

Understanding Multi-System Youth and their Patterns of Service Use

Final Report to the Stoneleigh Foundation

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EXECUTIVE SUMMARY

BACKGROUND

Many youth in Philadelphia face challenges at home, at school, and in their communities. Philadelphia's education, health and human service systems are, in turn, challenged to help these young people address a myriad of needs before they make the transition to adulthood. Recent attention by policymakers and researchers has focused in particular on the challenges of serving youth who are moving between and across service systems, often being served by multiple agencies simultaneously. While highlighting the complex needs of these youth, not all multi-system services involvement is negative or unplanned. Indeed, some system transfers are intentional and appropriate, and some youth who have needs in one domain, require support from other services as well. Nevertheless, multiple systems involvement may reveal a potential complexity to these intersecting problems, possible areas for collaboration between systems, and opportunities for leveraging public service investments to better serve vulnerable youth.

This study, commissioned by the Stoneleigh Foundation, is intended to take a close look at the nature and extent of multisystem services involvement of youth in Philadelphia. Access to administrative data maintained and integrated by the City of Philadelphia's health and human services agencies and by the School District of Philadelphia, make it possible to undertake a population-based examination of multisystem services use longitudinally. In other words, these records make it possible to identify a cohort of youth (in this case youth in grades 7-9 in the 2004-2006 school years), and to look at the proportion of them who experience multiple exposures to service system involvement in that period, and in which domains. Further, having identified them in this "index period," the integrated administrative data make it possible to look backwards at "antecedent" services use that may predict to multisystem involvement, and to look forward at "consequent" services use that may result.

Because each service system has its own "window" onto the experiences of youth, and sees its services through the vantage point of its own service system configurations, this study is organized according to the major departments with which these youth interact: the Department of Human Services, which has responsibility for both dependency and delinquency services; the Department of Behavioral Health Services; the Office of Supportive Housing, which has responsibility for emergency shelter for families; and the School District of Philadelphia which identifies youth who experience significant absenteeism (i.e. truancy) and which provides special education services. For our purposes, we focused on the most significant forms of service involvement, particularly experiences that involved out-of-home placements. So, while many youth may receive preventive child welfare services, or juvenile probation services, we examine here primarily those with placements out of their homes. Similarly, while we look at all users of mental health or family homeless services, we pay particular attention to youth with "heavy service use" patterns, including those with inpatient hospital stays and residential treatment, in the case of behavioral health, and repeated or lengthy shelter stays.

The four chapters provided here are organized according to a similar format. The users of a given service system are first identified with respect to their characteristics and the patterns of services use. Cluster analysis and other techniques are used to identify where different types of services use may reflect underlying differences in the population. Second, these various types of services users are

examined with respect to their multiple systems involvement, first looking at two systems users, and then three systems users, and so on. Each chapter also includes a multivariate analysis of a facet of multiple systems use that appeared to be of significant interest; for example, looking at youth who cross over between the child welfare to the foster care system.

PRIMARY RESULTS

Chapter 1: Youth in Dependent and Delinquent Care

This chapter examines youth in the study cohort (grades 7-9 in the 2004-2006 school years) who received services either in the child welfare (i.e., dependency services) or juvenile justice (i.e., delinquency services) systems that are administered by the City of Philadelphia's Department of Human Services (DHS). The chapter proceeds from first describing demographic and placement characteristics to building a typology, based upon patterns of placement histories with a focus on the frequency of placement and length of stay. These typologies for youth receiving dependency and delinquency services, important for better understanding the distinct service needs across subgroups of the youth, are extended by matching with records from the City of Philadelphia's school district (SDOP), Department of Behavioral Health and Intellectual disAbility Services (DBHIDS), and Office of Supportive Housing (OSH). The data matching allows examination of the extent to which youths in dependent care were involved in delinquent care and vice versa, and what proportion of the youth receiving dependency and delinquency services used other public services, including Medicaid-funded mental health services, absenteeism at schools, and homeless shelter stays. These analyses provide important information on the extent of crossover across public service systems for dependent and delinquent care, mental health, education, and homeless assistance, and also offer insight about the need of collaboration to reduce other service system involvement among the youth in dependent and delinquent care.

Youth in dependent care are those with substantiated neglect or abuse issues, and DHS's child welfare services include in-home preventive services, out-of-home placement, and adoption. This chapter focuses only on those youth with out-of-home placements, either in foster care or group homes and other institutional settings. It is these youth who have the most extensive needs for services and who, as a group, consume the highest volume and the most costly services in the child welfare system. The youth in dependent care included a total of 2,272 youth.

Youth receiving delinquent care, on the other hand, engaged in conducts which, if committed by an adult, would be criminal, and who are thus in need of treatment, rehabilitation and/or supervision services. Through its juvenile justice services, DHS operates the county juvenile detention center and manages delinquency services. The youth in the delinquency group in this chapter consisted of those who received out-of-home placements through DHS's juvenile justice services, and included a total of 2,764 youth.

The principle findings from this chapter include:

- Among the both groups, African Americans were heavily overrepresented and the majority of the youth had their first out-of-home care experience at age of 12 or older. The youth in the delinquency group were more likely than the youth in the dependency group to be male and less likely to have a history of foster care placement.

- The youth in dependent care during the index period (from September 2004 through August 2007) were clustered into three subgroups based on their placement characteristics. One cluster, short-term stayers, is composed of youth with an average of 4 placement changes and 26 months of stays in out-of-home care before, during, and after the index period. This cluster represents 55% of the youth. The second cluster, long stayers, has about 10 placement changes and 76 months on average in out-of-home care represents 33% of the youth. The third cluster, very long stayers, represents 12% of the youth and their average stay was over 160 months.
- The youth in delinquent care during the index period were classified into three distinct groups based on number of placement changes and length of stays. The short-term stayers represent 61% of the youth with an average of less than 3 placement changes and 22 months of stays in out-of-home care. The long stayers had on average about 11 placement changes and 65 months in out-of-home care. This group represents 37% of the youth. The very long stayers represent 3% of the youth.
- Youth in dependent care had very high rates of truancy over the observation period, with 70% in the pre-period, 36% in the index period, and 38% in the post-period. Their rate of delinquent care placement was 7% in the pre-period, 27% in the index period, and 14% in the post-period. The rate of sheltered homelessness was very low with the rate under 2%. The rate of having received intensive mental health services measured as inpatient care and residential treatment was 8% in the pre-period, 20% in the index period, and 9% in the post-period. The rate of other mental health service use was much higher, with 26% in the pre-period, 39% in the index period, and 25% in the post-period.
- Youth in delinquent care had rates of truancy of 73% in the pre-period, 38% in the index period, and 36% in the post-period. Their rates of dependent care placement were 10% in the pre-period, 22% in the index period, and then dropped to 5% in the post-period. Their rate of sheltered homelessness across the three time periods was under 2%. Their rates of receiving intensive mental health services were 6% in the pre-period, 19% in the index period, and 8% in the post-period. The rate of other mental health service use was much higher, with 23% in the pre-period, 36% in the index period, and 23% in the post-period.
- Approximately 40% of the youth in dependent care had a history of delinquent care. 24% of the youth had a history of receiving intensive mental health services. One out of ten youth in dependent care received both delinquent care and intensive mental health services. Overall, more than half of the youth (54%) were involved with at least two service systems out of the three.
- About one third of the youth in delinquent care had a history of dependent care. 23% of the youth had a history of receiving intensive mental health services. About 10% of youth in delinquent care received both dependent care and intensive mental health services. Among the three subgroups, the long and very long stayer groups were more likely to report multiple system involvement. Overall, half of the youth (50%) were involved with at least two service systems out of the three.
- Based on multivariate analyses, being male, case opening at 12 or older, having stayed in group home/institution, and frequent placement changes increased the likelihood of experiencing subsequent delinquent care among youth in the dependency group.

For youth in both types of care, the majorities fit into a services use pattern termed “short-term” stayers, although stays by youth in this group still averaged 26 months and 4 placement changes (dependency group) and 22 months and 3 placement changes (delinquency group). The rest of both groups averaged substantially longer stays – 76 months and 65 months for the “long stayers” that constitute about one-third of the dependency and delinquency groups, respectively; and the average of over 160 months (13 years!) for the 12% of the dependency group and 3% of the delinquency group who were classified as “very long stayers.”

Extending this typology to the other systems, the truancy rates for the period that preceded the study period were much higher than subsequent time periods for all clusters in both the dependency and delinquency groups. Given this, truancy can be considered a marker of dependent care placement and a common characteristic predictive of delinquent care involvement.

Rates of family shelter use for both groups were extremely low, to the point where there is little point in further considering this crossover. At least two reasons likely contribute to these findings. First, if the youth in both groups spend substantial amounts of time in out-of-home placements, this is likely to take on a latent role as a protective factor against homelessness. In other words, the institutional or foster care placements that these youth experienced may provide an alternative to family shelters. Second, the OSH shelters only cover family shelters, and records for youth and runaway shelters were unavailable. If youth this age were to become homeless, especially given tenuous family ties, they would presumably be more likely to either end up in such a facility or, alternately, to live in makeshift arrangements that would represent alternatives to any type of shelter.

The rates by which youth in these two groups received public mental health services are striking. During the index period, about one fifth of the each group received inpatient or residential treatment care and over one-third received other types of mental health services. Here the longer stay clusters have higher rates of services use as compared to the short-term stay cluster. Mental health issues likely impede exits from out-of-home placements, which in turn likely exacerbate mental health issues.

Cross-systems use within DHS was, not surprisingly, also relatively common. Looked at over the entire span of the study, approximately 40% of the youth in the dependency group had a history of being in the juvenile justice system, and about one-third of the youths in the delinquency group also were in the dependency group. There were no clear patterns to this by typology clusters, other than a high rate of very long stayers from the delinquency group also being in the dependency group. But this finding is likely an artifact of the way the group is structured, as the average stay of 13 years would suggest that they were too young to not have had some involvement in the dependency system prior to becoming involved with the juvenile justice system.

Putting this together, there is a tangible nexus found here between the child welfare, the juvenile justice and the public mental health systems for a substantial portion of the youth studied in both the dependency and the delinquency groups. For the youth in the dependency group, one out of ten of these youth received both delinquent care and intensive mental health services, and more than half of the youth (54%) were received services from at least two of these three service systems. On the delinquency side, the findings were similar. About 10% of the youth received both dependent care and intensive mental health services, and half of the youth (50%) were involved with at least two of the three service systems. Among the three subgroups, the long and very long stayer groups were more likely to report multiple system involvement.

Having established this strong link across systems, research should look further into the nature of this cross systems use. Examining the costs incurred by youth who make use of these three systems, the extent to which care between the systems is being coordinated, and the adult outcomes of these multi-system youth are three areas that can show whether there is a need to change the way these public services, which all are provided by public, municipal agencies, should be restructured. Finally, while these services are often necessary, making substantial reductions in services use for these multi-system youth also highlights the challenge of providing placements in stable, community settings for these youth, many of whom are presumably among the most difficult to place.

Chapter 2: Youth Using Public Behavioral Health Services

This study includes an overview of how youth aged 12-14 used public behavioral health services in Philadelphia and presents a set of criteria by which to identify youth as “heavy users” of these services in subsequent analyses in this study, whose overall goal is to examine the use of multiple public systems by youth in grades 7 through 9 in Philadelphia.

This study used cluster analysis to parse 3,315 youth who initially used these services during AY 2004 into six clusters based on their use in a two-year period of five different types of behavioral health services: inpatient psychiatric hospitalization; outpatient psychiatric services; community support services; behavioral health rehabilitation services; and residential treatment services. Highlighted findings here include:

- The largest cluster (58%) consisted of persons without extensive use of any of the services.
- This cluster typology provided a framework for identifying groups of “heavy users” of these services. Based on the clustering algorithms, minimum levels of use for these services were adapted as a set of criteria for heavy services use. Based on this, 21% of the study group were designated as “heavy users.” The costs associated with the four clusters upon which this designation was based were considerably higher than the costs for the remainder of the study group.
- This 21% of the study group designated as heavy users were found to consume 86% of the total costs associated with the claims.
- Based upon, and generalizing these heavy use criteria, a youth is considered to be a heavy user if he or she consumes, over a two-year period, at least one of the following levels of service:
 - 20 days of inpatient psychiatric hospitalization;
 - 42 days’ worth of community support services;
 - 92 contacts of behavioral health rehabilitation services; [or]
 - 25 days in a residential treatment services facility.
- Being in a heavy use cluster in the study period is associated with a higher likelihood of being a heavy services user in the time after the study period. This suggests, not surprisingly, that the types of services use that characterizes each of these four clusters will often extend for a longer period of time than what is covered by the study period.

- During the study period, two-thirds (66%) of the cohort met the truancy criterion of 25 unexcused absences during any year in the study period. This is somewhat higher than the rate for the pre-period (58%) and the post-period (60%). The truancy rates across all three time periods were substantially and significantly higher than those of the more general SDOP group. Large amounts of missing data and inability to control for other circumstances precludes, however, making any definitive conclusions on associations between receiving DBH services and truancy.
- Roughly one-third (34.5%) of the DBHIDS youth cohort were designated for some sort of special education, a proportion substantially and significantly higher than a comparison group. This overall proportion, as well as proportions for emotionally disturbed (6.9%) and specific learning disability (21.2%) categories, was also significantly and substantially higher than the comparison group. As with the truancy data, this analysis is done with large amounts of missing data does not control for any differences between groups besides records of DBHIDS involvement.
- Shelter use with families in the OSH system was low, with 2.1% of the overall cohort having a record of being in a shelter during the study period.
- In breaking down cross-systems services use by cluster, the group whose DBHIDS services use centers on residential treatment (RTF) stays had higher rates of special education placement into the emotionally disturbed category and higher rates of placements in both the DHS dependency and delinquency systems. Based on this, youth in the RTF cluster show the highest propensity among the clusters to show cross-systems use. Youth in the inpatient hospitalization cluster had higher rates of dependency placements than others in the cohort, and youth in the BHRS “wraparound” cluster had higher rates of special education, especially in the emotionally disturbed category.
- The predominant modes of cross-system use among this cluster were with the DHS dependency and delinquency systems. This is the locus of multi-system use among the DBHIDS youth cohort and the other services systems studied here.

This is a start for further exploration as to the degree to which services are currently coordinated across these systems and the extent to which collaborations can provide efficiencies in cost and outcomes for the youth in question. It is likely, in many of these cases, that children with primary ties to the DHS system are receiving placements in RTFs, instead of a similar DHS placement, in part due to the ability of DHS to “cost shift” the price of this care so that state Medical Assistance benefits for behavioral health, administered by the City of Philadelphia, becomes the payment source. Whether this is the most efficient and effective means to provide these services is also a topic for further research suggested by these findings.

Chapter 3: Youth Using Family Homeless Shelters

This study examined shelter use patterns and use of other services, mainly over a three-year period, by youth aged 12 to 15 in 2004 who spent time (with their family) in a Philadelphia OSH family shelter in

the academic years 2004 through 2006. The chapter examined shelter use patterns in one part and the use of other services in a second part.

Key findings from the analysis of demographics, family composition, and shelter experiences of the OSH cohort include:

- Twenty-seven percent (n=216) of the youth in this study group stood to be impacted particularly severely by their shelter experiences, which were either of an extended (23%) or repeated (4%) nature.
- There were 794 sheltered youth in 691 sheltered families. Households for youth in the OSH cohort tended to be bigger than average family households staying in OSH shelters. Most youth were in a single parent household with 3.3 children.
- Most youth and their families did make sustained exits from shelter use during the study period. However, 9% of the long-term cluster and 24% of the episodic cluster did experience additional shelter stays in the period following the study period.

Key findings from the analysis of cross-systems services use by the OSH cohort include:

- During the study period, nearly three-quarters of the OSH cohort (74%) were considered truant. This was both extensive and at a higher level than the large group of housed school district students used for a comparison group. Large amounts of missing data and inability to control for other circumstances precludes, however, making any definitive conclusions on the impact of shelter stays on truancy.
- One quarter of the OSH youth cohort was in some type of special education, and the rates of youth in this cohort who received special education services by virtue of being emotionally disturbed (5.6%) or with a specific learning disability (15.8%) was significantly higher than the comparison group.
- Over one-third (36%) of the overall OSH cohort also had some type of DBHIDS services during the study period. The overall rates for the periods preceding the study period (22%) and following the study period (30%; 7th graders only) were lower but were still high. Ten percent of the youth spent time in residential treatment or inpatient hospital settings during the study period.
- Small but substantial proportions of the youth cohort had involvement with DHS dependency (6%) and delinquency (5%) services during the study period.
- In addition to their shelter stay, 29% of the OSH youth cohort had a record of involved in one or more of the following systems: a DHS dependency or delinquency placement, a DBHIDS residential treatment or inpatient hospital stay, or placement in special education during the study period. Eight percent used at least any two of these systems.
- A substantial minority of the shelter youth (9% or 68 out of 794 persons) were considered heavy users by their extensive use of either DHS or DBHIDS services in addition to their being sheltered as part of a family. Additionally, this group had much higher levels than the rest of the cohort of placement in special education as emotionally disturbed.

- Despite being only 9% of the overall cohort, the heavy user designation mentioned in the last bullet was inclusive of the large majority of the multi-system users. This means that, in addition to their shelter use they also made extensive use of either child welfare and/or mental health services. Further analyses into this group shows that these “heavy users” also are disproportionately more likely to receive special education services as emotionally disturbed, and over half of them (56%) have services records in two or more of the four systems (beyond shelter) that were examined.

Any focus on multi-systems youth among the family shelter population would target this subset of the cohort. These youth appear to make substantial use of the different services examined here, in many cases across multiple systems. While definitive cost data was not available here, the available data suggest that services costs (including shelter) for many easily exceeded \$100,000 over the course of the three year study period.

There is no apparent relationship between shelter stay patterns and heavy services use. Slightly more youth who were identified as heavy users (78%) than others in the cohort (72%) had short-term, transitional shelter use patterns. This suggests that, while there is no evidence here that a “dose-response” effect, where shelter leads to increased services use in other systems, is present, a sizable minority of youth who are in sheltered households are troubled, based on their interactions with these systems, and shelter may offer an intervention point for these youth. While these youth are substantially involved in other systems, the extent to which this services use is coordinated across systems is unclear and, if not, efforts to coordinate these services for better and more cost efficient outcomes should be explored as a follow up to these results.

Chapter 4: Youth And School System-related Outcomes

This chapter looks at youth who were, according to School District of Philadelphia (SDOP) records, in grades 7 through 9 in the 2004-05 academic year (AY). There are three primary foci to this chapter. The first is on the prevalence and distinct patterns of school absenteeism among the study group. Second, this chapter also assesses whether different trajectories of school absenteeism are associated with multi-system service involvement across four municipal services systems. Finally, service-engaged youth with disabilities will be specifically identified within each service system. From the standpoint of special education, this project also highlights the association between disabilities and the involvement of other service systems.

The key findings of this chapter include:

- Five clear trajectory patterns on the basis of yearly unexcused absence over the three-year index period were identified. Approximately 75% of students have a stable-low group trajectory pattern over the entire index period. On the other hand, those experiencing the four other trajectory patterns stand to be at risk for poor educational and social outcomes over the index period.
- In the index-period over 8.2% of students were involved in any single service system. Delinquent and dependency care systems were the two most common systems that middle-school students engaged in, at 4.6% and 2.9 %, respectively. Approximately 2% of youth had intensive

involvement in the mental health care system. Less than 1% of youth were involved in the homeless shelter system.

- For students with identified trajectories of school absenteeism, the “high-decreasing-to-low” and “moderate-increasing-to-high-decreasing-to-low” are the two trajectory groups that had higher rates of service system utilization in pre, index, and post-periods.
- The descriptive analyses shows that students with “high-decreasing-to-low”, “stable-moderate”, “increasing-to-moderate-to-high”, and “moderate-increasing-to-high-decreasing-low” trajectory patterns had higher rates of single system and multi-system service use over the pre, index, and post periods.
- The findings from the regression models consistently show that students with “high-decreasing-to-low”, “stable-moderate”, “increasing-to-moderate-to-high”, and “moderate-increasing-to-high-decreasing-low” trajectory patterns have increased odds of involvement in any service system, including dependency care, delinquency care, homeless shelter care, and mental health care, when compared to the “stable-low” group. The “high-decreasing-to-low” trajectory group, in particular, appears to approximately double the rates of receiving any system service, except homeless shelter care. Consistent predictive patterns were also found in the typology models of school absenteeism predicting the number of services utilized (no system, single-, and multi-system).
- Students with emotional disturbance received the highest rates of dependent care, delinquent care, and mental health care. Students with learning disabilities and intellectual disabilities also had higher rates of involvement in the dependent care, delinquent care, and mental health systems.
- Students with emotional disturbance had the highest rates of multi-system service involvement.
- While controlling for child and family characteristics, students with emotional disturbance, learning disabilities, intellectual disabilities, and language disorders are more likely to be involved in any service system, including dependency care, delinquency care, homeless shelter care, and mental health care, when compared to students without disabilities.

This chapter stands as a broad outline for using absenteeism to identify particularly at risk students. Ironically, a student’s distancing himself or herself from the school system indicated a higher risk for participation in other systems. The relationship between absenteeism and service need is likely complex and multifaceted, and is beyond the scope of the data available for this study. Absenteeism is unlikely to be a major cause for needing these services, but is likely to exacerbate these needs and, more importantly, serve as a warning sign to help identify those students who have needs that demand services intervention. What is striking is how the four absentee trajectories, and particularly the high-decreasing-to-low trajectory, are associated with higher risk for services use across the four services systems. This includes systems such as mental health and public welfare services, which are ostensibly desirable linkages if absenteeism indicates family or a mental health issues, but it also indicates elevated risk for juvenile justice and shelter services, systems for which it is generally desirable to prevent engagement. This is particularly the case with juvenile justice (delinquency) services, in which 14% of the youth in the high-decreasing-to-low trajectory participated during the index period (compared to 4.6% of the overall group). If there is a goal suggested in this study, it would not be to decrease the

overall services participation rate but to move the distribution of this rate away from juvenile justice and homelessness and more towards mental health and child welfare.

Disability, identified through the need for special education services, also showed significant associations with the likelihood of receiving services in other systems. Particularly high likelihood was associated with emotional disturbance, for whom one-third had services use in other systems (33%, compared to 8.2% for the overall group), and a more modest, but still elevated likelihood for those with learning disabilities (13.2%). As with (and perhaps more so) as with the absenteeism findings, such service participation is not uniformly undesirable. If a student is receiving school-based services for being emotionally disturbed, it should be expected that he or she has a higher likelihood of engagement with the mental health system and the 7.8-fold greater odds of he or she doing so is a positive finding. But emotional disturbance is also associated with a 4.5-fold greater odds of being in the juvenile justice system, which is clearly an undesirable outcome. Having learning disabilities follows a similar but more muted trend. Both of these disabilities also have a significant and substantial association with receiving services in more than one system, which means that their services constellations across systems will tend to be complex and expensive, and likely mixing positive interventions such as mental health and child welfare services with negative interventions such as juvenile justice and shelter. This chapter, in making these connections, makes an initial step towards understanding and more effectively intervening in the services use of such students.

CONCLUSION

This report examines multi-system services use by Philadelphia youth who were in grades 7 through 9 during the 2004-05 school year. Each of the chapters in this report examines this subject from the perspective of a different system, and each has particular insights as to the dynamics of this multi-system services use. The results presented here, based upon matching an array of administrative records, provide an initial reconnaissance into the nature and extent of such multi-systems use, and in many cases indicate areas upon which to focus for policy and practice interventions, as well as for further research.

CHAPTER 1: YOUTH IN DEPENDENT AND DELINQUENT CARE

1. INTRODUCTION

This chapter focuses on youth in grades 7 through 9 who have received dependency and delinquency services from Philadelphia's Department of Human Services (DHS). For both groups of youth, this chapter first describes their demographic and placement characteristics. Then, again for both groups, it introduces a typology based on their use of dependency and delinquency services. This typology then becomes the basis for examining differences in demographic and service use characteristics. Ultimately, this chapter then assesses whether such typologies can be used to better understand the distinct service needs across subgroups of the youth, both within the child welfare (i.e., dependency) and juvenile justice (i.e., delinquency) systems and across several other systems.

This chapter used DHS administrative records as a basis for identifying the youth in dependent and delinquent care and ascertaining their placement histories. DHS data include information on demographic characteristics (e.g., sex, gender, age) and placement characteristics (e.g., date of services, type of care, service category, provider type, placement settings, reasons of exit) for both dependent and delinquent care. These records were also matched with records from the School District of Philadelphia's (SDOP), the City of Philadelphia's Department of Behavioral Health and Intellectual disability Services (DBHIDS), and City of Philadelphia's Office of Supportive Housing (OSH).

The methods used for analysis in this chapter start with descriptive analyses that describe the demographic and service characteristics of the samples. Next, for each of the dependency and delinquency groups, cluster analysis methods are used to parse each group of youth (dependent and delinquent) based upon services patterns. The matched records are then used to determine the proportion of youth in the dependency and delinquency groups with Medicaid-reimbursed mental health services, absenteeism in schools, and sheltered homelessness during the index period, as well as for the time periods preceding and following the index period. Lastly, logistic regression was the basis for modeling the association between demographic and placement characteristics (from the DHS data) and mental health service use, absenteeism, and sheltered homelessness outcomes from the other services systems.

Taken together, matching these data, both across delinquency and dependency services, and with the other services systems just mentioned, allows for an integrated assessment of services use across these multiple systems. These analyses promise insights on the extent to which youth receiving dependency and delinquency services use services in other these systems, and whether their services use patterns in the dependency and delinquency systems are associated with patterns of services use in other systems.

2. USE OF CHILD WELFARE AND JUVENILE JUSTICE SERVICES

2.1. Introduction and Research Questions

DHS provides services for both dependent and delinquent children and youth through its child welfare and juvenile justice systems, respectively. Youth in the dependency group are those with substantiated neglect or abuse issues, and DHS's child welfare services include in-home preventive services, out-of-home placement, and adoption. This chapter focuses only on those youth with out-of-home placements,

either in foster care or group homes and other institutional settings. It is these youth who have the most extensive needs for services and who, as a group, consume the highest volume and the most costly services in the child welfare system.

The youth in the dependency group in this chapter consisted of those who were in grades 7 through 9 in 2004-05 school year and who received out-of-home, child welfare services through DHS during the 3-year period from September 2004 through August 2007. This time period is hereafter referred to as the index period. Grade status was determined by age, so the youth were picked based on being born between September 1989 and September 1992. The sample of youth in the dependency group included a total of 2,272 youth.

Youth in the delinquency group, on the other hand, engaged in conducts which, if committed by an adult, would be criminal, and who are thus in need of treatment, rehabilitation and/or supervision services. Through its juvenile justice services, DHS operates the county juvenile detention center and manages delinquency services. The detention center provides temporary care, custody, and control for alleged and adjudicated delinquents age 13 and over, who are awaiting court action. Delinquent services are designed to help youth with histories of truancy, youth with minor charges and no adjudication in Family Court, and others with a high risk of delinquency.

The youth in the delinquency group in this chapter consisted of those who received out-of-home placements through DHS's juvenile justice services aforementioned index period and who, in the same manner as the dependent youth group, were determined as being in grades 7 through 9 during the 2004-05 school year. The dependent youth sample included a total of 2,764 youth.

This section of the chapter provides more detail about demographic characteristics and services use patterns of the youth in the dependency and the delinquency groups, and constructs a typology based on services use. This typology is explored within the two DHS domains (dependency and delinquency) and will be applied to other services systems in the Section 3 of this chapter.

The specific research questions that guide the analyses in this section are:

1. Are there identifiable patterns out-of-home placement among youth in the dependency and delinquency groups ages 12-15 that can be used as the basis for a working typology to identify heavy users of these services?
2. Based on the typology outlined in question #1, are there differences in the demographic and service use characteristics among youth in the dependency and delinquency groups?

2.2 – Demographics and Services Use History

Table 1 reports demographic and service characteristics among the youth receiving dependency and delinquency services. Among the 2,272 youth who received dependency services, 54% were male. African Americans were heavily overrepresented in this group, comprising more than 80% of the youth. 8% were identified as Latino. The majority of the youth entered the DHS care after the age of 12. When the distribution of age at the first case opening is broken down, over 60% had their first case opening at the age 12 or older while 20% did so between the ages of 6-11 and additional 20% at the age of 5 or younger. History of both foster care placement and group home/institution placement were very common in this group with 64% having been placed in a foster care setting and 88% in a group home/institutional setting.

Of the 2,764 youth receiving delinquency services, 77% were male. African Americans and Latino comprised 77% and 11% of the youth, respectively. Two third of the youth in the delinquency group had their first case opening at age 12 or older. More than 80% of the youth have been placed in a group home/institution setting while 21% have stayed in a foster care setting.

Comparing these results, those youth in the delinquency group were more likely to be male and less likely to have a history of foster care placement than the youth in the dependency group.

Table 1. Characteristics of youth in the dependency & delinquency groups

	Dependency Group (N=2,272)	Delinquency Group (N=2,764)
Male	54%	77%
African American	81%	77%
Latino	8%	11%
Age at case opening		
- 0-5	19%	24%
- 6-11	20%	8%
- 12 or older	60%	68%
History of placement^a		
- Foster care	64%	21%
- Group home/Institution	88%	82%

^a Not mutually exclusive.

Table 2 presents demographic and placement characteristics among only the youth in both groups who were placed in out-of-home care for the first time during the index period. Of the 2,272 youth receiving dependency services, approximately one third (n=803) were placed in out-of-home care for the first time from September 2004 through August 2005. Among these first timers, nearly half were male, 73% African American, and 10% Latino. While less than half of the first timers have stayed in a foster care setting, nearly 90% have experienced a stay in a group home/institution setting. The average number of placement changes and the average length of stay during the first spell of out-of-home care were 2.3 and 26 months, respectively.

Table 2. Characteristics of youth in the dependency & delinquency groups who were for the first time placed in out-of-home care from September 2004 through August 2005

	Dependency Group (N=803)	Delinquency Group (N=828)
Male	49%	76.1%
African American	73%	74.0%
Latino	10%	15.1%
Age at case opening - 12 or older	100%	100.0%
History of placement^a		
- Foster care	42%	7.9%
- Group home/Institution	87%	100.0%
Number of placement changes	2.3	1.5
Length of stay (mean)	26 months	38 months

^a Not mutually exclusive.

Of the 2,764 youth receiving delinquency services, about three out of ten (n=828) experienced their first time out-of-home placement from September 2004 through August 2005. Among those first timers 76% were male, 74% African American, and 15% Latino. Only 8% of those youth stayed in a foster care setting, whereas a stay in a group home/institution setting was universal. The average number of placement changes and the average length of stay during the first spell of out-of-home care were 1.5 and 38 months, respectively.

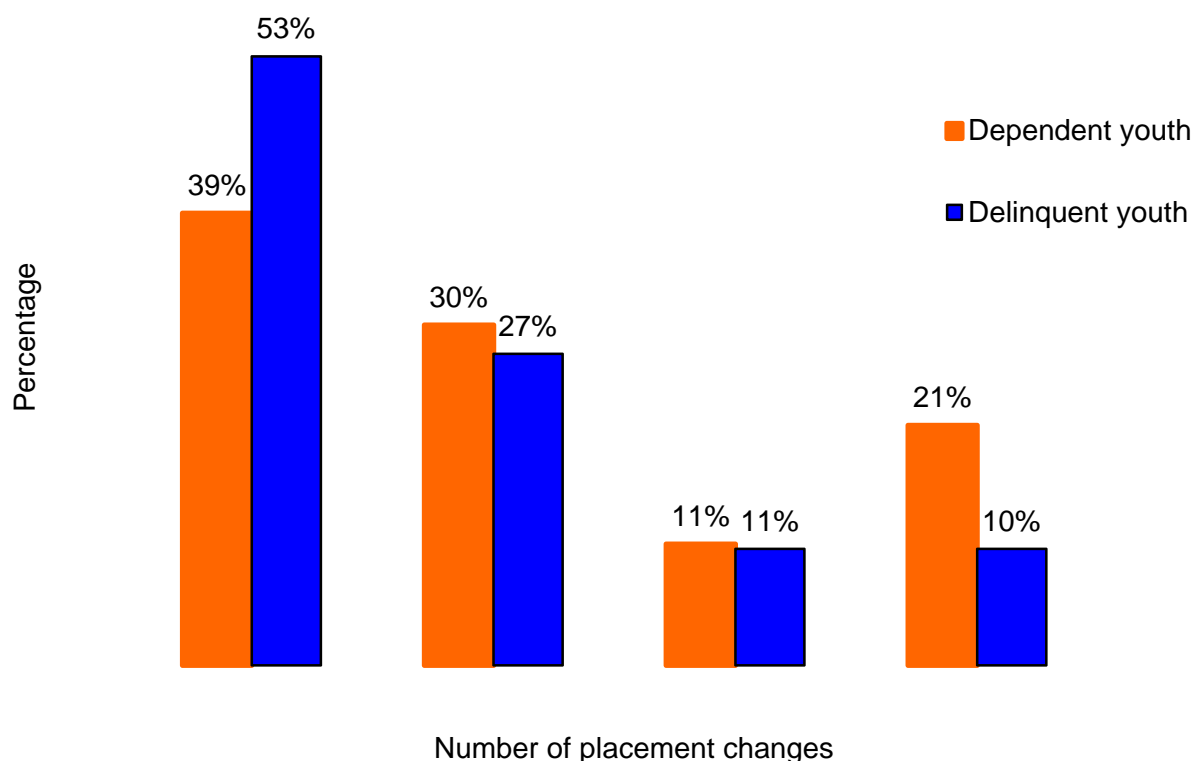
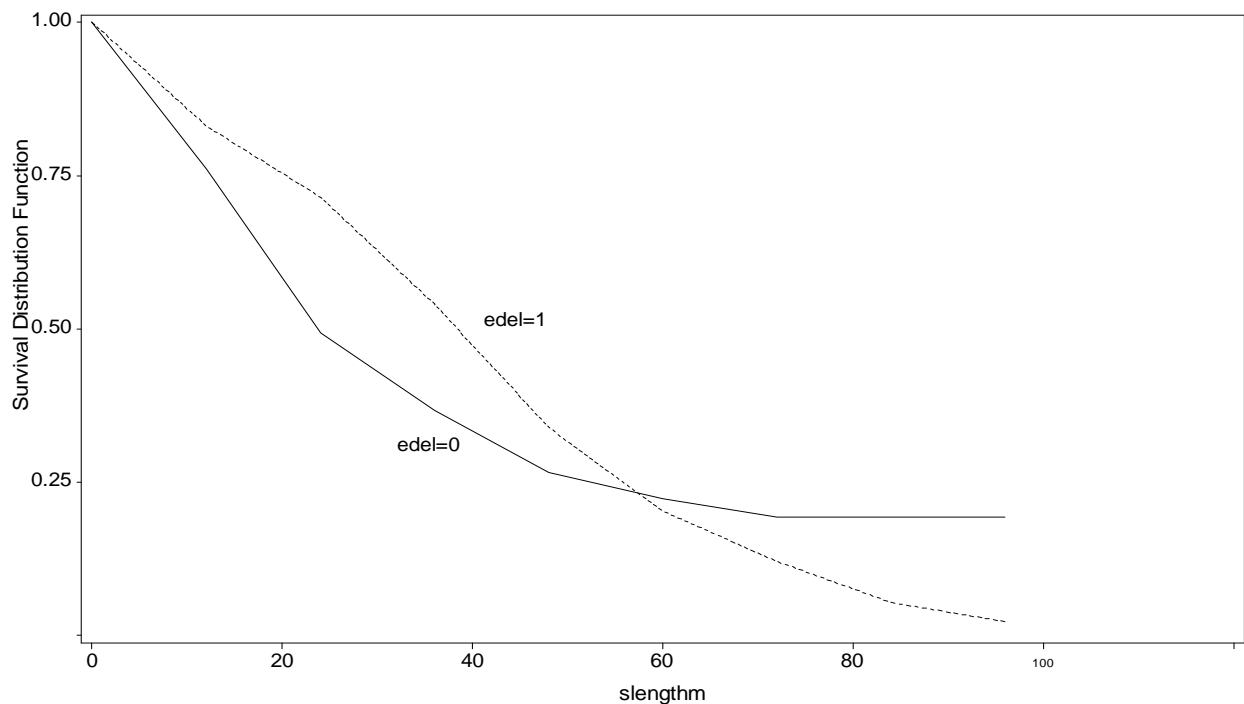


Figure 1. Number of placement changes among youth in the dependency and delinquency groups who were initially placed in out-of-home care from September 2004 through August 2005

Looking at placement changes in more detail, 53% of youth in the delinquency group experienced no placement change during their first spell in out-of-home care, compared to 39% among the youth in the dependency group. The percentage of those who experienced 5 or more placement changes was 2 times greater for the dependent group (21% vs. 10%). Figure 1 illustrates these differences.

Survival curves in Figure 2 displays the probability of exiting out-of-home care for each group of youth, after having been placed in out-of-home care. In this figure, “survival” means remaining in out-of-home care and an exit means going to a permanent placement that could include adoption, reunification with birth family, or legal guardianship. Before the 60-month point, the probability of exiting out-of-home

care was greater for the dependent group. However, the curves cross at this point and, among those who were in out-of-home care for longer than 5 years (i.e., 60 months), those receiving delinquency services had a higher probability of exiting to permanency than those in the dependency group. The differences in the two curves is indicative of the different dynamics involved with out-of-home placements in the child welfare and juvenile justice systems. In the former, exits to permanency are based on either reunification or placement to alternative, permanent households and those who receive such placements are more likely to receive them earlier in the tenure of out of home placement. According to Figure 2, after about 70 months those youth who did not get placed had almost no chance of subsequently receiving a placement. In juvenile justice services, the out-of-home placement is for a fixed period of time, whereupon most are released to an in-home setting. This release process is much steadier, over time, as almost everyone placed in a delinquency facility eventually will exit out-of-home care.



Note. "edel=0": dependent youth, "edel=1": delinquent youth.
"lengthm": number of month in out-of-home care

Figure 2 Survival curves for youth placed in out-of-home care for the first time: Achieving permanence by dependence and delinquency

2.3. Typologies Based Upon Services Use

The services use measures, which were reported in Subsection 2.2, are now used as the basis for constructing separate typologies for the dependency and delinquency groups. These typologies will be constructed through use of cluster analysis. Cluster analysis assigns observations to groups specified by a systematic procedure based on the values of the clustering criteria. Here the analysis was based on two criteria, length of out-of-home placement stays and number of placement changes in either the child welfare (for the dependency group) or juvenile justice (for the delinquency group) systems. With two clustering criteria, the end result is analogous to looking at a graph where a point is charted for each observation based on the coordinates of the two criteria, and then having circles drawn around groups of proximal points to form the clusters. There is no “natural” grouping of clusters; instead, the number of cluster groups is set by the researcher based on issues such as fit and parsimony.

2.3.1. Youth in the Dependency Group

Table 3 reports cluster analyses results for the youth who were in dependent care during the index period. These youth are parsed into three clusters based on their length of stay in out-of-home placement and the number of placement changes experienced during their stays. One cluster, labeled as short-term stayers, was composed of youth with an average of 4 placement changes and 26 months of stays in out-of-home care (before, during, and after the index period). This cluster represented 55% of the youth. The second cluster, labeled as long stayers, had about 10 placement changes and 76 months on average in out-of-home care. This group represented 33% of the youth. The third cluster, very long stayers, represented 12% of the youth and their average length of stay was over 100 months in out-of-home care.

Table 3. Cluster characteristics for the youth in the dependency group (N=2,272)

	Short-term Stayers	Long Stayers	Very Long Stayers	Total
Number of cases	1256	749	267	2,262
Total days in care	986,617	1,720,496	1,297,714	4,004,827
Average number of placements	4.2	10.8	17.3	7.9
Average number of months	25.7	76.1	161.5	58.2
Percentage of clients	55	33	11	100
Percentage of total days in care	25	43	32	100

2.3.2. Youth in the Delinquency Group

Table 4 reports cluster analyses results for the youth who were in delinquent care during the index period. In the same manner as the youth in the dependency group, this group was classified into three distinct groups based on length of out-of-home placement stay and the number of placement changes. The short-term stayers represented 61% of the youth with an average of less than 3 placement changes and 22 months of stays in out-of-home care (before, during, and after the index period). The long

stayers had on average about 11 placement changes and 65 months in out-of-home care. This group represented 37% of the youth. The very long stayers represented 3% of the youth.

Table 4. Cluster characteristics for the youth in the delinquency group (N=2,764)

	Short-term Stayers	Long Stayers	Very Long Stayers	Total
Number of cases	1681	1015	68	2764
Total days in care	1,112,129	1,980,844	339,311	3,432,284
Average number of placements	2.7	10.9	16.7	6.0
Average number of months	21.5	64.5	165.8	40.9
Percentage of clients	61	37	3	100
Percentage of total days in care	32	58	10	100

2.4. Demographic and Service Use Differences across Typologies

2.4.1. Youth in the Dependency Group

Table 5 shows that, among the typologies just introduced, the long and very long stayers groups were more likely to be male and African American, and had a history of staying in both foster care and group home/institution settings. The short-term stayers were much more likely than other two groups to have a case opening at age 12 or older.

Table 5. Demographic and placement characteristics by cluster for the youth in the dependency group (N=2,272)

	Short-term Stayers	Long Stayers	Very Long Stayers
Male***	50%	56%	69%
African American***	76%	84%	95%
Latino*	8%	10%	4%
Case opening at 12 or older***	83%	44%	3%
History of placement^a			
Foster care***	47%	80%	99%
Group home/Institution***	83%	94%	94%

^a Not mutually exclusive

* p<.05; *** p < .001 (based on chi-square test of difference between groups)

2.4.2. Youth in the Delinquency Group

As reported in Table 6, males and African Americans were more likely to fall into the long and very long stayer groups. Only few Latino youth were classified into the very long stayer group. Youth with a history of longer stays were more likely to have experienced both foster care and group home/institution settings.

Table 6. Demographic and placement characteristics by cluster for youth in the delinquency group (N=2,764)

	Short-term Stayers	Long Stayers	Very Long Stayers
Male***	70.7%	86.7%	88.2%
African American***	72.6%	83.2%	98.5%
Latino*	12.2%	10.6%	1.5%
Case opening at 12 or older***	65.9%	75.2%	10.3%
History of placement^a			
Foster care***	9.9%	32.8%	98.5%
Group home/Institution***	71.0%	99.9%	100.0%

^a Not mutually exclusive

* p<.05; *** p < .001 (based on chi-square test of difference between groups)

2.5. Section Summary

Section 2 reviewed demographic characteristics and stay dynamics for youth in grades 7 through 9 who received DHS services either in the context of child welfare (dependency group) or juvenile justice (delinquency group). Additionally, this subsection grouped the 2,272 youth in the dependency group and the 2,764 youth in the delinquency group into clusters as part of a typology based on stay dynamics. Key findings from these analyses include:

- Among the both groups, African Americans were heavily overrepresented and the majority of the youth had their first out-of-home care experience at age of 12 or older. The youth in the delinquency group was more likely than the youth in the dependency group to be male and less likely to have a history of foster care placement.
- The youth who were in dependent care during the index period (from September 2004 through August 2007) were clustered into three subgroups based on their placement characteristics. One cluster, short-term stayers, is composed of youth with an average of 4 placement changes and 26 months of stays in out-of-home care before, during, and after the index period. This cluster represents 55% of the youth. The second cluster, long stayers, has about 10 placement changes and 76 months on average in out-of-home care represents 33% of the youth. The third cluster, very long stayers, represents 12% of the youth and their average stay was over 160 months.
- The youth who were in delinquent care during the index period were classified into three distinct groups based on number of placement changes and length of stays. The short-term stayers represent 61% of the youth with an average of less than 3 placement changes and 22 months of stays in out-of-home care. The long stayers had on average about 11 placement changes and 65 months in out-of-home care. This group represents 37% of the youth. The very long stayers represent 3% of the youth.
- Cluster analyses generated three similar subgroups for both the dependency and delinquency groups. Among both groups, the long and very long stayers were more likely to be male and African American.

Those youth in both groups who were among the longer stayers used a disproportionate amount of DHS resources. In the next subsection, the focus will be on their use of services across DHS service types

(dependency youth in delinquency services, and *vice versa*), as well as in three other service systems, and whether these typologies also are useful for assessing services use in these systems.

3. SERVICES USE ACROSS OTHER SYSTEMS

3.1. Introduction and Research Questions

Following this examination of services use and demographic characteristics within each of the two DHS domains – child welfare and juvenile justice, the focus now turns to the use of services in the other DHS domain and across three other systems by the youth who were in the dependency and delinquency groups in Subsection 2. This expanded use of services is also now followed across an expanded time period as well.

More specifically, this section will look at the extent to which youth in this cohort:

1. Used services across the other DHS service system. This means the extent to which youth receiving dependency services also used delinquency services, and *vice versa*;
2. Had absentee records warranting a truancy designation, as per records from the School District of Philadelphia (SDOP);
3. Homeless; as per shelter records from the City of Philadelphia’s Office of Supportive Housing (OSH);
4. Were provided with behavioral health services; as per records from the City of Philadelphia’s Department of Behavioral Health and Intellectual disAbility Services (DBHIDS);

The examination of these uses of other service systems occur in the study period, which covers academic years (AY) 2004-2006 (September 2004 through August 2007); the three-year period immediately preceding the study period (AY 2001-2003); and the three-year period immediately following the study period (AY 2007-2009). School district data is only available through AY 2008.

Specific research questions that frame this part include:

1. What is the prevalence of other public service use of youth receiving dependency and delinquency services before, during, and after the index period?
2. What is the extent of the youth involved with multiple public service systems, including absenteeism at schools, dependent care, delinquency, mental health services, and homelessness?

3.2. Services Use across Other Systems for Youth in the Dependency Group

Table 7 shows rates of truancy in the SDOP system; rates of services use across the DHS delinquency system; rates of OSH family shelter use; and rates of DBHIDS services use. The truancy measure for the SDOP reflects how many youth with school records had at least 25 days of unexcused absences over the course of any school year during one of the three periods (pre-index period, index period, and post-index period). The DBHIDS rates are broken down into proportions which had an inpatient or residential treatment facility stay during one of the three periods, and a record of any other stay during one of the three periods.

The youth in the dependency group had a very high rate of truancy over the observation period. The rate was 70% in the pre-period, 36% in the index period, and 38% in the post-period. It is intriguing to see that truancy is highest in the pre-period. Although the finding does not indicate causality between truancy and dependent care placement, truancy at schools is clearly a marker of the youth in dependent care.

The finding shows a close link between dependent and delinquent care. The rate of delinquent care placement among the youth in the dependency group was 7% in the pre-period, 27% in the index period, and 14% in the post-period. This result implies that the placement in dependent care may be a predictor of a subsequent involvement with delinquent care.

The rate of sheltered homelessness is low with the rate of 2% in the index period and an even lower percentage in the post-period. This finding can be in part related to the fact that although adolescents have a presence in the shelter system, they are very underrepresented and hard to serve in shelters.

A considerable number of the youth in the dependency group received DBHIDS mental health services. For intensive mental health services measured as inpatient care and residential treatment, the rate was 8% in the pre-period, 20% in the index period, and 9% in the post-period. The rate of other mental health service use was higher, with 26% in the pre-period, 39% in the index period, and 25% in the post-period. The rates of both intensive and non-intensive mental health services were much higher during the index period. This may be related to a greater access to Medicaid and more exposure to stressors related to out-of-home placement during the index period.

Table 7. Other public service use of youth in the dependency group before, during, and after the index period

Types	Pre-period					Index period					Post-period				
	Abs	Del	Hom	MH		Abs	Del	Hom	MH		Abs	Del	Hom	MH	
				Inp/Rt	Oth				Inp/Rt	Oth				Inp/Rt	Oth
Short-term stayers	75%	7%	NA	6%	24%	40%	26%	2%	18%	39%	35%	10%	0.3%	7%	22%
Long Stayers	63%	10%	NA	8%	28%	32%	30%	2%	21%	39%	40%	21%	0.3%	11%	30%
Very long Stayers	61%	5%	NA	13%	33%	31%	22%	2%	23%	43%	44%	13%	0.4%	12%	30%
Total	70%	7%	NA	8%	26%	36%	27%	2%	20%	39%	38%	14%	0.3%	9%	25%

Note. Abs = truancy, Del = delinquent care, Hom = sheltered homelessness, Inp/Rt = inpatient hospitalization or residential treatment, Oth = other mental health services (e.g., outpatient, case management, wraparound etc.)

Figure 3 graphically illustrates the differential rates in other public service use across the three subgroups. The findings are those shown in Table 3, but showing them in this format facilitates comparisons between the typology groups. No particular pattern by cluster was observed for truancy. It is notable that long stayers, when compared to others, were more likely to be involved with delinquent care across the observation period. A longer stay in dependent care increased the likelihood of receiving mental health services.

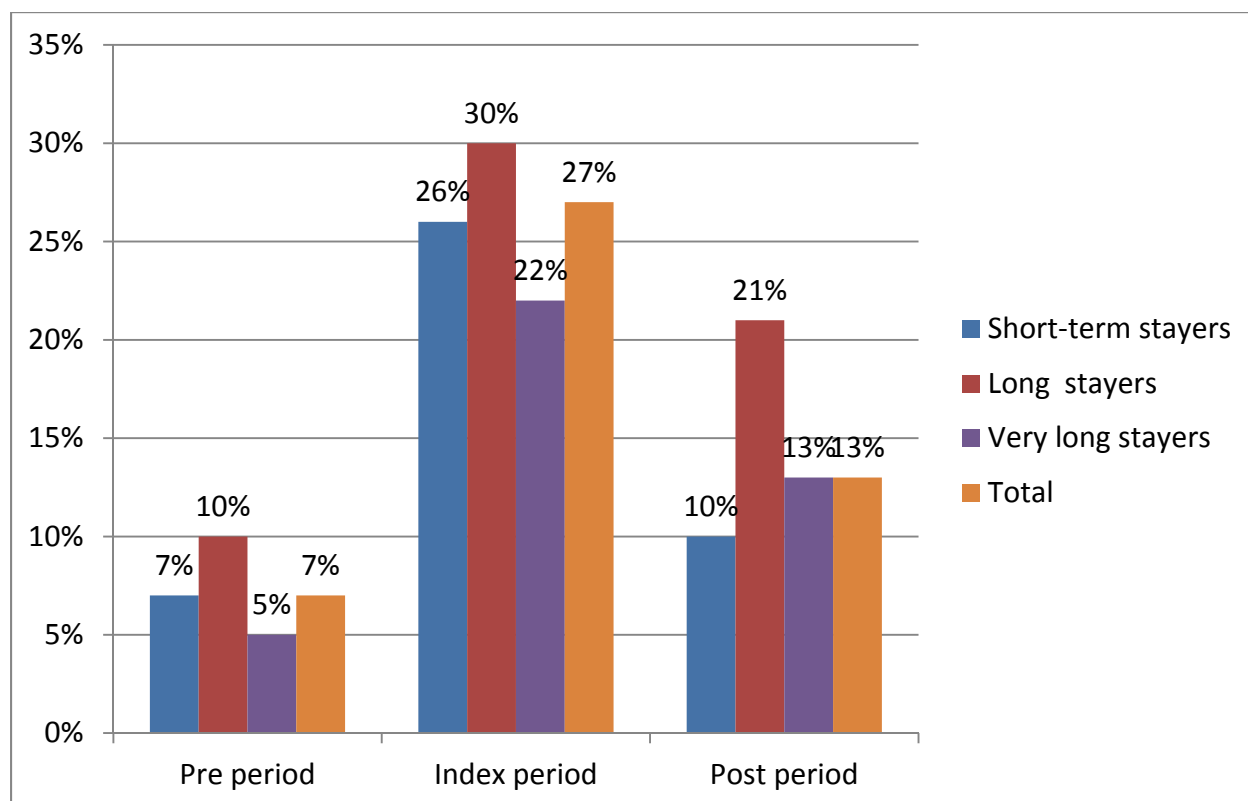


Figure 3. Proportion of youth in the delinquency group with a history of delinquent care by clusters before, during, and after the index period (N=2,262)

Table 8 provides a more in-depth examination of the characteristics of the youth in the dependency group and potential associations between these and a history of delinquency involvement. Overall, 40% the youth had a history of delinquent placement: 27% during or after the index period and 13% before the index period. Being male, the first case opening at age 12 or older, being in a group home/institution setting, and frequent placement changes were associated factors for having a delinquency history during or after the index period. Those with a stay in a foster care setting were less likely to have a delinquency involvement.

Table 8. Characteristics of youth in the dependency group with and without a history of delinquency (N=2,272)

	Without Delinquency	Delinquency during/after Index Period	Delinquency before Index Period
Male***	46%	64%	27%
Black Race	80%	83%	82%
Latino	8%	9%	10%
12 or older at 1st case opening***	54%	70%	72%
Ever being in foster care***	74%	52%	43%
Ever being in group home***	47%	77%	82%
No. placement changes***	7.3	9.2	8.1
Length of stay (month)	61	57	49
N	1,367	615	290
%	60%	27%	13%

*** $p < .001$ (based on chi-square test of difference between groups)

3.3. Services Use across Other Systems for Youth in the Delinquency Group

Table 9. Other public service use of youth in the delinquency group before, during, and after the index period

Types	Pre-period					Index period					Post-period				
	Abs	Del	Hom	MH		Abs	Del	Hom	MH		Abs	Del	Hom	MH	
				Inp/Rt	Oth				Inp/Rt	Oth				Inp/Rt	Oth
Short-term stayers	72%	4%	NA	5%	21%	41%	17%	2%	14%	34%	38%	2%	0.0%	6%	21%
Long Stayers	74%	18%	NA	7%	26%	33%	27%	1%	26%	40%	32%	18%	0.3%	12%	26%
Very long Stayers	85%	47%	NA	16%	34%	29%	47%	3%	29%	41%	37%	20%	1.5%	19%	35%
Total	73%	10%	NA	6%	23%	38%	22%	2%	19%	36%	36%	5%	0.1%	8%	23%

Note. Abs = truancy, Del = delinquent care, Hom = sheltered homelessness, Inp/Rt = inpatient hospitalization or residential treatment, Oth = other mental health services (e.g., outpatient, case management, wraparound etc.)

Here the cross-system use for youth in the delinquency group is reported in a manner that mirrors Subsection 3.2 where these results were reported for youth in the dependency group. Table 9 shows rates of truancy in the SDOP system; rates of services use across the DHS delinquency system; rates of

OSH family shelter use; and rates of DBHIDS services use. As in Table 7, the truancy measure for the SDOP reflects how many youth with school records had at least 25 days of unexcused absences over the course of any school year during one of the three periods (pre-index period, index period, and post-index period). The DBHIDS rates are broken down into proportions which had an inpatient or residential treatment facility stay during one of the three periods, and a record of any other stay during one of the three periods.

In Table 8, the youth in the delinquency group had a great degree of truancy, with the rate at 73% in the pre-period, 38% in the index period, and 36% in the post-period. Truancy at schools is a common characteristic predictive of delinquent care involvement. The rate of dependent care placement among the youth in the delinquency group was 10% in the pre-period, 22% in the index period, and 5% in the post-period. This finding shows that relatively a small number of the youth in delinquent care are subsequently placed in dependent care. The rate of sheltered homelessness is quite low with the rate of 2% in the index period and less than 1% in the post-period. For intensive mental health services measured as inpatient care and residential treatment, the rate was 6% in the pre-period, 19% in the index period, and 8% in the post-period. The rate of other mental health service use was much higher, with 23% in the pre-period, 36% in the index period, and 23% in the post-period. A higher number of youth in the delinquency group received both intensive and non-intensive mental health services during the index period.

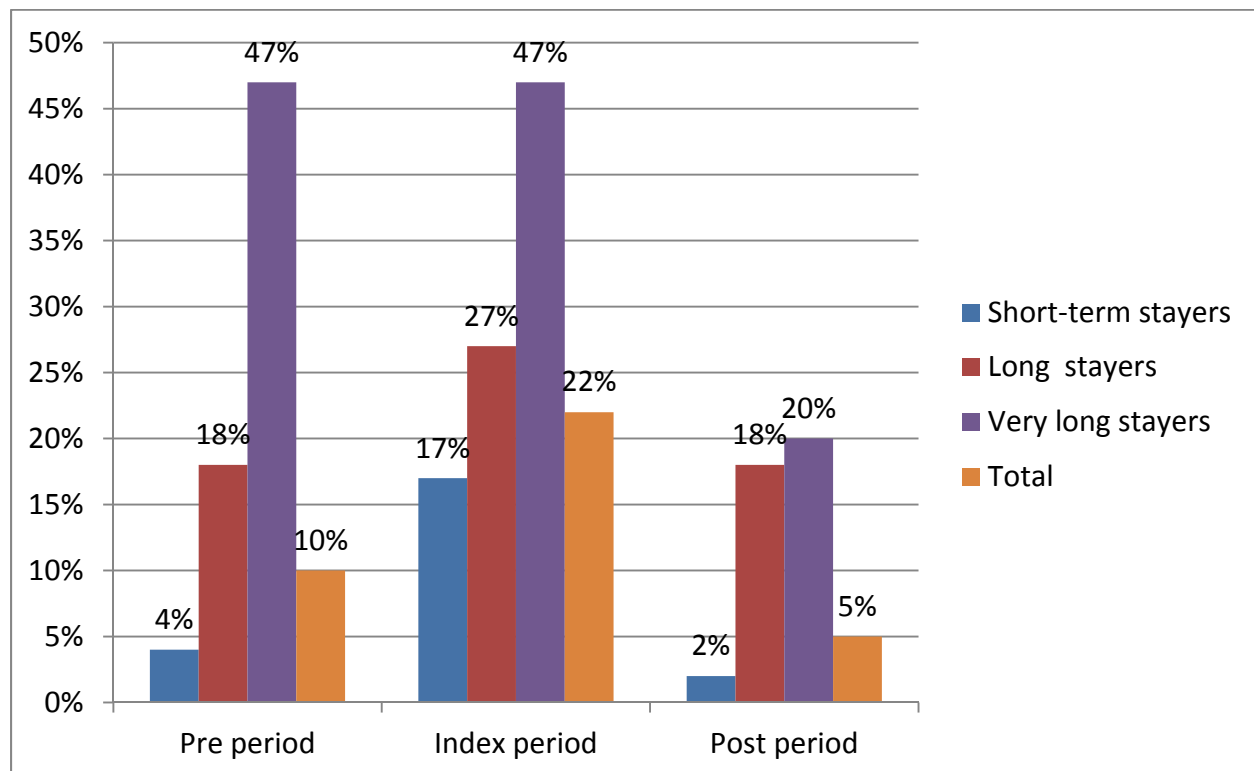


Figure 4. Proportion of youth in the delinquency group with a history of dependent care before, during, and after the index period (N=2,764)

Figure 5, in the same manner as Figure 4, facilitates comparisons of services use in other systems by cluster group for youth in the delinquency group. One thing to note is that the long stayers and the very long stayers were more likely to have a history of dependent care than the short stayer group (Figure 5). A longer stay in delinquent care is also associated with a greater likelihood of receiving mental health services.

Table 10. Characteristics of the youth in the delinquency group with and without a history of dependent care (N=2,764)

	No Dependent Care	Dependent Care during/after Index Period	Dependent Care before Index Period
Male***	81%	58%	75%
Black Race***	72%	82%	88%
Latino***	13%	13%	7%
12 or older at 1st case opening***	73%	99%	37%
Ever being in foster care***	2%	32%	64%
No. placement changes***	4.6	6.6	9.6
Length of stay (mean)***	33	34	67
N	1,753	346	665
%	63%	13%	24%

*** $p < .001$ (based on chi-square test of difference between groups)

Table 10 reports characteristics of youth in the delinquency group by a history of dependency involvement. Overall, 37% the youth had a history of dependent placement: 13% during or after the index period and 24% before the index period. Female and African American youths are overrepresented among those with a history of dependent care. The majority of those with dependent care before the index period had their first case opening before age 12. Among those without a dependent care history, few had a history of staying in a foster care setting. The youth with a dependent care history are more likely than those without to report frequent placement changes and lengthy stay.

3.4. DHS Youth Involvement in Multiple Public Service Systems

Table 11. Multi-system users among youth in the dependency group (N=2,272)

Clusters	Two system users		Three system users
	Dependent care + Delinquent care	Dependent care + Mental Health*	Dependent care + Delinquent care + Mental Health**
Short-term stayers	39.5%	22.1%	9.5%
Long stayers	41.7%	25.9%	12.4%
Very long stayers	36.3%	28.5%	12.0%
Total	39.8%	24.1%	10.7%

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

Table 11 shows the proportion of youth in the dependency group who were identified in other public service systems that indicate truancy at schools, intensive mental health service use (inpatient hospitalization and residential treatment), and delinquency. Approximately 40% of this group had a history of delinquent care. Twenty-four percent of the youth had a history of receiving intensive mental health services. One out of ten of the youth received both delinquent care and intensive mental health services. Overall, more than half of the youth (54%) in the dependency group were involved with at least two service systems out of the three.

Table 12 shows the rates of same multiple system involvement, but for the youth in the delinquency group. For this group, about one third had a history of dependent care; 23% had a history of receiving intensive mental health services; and about 10% received both dependent care and intensive mental health services. Among the three subgroups, the long and very long stayer groups were more likely to report multiple system involvement. Overall, half of the youth (50%) were involved with at least two service systems out of the three.

Table 12. Multi-system users among youth in the delinquency group (N=2,764)

Clusters	Two system users		Three system users
	Delinquent care + Dependent care***	Delinquent care + Mental Health***	Delinquent care + Dependent care + Mental Health***
Short-term stayers	26.9%	18.0%	6.0%
Long stayers	48.9%	30.9%	15.0%
Very long stayers	92.7%	39.7%	38.2%
Total	36.6%	23.3%	10.1%

*** $p < .001$

Table 13 reports the results of multivariate logistic regression models. In Model 1 of delinquent care during or after the index period (hereafter referred to as the during/post period), being male, African American, having a case opening at age 12 or older, ever being in group home/institution, and increased numbers of placement change had a statistically significant effect, increasing the likelihood of experiencing delinquent care during/post period. The odds of being placed in delinquent care during/post period were 2.1 times greater for males. African American youth were 1.6 times more likely than other racial/ethnic groups to have delinquent care in the during/post period. The first case opening at 12 or older was associated with 2.6 times higher odds of having delinquent care in the during/post period. While a history of staying in foster care setting decreased the odds of delinquent care in the during/post period, a history of group home/institution increased the odds by 2.3 to 3.3 times. The second model, where the dependent variable is being placed delinquency care after the index period. Here being male, having a case opening at age 12 or older, and history of being in an institution were associated with increased likelihoods of experiencing delinquent care after the index period.

Table 13. Logistic regression models of a delinquent care placement among youth in the dependency group

Variable	Model I	Model II
	Delinquency during/after the Index Period Odds Ratio	Delinquency after the Index Period Odds Ratio
Male	2.11***	4.15***
African American	1.62**	1.30
Latino	1.21	0.76
Case opening at 12 or older	2.57***	2.76***
Ever being in foster home	0.53***	0.73
Ever being in group home	2.28***	1.07
Ever being in institution	3.33***	2.30***
No. placement change	1.12**	1.17***
Length of stay (months)	1.00	1.00
Mental health in pre-period	0.97	0.70
Mental health in index period	0.89	0.97
Delinquency in pre-period	0.01	0.82
Delinquency in index period	N.A.	6.50***
Likelihood ratio	629.3 (df=12)***	709.2 (df=13)***

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

3.5. Section Summary

Section 3 focused on the extent to which youth in the dependency and delinquency groups used other DHS services and services in other systems. The key findings include:

- Youth in the dependency group had very high rates of truancy over the observation period, with 70% in the pre-period, 36% in the index period, and 38% in the post-period. Their rate of delinquent care placement was 7% in the pre-period, 27% in the index period, and 14% in the post-period. The rate of sheltered homelessness was very low with the rate under 2%. The rate of having received intensive mental health services measured as inpatient care and residential treatment was 8% in the pre-period, 20% in the index period, and 9% in the post-period. The rate of other mental health service use was much higher, with 26% in the pre-period, 39% in the index period, and 25% in the post-period.
- Youth in the delinquency group had rates of truancy of 73% in the pre-period, 38% in the index period, and 36% in the post-period. Their rates of dependent care placement were 10% in the pre-period, 22% in the index period, and then dropped to 5% in the post-period. Their rate of sheltered homelessness across the three time periods was under 2%. Their rates of having received intensive mental health services were 6% in the pre-period, 19% in the index period, and 8% in the post-period. The rate of other mental health service use was much higher, with 23% in the pre-period, 36% in the index period, and 23% in the post-period.

- Approximately 40% of the youth in the dependency group had a history of delinquent care. 24% of the youth had a history of receiving intensive mental health services. One out of ten youth in the dependency group received both delinquent care and intensive mental health services. Overall, more than half of the youth (54%) were involved with at least two service systems out of the three.
- About one third of the youth in the delinquency group had a history of dependent care. 23% of the youth had a history of receiving intensive mental health services. About 10% of youth in the delinquency group received both dependent care and intensive mental health services. Among the three subgroups, the long and very long stayer groups were more likely to report multiple system involvement. Overall, half of the youth (50%) were involved with at least two service systems out of the three.
- Based on multivariate analyses, being male, case opening at 12 or older, having stayed in group home/institution, and frequent placement changes increased the likelihood of experiencing subsequent delinquent care among youth in the dependency group.

4. ***CONCLUSION***

This chapter examined the services use dynamics of youth who were in grades 7 through 9 in the academic year 2004-2005 and who had records of out-of-home placements in the DHS child welfare system (dependency group) and the juvenile justice system (delinquency group). The first set of analyses in this chapter assessed services use in each of these DHS systems and created a basic typology based on this services use (Section 2), and the second set of analyses extended this typology to look at its relationships with services use in other systems (Section 3).

Results of the demographic characteristics and stay dynamics are summarized in Subsection 2.5. For both groups of youth, the majorities fit into a services use pattern termed “short-term” stayers, although stays by youth in this group still averaged 26 months and 4 placement changes (dependency group) and 22 months and 3 placement changes (delinquency group). The rest of both groups averaged substantially longer stays – 76 months and 65 months for the “long stayers” that constitute about one-third of the dependency and delinquency groups, respectively; and the average of over 160 months (13 years!) for the 12% of the dependency group and 3% of the delinquency group who were classified as “very long stayers.”

The results of the cross-system analyses are summarized in Subsection 3.5. The truancy rates for the period that preceded the study period were much higher than subsequent time periods for all clusters in both the dependency and delinquency groups. Given this, truancy can be considered a marker of dependent care placement and a common characteristic predictive of delinquent care involvement.

Rates of family shelter use for both groups were extremely low, to the point where there is little point in further considering this crossover. At least two reasons likely contribute to these findings. First, if the youth in both groups spend substantial amounts of time in out-of-home placements, this is likely to take on a latent role as a protective factor against homelessness. In other words, the institutional or foster care placements that these youth experienced may provide an alternative to family shelters. Second, the OSH shelters only cover family shelters, and records for youth and runaway shelters were unavailable. If youth this age were to become homeless, especially given tenuous family ties, they

would presumably be more likely to either end up in such a facility or, alternately, to live in makeshift arrangements that would represent alternatives to any type of shelter.

The rates by which youth in these two groups received public mental health services are striking. During the index period, about one fifth of the each group received inpatient or residential treatment care and over one-third received other types of mental health services. Here the longer stay clusters have higher rates of services use as compared to the short-term stay cluster. Mental health issues likely impede exits from out-of-home placements, which in turn likely exacerbate mental health issues.

Cross-systems use within DHS was, not surprisingly, also relatively common. Looked at over the entire span of the study, approximately 40% of the youth in the dependency group had a history of being in the juvenile justice system, and about one-third of the youths in the delinquency group also were in the dependency group. There were no clear patterns to this by typology clusters, other than a high rate of very long stayers from the delinquency group also being in the dependency group. But this finding is likely an artifact of the way the group is structured, as the average stay of 13 years would suggest that they were too young to not have had some involvement in the dependency system prior to becoming involved with the juvenile justice system.

Putting this together, there is a tangible nexus found here between the child welfare, the juvenile justice and the public mental health systems for a substantial portion of the youth studied in both the dependency and the delinquency groups. For the youth in the dependency group, one out of ten youth in the dependency group received both delinquent care and intensive mental health services, and more than half of the youth (54%) were received services from at least two of these three service systems. On the delinquency side, the findings were similar. About 10% of the youth received both dependent care and intensive mental health services, and half of the youth (50%) were involved with at least two of the three service systems. Among the three subgroups, the long and very long stayer groups were more likely to report multiple system involvement.

Having established this strong link across systems, research should look further into the nature of this cross systems use. Examining the costs incurred by youth who make use of these three systems, the extent to which care between the systems is being coordinated, and the adult outcomes of these multi-system youth are three areas that can show whether there is a need to change the way these public services, which all are provided by public, municipal agencies, should be restructured. Finally, while these services are often necessary, making substantial reductions in services use for these multi-system youth also highlights the challenge of providing placements in stable, community settings for these youth, many of whom are presumably among the most difficult to place.

CHAPTER 2: YOUTH USING PUBLIC BEHAVIORAL HEALTH SERVICES

1. INTRODUCTION

This chapter looks at youth in grades 7 through 9 who have used public behavioral health services and how they use these services as well as other public systems in Philadelphia. Specifically, this chapter uses administrative records from four City of Philadelphia service systems to assess services use across the public behavioral health, school, shelter and child welfare/juvenile justice systems for youth who are of age to be in grades 7 through 9 during the academic year (AY) 2004 (i.e., September 2004 through August 2005). The focus is primarily on a three-year period that covers AY 2004-2006, but the chapter also will look at services use in the periods preceding and following this study period.

This chapter focuses on youth who use public behavioral health services. The analyses will be based on Medicaid-funded behavioral health claims in Philadelphia that were provided by the Philadelphia Department of Behavioral Health and Intellectual disAbility Services (DBHIDS) from an administrative database that includes claims records maintained by Community Behavioral Health, the publicly run managed care organization that funds behavioral health services for Philadelphia Medicaid recipients. This database contained eligibility data for all MA-recipient youth in Philadelphia, and claims data for MA-reimbursed behavioral health services they used during the calendar years 2001 through 2010.

Part 2 of this study uses the DBHIDS data to construct a cohort of youth aged 12 to 15 in September 2004 who accessed Medicaid-funded behavioral health services during AY 2004 either as a first-time user or following a substantial period with no record of services use. More specifically, to be in this study group youth must have had no record of public behavioral health services use in the eight months prior to September 2004, and must have had a record of at least one Medicaid-funded behavioral health claim during AY2004. This was done to keep periods of services use intact so that, in the best manner that the data would allow, youth were followed upon their entry into the public mental health system and were not picked up in the midst or toward the end of a period of care. Their services use was then followed for the two-year period after their initial claim. The resulting group of 3,315 youth is referred to as the study group, and Part 2 details their personal characteristics and services use patterns.

Part 3 proceeds to look at different indicators in other public systems. In addition to the DBHIDS services reviewed in Part 2, Part 3 looks at truancy and special education designation from School District of Philadelphia data (SDOP); placements in the delinquency and dependency systems administered by the Philadelphia Department of Human Services (DHS); and shelter use (in family shelters) in the Philadelphia Office of Supportive Housing (OSH). Of interest here is the extent to which the DBHIDS youth cohort uses services in these other systems; whether different typologies based on DBHIDS services use correspond to increased or decreased likelihood of services use in other systems; and assessing how many of the youth in the cohort can be considered as “heavy” users across multiple systems.

2. *USE OF PUBLIC BEHAVIORAL HEALTH SERVICES*

2.1 Introduction and Research Questions

In this section, DBHIDS data is used to construct a cohort of youth aged 12 to 15 in September 2004 who accessed Medicaid-funded behavioral health services during AY 2004 either as a first-time user or following a substantial period with no record of services use. After presenting descriptive findings of the overall study group and their use of these services, this chapter will use cluster analysis, based on the frequency by which each youth used different types of behavioral health services (e.g., inpatient care, residential treatment, etc.), to identify patterns of services use that are indicative of frequent and heavy services users. The resulting typology, and the differences in characteristics associated with this typology, will be assessed to determine its value in identifying heavy users of these services for interventions that may lead to more effective and efficient use of services.

Specific questions addressed as part of these analyses include:

1. Are there identifiable patterns for the use of public behavioral health services among youth ages 12-15 that can be used as the basis of a working typology to identify heavy users of these services?
2. What are the cost differentials for providing services among persons identified as heavy users of public behavioral health services?
3. Based on the typology outlined in question #1, what proportion of youth in the study group can be considered to be heavy users of public behavioral health services?
4. Can criteria be developed that identify individuals as heavy users of these behavioral health services from a more general pool of mental health services-using youth?
5. Are there relationships between services use in the study period and services use in the periods preceding and following the study period?

2.2 Demographics

Figure 1 breaks down this study group by projected school grade at the beginning of the study period. This distribution is an estimate based on chronological age at date of service for youth as listed on claims records. Dates of birth were unavailable as they are considered protected health information and all records for this analysis were provided without identifiers. Furthermore, comprehensive school records were unavailable for this chapter. As a proxy, grade level was calculated for children where, based on given age at a particular service date, they could have been aged 12 through 14 on September 1, 2004 – the start of AY2004. Those who, based on the assessment of this procedure, could have been age 12 on September 1, 2004 were considered to be in seventh grade; those aged 13 on this date were considered to be in eighth grade; and those aged 14 on this date were considered to be in ninth grade. When a youth could have been in one of two grades, he or she was assigned to the higher grade. No adjustments could be made here to take into account children who were retained for one or more grades or who otherwise would have their age not be consistent with the prescribed age range for each of these three school grades. It is also not possible, given the available data, to verify that the youth in this study group were actually attending school during all or part of the study period. Given these

caveats acknowledging grade-level as representing the best approximation based on available data, we found that the largest proportion of the study group, 38%, were in ninth grade, with 26% of the study group falling into the eighth grade age group and 36% into the ninth grade age group.

Figure 1 - Youth Initially Receiving Medicaid-funded Behavioral Health Services in Philadelphia During the Time Period 9/1/2004 and 8/31/2005 who were of Age to be in Grades 7-9 (ages 12-14; n=3,318)

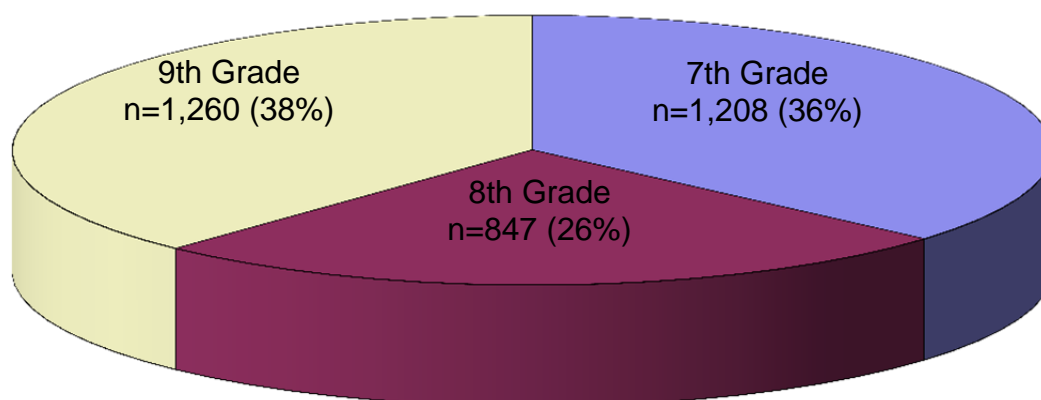


Table 1 provides other basic demographic data. Among the study group, 46% were female. Broken down by race, two-thirds were identified as Black and 16% as White, with another 17% grouped as missing or other. Most of the records in the latter group had missing race data. Twenty percent of the study group was identified as being of Latino ethnicity (regardless of race).

Table 1. Demographic Characteristics of the Youth Cohort (n=3,315)

Characteristic	%
Gender (female)	46
Black race	67
White race	16
Other or Unknown/Missing race	17
Latino ethnicity (any race)	20

2.3 Measures of Services Use

Data from DBHIDS consisted of claim-level records that included, along with the basic demographic information (age, race, and gender) summarized above, details related to the specific claim that was filed. Claims are records of individual behavioral health services for which DBHIDS was billed for and has paid for with Medicaid funds. For each youth, the data covers a two year period following their initial claim in AY2004. Measures taken from these claims data include the type of Medicaid eligibility; the types of services used; the diagnoses given in conjunction with these services; and the Medicaid-incurred costs for these provided services. The rest of this section describes each measure in further detail, along with the distributions of these measures in the study group.

2.3.1. Medicaid Eligibility

Youth are eligible for Medicaid by virtue of their or their household's being eligible for various assistance programs. There were four general eligibility categories through which the youth in the study group became Medicaid-eligible. Table 2 shows these categories, and the proportions of the study group eligible for Medicaid through each program. The majority, a little over two-thirds of the study group, were eligible through Temporary Assistance for Needy Families (TANF), the program commonly referred to as "welfare" where indigent families receive limited cash support and categorical Medicaid eligibility. Another 14% of the study group received Medicaid by virtue of their being eligible for Supplemental Security Income (SSI) benefits. SSI is a federal program administered by the Social Security Administration which provides cash assistance for persons (including children) with disabilities. SSI recipients are also categorically eligible for Medicaid. Healthy Beginnings, under which another 17% qualified for Medicaid, is a program administered by the State of Pennsylvania under which minors are eligible if they are not otherwise eligible for health care coverage and are in a household with income under the household poverty guidelines. Finally, 1% were Medicaid eligible in conjunction with General Assistance (GA), which is a program that usually provides Medicaid coverage and sometimes small amounts of cash assistance to eligible indigent adults. It is unusual for minors to be Medicaid eligible under GA, and likely reflects their parents GA eligibility.

Table 2. Categories of Medicaid eligibility for the youth cohort (n=3,315)

Category	%
Temporary Assistance to Needy Families (TANF)	68
Supplemental Security Income (SSI)	14
Healthy Beginnings (HB)	17
General Assistance (GA)	1

2.3.2. Types of Services

The claims data parses the services provided to the study group into broad categories of settings listed on Table 3. Many of the youth used services in multiple settings, so the sum of the proportions on Table 3 will exceed 100. Mean numbers of the units of services provided are also given in Table 3. Depending on the setting, the units can be expressed in days or, in settings where the services provided are less extensive, contacts. The units of service were averaged over the entire study group, but these means must be read with caution. On one hand, these means included the whole study group, including those

who received no services in a particular category. In all cases except for outpatient services, large numbers on non-users will attenuate the mean so that, were only actual services users taken into consideration, the means for units in the service setting categories would be substantially higher. On the other hand, the mean will also be unduly influenced by the small number of outlying higher values that are typically found in distributions of health services use.

The results for these groupings of services use are shown on Table 3. Highlights of these results include:

- A large majority, 88%, of the youth used outpatient psychiatric services, with a mean of 13.6 contacts per person.
- Inpatient hospitalization (used by 21% of study group) included stays for acute mental health issues in a hospital setting, and the mean stay was 5.5 days per person.
- Partial hospitalization (8%) referred to non-overnight stays in a hospital setting for mental health issues, and the mean days consumed was 1.9 days per person.
- Community Support Services (CSS), used by 6% of the study group, represents a constellation of community-based services designed to assist persons with severe psychiatric impairments live in the community and to minimize the need for stays in hospitals or residential facilities. Mean days consumed was 2.9 per person.
- Drug and alcohol (D&A) services (8%) refer to non-inpatient services provided for substance abuse related disorders (either outpatient or partial hospitalization); mean number of contacts for services in this category was 4 per person.
- Behavioral Health Rehabilitation Services (BHRS), also known as wraparound services, are supportive behavioral health services provided at the site where problematic behaviors occur, such as in the home, school, and community. Fifteen percent of the study group used BHRS services, and the mean contacts per person was 15.4.
- Residential Treatment services, used by another 16 percent of the study group, provide mental health services in a residential setting in a variety of settings for a variety of behavioral health (both mental health and drug/alcohol) issues. RTFs are provided in a non-hospital setting and stays in these facilities are typically longer than the stays in inpatient hospital settings. Mean stays came to 51.9 days per person.

Table 3. Settings for Medicaid Reimbursed Behavioral Health Services Provided to the Youth Cohort (n=3,315)

Setting	% using Services	Mean Units per Person (SD)
Inpatient Psychiatric Hospitalization	21	5.5 days (22.7)
Partial Psychiatric Hospitalization	8	1.9 days (13.5)
Community Support Services (CSS)	6	2.9 days (16.3)
Outpatient Psychiatric Services	88	13.6 contacts (22.7)
Drug & Alcohol Services – Any (D&A)	8	4.0 contacts (29.1)
Behavioral Health Rehabilitation Services (BHRS)	15	15.4 contacts (79.4)
Residential Treatment Services (RTS)	16	51.9 days (153)

SD – Standard Deviation

2.3.4. Diagnoses Given in Conjunction with Services Received

Each claim has up to three diagnoses from the Diagnostic and Statistical Manual, version IV (DSM=IV) that were given during the course of providing services. A person in the study group was considered, for this study, to be diagnosed with a particular behavioral health disorder if a given diagnosis is present on at least two separate claims. Table 4 shows the prevalence of various behavioral health disorders based on these diagnoses.

Table 4. Prevalence of Behavioral Health Diagnoses for the Study Group for Medicaid Reimbursed Behavioral Health Services Provided to the Youth Cohort (n=3,315)

Diagnosis	DSM IV Codes	%
Attention Deficit Disorder	314	22
Conduct Disorder	312	27
Depressive Disorder	296.2-296.3, 300.4, 311	27
Adjustment Disorders (includes Post Traumatic Stress Disorder)	309	29
Bipolar Disorder	296.0- 296.1, 296.4-296.8	5
Substance Abuse	291-292, 303-305.0, 305.2-305.9	9
Pervasive Developmental Disorders (including Autism and Asperger's Syndrome)	299	0.6
Oppositional Defiant Disorder	313.81	19

The most prevalent diagnoses among the study group were adjustment disorders (29%), depressive disorders (27%), and conduct disorders (27%). Rates of substance abuse and bipolar disorders were, compared to this, substantially lower.

2.3.5. Medicaid-incurred costs

The final measure reported in this section is based on the amount reimbursed by Medicaid for the service provided. Table 5 shows the distribution of total costs incurred by youth in the study group. Note the difference between the median and the mean, showing that the median cost incurred is \$1,758 but that costs per person that can go upwards of \$200,000 serve to skew the average to a much higher \$18,616.

Table 5. Medicaid Costs Based on Claims for the Youth Cohort over a 2-year period (n=3,315)

Costs per person	
Mean	\$18,616
99 th Percentile	\$222,984
75 th Percentile	\$12,535
Median	\$1,758
25 th Percentile	\$465
10 th Percentile	\$195

Table 6 provides the mean cost per unit (day or contact) for each of the service setting categories from Table 3. RTS is the service type with the highest overall expenditures for the study group, followed by inpatient hospitalization and BHRS. In terms of cost per unit, inpatient hospitalizations are most expensive, followed by RTS and CSS.

Table 6. Mean Cost per Unit – Settings for Medicaid Reimbursed Behavioral Health Services Provided to the Youth Cohort

Setting	Total Cost	Total Units	Mean Cost per Unit (SD)
Inpatient Psychiatric Hospitalization	\$8,759,487	18,256 days	\$480 (98)
Partial Psychiatric Hospitalization	\$743,140	6,420 days	\$116 (38)
Community Support Services (CSS)	\$1,722,600	9,685 days	\$177 (168)
Outpatient Psychiatric Services	\$3,649,199	45,133 contacts	\$80 (65)
Drug & Alcohol Services – Any (D&A)	\$2,074,521	13,386 contacts	\$155 (64)
Behavioral Health Rehabilitation Services (BHRS)	\$7,083,912	51,040 contacts	\$139 (61)
Residential Treatment Services (RTS)	\$37,736,446	172,212 days	\$219 (59)

SD – Standard Deviation

2.4 Cluster Analysis

Cluster analysis procedures were used to parse the data into different groups based on similar histories of the services use that were summarized by the seven categories on Table 3. Cluster analysis is a systematic procedure for assigning observations to groups based on their similarities in the clustering criteria. When there are two clustering criteria, the end result is analogous to looking at a graph where a point is charted for each observation based on the coordinates of the two criteria and circles are drawn around the main groupings. While the clustering is more complex here, as more than two criteria will be used as the basis for forming clusters here, the idea of circumscribing like observations into clusters remains.

The process by which clusters were specified in this study was modeled on a study by Lambert et al.,² who similarly used types and amounts of mental health services as bases for clusters among a sample of 984 children. As in the Lambert et al. study, the cluster analyses done in this study used PROC CLUSTER in SAS statistical software, with Ward's method,³ to cluster the data. Inherent to cluster analysis is that there is no "correct" way to cluster the data, nor is there any preset number of clusters to specify. Instead it is up to the researcher to determine the number and configuration of clusters that are optimal. In choosing the parameters (i.e., the clustering criteria and number of clusters) for this analysis, this study sought to balance parsimony of clusters (the smaller the number of clusters, the more intuitive the grouping) with specificity (observations in a cluster should be sufficiently alike to provide a cluster with distinctive group characteristics). Small clusters are undesirable, as they have

² Lambert EW, Brannan AM, Breda C, Heflinger CA, Bickman L (1998). "Common patterns of service use in children's mental health." *Evaluation & Program Planning* 21(1): 47-57.

³ SAS Institute Inc. 2010. *SAS/STAT® 9.22 User's Guide*. Cary, NC: SAS Institute Inc.

little practical value. Finally, diagnostic measures such as cubic clustering criteria, pseudo F, and t^2 statistics were also used for guidance in choosing the number of clusters and the clustering criteria.

Six clusters, based on five categories of services settings: inpatient psychiatric hospitalization; outpatient psychiatric services; community support services; behavioral health rehabilitation services; and residential treatment services (see tables 3 and 6), were ultimately chosen as the most demonstrative cluster configuration. In the process of assessing different cluster configurations, a clear pattern emerged whereby, on one hand, multiple smaller clusters would emerge around the higher use of a single service, while, on the other hand, a large number of observations would form a cluster that did not show high use of any particular service. Cluster configurations that included substance use services and partial hospitalization (the other two services types listed on tables 3 and 6) as criteria tended to produce small (less than 1% of the study group) clusters, so these two items were omitted from the clustering criteria. Finally, pseudo F and t^2 statistics for the cluster analysis output showed favorable values with a configuration of six clusters around inpatient, outpatient, BHRS, RTF and case management services.

Findings from Tables 7 and 8 are used to sketch profiles of each of the six clusters. Findings for each of the clusters can be compared to the others and to the findings for the overall study groups that have already been presented in the previous tables.

Cluster 1 – Fifty-eight percent of the study group fell into the first cluster, which was characterized by little or modest use of all services. While 88% of the group used outpatient services, on average the cluster members only had 4.9 outpatient contacts over the two years of service. Their rates of diagnosed disorders were lower than the overall study groups for each category. Demographically, the main finding of note was that the proportion of cluster members who were of seventh-grade age was higher than that of the overall study group.

Cluster 2 – At 21%, this was the second largest cluster and its characteristics were similar to those of cluster 1 except for their high levels of outpatient psychiatric services use, which is its defining characteristic. Levels of other services use, compared to the first cluster and the overall study population, were lower. Diagnostically, this cluster had higher than average levels of diagnoses for attention deficit disorder, depressive disorders and adjustment disorder. Like the first cluster, the members in this cluster were disproportionately of seventh grade age, and had higher than average (for the overall study group) rates of youth who were of White race and of Hispanic ethnicity.

Cluster 3 – The 12% of the study group who comprised this cluster had consistently high usage of residential treatment services (RTS), averaging 354 days per person (compared to 51.9 days for the overall group). This cluster also had the highest mean number of contacts (6.8) and highest rate (16%) of involvement among the clusters in substance abuse services, with 17% of the youth in this cluster (compared to 9% in the study group) diagnosed with substance use disorders. Seventy-two percent of this cluster had a conduct disorder diagnosis, and 93% of them were Medicaid eligible through TANF. Demographically, this was the oldest cluster (63% being of ninth grade age); the most male (only 24% was female); and the most Black (82%). Taken together, this represented a very distinct profile and very heavy services use, as on average they spent almost one year of the two-year study period living in an institutional facility.

Cluster 4 – Five percent of the study group landed in this cluster. The defining service use here was inpatient services, and cluster members had an average of 80 days over the study period spent in a hospital. Additionally, this group also had high levels of RTS (50% participation and, on average 171 days

in an RTS facility) so that, between inpatient hospitals and RTS facilities, the members of this cluster spent almost as much time in institutional settings as their Cluster 3 counterparts. They also had the highest levels of partial hospital participation (44%, with a mean stay of 6 days) of any cluster. Diagnostically, this group had the highest rates among the clusters for four disorders: depressive disorder (75%); oppositional defiant disorder (49%); substance abuse (21%); and bipolar disorder (26%), with elevated rates of conduct disorder (54%) as well. Seventy-three percent were Medicaid eligible through TANF, and, like cluster 3, this cluster was disproportionately older (48% of ninth grade age) and Black (75%), but in contrast to cluster three this cluster was 75% female.

Cluster 5 – The defining service for the 3% of the study group in this cluster is BHRS. Along with having, on average, an extensive amount of BHRS services (391), members of this cluster had moderately elevated amounts of mean inpatient days (12.4) and outpatient contacts (20.6). The primary diagnoses in this cluster were attention deficit disorder (53%), conduct disorders (50%) and oppositional defiant disorder (48%), while the rate of pervasive developmental disorders (including autism spectrum disorders) was, at 4.4%, by far the highest of all the clusters. Almost half (48%) of this group were Medicaid eligible through SSI, suggesting that more members in this group were considered, when compared to other clusters, to be long-term disabled. Finally, this cluster was pervasively male (33% were female) and, with 72% of the cluster at seventh grade age, was much younger than the other clusters.

Cluster 6 – This final and smallest group (2%) was characterized by its use of CSS. While all other clusters averaged less than seven CSS contacts per member, youth in this cluster each averaged just under 100 CSS contacts (99.7). It also had moderately higher levels of use for other services, including inpatient hospitalizations and RTS. Cluster 6 had the second-highest rate of persons diagnosed with depressive disorders (59%, second to the inpatient cluster), and high rates of adjustment disorders (47%), oppositional defiant disorder (45%), and attention deficit disorder (34%). Like cohort 5, it was a younger cohort (56% who are of seventh grade age) than the others.

Table 9 breaks down Medicaid costs by cluster and shows a wide range of costs incurred across the six clusters. It shows that the two largest clusters are also those whose members, on average, incurred the least expenses. Combined, these two clusters comprised 79% of the study group, but only accounted for 14% of the total costs. Costs for the other four clusters were markedly higher, with the most expensive cluster being cluster 4. Cluster 4 comprised 5% of the total study group and accounted for 21% of all the costs, much of it due to the high *per diem* rates charged for inpatient hospitalizations. The cluster with the highest gross expenditures, a result of both cluster size and cost per person, was cluster 3, characterized by the high use of residential treatment services. Taken together, these results are consistent with a general pattern that is often noticed in health care cost studies, in which a small proportion of patients typically account for the large majority of health care costs.⁴

⁴ See, for example, Stanton MW, Rutherford MK. The high concentration of U.S. health care expenditures. Rockville (MD): Agency for Healthcare Research and Quality; 2005. Research in Action Issue 19. AHRQ Pub. No. 06-0060.

Table 7 – Characteristics Related to Services Use, Diagnoses, and Medicaid Eligibility Type Broken Down by Clusters the Youth Cohort over a 2-year period (n=3,315)

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Primary Service Characteristic	None	Outpatient	Residential Tx	Inpatient	BHRS	CSS
Proportion of Study Group	58%	21%	12%	5%	3%	2%
Service Units (mean)						
Inpatient Psychiatric Hospitalization	1.0 days	1.5 days	1.1 days	80.0 days	12.4 days	19.9 days
Partial Psychiatric Hospitalization	1.9 days	1.7 days	1.9 days	6.0 days	4.3 days	6.7 days
Outpatient Psychiatric Services	4.9 contacts	41.7 contacts	3.7 contacts	9.5 contacts	20.8 contacts	28.1 days
CSS	0.9 contacts	0.2 contacts	0.0 contacts	5.1 contacts	6.6 contacts	99.7 contacts
BHRS	5.6 contacts	0.4 contacts	4.1 contacts	11.1 contacts	391 contacts	10.8 contacts
RTS	0.8 days	3.3 days	354 days	171 days	14.1 days	29.1 days
D&A Services – Any	5.3 contacts	0.3 contacts	6.8 contacts	1.5 contacts	0.2 contacts	1.8 contacts
Service Participation						
Inpatient Psychiatric Hospitalization	17%	16%	12%	100%	37%	58%
Partial Psychiatric Hospitalization	5%	6%	6%	44%	21%	38%
Outpatient Psychiatric Services	88%	100%	69%	76%	92%	89%
CSS	4%	2%	1%	18%	12%	100%
BHRS	13%	3%	27%	20%	100%	17%
RTS	1%	2%	100%	50%	10%	16%
D&A Services – Any	9%	2%	16%	9%	2%	8%
Diagnoses (see table 4)						
Attention Deficit Disorder	15%	35%	23%	26%	53%	34%
Conduct Disorder	16%	21%	72%	54%	50%	28%
Depressive Disorder	21%	37%	19%	75%	26%	59%
Adjustment Disorders	26%	40%	21%	28%	18%	47%
Bipolar Disorder	2%	7%	5%	23%	11%	13%
Substance Abuse	9%	4%	17%	21%	2%	13%
Pervasive Develop. Disorder	0.5%	0.4%	0.8%	1.3%	4.4%	0%
Oppositional Defiant Disorder	14%	18%	27%	49%	48%	45%
Medicaid Eligibility (see Table 2)						
TANF	64%	59%	93%	73%	40%	40%
SSI	22%	22%	5%	14%	48%	39%
Healthy Beginnings (HB)	13%	19%	2%	12%	12%	20%
General Assistance (GA)	2%	0.6%	0%	0.2%	0%	1%

CSS – Community Support Services; D&A – Drug and Alcohol; BHRS - Behavioral Health Rehabilitation Services; RTS – Residential Treatment Services

Table 8 – Demographic Characteristics, Broken Down by Clusters, for the Youth Cohort over a 2-year period (n=3,315)

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Primary Service Characteristic	None	Outpatient	Residential Tx	Inpatient	BHRS	Case Mgmt.
Grade						
Seventh	40%	44%	19%	29%	72%	56%
Eighth	27%	27%	18%	23%	17%	28%
Ninth	33%	29%	63%	48%	11%	16%
Female	45%	51%	24%	71%	33%	46%
Race						
Black	74%	57%	82%	75%	78%	66%
White	14%	26%	9%	11%	8%	7%
Other	12%	17%	9%	14%	15%	27%
Hispanic (any race)	15%	29%	9%	11%	10%	12%

Table 9 –Services Costs, Broken Down by Clusters, for the Youth Cohort over a 2-year period (n=3,315)

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Primary Service Characteristic	None	Outpatient	RTS	Inpatient	BHRS	CSS
Cost Per Person						
Mean	\$2,962	\$4,652	\$79,537	\$84,042	\$66,817	\$37,632
Median	\$550	\$2,660	\$52,212	\$62,211	\$52,098	\$30,033
90 th Percentile	\$7,300	\$8,631	\$163,757	\$179,087	\$128,904	\$67,545
Percent of Study Group	58%	21%	12%	5%	3%	2%
Percent of Total Cost	9%	5%	50%	21%	10%	4%
Proportion – Cost to Group Size	0.2	0.2	4.3	4.5	3.6	2.0

CSS – Community Support Services; BHRS - Behavioral Health Rehabilitation Services; RTS – Residential Treatment Services

2.5 – Identifying Heavy Users

Based on the results of Table 9, the cluster analysis offers a relatively bifurcated separation of these six clusters into two tiers of services use. The first group, consisting of relatively low-cost users, includes clusters 1 and 2. The youth in this group generally had low levels of intensive and high-cost services such as inpatient hospitalizations, residential treatment, behavioral health rehabilitation services, and community support services. Conversely, the second group combines the four clusters characterized by higher use of these more intensive services types. Both in terms of services use and of costs related to their use of behavioral health services, this latter group consists of the “heavy users.”

This pattern is the basis for an *ad hoc* means by which to identify heavy users in this Medicaid claims data without having to execute additional cluster analyses, and thus allows for a more inclusive assessment of persons based upon Medicaid claims records. In order to do this, youth will be considered heavy users if, during a two-year period covered in the available data, they meet the minimum levels of services use for at least one of the four clusters that were the basis for the heavy user group. These minimum criteria are shown in Table 10.

Table 10 – Minimum Criteria for Inclusion as a “Heavy User” Based on Use of Medicaid Reimbursed Behavioral Health Services

Setting	Corresponding Cluster	Minimum Levels of Services Used Over a 2-year Period
Inpatient Psychiatric Hospitalization	4	20 Days
Community Support Services (CSS)	6	42 Days
Behavioral Health Rehabilitation Services (BHRS)	5	92 Contacts
Residential Treatment Services (RTS)	3	25 Days

This means that a person would meet the criteria for being a “heavy user” if, based on records of services use over a two-year period, he or she had been hospitalized for psychiatric treatment for at least 20 days; received at least 42 days’ worth of CSS; had at least 92 BHRS contacts; or had spent 25 days in an RTS facility. These levels are the minimums for each service that members had in each of the corresponding clusters listed. For example, the 20-day inpatient criteria came from cluster 4, the cluster characterized by 100% inpatient use by its members. In this cluster, the least amount of days a member amassed in an inpatient facility was 20 days. The use criterion for each of the other three services was similarly derived from the other heavy use clusters.

Taken together, these criteria provide a straightforward, simple means for identifying heavy users, but limitations to this approach must also be acknowledged. First, there is no clinical basis for these criteria; the designation of “heavy” service user is based solely on relative amounts of services use as determined through cluster analysis procedures. Second, after applying the cluster analysis, not all observations fitting the criteria in Table 10 were placed in a heavy user cluster. In other words, while everyone in the four heavy use clusters (i.e., 21% of the study group) met at least one of the criteria on Table 10, another 107 observations (3%) met these criteria but were placed, based on the clustering algorithm, in one of the other two clusters. Thus, applying these criteria instead of a formal cluster

analysis expands the “heavy user” group slightly, as the heavy users would now comprise 24%, instead of 21%, of the study group.

In applying these criteria to the entire dataset of youth available for this study (this set included all Medicaid-reimbursed behavioral health claims records for the time period 2004 through 2007 for all children in Philadelphia who were born in the years 1989 through 1992) to the 13,807 records that were not included in the study group, 26% met the heavy user criteria shown in Table 10. This proportion is consistent with the distribution in the study group, both substantively and statistically (based on results of a non-significant chi-square test of difference).

2.6 Services in the 3-Year Study Period and the Periods preceding and following the Study Period

DBHIDS claims records from the 3-year periods preceding (September 2001 through August 2004) and following (September 2007 through August 2010) the three-year study period were available for the cohort in order to assess the extent to which the cohort used services over a larger period of time and whether or not this use of services differed by cluster (as assigned during the study period).

2.6.1. Pre-Period

Table 11 shows the proportions of the cohort, broken down by cluster, who had a record of any DBHIDS services use and “heavy” DBHIDS services use in the three-year period preceding the study period (i.e., pre-period). The proportion of youth in the cohort using such services will be suppressed somewhat since, as part of the selection criteria, the cohort could not have any DBHIDS services in the first eight months of 2007. With this in mind, 26% of the cohort had a record of any services use in the pre-period. Breaking this down into clusters, three clusters – 1, 3 and 6 (light services, residential treatment and CSS) – had similarly high proportions of users with pre-period services use, while the other three clusters – 2, 4, and 5 (outpatient, inpatient and BHRS) – had significantly less pre-period services use.

Table 11 – DBHIDS Services Use by Youth Cohort, Broken Down by Clusters, in the 3-Year Period Preceding the Study Period (September 2001 through August 2004). N=3,315

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Primary Service Characteristic	None	Outpatient	Residential Tx	Inpatient	BHRS	CSS
N (% of Study Group)	1,915 (58%)	697 (21%)	394 (12%)	153 (5%)	92 (3%)	64 (2%)
Has services record “Heavy” service use	31% 7%	5%*** 0.6%***	34% 13%***	19%** 7%	15%* 8%	34% 9%

N=3,315

CSS – Community Support Services; D&A – Drug and Alcohol; BHRS - Behavioral Health Rehabilitation Services; RTS – Residential Treatment Services

“Heavy” services use is use that, during pre-period, had total costs over \$3,000

Results with asterisks indicate significant difference in proportion, as compared to Cluster 1.

* - $p < .05$; ** - $p < .01$; *** - $p < .001$

Table 11 also looks at differences by cluster in history of “heavy” services use in the pre-period. Heavy services use was considered to be pre-period use that exceeded, in total, \$3,000 in costs (75th percentile

of pre-period costs among those who had any costs). Altogether, 6.5% of the total cohort were heavy users by this criterion. The residential treatment cluster (cluster 3) was the only cluster that had a significantly higher proportion of heavy pre-period users (13%), and the outpatient cluster was the only cluster that had a significantly lower proportion of pre-period services use (0.6%).

2.6.3 Post-Period

Table 12 shows the proportions of the cohort, broken down by cluster, who had a record of any DBHIDS services use and “heavy” DBHIDS services use in the three-year period following the study period (i.e., post-period). Among the cohort, 45% had a record of any services use in the pre-period. Breaking this down into clusters, compared to the light services use cluster (cluster 1), three clusters – 3,4 and 6 (inpatient, residential treatment and CSS) – had significantly higher proportions of members who also had any services use in the proceeding period, and the outpatient cluster (cluster 2) had substantially lower services use during this period.

Table 12 – DBHIDS Services Use by Youth Cohort, Broken Down by Clusters, in the 3-Year Period Following the Study Period (September 2007 through August 2010). N=3,315

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Primary Service Characteristic	None	Outpatient	Residential Tx	Inpatient	BHRS	CSS
N	1,915	697	394	153	92	64
(% of Study Group)	(58%)	(21%)	(12%)	(5%)	(3%)	(2%)
Has services record	45%	24%***	55%***	57%*	49%	79%***
“Heavy” service use	8%	5%*	19%***	27%***	32%***	53%***

N=3,315

CSS – Community Support Services; D&A – Drug and Alcohol; BHRS - Behavioral Health Rehabilitation Services; RTS – Residential Treatment Services

“Heavy” services use is use that, during pre-period, had total costs over \$10,200

Results with asterisks indicate significant difference in proportion with services, as compared to Cluster 1.

* - p < .05; ** - p < .01; *** - p < .001

As in Table 11, Table 12 looks at differences by cluster in history of “heavy” services use in the pre-period. As more of the cohort overall used services during this period, the threshold for heavy services use was increased to costs in the post-period that exceeded, in total, \$10,300 in costs (75th percentile of proceeding-period costs among those who had any costs). Altogether, 11% of the total cohort were heavy users by this criterion. Compared to cluster 1 (light use), all of the heavy use clusters (see section 4.2.3) had significantly higher proportions of heavy proceeding period services use, and in the CSS cluster 53% were considered “heavy” users in the post-period. On the other end, the outpatient cluster had a significantly lower proportion of heavy services use (5%).

In summary, there is much more continuity in services use between the study period and the period that follows, as compared to the period preceding the study. This, as was pointed out, is partly by design, but also underscores how members of the four clusters that use more intensive services in the study period are also the likeliest to use high levels of these services (as measured by cost) after the study period. This is particularly true for the Community Support Services (CSS; cluster 6) cluster.

2.7 Section Summary

Section 2 provided an overview of how youth aged 12-14 used public behavioral health services in Philadelphia and presented a set of criteria by which to identify youth as “heavy users” of these services in subsequent analyses in this study, whose overall goal is to examine the use of multiple public systems by youth in grades 7 through 9 in Philadelphia.

This chapter used cluster analysis to parse 3,315 youth who initially used these services during AY 2004 into six clusters based on their use in a two-year period of five different types of behavioral health services: inpatient psychiatric hospitalization; outpatient psychiatric services; community support services; behavioral health rehabilitation services; and residential treatment services. Highlighted findings here include:

- The largest cluster (58%) consisted of persons without extensive use of any of the services.
- Among the youth who used spent substantial time in institutional settings (clusters 3 and 4), both tended to be older than the overall study group.
- Those whose services history was characterized by their stays in residential treatment facilities (cluster 3) were predominately male and those whose histories were marked mainly by their inpatient hospitalizations were predominantly female.
- Those in cluster 4 also made use of residential treatment facilities, but those in cluster 3 had lower levels of psychiatric hospitalizations.

This cluster typology also provided a framework for identifying groups of “heavy users” of these services. Based on the clustering algorithms, minimum levels of use for these services were adapted as a set of criteria for heavy services use. Based on this:

- Twenty-one percent of the study group were designated as “heavy users.” The costs associated with the four clusters upon which this designation was based were considerably higher than the costs for the remainder of the study group.
- This 21% of the study group designated as heavy users were found to consume 86% of the total costs associated with the claims.

Generalizing these criteria, a youth is considered to be a heavy user if he or she consumes, over a two-year period, at least one of the following levels of service:

- 20 days of inpatient psychiatric hospitalization;
- 42 days’ worth of community support services;
- 92 contacts of behavioral health rehabilitation services; [or]
- 25 days in a residential treatment services facility.

Generalizing in this manner expanded the size of the heavy user group slightly to include about one quarter of the youth in the study group, and applying these criteria to the larger set of youth in the claims dataset produced consistent results. As such, the cluster analysis applied in this chapter offers a straightforward means to identify heavy users of Medicaid-reimbursed behavioral health services.

Applying this to look at services use in the time periods directly before and after the study period, being in a heavy use cluster in the study period is associated with a higher likelihood of being a heavy services user in the time after the study period. This suggests, not surprisingly, that the types of services use that characterize each of these four clusters will often extend for a longer period of time than what is covered by the study period.

3. SERVICES USE ACROSS OTHER SYSTEMS

3.1. Introduction and Research Questions

This part of the chapter follows the cohort of youth who were specified in the previous part and follows their use of services across three other systems and across three different time periods. This means that this section will look at the extent to which youth in this cohort were:

1. Truant and designated for special education, as per records from the School District of Philadelphia (SDOP);
2. Homeless; as per shelter records from the City of Philadelphia's Office of Supportive Housing (OSH);
3. Involved in foster care or juvenile justice services; as per records from the City of Philadelphia's Department of Human Services (DHS).

The examination of these uses of other service systems occur in the study period, which covers academic years (AY) 2004-2006 (September 2004 through August 2007); the three-year period immediately preceding the study period (AY 2001-2003); and the three-year period immediately following the study period (AY 2007-2009). School district data is only available through AY 2008.

This survey of services use over a broader time period and across different systems will provide a more comprehensive overview of total services use than has been previously undertaken. The study group remains the same as was described in the previous section: 3,315 youth who were users of behavioral health services. Along with providing an overview of their services use, the previous section used cluster analysis as a basis for placing persons in the study group into six different clusters. In this section, along with looking at overall services use, will also look at whether heavier users of behavioral health services had different levels of services use across the other service types.

Specific research questions that frame this part include:

1. What are rates of services use for youth in the DBHIDS cohort in the school, mental health, and child welfare systems?

2. To what extent do youth in the DBHIDS cohort access services in other public systems to where they can be considered as “heavy users”?
3. Do these rates of services use (both in individual systems and across multiple systems) differ within the DBHIDS cohort when the youth are grouped by the cluster typology outlined in the previous part of this chapter?

3.2. School District of Philadelphia (SDOP)

3.2.1. Truancy

Truancy was assessed based on a youth having 25 or more unexcused absences during one school year during one of the three time periods (pre-study period, study period, post-study period). Table 13 shows truancy rates for the overall DBHIDS cohort, as well as for the other SDOP records that were available for students in the same grades during the same years. This undifferentiated SDOP group represents a large convenience sample of all available records to be used as a rough comparison for the DBHIDS results.

Table 13 – Characteristics Related to Truancy – Youth Cohort and Other SDOP Records

	DBHIDS Cohort	All SDOP Records
Period Antecedent to Study Period (AY2001-2003)		
N	3,315	52,789
Has School Record	62%	100%
Truant	58%	36%
Study Period (AY2004-2006)		
N	3,315	55,778
Has School Record	53%	84%
Truant	66%	44%
Period Subsequent to Study Period (AY2007-2008)		
N	2,055	33,630
Has School Record	38%	74%
Truant	60%	41%

Proportion truant is based on data from the School District of Philadelphia, and reflects those who had school records available in the SDOP database.

Truancy criteria, for each time period, is any one academic year with 25 or more days in unexcused absences

The “period subsequent to the study period” only covers two years, and only youth in 7th and 8th grades in 2004 are followed here. This leaves a total n of 2,055 in the DBHIDS cohort.

In table 13, there were high rates of truancy for the DBHIDS cohort. During the study period, two-thirds (66%) met the truancy criterion. This is somewhat higher than the rate for the pre-period (58%) and the post-period (60%). The DBHIDS cohort had truancy rates across all three time periods that were substantially and significantly higher than those of the more general SDOP group. Even with this, however, the SDOP group rates were still relatively high, ranging from 36% (pre-period) to 44% (study

period). The DBHIDS cohort had high levels of missing data. Data missing in the SDOP records were lower, but still high, for the SDOP cohort in the study (16%) and post (26%) periods. Whether this represents missing records, unmatched records, or a child's no longer being in the school district is unclear. Regardless, such levels of missing data will limit interpreting truancy results.

Table 14 – Characteristics Related to Truancy Broken Down by Clusters the DBHIDS Youth Cohort (n=3,315)

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Primary Service Characteristic	None	Outpatient	Residential Tx	Inpatient	BHRS	CSS
N	1,915	697	394	153	92	64
(% of Study Group)	(58%)	(21%)	(12%)	(5%)	(3%)	(2%)
Period Antecedent to Study Period (AY2001-2003)						
Has School Record	65%	58%	62%	64%	42%	52%
Truant	59%	46%***	77%***	55%	49%	55%
Study Period (AY2004-2006)						
Has School Record	55%	59%	36%	43%	45%	50%
Truant	68%	55%***	75%	71%	63%	81%
Period Subsequent to Study Period (AY2007-2008)						
Has School Record	39%	43%	23%	26%	34%	33%
Truant	60%	56%	70%	61%	59%	59%

CSS – Community Support Services; D&A – Drug and Alcohol; BHRS - Behavioral Health Rehabilitation Services; RTS – Residential Treatment Services

Proportion truant is based on data from the School District of Philadelphia, and reflects those who had school records available in the SDOP database.

Truancy criteria, for each time period, is any one academic year with 25 or more days in unexcused absences

The “period subsequent to the study period” only covers two years, and only youth in 7th and 8th grades in 2004 are followed here. This leaves a total n of 2,055 (1,191 “none” (58%); 481 outpatient (23%); 161 RTS (8%); 90 inpatient (4%); 80 bhRS (4%); and 52 CSS (3%)).

Results with asterisks indicate significant difference in proportion assessed to be truant, as compared to Cluster 1.

* - p < .05; ** - p < .01; *** - p < .001

Table 14 breaks down the truancy rates for the DBHIDS cohort by the clusters created in the first section of this chapter. As in Table 13, the high level of missing data, especially in the subsequent period, must be kept in mind. Except for the outpatient cluster, which had significantly lower rates of truancy than the other clusters in the pre-period and the study period, and the RTF cluster, which had significantly higher rates of truancy in the pre-period, there was not significant variation in truancy rates across clusters.

In summary, there are no clear patterns here that link truancy and levels of behavioral health services among youth in this cohort. While the comparison between the DBHIDS cohort and the entire SDOP dataset show the former group to have much higher truancy rates, it is unclear how much of this difference can be attributed to use of behavioral health services or any related disorders. This is because there are likely other differences, including socioeconomic status, that contribute to these disparate rates of truancy. Data measuring these factors were not available for this study. When comparing the six clusters that comprise the cohort on the basis of truancy, clusters 3 through 6, which

indicate heavier services use, did not show consistently higher rates of truancy with the exception of Cluster 3 (high residential treatment use), which had significantly higher absenteeism in the pre-period, but not in the other two periods. A final note about these results is that the substantial amount of missing data, and the unclear reasons for this missing data, place additional limits on interpreting these results.

Section 3.2.2. Special Education

Data on whether or not children were in special education classes was also available from SDOP data. There were numerous special education categories, only the most frequently occurring categories are reported here, as well as the percentages who received any type of special education services during the study period. Those without SDOP records are excluded, and SDOP students without shelter records are included in Table 15 for comparison.

Table 15 – Students Receiving Special Education during Study Period (AY2004 to AY2006): DBHIDS Cohort and Other SDOP Records

	DBHIDS Cohort	Other SDOP Records
N	3,315	55,778
Has School Record***	65%	100%
Any Special Education***	34.5%	25.0%
Emotionally Disturbed***	6.9%	2.4%
Mentally Gifted***	2.4%	6.2%
Mentally Retarded**	3.2%	2.2%
Specific Learning Disability***	21.2%	12.3%

Chi-square test of difference results indicate significant differences in percentages with asterisks present.

*- p <.05; **- p <.01; ***- p <.001

In Table 15, the DBHIDS youth cohort, when compared to the school district group, showed statistically significant differences in all of the special education categories. Overall, roughly one-third (34.5%) were designated for some sort of special education (compared to 25% of the school group). The proportions for emotionally disturbed (6.9%) and specific learning disability (21.2%) were also substantially higher than the school group, and the proportion mentally gifted was substantially lower (2.4%) than the school group. As with the truancy data, this comparison does not control for any differences, and thus other factors, such as poverty, may confound the differences found here between the two groups.

Table 16 breaks down the special education designations for the DBHIDS youth cohort by cluster. Significant differences are present in the distributions for the emotionally disturbed category, where proportions in the RTS (11%) and BHRS (24%) clusters are significantly different than the comparison group (cluster 1), and the Inpatient and CSS groups also have substantially larger (but not statistically different, proportions than cluster 1. With the SLD category, the outpatient cluster was the only group with a significantly higher proportion (26%) than cluster 1. Otherwise, there are no significant differences between the first cluster (no services use characteristics) and the other five clusters.

Table 16 – Special Education, Broken Down by Clusters the DBHIDS Youth Cohort (n=3,315)

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Primary Service Characteristic	None	Outpatient	Residential Tx	Inpatient	BHRS	CSS
N (% of Study Group)	1,915 (58%)	697 (21%)	394 (12%)	153 (5%)	92 (3%)	64 (2%)
Has School Record	67%	64%	63%	67%	45%	56%
Any Special Education	33%	37%	36%	30%	63%	36%
Emotionally Disturbed	5%	5%	11%**	11%	24%**	11%
Mentally Gifted	3%	2%	2%	1%	0	0
Mentally Retarded	3%	3%	1%	3%	5%	6%
Specific Learning Disability (SLD)	20%	26%*	21%	15%	27%	22%

CSS – Community Support Services; D&A – Drug and Alcohol; BHRS - Behavioral Health Rehabilitation Services; RTS – Residential Treatment Services

Results with asterisks indicate significant difference in proportion assessed to be in the specific special education component, as compared to Cluster 1.

* - $p < .05$; ** - $p < .01$; *** - $p < .001$

3.3. Office of Supportive Housing (OSH)

Table 17. Prevalence of Homelessness among the DBHIDS Cohort – Study Period (SY2004 to SY2007) and Subsequent Period (SY2007-SY2009)

Cluster	N	Homeless During Study Period	Homeless After Study Period
#1 – No services characteristics	1,915	2.6%	0.6%
#2 – Primary outpatient services	697	1.0%	0.4%
#3 – Primary residential treatment	394	1.8%	0%
#4 – Primary inpatient services	153	1.9%	0%
#5 – Primary BHRS services	92	2.2%	0%
#6 – Primary CSS services	64	1.6%	0%
Total	3,315	2.1%	0.4%

The “period subsequent to the study period” only covers one year, and only youth in 7th grade in 2004 are followed here. This leaves a total n of 1,208 in the DBHIDS cohort.

As there is no basis for comparison, the only conclusion available here is that, at an absolute rate, homelessness among the DBHIDS cohort is a relatively rare event, and there is little apparent variation among clusters that might indicate that different behavioral health services use patterns are associated with differential rates of shelter use.

Data from OSH was matched with the DBHIDS cohort records to assess the extent of homelessness among the cohort. Table 17 summarizes the prevalence of shelter use, and shows that, during the study period, 2.1% of the cohort experienced a shelter stay (with their family) and, in the three-year period

subsequent to the study period, 0.4% had a record of an OSH shelter stay. When broken down by cluster, the first cluster, which is the largest and those with the least amount of behavioral health services use, had the highest rate of shelter use during the study period, but this rate was neither substantially nor significantly higher than the other clusters. For the subsequent period, which only followed those of seventh grade age (since others would have reached adulthood in the post-period), the inpatient cluster again had the highest rate greater, at 0.6%. Most of the other clusters did not record an incidence of shelter use.

3.4. Department of Human Services (DHS)

The Philadelphia Department of Human Services provides dependency and delinquency services to Philadelphia's children and youth. Dependency services consist of out-of-home placements in settings such as foster care and group homes, and delinquency services involve juvenile detention facilities. Table 18 shows the proportions of youth in the DBHIDS cohort, broken down by cluster and by time period, that received DHS delinquency and dependency services. Overall, as shown on Table 19, substantial proportions of the youth cohort had involvement with each type of DHS service. Especially during the study period, among the total DBH cohort 19% had a record of delinquency services and 17% had a record of dependency services. The proportions for involvement in these systems was substantially lower in the three-year periods preceding and following the study period.

Table 18 – DHS Delinquency and Dependency Services for the DBHIDS Youth Cohort

DHS Service	Pre-Period	Study Period	Post-Period
Delinquency	9%	19%	7%
Dependency	12%	17%	7%

n=3,315 for pre and study periods; n=1,208 for post-period (7th grade only)

Table 19 breaks down the cohort's involvement in the dependency and delinquency systems by cluster designation. The primary finding here is that youth in the RTF cluster have much higher rates of participation in both DHS systems than the other clusters, and youth in the inpatient cluster had substantially higher rates of youth in the dependency system.

Table 19 – DHS Delinquency and Dependency Services Broken Down by Clusters for the DBHIDS Youth Cohort

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Primary Service Characteristic	None	Outpatient	Residential Tx	Inpatient	BHRS	CSS
N (% of Study Group)	1,915 (58%)	697 (21%)	394 (12%)	153 (5%)	92 (3%)	64 (2%)
Period Prior to Study Period (AY2001-2003)						
Delinquency Record	7%	2%***	36%***	3%	0	2%
Dependency Record	9%	8%	34%***	17%***	8%	0%
Study Period (AY2004-2006)						
Delinquency Record	16%	6%***	64%***	10%	7%*	5%*
Dependency Record	13%	11%	42%***	32%***	11%	2%*
Period Subsequent to Study Period (AY2007-2009)						
Delinquency Record	4%	4%	51%***	11%*	6%	3%
Dependency Record	5%	4%	25%***	22%***	3%	0%

CSS – Community Support Services; D&A – Drug and Alcohol; BHRS - Behavioral Health Rehabilitation Services; RTS – Residential Treatment Services

AY – Academic Year

In the “period subsequent to the study period” only youth in 7th grade in 2004 are followed. This reduces the total n to 1208 (X “none” (%); Y outpatient (%); Z RTS (%); T inpatient (%); U hrs (%); and V CSS (%)).

n=3,315 for pre and study periods; n=1,208 for post-period (7th grade only); cluster breakdown is: 703 “none” (58%); 283 outpatient (23%); 81 RTS (7%); 45 inpatient (4%); 63 hrs (5%); and 33 CSS (3%)

Results with asterisks indicate significant difference in proportion assessed to be in the specific DSH system (delinquency or dependency), as compared to Cluster 1.

* - p < .05; ** - p < .01; *** - p < .001

3.5. “Heavy” Cross Systems Users

Multi-system and “heavy” services use combines the analyses of all of the systems assessed so far in this part of the chapter. The criteria for heavy services use are taken from Part 2 of this chapter (see section 2.5 and Table 10), and are applied to the DBHIDS cohort. Table 20 compares services use between these heavy users and others in the cohort, and shows the extent to which the cohort makes use of other systems, and combinations of other systems.

Twenty-four percent of this cohort (n=810) was designated as heavy users, a category which by definition included members of cohorts 3 through 6. A small number of those in the first two clusters also were designated as heavy users. The “heavy users,” which made up slightly over one-quarter of the entire users, overlap almost perfectly with the those who have accumulated the highest quartile of expenses during the study period (i.e., more than \$15,000), as 91% of the heavy users were in the highest quartile, and only 3% of the others were in the highest quartile.

Compared to the rest of the cohort, the heavy user group had a slightly higher rate of truancy (71% to 65%) and roughly the same rates of youth designated for special education classes. When looking at only those in special education in the emotionally disturbed category, the heavy users had a substantially and significantly higher rate (12% to 5%). As was reported earlier (section 3.3), few youth had records of OSH shelter use, and there were no differences found among the subgroups. Finally, youth in the heavy user subgroup showed much higher rates of DHS services use, in both the

Table 20 – Summary of Services Use by Youth in the DBHIDS Cohort across Four Other Services Systems

	Heavy Cross-System Services Users	Others	Total DBHIDS Youth Cohort
N	810	2,505	3,315
(% of Study Group)	24%	76%	100%
Shelter Typology			
1 – No Dominant Service	9%	73%	58%
2 – Outpatient	4%	27%	21%
3 – RTF	48%	0%	12%
4 – Inpatient	19%	0%	5%
5 – BHRS	11%	0%	3%
6 – CSS	8%	0%	2%
High Cost (Highest Quartile)	91%	3%	25%
School District (SDOP)			
Truant*	71%	65%	66%
Special Education (any)	37%	34%	35%
Emotionally Disturbed***	12%	5%	7%
Specific Learning Disability	20%	22%	21%
Shelter Services (OSH)			
Has OSH Record	2%	2%	2%
“Chronic” or “Episodic” Use Pattern	<1%	<1%	<1%
Child Welfare (DHS)			
Dependency or Delinquency***	57%	23%	31%
Dependency***	30%	12%	17%
Delinquency***	36%	13%	19%
“Long Stayer”***	6%	2%	3%
“Very Long Stayer”***	27%	14%	17%
Multi-System Involvement			
Dependency & Delinquency***	9%	3%	4%
Dependency and Shelter	<1%	<1%	<1%
Delinquency and Shelter	<1%	<1%	<1%
Shelter and Special Ed	<1%	<1%	<1%
Dependency and Special Ed***	6%	2%	3%
Delinquency and Special Ed***	11%	4%	5%
Dep/Del and Shelter	<1%	<1%	<1%
Dep/Del and Special Ed***	3%	0.4%	1%

CSS – Community Support Services; D&A – Drug and Alcohol; BHRS - Behavioral Health Rehabilitation Services;
RTS – Residential Treatment Services

Upper quartile includes all with fees charged for services exceeding \$15,000 during the study period.

SDOP proportions are restricted to those who have SDOP records available.

Chi-square tests of difference between “Heavy Cross-System Services Users” and “Others” are not performed when small cell values ($n \leq 5$) that may render test results invalid.

*- $p < .05$; **- $p < .01$; ***- $p < .001$

dependency and delinquency systems, for every measure included in this table. Over half of the heavy users (57%) had involvement either in the DHS dependency or delinquency systems. While the heavy

users only made up 24% of the DBHIDS cohort, they included 55% of those in the cohort who had a DHS record of either delinquency or dependency.

Finally, the multi-system measures in Table 20 all have very small percentages when they involve OSH shelter services, or they have more involvement by the heavy users of DBHIDS services by virtue of the substantial disparities in the DHS services.

Table 21 summarizes the number of the other systems used by youth in the DBHIDS cohort, broken down by the heavy user subgroup and the others in the cohort. Forty-seven percent of the total youth cohort used at least one of the other four systems (DHS dependency, DHS delinquency, SDOP special education). Breaking that down, two-thirds (67%) of the heavy DBHIDS users had records in at least one of the four systems, compared to 41% of the others. In another way to look at this, the heavy users (24% of the total cohort), accounted for 35% of those using another system (not shown on table). Twelve percent of the total cohort used two or more other systems, with a disproportionate amount of this use (46%, not on table) from those in the heavy user subgroup. Very small amounts of the overall cohort used three or more systems. Taken together, although larger proportions of the heavy user subgroup had services use across the other systems, a substantial number of cohort members not in the group also had services use across one or more other systems.

Table 21 – Number of Systems (other than DBHIDS) Used by Youth in the DBHIDS Cohort

	Heavy Cross-System Services Users	Others	Total DBHIDS Youth Cohort
N	810	2,505	3,315
(% of Study Group)	24%	76%	100%
Any One System	67%	41%	47%
Any Two Systems	22%	8%	12%
Any Three Systems	3%	1%	1%
All Four Systems	0.4%	0%	0.1%

Chi-square tests of difference between “Heavy Cross-System Services Users” and “Others” are all statistically significant (one and two-system involvement).

The four “systems” counted in the table are: DBHIDS residential treatment or inpatient care; DHS delinquency; DHS dependency; and SDOP special education.

Lower categories are inclusive of members in the higher categories. For example, those with three-system involvement are also in the proportions having two-system and one-system involvement.

Table 22 shows the results from a Poisson regression model with number of systems as the dependent variable. Poisson regressions are typically used to model count data such as these data, where a large number of persons have a count of the lowest value (i.e., zero systems) and the number of persons with the higher counts tail off. Careful attention must be given to whether the data fits the Poisson distribution parameters, and there is a limited ability to interpret the coefficient values for this model, as they provided in logged form, beyond gauging the magnitude of the effect and whether or not the corresponding covariate has a positive or negative association with the outcome.

Descriptive results for all of the covariates, as well as the outcome measure (see Table 21), have been provided in previous sections of this chapter. The key finding here is that the indicator for “heavy” user of DBHIDS services, which was the focus of much of this current subsection, did not show a significant

Table 22 – Poisson Regression Model Assessing Correlates for System Involvement among the DBHIDS Youth Cohort

Covariate	Coefficient Value (logged)	Confidence Interval
"Heavy" User of DBHIDS Services	-0.04	-0.29 - 0.22
DBHIDS Services Cost (logged)	0.08	0.05 - 0.11***
Clusters ("no service concentration" as reference category)		
Cluster 2 (Outpatient)	-0.27	-0.39 - -0.14***
Cluster 3 (RTF)	0.41	0.17 - 0.66***
Cluster 4 (Inpatient)	0.05	-0.25 - 0.35
Cluster 5 (BHRS)	-0.39	-0.75 - -0.03*
Cluster 6 (CSS)	-0.82	-1.33 - -0.32**
Diagnoses		
Attention Deficit Disorder	-0.08	-0.17 - 0.02
Conduct Disorder	0.12	0.03 - 0.22*
Depressive Disorder	-0.29	-0.39 - -0.19***
Bipolar Disorder	-0.04	-0.23 - 0.16
Adjustment Disorder	0.00	-0.09 - 0.09
Substance Abuse	0.03	-0.09 - 0.14
Oppositional Defiant Disorder	0.07	-0.03 - 0.17
Male	0.21	0.12 - 0.29***
Grade (grade 9 as reference category)		
Grade 7	-0.33	-0.43 - -0.23***
Grade 8	-0.13	-0.22 - -0.04**
Race (Black as reference category)		
White	-0.01	-0.17 - 0.10
Other (than Black or White)	-0.02	-0.19 - 0.16
Hispanic	-0.20	-0.37 - -0.03*
Medicaid Eligibility Category (TANF as reference category)		
SSI	0.22	0.12 - 0.32***
Healthy Beginnings	-0.49	-0.63 - -0.35***
General Assistance	-0.32	-0.82 - 0.18
SDOP – truant	0.05	-0.05 - 0.15
SDOP – no attendance record	-0.48	-0.59 - -0.38***
Intercept	-0.88	-1.12 - -0.64***

*- p <.05; **- p <.01; ***- p <.001

Dependent Variable is number of services systems used by study group members (see Table 21)

CSS – Community Support Services; D&A – Drug and Alcohol; BHRS - Behavioral Health Rehabilitation Services;

RTS – Residential Treatment Services

3,289 degrees of freedom, deviance value 2611 – model meets dispersion parameters

association with number of systems. Heavy use of DBHIDS does have a positive and significant impact when it is the only covariate in the model (results not shown here), but loses its significance once other control variables are introduced into the model.

Cost of DBH services was, in contrast, highly significant. The values for this covariate, as is often the practice when entering cost values into a regression model, have been logged to minimize the impact of outliers. Cost is a covariate that closely overlaps with the heavy services use measure, and the results here suggest that the relationship between DBHIDS services used (of which cost is a proxy) and services from the other systems is more incremental in nature than a dichotomous measure of heavy services use.

There were also differences in services involvement by cluster designation (see section 2.4). Using Cluster 1 (no service concentration) as the reference category, several clusters had significant, negative associations with the dependent variable (i.e., lower numbers of other services used), and only cluster 3 (RTS concentration) had a significant, positive association with the dependent variable (i.e., higher numbers of services used). Among the diagnoses listed (see table 4), only conduct disorder, with a positive association, and depressive disorders, with a negative association, have significant associations with the dependent variable.

The remainder of the variables served primarily as controls. Increased age, male gender, and Medicaid eligibility through SSI all had increased associations with more service systems used.

Taken together, this model suggests that high DBHIDS services use, measured by cost, is associated with services use across other systems, but that this propensity to use other services systems is also centered among those in the cluster marked by heavy use of residential treatment services. Youth who were designated as part of this cluster (see tables 7 and 8) also had a high prevalence rate (72%) of conduct disorder, were predominantly male (76%) and the majority (63%) were of ninth grade age. All of these characteristics were also associated with the use of more services systems.

3.6. Section Summary

Key findings from Section 3, focusing upon the analysis of cross-systems services use by the DBH cohort include:

- During the study period, two-thirds (66%) of the cohort met the truancy criterion of 25 unexcused absences during any year in the study period. This is somewhat higher than the rate for the pre-period (58%) and the post-period (60%). The truancy rates across all three time periods were substantially and significantly higher than those of the more general SDOP group. Large amounts of missing data and inability to control for other circumstances precludes, however, making any definitive conclusions on associations between receiving DBH services and truancy.
- Roughly one-third (34.5%) of the DBHIDS youth cohort were designated for some sort of special education, a proportion substantially and significantly higher than a comparison group. This overall proportion, as well as proportions for emotionally disturbed (6.9%) and specific learning disability (21.2%) categories, were also significantly and substantially higher than the comparison group. As with the truancy data, this analysis is done with large amounts of missing

data does not control for any differences between groups besides records of DBHIDS involvement.

- Shelter use with families in the OSH system was low, with 2.1% of the overall cohort having a record of being in a shelter during the study period.
- In breaking down cross-systems services use by cluster, the group whose DBHIDS services use centers on residential treatment stays have higher rates of special education placement into the emotionally disturbed category and higher rates of placements in both the DHS dependency and delinquency systems. Based on this, youth in the RTF cluster show the highest propensity among the clusters to show cross-systems use. Youth in the inpatient hospitalization cluster had higher rates of dependency placements than others in the cohort, and youth in the BHRS “wraparound” cluster had higher rates of special education, especially in the emotionally disturbed category.

4. CONCLUSION

This study examined patterns of mental health services use and use of other services, mainly over a three-year period, by youth aged 12 to 15 in 2004 who received services from Philadelphia DBHIDS during the study period (academic years 2004 through 2006) following an extended period of inactivity (i.e., incidence cohort). The chapter examined patterns of mental health services use in one part and the use of other services in a second part.

The key findings from these analyses are summarized in Subsections 2.7 and 3.6.

In the first section, about 21% of the study group was identified as heavy services users across a six-group services-based typology. In the second section, 47% of the youth in the cohort made use of services from systems other than DBHIDS. Youth who were in the residential treatment cluster, particularly those who consumed larger amounts of DBHIDS services, were most likely to also accrue services use in the other services systems examined here. The predominant modes of cross-system use among this cluster were with the DHS dependency and delinquency systems. This is the locus of multi-system use among the DBHIDS youth cohort and the other services systems studied here.

This is a start for further exploration as to the degree to which services are currently coordinated across these systems and the extent to which collaborations can provide efficiencies in cost and outcomes for the youth in question. It is likely, in many of these cases, that children with primary ties to the DHS system are receiving placements in RTFs, instead of a similar DHS placement, in part due to the ability of DHS to “cost shift” the price of this care so that state Medical Assistance benefits for behavioral health, administered by the City of Philadelphia, becomes the payment source. Whether this is the most efficient and effective means to provide these services is also a topic for further research suggested by these findings.

CHAPTER 3: YOUTH USING FAMILY HOMELESS SHELTERS

1. INTRODUCTION

Research has shown that children are at highest risk of experiencing stays in emergency shelter during their pre-school years and this risk drops off considerably by the time children reach adolescence. Explanations for this are mostly related to circumstances related to a mother with one or more preschool age children and the vulnerabilities she experiences related to economic hardship, strained family support, and difficulties with child care and partaking in the labor force. As families get older their economic situation tends to stabilize to where the family is at substantially reduced risk for homelessness. In families that contain adolescent children and experience unstable housing situations, older children will often be informally placed with others while the mother and younger siblings stay in shelter, which further reduces their presence among the sheltered population. Additionally, logistical difficulties of having adolescent boys live in shelter facilities containing mostly single mothers and younger children also sometimes preclude these boys from staying with their families.⁵

Although underrepresented and often overlooked, adolescent children do have a presence among the sheltered homeless population. This chapter provides some findings on 794 youth who were of age to be in grades 7 through 9 and their experiences in the municipal shelter system, school system, and child welfare system over a three-year time period. Specifically, these were youth who were of age to be in grades 7 through 9 (i.e., ages 12 and 15, or born between September 1, 1989 and August 31, 1992) when school started in September 2004 and who had a record of staying in a homeless shelter that was administered or funded through the Philadelphia Office of Supportive Housing (OSH) during the 3-year time period from September 2004 through August 2007.

This cohort was identified through administrative data compiled from the homeless management information system (HMIS) database of OSH. OSH either administers or funds approximately 85% of the shelter beds available in Philadelphia to both families and single adults, and has been systematically maintaining records on persons staying in this shelter system, and the time they have spent in shelter, since 2004. While this database permits wide-ranging examination of the sheltered homeless population, it does not include data on any of the youth shelters in Philadelphia, which are not affiliated with OSH, nor does it cover any families or individuals who experienced homelessness but who did not make use of OSH shelters.

These records are also matched with records from the City of Philadelphia's School District, Department of Human Services, and Department of Behavioral Health and Intellectual disAbility Services. These

⁵ For further research on this, see: Culhane, Dennis P. & Stephen Metraux (1999). "Assessing Relative Risk for Homeless Shelter Usage in New York City and Philadelphia." *Population Research and Policy Review* 18(3): 219-236; Culhane, Dennis P., Stephen Metraux, and Jay Bainbridge. "The Age Structure of Contemporary Homelessness: Risk Period or Cohort Effect?" *Penn School of Social Policy and Practice Working Paper* (2010): 1-28 (available at: http://works.bepress.com/dennis_culhane/93), and Fargo, Jamison D., Nicholas Eng, Stephen Metraux, & Dennis Culhane, PhD (2010). "Trends in Earnings and Employment Before and After the First Instance of Homelessness: A Multi-Cohort Analysis." Paper presented at the Annual Meeting of the American Public Health Association, Denver CO, November 6-10.

matched records permit an examination into the extent to which the youth in the OSH cohort specified here also extended their services use into other systems, creating a situation where their services use may be expensive and poorly coordinated. Also examined here is whether those youth who are in the family shelter system for longer periods are at greater risk for involvement across other systems. Results from these analyses promise to offer a unique look across systems into how experiences of homelessness interact with the use of other services among the youth that are the focus of this study.

2. *MUNICIPAL SHELTER EXPERIENCES*

2.1. Introduction and Research Questions

This section provides a basic profile of the 794 youth in the OSH cohort through descriptive findings related to their shelter use, family composition and demographics. The youth will hereafter be referred to as the study group, and the three-year time period (September 2004 through August 2007) will hereafter be referred to as the study period. Data from OSH consisted of person-level records that included individual identifiers (name, social security number, gender, date of birth) and basic demographic information (age, race, and gender), and stay level identifiers that included details on dates and places in which the individuals were sheltered. These data were denoted by both individual and household identifiers that enabled matching the youth in the study group with the household they were in when they stayed in shelter.

Specific questions addressed in this part of the chapter include:

1. What proportion of youth aged 12-15, based on a shelter use typology, show extended or repeated patterns of shelter use?
2. What are the household compositions for sheltered youth ages 12-15?
3. Was extended shelter use in the study period more likely to lead to additional shelter use in the time period after the study period?

2.2. Demographics

Figure 1 breaks down this study group by projected school grade at the beginning of the study period.⁶ The largest proportion of the study group, 40 percent, were in seventh grade, and these proportions fell with each subsequent grade – 35% for eighth graders and 25% for ninth graders. This disparity in age distribution was likely due to the older youth being more likely to make arrangements other than staying in shelter with their families during periods of homelessness.

⁶ A substantial proportion of the OSH cohort did not have matching school records. Given this inability to determine grades for the entire cohort, children who were aged 12 on September 1, 2004 – the start of school year 2004-05 – were considered to be in seventh grade; those aged 13 on this date were considered to be in eighth grade; and those aged 14 on this date were considered to be in ninth grade. It was not possible to identify children who were retained for one or more grades or who otherwise would have their age not be consistent with the prescribed age range for each of these three school grades. It was also not possible, given the available data, to verify that the youth in this study group were actually attending school during all or part of the study period.

Figure 1 - Youth In Philadelphia Municipal Homeless Shelter System between 9/1/2004 and 8/31/2007 who were of Age to be in Grades 7-9 (ages 12-14; n=794)

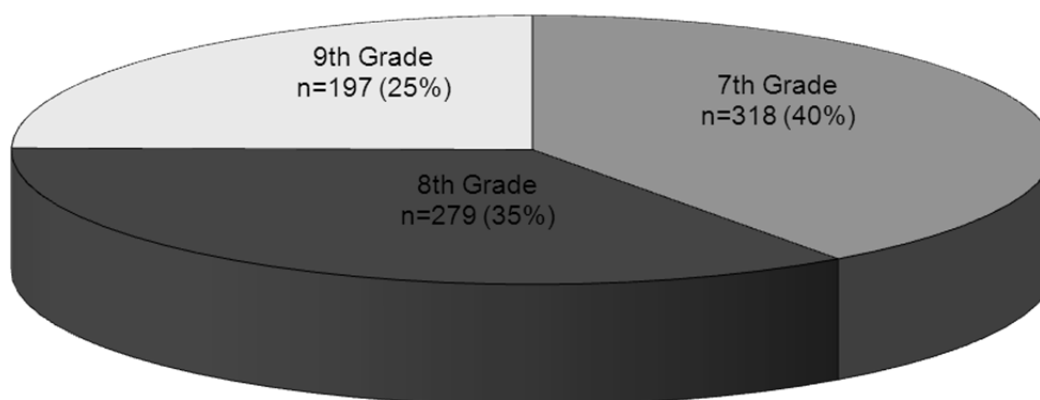


Table 1 shows that 47% of the youth in the study group were male. When this gender distribution is broken down by grade (not shown on the table), 50% and 49% of the youth in grades 7 and 8, respectively, are female, while 61% of those in grade 9 are female. This, along with the reduced number of ninth-grade aged children shown on Figure 1, supports the assumption that a substantial number of older boys who otherwise would have been in this study group do not accompany their families to shelter. The racial and ethnic distribution of the youth in the study group were largely consistent with the distribution of the overall sheltered homeless population in Philadelphia, with the large majority of youth being non-Hispanic African-American (87%), Hispanics (of any race) comprising 8% of the population, and non-Hispanic Whites comprising 3% of the population.

Table 1. Characteristics of the youth cohort

Variables	Youth cohort (N=794)
Gender (male %)	47
African-American (non-Hispanic) (%)	87
Latino (any race) (%)	8
White (non-Hispanic) (%)	3
Other (%)	1
Unknown/Missing (%)	1

2.3. Shelter Utilization

Shelter stays are reported in terms of total days spent in shelter and number of discrete shelter episodes during the three-year study period for each youth in the study group. Total day and episode data for

each youth was derived from aggregating shelter records that were in the OSH HMIS. Total shelter days are simply unduplicated days spent in shelter over the three-year study period. Shelter episodes are the length of time spent in shelter based on joining proximate OSH stay records into more extended shelter episodes using a 30-day-gap exit criterion.⁷

Table 2. Days in Shelter and Shelter Stays during Study Period (1) for Youths in the Study Group (2)

Stays in Shelter (3)	
Mean (stays)	1.3 stays
1	78%
2	18%
3 to 5	4%
Days in Shelter (total in 3 yrs) (4)	
Mean (days)	180 days
1-7	11%
7-14	7%
14-30	8%
30-90	20%
90-180	16%
180-365	22%
365+	16%

N=794

1 – Study Period covers September 1, 2004 through August 31, 2007

2 – Youths in the study group are all those identified as having spent time in a shelter administered through Philadelphia’s Office of Supportive Housing

3 – A shelter “stay” refers to a period of time spent in shelter that is marked by at least a 30-day absence from any shelter prior to initial shelter entrance and again following shelter exit. Exits from shelter for shorter periods are still considered as the same shelter stay.

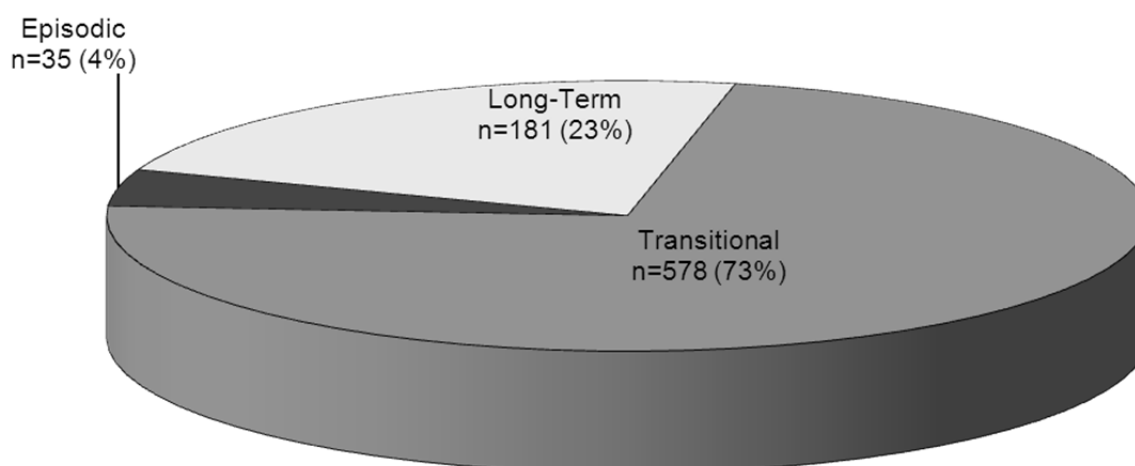
4- Shelter days reflect only those days that persons are recorded as having been in shelter, and do not include days recorded as part of a stay when the person did not have a record of being physically in the shelter.

Table 2 shows stay dynamics as broken down by shelter days and episodes. The large majority of youths (78 percent) were in families that only had single episodes of shelter use (using the 30-day criterion previously explained), although these single shelter stays could range in duration from a few days to multiple years. Only 4% had 3 or more stays, and no family accrued more than 6 stays during the three-year study period. Looking at the total number of days accrued during the study period, while the mean stay was 180 days, slightly less than the majority of families (46%) used less than ninety days. Thirty-eight percent of the youth were in families that accrued more than 180 days in shelter during the study period.

⁷ Put differently, this means that all stays in which the gap from one exit to the next entry was less than 30 days were considered to be part of one discrete episode. This helps ensure that multiple episodes did not merely reflect temporary respites from shelter in which housing remained tenuous and that only sustained exits of a specified duration (30 days or more) were identified as distinct exits.

Shelter utilization by the study group was converted into a basic typology based upon shelter days and episodes over the course of the study period. In creating this typology, we used cluster analysis methods similar to previous studies⁸ in which single adults were assigned to three specific clusters based on the number of days spent in shelter and the number of discrete stays in shelter during a specific time period. Cluster analysis is a systematic procedure for assigning observations to groups based on their similarities in the clustering criteria, with the end result being analogous, in this case, to looking at a graph where total days and total episodes were charted and circles were drawn around the main groupings. For the purposes of designating accurate clusters, data from outside the study period and part of stays that extended into the study period were included in the cluster analysis.

Figure 2 - Clusters Based on Shelter Days and Stays Spent in the Philadelphia Municipal Shelter System During the 3-Year Study Period for Study Group Youth (n=794)



The cluster distribution shown on Figure 2 shows the youths (and their families) as falling into three distinct clusters. These groups included *transitional* users, where persons used shelter for one or two stays and for a limited number of days; *long-term* users, where persons used shelter for a limited number of extended stays; and *episodic* users, where persons tallied multiple shelter stays of relatively

⁸ Two of the more prominent studies which use similar cluster analysis methodologies are: Culhane, Dennis P., Stephen Metraux, Jung Min Park, Mary Ann Schretzman & Jesse Valente (2007). "Testing a Typology of Family Homelessness Based on Patterns of Public Shelter Utilization in Four US Jurisdictions: Implications for Policy and Program Planning." *Housing Policy Debate* 18(1): 1-28; and Kuhn, Randall, and Dennis P. Culhane (1998). "Applying Cluster Analysis to Test a Typology of Homelessness: Results from the Analysis of Administrative Data." *American Journal of Community Psychology* 17(1):23-43.

brief durations. Just under three-quarters of the youth in the study group fell into the transitional cluster, meaning that their stays in the shelter system were time limited (mean of 1.2 stays and 84 days in shelter), after which they were able to make lasting exits out of the shelter system. Of more concern are the remaining youth who either showed long-term stay patterns (23 percent) with extended periods of shelter use (mean 1.2 stays and 455 days), and the remaining four percent whose families showed recurring, episodic shelter use (mean 3.4 stays and 327 days).⁹ These latter two patterns showed more extensive involvement with the shelter system where they would be at higher risk of experiencing detrimental collateral outcomes, including but not limited to difficulty maintaining their school attendance.

2.4. Household Composition

Findings on household composition were derived by merging stay-level, individual-level, and household-level datasets from the OSH HMIS to get records of all members of the households with whom each youth in the study group entered into shelter. Two principal measures were sought in doing this: first was the degree to which individuals in the study group were in the same household with other individuals in the study group (and presumably siblings); and the second was the overall composition of the household – adults and children – for each youth in the study group.

Table 3 provides some information on the household composition of the youth in the study group. The 794 youth were part of 631 different households, and of these households 486 (77 percent) contained only one youth who was in the study group. This means that 486 of the 794 youth (61 percent) were the only person in their household who was in the study group, and the remaining 39 percent of the youth were in the 23 percent of households that contained multiple youth who were in the study group. In most cases, this meant that families contained siblings who were twins or close enough in age to where they were both of age to be in grades 7 through 9. While relationship can often be inferred from similar names and birth dates, relationship cannot be conclusively determined from information in the OSH data.

Data on household composition is also shown on Table 3. Eighty-three percent of the youth were in families headed by single adults. In four of these cases, the youths themselves were the oldest persons in the household, and were accompanied in the shelter with infants who were presumably their children. In these cases they were counted as adults (although they were under age 18) as they were the apparent heads of household. Looking at the number of children in the families for all 794 youth in the study shows that the majority of these youth were in families containing three or more children, with a mean number of 3.3 children per family. These measures show these families as containing more children, on average, than the mean for all families who stayed in shelters. This is likely due to the families containing these youth being older than most of the families staying in shelter, and thus having had more opportunity to have children than other families, most of whom consist of younger mothers with young children.

Table 3 – Household Composition for Youths in the Study Group (1)

⁹ Mean days and stays for each cluster are not shown in figures or tables.

Siblings (among study group members) in Families (n=631 families) (2)	
0 siblings	77%
1 siblings	20%
2 to 4 siblings	3%
Household Composition (n=794 individuals) (3)	
Number of Adults	
1	83%
2	15%
3+	2%
Number of Adults (mean)	1.2 persons
Number of Children	
1	16%
2	22%
3	19%
4	21%
5+	22%
Number of Children (mean)	3.3 persons

1 – Youths in the study group are all those identified as having spent time in a shelter administered through Philadelphia’s Office of Supportive Housing

2 – Families refers to the household with whom the youths spent their time in shelters.

3 – In all but four cases, the youths in the study group were regarded as children in families headed by one or more adults. In the other four cases, the youths entered shelter as heads of household accompanied by an infant. In these cases, the youth is regarded as head of the household and is counted as an adult in this table.

2.5. Shelter use following the risk period

Shelter use was also tracked for the three-year period following the study period for the 318 in the cohort who were of age to be in grade 7. This time period, referred to in this section as the “post-period”, spanned academic years 2007-2010 and only the subset was followed because this was the only grade/age in which the youth remained juveniles for the entire post period.

Table 4 summarizes shelter use in the post-period by the total OSH study group as well as for each of the three clusters. Six percent of the entire cohort experienced an additional shelter stay in the subsequent period. This overall rate belies differences between clusters, with 4% of the transitional cluster experiencing additional shelter stays in the subsequent period, compared to 24% and 9% experiencing stays during this period by persons in the episodic and long-term clusters, respectively. For each cluster, most of those who do experience a repeat stay in all the clusters will stay in shelter for one stay, and their total shelter days will number over 30 days during this period. While the two clusters with the heaviest shelter use in the study period are at risk for continued shelter use in the subsequent period, the overall rates of shelter return are only high in the smallest (episodic) cluster.

Table 4 – Shelter Stays and Days in the 3-Year Period Subsequent to the Study Period (AY2007-2010) for those in the Cohort of Age to be in Seventh Grade in AY2004

	Cluster 1	Cluster 2	Cluster 3	Total
Primary Service Characteristic	Transitional	Episodic	Long-Term	
N	229	17	72	318
(% of Study Group)	(72%)	(5%)	(23%)	(100%)
Shelter Stays				
No Stays	96%	76%	91%	94%
1 Stay	3%	18%	8%	5%
2-3 Stays	0.4%	6%	1%	1%
Shelter Days				
0 Days	96%	76%	91%	94%
0-30 Days	2%	6%	1%	2%
30+ Days	2%	18%	8%	4%

Differences between clusters in shelter days and stays both have significant chi-square values ($p < .001$)

2.6. Section Summary

Key findings from Section 2, containing analyses related to demographics, family composition, and shelter experiences of the OSH cohort include:

- Twenty-seven percent ($n=216$) of the youth in this study group stood to be impacted particularly severely by their shelter experiences, which were either of an extended (23%) or repeated (4%) nature.
- There were 794 sheltered youth in 691 sheltered families. Households for youth in the OSH cohort tended to be bigger than average family households staying in OSH shelters. Most youth were in a single parent household with 3.3 children.
- Most youth and their families did make sustained exits from shelter use during the study period. However, 9% of the long-term cluster and 24% of the episodic cluster did experience additional shelter stays in the period following the study period.

3. SERVICES USE ACROSS OTHER SYSTEMS

3.1. Introduction and Research Questions

This section follows the cohort of youth who were described in the previous section (794 youth who were in families that used OSH shelters) and assesses their use of services across three other systems and across three different time periods. This means that this section will look at the extent to which youth in this cohort were:

1. Truant or enrolled in special education classes, as per records of from the School District of Philadelphia (SDOP);

2. Provided with behavioral health services; as per records from the City of Philadelphia's Department of Behavioral Health and Intellectual disAbility Services (DBHIDS);
3. Involved in dependency (group home, foster care, and other out-of-home placements) and delinquency (juvenile detention) services; as per records from the City of Philadelphia's Department of Human Services (DHS).

This section looks at these uses of other service systems both in the study period, which covers academic years (AY) 2004-2006 (September 2004 through August 2007); the three-year period immediately preceding the study period (AY 2001-2003; or the "pre-period"); and the three-year period immediately following the study period (AY 2007-2009; or the "post-period"). In the case of SDOP data, the post-period is only two years due to data limitations.

This survey of services use over a broader time period and across different systems will provide a more comprehensive overview of total services use than has been previously undertaken. The next three sections in this part of the chapter will each focus on one services system, and the subsequent section will take a more integrated look at services across these systems.

The key questions for this part of the chapter are:

1. What are rates of services use for youth in the OSH cohort in the school, mental health, and child welfare systems?
2. To what extent do youth in the OSH cohort access services in other public systems to where they can be considered as "heavy users"?
3. Do these rates of services use (both in individual systems and across multiple systems) differ within the OSH cohort when the youth are grouped by shelter use patterns (clusters based on total days and discrete stays in shelters)?

3.2. School District of Philadelphia (SDOP)

3.2.1. Truancy

Truancy was assessed based on a youth having 25 or more unexcused absences during one school year during one of the three time periods (pre-study period, study period, post-study period). Table 5 shows truancy rates for the overall OSH cohort, as well as for the other SDOP records that were available for students in the same grades during the same years. This undifferentiated SDOP group represents a large convenience sample of all available records to be used as a rough comparison for the OSH results.

There were high rates of truancy for the OSH cohort. During the study period, nearly three-quarters of the study group (74%) met the higher truancy criterion. The comparable rates for the pre and post periods were lower (62% and 66%, respectively). While levels of truancy increased from the pre-period to the study period, where the youth first became homeless, the truancy levels for the SDOP group also increased over these two time periods.

Table 5 – Characteristics Related to Truancy – Youth Cohort and Other SDOP Records

	OSH Cohort	Other SDOP Records
Period Antecedent to Study Period (AY2001-2003)		
N	794	54,851
Has School Record	62%	100%
Truant	62%	37%
Study Period (AY2004-2006)		
N	794	57,425
Has School Record	60%	84%
Truant	74%	44%
Period Subsequent to Study Period (AY2007-2008)		
N	413	34,611
Has School Record	69%	73%
Truant	66%	42%

Proportion truant is based on data from the School District of Philadelphia, and reflects those who had school records available in the SDOP database.

Truancy criteria, for each time period, is any one academic year with 25 or more days in unexcused absences. The “period subsequent to the study period” only covers two years, and only youth in 7th and 8th grades in 2004 are followed here.

One limitation to these findings was the high levels of missing data where many OSH records did not have a matching SDOP record. Records may have been missing in SDOP database due to such factors as dropping out or moving, or inconsistent identifying information. Missing SDOP records were also a problem with the later time periods for the SDOP records, but less so than for OSH records.

Table 6 breaks down the truancy rates for the OSH cohort by the clusters created in the first section of this chapter. As in Table 5, the level of missing data, especially in the subsequent period, must be kept in mind. Truancy rates were high across all clusters in the study period and in the subsequent period. Chi-square test for difference indicated significant differences in truancy rates between clusters only in the post-period. Across both the study and post periods, truancy for youth in the episodic cluster was markedly higher than the other clusters, but there were relatively small numbers of youth in this cluster.

Table 6 – Characteristics Related to Truancy: Youth Cohort as Broken Down by Shelter Use Clusters (n=794)

	Cluster 1	Cluster 2	Cluster 3
Primary Service Characteristic	Transitional	Episodic	Long-Term
N	578	35	181
(% of Study Group)	(73%)	(4%)	(23%)
Period Antecedent to Study Period (AY2001-2003)			
Has School Record	59%	63%	72%
Truant	61%	59%	67%
Study Period (AY2004-2006)			

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Has School Record	57%	57%	70%
Truant	72%	95%	74%
Period Subsequent to Study Period (AY2007-2008)			
Has School Record	65%	79%	76%
Truant	61%	93%	75%

Proportion truant is based on those with records in the SDOP database.

Truancy criteria, for each time period, is any one academic year with 25 or more days in unexcused absences

The “period subsequent to the study period” only covers two years, and only youth in 7th and 8th grades in 2004 are followed here. This leaves a total n of 413 (289 transitional (70%); 19 episodic (5%); 105 long-term (25%)).

Section 3.2.2. Special Education

Table 7 – Students Receiving Special Education during Study Period (AY2004 to AY2006): Sheltered and Other SDOP Records

	OSH Cohort	Other SDOP Records
N	794	57,425
Has School Record	65%	100%
Any Special Education	27.5%	25.0%
Emotionally Disturbed***	5.6%	2.5%
Mentally Gifted**	3.1%	6.1%
Mentally Retarded*	3.7%	2.2%
Specific Learning Disability*	15.8%	12.9%

Chi-square test of difference results indicate significant differences in percentages with asterisks:

*- p <.05; **- p <.01; ***- p <.001

There were no significant differences in the OSH cohort between clusters and thus the breakdown of results by cluster are not shown here.

Data on whether or not children were in special education classes were also available from SDOP data. There were numerous special education categories, only the most frequently occurring categories are reported here, as well as the percentages who received any type of special education services during the study period. Those without SDOP records are excluded, and SDOP students without shelter records are included in Table 7 for comparison.

In Table 7, the OSH cohort showed statistically significant differences in all of the subcategories of special education, but not in the overall category, where roughly one quarter of each group received such services. The proportion of youth receiving special education in the emotionally disturbed category is about twice as high in the sheltered group, and those in the mentally gifted category is roughly half as high among the sheltered youth. However, for both categories the percentages are low. Finally, this comparison does not control for any differences, and thus other factors, such as poverty, may confound the differences attributed to shelter in Table 7.

3.3 Department of Behavioral Health and Intellectual Disability Services (DBHIDS)

Table 8 – Characteristics Related to DBHIDS Services Use for the OSH Cohort Broken Down by Clusters and by Three Time Periods

	Cluster 1	Cluster 2	Cluster 3	Total
Primary Service Characteristic	Transitional	Episodic	Long-Term	
N	578	35	181	794
(% of Study Group)	(73%)	(4%)	(23%)	(100%)
Period Antecedent to Study Period (AY2001-2003)				
Has DBHIDS Record	24%	14%	18%	22%
Residential Treatment or Inpatient Care	4%	0%	2%	3%
Study Period (AY2004-2006)				
Has DBHIDS Record	35%	23%	41%	36%
Residential Treatment or Inpatient Care	10%	0%	11%	10%
Period Subsequent to Study Period (AY2007-2009)				
Has DBHIDS Record	29%	41%	29%	30%
Residential Treatment or Inpatient Care	10%	6%	7%	9%

AY – Academic Year

In the “period subsequent to the study period” only youth in 7th grade in 2004 are followed. This reduces the total n to 318 (229 transitional (72%); 17 episodic (5%); 72 long-term (23%)).

Chi-square tests of difference find no differences between clusters in either of the DBHIDS services types in any of the three time periods.

DBHIDS claims records were matched with the OSH cohort in order to assess the extent to which the cohort used services over a larger period of time and whether or not this use of services differed by cluster (as assigned during the study period). Table 8 summarizes the results for this match. Over one-third (36%) of the overall OSH cohort also had some type of DBHIDS services during the study period. The overall rates for the periods preceding the study period (22%) and following the study period (30%; 7th graders only) were lower but were still high. A substantial subset of the youth spent time in residential treatment or inpatient hospital settings. There was no significant difference in the proportions across clusters in any of the time periods or categories of service (inpatient/residential treatment or any service).

3.4. Department of Human Services (DHS)

The Philadelphia Department of Human Services provides dependency and delinquency services to Philadelphia’s children and youth. Dependency services consist of out-of-home placements in settings such as foster care and group homes, and delinquency services involve juvenile detention facilities. Table 9 shows the proportions of youth in the OSH cohort, broken down by cluster and by time period,

that received DHS delinquency and dependency services. Overall, substantial proportions of the youth cohort had involvement with either type of DHS service. Except for the dependency record in the antecedent period, there were no significant and substantial differences across clusters. However, the transitional cluster has a consistently higher rate of both dependency and delinquency records than the other two clusters and, if the long-term and episodic clusters were combined, then the differences among the transitional and combined cluster groups was significant across the study and post periods. As both dependency and delinquency placements represent extensive time in residential settings, the youth may have less opportunity to be homeless with their family and thus may have disproportionately shown transitional shelter patterns.

Table 9 – Characteristics Related to DHS Services Use for the OSH Cohort Broken Down by Clusters and by Three Time Periods

	Cluster 1	Cluster 2	Cluster 3	Total
Primary Service Characteristic	Transitional	Episodic	Long-Term	
N	578	35	181	794
(% of Study Group)	(73%)	(4%)	(23%)	(100%)
Period Antecedent to Study Period (AY2001-2003)				
Delinquency Record	1%	0%	2%	2%
Dependency Record*	5%	0%	1%	4%
Study Period (AY2004-2006)				
Delinquency Record	6%	0%	3%	5%
Dependency Record	7%	3%	3%	6%
Period Subsequent to Study Period (AY2007-2009)				
Delinquency Record	4%	0%	4%	4%
Dependency Record	3%	0%	3%	3%

AY – Academic Year

In the “period subsequent to the study period” only youth in 7th grade in 2004 are followed. This reduces the total n to 318 (229 transitional (72%); 17 episodic (5%); 72 long-term (23%)).

Chi-square test of difference results indicate significant differences in percentages with asterisks:

*- p <.05; **- p <.01; ***- p <.001

3.5. “Heavy” Cross Systems Users

Multi-system and “heavy” services use combines the analyses of all of the systems assessed in this part of the chapter. “Heavy” services use was, as determined in Chapter 2 on DBHIDS services, use of residential treatment or inpatient services and costs accrued that were one standard deviation (\$31,400) or more above the mean (\$14,500), rounded to an even \$46,000, or, on average, over \$15,000 per year worth of mental health services over the study period. For DHS services, use was considered heavy when the services use patterns were judged as “long stayers” or “very long stayers” based on their lifetime use of DHS services in either the delinquency or the dependency systems.¹⁰ While these criteria for heavy use are somewhat arbitrary, they are unambiguous indicators of heavy involvement in either of the two systems.

Table 10 compares the subgroup assessed as heavy services users and the rest of the OSH cohort on their levels of services use across systems. Sixty-eight youth in the OSH cohort (9%) are in the “heavy cross-system service users” subgroup. There were no significant differences in the distribution of clusters between the heavy users and others in the OSH cohort. Partially by design, there were substantial differences between the heavy user subgroup and the others in the OSH cohort in many of the single-system services use measures across the SDOP, DBHIDS, and DHS systems. Finally, this

¹⁰ The “long stayer” and “very long stayer” designations were derived in the section of the Multi-System Youth Study that examined a cohort of DHS-using youth. For dependency, long-stayers and very long-stayers had, on average, accrued 76 and 162 months of placement in the DHS system, respectively. For delinquency, these respective means are 65 and 166 months.

subgroup was inclusive of almost all of those counted as “multi-system”-involved by the measures shown in Table 9.

Table 10 – Summary of Services Use by OSH Youth Cohort across Four Other Services Systems

	Heavy Cross-System Services Users	Others	Total OSH Youth Cohort
N	68	726	794
(% of Study Group)	9%	91%	100%
Shelter Typology			
Transitional	78%	72%	73%
Episodic	1%	5%	4%
Long-Term	21%	23%	23%
School District (SDOP)			
Truant	68%	74%	74%
Special Education (any)**	46%	27%	28%
Emotionally Disturbed***	17%	4%	6%
Specific Learning Disability	21%	15%	16%
Behavioral Health (DBHIDS)			
Has DBHIDS Record***	96%	30%	36%
Residential Treatment or Inpatient Care (RT/IP) ***	56%	6%	10%
\$46,000+ in Costs***	44%	0.3%	4%
Child Welfare (DHS)			
Dependency or Delinquency***	74%	3%	9%
Dependency***	44%	3%	6%
Delinquency***	46%	1%	5%
“Long Stayer”	9%	0%	0.8%
“Very Long Stayer”	56%	0%	9%
Multi-System Involvement			
Dependency and Delinquency	16%	0.7%	2%
Dependency and RT/IP	15%	0.6%	2%
Delinquency and RT/IP	25%	0.4%	3%
RT/IP and Special Education***	21%	1%	3%
Dependency and Special Ed	16%	0.7%	2%
Delinquency and Special Ed	19%	0.3%	2%
Dep/Del and RT/IP	10%	0%	0.9%
Dep/Del and Special Ed	9%	0%	0.8%

Chi-square tests of difference between “Heavy Cross-System Services Users” and “Others” are not performed when small cell values (n <= 5) that may render test results invalid.

*- p <.05; **- p <.01; ***- p <.001

RT/IP – DBHIDS residential treatment/inpatient care; Dep/Del – DHS dependency and delinquency services

Table 11 looks at the proportions of the OSH cohort who were involved in other systems, broken down by heavy user subgroup classification. Twenty-nine percent of the entire cohort had a record in at least one of the other four systems, and 8% had a record in two of the other four systems. The majority of

youth in the two-system category, and virtually all of those involved in three or four systems, fell into the heavy user category.

Table 11 – Number of Systems (other than OSH) Used by Youth in the OSH Cohort

	Heavy Cross-System Services Users	Others	Total OSH Youth Cohort
N	68	726	794
(% of Study Group)	9%	91%	100%
Any One System	100%	23%	29%
Any Two Systems	56%	3%	8%
Any Three Systems	19%	0.3%	2%
All Four Systems	6%	0%	0.5%

Chi-square tests of difference between “Heavy Cross-System Services Users” and “Others” are all statistically significant (one and two-system involvement).

The four “systems” counted in the table are: DBHIDS residential treatment or inpatient care; DHS delinquency; DHS dependency; and SDOP special education.

Lower categories are inclusive of members in the higher categories. For example, those with three-system involvement are also in the proportions having two-system and one-system involvement.

Finally, Table 12 assesses different demographic and services use covariates and their relationship to being in the heavy-user subgroup. DBHIDS and DHS measures were not included in the model since they were instrumental in designating youth as heavy users. In this model, the only service-use covariate to have had a significant relationship with being a heavy user was receiving special education as emotionally disturbed. Noteworthy also was the lack of significant relationship between shelter use patterns and having heavy user status. Otherwise, being male also was significantly associated with increased odds of being in the heavy user cohort.

In summary, a substantial minority of the shelter youth (9% or 68 out of 794 persons) were considered heavy users by their extensive use of either DHS or DBHIDS services in addition to their being sheltered as part of a family. This group also had much higher levels than the rest of the cohort of being in special education as emotionally disturbed. Given the overlapping use of these four systems: DHS dependency and delinquency; SDOP emotionally disturbed special education programming, and high-cost DBHIDS residential treatment or inpatient hospitalization, this heavy user group consumes large amounts of services across systems at considerable cost. While the precise costs are only available for the DBHIDS services, the majority of this cohort also had years of residential placements in the DHS delinquency and dependency systems, and over half had records of special education.

Table 12 – Logistic Regression Model Assessing Correlates for “Heavy Cross-Systems Services Use” among the OSH Youth Cohort

Covariate	Odds Ratio	Confidence Interval
Cluster (transitional as reference category)		
Long-term	0.85	0.45-1.59
Episodic	0.34	0.04-2.55
Special Education Type		
Emotionally Disturbed	5.26	2.16-12.77***
Specific Learning Disability	1.41	0.66-3.02
Truant	0.64	0.32-1.29
Missing School District Record	0.79	0.38-1.63
Male	1.72	1.01-2.92*
Grade (grade 7 as reference category)		
Grade 8	1.66	0.90-3.06
Grade 9	1.64	0.84-3.23
Black	2.15	0.82-5.62

*- p <.05; **- p <.01; ***- p <.001

3.6 Section Summary

Key findings from the analysis of cross-systems services use by the OSH cohort include:

- During the study period, nearly three-quarters of the OSH cohort (74%) were considered truant. This was both extensive and at a higher level than the large group of housed school district students used for a comparison group. Large amounts of missing data and inability to control for other circumstances precludes, however, making any definitive conclusions on the impact of shelter stays on truancy.
- One quarter of the OSH youth cohort was in some type of special education, and the rates of youth in this cohort who received special education services by virtue of being emotionally disturbed (5.6%) or with a specific learning disability (15.8%) was significantly higher than the comparison group.
- Over one-third (36%) of the overall OSH cohort also had some type of DBHIDS services during the study period. The overall rates for the periods preceding the study period (22%) and following the study period (30%; 7th graders only) were lower but were still high. Ten percent of the youth spent time in residential treatment or inpatient hospital settings during the study period.
- Small but substantial proportions of the youth cohort had involvement with DHS dependency (6%) and delinquency (5%) services during the study period.
- In addition to their shelter stay, 29% of the OSH youth cohort had a record of involved in one or more of the following systems: a DHS dependency or delinquency placement, a DBHIDS residential treatment or inpatient hospital stay, or placement in special education during the study period. Eight percent used at least any two of these systems.

- A substantial minority of the shelter youth (9% or 68 out of 794 persons) were considered heavy users by their extensive use of either DHS or DBHIDS services in addition to their being sheltered as part of a family. Additionally, this group had much higher levels than the rest of the cohort of placement in special education as emotionally disturbed.

4. CONCLUSION

This study examined shelter use patterns and use of other services, mainly over a three-year period, by youth aged 12 to 15 in 2004 who spent time (with their family) in a Philadelphia OSH family shelter in the academic years 2004 through 2006. The chapter examined shelter use patterns in one part and the use of other services in a second part. The key findings from these analyses are presented in sections 2.6 and 3.6.

Shelter use patterns among the families of these youth are consistent with findings in other homeless populations that show most homeless households (families and single individuals) are homeless for a single, relatively brief episode. However, 27% of the youth were in households that showed shelter use patterns that were either of an extended or repeated nature. Given the difficulties associated with experiencing homelessness, youth in such households would raise the most concern as being vulnerable to problems that may necessitate the use of other systems. This was a primary focus in examining collateral services use among these groups in the school system, the mental health system, and the child welfare and juvenile justice systems.

The results from the other systems showed relatively high levels of services use in these systems by the OSH youth cohort, but no evidence which linked extensive shelter use to higher levels of services use in the other systems. Among the more striking findings, 36% of the cohort youth received some sort of a DBHIDS mental health service in the study period, with 10% spending some time in a residential treatment or inpatient hospital facility. Nine percent spent time in a placement in either the DHS dependency or delinquency systems. And, among those for whom records are available, almost three-quarters (78%) met criteria for truancy and over one-quarter (28%) were in some type of special education setting in the school district.

Nine percent of the youth (64 of 794 persons) in the OSH youth cohort met the criteria set here for heavy cross-systems services use. This means that, in addition to their shelter use they also made extensive use of either child welfare and/or mental health services. Further analyses into this group shows that these “heavy users” also are disproportionately more likely to receive special education services as emotionally disturbed, and over half of them (56%) have services records in two or more of the four systems (beyond shelter) that were examined. Conversely, despite being only 9% of the overall cohort, this heavy user designation was inclusive of the large majority of the multi-system users.

Any focus on multi-systems youth among the family shelter population would target this subset of the cohort. These youth appear to make substantial use of the different services examined here, in many cases across multiple systems. While definitive cost data was not available here, the available data suggest that services costs (including shelter) for many easily exceeded \$100,000 over the course of the three year study period.

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There is no apparent relationship between shelter stay patterns and heavy services use. Slightly more youth who were identified as heavy users (78%) than others in the cohort (72%) had short-term, transitional shelter use patterns. This suggests that, while there is no evidence here that a “dose-response” effect, where shelter leads to increased services use in other systems, is present, a sizable minority of youth who are in sheltered households are troubled, based on their interactions with these systems, and shelter may offer an intervention point for these youth. While these youth are substantially involved in other systems, the extent to which this services use is coordinated across systems is unclear and, if not, efforts to coordinate these services for better and more cost efficient outcomes should be explored as a follow up to these results.

CHAPTER 4: YOUTH AND SCHOOL SYSTEM-RELATED OUTCOMES

1. INTRODUCTION

This chapter looks at youth who were, according to School District of Philadelphia (SDOP) records, in grades 7 through 9 in the 2004-05 academic year (AY). There are three primary foci to this chapter. The first is on the prevalence and distinct patterns of school absenteeism among the study group. Second, this chapter also assesses whether different trajectories of school absenteeism are associated with multi-system service involvement across four municipal services systems. Finally, service-engaged youth with disabilities will be specifically identified within each service system. From the standpoint of special education, this project also highlights the association between disabilities and the involvement of other service systems.

This population-based study uses an integrated administrative data system to examine the prevalence of system service involvement and the dynamics of service use for a cohort of middle-school youth. This chapter provides information regarding prevalence, service system utilization patterns, and associated characteristics of multi, single, and no system users, and it measures unmet needs of students with disabilities. Results should also provide detailed information for policy makers and practitioners regarding youth service users (in particular multi-system service users), their gateways of entry into these systems and adverse impacts on subsequent educational and social outcomes. Implications include potential areas of interagency collaboration and programming to intervene effectively in the lives of youth with disabilities and/or multi-system involvement.

To address the problems of school absenteeism in public schools, related system service utilization, and unmet service needs of students with disabilities, this project has several major purposes:

1. Identify the prevalence of school absenteeism by type and reason, describe the yearly and monthly trends of school absenteeism, and identify distinct group trajectories of school absenteeism over time.
2. Describe the number of youth involved in each social service system; identify multi, single, and no system users; describe the associations between school absenteeism and involvement in other related service systems.
3. Describe the prevalence of youth with disabilities who utilize or are at risk for engaging in any service system; identify youth with disabilities who engaged in multi, single or none of the identified systems; and describe the associations between disabilities and system(s) involvement.

2. Prevalence and trajectories of school absenteeism

2.1. Introduction and Research Questions

Prior research has found that children with chronic school absenteeism exhibit lower academic achievement, higher dropout rates, and poor social/behavioral adjustment compared to other children.

Findings have shown that these students tend to have poor attendance rates, which might contribute to chronic truancy and school failure. The vulnerability associated with school absenteeism has become a great concern in the education system regarding children's educational well-being. Existing research, however, is limited in its capacity to understand school attendance problems for students in large urban areas. Major limitations in this nascent body of research include: (1) reliance on small convenience samples; (2) utilization of aggregate data; (3) self-report of school absenteeism; (3) methodological shortcomings in determining the longitudinal nature of absenteeism; and (4) the failure to declare the potential heterogeneity of trajectories of school absenteeism. This population-based study uses an integrated data system to investigate the prevalence and trajectory patterns of school absenteeism for a cohort of middle-school youth with emotional disturbance in a large urban school district (N=58,029). This project has three purposes: (1) demonstrate the prevalence of school absenteeism; (2) identify distinct trajectory patterns of absenteeism; and (3) identify related student characteristics based on population-based data. This project would help researchers and practitioners develop and improve service provision.

The data for this chapter comes primarily from SDOP administrative records. This database was used to create a youth cohort consisting of 58,029 participants, who were enrolled in 7th, 8th and 9th grades in school year 04-05 in the School District of Philadelphia. Table 1 displays sample means for characteristics of the youth cohort, selected in school year 04-05. More than half of students were male (51.7%). Among students, there were 66.1% African-American, 14.9% Latino, 13.8% White, and 5.3% others (i.e., Asian and Native American). Nearly 46% of students were eligible for free/reduced lunch. Additionally, 18.8% of students were identified with disabilities and received special education services. Fewer than 10% of students were limited English proficient (LEP) students. The attrition rates in school year 05-06 and 06-07 were 6.9% (N=54,027) and 15.94% (N=48,777), respectively.

Table 1. Characteristics of the middle-school youth cohort, selected in school year 04-05

Variables	Youth cohort (N=58,029)
Gender (male %)	52
African-American (%)	66
Latino (%)	15
White (%)	14
Other (%)	5
Free/reduced lunch (%)	46
Special education (%)	19
Limited English Proficiency (%)	9

Descriptive analysis was conducted to indicate the prevalence of absenteeism by types and reasons in school years 2004-05, 2005-06, and 2006-07, respectively. These three years, collectively, will be referred to as the index period. Also, means were reported to show the variation of the monthly and yearly absenteeism and unexcused absence rates, respectively, the index period.

Aside from prevalence, another aim of this study is to develop a better understanding of the patterns of school absenteeism at the individual level over the course of the index period. Because trajectory

patterns, the patterns whereby students are absent over time, can be expected to fluctuate over time, simple linear or quadratic functions of the developmental change may not be appropriate. This is one of the first studies to examine the trajectory patterns of absenteeism through a person-centered analysis, which allows for the analysis of distinct patterns and trajectories.

Latent trajectory models were used to differentiate whether there were multiple patterns of developmental trajectories in monthly and yearly unexcused absenteeism rates, respectively. The trajectory models for each outcome (monthly and yearly unexcused absences) were estimated using a finite mixture approach conducted via Proc TRAJ in SAS 9.1.¹¹ An optimal number of groups were then selected based on the starting level and the shape of the change of the developmental trajectories. When analyzing the trajectory patterns of monthly unexcused absences, each school year consisted of 10 waves of data points that denote the monthly absenteeism rates from September to June. When analyzing the trajectory patterns of yearly unexcused absenteeism, 3 waves of data points that indicate the yearly absenteeism rates in school years 04-05, 05-06, and 06-07 were used. After a series of analysis with different numbers of group patterns, the number of group trajectory patterns was finalized through the comparison of Bayesian Information Criterion (BIC), group size, and the shape of change in each trajectory (linear, quadratic, or cubic).

Based on this, the key questions for this part of the chapter are:

1. What is the prevalence of absenteeism (by types and reasons) for the youth cohort in school years 04-05, 05-06, and 06-07, respectively?
2. What are the monthly absenteeism and unexcused absence rates, respectively, for the youth cohort in school years 04-05, 05-06, and 06-07?
3. What are the yearly absence and unexcused absence rates, respectively, for the youth cohort in school years 04-05, 05-06, and 06-07?
4. Are there distinct, multiple patterns of change in the monthly unexcused absences of the youth cohort in school years 04-05, 05-06, and 06-07?
5. Are there distinct, multiple patterns of change in the yearly unexcused absences of the youth cohort in school years 04-05 through 06-07?

2.2. Types of and Reasons for Absenteeism

Table 2 shows the mean numbers of days absent by type for the youth cohort in school years 04-05, 05-06, and 06-07. The most common types of school absence were unexcused absence, excused absence, out of school suspension, and tardy. Among these absenteeism types, students had, on average, 20 days of unexcused absences in school years 04-05 through 06-07. There were, on average, 3 days of excused absences and 1 day of school suspension per student. There were nearly 16 incidences of tardiness for homeroom or start of day per average student. However, tardiness as a reason for school absence was not included in the analysis.

¹¹ For more information on trajectory analysis, the reader is referred to: Nagin, DS (2005). *Group-based Modeling of Development*. Cambridge, MA: Harvard University Press.

Table 2. Mean numbers of absence days (by types) per student over 3 school years

Absenteeism type	School year 04-05 (N=58,029)	School year 05-06 (N=54,027)	School year 06-07 (N=48,777)	Average
Unexcused absence	18.66	20.47	20.21	19.78
Tardy	15.53	17.24	15.89	16.33
Excused absence	3.78	3.00	3.19	3.32
Out of school suspension	1.36	1.14	0.97	1.16
Unknown	0.00	0.04	0.00	0.01

Table 3 shows the prevalence of absenteeism by reason for the youth cohort in school years 04-05, 05-06, and 06-07. While the reasons varied, the most common reasons for school absence were illness of pupil, parental non-compliance, suspension, and “other urgent.” Among these absence reasons, health issues (illness of pupil) was shown to be a challenge that leads to students’ school absenteeism. Furthermore, parental non-compliance is another barrier that affects students’ school absence. However, nearly 31-35 days of absence from school were labeled as “unknown,” which suggests a need for further clarification in the reporting system.

Table 3. Mean numbers of absence days (by reason) per student over 3 school years

Absenteeism type	School year 04-05 (N=58,029)	School year 05-06 (N=54,027)	School year 06-07 (N=48,777)
Unknown	31.03	35.11	33.35
Parental non-compliance	3.08	2.60	2.51
Illness of pupil (excused)	3.06	2.20	2.34
Suspension	0.95	1.06	1.03
Other urgent reason (excused)	0.99	0.73	0.62
Truancy (unexcused)	0.10	0.06	0.24
Teen parent leave	0.03	0.04	0.08
Death in family (excused)	0.09	0.07	0.07
Immunization non-compliance	0.01	0.00	0.01
Religious holiday (excused)	0.01	0.01	0.00

2.3. Monthly and Yearly Absence Rates

Figure 1 shows the monthly absenteeism rates in school years 04-05, 05-06, and 06-07. The absence rates changed and increased gradually over time and peaked in the last month of each school year.

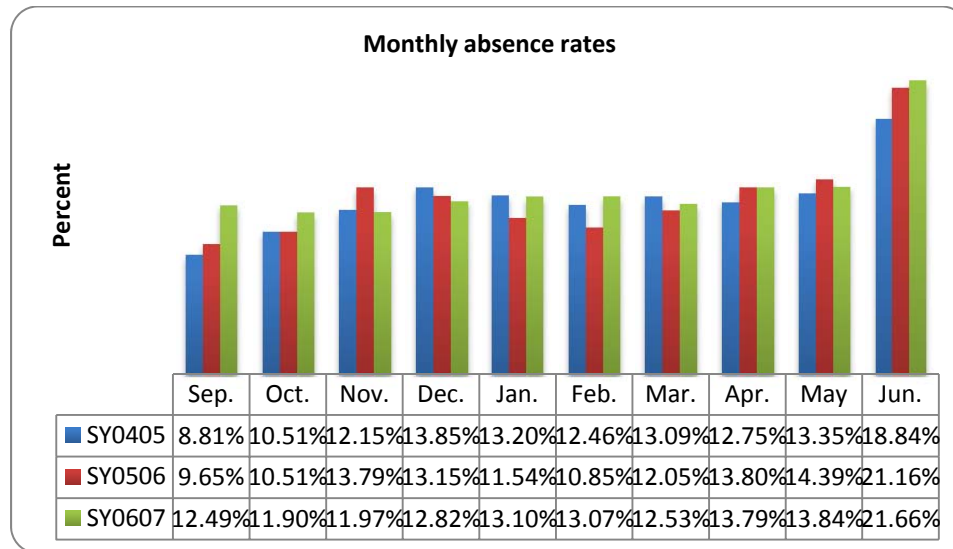


Figure 1. Monthly absenteeism rates in school years 04-05, 05-06, and 06-07

Figure 2 shows the monthly unexcused absence rates in school years 04-05, 05-06, and 06-07. The unexcused absence rates also changed and increased gradually over time and peaked in the last month of each school year. To differentiate the heterogeneity within the middle-school youth, using data from school year 05-06, section 3.4 identified subgroups of students with distinct trajectory patterns of school absenteeism through latent trajectory analysis.

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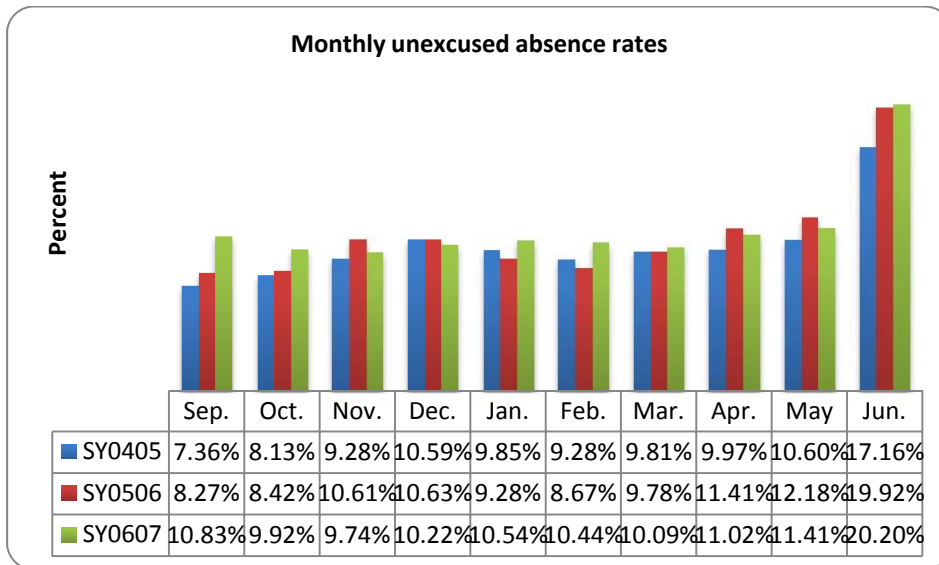


Figure 2. Monthly unexcused absence rates in school years 04-05, 05-06, and 06-07

Figure 3 shows the yearly absence rates in school years 04-05, 05-06, and 06-07. The average absence rates were 12.66% in school year 04-05, 13.62% in school year 05-06, and 13.47% in school year 06-07.

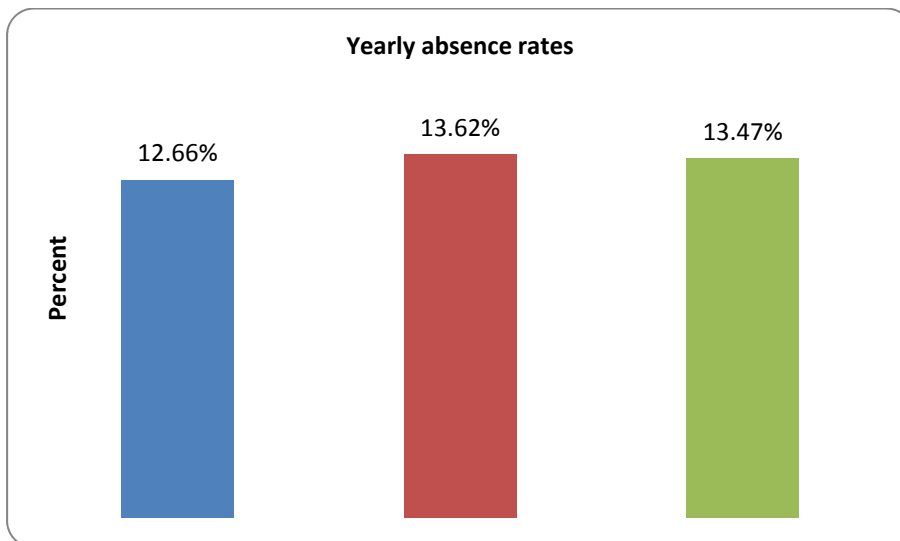


Figure 3. Yearly absence rates in school years 04-05, 05-06, and 06-07

Figure 4 shows the yearly unexcused absence rates in school years 04-05, 05-06, and 06-07. The average unexcused absence rates were 9.93% in school year 04-05, 10.89% in school year 05-06, and 11.17% in school year 06-07. To differentiate the heterogeneity within the middle-school youth, using data from

school year 05-06, section 3.5 identified subgroups of students with distinct trajectory patterns of school absenteeism with the latent trajectory analysis.

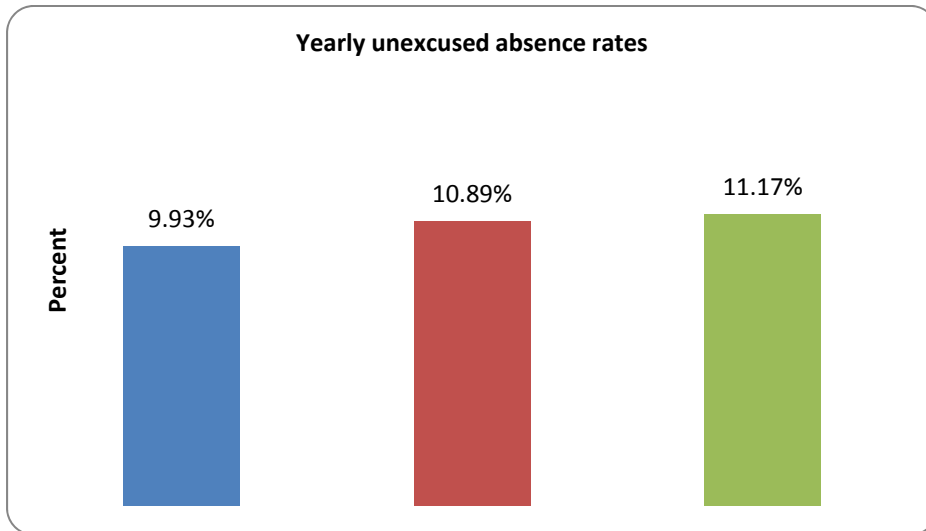


Figure 4. Yearly unexcused absence rates in school years 04-05, 05-06, and 06-07

2.4. Trajectory Patterns of Unexcused Absence Rates Over Time

Using a finite mixture approach conducted via Proc TRAJ in SAS 9.1, several models with different number of group patterns were analyzed here and five group trajectory patterns were finalized as optimal group memberships. The results from school year 05-06 typify the patterns observed in 04-05 and 06-07, and these results are provided here to show the typical patterns and types that were observed throughout the latent trajectory analysis.

Table 4 indicates the sizes of the five absenteeism groups in school year 05-06. The groups were labeled as:

- Stable-very-low. This group contained 38% of participants and its members had virtually no absences during the school year.
- Stable-low. This group contained 42% of participants and its members maintained a low level of absences over the school year;
- Early-increasing/decreasing. Three percent of participants were in this group. Their absenteeism trajectory consisted of an early increase to a high level of absence, and then dropped back again to a low level of absence.
- Increasing-to-stable-moderate. Nearly 14% of participants experienced a gradually increasing-to-stable-moderate trajectory course.

- Increasing-to-stable high. This group contained 3% of participants, and had an increase in the beginning of the school year and then remained at a high rate of absence over the school year. Having such a trajectory indicates severe and chronic school absenteeism problems.

Table 4. Percentages of the study group assigned to each trajectory group based on patterns of unexcused absences: School year 2005-06

Group membership		Size of participants (%)
1	Stable-very-low	38
2	Stable-low	42
3	Increasing-to-stable-moderate	14
4	Early-increasing/decreasing	3
5	Increasing-to-stable-high	3

Figure 5 provides an illustration of the patterns of absenteeism over the course of the 2005 school year for each of the five trajectory types. The two lowest trajectories are relatively stable, trajectories #3 and #5 each increased moderately over time and became those with the highest rates of absenteeism by the end of the year, and trajectory #4, with its increase and subsequent decrease, was the most volatile.

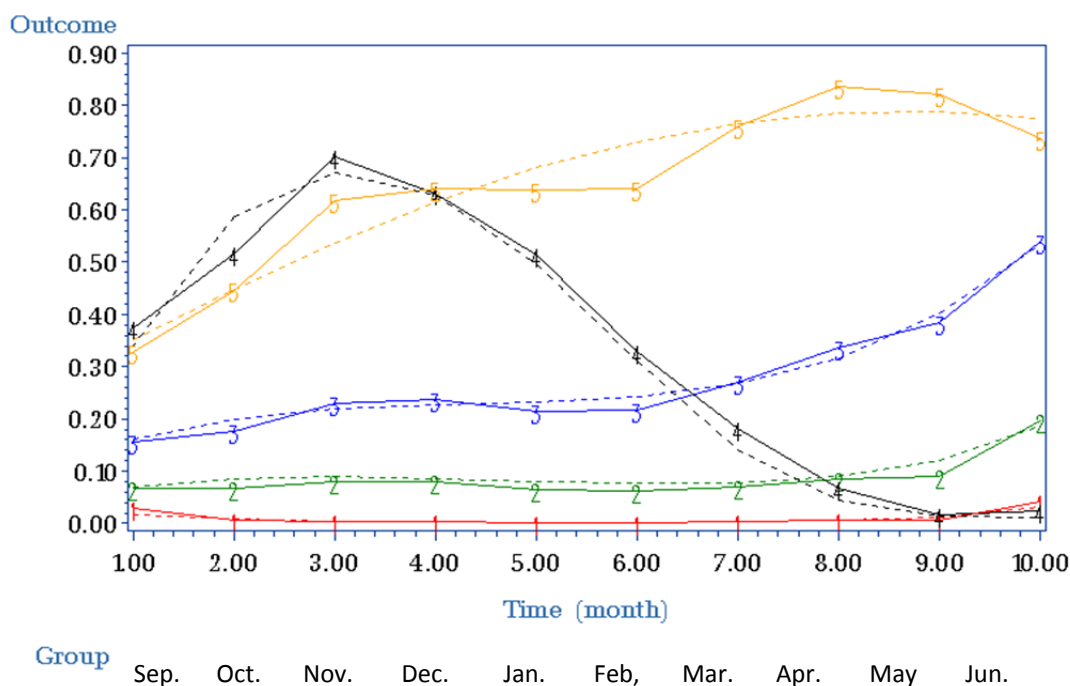


Figure 5. Trajectories of unexcused absence in school year 2005-06

The same method used to produce the trajectory for the single year was applied to data for the three annual absenteeism levels for each year of the index period. In other words, where the five trajectories for the 2005-06 school year (Table 4) were specified based upon ten single-month points, now five new trajectories are specified based on three single-year points. The results are shown on Table 5. The trajectories patterns for the index period differ from those on Table 4. To summarize:

- The “stable-low” trajectory is the only group to continue from the 1-year analysis, and its membership increased from 38% of the study group in the one-year analysis (Table 4) to 75% of this extended analysis. This group remained close to a zero level of absenteeism over the whole period of 3 school years.
- There is now a “stable-moderate” trajectory, containing 15% of the study group.
- Three percent of the study group had an early high level absenteeism rate and then dropped gradually to very a low level absence rate, giving this group a trajectory labeled “high-decreasing-to-low” type.
- The “increasing-to-high” group consisted of 3% of the study group who were gradually increasing to a high-level absenteeism rate over the index period.
- Finally, 4% of the study group were in the “moderate-increasing-to-high-decreasing-to-low” group, which had an increase in the beginning of the school year and changed from a high-level to a low-level absence rate over the school years (see figure 8).

Table 5. Percentage of the sample assigned to each trajectory group by yearly unexcused absence

Group membership		Size of participants (%)
1	Stable-low	75
2	High-decreasing-to-low	3
3	Stable-moderate	15
4	Increasing-to-high	3
5	Moderate-Increasing-to-high-decreasing-to-low	4

Figure 6, in the manner done in Figure 5, shows the unexcused absenteeism levels over time for the five trajectories that were introduced on Table 5. Keeping in mind that three-quarters of the study group were in the “stable-low” (#1) trajectory, three of the other trajectories (#2, #5, and #4) each had a high level of unexcused absence in one of the three years. The remaining trajectory, the “stable-moderate” (#3), had (as described) a steady rate of absenteeism over the three years that was higher than the #1 trajectory.

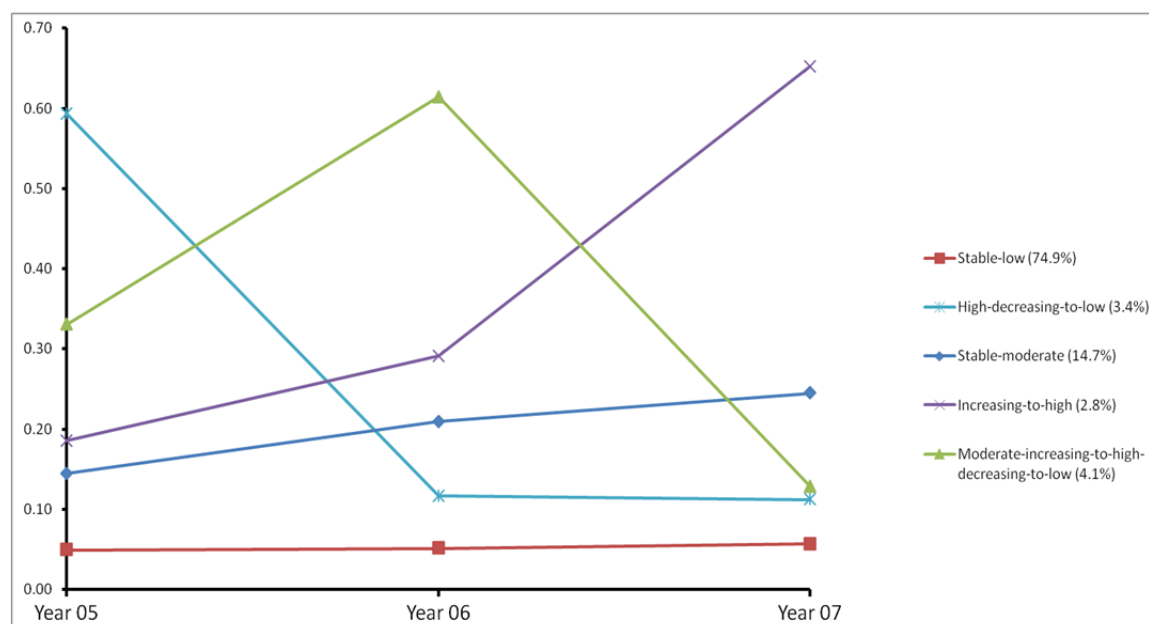


Figure 6. Trajectories of yearly unexcused absence in school year 04-05 through 06-07

2.5. Section Summary

This section reviewed the extent of absenteeism among students in the study group, first by assessing average levels of absenteeism by year and by month, and then by looking at the heterogeneity of school absenteeism through assessing trajectories of absenteeism over the course of one year and then over the course of the three-year index period.

The key findings of this section include:

- The most common types of absence were unexcused absences, excused absences, out of school suspensions, and tardiness. Students had, on average, 19.78 days of unexcused absences in school years 04-05 through 06-07. In contrast, students had, on average, 3.32 days of excused absences and 1 day of school suspension.
- Results of the trajectory patterns of monthly unexcused absence indicate that most students are clustered in the stable-low (41.85%) and stable-very-low (38.16%) groups over the index period. The remainder had higher levels of absenteeism that fluctuated over the course of the school year. 3% of the students were assessed as having an “increasing-to-stable-high” trajectory, which indicates severe and chronic school absenteeism problems.
- Consistent patterns were also found in the trajectory patterns of yearly unexcused absence. Approximately 75% of students have a stable-low group patterns over the entire index period. On the other hand, those experiencing the four other trajectory patterns stand to be at risk for poor educational and social outcomes over the index period.

The typologies identified in this project better the understanding of the characteristics and potential services needs of subgroups students with specific typologies of school absenteeism. In the next section, this inquiry will be expanded to assess whether these trajectories also showed differential rates of services use in other public social services systems.

3. School Absenteeism and Service System Utilization

3.1. Introduction and Research Questions

This project also investigated the relationship between trajectory patterns of school absenteeism and students' involvement in multiple service systems, including mental health (DBH), child welfare (DHS), and homelessness (OSH). Descriptive analyses provided information on the prevalence of service system utilization and the extent of multi, single, or no system use for the youth cohort in the pre-period, index-period, and post-period. Hierarchical logistic regression modeling was then used to analyze whether the typologies of school absenteeism were associated with any involvement of any service system (i.e., dependent and delinquent care, mental health care, and homeless shelter use) in the index period while controlling for child and family covariates. Ordinal logistic regression modeling was also used to analyze whether the typologies of school absenteeism were associated with the involvement of multi-system service utilization in the index period (multi, single, and no system users) while controlling for child and family covariates.

The complete sample (i.e., 7th, 8th and 9th graders) was used for analysis in the pre-period (N=54,875) and index period (N=58,029). Only the 7th grade population (N=15,077) was selected for analysis in the post-period because the majority of 8th and 9th graders had already exited the school system by that time. This other services to which the records for the students in this study group were matched to were:

1. Family homeless shelter; based upon shelter records from the City of Philadelphia's Office of Supportive Housing (OSH);
2. Involvement in foster care or juvenile justice services; based upon records from the City of Philadelphia's Department of Human Services (DHS).
3. Behavioral health (i.e., mental health and substance abuse) services; based upon records from the City of Philadelphia's Department of Behavioral Health and Intellectual disAbility Services (DBHIDS);

The specific research questions guiding the analyses in this section include:

1. What is the prevalence of any service system utilization for youth with distinct types of school absenteeism in the pre-index period (SY 01-02 through SY 03-04), index-period (SY 04-05 through SY 06-07), and post-index period (SY 07-08 through SY 09-10)?
2. What is the prevalence by type of school absenteeism of involvement in single and multi-system services uses, or no system (unduplicated) services use in the pre-period, index-period, and post-period?

3. To what extent are the typologies of school absenteeism associated with any involvement of any service system while controlling for child and family covariates?
4. To what extent are the typologies of school absenteeism associated with the involvement of multi-system services use (multi-, single, and no system users) while controlling for child and family covariates

3.2. Overall Use of Services in Other (non-SDOP) Public Systems

In the pre-period approximately 4.9% of students in the School District of Philadelphia were involved in any one service system (i.e., dependent and delinquent care, inpatient/residential care, and/or homeless shelter services). In the index-period over 8.2% of students were involved in any single service system. In the post-period over 3.1% of students were involved in any service system. Thus, the index period was the peak period of service system involvement. Table 6 lays out these results.

Table 6. The prevalence of multi-, single and no system users

	Pre-period (N=54,875)	Index-period (N=58,029)	Post-period (N=15,077)
No system use	95%	92%	97%
One system use	3.7%	6.3%	2.5%
Two or more system use	1.2%	1.9%	0.6%
Total service users	4.9%	8.2%	3.1%

Figure 7 presents the prevalence rates of individual service system utilization for the youth cohort in the pre, index, and post-periods. In the pre-period the largest number of students involved in any service system utilization was in the child welfare system (i.e., dependent and delinquent care, out of home placements) at 2.7% and 2.4%, respectively. Over 1% of youth had involvement with intensive mental health services (inpatient or residential care). Specifically, Table 7 shows that, for students with identified typologies of school absenteeism, more than 8% of students with a high-decreasing-to-low trajectory pattern were youth in the dependency and delinquency groups. A considerable number of the moderate-increasing-to-high-decreasing-to-low group received dependency care and delinquent care service (6.2 % and 5.6%, respectively). Additionally, stable-moderate and increasing-to-high also have received dependency care (3.2% and 3.6%, respectively) and delinquent care (2.2% and 2.5%, respectively). Less than 1% of students with a stable-low trajectory pattern received intensive mental health services. Students with other typologies of school absenteeism received higher rates of mental health service utilization, at 1.5%-3.3%. In general, students with high-decreasing-to-low and moderate-increasing-to-high-decreasing-to-low were the two groups that had higher rates of service system utilization. Students with a stable-low trajectory pattern tended to have the least amount of service system utilization.

In the index period the majority of the youth cohort involved in a single system was in the child welfare system (see Figure 7). Delinquency and dependency were the two most common systems that middle-school students engaged in, at 4.6% and 2.9 %, respectively (again, out of home placement). Approximately 2% of youth had involvement with intensive mental health services (again, inpatient or residential care). Less than 1% of youth were involved in the homeless shelter system. Specifically, for students with identified typologies of school absenteeism, a considerable number of the high-decreasing-to-low group was in the dependency and delinquency groups, at 9.7% and 14.6%, respectively. The moderate-increasing-to-high-decreasing-to-low group also received dependency care and delinquent care services (7.2% and 10.7%, respectively). Additionally, stable-moderate and increasing-to-high also received dependent care (3.9% and 5.5%, respectively) and delinquent care (4.5% and 7.4%, respectively). In general, students with high-decreasing-to-low and moderate-increasing-to-high-decreasing-to-low were the two groups that had higher rates of service system utilization. Students with a stable-low trajectory pattern tended to have the least amount of service system utilization. Thus the results in the index period were similar to those in the pre-period.

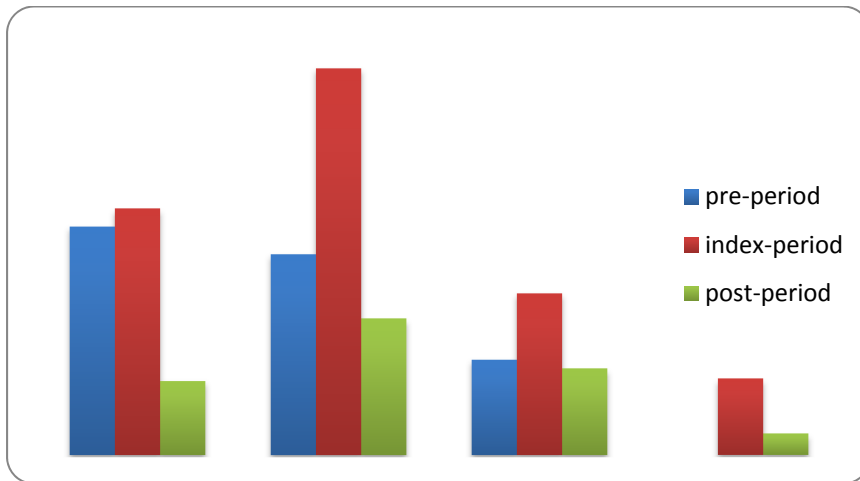


Figure 7. The prevalence of individual service system utilization of the youth cohort

Applying the same definitions of service involvement as above, in the post-period, delinquent care was the most common system that middle-school students engaged in, at 1.6%. Approximately 1% of youth were involved in the dependent care or mental health care systems in the post-period. Only 0.3% of youth were involved in the homeless shelter system. Specifically, for students with identified typologies of school absenteeism, a considerable number of the high-decreasing-to-low group was in the dependency and delinquency group, at 4.2% and 13.7%, respectively. The moderate-increasing-to-high-decreasing-to-low group also received dependency care and delinquent care services (2.3% and 8.4%, respectively). Additionally, stable-moderate and increasing-to-high also have received dependent care (1.9% and 2.1%, respectively) and delinquent care (2.6% and 5%, respectively). Again, in general, students with high-decreasing-to-low and moderate-increasing-to-high-decreasing-to-low were two groups that had higher rates of service system utilization. Students with a stable-low trajectory pattern tend to have the least amount of service system utilization. The biggest notable shift was a general declines in use of all services systems in the post period.

Table 7. The prevalence of service system involvement for the youth with identified typologies of school absenteeism

Types	Pre-period				Index-period				Post-period			
	Dep	Del	H	MH (in/re)	Dep	Del	H	MH (in/re)	Dep	Del	H	MH (in/re)
1	2.1%	2.0%	N/A	0.9%	2.1%	3.6%	0.7%	1.5%	.7%	1.2%	.1%	.7%
2	8.6%	8.2%	N/A	3.3%	9.7%	14.1%	0.9%	6.3%	4.2%	13.7%	1.1%	11.6%
3	3.2%	2.2%	N/A	1.5%	3.9%	5.5%	1.5%	2.5%	1.9%	2.6%	.7%	1.9%
4	3.6%	2.5%	N/A	1.8%	4.5%	7.4%	2.7%	2.9%	2.1%	5%	1.1%	3%
5	6.2%	5.6%	N/A	2.4%	7.2%	10.7%	1.7%	4.4%	2.3%	8.4%	2.3%	5.3%
Total	2.7%	2.4%	N/A	1.1%	2.9%	4.6%	0.9%	1.9%	0.9%	1.6%	0.3%	1.0%

Note. Dep=dependency; Del=delinquency; H=homelessness; MH (in/re)=Mental health (inpatient/residential). 1 – Stable-low; 2 – High-decreasing-to-low; 3- Stable-moderate; 4 – Increasing-to-high; 5 – Moderate-increasing-to-high-decreasing-to-low

3.3. Multi, Single, or No System Utilization (unduplicated count)

Table 6 presents the prevalence of no system use, single system use, and 2 or more system use for the youth cohort in the pre, index, and post-period. In the pre-period the majority of youth had no system use (95%). Within the total unduplicated count, approximately 4% of students in the School District of Philadelphia were involved in a single service system and more than 1% were engaged in 2 or more service systems. In the index-period nearly 92% of youth did not access any service system included in this study. Over 6% of students were involved in a single service system and nearly 2% of students received services from 2 or more systems. In the post-period nearly 3% of youth were identified as multi-system users and less than 1% of youth were identified as a single system user.

Table 8 presents the number of multi, single and no system utilization for the youth cohort with identified typologies of student absenteeism in the pre, index, and post-periods. For single system users, 11.5% of students with a high-decreasing-to-low trajectory pattern accessed a single service system. Nearly 9% of students with a moderate-increasing-to-high-decreasing-to-low trajectory pattern received services from 1 system. Nearly 5% of students with an increasing-to-moderate-to-high trajectory pattern were involved in a single system. 4% of student with a stable-moderate trajectory pattern were engaged in a single system. For multi-system users, more than 4% of students with a high-decreasing-to-low trajectory pattern accessed multiple service systems. Nearly 3% of students with a moderate-increasing-to-high-decreasing-to-low trajectory pattern received services from multiple systems. And nearly 1.5% of students with increasing-to-moderate-to-high and stable-moderate trajectory patterns were engaged in multiple service systems.

Table 8. Multi-, single and no system utilization for the youth cohort with identified typologies of student absenteeism in pre-, index, and post-periods

	Pre-period			Index-period			Post-period		
	0	1	2	0	1	2	0	1	2
Stable-low	96.1%	2.9%	1.0%	93.8%	4.8%	1.4%	97.8%	1.8%	0.5%
High-decreasing-to-low	84.4%	11.5%	4.1%	76.0%	17.9%	6.1%	80.0%	10.5%	9.5%
Stable-moderate	94.6%	4.0%	1.4%	89.3%	8.4%	2.3%	93.9%	5.1%	1.0%
Increasing-to-moderate-to-high	93.6%	4.9%	1.5%	85.7%	11.2%	3.1%	90.4%	8.0%	1.6%
Moderate-increasing-to-high-decreasing-low	88.7%	8.8%	2.5%	80.9%	14.5%	4.6%	84.7%	12.2%	3.1%
Total	95.1%	3.7%	1.2%	91.8%	6.3%	1.9%	96.9%	2.5%	0.6%

For single system users, 17.9% of students with a high-decreasing-to-low trajectory pattern access services from a single system. Nearly 15% of students with a moderate-increasing-to-high-decreasing-to-low trajectory pattern received services from a single system. More than 11% of students with a increasing-to-moderate-to-high trajectory pattern received services from a single system. 8.4% of students with a stable-moderate trajectory pattern were engaged in services from a single system. For multi-system users, more than 6% of students with a high-decreasing-to-low trajectory pattern were multi-system users. Nearly 5% of students with a moderate-increasing-to-high-decreasing-to-low trajectory pattern received services from multiple systems. More than 3 % of students with an increasing-to-moderate-to-high trajectory pattern were engaged in multiple system services. 2.3% of students with a stable-moderate trajectory pattern received services from multiple systems.

For single system users, 10.5% of students with a high-decreasing-to-low trajectory pattern accessed a single service system. Nearly 12.2% of students with a moderate-increasing-to-high-decreasing-to-low trajectory pattern received services from a single system. More than 8% of students with an increasing-to-moderate-to-high trajectory pattern were involved in a single system. 5.1% of students with a stable-moderate trajectory pattern were engaged in a single system. For multi-system users, more than 9% of students with a high-decreasing-to-low trajectory pattern accessed services from multiple systems. More than 3% of students with a moderate-increasing-to-high-decreasing-to-low trajectory pattern received services from multiple systems. Nearly 2 % of students with an increasing-to-moderate-to-high trajectory pattern were engaged in multiple system services. 1% of students with a stable-moderate trajectory pattern received multi-system services.

3.4. Associations between Trajectories of School Absenteeism and Any Service System Utilization

With the stable-low trajectory as a reference group, logistic regression was used to examine typologies of school absenteeism and predict any service system utilization (see Table 9). With respect to any service system utilization and using controls for child and family characteristics, students with a high-

decreasing-to-low trajectory pattern are 2.09 times more likely to be involved in any service system utilization, compared to students with a stable-low trajectory pattern. The odds of any service involvement for students with stable-moderate, increasing-to-moderate-to-high, and moderate-increasing-to-high-decreasing-low trajectory patterns are 1.15, 1.20, and 1.26 times as large, respectively, as the odds of students with a stable-low trajectory pattern. Overall, while controlling for child and family covariates, compared to the stable-low group, students with the remaining trajectory patterns have higher odds of involvement in any single service system. Students with a high-decreasing-to-low trajectory patterns, in particular, has the most significant risk of any service involvement, except homelessness.

Table 9. Typologies of school absenteeism predicting any service utilization in index period

Odds ratios Variables	Any service system use	Dependency	Delinquency	Homelessness	MH (in/re)
Male	1.95**	.91+	3.09**	.72**	2.10**
Black	2.40**	2.13**	2.23**	4.94**	2.61**
Hispanic	1.57**	1.14	1.80**	1.64	1.72**
Other	.72*	.89	.59**	.65	.85
Limited English Proficiency	.60**	.57**	.65**	.46+	.64*
Poverty	1.62**	1.41**	1.53**	2.70**	1.58**
Special Education	1.62**	1.52**	1.63**	1.26*	1.90**
High-decreasing-to-low	2.09**	2.15**	1.98**	1.50**	1.98**
Stable-moderate	1.15**	1.17**	1.10**	1.23**	1.13**
Increasing-to- moderate-to-high	1.20**	1.17**	1.16**	1.37**	1.13**
Moderate-increasing- to-high-decreasing-low	1.26**	1.27**	1.23**	1.19**	1.22**

Note. + $p < .10$, * $p < .05$, ** $p < .01$

Consistent patterns were found in the models of trajectories of school absenteeism predicting dependency care, delinquency care, homeless shelter care, and mental health care. While controlling for child and family characteristics, students with a high-decreasing-to-low trajectory pattern are approximately 2 times, more likely to be involved in any service system utilization (dependence care: O.R.=2.15, delinquency care and mental health care: O.R.=1.98, except homeless shelter care) compared to students with stable-low trajectory pattern. The odds of any service involvement for students with stable-moderate, increasing-to-moderate-to-high, and moderate-increasing-to-high-decreasing-low trajectory patterns are over 1 times, more than the odds of students with a stable-low trajectory pattern. Overall, while controlling for the child and family covariate, compared to the stable-low group, students with the remaining trajectory patterns have higher odds of involvement in any service system. A high-decreasing-to-low absenteeism typology appears to be the strongest risk factor for predicting nearly double the rate of students' service involvement, compared to the stable low absenteeism trajectory group.

3.5. Trajectories of School Absenteeism Predicting Multi-, Single, or No System Utilization

Table 10 shows the typologies of school absenteeism predicting the number of services utilized (no system, single-, and multi-system) in the index period. All trajectory patterns, including high-decreasing-to-low; stable-moderate; increasing-to-moderate-to-high; and moderate-increasing-to-high-decreasing-low, were significantly higher in risk than the reference population (stable-low). For students with a high-decreasing-to-low trajectory pattern, a .73 increase in the log odds of involvement in a higher number of service systems is expected, when compared to students with a stable-low trajectory pattern. For students with a stable-moderate trajectory pattern, a .14 increase in the log odds of involvement in a higher number of service systems is expected, compared to students with a stable-low trajectory pattern. For students with an increasing-to-moderate-to-high trajectory pattern, a .18 increase in the log odds of involvement in a higher number of service systems is expected, compared to students with a stable-low trajectory pattern. For students with a moderate-increasing-to-high-decreasing-low trajectory pattern, a .23 increase in the log odds of being involved in a higher number of service systems is expected, compared to students with a stable-low trajectory pattern. During index period, the high-decreasing-to-low trajectory pattern appears to be a strong risk factors predicting the higher number of system utilization compared stable-low trajectory pattern. Other trajectory patterns were also associated with an increase in the odds of system service utilization.

Table 10. Typologies of school absenteeism predicting the number of service utilization in index period

Variables	Multi-, single, or no system utilization (Coef.)
Male	.67**
Black	.88**
Hispanic	.46**
Other	-.33*
Limited English Proficiency	-.52**
Poverty	.48**
Special Education	.48**
High-decreasing-to-low	.73**
Stable-moderate	.14**
Increasing-to-moderate-to-high	.18**
Moderate-increasing-to-high-decreasing-low	.23**

Note. + $p < .10$, * $p < .05$, ** $p < .01$

3.6. Section Summary

This section examined the extent to which students in the study group made use of public mental health, child welfare and juvenile justice, and family homeless shelter services. Associations between

absenteeism trajectory types and services use were also examined through logistic regression modeling. Highlights of the findings in this section include:

- In the pre-period approximately 4.9% of students in the School District of Philadelphia were involved in any single service system. The largest number of students involved in any service system utilization was in the dependent and delinquent care systems, at 2.7% and 2.4%, respectively. Over 1% of youth had intensive involvement in the mental health system.
- In the index-period over 8.2% of students were involved in any single service system. Delinquent and dependency care systems were the two most common systems that middle-school students engaged in, at 4.6% and 2.9%, respectively. Approximately 2% of youth had intensive involvement in the mental health care system. Less than 1% of youth were involved in the homeless shelter system.
- In the post-period over 3.1% of students were involved in any service system use. Delinquent care was the most common system that middle-school students engaged in, at 1.6%. Approximately 1% of youth were involved in the dependent care and mental health care, respectively. Only 0.3% of youth were involved in the homeless shelter system.
- For students with identified trajectories of school absenteeism, students with high-decreasing-to-low and moderate-increasing-to-high-decreasing-to-low are the two groups that had higher rates of service system utilization in pre, index, and post-periods.
- Students with a stable-low trajectory pattern tended to have the least amount of any service system utilization.
- Looking at aggregate system use in the pre, index, and post-period, the vast majority of students in the study group had no other service system involvement in any of the three periods. In the pre-period, approximately 4% of students were involved in a single service system and more than 1% of youth were engaged in 2 or more service systems. In the index-period, over 6% of students were involved in a single service system and nearly 2% of students received services from 2 or more systems. In the post-period, nearly 3% of youth were identified as multi-system users and less than 1% of youth were identified as single system users.
- The descriptive analyses shows that students with high-decreasing-to-low, stable-moderate, increasing-to-moderate-to-high, and moderate-increasing-to-high-decreasing-low trajectory patterns had higher rates of single system and multi-system service use over the pre, index, and post periods.
- The findings from the regression models consistently show that students with high-decreasing-to-low, stable-moderate, increasing-to-moderate-to-high, and moderate-increasing-to-high-decreasing-low trajectory patterns have increased odds of involvement in any service system, including dependency care, delinquency care, homeless shelter care, and mental health care, when compared to the stable-low group. The high-decreasing-to-low, in particular, appears to approximately double the rates of receiving any system service, except homeless shelter care. Consistent predictive patterns were also found in the typology models of school absenteeism predicting the number of services utilized (no system, single-, and multi-system). The high-

decreasing-to-low trajectory pattern, in particular, was again a significant risk factor, which resulted in higher log odds of service involvement.

4. THE ROLE OF DISABILITY IN SERVICE SYSTEM UTILIZATION

4.1. Introduction and Research Questions

The analysis of school absenteeism and related service system utilization showed that students with disabilities were more likely to be involved in any single service system utilization and were at significant risk for being multi-system users. In order to identify the unmet service needs of students with disabilities, a high risk group, this project further describes the prevalence of service system utilization for each disability and the extent to which system involvement is accounted for by specific disabilities.

Children and youth with disabilities often have multiple challenges, which affect their daily functioning. Their intensive involvement in multiple service systems raises critical issues regarding placement and best practice models. Addressing the unmet needs of students with disabilities who receive services through several systems, and improving their coordination, could help policymakers and professionals work with this vulnerable population. There are a growing number of students with disabilities involved in multiple systems; however, research that identifies the prevalence and distinguishes the characteristics of multi-system users and related consequences is very limited.

This section describes the prevalence and characteristics of the most at-risk children and youth, and discusses the potential strategies for policymakers and practitioners to target their limited resources in order to have the maximum impact on students who need intensive services.

Descriptive analysis was used to provide information regarding the prevalence of any service system utilization, as well as multi-, single and no service system utilization for students with disabilities in the pre-period, index-period, and post-period. Subsequently, hierarchical logistic regression was used to analyze whether disabilities are associated with any involvement of any service system (i.e., DBH, DHS, and OSH) while controlling for child and family covariates in index period. Ordinal logistic regression was used to analyze whether disabilities are associated with the involvement of multi-system utilization (multi-, single, and no system users), while controlling for child and family covariates in the index period. A complete sample (i.e., 7th, 8th and 9th graders) was used for analysis in the pre-period and index periods while only records for youth in the 7th grade were used analysis in the post-period because the majority of 8th and 9th graders had already exited the school system at that time.

Specific research questions for this section are as follow:

1. What is the prevalence of the service system utilization (across systems) for youth with disabilities?
2. What is the prevalence of nonuse, single system use, and multi-system use for youth with disabilities?
3. To what extent is the disability status associated with the any involvement in the DBH, DHS, or OSH service system utilization while controlling for child and family covariates?

4. To what extent is the disability status associated with the number of service systems involved (none, single, and multiple) while controlling for child and family covariates.

4.2. Specific Service System Involvement for Students with Disabilities

Table 11 presents the prevalence of any service system utilization for students with disabilities and without disabilities in the pre-, index, and post-period. Table 11 shows that students with disabilities appear to have higher rates of having received dependent care (8.3%), delinquent care (4.6%) and mental health care (3.9%) in index period. Findings also indicated higher rates of dependent care (4.6% and 3.2%), delinquent care (4.4% and 1.4%), and mental health care (2.9% and 1.9%) in pre- and post-periods for students with disabilities. However, the rates of having received homeless shelter service care were much lower in index (1.1%) and post-period (0.2%).

Table 11. The prevalence of any service system utilization for students with disabilities in pre-, index, and post-period

Types	Pre-period				Index-period				Post-period			
	Dep	Del	H	MH (in/re)	Dep	Del	H	MH (in/re)	Dep	Del	H	MH (in/re)
No disabilities	2.3%	1.9%	N/A	0.7%	2.5%	3.8%	0.8%	1.5%	.7%	1.3%	.3%	.8%
Disabilities	4.6%	4.4%	N/A	2.9%	4.6%	8.3%	1.1%	3.9%	1.4%	3.2%	.2%	1.9%
Total	2.7%	2.4%	N/A	1.1%	2.9%	4.6%	0.9%	1.9%	0.9%	1.6%	0.3%	1.0%

Table 12 shows the prevalence of any service system utilization for students with different categories of disabilities. In index period, students with emotional disturbance have the highest rates of any service involvement within the middle-school youth. More than 20% of students with emotional disturbance were youth receiving delinquency services, and approximately 12% of students with emotional disturbance received dependent care. Over 13% of students with emotional disturbance were involved in mental health care. Less than 2% of students with emotional disturbance were engaged in the homeless system. Students with learning disabilities and intellectual disabilities appear to be the group with the second and third highest rates of any service involvement in index period. For students with learning disabilities, more than 8% were engaged in delinquent care and 4.3% received dependent care. 3.2 % received mental health care, and 1.1% had been in the homeless system. Nearly 4% of students with intellectual disabilities received dependent and delinquent care, and 1.9% were involved in the mental health system. Less than 3% of other students with disabilities appeared to be engaged in these systems of care. In pre- and post-periods, students with emotional disturbance, learning disabilities, and intellectual disabilities also have higher rates of having received dependent care (pre-period: 11.7%, 4.3%, 3.3%; post-period: 3.8%, 1.4%, 1.6%), delinquent care (pre-period: 12.3%, 4%, 2.6%; post-period: 11.5%, 3%, 1.6%), and mental health care (pre-period: 11.6%, 2.1%, 1.3%; post-period: 7.6%, 1.8%, 0.3%), except homeless shelter care. Instead, students with other disabilities have higher rates of involvement in the homeless shelter system care in post-period.

Table 12. The prevalence of the youth with identified disabilities in the SDOP in pre-, index, and post-period

Types	Pre-period				Index-period				Post-period			
	Dep	Del	H	MH (in/re)	Dep	Del	H	MH (in/re)	Dep	Del	H	MH (in/re)
No disabilities	2.3%	1.9%	N/A	0.7%	2.5%	3.8%	0.8%	1.5%	.7%	1.3%	.3%	.8%
Autism	.6%	0.0%	N/A	1.9%	.6%	0.0%	0.0%	1.8%	0.0%	0.0%	0.0%	0.0%
Emotional disturbance	11.7%	12.3%	N/A	11.6%	11.5%	20.4%	1.8%	13.3%	3.8%	11.5%	0.4%	7.6%
Intellectual disabilities	3.3%	2.6%	N/A	1.3%	3.9	4.0%	1.3%	1.9%	1.6%	1.6%	0.0%	0.3%
Learning disabilities	4.3%	4.0%	N/A	2.1%	4.3%	8.1%	1.1%	3.2%	1.4%	3.0%	0.2%	1.8%
Language disorders	1.0%	1.0%	N/A	.4%	1.0%	2.5%	0.5%	1.1%	0.3%	1.0%	0.0%	0.0%
Other disabilities	1.7%	1.5%	N/A	.5%	1.4%	3.5%	0.9%	0.7%	0.0%	0.0%	0.8%	0.0%
Total	2.7%	2.4%	N/A	1.1%	2.9%	4.6%	0.9%	1.9%	0.9%	1.6%	0.3%	1.0%

4.3. Multi-system Service Involvement for Students with Disabilities

Table 13. The prevalence of multi, single, and no service system utilization for students with disabilities

	Pre-period			Index-period			Post-period		
	0	1	2	0	1	2	0	1	2
No disabilities	96.1%	3.0%	0.9%	93.1%	5.4%	1.5%	97.4%	2.1%	0.5%
Disabilities	90.9%	6.6%	2.5%	86.1%	10.3%	3.6%	94.5%	4.2%	1.2%
Total	95.1%	3.7%	1.2%	91.8%	6.3%	1.9%	96.9%	2.5%	0.6%

Table 13 presents the prevalence of multi, single, and no service system utilization for students with disabilities in the pre, index, and post-period. Table 13 shows that students with disabilities appear to have higher rates of being involved in a single service system (10.3%) and multi-system services (3.6%) in index period. Findings also suggest that students with disabilities have higher rates of being engaged in single system (pre: 6.6%; post: 4.2%) and multi-system services (pre: 2.5%; post: 0.6%). Specifically, for students with disabilities, findings show higher rates of single system involvement than multi-system utilization in pre, index, and post-periods.

Table 14 shows the prevalence of multi, single, and no service system utilization for students with specific identified disabilities. In index period, students with emotional disturbance have the highest rates of single and multi-service involvement within the middle-school youth. Approximately 22% of students with emotional disturbance accessed a single service system and nearly 12% of students with emotional disturbance accessed multiple service systems. Students with learning disabilities and intellectual disabilities appear to be the group with the second and third highest rates of single and multi-service involvement in index period. For students with learning disabilities, 10.1% were engaged in a single system and 3.1 % received multi-system services. Nearly 8% of students with intellectual disabilities were involved in single system and less than 1.5% of students with intellectual disabilities appeared to be engaged in multi-system of care. The remaining students with disabilities (e.g., autism and language disorders) had less experience engaging in single and multi- system services. In pre- and post-periods, students with emotional disturbance, learning disabilities, and intellectual disabilities also have higher rates of having received single system (pre-period: 18.5%, 6%, 4.5%; post-period: 13%, 4.2%, 2.2%) and multi-system care (pre-period: 8%, 2.1%, 1.4%; post-period: 5%, 1.1%, 0.6%). However, students with language disorders, autism and other disabilities have almost zero rate of multi-system involvement in post-period.

Table 14. The prevalence of multi, single, and no service system utilization for students with specific identified disabilities

	Pre-period			Index-period			Post-period		
	0	1	2	0	1	2	0	1	2
No disabilities	96.1%	3.0%	0.9%	93.1%	5.4%	1.5%	97.4%	2.1%	0.5%
Autism	98.1%	1.3%	0.6%	98.2%	1.2%	0.6%	100%	0.0%	0.0%
Emotional disturbance	73.5%	18.5%	8.0%	66.9%	21.7%	11.4%	82.1%	13.0%	5.0%
Intellectual disabilities	94.1%	4.5%	1.4%	90.6%	7.9%	1.5%	97.1%	2.2%	0.6%
Learning disabilities	91.9%	6.0%	2.1%	86.8%	10.1%	3.1%	94.7%	4.2%	1.1%
Language disorders	98.0%	1.6%	0.4%	95.9%	3.2%	0.9%	98.7%	1.3%	0.0%
Other disabilities	97.3%	2.0%	0.7%	94.8%	4.0%	1.2%	99.2%	0.8%	0.0%
Total	95.1%	3.7%	1.2%	91.8%	6.3%	1.9%	96.9%	2.5%	0.6%

4.4. Disability Status Predicting Any Involvement in Other Service Systems

Table 15 presents the relationship between specific disabilities and any service system involvement. This study utilized students without disabilities as reference group in order to conduct logistic regression to examine disability status and predict any service system utilization. With respect to any service system utilization, controlling for child and family characteristics, students with emotional disturbance are 5.24 times more likely to be involved in any service system, compared to students without disabilities. The odds of any service involvement for students with learning disabilities, intellectual disabilities, language disorders, other disabilities, and autism are 1.71, 1.18, and .52, .67, and .23 times, respectively, as large as the odds of students without disabilities. Overall, while controlling for the child and family covariates, compared to students without disabilities, students with disabilities, in particular emotional disturbance, have higher odds of involvement in any service system. Those with emotional disturbance have

significant risk of being engaged in system(s) care, which indicates the targeted group in need of support. Additionally, students with learning disabilities and intellectual disabilities were also 1-2 times more likely to be involved in any service utilization compared to students without disabilities.

Consistent patterns were found in the models of disability status predicting dependency care, delinquency care, homeless shelter care, and mental health care. While controlling for child and family characteristics, students with emotional disturbance are approximately 4-8 times, more likely to be involved in any service system utilization (dependence care: O.R.=4.64, delinquency care: O.R.=4.47, homeless: O.R. =2.26, mental health care: O.R.=7.79) compared to students without disabilities. Findings suggest, across different service systems, students with emotional disturbance have the highest odds of service involvement in mental health care. In addition, the odds of any service involvement for students with learning disabilities are over 1 times, more than the odds of students without disabilities. Students with intellectual disabilities only have significant risks on the involvement of dependency care in index period. (O.R. = 1.45). Overall, while controlling for the child and family covariate, compared to students without disabilities, students with emotional disturbance have the highest and significant risk of being engaged in different service system. While allocating services and resources for those with disabilities, in particular students with emotional disturbance, intensive and comprehensive services will be needed.

Table 15. The association between disabilities and any service system involvement

Odds ratios Variables	Any service system use	Dependency	Delinquency	Homelessness	MH (Heavy use)
Male	1.91**	.90*	3.83**	.72**	2.00**
Black	2.39**	2.13**	2.21**	5.12**	2.61**
Hispanic	1.61**	1.17	1.84**	1.68	1.76**
Other	.73*	.88	.60**	.63	.88
Limited English Proficiency	.60**	.58**	.65**	.45*	.65*
Poverty	1.76**	1.56**	1.64**	2.97**	1.72**
Autism	.23*	.27	---	---	1.14
Emotional disturbance	5.24**	4.64**	4.47**	2.26**	7.79**
Intellectual disabilities	1.18+	1.45*	.85	1.39	1.12
Learning disabilities	1.71**	1.63**	1.73**	1.31**	1.79**
Language disorders	.52**	.40**	.54**	.69	.69
Other disabilities	.67+	.56	.79	1.21	.43

Note. + $p < .10$, * $p < .05$, ** $p < .01$

4.5. Associations Between Disability Status and System Involvement

Table 16 presents the relationship between disabilities and multi, single, and no service system utilization in the index period. The disability status, including emotional disturbance, learning disabilities, and language disorders, is statistically significant. For students with emotional disturbance, a 1.68 increase in the log odds of involvement in a higher number of service systems is expected, compared to students without disabilities. For students with learning disabilities, a .54 increase in the

log odds of involvement in a higher number of service systems is expected, compared to students without disabilities. For students with language disorders, a -.65 decrease in the log odds of involvement in a higher number of service systems is expected, compared to students without disabilities.

Table 16. Typologies of school absenteeism predicting the number of service utilization in index period

Variables	Multi-, single, or no system utilization (Coef.)
Male	.64**
Black	.87**
Hispanic	.47**
Other	-.32*
Limited English Proficiency	-.51**
Poverty	.57**
Autism	-1.48*
Emotional disturbance	1.68**
Intellectual disabilities	.16
Learning disabilities	.54**
Language disorders	-.65**
Other disabilities	-.40+

Note. + $p < .10$, * $p < .05$, ** $p < .01$

4.6. Section Summary

Results suggest that disability status was a significant risk factor associated with any service involvement.

- Students with emotional disturbance received the highest rates of dependent care, delinquent care, and mental health care.
- Students with learning disabilities and intellectual disabilities have higher rates of involvement in the dependent care, delinquent care, and mental health systems.
- Students with emotional disturbance had the highest rates of multi-system service involvement.
- While controlling for child and family characteristics, students with emotional disturbance, learning disabilities, intellectual disabilities, and language disorders are more likely to be involved in any service system, including dependency care, delinquency care, homeless shelter care, and mental health care, when compared to students without disabilities.

5. CONCLUSION

This chapter sought to explore associations between absenteeism and disability, as they are found in SDOP administrative records, and services use in four other municipal services systems: public behavioral health, child welfare, juvenile justice, and family homeless shelter. The first part of the chapter explored absenteeism in greater depth, and found that about three-quarters of students in grades 7 through 9 had low rates of absenteeism. Among the remaining quarter, four different trajectories of absenteeism were identified. Those experiencing these four other trajectory patterns stood to be at risk for services use in the four outside systems, and assessing this became the focus for the second part of this chapter.

During the three-year index period that was the focus of this study, 8.2% of all students whose records were examined here received services in at least one of the four service systems. Delinquency (i.e., juvenile justice) and dependency (i.e., child welfare) care systems were the two most common systems that these middle-school students engaged in, at 4.6% and 2.9%, respectively. Among the four trajectories of school absenteeism that were of interest, all of them had higher levels of services use in other systems, and two of them, “high-decreasing-to-low” and “moderate-increasing-to-high-decreasing-to-low” were associated with particularly high rates of service system utilization. When controlling for other factors, all four trajectories were associated with significant, albeit modest increases in the risk of using any of the four systems. However, when looking at the risk of using one or multiple systems, one attendance trajectory, high-decreasing-to-low, was associated with a strong increase in risk for service involvement.

This chapter stands as a broad outline for using absenteeism to identify particularly at risk students. Ironically, a student’s distancing himself or herself from the school system indicated a higher risk for participation in other systems. The relationship between absenteeism and service need is likely complex and multifaceted, and is beyond the scope of the data available for this study. Absenteeism is unlikely to be a major cause for needing these services, but is likely to exacerbate these needs and, more importantly, serve as a warning sign to help identify those students who have needs that demand services intervention. What is striking is how the four absentee trajectories, and particularly the high-decreasing-to-low trajectory, are associated with higher risk for services use across the four services systems. This includes systems such as mental health and public welfare services, which are ostensibly desirable linkages if absenteeism indicates family or a mental health issues, but it also indicates elevated risk for juvenile justice and shelter services, systems for which it is generally desirable to prevent engagement. This is particularly the case with juvenile justice (delinquency) services, in which 14% of the youth in the high-decreasing-to-low trajectory participated during the index period (compared to 4.6% of the overall group). If there is a goal suggested in this study, it would not be to decrease the overall services participation rate but to move the distribution of this rate away from juvenile justice and homelessness and more towards mental health and child welfare.

Disability, identified through the need for special education services, also showed significant associations with the likelihood of receiving services in other systems. Particularly high likelihood was associated with emotional disturbance, for whom one-third had services use in other systems (33%, compared to 8.2% for the overall group), and a more modest, but still elevated likelihood for those with learning disabilities (13.2%). As with (and perhaps more so) as with the absenteeism findings, such service participation is not uniformly undesirable. If a student is receiving school-based services for

being emotionally disturbed, it should be expected that he or she has a higher likelihood of engagement with the mental health system and the 7.8-fold greater odds of he or she doing so is a positive finding. But emotional disturbance is also associated with a 4.5-fold greater odds of being in the juvenile justice system, which is clearly an undesirable outcome. Having learning disabilities follows a similar but more muted trend. Both of these disabilities also have a significant and substantial association with receiving services in more than one system, which means that their services constellations across systems will tend to be complex and expensive, and likely mixing positive interventions such as mental health and child welfare services with negative interventions such as juvenile justice and shelter. This chapter, in making these connections, makes an initial step towards understanding and more effectively intervening in the services use of such students.