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Patterns of Multisystem Service Use and School Dropout Among Seventh-, Eighth-, and Ninth-Grade Students

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Abstract

Youth who receive services from public mental health, child welfare and delinquency, and homeless systems are often exposed to a number of overlapping child, family, school, and community risk factors. Minimal research, however, has focused on the extent to which single- or multiple-system involvement influences school dropout. Relying on an integrated data set, the associations between single- and multiple-system utilization and risk for dropping out, or actually dropping out of school, among youth in Grades 7 through 9 were examined. Results showed dropout rates more than doubled among public youth system users compared with those in the overall sample. With a few exceptions, use of combinations of services systems translated into somewhat higher likelihoods of dropping out of school when compared with single-system use. Future research is warranted to identify the underlying processes by which single- and multiple-system involvement influences school dropout rates.

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Introduction

Although providers in child welfare, juvenile justice, behavioral health, homelessness, and education systems are often governed by different missions, goals, and procedures, they unequivocally work toward promoting well-being and prosocial behaviors (Campie, Pakstis, Flynn, & McDermott, 2015). School personnel, unlike providers in other child-serving systems of care, are tasked with the responsibility of promoting learning and intellectual capacities for all youth. For the alarming number of youth who have experienced trauma and/or exhibit externalizing and internalizing behaviors, the ability to actively engage in school is likely to be compromised. Students who experience disruptions in the learning process are not as likely to develop the skills, competencies, and values that allow them to successfully transition into adulthood (Wang & Eccles, 2012; Wang & Holcombe, 2010). At the extreme, students receive services from multiple systems of care, with hopes and intentions to address the unintended consequences of trauma (Bai, Wells, & Hillemeier, 2009; Herz et al., 2012; Hong & Piescher, 2012; Larson & Meehan, 2011). However, a large body of research has shown that services across child-serving systems of care are often underutilized and ineffective in promoting well-being and prosocial development (Campie et al., 2015; Li & Lerner, 2011). Policy makers and researchers now recognize the need to achieve these intended outcomes as a means to promote school engagement and decrease the alarming dropout rate in the United States (Chuang & Wells, 2010; Geenen & Powers, 2006; Herz, Ryan, & Bilchik, 2010; Hill, 2009; Huang, Ryan, & Herz, 2012). Multiple-system involvement may signal 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 and ensure they benefit from attaining a high school education.

Impact of Single-System Involvement on School Dropout

An extensive body of research has documented associations between individual child-serving systems and poor educational outcomes, including high school dropout. Previous research underscores the need to understand how each system, in the context of its own respective intent, capacity, and feasibility, identifies and addresses the needs of youth who are at risk of dropping out of high school.

Foster care and school dropout. Ferguson and Wolkow (2012), in a review of the literature on educational outcomes, concluded that youth in out-of-home care are at a "significant educational disadvantage," including a higher risk for dropping out of high school (p. 1183). Trout, Hagaman, Casey, Reid, and Epstein (2008), in another review of this literature, concluded that although this educational disadvantage is well documented, there is limited research that examines specific underlying structural or systemic reasons related to poor education outcomes. Pecora (2012), intending to unpack this gap, cited that higher rates of school mobility and educational instability are indeed perpetuated by a system where children frequently change placements and are otherwise confronted with obstacles to overcome the ill effects of trauma. To that end, only half of foster youth who "age out" of the system graduate high school at the time of discharge (Courtney & Piliavin, 1998).

Juvenile justice and school dropout. Educational disadvantage is also associated with juvenile justice involvement. Kirk and Sampson (2013) found that a juvenile arrest contributed to elevated levels of school dropout compared with a similar group of youth who werenot arrested, and that "an arrest that results in a period of confinement in a juvenile detention facility virtually guarantees that a student will not finish high school" (p. 55). They present strong evidence that the association between arrest and school dropout is due primarily to institutional reactions as opposed to person-level mechanisms, and posit that incarceration creates even stronger obstacles to reengaging with school. Cavendish (2014) validates and adds to these findings, finding thatthat only 44% of middle and high school–age children released from detention facilities in Florida returned to school within 3 years after release.

Behavioral health and school dropout. The odds of dropping out of high school increases when health and mental health outcomes are compromised. To that end, educators and health professionals have allocated resources toward delivering school-based interventions, inclusive of school health programs, health clinics, mental health services, and/or substance abuse prevention and treatment programs (Freudenberg & Ruglis, 2007). The range of services and programs, however, varies in type, quality, dosage, and longevity. When delivered, they are rarely coordinated and implemented to fidelity; and funding to assess longitudinal impact of programs on school dropout rates is limited (Cook & Odom, 2013; Freudenberg & Ruglis, 2007). To that end, we still lack a comprehensive framework that elucidates how and under what conditions health programs promote well-being and reduce dropout rates (Campie et al., 2015; Freudenberg & Ruglis, 2007).

Homelessness and school dropout. Resembling maltreated children, homeless children are more likely to experience lower rates of school attendance than peers who reside in stable living conditions (Larson & Meehan, 2011; Rubin et al., 1996). Adding to these findings, Masten and colleagues (1997) concluded that they are disproportionately more likely to experience grade repetition and high rates of mobility. These factors, in turn, increase the likelihood of dropping out of high school (Freeman & Simonsen, 2015; Freudenberg & Ruglis, 2007; Kearney, 2008). However, after linking and analyzing data from children's supportive housing records and the Minnesota Departments of Education and Human Services, Hong and Piescher (2012) found that school attendance and math achievement improved after receiving supporting housing services.

Special education and school dropout. In addition to homelessness, the need for special education services is likely to increase the likelihood of school dropout (Kearney, 2008; Masten et al., 1997; Rubin et al., 1996). In fact, between one - third (Hasazi, Gordon, & Roe, 1985; Zigmond & Thornton, 1985) and one - half of adolescents (Levin, Zigmond, & Birch, 1985) diagnosed with a learning disability dropout of high school. Subsequent studies conducted by Sinclair and colleagues (i.e., Sinclair, Christenson, & Evelo, 1998; Sinclair, Christenson, & Thurlow, 2005) report positive effects of preventions programs aimed toward decreasing dropout rates among students diagnosed with disabilities. Students, for example, enrolled in the check and connect student engagement model—a model aimed to promote relationship building, problem solving, and capacity building—were less likely to drop out of high school at the end of four years as compared with those assigned to the control group (Sinclair et al., 2005). Although special education practitioners are aware of promising or evidence-supported interventions, such as Check and Connect, lack of funding, training, and organizational capacity prevent implementation. Consequently, they tend to deliver instructional practices shown by research to be ineffective (Burns & Ysseldyke, 2009; Cook & Odom, 2013).

Impact of Multiple-System Involvement on School Dropout

What is clear from prior studies is that the dosage and quality of services received from a single child-serving system may not be adequate enough to disrupt alarming high school dropout rates. Thus, it may be necessary to implement a coordinated service plan that engages more than one system. Indeed, prior research has revealed that some system transfers are intentional and appropriate, and some youth who have needs in one domain may need support from other services across systems of care (Bai et al., 2009; Herz et al., 2012; Hill, 2009; Howell, Kelly, Palmer, & Mangum, 2004).

Foster care, juvenile justice, and special education. Larson and Meehan (2011) found that homeless children had a much higher rate of substantiated incidents of maltreatment and out-of-home placements than their mobile peers (i.e., students who have experienced residential change) and non-mobile peers (i.e., students without any indication of mobility or homelessness). In the same study, they found that homeless and highly mobile students were slightly more likely to be placed in special education, much less likely to speak a language other than English in the home, and significantly less likely to experience poor attendance trajectories.

A number of studies have shown that youth involved in the foster care and juvenile justice systems are diagnosed with mental health, intellectual, developmental, and learning disabilities at a higher rate than youth in the general population (Havlicek, Garcia, & Smith, 2012; Lightfoot, Hill, & LaLiberte, 2011; Sullivan & Knutson, 2000). Relying on data from an entire school-based population of 50,000 children enrolled in public and archdiocese schools in Nebraska, Sullivan and Knutson (2000) conclude that children with disabilities are 3.4 times more likely to be maltreated than peers without disabilities. The Individuals With Disabilities Education Act (IDEA) emphasizes the importance of providing a continuum of services for students with disabilities. Although the special education system has made great strides in delivering services to children with disabilities (e.g., greater access to public education and earlier detection of symptoms of disabilities), many challenges still remain in attempts to promote positive educational outcomes (Aron & Loprest, 2012).

In another study, Herz and Ryan (2008) found that while the majority of youth involved in the juvenile justice and child welfare systems in Los Angeles were enrolled in school, 51% were truant, 47% engaged in problem behaviors that resulted in suspensions, 49% had not performed well academically, and 21% had been diagnosed with a learning disability. Halemba, Siegel, Lord, and Zawacki (2004) found slightly worse outcomes among users of similar systems in Arizona. Adding to these findings, Fantuzzo and Perlman (2007) found that foster care involvement is related to poor academic achievement among a cohort of second-grade children. However, when they controlled for maltreatment and homelessness, foster care involvement no longer influenced the students' educational trajectory.

Behavioral health intersects with multiple systems. Across the board, youth who receive services in the special education, child welfare, juvenile justice, and homeless systems are among the many youth who disproportionately rely on the mental health system to address clinically pervasive social, emotional, and behavioral problems (Cavendish, 2014; Perlman & Fantuzzo, 2010;

Stiffman, Pescosolido, & Cabassa, 2004). Wood and colleagues (2012), for example, show that greater absenteeism is related to increased depression and conduct problems. Collectively, studies over the past decade show that the need or demand for effective, timely, and coordinated services to address the myriad challenges youth are confronted with often exceed available resources (Chuang & Wells, 2010; Darlington, Feeney, & Rixon, 2005; Johnson, Stodden, Emanuel, Luecking, & Mack, 2002). Bureaucratic, regulatory, and financial barriers (Aron & Loprest, 2012), coupled with lack of collaboration between social services systems (Herz et al., 2012) likely exacerbate the numerous interlocking public health concerns for many youth who have dropped out of school.

Predictors of School Dropout

Prior research has illuminated the interlocking risk factors or profiles that may increase problematic school absenteeism (Cavendish, 2014; Kearney, 2008). According to Kearney, child-specific factors include race/ethnicity, age, trauma exposures, clinically pervasive internalizing and externalizing behaviors, and poor physical health. Family risk profiles include homelessness, poverty, single parenting, large family size, and stressful family transitions. Other factors, including negative interactions with peers (drug use, victimization from bullies, delinquent acts) and negative school contexts and experiences (poor school climate, irrelevant curricula, inadequate responsiveness to address learning disabilities, school-based racism) are likely to increase academic disengagement. Finally, Kearney cites community-level risk factors, inclusive of unsafe neighborhoods, gang activity, and lack of social services and supports, that are likely to perpetuate and prolong school absenteeism and subsequently lead to school dropout.

Some student groups are disproportionately more likely to experience school dropout (Williams, Ernst, & Kaui, 2015). For example, low-income, urban youth minorities are more likely to experience academic challenges, problematic behaviors, and difficult life events when compared to their Caucasian counterparts (Rath, Rock, & Laferriere, 2011). In light of these findings, it is imperative to report dropout rates by race/ethnicity. Other studies have also controlled for gender, acknowledging that male students tend to have more difficulty completing school, with female students graduating at slightly higher rates (Bridgeland, Dilulio, & Morison, 2006). In fact, 7% of males ages 16 to 24 were high school dropouts compared with 6% of females in 2014 (Child Trends, 2015). In addition, the U.S. Department of Education (2012) reported that two thirds of students with disabilities do not complete high school. This is nearly double the rate of their non-disabled peers (The

President's Commission on Excellence in Special Education, 2002). There are over 5.5 million students with limited English proficiency (LEP), and they are also at higher risk to not graduate from high school. The U.S. Department of Education (2012, as cited in Williams et al., 2015) found that nearly 25 states graduated less than 60% of students with LEP in 2010-2011. Stetser and Stillwell (2014) corroborated these findings, noting in particular that economically disadvantaged students, students with LEP, and students with disabilities in the United States experience adjusted cohort graduation rates well below the national average at 72%, 59%, and 61%, respectively, in 2011-2012. Lack of effective, coordinated services within and between different sectors of care may only serve to perpetuate the likelihood of permanent dropout from school (Kearney, 2008; Pellegrini, 2007), particularly for students with a disability or LEP.

Theoretical Framework

What we know from prior research is that there are a number of interlocking risks embedded within individual, family, community, and organizational factors that are likely to increase school dropout. We are also able to surmise that child-serving systems of care may not be effective in addressing these risk factors, achieving intended outcomes, and promoting well-being. However, what is less clear is whether involvement in one, two, or more of these services systems reduces the likelihood of being at risk for dropping out or actually dropping out of high school. Prior efforts have focused on examining general populations of youth, or youth who could be at risk, rather than focusing on those whose well-being may already be compromised (Campie et al., 2015). Unlike many other studies, we focus our attention on understanding patterns of services systems use among students who fall in the latter category.

The lingering question is whether or not multiple-system involvement increases school dropout. As Wang and Fredricks (2014) posited, "School engagement is one proximal process between social contexts and learning. It is also the direct pathway to cumulative learning, educational achievement, and long-term success" (p. 723). According to them, and as originally theorized by Skinner and Pitzer (2012), the self-system model illuminates the complex process of school disengagement, problem behavior, and school dropout. The model posits that youth are likely to overcome difficulties and obstacles in school, bounce back from failures, and reengage in academic tasks as long as they are behaviorally, emotionally, and cognitively engaged with school (Skinner & Pitzer, 2012). To achieve this goal, however, students' social, emotional, and behavioral needs must be met (Campie et al.,

2015; Zins, Bloodworth, Weissberg, & Walberg, 2007). Although we would assume that providers across systems are collectively able to reduce risk and address need—and in turn cultivate opportunities and capacities for active learning and academic engagement—a large body of research paints a different picture. To summarize, a significant proportion of youth in foster care experience multiple placement disruptions and school changes (Koh, Rolock, Cross, & Eblen-Manning, 2014; Rock, Michelson, Thomson, & Day, 2015; Stott, 2012), and by the time they age out of foster care, mental health is often compromised due to lack of effective strategies to deliver and implement evidence-based treatments to fidelity (Garcia, Circo, DeNard, & Hernandez, 2015; Novins, Green, Legha, & Aarons, 2013). They, along with juvenile justice system-involved youth, are less likely to earn a high school diploma and gain employment and are more likely to live in poverty and become homeless (Aratani & Cooper, 2015; Henry, Knight, & Thornberry, 2012; Nolan, Cole, Wroughton, Clayton-Code, & Riffe, 2013; Woods, Farineau, & McWey, 2013). These outcomes suggest that despite system involvement, opportunities to address poor psychosocial outcomes, and in turn increase educational mobility, are limited.

To make matters worse, these systems often work in silos because of conflicting missions, goals, and organizational norms and practices (Campie et al., 2015; Siegel & Lord, 2005). Yet, most efforts to disrupt negative educational trajectory have focused on modifying students' behaviors, labeling them as the source of the problem, rather than understanding and addressing the student within a larger context (Freeman & Simonsen, 2015; Freudenberg & Ruglis, 2007). Indeed, the current study addresses this gap by focusing instead on whether structural, organizational, and system-level effects (i.e., receipt of services from multiple systems) impact high school dropout rates. Interview and focus group data provided by mental health clinicians, agency social workers, and city-employed child welfare caseworkers reveal that information sharing across systems is halted by variation in information accessibility; lack of clarity in policies, procedures, and protocols; and perceived differences in how best to develop and sustain collaborative relationships (Hwang, Mollen, Kellom, Dougherty, & Noonan, 2016). Thus, it is plausible that capacity to develop and implement coordinated services so as to decrease high school dropout rates is limited.

Target Population

Neild and Balfanz (2006) found that ninth grade was the year in which students showed the highest risk of dropping out. Thus, they focused on eighth grade as the year in which several factors, including increased absenteeism,

manifested themselves as key predictors of students subsequently dropping out of school. It is paramount then to examine school dropout during the ninth grade when students show the highest risk of dropping out (Neild & Balfanz, 2006). Understanding the experiences of dropout among older youth in the latter part of their high school education is important; however, at that age, little time is left to modify the course of their poor educational trajectories before they reach early adulthood (Stetser & Stillwell, 2014). To that end, our study seeks to identify whether service use, be it single- or multiple-system involvement, influences risk for school dropout.

Research Questions and Hypothesis

The current descriptive study addresses the following questions:

Research Question 1: What is the prevalence of services system utilization and combinations of services systems utilization among a cohort of seventh-, eighth-, and ninth-grade students in a large, racially/ethnically diverse Mid-Atlantic city?
Research Question 2: Does single- and/or multiple-system involvement predict whether seventh- and eighth-grade students are considered at risk for dropping out (i.e., being absent at least 20% of the school year), controlling for some of the child (age, gender, race/ethnicity), family (i.e., poverty as operationalized by free lunch and medical assistance eligibility, and LEP), and school-based factors (special education due to disability) that may increase the likelihood of excessive school absenteeism and eventual dropout?
Research Question 3: Does single- and/or multiple-system involvement predict whether students in the ninth grade drop out or are considered at risk for near-dropout (i.e., being absent for over 50% of the school year), controlling for the aforementioned family and sociocontextual factors?

We hypothesize that a positive relationship between school dropout and services system involvement, as a result of system failures and lack of coordination between systems, will be detected. As noted by Fantuzzo and Perlman (2007), however, foster care involvement does not influence educational outcomes after controlling for maltreatment and homelessness. While novel, their study focused on young second graders who are not as likely to exhibit behaviors that would warrant involvement in mental health or juvenile justice systems as the older youth in our study are. Moreover, based upon Hwang et al. (2016) recent findings, it is plausible that barriers to information sharing and collaboration may interfere with

goals to coordinate services across systems and disrupt a myriad of complex needs and risk factors. Thus, school dropout may increase as additional service systems operate in silos and encounter barriers to engage in intraorganizational collaboration.

Method

Participants

Data used in this study came from administrative data sets that span services from four different public entities in the City of Philadelphia. The study group consisted of 51,687 students who were enrolled in seventh, eighth, and ninth grades during the school year 2004-2005 in the School District of Philadelphia (SDP). The school records for these students were then matched with records of behavioral health services use from the city's Department of Behavioral Health and Intellectual disAbility Services (DBHIDS), records of child welfare and juvenile justice involvement from the city's Department of Human Services (DHS), and records of family shelter use from the city's Office of Supportive Housing (OSH). Data from these three city systems were accessed through CARES, the City of Philadelphia's integrated data system for services to children and youth. Data-use agreements were obtained with the SDP and City of Philadelphia, and City of Philadelphia personnel performed the record matching, based on common student name, social security number, sex, and date of birth. City personnel provided for this study one matched, de-identified record per student that contained information on his or her use of public schools (absenteeism/truancy), foster care, juvenile justice, homelessness, and behavioral health services.

A waiver for obtaining individual informed consents from the study group members and approval for this research were received through the City of Philadelphia and the University of Pennsylvania institutional review boards.

Procedure and Measures

The SDP provided a record for each student on school participation from academic years (AYs) 2001-2002 through 2005-2006. We used records for the 51,687 students in the database who attended Grades 7 through 9 in AY 2004-2005, who were no more than 2 years above the normal age for the grade, and who remained in the district for the whole AY. Students who were older than 2 years above the normal age were not included as their circumstances and school outcomes are substantially different from their younger classmates. Data included fields that provided information on the following:

- Promotion outcome (promoted, retained, dropped out, moved, other). This data field, along with number of days attending school, was used to determine a student's dropout status.
- Receipt of special education services as "emotionally disturbed" (ED). ED services receipt, signified by a dichotomous indicator, was considered as a category of behavioral health services provided through the school system. Students in the ED category typically present with a complex range of disabilities, from conduct disorder to schizophrenia, which often overlap with the use of other services, such as those examined in this study and which may indicate other problems that interfere with the student's ability to learn. We examined the impact of receiving these school-based services upon more mainstream school district outcomes.
- The use of other special education services, including those for learning disabilities, physical disabilities, and "academically gifted" students. The only one of these categories that is generally associated with negative learning outcomes is learning disabilities (Cortiella & Horowitz, 2014; Doren, Murray, & Gau, 2014), and a dichotomous indicator for receipt of learning disability services is included as a control variable.
- Whether or not students were considered to have LEP (dichotomous variable).
- Grade attended, number of days in attendance (continuous variable), and free lunch eligibility (dichotomous variable).
- Basic demographics: race, age, and gender.

The DBHIDS provided data on Medicaid-funded behavioral health claims from an administrative database that included claims records maintained by Community Behavioral Health, the publicly run managed care organization that funds behavioral health services for Philadelphia Medicaid recipients. Medicaid-funded behavioral health services provided by DBHIDS included inpatient psychiatric hospitalization, partial psychiatric hospitalization, community support services, outpatient psychiatric services, drug and alcohol services, and residential treatment services. This study focused on "heavy users"—those students who experienced the most extensive DBHIDS service involvement, based on a cluster analysis of types and amounts of DBHIDS services used and which identified groups of the most intensive users of the highest cost services (Lambert, Brannan, Breda, Heflinger, & Bickman, 1998; Metraux, 2012). For the school year 2004-2005, a "heavy DBHIDS user" referred to anyone using at least 10 days of inpatient hospital services, 12 days of residential treatment facility services, 21 units of case management services,

and/or 46 units of behavioral health rehabilitation services (BHRS or "wrap-around"). We also examined DBHIDS services use during the 3 years prior to school year 2004-2005, and here we assigned "heavy user" status to anyone using at least 30 days of inpatient services, 37 days of residential treatment facility services, 62 units of case management services, and/or 138 units of BHRS services. An indicator for any DBHIDS services use, not including those in the heavy user designation, was also used in this study. Finally, data on whether or not the student was Medicaid eligible (regardless of whether or not behavioral health services were provided) were also gathered from this data source. Data were available for AY 2001-2002 through 2004-2005.

The DHS, Dependency Care provides services for dependent children and youth through its child welfare system. 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. The dependency indicator in this study was for youth with out-of-home placements, either in foster care, in group homes, or in other institutional settings in this system. More specific information on the details of these placements (e.g., length of placement, number of placements) was not available. We did not include in-home preventive services in this study as such services involvement, and the problems that initiated these services, are qualitatively different and not as disruptive as removing a child from his or her home. Data were available for AY 2001-2002 through 2004-2005.

The DHS, Delinquency Care provides services for delinquent children and youth through its juvenile justice system. DHS's juvenile justice system is administered in parallel to DHS's dependency care system. Youth in the delinquency group engaged in conduct which, if committed by an adult, would be criminal, and thus, they are 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 over the age of 13 who are awaiting court action. Other delinquent placements are in group homes for youth who have histories of truancy, other adjudications in Family Court, and a high risk of delinquency. As with the dependency data, more specific information on the details of these placements was not available. The delinquency indicator in this study was for youth with out-of-home placements in this system (which are different than dependency care out-of-home placements). Data were available for AY 2001-2002 through 2004-2005.

The OSH provided data on homeless shelter services. This information 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 shelters. The OSH indicator is for those who experienced stays in emergency shelters during the observation period and did not include stays in youth shelters. OSH does not administer youth shelters, and there is no central database for youth shelter users. OSH data were available only for AY 2004-2005. Although the OSH shelter data available capture a limited segment of the students who experienced homelessness, the adverse effects of shelter use on school performance render it worthwhile to assess the risk for dropout among those students who we are able to identify as having experienced shelter stays.

In summary, the data sets from the different services systems were matched so that there was one integrated, person-level record for each student based on the SDP record and containing indicators for special education services in the ED category, for DBHIDS involvement (heavy user and any use), for DHS delinquency and dependency services, and for OSH shelter services. For all systems except for OSH, separate indicators were created for current (AY 2004-2005) and past (AY 2001-2002, AY 2002-2003, and AY 2003-2004) years. Complete data from OSH was only available starting in AY 2004-2005. Although the administrative records used for this study cover a large number of students, the information provided in these records (as is typical of administrative data sets) is limited and often leads to working with basic indicators of whether services were received and measures of services intensity when more detailed information about the nature of the services would be more desirable.

In addition to these data system indicators, two other indicators, served as outcomes, were derived from the SDP data. One indicator represents dropouts, or near-dropouts, based on measures first derived by Neild and Balfanz (2006). These students stopped attending school for reasons other than residential moves, school transfers, or any other event where their education presumably continued. Relying on Neild and Balfanz's criteria, students were designated as "dropout" if they were listed in the SDP record as "withdrawn" for reasons other than a move or a transfer and had no records of subsequent school attendance. Students were considered near-dropout if they had been absent for more than 50% of the school year but were still enrolled. The near-dropout designation may have captured some students who were absent long term for other reasons, such as medical reasons; however, missing school for over half a school year and then successfully resuming studies would have been infrequent. As Neild and Balfanz explained, based on the students' extreme lack of attendance, the situation of near-dropouts was more similar than different to that of dropouts. The second indicator, for students who were at risk for dropping out, includes every student who was absent from school

at least 20% of the time. Neild and Balfanz concluded that this indicator is one of the best predictors of eighth-grade students dropping out in subsequent years. The dropout/near-dropout indicator was used as an outcome for ninth-grade students while the at-risk indicator was used as an outcome for seventh- and eighth-grade students, respectively.

Data Analyses

Descriptive statistics were first analyzed to collect information regarding demographic, socioeconomic, and other available school-related characteristics, as well as the prevalence of services system utilization and combinations of services systems utilization during AY 2004-2005. Logistic regression was then used to model associations between services system use and (a) seventh and eighth graders being considered as at risk for dropping out (operationalized by students being absent at least 20% of the school year) and (b) ninth graders dropping out or having near-dropout status (operationalized as being absent for over 50% of the school year). Analyses controlled for child (age, gender, race/ethnicity) and family risk profiles (i.e., poverty as operationalized by free lunch and medical assistance eligibility and LEP), and enrollment in special education for a disability.

Results

Table 1 provides summary statistics of demographic, socioeconomic, and school-related characteristics that were available in AY 2004-2005 for the whole student cohort through the available data. To briefly summarize, the aggregate profiles of Grades 7 and 8 were similar, based on the frequency distributions in Table 1, but these profiles differed substantially from that of Grade 9. Among the most extreme differences between seventh and eighth graders versus ninth graders are grade retention (2% and 1.8% in Grades 7 and 8, respectively, and 19.3% in Grade 9) and dropout rates (1% and 2.1% in Grades 7 and 8, respectively, and 9.3% in Grade 9). Based on these findings, students in Grades 7 and 8 were examined together, and students in Grade 9 were examined separately in the subsequent analyses.

The extent to which students in the study cohort used services in other systems (including special education services in the ED category) during AY 2004-2005 and in the 3-year period before AY 2004-2005 is shown in Table 2. During AY 2004-2005, the proportion of students who accessed at least one of the systems increased slightly as grades progressed (14.1% and 15.4% for Grades 7/8 and 9, respectively). The corresponding percentages for the prior period were identical, 15.2% for all grades. Combining use for these two time

Table 1. Demographic, Economic, and Basic School Performance Characteristics by the School District of Philadelphia Study Group: Academic Year 2004-2005.

	Grade 7	Grade 8	Grade 9
	n = 16,246	*n* = 15,802	*n* = 19,639
At "Grade Age"[a]	75.3%	74.6%	63.1%
Male	50.6%	50.6%	51.8%
Race/ethnicity			
African American (non-Hispanic)	67.2%	67.6%	66.4%
Latino	14.5%	14.9%	14.5%
White (non-Hispanic)	13.1%	12.5%	13.8%
Other	5.3%	5.0%	5.4%
Limited English proficiency	8.4%	8.7%	9.0%
Free lunch eligibility	50.0%	47.8%	43.2%
Medical assistance eligibility (any)	46.5%	49.3%	40.4%
Medical assistance eligibility—type			
Temporary assistance to needy families	29.1%	31.4%	25.4%
Supplemental security income	2.0%	2.2%	2.1%
Healthy beginnings	14.4%	14.7%	12.1%
General assistance	1.0%	1.1%	0.8%
Retained in grade	2.0%	1.8%	19.3%
Dropped out of school	1.0%	2.1%	9.3%
"Near Dropout" (absent 50+% of school year)	1.0%	1.4%	5.9%
Absent over 20% of the school year[b]	11.0%	12.3%	20.2%

[a]"Grade age" is 12 for seventh grade, 13 for eighth grade, 14 for ninth grade.
[b]Dropout, "near dropout," and absent over 20% are mutually exclusive.

periods yielded increases of one quarter (to 18.9% for Grades 7/8) and one third (to 19.3% for Grade 9) in the proportions of students accessing services.

Table 2 displays the breakdowns of services use by systems. For both past and present services use, DBHIDS was the most frequently used service, but only between one fifth and one quarter of DBHIDS users were classified as heavy users. The next most frequently used system were delinquency and dependency services.. Proportions of students receiving DHS delinquency services increased with age, while rates of dependency services use were greater in the pre-period but higher for the ninth-grade subgroup. Either 2.2% (seventh/eighth grade) or 2.6% (ninth grade) of students received special education services under ED during the AY 2004-2005; the corresponding proportions were somewhat lower in the pre-period. Less than 1% of students in all grades stayed in OSH shelters in AY 2004-2005; no data for shelter stays were available for the pre-period. Finally, Table 2 shows corresponding proportions of services users for students who were found, among seventh

Table 2. Services Systems Use[a] by School District of Philadelphia Study Group During and Prior to Academic Year 2004-2005 (AY 2004).

	Seventh/eighth grade (*n* = 32,048)		Ninth grade (*n* = 19,639)	
	% of total	% of at-risk group	% of total	% of dropout/near-dropout group
Service system involvement (during AY 2004)[b]				
Any services use[c]	14.1	30.1	15.4	29.7
Special education—ED[d]	2.2	5.2	2.6	5.6
DBHIDS—Heavy user[e]	2.9	7.0	1.9	3.4
DBHIDS—Other than heavy user	7.8	14.4	6.0	8.1
DHS—Dependency	2.0	5.6	3.3	8.0
DHS—Delinquency	2.6	7.4	5.9	14.7
OSH—Shelter use	0.6	1.5	0.1	0.2
Service system involvement (3 years pre-AY 2004)				
Any services use	15.2	30.0	15.2	25.5
Special education—ED	1.5	3.3	1.9	4.2
DBHIDS—Heavy user[f]	2.9	5.7	2.4	3.6
DBHIDS—Other than heavy user	10.9	18.8	8.2	9.2
DHS—Dependency	1.7	4.1	3.4	8.0
DHS—Delinquency	0.9	2.7	3.5	9.6
Service system involvement (combined AY 2004 or 3 years pre-AY 2004)				
Any services use	18.9	36.9	19.3	32.8
Special education—ED	2.3	5.5	2.7	5.7
DBHIDS—Heavy user	4.2	9.4	3.3	5.5
DBHIDS—Other than heavy user	13.7	24.7	10.8	13.4
DHS—Dependency	2.4	6.9	4.5	10.9
DHS—Delinquency	2.7	7.9	6.4	16.1

Note. ED = emotionally disturbed; DBHIDS = Department of Behavioral Health and Intellectual disAbility Services; DHS = Department of Human Services; OSH = Office of Supportive Housing; BHRS = behavioral health rehabilitation services.

[a]"System" refers to either being enrolled in the ED component of Special Education or receiving services through DBHIDS (heavy or nonheavy use), DHS (dependency and/or delinquency), or OSH (shelter).

[b]SDP record reflects academic year 2004-2005; other system services occurred between July 1, 2004 and June 30, 2005.

[c]"Any services use" refers to involvement in Special Ed—ED, DBHIDS—All Users, DHS—Dependency, DHS—Delinquency, or OSH—Shelter services.

[d]ED is the only component of Special Education services to be considered a "system" here.

[e]"Heavy" DBHIDS user (for AY 2004-2005) refers to anyone using at least 10 days of inpatient services, 12 days of residential treatment facility services, 21 units of case management services, and/or 46 units of BHRS (i.e., "wraparound") services.

[f]"Heavy" DBHIDS user (for 3 years prior to AY 2004-2005) refers to anyone using at least 30 days of inpatient services, 37 days of residential treatment facility services, 62 units of case management services, and/or 138 units of BHRS (i.e., "wraparound") services.

and eighth graders, to be at risk for dropping out and, for ninth graders, to be dropouts or near-dropouts. As explained previously, the at-risk measure was an outcome for the seventh and eighth-grade subgroup, and the dropout/

Table 3. Cross-Services Use by School District of Philadelphia Study Group: Academic Year 2004-2005.

	Seventh/eighth grade (n = 32,048)		Ninth grade (n = 19,639)	
	Percent of total	Percent of at-risk group	Percent of total	Percent of dropout/near-dropout group
Sole system involvement (i.e., no other system)				
Special education—ED	0.7	1.3	1.2	2.3
DBHIDS—Heavy user	1.6	3.3	0.8	1.0
DBHIDS—Other than heavy user	5.8	9.4	3.9	4.0
DHS—Dependency	0.8	2.1	1.7	4.4
DHS—Delinquency	1.3	3.5	3.8	9.5
Dual system involvement				
ED and DBHIDS heavy user	0.6	1.5	0.3	0.4
ED and DBHIDS other than heavy user	0.5	1.1	0.3	0.4
ED and dependency	0.04	0.09	0.1	0.2
ED and delinquency	0.1	0.4	0.3	1.0
DBHIDS (heavy user) and dependency	0.3	1.0	0.3	0.9
DBHIDS (heavy user) and delinquency	0.2	0.6	0.3	0.5
DBHIDS (other than heavy user) and dependency	0.6	1.4	0.6	1.0
DBHIDS (other than heavy user) and delinquency	0.6	1.6	0.8	1.7
Delinquency and dependency	0.1	0.2	0.3	0.6
Involvement in one system	10.6	20.6	11.5	21.3
Involvement in two systems	3.1	8.1	3.3	6.8
Involvement in three or more systems	0.4	1.4	0.6	1.6

Note. ED = emotionally disturbed; DBHIDS = Department of Behavioral Health and Intellectual disAbility Services; DHS = Department of Human Services.

near-dropout measure was an outcome for the ninth-grade subgroup. For those students who showed such outcomes, the proportion of services use, both among individual systems and in the aggregate, were consistently higher and sometimes over twice as high.

Table 3, which shows combinations of services systems use, indicates that the majority of services users of each type identified on Table 2 did not show use of a second services type during AY 2004-2005. Overall, 3.5% of seventh and eighth graders and 3.9% of ninth graders used combinations of the five types of services shown in Table 2. Among the multisystem users, there were many combinations of services used. None had a combined proportion higher than 1%, and the systems most frequently paired were DHS services (both delinquency and dependency) and DBHIDS (heavy user), each with about 0.6% of the overall student cohort. As with Table 2, Table 3 shows consistently higher rates of multi-systems users among those who either were at

Table 4. Impact of Systems Use on Risk of "At Risk" Status for Dropping Out.[a]

Covariate	% "at risk"	Adjusted odds ratio	95% confidence interval	
Sole system use (AY 2004)				
Special education—ED	26.7	3.08	[2.13, 4.43]	***
DBHIDS—Heavy user	29.4	2.65	[2.10, 3.33]	***
DBHIDS—Other services	23.2	1.63	[1.42, 1.87]	***
DHS—Dependency	39.4	4.60	[3.37, 6.28]	***
DHS—Delinquency	39.9	3.85	[3.06, 4.83]	***
OSH—Shelter (all OSH use)	35.9	2.75	[2.01, 3.76]	***
Multiple-system use (AY 2004)				
ED and DBHIDS heavy user	38.6	5.34	[3.65, 7.81]	***
ED and DBHIDS other user	30.5	3.29	[2.14, 4.75]	***
ED and DHS dependency	33.3	4.89	[1.41, 17.0]	*
ED and DHS delinquency	53.1	9.90	[4.63, 21.2]	***
DBHIDS heavy user and DHS dependency	47.8	6.69	[4.19, 10.7]	***
DBHIDS heavy user and DHS delinquency	38.9	3.51	[2.07, 5.95]	***
DBHIDS other user and DHS dependency	34.4	3.57	[2.48, 5.14]	***
DBHIDS other user and DHS delinquency	38.4	2.96	[2.15, 4.08]	***
DHS dependency and DHS delinquency	33.3	2.87	[1.33, 6.19]	**
User of more than two systems	51.2	7.50	[4.90, 11.5]	***
Previous system use (3 years prior AY 2004)				
Special education—ED	30.9	0.92	[0.68, 1.24]	n.s.
DBHIDS—Heavy user	28.0	0.96	[0.78, 1.17]	n.s.
DBHIDS—Other services	24.7	1.16	[1.03, 1.29]	*
DHS—Dependency	35.0	0.60	[0.46, 0.78]	***
DHS—Delinquency	42.8	0.95	[0.71, 1.27]	n.s.
All students—Grades 7-8 (n = 32,048)	14.3			
Students—1+ systems (n = 4,510)	30.6			
Students—No systems (n = 27,538)	11.6			

Note. ED = emotionally disturbed; DBHIDS = Department of Behavioral Health and Intellectual disAbility Services; DHS = Department of Human Services; OSH = Office of Supportive Housing.
[a]"At risk" is operationalized as being absent for at least 20% of the school year.
[b]In addition to covariates shown here, this logistic regression model included control variables (results not shown) of age, gender, race/ethnicity, free lunch eligibility, Medical Assistance eligibility types, Special Education for learning disability, and Limited English Proficiency classification.

risk for dropping out (seventh- and eighth-grade outcome measure) or who were considered dropouts or near-dropouts (ninth-grade outcome measure).

Table 4 shows results from a logistic regression model estimating associations between services use (during and prior to AY 2004-2005), combinations of services use, and the risk of dropping out among the seventh and eighth graders in the student cohort. Results indicate that the overall model of the predictors was statistically reliable in distinguishing between students who

were and were not at risk of dropping out of school, −2 log likelihood = 24137.79, Wald = 2093.45, $\chi^2(30) = 2176.67$, $p < .0001$. The model correctly classified 70% of the cases. Among all seventh and eighth graders in the student cohort, 14.3% were at risk of dropping out or had already attained dropout/near-dropout status. This contrasts to a corresponding rate of 30.6% for the students who accessed at least one of the five services examined here. The adjusted odds ratios (AORs) for all of the systems measures were compared with those for students who had no record of service use. All types of single-system use were positively associated with increased odds of being at risk for dropping out. The adjusted AOR for these effects fell between 1.63 (DBHIDS nonheavy user) and 4.60 (DHS dependency). When students used more than one other system (represented here by the interaction terms under the "Multiple Systems Use" heading), the associated AORs positively increased for all combinations, and in many cases the AORs increased markedly. This included AORs of 9.9 for ED and DHS delinquency services, and 7.5 for any use of three or more services systems. Systems involvement in the pre-period did not significantly influence the odds of having at-risk status, except for non-heavy DBHIDS users (AOR = 1.16) and DHS dependency (AOR = 0.60).

Table 5 has a virtually identical structure and format to Table 4 in assessing the risk, this time among the ninth graders in the student cohort, for either dropping out of school or being of near-dropout status. Results indicated that the overall model of the predictors was statistically reliable in distinguishing between students who did and did not dropout or had attained near-dropout status, −2 log likelihood = 13439.93, Wald = 2790.54, $\chi^2(30) = 3305.32$, $p < .0001$. The model correctly classified 79% of the cases. Overall, 15.2% of the ninth-grade students dropped out or nearly dropped out, with this proportion rising to 34% among services systems users. Results from this model showed that, when compared with non-services systems users, use of single systems (except OSH shelter use) was associated with increased risk for dropout/near-dropout status. AORs for the four significant services types ranged from 1.87 (Special Ed—ED) to 3.25 (DHS dependency). Similar to the results in Table 4, when students used more than one other system (again represented by the interaction terms under the "Multiple Systems Use" heading), the associated AORs significantly increased for all combinations except one (ED and DHS dependency), and in many cases the AORs increased more markedly. The highest AORs for this model were 8.55 for DBHIDS (heavy user) and DHS dependency services, and 7.1 for any use of three or more services systems. Also consistent with the Table 4 results, previous systems use was non-significant for all but two systems, with DBHIDS (nonheavy users) associated with a significant but modest increase (AOR = 1.26) and DHS dependency services associated with a reduced AOR (0.71).

Table 5. Impact of Systems Use on Risk of Dropout or "Near Dropout" Status.[a]

Covariate	% dropout or near-dropout	Adjusted odds ratio	95% confidence interval	
Sole system use (AY 2004)				
Special education—ED	30.4	1.87	[1.23, 2.83]	**
DBHIDS—Heavy user	18.5	2.14	[1.36, 3.38]	**
DBHIDS—Other services	15.4	1.72	[1.35, 2.18]	***
DHS—Dependency	39.5	3.25	[2.39, 4.42]	***
DHS—Delinquency	38.2	2.07	[1.65, 2.58]	***
OSH—Shelter (all OSH use)	6.3	0.78	[0.23, 2.69]	n.s.
Multiple-system use (AY 2004)				
ED and DBHIDS heavy user	22.5	2.39	[1.07, 5.33]	*
ED and DBHIDS other user	20.6	2.31	[1.15, 4.66]	*
ED and DHS dependency	31.6	2.19	[0.68, 7.03]	n.s.
ED and DHS delinquency	55.6	3.36	[1.64, 6.90]	***
DBHIDS heavy user and DHS dependency	41.5	8.55	[4.83, 15.1]	***
DBHIDS heavy user and DHS delinquency	27.3	3.13	[1.61, 6.07]	***
DBHIDS other user and DHS dependency	27.3	4.05	[2.49, 6.57]	***
DBHIDS other user and DHS delinquency	31.7	4.06	[2.77, 5.96]	***
DHS dependency and DHS delinquency	34.5	2.61	[1.36, 5.02]	**
User of more than two systems	40.0	7.13	[4.25, 12.0]	***
Previous system use (3 years prior AY 2004)				
Special Ed—ED	33.8	1.27	[0.85, 1.89]	n.s.
DBHIDS—Heavy user	22.7	1.23	[0.91, 1.67]	n.s.
DBHIDS—Other services	17.1	1.26	[1.05, 1.51]	*
DHS—Dependency	35.4	0.71	[0.55, 0.91]	**
DHS—Delinquency	41.8	1.15	[0.91, 1.46]	n.s.
All students—Grade 9 (n = 19,639)	15.2			
Students—1+ systems (n = 3,027)	34.0			
Students—No systems (n = 16,612)	12.6			

Note. ED = emotionally disturbed; DBHIDS = Department of Behavioral Health and Intellectual disAbility Services; DHS = Department of Human Services; OSH = Office of Supportive Housing.
[a]"Near Drop Out" is operationalized as being absent for at least 50% of the school year.
[b]In addition to covariates shown here, this logistic regression model included control variables (results not shown) of age, gender, race/ethnicity, free lunch eligibility, Medical Assistance eligibility types, Special Education for learning disability, and Limited English Proficiency classification.

Discussion

The primary objectives of this study were to determine (a) the prevalence of services system utilization and combinations of services systems utilization among a cohort of seventh-, eighth-, and ninth-grade students and (b) whether single- and/or multiple-system involvement increased the likelihood to be at risk for and/or to experience dropout. Regarding the first objective, we found 1-year prevalence rates of 14.1% for students in seventh and eighth grades, and 15.4% for students in ninth grade, who were involved in one or more of four city services systems or in the ED category for special

education services during the 2004-2005 school year. When adding systems involvement over the previous 3 years to this 1-year prevalence rate, the proportions increased to 18.9% (seventh and eighth grades) and 19.3% (ninth grade). Of the students using these services, just under one fourth used more than one of these five services. Among the subgroup of these students deemed at risk for dropping out (seventh and eighth grade), or who were either dropouts or near-dropouts (ninth grade), the corresponding proportions of services involvement were over twice as high.

Regarding the second objective, we found that involvement with public youth services systems was associated with worse dropout rates compared with the non-services using students in our sample. Users of these services systems had dropout and near-dropout rates (34% for ninth graders) and at risk for dropping out rates (30.6% for seventh and eighth graders) that were more than double the corresponding rates in the overall group (15.2% and 14.3%). After controlling for child and family risk factors and special education for disability, involvement in any of the services systems examined here (or combinations thereof) was associated with increased risk of being at risk for dropping out (including nearly dropping out) of school. As a general rule, use of combinations of services systems translated into somewhat higher likelihoods of experiencing school dropout when compared with single-system use, but this was not always the case. In both models, the small numbers of students who used three or more services systems had substantially higher likelihoods of either being at risk for dropping out or being a dropout or near-dropout. On the other hand, prior history of services use did not change the likelihood of either outcome substantially, the only exception being that a history of prior out-of-home placement in the child welfare system decreased the likelihood for being at risk for and actually dropping out of school. One possible, albeit speculative, explanation for this finding is that child welfare caseworkers and foster caregivers are able to keep youth in child welfare placements in school during Grades 7 to 9.

We have been unable to locate many other studies that examine the extent of public systems use among a comparable, school-based population. Thus, it is difficult to provide a context for these findings. A notable exception is the study conducted by Neild and Balfanz (2006), who reported rates of child welfare and juvenile justice involvement among a cohort of seventh- and eighth-grade students in Philadelphia that are consistent with the rates we found. However, it remains unknown whether school-based populations in other jurisdictions would see similar rates of services involvement. Such rates would, at least to some extent, be predicated on the availability of such services and data systems to track and monitor trends in a localized context.

The rates found here indicate that a relatively substantial number of students were involved in other public services systems. Even after excluding those with "other" DBHIDS involvement from this group, those with out-of-home placement or significant behavioral health interventions still amounted to at least 8.2% (seventh and eighth grades) and up to 11.5% (ninth grade) of the student population (these findings were not presented in the tables). This would, on average, equate to at least two to three students per classroom. Among this subgroup of system-involved students, approximately one fourth were involved with multiple systems, representing a relatively small proportion of the overall student population. With respect to the outcomes related to school graduation examined here, the likelihood of adverse outcomes associated with multiple-system involvement was often, but not always, somewhat higher than comparable likelihoods associated with single-system involvement. For example, in Table 5, a DHS-dependency placement (without other services use) had an AOR of 3.25 (compared with those with no record of services use). When combined with other systems, however, the AOR either dropped substantially (dependency and special education—ED), dropped modestly (dependency and delinquency), or increased substantially (dependency and heavy use of DBHIDS services).

Implications for Future Research, Practice, and Policy

Findings lend to a number of implications for research, practice, and policy. First of all, additional research is needed on how the mechanisms related to involvement in one system (or utilization of multiple systems) directly and indirectly influence the likelihood of dropping out of school. More specifically, there is a need to understand the organizational policies, structures, and conditions specific to each respective public youth-serving agency, and the extent to which these factors facilitate positive educational trajectories for at-risk youth.

Second, there is only sporadic consistency across the models in Tables 4 and 5 in AOR values for specific covariates. This suggests that being at risk for dropping out may involve different dynamics between students with services involvement versus students who actually experience dropout. Services use, especially out-of-home care, can easily lead to increased absenteeism, but perhaps, at times, it offers sufficient support to mitigate what would have been an even higher risk of dropping out in the absence of these services. Likewise, the increased supervision present in family shelters may contribute to the non-significant relationship found between shelter use and dropout/near-dropout rates. On the other hand, the disruptions associated with homelessness and shelter use may account for much of the increased likelihood (AOR = 2.75) associated with at-risk status (i.e., frequent absenteeism) among youth with shelter stays.

Third, findings underscore the need to implement policies and procedures to routinely identify issues of concern among students as they navigate within and across public youth-serving systems. For example, community-led coalitions inclusive of educators, social workers, and providers from other child-serving systems could develop local protocols to identify heavy system users and provide coordinated services, with the intended outcome of addressing developmental needs and observing fewer school dropouts. Adequate supports and resources within agencies to promote a culture conducive to the prevention of school dropout may then be implemented. Are child welfare caseworkers and mental health providers, for instance, considering how best to promote safety and positive mental health outcomes so that, in turn, students are likely to remain motivated to learn and stay engaged in school? How effective are efforts devoted to modifying risks for poor developmental outcomes in reducing school dropouts? Next steps may involve mobilizing partner agencies to facilitate interagency collaboration to collectively develop treatment plans that capitalize on students' strengths and mitigate negative psychosocial risk factors. These plans, for example, may include the implementation of support groups and natural mentoring for youth who are involved in the juvenile justice and/or child welfare system.

A noteworthy strength of our study is that findings may resonate well with educators and service providers who work with a racially and ethnically diverse sample of system users. In fact, nearly 70% of the students identified as African American, while 15% were Latino. Findings show that African American (AOR = 1.28) and Latino (AOR = 1.41) students were more likely to be at risk of dropping out of school than their Caucasian counterparts. With respect to dropout or near-dropout status, however, African Americans (AOR = 0.786) were at lower risk compared with Caucasian students. These findings suggest that African American and Latino youth encounter a number of challenges or adverse events that elevate risk for school dropout. However, at least collectively, African American students may experience a number of strengths and informal supports to help them overcome adversity and academic disengagement. Additional research to test this hypothesis is warranted.

A finding that generates additional scientific inquiry is that African American students were more likely to experience any, as well as multiple (two or three), system involvement as compared with Caucasians. Unlike African American students, however, Latinos were significantly more likely to experience involvement in one system and were no more likely to experience involvement in multiple systems as compared with Caucasians. What is abundantly clear from prior research is that children of color are likely to be heavy system users within the child welfare and juvenile justice systems (Jones, 2012; Marshall & Haight, 2014; Ryan, Herz, Hernandez, &

Marshall, 2007). Thus, the finding that students of color are generally, albeit with a few exceptions, more likely to experience services system involvement is not surprising. Once they are involved in these systems, however, they are less likely to receive effective mental health and other prevention services (Garcia, Palinkas, Snowden, & Landsverk, 2013) to ameliorate adverse events and subsequently prevent school dropout (Porche, Fortuna, Lin, & Alegria, 2011; Price, McKinney, & Braun, 2011). Future research is needed to identify whether modifying the contextual and organizational conditions where students access and utilize effective services within single or multiple services systems decreases racial/ethnic disparities in the outcomes we observed. For example, are child welfare, mental health, and juvenile justice agencies armed with the capacity and resources to implement culturally relevant, evidence-based practices to ameliorate the effects of trauma, abuse, and exposure to multiple forms and types of violence and delinquent acts—all factors that if left unaddressed will also likely lead to higher rates of school dropout?

Finally, it is well agreed upon that adverse childhood experiences may influence school dropout (Porche et al., 2011). Due to limitations in the data provided by the city, however, we were not able to explore this relationship. Nonetheless, we can surmise that because youth were involved in systems of care (foster care, juvenile justice, homelessness, special education) risk for poor outcomes, and consequently need for service system involvement had been identified. Our study, however, specifically focused on examining the relationship between system involvement and school dropout. The emphasis on this question is novel, in that it has not been explored, and noteworthy to address before we begin to disentangle the complex relationships between multiple trauma exposures, system involvement, and school dropout. The findings of this study, coupled with prior research on adverse childhood experiences, will then lend to generating a sound hypothesis for future researchers to examine whether service system involvement mediates the relationship between trauma exposures and school dropout.

Limitations

Many of the limitations generally associated with gauging services use through administrative data matching also apply to this study. Insofar as the data available for this study only covered publicly provided and publicly funded services, those who accessed services outside these systems would not be covered by this study. This is most apparent with shelter services. The relatively low proportion of shelter use among this cohort is reflective of data that were only available for municipally funded adult and family shelters.

This means that the data did not cover students in runaway and youth shelters, nor youth in families that spent their homelessness in more makeshift living arrangements.

Other systems will also have had more modest degrees of undercount for reasons related to data coverage. For example, behavioral health services received from private providers and reimbursed through non-public payers would not be captured in these data. It is also unclear to what extent prior services use was missed because the student was not living in Philadelphia prior to the AY 2004-2005. These limitations, taken together, contribute to what is likely to be a conservative assessment of services use.

Limitations that are inherent to use of administrative data also include data-quality issues. These data were compiled primarily as a means of keeping records of systems users and their services use. The quality control procedures for these records are unclear, given that data from multiple services systems were gathered, stored, and eventually linked by city personnel. The authors were only privy to a matched, de-identified data set. Thus, there were limited means to assess the accuracy of these data beyond straightforward face validity checks. Few data problems were noted, with extreme outliers and obviously incorrect values for data transformed into missing values. Missing values were few and non-systematic (i.e., less than 5% on any given variable). In such cases, the missing data were coded as zero values for indicators (e.g., missing value for a student disposition field led to a non-dropout designation), which likely created a small attenuation bias. Records with insufficient information in identifying fields (name, date of birth, etc.) were not retained in the matching process. Due to conditions of data access, City of Philadelphia personnel performed all data matches, and the study's investigators were unable to monitor this process. The personnel who did the matching, however, were experienced in data management and very familiar with these data. Only deterministic matching procedures were used, which renders it likely that variations in identifying information across records could lead to the loss of some matches, and the match rates should be considered as conservative.

Limitations of time and scope also warrant mention. The sample is restricted to students and social services provided a decade ago. Despite advances in policies (e.g., Keeping Children and Families Safe Act of 2003) to support cross-system collaboration, screenings, and proactive approaches to enhance linkages between child-serving systems (Child Welfare Information Gateway, 2016), it is unclear if these policies have been implemented uniformly and to fidelity. Thus, the question of whether circumstances and outcomes differ between time of data collection and now is unclear. What is clear is the need to determine, with more recent data, whether the primary finding of this study—that multiple and heavy system use is associated with increased risk

for school dropout—is validated. Regardless, the study provides an impetus for comparing trends and outcomes that emerge before and after key policies to support cross-system collaboration were enacted.

Limits to the scope of the available data precluded consideration of a number of pertinent risk factors for school dropout, including negative interactions with peers, neighborhood disadvantage, or lack of social supports (Kearney, 2008). Moreover, we could not, in these analyses, control for variability of educational attainment across specific schools in Philadelphia, as data on schools in which the youth were enrolled were not available for this study. Thus, the results are only generalizable to the experiences of racially and ethnically diverse youth immersed in a large urban city.

Another limitation, and a challenge for future research along these lines, is disentangling the impact of the services systems from the impact of such factors as behavioral health disorders, behavioral problems, maltreatment, and housing instability on school dropout. That receipt of these services was associated with dropping out of school should not be surprising. How much worse these outcomes would have been in the absence of such services is uncertain. It is highly probable that there is unevenness or considerable heterogeneity related to the associations between different configurations of services involvement and outcomes, particularly with respect to dosage and quality. Consequently, there is likely room for aligning these services to be more responsive to successful educational trajectories.

The sequencing of absences with services involvement on a level more granular than AY was also not possible. While absences likely occurred over an extended time period and overlapped with services involvement, there may be an unknown number of instances where services involvement came after the absences were recorded in a particular AY.

The relationships found here, linking higher likelihoods of dropping out and being at risk for dropping out of school with system involvement, should not solely be seen as the fault of the systems themselves. The systems are proxies for underlying needs and should not be confused with contributing factors. Thus, future research is needed to examine the multiple pathways that may initially lead to single- and/or multiple-system involvement, which then, in turn, may influence educational attainment. For example, more concentrated efforts may need to be devoted to facilitating and sustaining communication and collaboration between human services providers who serve at-risk youth from different public youth-serving agencies (Darlington et al., 2005; Palinkas, Fuentes, Finno, Garcia et al., 2012). The transactional interchange of knowledge, case information and data sharing, and case procedures will likely contribute to positive educational outcomes, albeit future efforts to facilitate this process and test this hypothesis are warranted.

Concluding Remarks

In conclusion, results show that a relatively small group of students who are involved in several services systems have higher likelihoods of being at risk for and actually dropping out of school. Further attention to the educational outcomes of these students holds promise as a means to reach a subgroup that is clearly less likely to graduate from high school. While it is difficult to tease out whether it is the system involvement itself which is implicated in the worsening school prospects found here, interventions targeting these multiple-system youth to keep them in school appear warranted as a means to improve a range of outcomes, both in adolescence and adulthood.

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Stephen Metraux has done extensive research on homelessness and housing, mental illness and community integration, prison reentry, and other aspects of urban health. His current research focuses on homelessness prevention, particularly among veterans.

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