

Youth Trauma Experiences and the Path from Child Welfare to Juvenile Justice

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EXECUTIVE SUMMARY

Youth involved in the child welfare system and the juvenile justice system face high rates of trauma. In addition, youth involved in the child welfare system are likely to also be involved in the juvenile justice system. This study explores how trauma experiences can contribute to youth being involved in both systems. Of specific interest is the combined impact of trauma, history of child welfare involvement, and additional child, family, and community factors. We examine these relationships in a cohort of foster care youth from the Chicago area on whom the Illinois child welfare agency collected information on trauma, risks, and strengths as part of intake for foster care placement.

Using an observational longitudinal cohort study design, we identify a cohort of youth from Chicago who have been involved in the child welfare system at some point in their lives. For this cohort, we capture all child welfare system events (e.g., investigations, substantiated maltreatment allegations, out-of-home placements) along with demographic characteristics. We observe these youth over time to identify if and when they experience a juvenile justice system contact, specifically, any instance of arrest, detention, court involvement, probation sentence, or juvenile corrections. We use survival analysis to assess the characteristics and timing associated with these outcomes. Survival analyses produce an estimate of the amount of time that passes between one event (e.g., child welfare intake) and an outcome that follows it (e.g., a juvenile arrest). The analyses take into account the characteristics of persons in the sample and can contribute to an understanding of how those characteristics influence the outcome of interest.

Results suggest cumulative trauma exposure, as measured in our study, does not add significantly to our understanding of the likelihood for juvenile justice contacts once we account for observed youth characteristics, child welfare history, and risks and strengths. Some types of involvement with the juvenile justice system are more likely among children exposed to violence in the community and at school. Exposure to family violence, however, is associated with a decreased risk of experiencing detention, court, and probation. Risk behaviors, as measured by the Child and Adolescent Needs and Strengths (CANS) assessment, are highly correlated with increased risk of detention, court filing, probation, and juvenile corrections. In particular, a high score on the delinquency risk behavior item is associated with all types of system crossover. Having a high number of out-of-home placements is another key factor associated with juvenile justice contact. We find no evidence that community factors, as measured by the Urban Hardship Index or CANS, are associated with crossover events.

We also investigate the relationship between trauma exposure and juvenile justice involvement by looking separately at young men and young women in the study cohort. Males and females in the study cohort experience similar levels of trauma exposure, although the type of trauma differs. Girls experience increased rates of sexual abuse and boys experience increased rates of exposure to violence outside the home. Males have significantly higher levels of crossover into the juvenile justice system. For young men, several dimensions of child welfare history and CANS risk behaviors relate to the probability of crossover. For young women, the number of out-of-home placements, exposure to community violence, and having behavioral or emotional needs increase the probability of crossover.

For all youth, recognizing placement instability as a key risk factor for crossover is important. Inquiring about youth's exposure to community and school violence could be a potential strategy for identifying youth at high risk for juvenile justice involvement. Improving our understanding of crossover risk factors would enable providers to target interventions designed to help these youth address their trauma.

INTRODUCTION

Trauma exposure is high among child welfare and juvenile justice populations. In addition, children in one of the populations is likely to crossover into the other group. Less is known about how the impact of trauma combined with child, family and community factors, affect the likelihood of youth becoming involved with both systems (i.e., becoming dually involved). The goal of this project is to explore pathways from trauma exposure to juvenile justice involvement for children and youth who have been involved in the child welfare system.

The project aims to answer the research question: “How do child characteristics, measures of trauma, risks and strengths, type and duration of child welfare involvement, and ecological factors affect the likelihood of child welfare system-involved youth entering the juvenile justice system?” We examine the relationships between these factors and crossover from the child welfare system to the juvenile justice system in Chicago, IL.

The analysis uses administrative data from the Illinois Department of Children and Family Services (IDCFS) to identify a cohort of Chicago-area youth and capture a measure of their trauma experiences. Individual youth exposure to trauma is measured with the comprehensive assessment from the Child and Adolescent Needs and Strengths (CANS; an instrument administered by IDCFS used to assess youth and caregiver needs and strengths across a number of domains, including trauma). Juvenile justice involvement is captured through linking with administrative records for arrests from the Chicago Police Department (CPD); records on detention, court involvement, and probation from the Juvenile Probation and Court Services (JPCS) Department of the Cook County Circuit Court; and juvenile corrections from the Illinois Department of Juvenile Justice (IDJJ). We also capture local ecological factors with a measure of urban hardship, generated from publicly available data from the American Community Survey (ACS).

By examining a cohort of youth with child welfare system involvement and their individual, family, and ecological exposure to trauma, this study informs the development of community-based, trauma-informed interventions which may prevent youth from “crossing over.” The aim is to produce a model that accurately describes the factors associated with increased likelihood of juvenile justice involvement, based on available administrative data, which could be used to inform interventions targeted to youth with specific experiences.

Background

Trauma

Exposure to trauma among youth is pervasive in the United States. Trauma, as defined by the Substance Abuse and Mental Health Services Administration, refers to experiences that cause intense physical and psychological stress reactions. . . [whether from] a single event, multiple events, or a set of circumstances. . . experienced by an individual as physically and emotionally harmful or threatening and that [have] lasting adverse effects on the individual’s physical, social, emotional, or spiritual well-being (SAMHSA, 2014).

SAMHSA describes 17 types of traumatic events that can influence behavioral health: sexual abuse or assault; physical abuse or assault; emotional abuse or psychological maltreatment; neglect; serious accident, illness, or medical procedure; victim or witness to domestic violence; victim or witness to community violence; historical trauma; school violence; bullying; natural or manmade disasters; forced displacement; war, terrorism, or political violence; military trauma; victim or witness to extreme personal or interpersonal violence; traumatic grief or separation; system-induced trauma and re-traumatization.¹

According to a recent national survey on children’s exposure to violence, approximately two out of every three children will be exposed to violence, crime, or abuse in their homes, schools, and communities (Finkelhor, Turner, Ormrod, &

¹ Retrieved from the Substance Abuse and Mental Health Services Administration (SAMHSA) government website: <https://www.samhsa.gov/trauma-violence/types>.

Hamby, 2009). Trauma-exposed youth tend to be involved in multiple service systems, including child welfare, juvenile justice, special education, and mental health or substance abuse treatment (Ford, Chapman, Hawke, & Albert, 2007; Dierkhising, Ko, & Goldman, 2013; Garland et al., 2001). Approximately 85% of youth involved in the child welfare system have been exposed to at least one traumatic event (Miller, Green, Fettes, & Aarons, 2011), and these children are nearly four times more likely to have experienced four or more traumatic events and related adverse experiences than youth not involved in the child welfare system (Stambaugh et al., 2013).

Youth involved in the juvenile justice system are disproportionately exposed to traumatic events compared to the general adolescent population (Finkelhor, Ormrod, Turner, & Hamby, 2005). A study conducted in Cook County, IL found that more than 80% of youth in juvenile justice settings have experienced traumatic events (Abram et al., 2004). Similarly, more than 75% of youth in the juvenile justice system have experienced traumatic victimization (Abram et al., 2004; Ford, Chapman, Connor, & Cruise, 2012). Commonly reported traumatic events include witnessing someone getting seriously injured or killed, being threatened with a weapon, being in a bad accident, or being forced to do something sexual (Abram et al., 2004). In addition, youth with maltreatment histories who become involved in the juvenile justice system are at higher risk for reoffending than their counterparts without maltreatment histories (Herz et al., 2010; Huang, Ryan, & Herz, 2012; Ryan, Herz, Hernandez, & Marshall., 2007).

How does exposure to trauma affect the likelihood of youth moving from the child welfare system into the juvenile justice system? Prior research has looked at some determinants of this movement; characteristics such as gender (Salisbury & Van Voorhis, 2009), race (Ryan et al., 2007), and placement in substitute care (Ryan & Testa, 2005) have been shown to have differential effects on youth crossing over from child welfare to the juvenile justice system. Less is known about how trauma, risks, and strengths, identified at both the individual and ecological levels, are associated with becoming involved in both systems.

Crossover from child welfare to juvenile justice

Researchers have documented that entrance into the child welfare system makes youth more likely to become involved with the juvenile justice system. Estimates vary by study, but about one-third of child welfare system-involved youth have had contact with the juvenile justice system (Halemba, Siegel, Lord, & Sawacki, 2004; Herz, Ryan & Bilchick, 2010; Kelley, Thornberry, & Smith, 1997). Overall, maltreated youth are estimated to be at a 47% greater risk for becoming involved in delinquency than youth from the general population (Ryan & Testa, 2005). Similarly, a history of neglect or abuse is shown to increase the risk of youth arrest by 55% and increase the risk of committing violent crimes by 96% (Halemba & Siegal, 2011; Kaufman & Widom, 1999).

Much of the extant research has focused on defining the demographic characteristics of youth in the child welfare and juvenile justice systems. In general, boys are more likely than girls to be dually involved, with African American boys at greatest risk for dual involvement (Goodkind, Shook, Kim, Pohlig, & Herring, 2013; Jonson-Reid, 2002; Jonson-Reid & Barth, 2000). Similarly, previous studies have found that youth who are older when they enter the child welfare system are more likely to cross over (Goodkind et al., 2013; Ireland, Smith, & Thornberry, 2002; Thornberry, Ireland, & Smith, 2001). Type of involvement in the child welfare system, most notably out-of-home placement and group home settings, is also strongly associated with crossing over (Doyle, 2007; Jonson-Reid, 2002; Ryan, Marshall, Herz, & Hernandez, 2008). While this evidence is helpful in shedding light on disparities, the program or policy responses to demographic or placement characteristics are large and related to greater societal change (i.e., reducing racism or poverty). Creating interventions to address these issues represents a great challenge (Watson & Edelman, 2012; Sian, Law, & Sayyid, 2013).

Youth involved in the child welfare system generally receive harsher treatment within the juvenile justice system. For example, they are less likely than delinquent youth without maltreatment histories to receive probation and more likely to be placed in group homes or correctional facilities (Ryan et al., 2007; Ryan et al., 2008; Morris & Freundlich, 2004; Jonson-Reid & Barth, 2000). Other research suggests that as involvement with the juvenile justice system deepens,

youth with a history of child welfare system involvement comprise a larger share of the population (Halemba et al, 2004).

Youth who are dually involved have been found to have higher rates of mental and substance use disorders, academic problems, suicide attempts, and premature death (DeHart & Moran, 2015; Ford, Chapman, Mack, & Pearson, 2006; Kerig, Becker, & Egan, 2010). A majority of youth in contact with the juvenile justice system in this country have a diagnosable behavioral health condition (Shufelt & Coccozza, 2006; Teplin et al., 2013; Wasserman, McReynolds, Schwalbe, Keating, & Jones, 2010). Additionally, being dually involved is linked to harsher legal outcomes for adolescents (Cauffman, Monahan, & Thomas, 2015; Chauhan, Reppucci, & Turkheimer, 2009; Li, Chu, Goh, Ng, & Zeng, 2015).

While the focus in understanding systems-involved youth has often centered on a deficit model, assets or strengths in a youth's life can have mediating effects on the impact of trauma on their well-being (Helton & Smith, 2014). Strengths refers to the idea that "individuals possess abilities and inner resources that allow them to cope effectively with the challenges of living" (Brun & Rapp, 2001, p. 279). Augmenting assets and strengths has been tied to improved outcomes among homeless youth (Heinze, 2013), improved outcomes among youth in foster care (Schofield & Beek, 2009), and lower levels of risk behaviors among youth (Scales, Benson, Leffert, & Blyth, 2000). Even so, many youth simply do not have strong enough assets to prevent system involvement.

Findings from previous studies focus on youth characteristics and experiences, but less is known about how community context intersects with or impacts child welfare and juvenile justice system-related outcomes. Researchers studying crime have a long history of integrating ecological context into their understanding of criminality (see Sampson, Morenoff, & Gannon-Rowley, 2002 for an overview). Scholars studying youth well-being and youth systems involvement also integrate this perspective to complement other youth or family-centered explanations (Baglivio, Wolff, Epps, & Nelson, 2017; Browning, Soller, & Jackson, 2015; Weiner, Leon, & Stiehl, 2011). The integration of ecological factors into studies of crossover youth remains rare, as scholars often look at demographics, psychological/mental health characteristics, or system-related characteristics (i.e., placements for child welfare or type of offense for juvenile justice) for explanations as to why youth cross over (Jonson-Reid & Barth, 2000; Ireland et al., 2002; Kerig et al., 2010; Lee & Villagana, 2015; Li et al., 2015).

This study builds on prior work that has examined the relationship between childhood maltreatment and delinquency, how patterns of child welfare involvement are related to delinquency and juvenile justice involvement, and the role of youth characteristics in becoming dually involved. We examine dual involvement in light of traumas, risks, strengths, and community factors in youth's lives.

Current Study

This study examines how child characteristics, measures of trauma, risks, strengths, type and duration of child welfare involvement, and community factors affect the likelihood of child welfare system-involved youth encountering the juvenile justice system in Chicago, IL.

We use an observational, longitudinal cohort study design. We identify a cohort of youth that have been involved in the child welfare system at some point in their lives and capture all child welfare system events (e.g., investigations, substantiated allegations of maltreatment, out-of-home placements, etc.) along with demographic characteristics of the youth. We then observe these youth over time to identify if and when they experience a juvenile justice system contact—specifically an instance of arrest, detention, court involvement, probation sentence, or juvenile corrections—before age 18.

We use a survival analysis approach to assess the characteristics and timing associated with youth crossing over into the juvenile justice system and having particular types of juvenile justice system involvement (arrest, detention, court involvement, probation sentence, or juvenile corrections). Survival analyses are ideal for modeling the association between characteristics of interest (i.e., youth trauma experiences) with the risk or likelihood of an outcome (i.e., juvenile justice involvement) where the timing of a particular event occurring or not occurring varies by individual

(Jones & Branton, 2005). The survival approach is appropriate for this study as different youth will (potentially) cross over to the juvenile justice system at different times. Thus, the associated risk or likelihood of crossing over must account for the indeterminate duration (Jones & Branton, 2005). This study aims to build on previous investigations of this population of youth by focusing on key variables with the potential to inform service development (i.e., specific forms of trauma directly experienced by the youth that potentially may exacerbate risk if not addressed).

A note on terms: the population in this study consists of youth who may be referred to as “crossover” youth, “dually involved” youth, or “dually adjudicated” youth (Lee & Villagrana, 2015). We define “crossover” as youth who have been involved with the child welfare system (current or historical) and experience any juvenile justice system contact. We define “dually involved” as youth that have an active child welfare case at the time the juvenile justice contact (i.e., the “crossover”) occurs. Therefore, all dually involved youth are a subset of the crossover youth population.

DATA

Data Sources

This study draws on four sources of administrative data. Data were obtained from the Illinois Department of Child and Family Services (IDCFS) and the Illinois Department of Juvenile Justice (IDJJ); from one county juvenile court and probation services division (Juvenile Probation and Court Services [JPCS] of the Cook County Circuit Court); and from one municipal police department (the Chicago Police Department [CPD]). We use these data to match youth across systems and to provide detailed knowledge about child welfare system involvement, trauma experiences, child strengths and risks, and particular juvenile justice outcomes. Arrest data is available through September 2017. Child welfare and juvenile court data are available through December 2017. Data for juvenile corrections from the IDJJ is only available through June 2016; however, we are able to use a corresponding indicator in the juvenile court data to capture this outcome through December 2017. Table 1 presents details on data sources and available years. Figure 1 shows what ages are captured by some of the data sources.

Study data are restricted to Chicago, IL, the jurisdiction for which data is available from all four sources. While the data is only available for this one geographic area, Chicago is the third-largest city in the nation, and approximately 22% of its population (over 685,000 residents) are age 19 or younger (U.S. Census Bureau, 2015).

Table 1. Linked Administrative Data Sources for Chicago

Data	Data Provider	Available Data
Child and Adolescent Needs and Strengths (CANS)	Illinois Department of Child and Family Services (IDCFS)	2007–December 2017
Child and Youth Centered Information System (CYCIS)	Illinois Department of Child and Family Services (IDCFS)	1992–December 2017
Child Abuse & Neglect Tracking System (CANTS/SACWIS)	Illinois Department of Child and Family Services (IDCFS)	1992–December 2017

Data	Data Provider	Available Data
Chicago Police Department - Arrest and disposition data	Chicago Police Department (CPD)	1991–September 2017
Juvenile Enterprise Management System (JEMS)	Juvenile Probation and Court Services (JPCS) Circuit Court of Cook County	2010–December 2017
Juvenile Tracking System - Admissions	Illinois Department of Juvenile Justice (IDJJ)	1993–June 2016

Child welfare

Data on child welfare involvement were obtained through an agreement with IDCFS, the state child welfare agency in Illinois. IDCFS maintains several information systems. These systems track two types of data: (1) children and households to which it provides services and (2) the providers it contracts for services. The Child and Youth Centered Information System (CYCIS) captures data for any person or family that currently receives or historically received services through IDCFS. The system records demographic information on all clients, as well as placement and permanency goal information for all children for whom IDCFS is legally responsible. IDCFS uses the Child Abuse & Neglect Tracking System (CANTS/SACWIS) to record all allegations of abuse or neglect, investigation dates, and outcomes of the investigation. Chapin Hall at the University of Chicago receives extracts from these databases on an ongoing basis.

In addition to the data on youth’s experience in the child welfare system, IDCFS includes information from the Child and Adolescent Needs and Strengths (CANS) comprehensive assessment instrument. The instrument contains a trauma experiences domain designed to assess exposure to different types of trauma, along with other domains that assess levels of needs and strengths in a youth’s life (Lyons, 2009).

Juvenile justice

Data from CPD, JPCS, and IDJJ were used to analyze involvement of our study cohort in the juvenile justice system. The CPD Criminal Incident Database tracks all arrests and criminal incidents in the City of Chicago. Data files accessed for this project included arrest and disposition, which documents the outcomes of a youth’s arrest. The JEMS data contains a series of tables maintained by the court’s Juvenile Probation and Court Services Department. The tables track information about youth with delinquency cases referred to the court and monitor any services ordered by the court to help rehabilitate the minor. The data set used in this project contains detention, court referral, and sentence disposition information on all youth with a first court referral between January 1, 2010 and December 31, 2017. The Juvenile Tracking System maintains information on all youth admitted to an IDJJ correctional facility, including demographic information, holding charge information, and admission and release dates for youth in IDJJ.

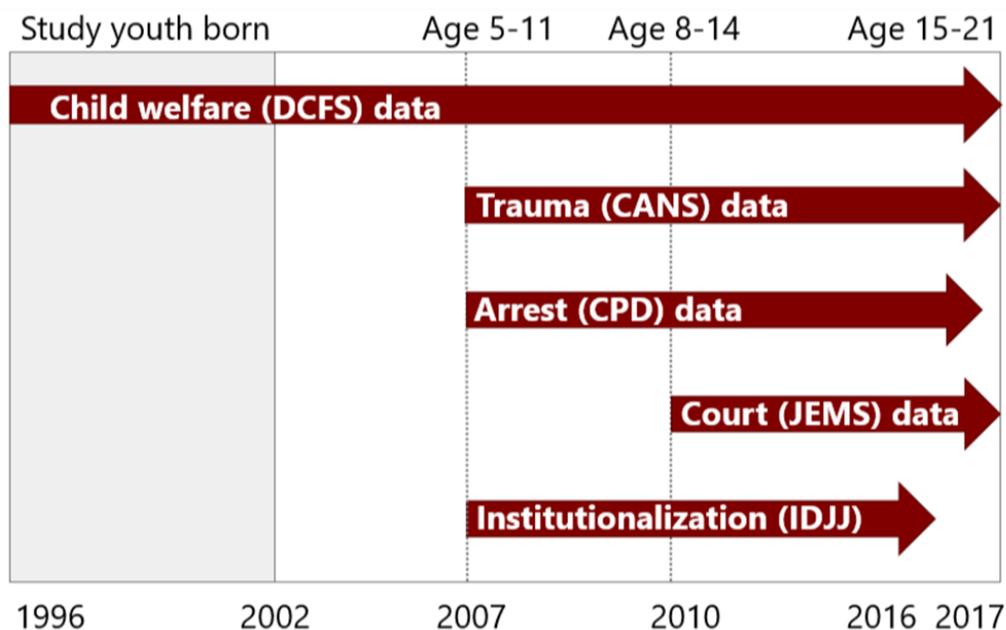
Analytic Sample

The study cohort was drawn from all youth residing in Chicago who had a first child welfare case opened after January 1, 2007. Chapin Hall used this cutoff date for case opening because that is when the CANS (trauma) data first became available in Illinois, due to the IDCFS statewide implementation of the CANS Assessment during all Integrated Assessments (IA). The CANS is a tool administered to young people who are placed in foster care and has not been used consistently across time. It helps clarify (among other things) the extent to which young people have experienced trauma.

The sample was further restricted to youth born between 1996 and 2002 to allow enough time to follow youth through the age we would expect to see them in the juvenile justice system. Approximately 80–95% of youth who are arrested

or in detention in Illinois are age 14 or older (Kaba, 2014). This resulted in a sample of 22,885 youth. Because we are interested in trauma experiences among children and youth who crossed over from child welfare to juvenile justice, we included in the study only those young people for whom we had CANS information. To do this, the sample was then linked to the CANS assessment through the IDCFS CYCIS system identifier. We restrict the sample to youth with at least one completed CANS assessment ($n = 2,072$) who do not have pre-existing juvenile justice involvement at the time of the CANS. The resulting study cohort contained 1,633 youth. Figure 1 displays the timeline of data coverage for each data source and the age range of youth in the sample cohort.

Figure 1. Data Source Timeline



We then link the study cohort to the three sources of juvenile justice administrative data. We used probabilistic record linkage and BigMatch software on a secured server to link individual children’s records from IDCFS to CPD, JCPS, and IDJJ data. Each data source file was first unduplicated to identify duplicate records for individuals in the same data system. Matching variables include name, birth dates, race, sex, social security numbers, identification record (IR) number (fingerprint ID), and central booking number. The resulting linked files were assigned a unique identifier. All identifying information was removed from the analytic files prior to analysis.

Measures

Juvenile justice system involvement

The timing and types of juvenile justice system involvement are the key outcomes of this analysis. Juvenile justice contacts information for cohort youth is obtained in administrative data from three agencies: CPD, JCPS, and IDJJ (see Table 1 and Figure 1). In this study, we focus on the initial crossover points and measure each of five types of juvenile justice system contacts or experiences that occur before a youth’s 18th birthday: arrests, detention, court involvement, probation, and juvenile corrections. Note that while these system contacts generally increase in severity and decrease in overall instance in the presented order, the path through these touchpoints for a given youth is not always strictly linear. Table 2 presents descriptions of the data elements and data source for each of the five types of juvenile justice contacts.

Table 2. Measures of Juvenile Justice System Involvement

Juvenile Contact	Data Source	Data Elements
Arrest	CPD Arrest and Disposition data	<p><i>Total number of arrests:</i> Count of all arrest records (unique Central Booking Numbers) for a youth</p> <p><i>Date of first arrest:</i> Earliest date of an arrest for a youth</p> <p><i>Age at first arrest:</i> Age of youth on date of first arrest using birthdate from IDCFS data</p> <p><i>Dually involved at first arrest:</i> Whether youth had an open child welfare case at the time of first arrest</p>
Detention	JCPS JEMS data	<p><i>Detained secure ever:</i> If a youth was ever held in short-term secure confinement pending disposition. Includes detention prior to screening or a hearing.</p> <p><i>Date of first secure detention:</i> The date a youth was first ordered held in secure confinement</p> <p><i>Dually involved at first detention:</i> Whether the youth had an open child welfare case at the time of first secure detention</p>
Court involvement	JCPS JEMS data	<p><i>Referred to court ever:</i> If a youth had a screening referral record in the JEMS data</p> <p><i>Delinquency petition filed:</i> If youth ever had a screening decision code of file</p> <p><i>Date first delinquency petition filed:</i> Filing date of youth’s first juvenile delinquency petition</p> <p><i>Dually involved at first delinquency petition filing:</i> Whether the youth had an open child welfare case at the time of first delinquency petition filing</p>
Probation	JCPS JEMS data	<p><i>Probation or supervision:</i> Youth ever had a court-ordered service for probation or supervision</p> <p><i>Date of first probation/supervision:</i> Earliest court order date for probation or supervision</p> <p><i>Dually involved at first probation/supervision:</i> Whether the youth had an open child welfare case at the time of first court order for probation or supervision</p>
Juvenile corrections	IDJJ Admissions and JCPS/JEMS data	<p><i>Juvenile corrections (IDJJ) – youth was released by the court to the custody of IDJJ</i></p> <p><i>Date of first probation/supervision – earliest court ordered release upon request initiation date to IDJJ</i></p> <p><i>Dually involved at first juvenile corrections – whether the youth had an open child welfare case at the time of first release to the custody of IDJJ</i></p>

Note: We use IDJJ data to capture juvenile corrections up to June 2016, the most recent data available, we then use comparable indicators from the JCPS data from July 2016 to December 2017.

Trauma experiences, risks, and strengths

Youth exposure to trauma is the key variable of interest in this analysis of crossover from child welfare to juvenile justice. We measure youth trauma experiences from the Child and Adolescent Needs and Strengths (CANS) Comprehensive Assessment data collected by IDCFS. The CANS is designed to assess exposure to trauma, levels of risk, and strengths in a youth's life (Lyons, 2009). In Illinois, IDCFS administers the CANS at the time of intake for all youth. Within IDCFS this is called the integrated assessment (IA); it is completed within the first 45 days. Subsequent CANS are administered at various intervals depending on the youth's circumstances. For youth in residential (congregate care) placements, follow up is every 3 months until case closure. For youth in out-of-home placements, follow up is every 6 months with the youth, and every 3 months with parents (with goal of reunification), until case closure. For youth in intact families, follow up is every 6 months until case closure. As is common in child welfare systems, there are some irregularities related to assessment timing. However, previous work by Chapin Hall has found this to be limited.

The CANS includes eight domains: exposure to potentially traumatic experiences, symptoms related to traumatic childhood experiences, child strengths, life domain functioning, acculturation, child behavioral/emotional needs, child risk behaviors, and caregiver needs and strengths (Kisiel, Fehrenbach, Small, & Lyons, 2009). Trained caseworkers administer the CANS and use it to assign scores to indicate levels of need related to a domain. The CANS domains have been found to be valid and reliable across populations (Lyons, 2009).

The CANS instrument is designed to identify needs in order to guide service planning. Each item has four levels (0–3) with anchored definitions that translate to action levels for case planning and service provision. Higher item scores indicate areas where youth have highest needs. The four levels for the trauma experiences domain are:

0: No evidence of any trauma of this type

1: A single incident or trauma occurred or suspicion exists of this type of trauma

2: Multiple incidents or a moderate degree of trauma of this type

3: Repeated and severe incidents of trauma of this type

It is important to note that the trauma experiences domain is retrospective and cumulative in nature. The domain captures information about anything that has occurred in the youth's life up to the time of the assessment. The other CANS domains primarily focus on youth's current status and on status and needs within the 30 days immediately preceding the assessment. The items and scoring for each of the CANS domains are presented in Appendix C (Illinois CANS Comprehensive Assessment instrument manual from 2005).

In this study, the primary measure of trauma is a youth's total average score in the trauma experiences domain from their baseline CANS assessment. For reporting and analysis, we categorize youth into four groups (quartiles) based on the distribution of the trauma score (Q1: 0–25%; Q2: 26–50%; Q3: 51–75%; and Q4: 76–100%).

Child welfare system involvement

We use youth's involvement with the child welfare system to characterize the study cohort and include this information as important control variables in the analysis models. Child welfare history needs to be considered in analyzing the connection between child welfare system involvement, trauma, and juvenile justice system involvement. We obtained information about child welfare system involvement from the IDCFS data (specifically, the Child Abuse and Neglect Tracking System and the Child and Youth Centered Information System data). In this analysis, we incorporate the following information on each youth: total number of investigations; substantiated investigations (i.e., occurrence of maltreatment has been confirmed) by type for neglect, physical abuse, and sexual abuse; total number of out-of-home placements; and the age at first out-of-home placement.

Community factors

We use a measure of community factors to capture youth exposure to the economic and social conditions of the neighborhood in which they live. We use this information descriptively to visualize the residence and local conditions of the study cohort within the City of Chicago and also include this information as a control variable in the analysis. There are many established measures for gauging community or neighborhood hardship (see, for example, Carstairs, 1995; Townsend, Phillimore, & Beattie, 1988; Krieger et al., 2002; and Jennings, 2012; among others). In this study, we use the Urban Hardship Index. First published in 1976, the Urban Hardship Index (also known as the Intercity) captures economic and social conditions in populous metropolitan areas in the U.S. (Nathan & Adams, 1976; 1989). It has been used to measure and report on conditions in major cities for over 40 years. This study uses the Urban Hardship Index in part because it is a relevant metric at the local level for the study location. The Urban Hardship Index is featured in the city plan “Healthy Chicago 2.0: Partnering to Improve Health Equity 2016–2020” and is reported via the City of Chicago data portal.

The Urban Hardship Index is a composite of six factors: unemployment (defined as the percentage of the unemployed civilian population over the age of 16); dependency (the percentage of the population under the age of 18 or over the age of 64); education (the percentage of those over the age of 25 with less than a high school education); income level (per capita); crowded housing (measured by the percentage of occupied housing units with more than one person per room); and poverty (the percentage of people living below the federal poverty level). The composite score ranges from 0 to 100; a higher composite score indicates higher levels of local hardship. Urban Hardship Index data is calculated from the U.S. Census Bureau 2007–2011 American Community Survey 5-year estimates. We use calculations generated by the Chicago Department of Public Health and made publicly available on the City of Chicago data portal.² The 2007–2011 estimates correspond with the time when the majority of the youth enter the study cohort. We assign an Urban Hardship Index score to a given youth based on their residential address in the IDCFS data at the time of the child welfare event that brings them into the study cohort.

Youth characteristics

We also include youth characteristics in the analysis. These include birth year; age at time of entry into the child welfare system; age at time of the CANS assessment; race/ethnicity; and gender. Prior research indicates that these are the most salient characteristics for dually involved youth (Ryan et al, 2008; Goodkind et al., 2013; Lee & Villagrana, 2015). Youth demographics are initially drawn from IDCFS data and compared with demographic data in the other datasets for disparities and to replace missing values.

METHOD

Based on the need for a greater understanding of how trauma, risks, and strengths affect the likelihood of child welfare-involved youth becoming involved in the juvenile justice system, we focus on the following research question:

“How do child characteristics, measures of trauma, risks and strengths, type and duration of child welfare involvement, and ecological factors affect the likelihood of child welfare system-involved youth entering the juvenile justice system?”

This research question expands upon previous efforts to understand how types of risks impact crossing over (Lee & Villagrana, 2015), differing pathways through the child welfare system (Randall et al., 2015), and ecological factors shown to be associated with juvenile justice involvement (Browning, Gardner, Maimon, & Brooks-Gunn, 2014; Fagan, Wright, & Pinchevsky, 2014). We approach this research question with a descriptive analysis of the relationships

² Technical documentation for the Urban Hardship Index data is available from the City of Chicago data portal: <https://data.cityofchicago.org/api/assets/8D10B9D1-CCA3-4E7E-92C7-5125E9AB46E9>

between trauma exposure and system crossover. We then model the relationships with a survival analysis approach to assess the timing and conditions associated with crossover, accounting for child welfare history, strengths, risks, and community factors. Finally, we conduct a supplemental analysis that examines results separately by youth gender.

Descriptive Statistics

We characterize the cohort by providing descriptive statistics of the youth characteristics and child welfare history. We visualize the cohort youth's location in the city and the location's Urban Hardship Index by Chicago Community Area. We report the trauma experiences from the CANS assessment along with item and domain scores for the other CANS domains. We show juvenile justice contacts occurring before 18 years of age and display rates of juvenile justice contacts by quartile of trauma exposure.

Survival Analysis

The primary analytic strategy is a survival analysis. We use a survival analysis approach to assess the characteristics and timing associated with youth within the cohort crossing over into the juvenile justice system and having particular types of juvenile justice system involvement (arrest, detention, court involvement, probation sentence, or juvenile corrections)³.

Survival analyses produce an estimate of the amount of time that passes between one event and an outcome that follows it. It can answer questions such as "what proportion of the population will have outcome Y (e.g., an arrest) in a given time span (e.g., before age 18)?" Originally applied in fields such as engineering and medicine, survival analysis can take into account the characteristics of persons in the sample and contribute to an understanding of how those characteristics influence the outcome of interest. Survival models have been routinely applied in the social sciences to analyze the risk of events occurring (Box-Steffensmeier & Jones, 2004). Weiner et al. (2011) used this method to estimate the risk related to placement disruption among child welfare system youth in Illinois. However, the application to crossover youth is relatively novel.

To operationalize the research question, we examine the following hypotheses:

Hypothesis 1: Controlling for youth characteristics, age of entry into the child welfare system, type/duration of child welfare system involvement, and community factors, the probability of youth entering the juvenile justice system will increase as the severity of **trauma exposure** (as measured by the CANS) increases.

Hypothesis 2: Controlling for youth characteristics, age of entry into the child welfare system, and type/duration of child welfare system involvement, the probability of youth entering the juvenile justice system will increase as the severity of **community distress** as measured by the Urban Hardship Index increases.

Hypothesis 3: Controlling for youth characteristics, age of entry into the child welfare system, type/duration of child welfare system involvement, and community factors, the probability of youth entering the juvenile justice system will increase as the severity of **youth risks** (as measured by the CANS risks, trauma stress symptoms, and behavioral/emotional needs domains) increases.

Hypothesis 4: Controlling for youth characteristics, age of entry into the child welfare system, type/duration of child welfare system involvement, and community factors; the probability of youth entering the juvenile justice system will increase as the number of **youth strengths** (as measured by the CANS strengths and life domain functioning domains) in a youth's life decreases.

We test each of the four hypotheses using survival models to analyze how trauma exposure, community distress, youth risk, and youth strengths affect the probability of juvenile justice involvement.

³ Specifically, we use Cox proportional-hazard regressions.

There are three possible outcomes for youth in the study. First, youth may become juvenile justice system-involved after the IDCFS involvement that prompts their inclusion in the study cohort. Second, youth may have no juvenile justice system involvement by the time they reach age 18, meaning they are not observed in the available administrative juvenile justice data. Third, youth may have no juvenile justice involvement during the time of the study, but may be under 18 years of age at the end point of the study data. This final set of youth may yet become juvenile justice system-involved, but such involvement is not observed in study period.

To best account for these different outcomes, we use survival analyses, specifically Cox regression analyses (see Figure 2). Cox regression models are appropriate for analyzing the relationship between characteristics of individuals and the risk of an event occurring, such as involvement with the juvenile justice system (Box-Steffensmeier & Jones, 2004). Survival models can account for the data being “right censored”—that is, the risk associated with an outcome is unknown for some individuals because it does not take place during the study period (e.g., youth in the cohort that do not reach age 18 by the end of the study period).

Figure 2. Survival Analysis (Cox regression)

The general model for the Cox regressions is:

$$\ln H(t) = H_0(t) * (b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5)$$

Where

$H(t)$ = the hazard (of entering the juvenile justice system) at time t

$H_0(t)$ = the baseline hazard (of entering the juvenile justice system)

b_1X_1 = represents the CANS trauma experiences

b_2X_2 = represents the array of child characteristics variables

b_3X_3 = represents the array of variables related to child welfare history

b_4X_4 = represents the Urban Hardship Index score

b_5X_5 = represents the array of variables for the remaining CANS domains

We examine the four hypotheses with separate Cox regression models that assess the impact of covariates on the time until five types of juvenile justice involvement: arrests, detention, court involvement, probation, and juvenile corrections. For simplicity, we focus on models for arrest and synthesize and compare the arrest results with the four remaining juvenile justice contact types.

Supplemental Analyses

We also investigate the relationship between trauma exposure and juvenile justice involvement by looking separately at young men and young women in the study cohort. Prior research suggests that girls and boys will likely report different types of trauma experiences. For example, girls are at much higher risk for sexual abuse (Abram et al., 2004; Belknap & Holsinger, 2006; Ford, Hartman, Hawke, & Chapman, 2008; Johansson & Kempf-Leonard, 2009; Kerig et al., 2010; Wareham & Dembo, 2007). However, in general, boys (relative to girls) are at greatest risk for dual-system involvement (Goodkind et al., 2013; Jonson-Reid, 2002; Jonson-Reid & Barth, 2000).

To examine key differences by gender for this study, we report descriptive statistics for trauma experiences and juvenile justice involvement. We also conduct separate Cox regression models by gender.

FINDINGS

Descriptive statistics

Cohort characteristics

Youth characteristics are presented in Table 3. The study cohort contains almost equal proportions of females (52%) and males (48%). The majority of the cohort is African American (79%). Youth in the study cohort were born between 1996 and 2002 and the cohort is relatively evenly distributed by birth year. Because youth born in 2000 and after do not reach age 18 during the study timeframe, we use a survival model to account for these differences in the available observation period.

Table 3. Youth Characteristics and Child Welfare History

Youth Characteristics	Mean	SD
Female	0.52	(0.50)
African American	0.79	(0.40)
Hispanic	0.12	(0.32)
Other race	0.023	(0.15)
White	0.064	(0.24)
Born 1996 (age 18 in 2014)	0.14	(0.34)
Born 1997 (age 18 in 2015)	0.13	(0.34)
Born 1998 (age 18 in 2016)	0.15	(0.35)
Born 1999 (age 18 in 2017)	0.15	(0.35)
Born 2000 (age 18 in 2018)	0.15	(0.36)
Born 2001 (age 18 in 2019)	0.14	(0.35)
Born 2002 (age 18 in 2020)	0.15	(0.36)
Urban Hardship Index (0-100)	63.9	(26.3)
Child welfare history	Mean	SD
Any investigations	0.97	(0.18)
Total investigations	5.15	(3.74)
Any substantiated investigations	0.83	(0.38)
Neglect substantiated	0.59	(0.49)
Physical abuse substantiated	0.46	(0.50)
Sexual abuse substantiated	0.20	(0.40)
Any out-of-home placements	0.97	(0.17)
Total out-of-home placements	7.45	(7.75)
Age of first placement (years)	8.56	(5.06)
Observations	1,633	

The cohort is drawn from Chicago-area youth in IDCFS for whom a CANS assessment is conducted. The CANS is administered as part of the Integrated Assessment (IA), the specialized assessment process used for foster care placement cases. As a result, the study cohort is comprised of youth with one or more out-of-home foster care placements. As a group, these youth have extensive histories of child welfare involvement. On average, the cohort youth have been the subject of five IDCFS investigations for allegations of maltreatment. Four out of five youth (83%), have at least one “substantiated” investigation. A “substantiated” allegation is an allegation of maltreatment that IDCFS

has confirmed to have occurred. In the cohort, 59% have at least one substantiated incident of neglect, 46% have substantiated physical abuse, and 20% have substantiated sexual abuse. Almost all youth have at least one documented out-of-home placement. This is expected given that a placement qualifies youth entry into the study cohort. Youth in the cohort have had an average of seven different placements. The high number of placements include very short and transitional placements, such as those lasting only one or two nights. Nevertheless, this group of children has extensive system involvement. The average age at first placement is 8.5 years old. The older age of placement entry distinguishes the study cohort.

To help understand how the study cohort relates to a broader population of children and youth that have been touched by the child welfare system, we compare the cohort characteristics with all children in the Chicago area born between 1996 and 2002 who were investigated by IDCS after January 1, 2007. The comparison results are presented in Appendix Table B-1.

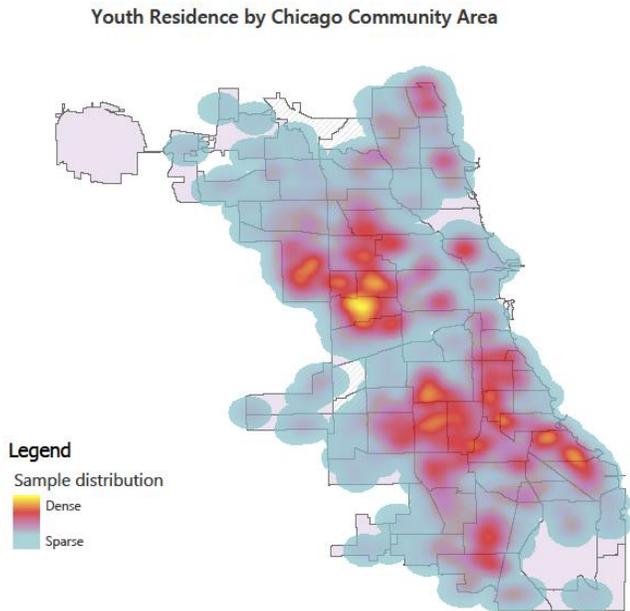
We found that the two groups are similar in composition with regards to gender and birth year. The study cohort contains a slightly higher proportion of Hispanic youth and a lower proportion of white youth than the broader Chicago child welfare group. The study cohort has significantly more instances of all listed types of child welfare history indicators. Study youth have been the subject of more investigations (5 vs. 2) and are more likely to have substantiated investigations overall (83% vs. 66%) and by type (neglect 59% vs. 49%; physical abuse 46% vs. 37%; and sexual abuse 20% vs. 4%). The cohort has much higher rates of out-of-home placement (97% vs 71%) and number of placements (7 vs. 2). Perhaps most striking, the average age at first placement was 8.5 years old for the study cohort and 1.5 years old in the comparison group. Children entering the child welfare system at older ages tend to follow very different pathways of system involvement than very young children. Cohort youth also have significantly higher rates of crossover into the juvenile justice system than the comparison group (see Appendix Table B-2). For example, cohort youth are twice as likely to be arrested and four times as likely to be held in detention as youth in the comparison Chicago child welfare group.

Overall, the study cohort has relatively extensive involvement with the child welfare system and juvenile justice systems. As a result, study results are specific to this relatively unique population and are not generalizable to the broader child welfare population. This is a limitation of the study.

Also of interest in this study are the ecological or community factors of the youth's neighborhoods. The community environment may contribute to their overall experiences of trauma or of supportive environments. Figure 3 displays where youth lived at the time of entry into the study cohort (their first Integrated Assessment for foster care placement after January 1, 2007), by Chicago Community Area. Figure 4 displays the Urban Hardship Index score for each Chicago Community Area.

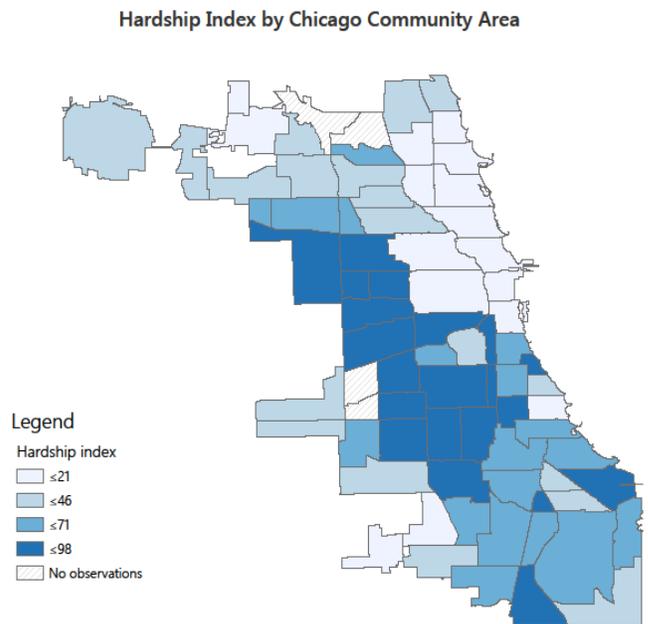
A visual comparison of the maps in Figure 3 and Figure 4 reveals that, in general, the study youth are located in the Chicago Community Areas that experienced high levels of urban hardship during the study timeframe, characterized by high rates of unemployment, poverty, crowded housing; high proportions of children and senior citizens; and low levels of adult education attainment and per capita income.

Figure 3. Youth Residence by Chicago Community Area



Source: Study sample. Youth residence obtained from DCFS data at the time of entry into the study sample, 2007 – 2017.

Figure 4. Urban Hardship by Chicago Community Area

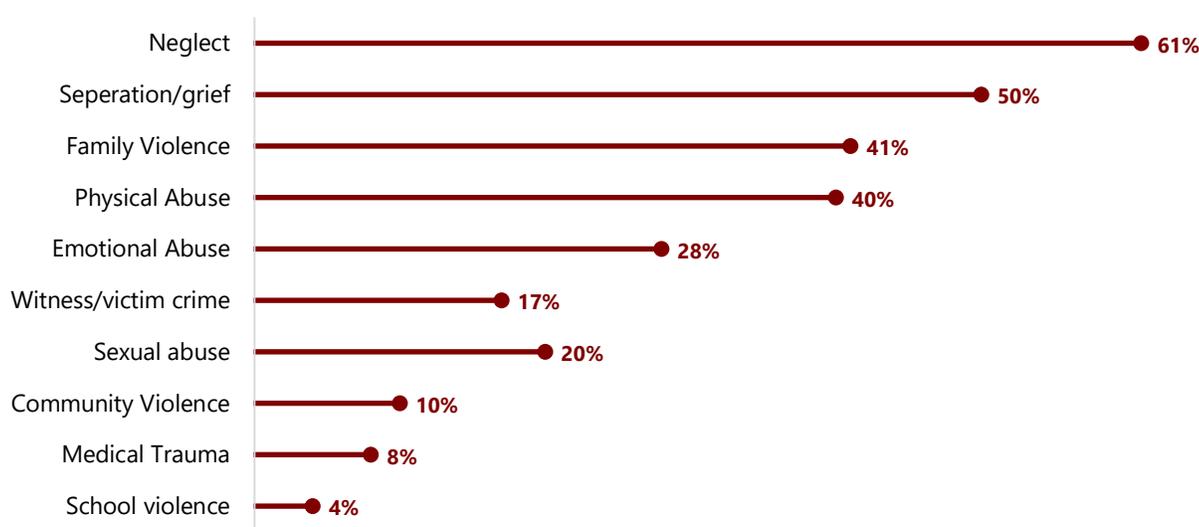


Source: U.S. Census Bureau 2007-2011 American Community Survey. Estimates for Chicago Community Areas, calculated by the Chicago Department of Public Health. Urban Hardship Index designed by Nathan and Adams (1976).

Trauma experiences

Cohort youth report significant exposure to traumatic experiences. Figure 5 presents the proportion of youth experiencing a moderate degree or repeated instances of each trauma type. Neglect is the most frequently reported trauma experience (61%). The proportions of child neglect, physical abuse (40%), and sexual abuse (20%) are comparable to the instances of substantiated maltreatment identified by the child welfare system. The trauma domain also captures items not available in the child welfare data. Half of the youth report traumatic grief due to loss or separation from a significant caregiver. Over one-quarter of youth have experienced emotional abuse (28%). Significant portions of the cohort report exposure to violence inside and outside their home environments. Over 40% of youth report exposure to family violence. Almost one in five youth (17%) have been witness to or victims of crime. Youth also report experiencing community violence (10%), medical trauma (8%), and school violence (4%). Less than 0.5% of the cohort experienced natural or manmade disasters, or were affected by war or terrorism.

Figure 5. CANS Trauma Experiences, Moderate Trauma Exposure by Type



Note: CANS Trauma experiences are scored 0 to 3. This graph represents youth with a score of 2 or 3, indicating multiple incidents or a moderate degree of this type of trauma. Three additional items in the trauma experiences domain—natural or manmade disasters, war affected, or terrorism affected—are not shown due to fewer than 0.5% of youth reporting those experiences.

In the CANS assessment each item is scored 0 to 3 (see Measure section for more detail). Table 4 presents the average score for each trauma experiences item. In the study cohort, the total average trauma experiences score is 0.66. In the analysis models, we incorporate trauma experiences by quartiles (Q1: 0–25%; Q2: 26–50%; Q3: 51–75%; and Q4: 76–100%) of the total average score and as individual items, in separate models. Item and domain scores for the other CANS domains are presented in supplemental tables in Appendix B (Table B-3. Traumatic stress symptoms, Table B-4. Strengths, Table B-5. Risk behaviors, Table B-6. Life domain functioning, and Table B-7. Behavioral/emotional needs).

We examine youth characteristics by trauma quartile to look for patterns of characteristics related to higher or lower levels of trauma exposure. Youth characteristics by trauma quartile are presented in Appendix Table B-8. There are almost no observed differences in youth demographics, urban hardship, or child welfare history by level of trauma

exposure. Youth in the lowest quartile of trauma exposure are half as likely to have an instance of substantiated sexual abuse as youth in the highest quartile (14% in Q1 vs. 16% in Q2, 21% in Q3, and 30% in Q4). All other reported covariate means are similar across youth grouped by trauma quartile.

Table 4. CANS Trauma Experiences

CANS Trauma Experience	Mean (0 – 3)	SD
Sexual abuse	0.58	(0.94)
Physical abuse	1.10	(0.97)
Emotional abuse	0.94	(0.89)
Neglect	1.64	(0.91)
Medical trauma	0.33	(0.69)
Family violence	1.15	(1.01)
Community violence	0.44	(0.72)
School violence	0.27	(0.53)
Natural or manmade disasters	0.037	(0.27)
Traumatic grief/separation	1.43	(0.85)
Affected by war	0.0049	(0.099)
Affected by terrorism	0.0012	(0.035)
Witness/victim to criminal activity	0.61	(0.85)
<i>Total average trauma experiences</i>	0.66	(0.32)
Observations	1,633	

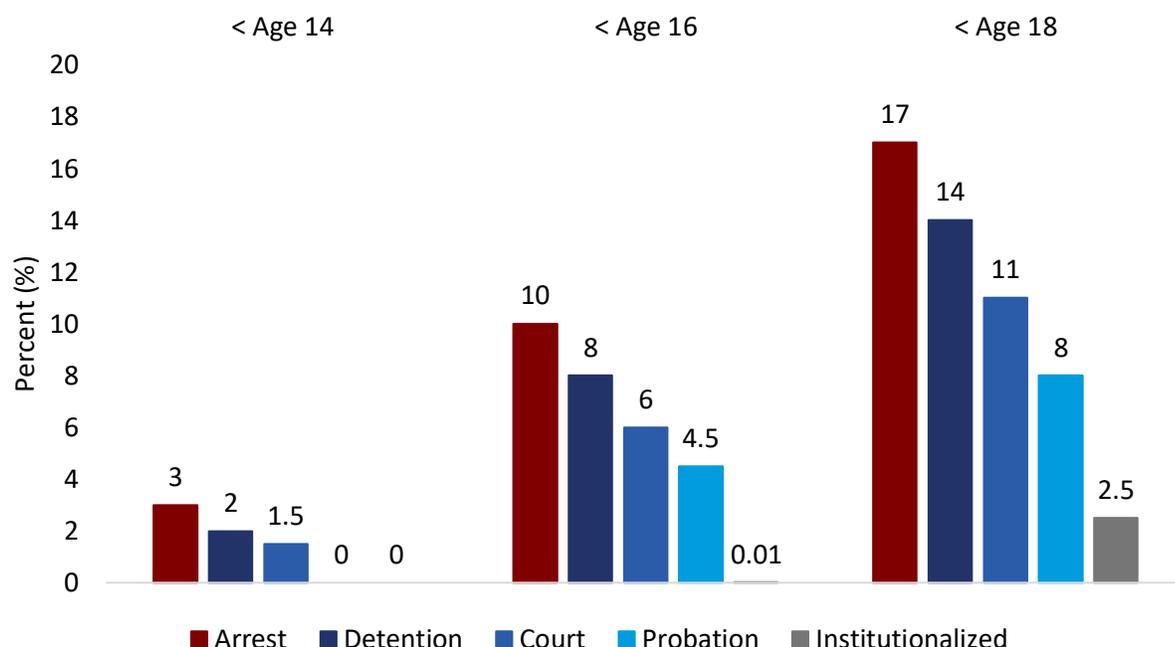
Juvenile justice system involvement

We wanted to know what proportion of cohort youth crossover into the juvenile justice system. Here, we report observed instances of arrest, detention, court involvement, probation, and juvenile corrections occurring before a youth’s 18th birthday.

Figure 6 displays instances of crossover by type of juvenile justice contact by age 18 (the right most set of columns), along with the rates of system contact among cohort youth by age 14 and age 16. Seventeen percent of the cohort youth are arrested before age 18. Almost one in six youth are held at least one night in secure detention (14%) and one in ten are referred to juvenile court (11%). Of the study cohort, 8% have been sentenced to probation or supervision and just under 3% have ever been sentenced to juvenile corrections.

Among youth with system involvement, the average age of first system contact ranges from 15.6 to 16.1 years (See Appendix Table B-2 for a complete listing of mean rates of juvenile justice system contact by ages 14, 16, and 18, and age of first contact for the study cohort and the Chicago child welfare comparison group.)

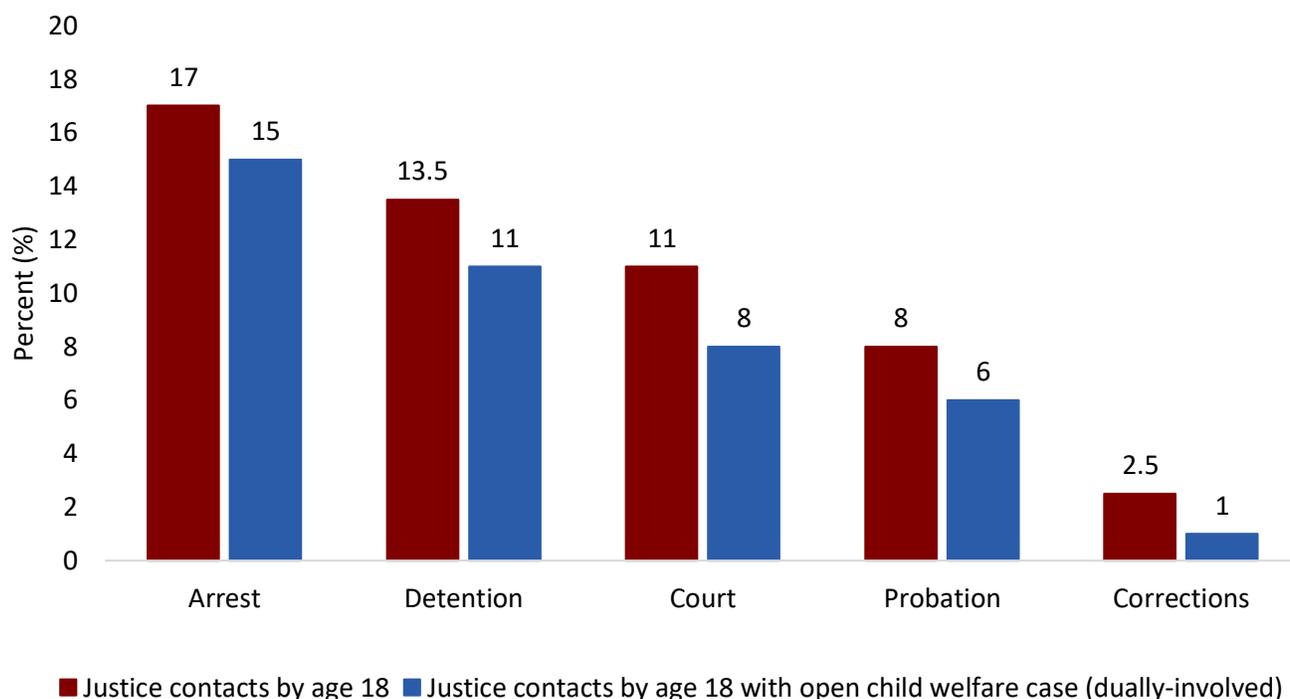
Figure 3. Juvenile Justice Contacts by Ages 14, 16, and 18



We also wanted to study what proportion of cohort youth crossover into the juvenile justice system occurs while youth have an active case with IDCFS—that is, what proportion of cohort youth are dually involved. We report whether a youth’s first instance of arrest, detention, court involvement, probation, and juvenile corrections occurs while the youth has an active case with the child welfare system. Figure 7 presents the overall proportion of first juvenile justice system contacts and the proportion of first juvenile justice system contacts that represent dual-involvement.

In the study cohort, the vast majority of youth first arrests, first instances of detention, court filing, and probation represent dual involvement. Specifically, 15% of cohort youth had a first arrest occur while they had an active IDCFS case, 11% of youth experienced a first detention, 8% a first probation, and 1.5% a first transfer to IDJJ while dually-involved.

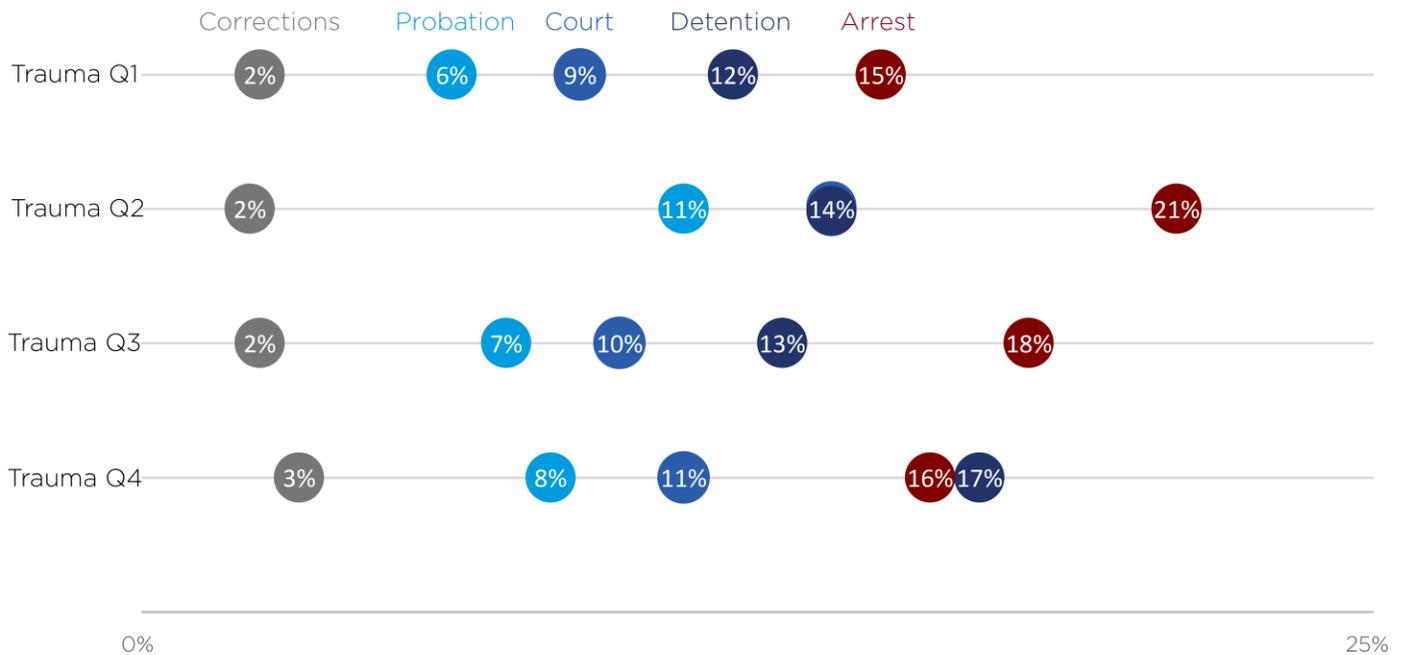
Figure 4. Juvenile Justice Contacts by Age 18 and Proportion Dually Involved



Note: The maroon bar displays percentage of sample youth with each type of justice contact. The blue bar shows the percentage of youth where the first justice contact for each type occurred while the youth had an open child welfare case.

Of particular interest to this study is whether there are different rates of crossover into the juvenile justice system for youth with higher trauma exposure. Figure 8 presents proportions of youth with juvenile justice system contact by type and trauma quartile (see Appendix Table B-9 for additional detail). In general, we observe the lowest rates of juvenile justice contacts for youth in the lowest quartile (Q1) of trauma exposure for arrest, detention, court, and probation. Frequency of crossover events is higher among the second, third, and fourth quartile of trauma exposure (relative to Q1) but the pattern is not linear. There is no significant pattern of frequency of juvenile corrections by level of trauma exposure. Rates of juvenile justice contact by age of youth and trauma quartile are displayed in life tables graphs for each type of juvenile justice contact in Appendix A (see supplemental Figures A1, A2, A3, A4 and A5.)

Figure 8. Juvenile Justice Contacts by Age 18 and Trauma Quartile



Note: Trauma experiences total average score by quartile (scored 0 to 3). Average trauma score Quartile 1 (0-25%) = 0.32; Quartile 2 (26-50%) = 0.58; Quartile 3 (51-75%) = 0.76; Quartile 4 (76%-100%) = 1.12.

Survival analysis results

We use survival analysis to examine if these descriptive patterns persist once we account for other factors, including child characteristics, risks and strengths, type and duration of child welfare involvement, and community factors. Table 5 presents the final models, including all relevant covariates, for each type of juvenile justice contact. Trauma experiences are included in the model as a categorical variable with four values representing total average trauma experience scores by quartile. Table 6 presents the same models except that trauma experiences are captured by the individual item scores rather than the domain average to look for relationships between specific trauma types and crossover events. In all Cox regression tables the coefficients are presented as odds ratios, where values below one indicate a negative relationship (i.e., less likely) and values above one indicate a positive relationship (i.e., more likely) with the outcome variable. Coefficients very close to one indicate no evidence of a relationship (e.g., “zero” effect).

Table 5. Cox Proportional Hazards Regression for Juvenile Justice by Age 18, Trauma Quartile

	Arrest	Detention	Court	Probation	Corrections
	b/se	b/se	b/se	b/se	b/se
Trauma Q2	1.377 (0.23)	0.939 (0.19)	1.315 (0.28)	1.387 (0.35)	0.627 (0.31)
Trauma Q3	1.002 (0.17)	0.720 (0.15)	0.742 (0.17)	0.779 (0.21)	0.663 (0.31)
Trauma Q4	0.910 (0.19)	0.985 (0.21)	0.736 (0.19)	0.715 (0.21)	0.842 (0.42)
Hispanic	0.712 (0.17)	0.770 (0.20)	0.438* (0.16)	0.475 (0.20)	1.591 (0.89)
Other race	0.808 (0.34)	0.637 (0.33)	0.348 (0.25)	0.235 (0.24)	0.748 (0.81)
White	0.573 (0.18)	0.671 (0.22)	0.619 (0.23)	0.523 (0.25)	0.317 (0.33)
Female	0.653*** (0.08)	0.319*** (0.05)	0.318*** (0.06)	0.298*** (0.06)	0.204*** (0.08)
Age at CANS assessment	0.909*** (0.03)	1.013 (0.03)	0.906* (0.04)	0.892* (0.04)	0.833 (0.08)
Urban Hardship Index (0-100)	1.004 (0.00)	0.999 (0.00)	1.000 (0.00)	0.998 (0.00)	0.996 (0.01)
Total out-of-home placements	1.035*** (0.01)	1.053*** (0.01)	1.040*** (0.01)	1.032*** (0.01)	1.043*** (0.01)
Age of first placement	1.019 (0.01)	1.027 (0.02)	1.043* (0.02)	1.042 (0.02)	1.069 (0.05)
Sexual abuse substantiated	0.823 (0.14)	0.780 (0.16)	0.798 (0.19)	0.649 (0.20)	0.455 (0.29)
Physical abuse substantiated	1.368* (0.14)	1.025 (0.16)	1.373 (0.19)	1.564* (0.20)	0.806 (0.29)

	Arrest	Detention	Court	Probation	Corrections
	b/se	b/se	b/se	b/se	b/se
	(0.18)	(0.15)	(0.23)	(0.31)	(0.29)
Neglect substantiated	1.065	0.780	0.962	1.019	1.049
	(0.13)	(0.11)	(0.15)	(0.19)	(0.35)
Trauma stress symptoms (CANS)	0.820	0.679*	1.113	1.214	0.769
	(0.13)	(0.11)	(0.20)	(0.25)	(0.30)
Risk behaviors (CANS)	0.875	2.345***	1.795*	2.284*	2.950*
	(0.21)	(0.56)	(0.49)	(0.74)	(1.60)
Behavioral/emotional needs (CANS)	2.286**	1.711	2.165*	1.212	1.985
	(0.61)	(0.49)	(0.70)	(0.46)	(1.35)
Strengths (CANS)	1.086	0.943	1.003	1.147	1.186
	(0.16)	(0.16)	(0.19)	(0.25)	(0.48)
Life domain functioning (CANS)	0.807	1.592	0.827	1.045	1.282
	(0.19)	(0.39)	(0.23)	(0.34)	(0.77)
Observations	1,633	1,633	1,633	1,633	1,633

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Exponentiated coefficients

Reference group for Trauma = Q1; race/ethnicity = Black/African American. Indicator variables for year of birth 1996-2002 are included but not shown in all models.

Table 6. Cox Proportional Hazards Regression for Juvenile Justice by Age 18, Trauma Items

	Arrest	Detention	Court	Probation	Corrections
	b/se	b/se	b/se	b/se	b/se
Trauma: Sexual abuse	0.994 (0.08)	0.907 (0.08)	1.099 (0.11)	1.017 (0.12)	0.899 (0.21)
Trauma: Physical abuse	0.974 (0.08)	0.950 (0.09)	1.025 (0.11)	1.007 (0.12)	0.855 (0.20)
Trauma: Emotional abuse	1.055 (0.09)	1.053 (0.10)	0.962 (0.11)	1.050 (0.14)	1.035 (0.26)
Trauma: Neglect	0.880 (0.06)	0.904 (0.08)	0.929 (0.09)	1.038 (0.11)	0.778 (0.16)
Trauma: Medical trauma	0.939 (0.09)	0.999 (0.10)	0.918 (0.11)	0.877 (0.13)	0.880 (0.24)
Trauma: Family violence	0.925 (0.07)	0.846* (0.07)	0.769** (0.07)	0.732** (0.08)	0.936 (0.20)
Trauma: Community violence	1.133 (0.10)	1.099 (0.11)	1.289* (0.14)	1.284* (0.16)	1.465 (0.32)
Trauma: School violence	1.032 (0.12)	1.295* (0.16)	1.077 (0.15)	1.227 (0.19)	1.066 (0.29)
Trauma: Traumatic grief/separation	1.046 (0.08)	0.981 (0.09)	0.982 (0.10)	0.976 (0.11)	0.805 (0.18)
Trauma: Witness/victim to crime	0.990 (0.08)	1.150 (0.10)	0.993 (0.11)	0.906 (0.12)	1.172 (0.26)
Hispanic	0.702 (0.16)	0.787 (0.21)	0.452* (0.17)	0.504 (0.21)	1.533 (0.87)
Other race	0.902 (0.38)	0.795 (0.42)	0.467 (0.34)	0.320 (0.32)	1.002 (1.07)
White	0.591	0.716	0.705	0.646	0.347

	Arrest	Detention	Court	Probation	Corrections
	b/se	b/se	b/se	b/se	b/se
	(0.19)	(0.23)	(0.27)	(0.31)	(0.37)
Female	0.660**	0.360***	0.322***	0.320***	0.258**
	(0.09)	(0.06)	(0.06)	(0.07)	(0.11)
Age at CANS assessment	0.902***	0.995	0.891**	0.880**	0.826*
	(0.03)	(0.03)	(0.03)	(0.04)	(0.07)
Urban Hardship Index (0-100)	1.004	0.999	0.999	0.997	0.997
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Total out-of-home placements	1.035***	1.051***	1.041***	1.030***	1.040**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Age of first placement	1.022	1.025	1.049*	1.049*	1.039
	(0.01)	(0.02)	(0.02)	(0.02)	(0.05)
Sexual abuse substantiated	0.821	0.884	0.754	0.643	0.603
	(0.15)	(0.19)	(0.19)	(0.20)	(0.40)
Physical abuse substantiated	1.348*	1.093	1.342	1.612*	0.891
	(0.18)	(0.17)	(0.23)	(0.33)	(0.34)
Neglect substantiated	1.149	0.836	1.011	0.998	1.064
	(0.15)	(0.13)	(0.17)	(0.19)	(0.37)
Trauma stress symptoms (CANS)	0.820	0.709*	1.095	1.186	0.862
	(0.13)	(0.12)	(0.20)	(0.25)	(0.35)
Risk behaviors (CANS)	0.826	2.285***	1.515	2.066*	2.270
	(0.20)	(0.57)	(0.44)	(0.71)	(1.35)
Behavioral/emotional needs (CANS)	2.247**	1.791*	2.309*	1.258	2.264
	(0.61)	(0.53)	(0.76)	(0.50)	(1.55)
Strengths (CANS)	1.089	0.944	1.039	1.112	1.446
	(0.17)	(0.17)	(0.20)	(0.26)	(0.63)
Life domain functioning (CANS)	0.767	1.314	0.634	0.810	0.863

	Arrest	Detention	Court	Probation	Corrections
	b/se	b/se	b/se	b/se	b/se
	(0.19)	(0.34)	(0.18)	(0.28)	(0.54)
Observations	1633	1633	1633	1633	1633

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Exponentiated coefficients

All trauma items scored 0 – 3. Reference group for race/ethnicity = Black/African American. Indicator variables for year of birth 1996-2002 are included but not shown in all models.

We expect youth with more extensive child welfare system involvement to be at higher risk of juvenile justice involvement given the combination of circumstances and experiences that have resulted in and from being placed in out-of-home care. In this study, the number of out-of-home placements correlates with an increased probability of all five types of juvenile justice system involvement. Specifically, one additional placement increases the risk of a juvenile justice system contact by 3 to 5%. We found that substantiated instances of physical abuse related to probability of crossover; however, these findings are not consistent across models. Having an instance of substantiated physical abuse is related to an increased probability of arrest (37% increased risk) and probation (56% increased risk).

In our data, young women have about a 35% lower risk of arrest, a 70% lower risk of detention, court filing, and probation, and an 80% lower risk of juvenile correction involvement, relative to young men. To investigate this issue we conducted gender-specific analyses and report those results in the Supplemental Analyses section.

We next discuss the Cox regression results as they relate to each study hypothesis.

Hypothesis 1: Controlling for youth characteristics, age of entry into the child welfare system, type/duration of child welfare system involvement, and community factors, the probability of youth entering the juvenile justice system will increase as the severity of trauma exposure (as measured by the CANS) increases.

We find no evidence for the hypothesis that greater total trauma exposure is related to increased probability of crossover. Level of trauma exposure, measured by quartile, has no significant relationship with arrests, detention, court filing, probation, and juvenile corrections in our models (see Table 5). We also input trauma exposure into the survival models using the individual item scores. Experiencing community violence correlates to about a 30% increased risk of both court filing and probation. Exposure to school violence correlates to a 30% increased risk of detention. Family violence, however, is associated with a decreased risk of detention (15% decreased risk), court filing (23% decreased risk), and probation (27% decreased risk).

Hypothesis 2: Controlling for youth characteristics, age of entry into the child welfare system, and type/duration of child welfare system involvement, the probability of youth entering the juvenile justice system will increase as the severity of community distress as measured by the Urban Hardship Index increases.

We find no evidence to support the hypothesis that increased community distress is related to crossover. Urban hardship is not correlated with any type of juvenile justice involvement in models for the full study cohort nor separately by gender. This is true when urban hardship was specified as a continuous variable (see Tables 5 and 6) and as indicator variables for hardship quartile (not shown). The study cohort does contain variation in urban hardship but that variation is relatively evenly dispersed by trauma exposure, meaning that we do not observe higher scores of urban hardship among youth with higher trauma exposure. Average urban hardship scores are similar across trauma quartiles (see Appendix Table B-8).

Hypothesis 3: Controlling for youth characteristics, age of entry into the child welfare system, type/duration of child welfare system involvement, and community factors, the probability of children and youth entering the juvenile justice system will increase as the severity of youth risks (as measured by the CANS risks, trauma stress symptoms, and behavioral/emotional needs domains) increases.

We find mixed evidence for the hypothesis that risks and related behaviors are related to crossover. Results vary by type of juvenile justice involvement. Risk behaviors are highly correlated with increased risk of detention, court filing, probation, and juvenile corrections. Additional models (not shown) with the individual risk items suggest that delinquency risk behavior is highly correlated with all types of system crossover. For youth without formal juvenile justice involvement, this item captures status offenses (e.g., truancy) and suspected criminal or delinquent behavior that may be precursors to formal juvenile justice involvement.

The behavioral/emotional needs domain score correlates to an increased risk of arrest and detention. Results of this domain score for other juvenile justice system contacts all suggest a positive relationship but are not statistically significant. Increased trauma stress symptom scores are related to a decreased risk for detention (32% decreased risk) but there are no significant results for other crossover events.

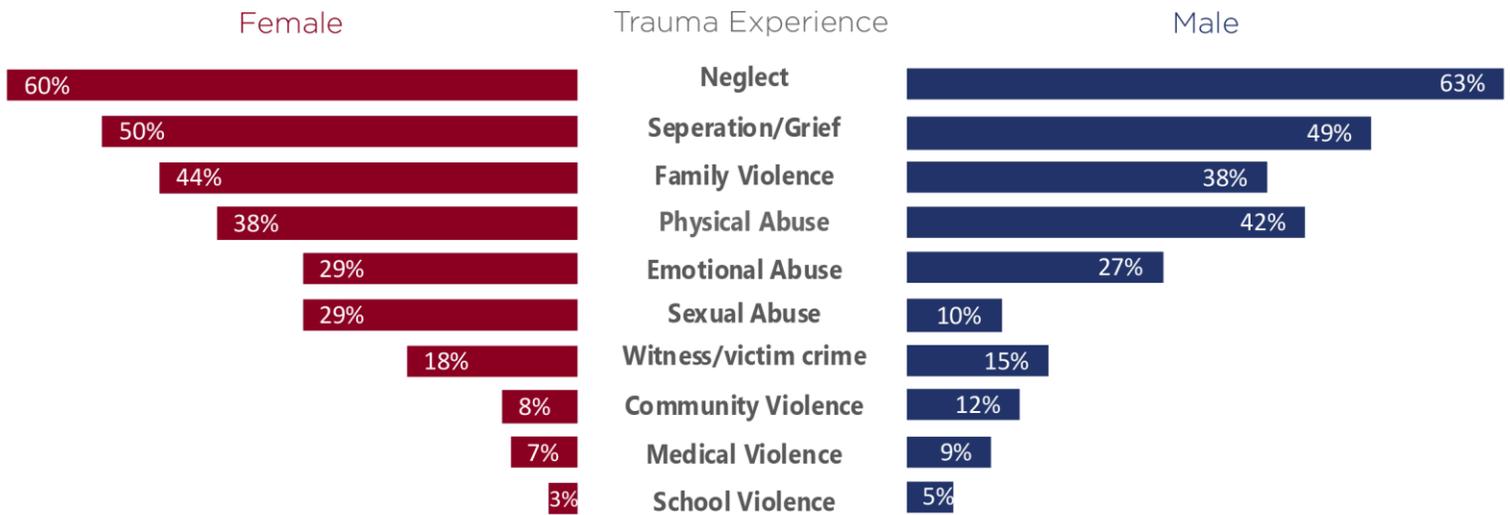
Hypothesis 4: Controlling for youth characteristics, age of entry into the child welfare system, type/duration of child welfare system involvement, and community factors, the probability of children and youth entering the juvenile justice system will increase as the number of strengths (as measured by the CANS strengths and life domain functioning domains) in a youth's life decreases.

We find no evidence for the hypothesis that decreased strengths as measured by the CANS are correlated with the likelihood of juvenile justice system involvement.

Supplemental analyses

We also investigate the relationship between trauma exposure and juvenile justice involvement by looking separately at young men and young women in the study cohort. To examine any key differences by gender for this study, we present descriptive statistics for trauma experiences, juvenile justice involvement, and results for separate Cox regression models by gender (see Figure 9).

Figure 5. CANS Trauma Experiences, by Gender

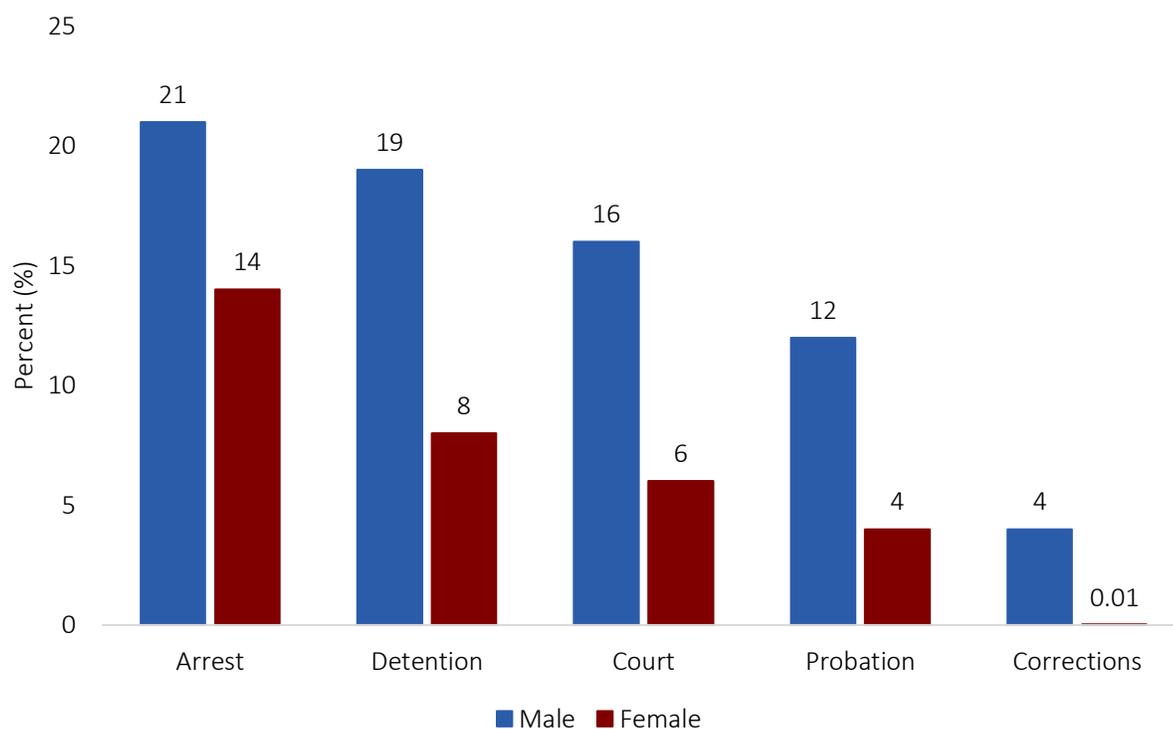


Note: CANS Trauma experiences are scored 0 to 3. This graph represents youth with a score between 2 and 3, indicating multiple incidents or a moderate degree of this type of trauma. Three additional items in the trauma experiences domain (natural or manmade disasters, affected by war, or affected by terrorism) are not shown due to fewer than 0.5% of youth reporting those experiences.

Given the emphasis on trauma in this report, we examine the patterns of trauma experiences by gender for any evidence of the role trauma might play in explaining observed gender differences in justice contacts. In the study cohort, males and females have similar levels of trauma exposure. Average trauma experience scores by gender are almost equivalent in the study cohort with 0.67 for females and 0.64 males (see Appendix Table B-10). There is variation by individual trauma experiences. Experiences of neglect, community violence, and school violence are more prevalent among young men while sexual abuse and family violence are more prevalent among young women (see Figure 9). Our finding of high rates of sexual abuse among system-involved girls is consistent with prior research (Belknap & Holsinger, 2006; Johannson & Kempf-Leonard, 2009; Kerig et al., 2010; Wareham & Dembo, 2007).

Patterns and rates of juvenile justice contacts are different for young men and young women. Among cohort youth, males are much more likely than females to experience juvenile justice events. Figure 10 shows stark differences by gender in the rates of juvenile justice contacts for all events (arrest, detention, court involvement, probation sentence, and juvenile corrections). The differential rates of juvenile justice contacts for males and females widens as the depth of system involvement increases, beginning with arrests and continuing through juvenile corrections. The disparate rates are likely the result of many societal- and system-level factors (see, for example, MacDonald & Chesney-Lind, 2001; Peck, Leiber, & Brubaker, 2014).

Figure 6. Juvenile Justice Contacts by Age 18, by Gender



For comparison with the main results, we conduct separate survival analyses by gender for trauma quartiles (Appendix Table B-12 for males and Table B-13 for females) and individual trauma experiences item scores (Appendix Table B-14 for males and Table B-15 for females).

For males, we observe no evidence of trauma exposure overall or particular trauma experiences correlating to the probability of crossover from child welfare into juvenile justice. Out-of-home placements are related to an increased probability of crossover (one additional placement is related to a 3 to 7% increased risk of juvenile justice events) and older age at first placement (one additional year of age related to a 5 to 7% increased risk of arrest, detention, court, and probation). A history of substantiated physical abuse is related to increased risk of arrest (54%), detention (65%), and probation (70%). CANS risk behaviors highly correlated with detention, court filing, and probation.

For females, having total trauma exposure in the second quartile is related to an increased risk of arrest relative to the lowest trauma quartile. However, there is no evidence of a relationship for other levels of trauma exposure or other juvenile justice events. Among the individual trauma experiences, exposure to community violence is associated with increased risk of court filing and probation. Similar to males, the number of out-of-home placement is related to an increased probability of crossover (one additional placement is related to a 3 to 5% increased risk of juvenile justice events). The only other significant factor for females is the behavioral/emotional needs domain. This domain correlates to an increased risk of arrest and court filing. Coefficients for detention and probation are similar but not statistically significant.

DISCUSSION

Summary of results

In this study, we examined four hypotheses about how the traumatic experiences of youth in the child welfare system relate to the risk of five types of juvenile justice involvement. We use a cohort of youth that have been involved in the child welfare system and observe these youth over time to identify if and when they experience a juvenile justice system contact, specifically an instance of arrest, detention, court involvement, probation sentence, or juvenile corrections before age 18.

Descriptively, study youth report significant exposure to traumatic experiences. The most common types of trauma relate to instances of child maltreatment (neglect, emotional abuse, and physical abuse). We observe significant rates of youth crossover. Seventeen percent of the cohort youth are arrested before age 18 and almost one in six youth have been held in secure detention. Fewer youth are referred to juvenile court, or sentenced to probation or juvenile corrections. We find the lowest rates of juvenile justice contacts among youth with the lowest levels of trauma exposure for arrest, detention, court, and probation. Frequency of crossover events is higher among youth with increased trauma exposure.

We use a survival analysis approach to assess the characteristics and timing associated with youth crossing over into the juvenile justice system and having particular types of juvenile justice system involvement. Child welfare history, number of out-of-home placements, and confirmed instances of physical abuse are related to increased risk of crossover into the juvenile justice system. Model results suggest cumulative trauma exposure, measured by the Child and Adolescent Needs and Strengths (CANS), does not add significantly to our understanding of the likelihood for juvenile justice contact once we account for observed youth characteristics, child welfare history (particularly, the number of out-of-home placements), and risks and strengths. These results are consistent with research conducted by Baglivio and colleagues, who find that traumatic childhood experiences do not have a direct effect on juvenile re-offending. However, they do find evidence of an indirect effect working through child welfare placements (Baglivio et al., 2016).

Specific trauma experiences of exposure to violence in the community and at school are related to an increased probability of some types of juvenile justice involvement. Exposure to family violence, however, is associated with a decreased risk of detention, court involvement, and probation. Risk behaviors, as measured by the CANS, are highly correlated with increased risk of detention, court filing, probation, and juvenile corrections. In particular, a high score on the delinquency risk behavior item is associated with all types of system crossover. We find no evidence that community factors, as measured by the Urban Hardship Index, or CANS strengths are associated with crossover events.

Males and females in the study cohort experience similar levels of trauma exposure, although the type of trauma differs. Girls experience increased rates of sexual abuse and boys experience increased rates of exposure to violence outside the home. Males have significantly higher levels of crossover into the juvenile justice system. In survival models for males, several dimensions of child welfare history and CANS risk behaviors relate to the probability of crossover. In survival models for females, the number of out-of-home placements, exposure to community violence, and CANS behavioral/emotional needs increase the probability of crossover.

Limitations

Study results should be interpreted in light of several important limitations of the data and study cohort. We use data from Chicago; those data are not necessarily representative of other parts of the United States. Findings from the analyses may be informative to other metropolitan areas. However, further studies would be needed to determine how accurate the results of this study are in other metropolitan contexts.

The data also inherently present some limitations. First, our data likely undercount arrests, as they only capture arrests made by the Chicago Police Department. Cohort youth arrested by other police departments in the Chicago area could be represented in the detention, court, and probation outcomes data (which cover all of Cook County), and the IDJJ data (which covers the state) but we do not observe the initial arrest. The arrest data also ends 3 months before the other sources of juvenile justice data (i.e., September 2017 instead of December 2017). Second, the CANS data have only been collected since 2007, which limits the time period for which analyses can be conducted (which means lower levels of internal validity). Specifically, we cannot observe a cohort of youth for whom the CANS would have been universally implemented at their first foster care placement (this would entail using children born after 2007, who would only be 10 years old at the end of the study period). Third, the CANS data is only collected for youth undergoing an intake for foster care placement. As a consequence, the youth in our sample are likely to have had one or more out-of-home foster care placements and an extensive child welfare history. Therefore, results are not generalizable to a broader child welfare population. Fourth, the data are time limited, in that youth younger than age 18 prior to the end of the study period (2017) may yet become involved in the juvenile justice system. Finally, overall, our sample size is such that we have limited power to estimate results, especially when predicting rare events like juvenile corrections and splitting the cohort by gender.

In addition to the limits imposed by using specific datasets, there are also the more general limits of using administrative data. Administrative data only contain information about activities recorded by administrative agencies, and not all relevant youth activities or circumstances may be recorded. Administrative data may also contain errors or omissions. Inconsistencies in the identifying information (e.g., names and birthdates) collected by the different agencies may have resulted in improper matching of youth records across the four administrative data sources.

While these limitations challenge the study results in terms of internal and external validity, the benefits of the data far outweigh the limitations. The data are geographically limited, but they represent one of the largest and most complex child welfare and juvenile justice systems in the country. Administrative data, though imperfect, are the most efficient and cost-effective way to capture the experiences of several thousand young people who have been in foster care.

Implications for practice and policy

Findings from this study could help inform policy and programming related to targeting services to children and youth in effective ways. The analyses provide evidence of the types of trauma experienced by youth who cross over from child welfare to the juvenile justice system. Identification of the association of particular trauma patterns, risks, or strengths, with the increased risk of juvenile justice system involvement, could lead the child welfare system to better target scarce resources at youth at pivotal junctures rather than creating blanket programs that cover all youth.

Youth with high numbers of out-of-home placements and those who are older at the time of their first placement appear to be at particular risk for crossover into the juvenile justice system. This was true for both young men and young women. This finding speaks to the importance of targeting child welfare resources to ensure placement stability, using strategies such as improved recruitment, matching, payment, foster parent training, wraparound services, and respite for all children. Such investments may be particularly important for older youth entering care. These youth typically experience a high rate of placement instability and multiple moves. Increased resources for utilization of

intensive home-based wraparound services to prevent the initial foster care placement for older youth could also be helpful.

Trauma does not directly predict crossover in our analysis. However, the observed placement disruption may be a result of placements that are ill-equipped to handle youth dealing with trauma. Additionally, youth with highly disruptive traumatic experiences may demonstrate hyperarousal and related symptoms that are mistakenly interpreted as challenging behaviors. Providing service models that help minimize placement disruptions for youth who have experienced trauma could help reduce the risk of placement instability and juvenile justice involvement (see, for example, Treatment Foster Care Oregon (previously Multidimensional Treatment Foster Care) Eddy, Whaley, & Chamberlain, 2004; Leve & Chamberlain, 2005; Leve, Chamberlain, & Reid, 2005).

With regards to trauma experiences, results indicate that exposure to community and school violence may place youth at heightened risk for juvenile justice involvement. Perhaps not surprisingly, youth with a history of status offenses, or who are suspected of participation in criminal activity, are at increased risk of crossover events. For these youth, it is important to identify that risk and take action steps before behavior escalates.

Study findings highlight the importance of screening for trauma (as well as other emotional, behavioral, or mental health symptomology and risk behaviors) within each system (child welfare and juvenile justice) and across touchpoints (e.g., detention, court, probation, corrections). Having tools that screen for different types of trauma may be important. At the time of youth entering the system, agency staff should be enabled to 'triage' those youth who have past experiences more highly associated with the risk of juvenile justice system involvement.

In addition to identifying trauma, there is a need to ensure that pertinent information about youth—such as trauma concerns or crossover events—is available to relevant agency staff as youth move across placements, programs, and agencies. It is also important for both systems to offer a diverse array of evidence-based, trauma-informed interventions so that, once identified, youth needs can be addressed.

Conclusion

In summary, this study aimed to explore the role of trauma experiences in the path of crossing over from the child welfare system into the juvenile justice system. Of specific interest was the combined impact of trauma, history of child welfare involvement, and additional child, family, and community factors. We examined these relationships in a cohort of foster care youth from the Chicago area for whom the Illinois child welfare agency collected information on trauma, risks, and strengths as part of their intake for foster care placement. In the study cohort, youth with higher trauma exposure have slightly higher rates of arrest, detention, court filing, and probation. Results of the survival models suggest that total level of trauma exposure is not related to likelihood of crossover once youth characteristics, child welfare history, and risks and strengths are accounted for in the model. There is evidence to suggest that some types of traumatic experiences—specifically, exposure to violence in the community and at school—may increase the risk for crossover juvenile justice involvement. Having a high number of out-of-home placements is another key factor associated with juvenile justice contact.

Trauma experiences are only one piece of a complicated puzzle contributing to crossover from child welfare to juvenile justice. Recognizing placement instability and the factors surrounding it as a key risk factor for crossover is important. Inquiring about youth's exposure to community and school violence could be a potential strategy for identifying youth at high risk for juvenile justice system involvement. That group could be targeted with interventions designed to help youth address any trauma from those experiences.

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APPENDIX A. SUPPLEMENTAL FIGURES

Figure 7. Life table of arrest before age 18 by trauma quartile

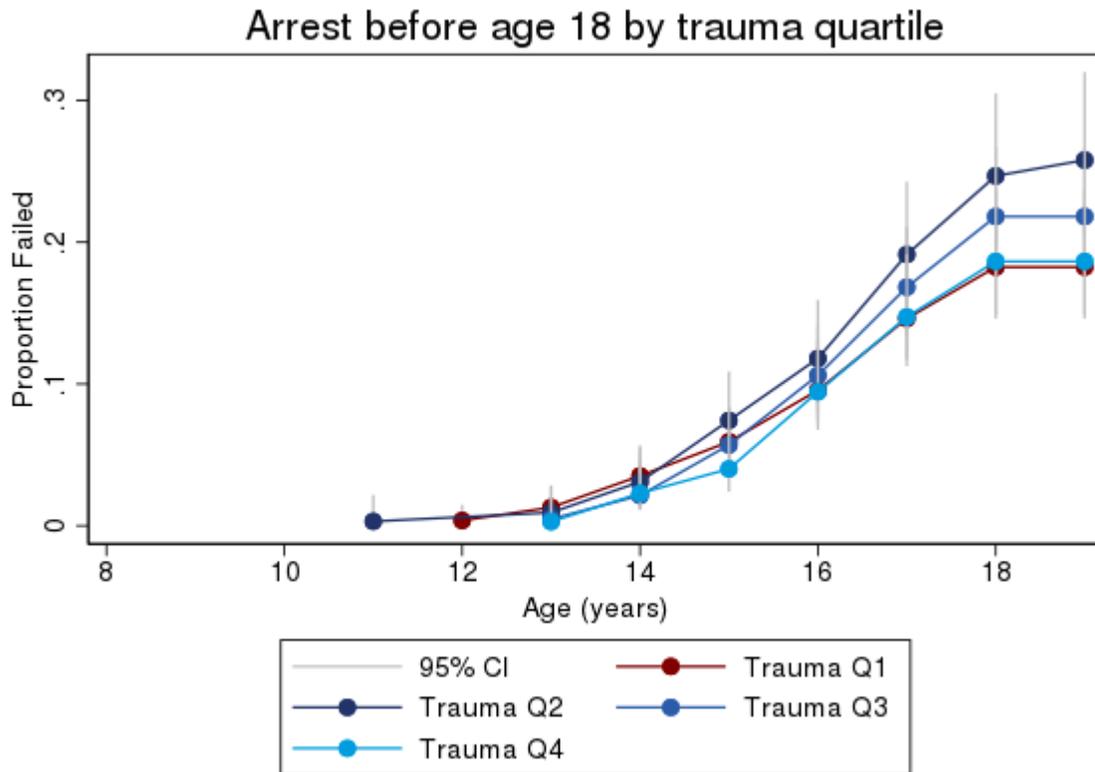


Figure 8. Life table of detention before age 18 by trauma quartile

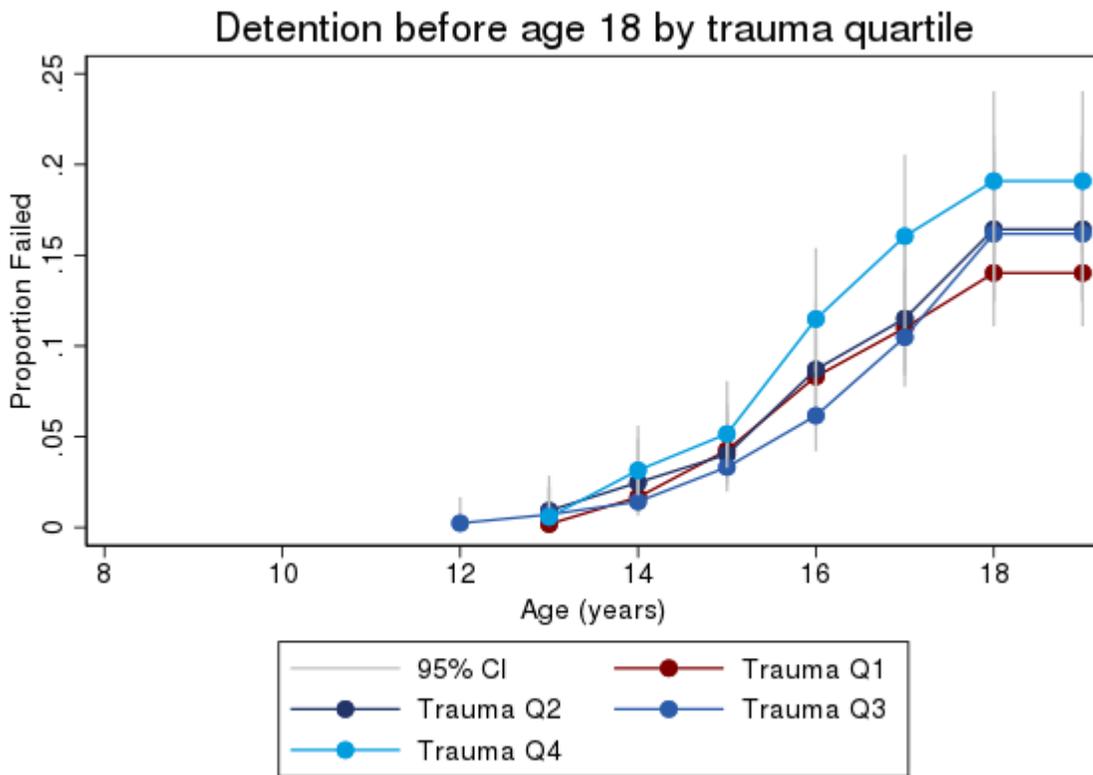


Figure 9. Life table of court before age 18 by trauma quartile

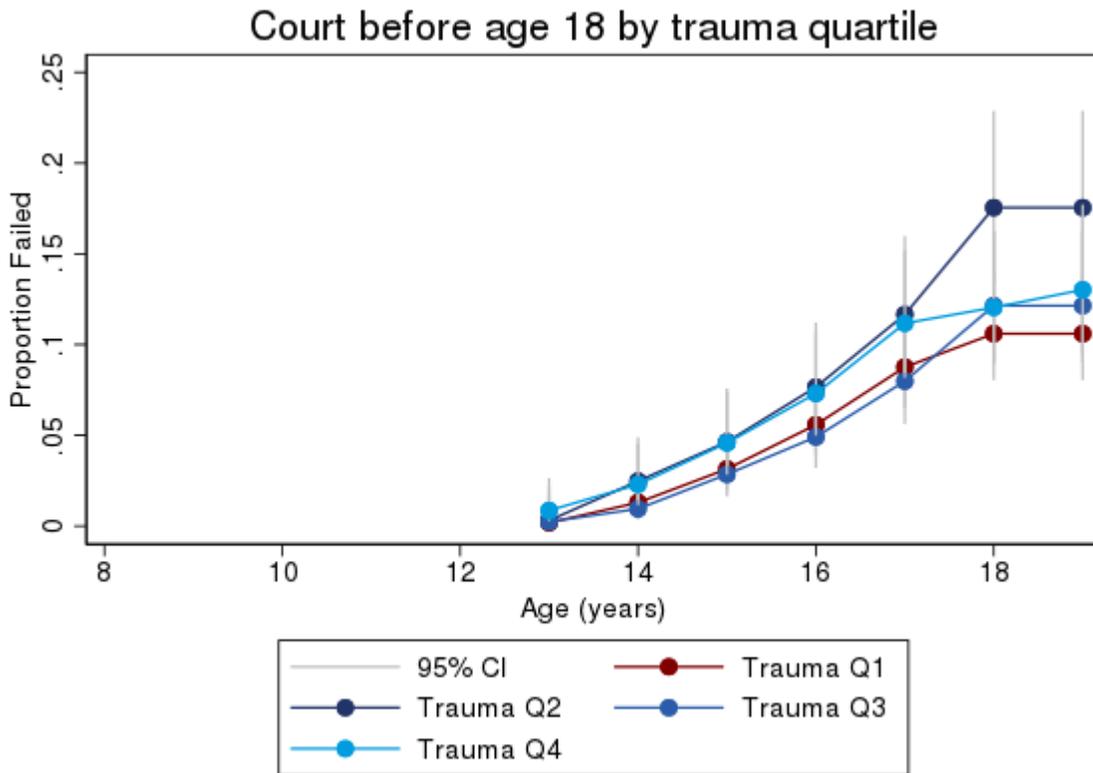


Figure 10. Life table of probation before age 18 by trauma quartile

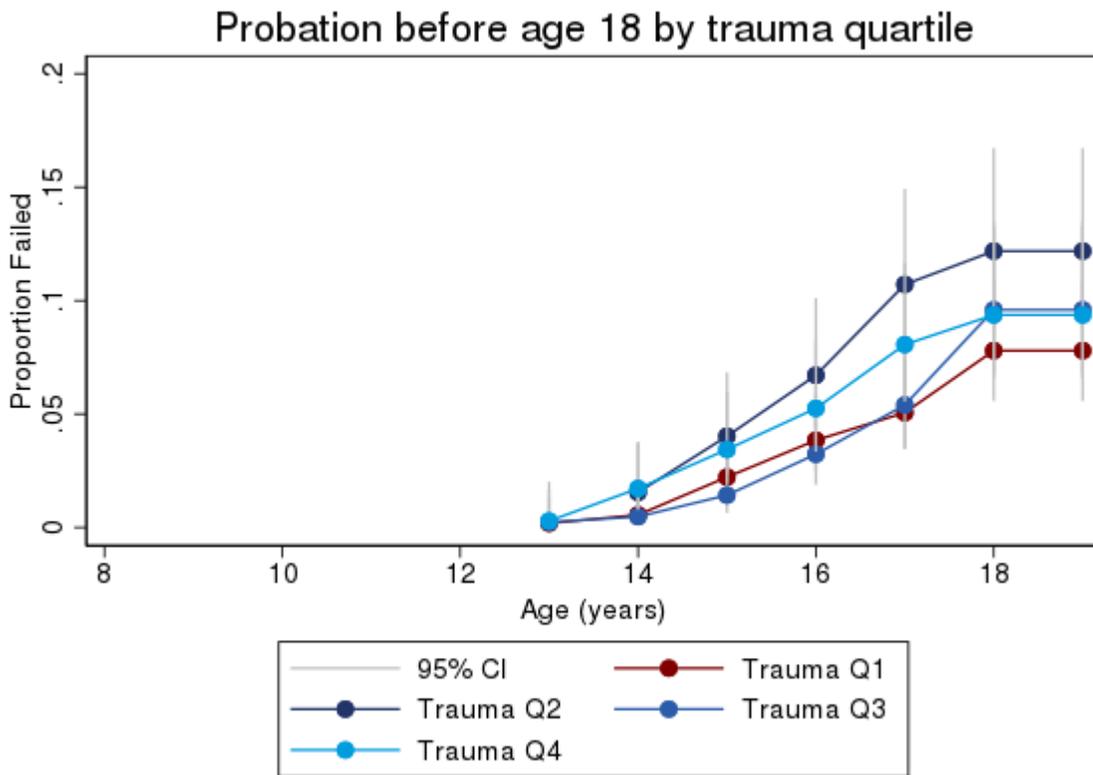
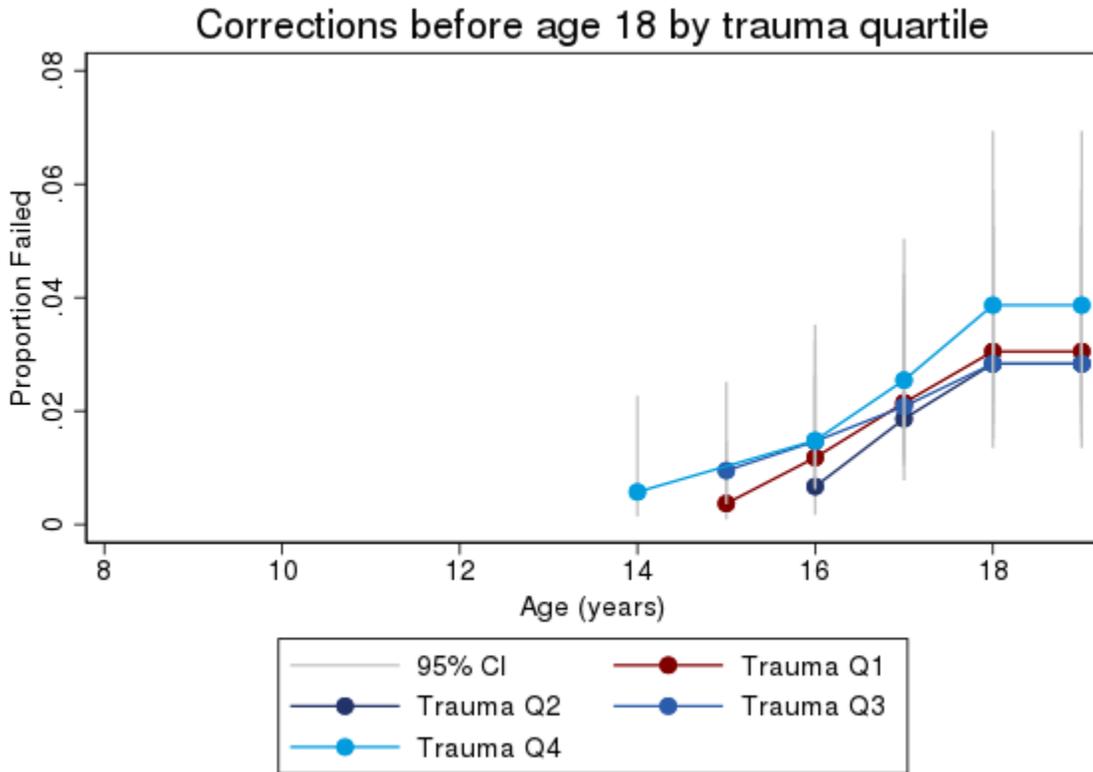


Figure 11. Life table of juvenile corrections before age 18 by trauma quartile



APPENDIX B. SUPPLEMENTAL TABLES

Table B-1. Youth characteristics, cohort sample and Chicago, IL comparison

	Sample Cohort		Chicago Comparison		Test of difference p-value
	mean	sd	Mean	sd	
Female	0.52	(0.50)	0.49	(0.50)	0.191
African American	0.79	(0.40)	0.81	(0.40)	0.911
Hispanic	0.12	(0.32)	0.078	(0.27)	0.000
Other race	0.023	(0.15)	0.022	(0.15)	0.987
White	0.064	(0.24)	0.095	(0.29)	0.000
Born 1996 (age 18 in 2014)	0.14	(0.34)	0.22	(0.41)	0.000
Born 1997 (age 18 in 2015)	0.13	(0.34)	0.19	(0.39)	0.000
Born 1998 (age 18 in 2016)	0.15	(0.35)	0.17	(0.37)	0.452
Born 1999 (age 18 in 2017)	0.15	(0.35)	0.13	(0.33)	0.054
Born 2000 (age 18 in 2018)	0.15	(0.36)	0.11	(0.31)	0.000
Born 2001 (age 18 in 2019)	0.14	(0.35)	0.11	(0.31)	0.006
Born 2002 (age 18 in 2020)	0.15	(0.36)	0.090	(0.29)	0.000
Any investigations	0.97	(0.18)	0.76	(0.43)	0.000
Total investigations	5.15	(3.74)	1.99	(2.33)	0.000
Any substantiated investigations	0.83	(0.38)	0.66	(0.47)	0.000
Neglect substantiated	0.59	(0.49)	0.49	(0.50)	0.000
Physical abuse substantiated	0.46	(0.50)	0.37	(0.48)	0.000
Sexual abuse substantiated	0.20	(0.40)	0.040	(0.20)	0.000
Any out-of-home placements	0.97	(0.17)	0.71	(0.46)	0.000
Total out-of-home placements	7.45	(7.75)	1.93	(2.25)	0.000
Age of first placement	8.56	(5.06)	1.46	(3.22)	0.000
Observations	1633		18396		

Table B-2. Juvenile justice contacts by age, cohort sample and Chicago, IL comparison

	Sample Cohort		Chicago Comparison		Test difference
	mean	sd	mean	sd	p-value
<i>JJ contact by age 14</i>					
Arrest by age 14	0.028	(0.17)	0.023	(0.15)	0.000
Detention by age 14	0.021	(0.14)	0.0019	(0.044)	0.000
Court by age 14	0.017	(0.13)	0.0051	(0.071)	0.000
Probation by age 14	0.0098	(0.099)	0.0022	(0.047)	0.000
Corrections by age 14	0.0012	(0.035)	0.00011	(0.010)	0.000
<i>JJ contact by age 16</i>					
Arrest by age 16	0.10	(0.30)	0.064	(0.24)	0.000
Detention by age 16	0.084	(0.28)	0.013	(0.12)	0.000
Court by age 16	0.060	(0.24)	0.028	(0.16)	0.000
Probation by age 16	0.045	(0.21)	0.016	(0.13)	0.000
Corrections by age 16	0.012	(0.11)	0.0020	(0.044)	
<i>JJ contact by age 18</i>					
Arrest by age 18	0.17	(0.47)	0.091	(0.29)	0.000
Detention by age 18	0.14	(0.42)	0.027	(0.16)	0.000
Court by age 18	0.11	(0.41)	0.047	(0.21)	0.000
Probation by age 18	0.078	(0.38)	0.031	(0.17)	0.000
Corrections by age 18	0.025	(0.22)	0.0061	(0.078)	0.000
<i>Age of first contact ^a</i>					
First arrest age	15.9	(2.11)	15.5	(2.12)	0.000
First detention age	16.1	(1.87)	16.0	(1.54)	0.002
First probation age	15.8	(1.39)	16.0	(1.27)	0.000
First court age	15.6	(1.45)	15.7	(1.30)	0.000
Corrections age	16.0	(1.29)	16.5	(1.07)	0.054
Observations	1633		18396		

^a Age of first contact reported for youth with at least one contact by that type prior to age 18.

Note: Chicago comparison group represents all youth known to IDCFS with Chicago residence born 1996-2002.

Table B-3. CANS Traumatic stress symptoms

	mean (0-3)	sd
Adjustment to trauma	1.50	(0.80)
Re-experiencing	0.68	(0.82)
Avoidance	0.90	(0.82)
Numbing	0.62	(0.78)
Dissociation	0.25	(0.53)
<i>Total average traumatic stress symptoms</i>	0.79	(0.53)
Observations	1633	

Table B-4. CANS Strengths

	mean (0-3)	sd
Family	1.61	(0.75)
Interpersonal skills	1.03	(0.79)
Educational setting	1.11	(0.92)
Vocational	1.12	(1.07)
Well-being	1.29	(0.76)
Optimism	1.01	(0.74)
Talents/interests	0.91	(0.81)
Spiritual/religious	0.93	(0.97)
Community life	1.18	(0.96)
Relationship permanence	1.44	(0.81)
<i>Total average strengths</i>	1.17	(0.54)
Observations	1633	

Note: Strength items are scored where 0 indicates a well-developed or centerpiece strength and 3 indicates an area with no current strength identified

Table B-5. CANS Risk behaviors

	mean (0-3)	sd
Suicide risk	0.32	(0.61)
Self-mutilation	0.19	(0.50)
Other self-harm	0.30	(0.63)
Danger to others	0.53	(0.78)
Sexual aggression	0.14	(0.47)
Runaway	0.43	(0.81)
Delinquency	0.21	(0.55)
Judgment	0.92	(0.93)
Fire setting	0.10	(0.39)
Social behavior	0.59	(0.78)
Sexually reactive behaviors	0.28	(0.62)
<i>Total average risk behaviors</i>	0.36	(0.39)
Observations	1633	

Table B-6. CANS Life domain functioning

	mean	sd
Family	1.47	(0.89)
Living situation	0.87	(0.92)
Social functioning	0.95	(0.86)
Developmental/intellectual	0.36	(0.69)
Recreational	0.69	(0.79)
Job functioning	1.67	(1.39)
Legal	0.17	(0.57)
Medical	0.47	(0.70)
Physical	0.20	(0.50)
Sexual development	0.27	(0.62)
School achievement	0.98	(0.95)
School attendance	0.58	(0.91)
<i>Total average life domain functioning</i>	0.67	(0.41)
Observations	1633	

Table B-7. CANS Behavioral/emotional needs

	mean	sd
Psychosis	0.16	(0.47)
Attention/impulse	0.86	(0.89)
Depression	1.30	(0.75)
Anxiety	1.05	(0.74)
Oppositional	0.74	(0.79)
Conduct	0.39	(0.67)
Substance abuse	0.23	(0.57)
Attachment	0.91	(0.83)
Eating disturbances	0.17	(0.48)
Affect dysregulation	0.68	(0.82)
Behavior regressions	0.21	(0.55)
Somatization	0.13	(0.41)
Anger control	0.97	(0.91)
<i>Total average behavioral/emotional needs</i>	0.60	(0.37)

Observations	1633	
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Table B-8. Youth characteristics and child welfare history by trauma quartile

	Total	Trauma Q1	Trauma Q2	Trauma Q3	Trauma Q4
	mean	mean	mean	mean	mean
Female	0.52	0.50	0.50	0.51	0.56
African American	0.79	0.82	0.79	0.79	0.77
Hispanic	0.12	0.089	0.12	0.13	0.15
Other race	0.023	0.028	0.028	0.019	0.014
White	0.064	0.063	0.065	0.062	0.066
Urban hardship index (0-100)	63.9	62.7	62.1	66.3	64.6
Any investigations	0.97	0.96	0.96	0.97	0.97
Total investigations	5.15	4.48	5.18	4.98	6.34
Any substantiated investigations	0.83	0.78	0.83	0.86	0.86
Neglect substantiated	0.59	0.57	0.64	0.55	0.61
Physical abuse substantiated	0.46	0.38	0.39	0.53	0.57
Sexual abuse substantiated	0.20	0.14	0.16	0.21	0.30
Any out-of-home placements	0.97	0.97	0.97	0.97	0.97
Total out-of-home placements	7.45	6.67	7.06	8.11	8.22
Age of first placement	8.56	8.06	9.00	8.68	8.77
Observations	1633	540	323	421	349

Table B-9. Juvenile justice contacts by age 18 and age of first contact by trauma quartile

	Total	Trauma Q1	Trauma Q2	Trauma Q3	Trauma Q4
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	mean	mean	mean	mean	mean
Arrest by age 18	0.17	0.15	0.21	0.18	0.16
Detention by age 18	0.14	0.12	0.14	0.13	0.17
Court by age 18	0.11	0.089	0.14	0.097	0.11
Probation by age 18	0.078	0.063	0.11	0.074	0.083
Corrections by age 18	0.025	0.024	0.022	0.024	0.032
First arrest age	15.9	15.9	15.8	16.0	16.0
First detention age	16.1	15.9	16.0	16.5	15.9
First court age	15.8	15.8	15.7	16.1	15.5
First probation age	15.6	15.5	15.7	15.9	15.3
First corrections age	16.0	16.1	16.5	15.8	15.8
Observations	1633	540	323	421	349

Table B-10. CANS Trauma experiences (scored 0-3), by gender

	Female		Male	
	mean	sd	mean	sd
Sexual abuse	0.81	(1.04)	0.34	(0.74)
Physical abuse	1.10	(0.95)	1.11	(0.98)
Emotional abuse	0.97	(0.90)	0.91	(0.87)
Neglect	1.60	(0.90)	1.67	(0.92)
Medical trauma	0.29	(0.65)	0.37	(0.72)
Family violence	1.21	(1.02)	1.08	(0.99)
Community violence	0.39	(0.67)	0.49	(0.76)
School violence	0.23	(0.49)	0.31	(0.57)
Natural or manmade disasters	0.034	(0.26)	0.039	(0.28)
Traumatic grief/separation	1.42	(0.86)	1.43	(0.83)
War affected	0.0036	(0.077)	0.0063	(0.12)
Terrorism affected	0.0012	(0.034)	0.0013	(0.036)
Witness/victim to criminal activity	0.63	(0.88)	0.58	(0.81)
<i>Total average trauma experiences</i>	0.67	(0.33)	0.64	(0.30)
Observations	842		1061	

Table B-11. Juvenile justice contacts by gender

	Total	Males	Females
	mean	mean	mean
<i>JJ contact by age 14</i>			
Arrest by age 14	0.028	0.039	0.018
Detention by age 14	0.021	0.034	0.0083
Court by age 14	0.017	0.025	0.0083
Probation by age 14	0.0098	0.016	0.0036
Corrections by age 14	0.0012	0.0013	0.0012
<i>JJ contact by age 16</i>			
Arrest by age 16	0.10	0.13	0.075
Detention by age 16	0.084	0.13	0.045
Court by age 16	0.060	0.092	0.030
Probation by age 16	0.045	0.072	0.020
Corrections by age 16	0.012	0.019	0.0059
<i>JJ contact by age 18</i>			
Arrest by age 18	0.17	0.21	0.14
Detention by age 18	0.14	0.19	0.084
Court by age 18	0.11	0.16	0.057
Probation by age 18	0.078	0.12	0.039
Corrections by age 18	0.025	0.042	0.0095
<i>Age at first contact^a</i>			
First arrest age	15.9	15.7	16.3
First detention age	16.1	15.9	16.4
First probation age	15.8	15.7	15.9
First court age	15.6	15.5	15.7
First corrections age	16.0	16.1	15.6
Observations	1633	791	842

^a Age of first contact reported for youth with at least one contact by that type prior to age 18.

Table B-12. Cox proportional hazards regression for juvenile justice by age 18, males

	Arrest	Detention	Court	Probation	Corrections
	b/se	b/se	b/se	b/se	b/se
Trauma Q2	1.118 (0.24)	0.915 (0.23)	1.239 (0.32)	1.288 (0.38)	0.476 (0.27)
Trauma Q3	0.750 (0.17)	0.607* (0.15)	0.655 (0.18)	0.766 (0.24)	0.453 (0.24)
Trauma Q4	0.806 (0.22)	0.924 (0.25)	0.867 (0.26)	0.819 (0.29)	0.643 (0.37)
Hispanic	0.736 (0.23)	0.891 (0.28)	0.628 (0.23)	0.662 (0.29)	2.491 (1.46)
Other race	0.848 (0.40)	0.734 (0.44)	0.202 (0.20)	0.281 (0.29)	0.000 (0.00)
White	0.421* (0.18)	0.644 (0.26)	0.570 (0.25)	0.400 (0.24)	0.403 (0.43)
Age at CANS assessment	0.871*** (0.03)	1.016 (0.04)	0.896* (0.04)	0.883* (0.05)	0.841 (0.09)
Urban Hardship Index (0-100)	1.003 (0.00)	1.003 (0.00)	0.997 (0.00)	0.996 (0.00)	0.995 (0.01)
Total out-of-home placements	1.032*** (0.01)	1.077*** (0.01)	1.043*** (0.01)	1.034** (0.01)	1.049*** (0.01)
Age of first placement	1.055** (0.02)	1.054** (0.02)	1.069** (0.02)	1.066* (0.03)	1.051 (0.05)
Sexual abuse substantiated	0.731 (0.19)	0.563* (0.16)	0.650 (0.20)	0.477 (0.19)	0.613 (0.40)
Physical abuse substantiated	1.543* (0.26)	1.409 (0.26)	1.647* (0.33)	1.713* (0.40)	1.015 (0.45)
Neglect substantiated	0.919 (0.15)	0.775 (0.13)	0.827 (0.15)	0.873 (0.19)	0.958 (0.36)
Trauma stress symptoms (CANS)	0.875	0.823	1.086	1.220	0.646

	(0.17)	(0.16)	(0.22)	(0.28)	(0.30)
Risk behaviors (CANS)	0.957	2.300**	1.936*	2.982**	3.107
	(0.29)	(0.64)	(0.62)	(1.11)	(1.86)
Behavioral/emotional needs (CANS)	2.198*	1.541	1.900	1.022	1.757
	(0.79)	(0.55)	(0.75)	(0.47)	(1.37)
Strengths (CANS)	0.945	1.030	0.957	1.059	1.325
	(0.18)	(0.22)	(0.21)	(0.27)	(0.59)
Life domain functioning (CANS)	0.757	1.602	0.842	0.902	1.694
	(0.24)	(0.48)	(0.28)	(0.35)	(1.18)
Observations	791	791	791	791	791

Exponentiated coefficients

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Reference group for Trauma = Q1; race/ethnicity = Black/African American. Indicator variables for year of birth 1996-2002 are included but not shown in all models.

Table B-13. Cox proportional hazards regression for juvenile justice by age 18, females

	Arrest	Detention	Court	Probation	Corrections
	b/se	b/se	b/se	b/se	b/se
Trauma Q2	2.064*	1.028	1.491	1.647	---
	(0.58)	(0.38)	(0.63)	(0.84)	---
Trauma Q3	1.708	0.989	0.958	0.762	---
	(0.48)	(0.36)	(0.42)	(0.42)	---
Trauma Q4	1.123	0.901	0.406	0.436	---
	(0.38)	(0.36)	(0.23)	(0.28)	---
Hispanic	0.799	0.627	0.000	0.000	---
	(0.29)	(0.31)	(0.00)	(0.00)	---
Other race	0.540	0.216	0.897	0.000	---
	(0.55)	(0.26)	(0.97)	(0.00)	---
White	0.954	1.059	1.094	1.255	---
	(0.46)	(0.58)	(0.82)	(0.98)	---
Age at CANS assessment	0.968	0.985	0.945	0.953	---
	(0.04)	(0.06)	(0.07)	(0.08)	---

Urban Hardship Index (0-100)	1.006 (0.00)	0.993 (0.00)	1.013 (0.01)	1.006 (0.01)	---
Total out-of-home placements	1.042*** (0.01)	1.041*** (0.01)	1.048*** (0.01)	1.035** (0.01)	---
Age of first placement	0.969 (0.02)	1.008 (0.03)	1.003 (0.03)	1.003 (0.04)	---
Sexual abuse substantiated	0.848 (0.21)	0.996 (0.32)	0.970 (0.38)	1.034 (0.50)	---
Physical abuse substantiated	1.120 (0.22)	0.675 (0.18)	0.851 (0.27)	1.229 (0.47)	---
Neglect substantiated	1.347 (0.28)	0.813 (0.21)	1.454 (0.48)	1.728 (0.72)	---
Trauma stress symptoms (CANS)	0.651 (0.17)	0.489* (0.15)	1.138 (0.42)	0.981 (0.43)	---
Risk behaviors (CANS)	0.671 (0.27)	2.554* (1.21)	1.490 (0.88)	0.997 (0.73)	---
Behavioral/emotional needs (CANS)	3.326** (1.47)	1.589 (0.87)	3.498* (2.20)	2.463 (1.86)	---
Strengths (CANS)	1.491 (0.38)	0.751 (0.25)	1.565 (0.63)	1.791 (0.90)	---
Life domain functioning (CANS)	0.810 (0.29)	2.764* (1.20)	0.560 (0.32)	1.313 (0.88)	---
Observations	842	842	842	842	

Exponentiated coefficients

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Corrections is too rare an outcome among females to generate meaningful regression estimates.

Reference group for Trauma = Q1; race/ethnicity = Black/African American. Indicator variables for year of birth 1996-2002 are included but not shown in all models.

Table B-14. Cox proportional hazards regression for juvenile justice by age 18, trauma items, males

	Arrest	Detention	Court	Probation	Corrections
	b/se	b/se	b/se	b/se	b/se
Trauma: Sexual abuse	0.969 (0.12)	0.889 (0.11)	1.163 (0.14)	1.149 (0.16)	0.732 (0.21)
Trauma: Physical abuse	0.953 (0.10)	0.924 (0.11)	0.999 (0.12)	0.996 (0.14)	0.853 (0.24)
Trauma: Emotional abuse	1.020 (0.12)	1.082 (0.13)	0.908 (0.12)	0.944 (0.15)	1.025 (0.30)
Trauma: Neglect	0.970 (0.09)	0.939 (0.10)	1.016 (0.11)	1.134 (0.14)	0.726 (0.17)
Trauma: Medical trauma	0.921 (0.12)	0.922 (0.12)	0.919 (0.13)	0.904 (0.15)	0.572 (0.22)
Trauma: Family violence	0.884 (0.09)	0.824 (0.09)	0.871 (0.10)	0.794 (0.10)	0.841 (0.21)
Trauma: Community violence	1.015 (0.12)	1.061 (0.12)	1.164 (0.15)	1.080 (0.16)	1.252 (0.33)
Trauma: School violence	1.177 (0.18)	1.188 (0.18)	1.084 (0.18)	1.339 (0.24)	1.326 (0.40)
Trauma: Traumatic grief/separation	0.941 (0.10)	1.013 (0.11)	1.001 (0.12)	0.928 (0.13)	0.698 (0.18)
Trauma: Witness/victim to crime	0.966 (0.11)	1.129 (0.13)	0.922 (0.12)	0.825 (0.13)	1.024 (0.28)
Hispanic	0.734 (0.23)	0.890 (0.28)	0.652 (0.24)	0.719 (0.31)	2.274 (1.39)
Other race	0.984 (0.48)	0.875 (0.53)	0.230 (0.23)	0.321 (0.33)	0.000 (0.00)
White	0.439 (0.19)	0.646 (0.27)	0.623 (0.28)	0.491 (0.30)	0.497 (0.55)
Age at CANS assessment	0.857*** (0.03)	0.993 (0.04)	0.881** (0.04)	0.865** (0.05)	0.821 (0.09)
Urban Hardship Index (0-100)	1.003 (0.00)	1.003 (0.00)	0.996 (0.00)	0.996 (0.00)	0.998 (0.01)

	Arrest	Detention	Court	Probation	Corrections
	b/se	b/se	b/se	b/se	b/se
Total out-of-home placements	1.031*** (0.01)	1.070*** (0.01)	1.043*** (0.01)	1.034** (0.01)	1.042* (0.02)
Age of first placement	1.059** (0.02)	1.049* (0.02)	1.077** (0.03)	1.082** (0.03)	1.021 (0.05)
Sexual abuse substantiated	0.749 (0.20)	0.702 (0.21)	0.599 (0.19)	0.427* (0.18)	1.101 (0.78)
Physical abuse substantiated	1.578* (0.29)	1.418 (0.27)	1.612* (0.34)	1.860* (0.45)	1.267 (0.59)
Neglect substantiated	0.919 (0.16)	0.803 (0.14)	0.827 (0.16)	0.802 (0.18)	0.882 (0.35)
Trauma stress symptoms (CANS)	0.924 (0.18)	0.862 (0.17)	1.131 (0.23)	1.314 (0.31)	0.809 (0.37)
Risk behaviors (CANS)	0.921 (0.29)	2.437** (0.71)	1.725 (0.58)	2.524* (0.99)	2.701 (1.87)
Behavioral/emotional needs (CANS)	2.242* (0.82)	1.552 (0.57)	1.999 (0.80)	1.060 (0.50)	1.598 (1.26)
Strengths (CANS)	0.935 (0.18)	1.032 (0.22)	0.931 (0.21)	0.991 (0.26)	1.733 (0.86)
Life domain functioning (CANS)	0.703 (0.23)	1.292 (0.41)	0.724 (0.26)	0.837 (0.34)	1.356 (1.01)
Observations	791	791	791	791	791

Exponentiated coefficients

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: All trauma items scored 0 – 3. Reference group for race/ethnicity = Black/African American. Indicator variables for year of birth 1996-2002 are included but not shown in all models.

Table B-15. Cox proportional hazards regression for juvenile justice by age 18, trauma items, females

	Arrest	Detention	Court	Probation	Corrections
	b/se	b/se	b/se	b/se	b/se
Trauma: Sexual abuse	0.923 (0.11)	1.024 (0.15)	0.936 (0.17)	0.723 (0.16)	---
Trauma: Physical abuse	0.996 (0.13)	0.967 (0.18)	1.056 (0.22)	1.022 (0.27)	---
Trauma: Emotional abuse	1.128 (0.16)	1.026 (0.20)	1.171 (0.27)	1.488 (0.43)	---
Trauma: Neglect	0.784* (0.09)	0.846 (0.14)	0.733 (0.14)	0.766 (0.19)	---
Trauma: Medical trauma	0.966 (0.15)	1.062 (0.20)	0.770 (0.22)	0.561 (0.22)	---
Trauma: Family violence	0.942 (0.10)	0.879 (0.13)	0.569** (0.11)	0.523** (0.12)	---
Trauma: Community violence	1.281 (0.19)	1.074 (0.22)	1.737* (0.38)	2.067** (0.52)	---
Trauma: School violence	1.007 (0.21)	1.487 (0.35)	1.026 (0.31)	0.962 (0.33)	---
Trauma: Traumatic grief/separation	1.197 (0.15)	0.888 (0.15)	0.956 (0.19)	1.178 (0.29)	---
Trauma: Witness/victim to crime	1.004 (0.12)	1.151 (0.18)	1.078 (0.21)	1.023 (0.25)	---
Hispanic	0.741 (0.27)	0.643 (0.32)	0.000 (0.00)	0.000 (0.00)	---
Other race	0.468 (0.48)	0.264 (0.31)	1.214 (1.34)	0.000 (0.00)	---
White	0.950 (0.46)	1.170 (0.66)	1.357 (1.06)	1.293 (1.10)	---
Age at CANS assessment	0.955 (0.04)	0.979 (0.06)	0.907 (0.07)	0.909 (0.08)	---
Urban Hardship Index (0-100)	1.006 (0.00)	0.992 (0.00)	1.011 (0.01)	1.002 (0.01)	---

	Arrest	Detention	Court	Probation	Corrections
	b/se	b/se	b/se	b/se	b/se
Total out-of-home placements	1.044 ^{***} (0.01)	1.044 ^{***} (0.01)	1.051 ^{***} (0.01)	1.035 [*] (0.01)	---
Age of first placement	0.981 (0.02)	1.006 (0.03)	1.028 (0.04)	1.036 (0.04)	---
Sexual abuse substantiated	0.898 (0.24)	0.983 (0.33)	0.934 (0.41)	1.155 (0.62)	---
Physical abuse substantiated	1.152 (0.24)	0.736 (0.21)	0.930 (0.32)	1.478 (0.60)	---
Neglect substantiated	1.551 [*] (0.33)	0.902 (0.25)	1.669 (0.57)	1.879 (0.82)	---
Trauma stress symptoms (CANS)	0.664 (0.17)	0.473 [*] (0.16)	1.030 (0.41)	0.964 (0.46)	---
Risk behaviors (CANS)	0.647 (0.27)	1.970 (0.99)	1.123 (0.72)	1.056 (0.80)	---
Behavioral/emotional needs (CANS)	2.784 [*] (1.24)	1.738 (0.98)	3.135 (2.05)	1.709 (1.39)	---
Strengths (CANS)	1.547 (0.40)	0.723 (0.25)	1.560 (0.65)	1.625 (0.82)	---
Life domain functioning (CANS)	0.780 (0.30)	2.692 [*] (1.20)	0.475 (0.30)	1.048 (0.78)	---
Observations	842	842	842	842	

Exponentiated coefficients

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: All trauma items scored 0 – 3. Corrections is too rare an outcome among females to generate meaningful regression estimates. Reference group for Trauma = Q1; race/ethnicity = Black/African American. Indicator variables for year of birth 1996-2002 are included but not shown in all models.

APPENDIX C. ILLINOIS CANS MANUAL