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High cost child welfare cases: Child characteristics and child welfare services☆

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ABSTRACT

The IV-E Waivers and Family First Prevention Services Act prioritize prevention services, including services that reduce out-of-home placements. Placement in out-of-home care is associated with a variety of adverse outcomes as well as high costs to society. Studies that focus on utilization of health services suggest that these costs are not evenly distributed among recipients, and that high utilizers make up a small percentage of individuals who utilize a disproportionate share of resources. The purpose of the paper is to examine child characteristics and child welfare services associated with high welfare costs, defined as the top decile of child welfare costs. Results indicate that older age of child, child sexual abuse and/or neglect, and inability of parent to provide care are associated with high child welfare costs. Parental substance abuse or domestic violence in the household are less common among children with high costs. High cost children are more likely to have serious behavioral problems perhaps reflecting the severity of these problems. Residential treatment and group home placements and services were also associated with having high costs.

1. Introduction

The IV-E Waivers and Family First Prevention Services Act (GovTrack.us, 2019) prioritize prevention services, including services that reduce out-of-home placements. Research has shown that placement in out-of-home care is associated with a variety of adverse outcomes for the child including increased risk for depression (Anderson, 2011), substance use (Traube, James, Zhang, & Landsverk, 2012), behavioral problems (Bellamy, 2008), increased risk of delinquent behaviors (Brown & Shillington, 2017), involvement in health-risk behaviors (Heneghan et al., 2015), poor physical health (Rienks, Phillips, McCrae, Bender, & Brown, 2017), and increased risk of criminal convictions in adulthood (Dregan & Gulliford, 2012). Negative outcomes associated with out-of-home placement are further exaggerated when combined with long length of stays (i.e., timely permanency is not achieved), congregate care placements, multiple placements, and reentry into care (Fawley-King & Snowden, 2012; Fisher, Mannering, Stoolmiller, Takahashi, & Chamberlain, 2011; Jones et al., 2011).

In addition, placement in out-of-home care is associated with high costs to society due to the substantial amount of resources required for various types of services, judiciary activities, and adult health care-related issues (Ferrara et al., 2015). The estimated economic burden of child maltreatment for the US population based on 2015 substantiated incident cases was $428 billion (Peterson, Florence, & Klevens, 2018), with direct expenditures on child welfare services of $29.9 billion in 2016 (Rosinsky & Williams, 2018). Out-of-home placements account for the largest share of child welfare expenditures, with out-of-home services accounting for 45% of all child welfare spending (Rosinsky & Williams, 2018).[1]

Studies on the utilization of health services have suggested, however, that the costs are not evenly distributed among recipients. Overall, these studies found that high utilizers make up a small percentage of individuals who utilize a disproportionate share of resources. For example, results of a study of primary care utilization indicated that the top 10% of patients accounted for 30–50% of all services (Morriss et al., 2012). Based on a sample of individuals who seek care in psychiatric emergency services, Pasic, Russo, and Roy-Byrne (2005) reported similar results. They found that almost a quarter of all visits were

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[1] Additional important service categories include adoption and guardianship (18%), child protective services (17%), and prevention services (15%) (Rosinsky & Williams, 2018).

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accounted for by individuals who use emergency services two or more times a year. Similarly, a study by Thackeray, Leonhart, Yackey, Cooper, and Kelleher (2016) that aimed to assess utilization of emergency care departments in a sample of adolescents living in group homes, found that over half of emergency department visits were attributed to one quarter of these youth. This information about high cost utilizers helps to understand the extent to which expenditures are driven by high utilizing populations, and has led to a wide variety of interventions designed to reduce healthcare use that is avoidable or modifiable and improve quality of care (Agency for Healthcare Research and Quality, 2019).

Further support for these findings comes from studies of the child welfare population. Children in family foster care accounted for 41% of all users of child mental health services in the California Medi-Cal system while representing only 4% of the eligible population (Halfon, Berkowitz, & Klee, 1992). In addition, the top 10% of mental health service users accounted for 83% of mental health costs (Rubin et al., 2004). Although dramatic changes in costs for services occurred over time, recent analyses focusing on Medicaid services received by children in the child welfare system indicated that children in out-of-home care remain the highest utilizers of these services (Yampolskaya et al., 2016).

In light of the findings for healthcare utilization, it seems reasonable to expect that a similar trend will be observed for utilization of child welfare services. To date, however, research has mostly focused on health services. But as costs associated with child welfare involvement have increased, a considerable interest has grown in the trends of child welfare service use. Thus, one of the goals of the current investigation is to explore whether a small proportion of children account for a sizable proportion of child welfare costs. To further our understanding of cost allocation among child welfare involved families, the present study also aimed to identify factors that contribute to high utilization of child welfare services. Examination of predictors for high service utilization allows for identifying specific child welfare services, and specific child and family characteristics that might differentiate between high utilizers of child welfare services and average users. For the purpose of this study, high utilizers are defined as those children with total costs in the top decile of child welfare costs. Health care research often uses costs to indicate high utilization because it incorporates several aspects of care. This paper takes a similar approach by examining several questions related to high cost child welfare cases.

Differences in child welfare costs may come about due to differences in the length of care and differences in the intensity of services. A variety of risk factors have been identified for increased length of stay in out-of-home care. Previous research has shown that child demographic characteristics were associated with longer stay in out-of-home care. For example, a study by Whitaker (2011) reported that older children and children who were Hispanic/Latino were less likely to exit out-of-home care and more likely to have longer stays compared to White/Caucasian children. Similarly, a study by Harris and Courtney (2003) demonstrated that children who are African-American have longer lengths of stay than children of other race/ethnicities.

Several studies found that parental substance abuse was associated with longer out-of-home stay. Their findings indicated that children of substance abusing parents are more likely to enter out-of-home care and remain in care longer and children removed due to any parental drug use stay in foster care for an average of 49–156 days longer than their peers (Akin, Brook, & Lloyd, 2015; Barth, Gibbons, & Guo, 2006; Lloyd & Akin, 2014; USDHHS, 2017). In addition, it was shown that children with the removal reason of other parental incapability (e.g., parental mental illness or developmental disability) were less likely to exit out-of-home care by the end of the study compared to children without this removal reason (Whitaker, 2011). Similarly, studies have shown that youth with a mental health diagnosis spent longer time in out-of-home care (Glisson, Bailey, & Post, 2000; Kemp & Bodonyi, 2002).

Another important predictor for longer stays in out-of-home care was initial placement in congregate care. Studies indicate that initial placement in congregate care settings was associated with longer stays in out-of-home care, a substantial decrease in the likelihood of permanence and particularly decreased the likelihood of permanence for African American youths (Lee, Bright, Svoboda, Fakunmoju, & Barth, 2011; Park & Ryan, 2009; Whitaker, 2011). Finally, a study by James, Zhang, and Landsverk (2012) found that chronic health problems and a greater number of placements were associated with longer stays in out-of-home care.

Receipt of intensive behavioral health treatment services, such as inpatient or residential treatment care, is another factor that could contribute to high service costs. Therefore, gaining a better understanding of the factors associated with utilization of this type of out-of-home care will help to further explain differences in child welfare expenditures. A number of studies have examined the predictors of entry into intensive or restrictive settings among foster care youth. In general, behavioral problems were linked to entering intensive, restrictive and residential care programs. Specifically, it has been shown that higher rates of externalizing problems, presence of clinically significant behavior problems, and psychiatric diagnoses of psychotic disorders, adjustment disorders, and behavior problems predict admission to intensive or residential care settings (James, Landsverk, Leslie, Slymen, & Zhang, 2008; Persi & Sisson, 2008; Pottick, Hansell, Gutterman, & White, 1995). In addition, several other youth characteristics, such as older age, male gender, previous hospitalization, number of placements prior to entry into an intensive or restrictive setting were significantly associated with residential or inpatient care (Farmer, Mustillo, Burns, & Holden, 2008; Griffith et al., 2009; James et al., 2006). Finally, a study by Griffith et al. (2009) suggested that youth who came from families with high levels of risks and low levels of parenting skills were more likely to enter residential care.

The studies presented above are meant to highlight the growing interest in the receipt of intensive child welfare services and to identify factors associated with more costly service provision. No previous studies, however, have examined the proportion of total child welfare costs used by high utilizers, and factors associated with a child becoming a high utilizer of child welfare services. The current investigation was intended to fill the identified gap in the literature by exploring the distribution of child-level costs among children entering out-of-home care during a specific fiscal year and by examining factors associated with receipt of the high intensity of services. Identifying characteristics of children and parents who are at risk for having high child welfare costs will be critical to the development of successful prevention, early intervention and targeted interventions and therefore to reduction of costs.

2. Method

2.1. Data sources

The primary data source is the Florida Safe Families Network (FSFN), which is the Florida Statewide Automated Child Welfare Information System (SACWIS). Child level cost data and case data were available from SFY 13-14 through SFY 16-17. For each child, cost data are available for each service received, and included child demographic characteristics, fiscal agency (typically the child welfare agency), service dates, service category, and payment. Child case data included the date of placement in out-of-home care, reasons for removal, placement type, child health problems, discharge reasons, and dates of discharge.

Although various research questions related to costs can be answered using FSFN child level data, these data do not include information about dependency case management or prevention services. Dependency case management costs, while substantial, would be difficult to attribute to specific children. Prevention services, while an important component of overall child welfare expenditures, are expected to comprise a smaller proportion of costs for children that

receive out-of-home care. Among children that receive prevention services prior to entering out-of-home care, the costs associated with out-of-home care would likely comprise the majority of total costs associated with the child.

3. Measures

Child demographic characteristics. Characteristics included gender, age at the time of entry into out-of-home care, and race/ethnicity, which was categorized into Non-Hispanic White, African American, Hispanic, and Other.

Child physical health problems. Child's health status was measured by three variables: (a) presence of any severe emotional problems, (b) presence of any serious physical health problems, and (c) the need for special care for chronic physical or mental health conditions (National Data Archive on Child Abuse and Neglect, n.d.). Each health status variable was coded as 1 if the records indicated that the child had the specified health problem and 0 if not.

Household characteristics. These characteristics include family structure, domestic violence and parental substance use.

Family structure. Family structure refers to the structure of a family from which the child was removed or a family at time of first placement. Three types of family structure were examined: (a) two-parent family, (b) female single-parent family, and (c) male single-parent family. A categorical variable was created identifying each family structure. The child was considered to have a two-parent family regardless of whether both caregivers were biological parents and regardless of caregivers' marital status.

Domestic violence. Domestic violence was defined as a situation when any violence (e.g., violence among family members) threatened the child's safety. The presence of domestic violence as a primary reason for service is determined by the protective investigator as a result of the child protection investigation. This specific reason for service is included in the subcategory threatened harm and is considered a type of child maltreatment.

Parental substance abuse problems. The presence of substance abuse problems was defined as the parent either having a substance abuse-related diagnosis or receiving substance abuse services. This information is routinely obtained as a part of child protection investigation and entered in the data set by a caseworker.

Reasons for service. Reasons for service or reasons for child's placement in out-of-home care were determined by the child protection investigator as a result of the child protection investigation. They included (a) physical abuse, (b) sexual abuse, (c) neglect, (d) threatened harm, (e) parental substance use, (f) domestic violence, (g) child behavioral problems, and (h) caregiver loss. Child behavioral problems is defined as serious behavioral problems that couldn't be managed by the caregivers and that resulted in the child's placement in out-of-home care. This variable indicates that child behavioral problems is the primary reason for placement. Caregiver loss that resulted in an absence of care indicates the caregiver is not available, for example, due to death or incarceration. While not technically maltreatment, the lack of a caregiver requires intervention by the State.

Placement Types. For each child placed in out-of-home care, the FSFN placement module includes data on each placement, including the type of placement (licensed foster family care, relative/kinship care, group home care, residential treatment center, and correctional placements), the dates of the placement, and the reason the placement ended. In addition, the cost data included expenditures for placements in out of home mental health treatment settings including Statewide Inpatient Psychiatric Program, Specialized Therapeutic Group Home care, and Specialized Therapeutic Foster Care settings.

Other child welfare services. Other child welfare services reported in the cost data include adoption services, aftercare/transition, human trafficking, clothing, Extended Foster Care, education, health care, shelter care, travel/mileage, and other). Human trafficking services are specialized services provided to children where the type of maltreatment is either human trafficking for commercial sexual exploitation or child labor. Extended foster care enables young adults who are in licensed foster care when they turn 18 to continue to receive child welfare services until the age of 21. To remain eligible for services, young adults must be in an educational program (high school, working towards a GED, vocational education, or college), working at least 80 h of month, or have a disability that prevents such activities. Education services include scholarships such as Education and Training Vouchers (ETV) and the Postsecondary Education Services and Support (PESS) program. Shelter care is typically a temporary emergency placement that occurs prior to judicial proceedings to determine whether maltreatment has occurred.

Analytic methods. In order to examine child characteristics, an entry cohort of children who entered out-of-home child welfare services in SFY 13-14 was examined.[2] Total costs were computed for each child in the cohort starting on the removal date and ending on June 30, 2017. Total costs include all child welfare costs accrued over the entire four-year period. Thus, total costs included the out-of-home episode starting in SFY 13-14, and for youth who exited and re-entered out-of-home care, total costs also included costs associated with any future episodes. Children in the top decile of costs were classified as high cost. We used four years of data to focus on children who are high cost over time as opposed to a shorter period of time such as six months or a year.

The characteristics of children in the top decile of expenditures for the four years were compared to the remaining 90% of children. Logistic regression was used to examine characteristics associated with being a high cost case:

$$Highcost_i = Xi \cdot \beta + Zi \cdot \alpha + u_i \quad (1)$$

where *High cost* denotes whether the child was in the top decile of costs, i denoted individuals, and u_i was the error term. The variables in X included child characteristics (age, gender, race, physical health problems), with age measured as a continuous variable, gender as a dichotomous variable (female with male as the reference group), race is a categorical variable (white, black, with other as the reference group), and physical health problems is a dichotomous variable denoting the child has physical health problems. Family characteristics include a categorical variable denoting family structure (single parent-female, single parent-male with two parent family as the reference group), and a vector of maltreatment types each measured as a dichotomous variable (sexual abuse, physical abuse, neglect, caregiver loss, threatened harm, child behavioral problems, parental substance abuse, domestic violence). The variables in Z included placements while receiving child welfare services, each measured as a dichotomous variable (corrections, residential treatment centers, licensed foster family care, kinship care, group homes, SIPP/STGH, and STFC) and 8 additional child welfare service variables (adoption, aftercare/transition, human trafficking, extended foster care, education, health care, shelter care, and travel/mileage). In addition, the regression included a variable denoting the total number of days in out-of-home care from SFY 2013/14 through 2016/17. With the exception of total days in care, each variable was converted into a dichotomous variable denoting whether the child received the service.

4. Results

Children at the 90th percentile had costs of $51,628. Children with costs above $51,628 were classified as high cost, while children below

[2] All children in the study entered out-of-home care during SFY 13–14. Children may enter out-of-home care upon the initial investigation by child protective services or may enter out-of-home care after receiving in-home prevention services. In both cases, this study examines costs starting with the date of removal from the home.

Table 1
Child characteristics.

	Lower cost (n = 7,983) %/mean	High cost (n = 887) %/mean
Total cost	9810	93,170
Males	50.2%	51.5%
Age	5.6	12.3
White	66.8%	54.6%
Black	37.6%	48.8%
Physical health problems	0.8%	3.0%
Single parent - Female	52.3%	51.8%
Single parent - Male	4.0%	9.8%
Two parent family	44.3%	40.4%
Reasons for service		
Parental substance abuse	44.1%	17.4%
Domestic violence	15.0%	6.5%
Sexual abuse	3.6%	8.2%
Physical abuse	14.4%	16.0%
Neglect	42.3%	43.1%
Caregiver loss	23.8%	42.5%
Child behavioral problems	3.5%	14.3%
Threatened harm	1.2%	1.2%

Note. Data Source: DCF Office of Child Welfare and DCF Office of CBC/ME Financial Accountability.

$51,628 were classified as lower cost.

Child and household characteristics for high and lower cost children are provided in Table 1. Children in the top decile of costs had average costs of $93,170 compared to average costs of $9810 for the other 90% of children. Thus, among children with total costs above $51,628, the average cost was $93,170. Total costs for the top 10% were $82,641,790, while total costs for the lower 90% were $78,313,230. Thus, the top 10% of children accounted for 52% of the $160 million in total costs. Children with high costs were older with an average age of 12.3 years compared to 5.6 years for other children. A greater percentage of children who were Black were in the high cost group compared to Whites. Thirty-eight percent of the lower cost group was Black compared to 48.8% of the high cost group. A smaller percentage of children with parental drug abuse and domestic violence in the household were in the high cost group. Over 40% of the low cost group involved parental substance abuse compared to 17.4% of the high cost group. A greater percentage of children who were victims of sexual abuse or a caregiver loss (e.g., due to parent incarceration, death, abandonment of child, or relinquishment of custody) were in the high cost group. A greater percentage of children with reported behavioral problems were in the high cost group. Children with behavioral problems comprised 14.3% of the high cost group and 3.5% of the low cost group.

Table 2 contains the total cost for each service type. High cost children were more likely to receive group home care with group home care costs accounting for 68.5% of total costs for high cost cases. In contrast, foster family care comprised 55.0% of total costs for lower cost children. However, the distinction between high cost and lower cost children is not simply a group home care versus foster family care question. Twenty percent of lower cost children received some group home care services and 62% of high cost children received some foster care services. High cost children were also more likely to receive out-of-home mental health treatment (Statewide Inpatient Psychiatric Program, Specialized Therapeutic Group home care, or Specialized Therapeutic Foster Care). The costs for out-of-home mental health care are typically the responsibility of the Medicaid program. Thus, the total costs for these services are only a portion of the total cost of out-of-home mental health care. Consistent with the older age of high cost cases, they were more likely to receive Extended Foster Care services (21.5% of high cost children versus 2.1% of other children). Finally high cost children were much less likely to have expenditures related to adoption services (17.3% of high cost children versus 40.0% of other children).

Table 3 contains the logistic regression results examining the relationship between child characteristics and services and the likelihood of being a high cost case. Older children (OR 1.12, 95% CI: 1.09–1.15), who were Black (OR 1.55, 95% CI: 1.03–2.32), and had physical health problems (OR 2.24, 95% CI: 1.22–4.20) were more likely to be high cost cases. Parental substance abuse lowered the likelihood of a high cost case (OR 0.60, 95% CI: 0.47–0.76). None of the reasons for child welfare services remained significantly associated with being a high cost case. Among the child welfare placements, child placement in residential treatment centers (OR 1.43, 95% CI: 1.02–2.01), out-of-home placements in SIPPs or STGHs (OR 4.25, 95% CI: 2.39–7.56), and group homes (OR 6.97, 95% CI: 5.32–9.15) increased the likelihood of high costs, while licensed foster family care (OR 0.45, 95% CI: 0.36–0.56) and kinship care (OR 0.35, 95% CI: 0.28–0.42) placements had a lower likelihood of high costs. Children in out-of-home care for longer were also more likely to be a high cost case (OR 1.30, 95% CI: 1.26–1.34). Consistent with the older age of high cost children, the receipt of Extended Foster Care services (OR 1.64, 95% CI: 1.20–2.24), educational (OR 2.25, 95% CI: 1.47–3.43), and shelter (OR 1.70, 95% CI: 1.39–2.08) services increased the likelihood of being a high cost case, while adoption services (OR 0.69, 95% CI: 0.55–0.87) were associated with a lower likelihood of being a high cost case.

5. Discussion

This paper examined child-level data on costs as reported by fiscal agencies, and examined the relationship between specific child and

Table 2
Child welfare services.

	Lower cost (n = 7.983)			High cost (n = 887)		
	# children	# services	total cost ($)	# children	# services	total cost ($)
Adoption	3195	24,537	4,071,181	154	2614	738,369
After/Trans	55	210	70,648	41	155	74,075
Chance-Traf	26	363	130,619	20	265	147,107
Clothing	4747	12,369	1,880,740	831	2901	547,373
EFC	169	4836	1,138,554	191	4947	1,400,847
Education	69	1062	928,718	91	1348	1,186,741
Foster care	5767	128,332	43,101,243	522	17,976	10,792,220
Group home	1601	18,571	21,157,720	771	25,545	56,627,529
Health care	180	444	165,773	30	247	658,555
Other	652	1674	380,795	32	193	178,765
SIPP/STGH	24	157	279,288	56	665	1,157,280
STFC	87	857	338,064	36	489	205,772
Shelter	766	3172	4,596,459	397	4089	8,918,039
Travel/mile	150	1146	77,276	< 10	58	9415

Table 3
Logistic regression results: Relationship between child welfare services and high cost cases.

	β	Wald $\chi^2_{(1)}$	OR	95% CI
Child characteristics				
Female	−0.0054	0.013	0.99	[0.82, 1.19]
Age	0.1123	78.6	1.12	[1.09, 1.15]*
White	0.1964	0.884	1.22	[0.81, 1.83]
Black	0.4361	4.48	1.55	[1.03, 2.32]*
Physical health problems	0.8179	6.77	2.27	[1.22, 4.20]*
Parental characteristics				
Substance abuse	−0.5155	18.2	0.60	[0.47, 0.76]
Domestic violence	−0.1484	0.784	0.86	[0.62, 1.20]
Family structure (reference: two-parent family)				
Single parent - Female	0.106	0.499	1.11	[0.83, 1.49]
Single parent - Male	0.2739	1.39	1.32	[0.83, 2.07]
Reasons for service				
Sexual abuse	0.2185	1.42	1.24	[0.87, 1.78]
Physical abuse	0.2063	2.45	1.23	[0.95, 1.59]
Neglect	0.0781	0.651	1.08	[0.89, 1.31]
Caregiver loss	0.1386	1.67	1.15	[0.93, 1.42]
Child behavioral problems	−0.2266	2.13	0.80	[0.59, 1.08]
Threatened harm	−0.3634	0.741	0.70	[0.30, 1.59]
Placements				
Corrections	0.1451	0.984	1.16	[0.87, 1.54]
Residential treatment center	0.3604	4.35	1.43	[1.02, 2.01]*
Licensed care	−0.7975	52.3	0.45	[0.36, 0.56]*
Kinship care	−1.064	101.6	0.35	[0.28, 0.42]*
Group home	1.942	197.0	6.97	[5.32, 9.15]*
SIPP/STGH	1.447	24.3	4.25	[2.39, 7.56]*
STFC	0.3091	1.35	1.36	[0.81, 2.30]
Total days in care/100	0.2603	318.3	1.30	[1.26, 1.34]*
Other child welfare services				
Adoption services	−0.3736	9.90	0.69	[0.55, 0.87]*
Aftercare/transition	−0.3078	1.40	0.74	[0.44, 1.22]
Chance-Human trafficking	0.5342	2.13	1.71	[0.83, 3.49]
Extended Foster Care	0.4934	9.68	1.64	[1.20, 2.24]*
Education	0.8098	14.0	2.25	[1.47, 3.43]*
Health care	0.5186	3.33	1.68	[0.96, 2.93]
Shelter	0.5289	26.3	1.70	[1.39, 2.08]*
Travel/mileage	0.0248	0.003	1.03	[0.39, 2.71]

Notes: * denotes significance at the $p < .05$ level.

parent characteristics and the likelihood of a child being a high cost case. Overall, a high cost child tends to be older, more likely to be a victim of sexual abuse and/or neglect, or with parents that are not able to provide care. The findings for child age are consistent with Whitaker (2011), who found that older children were less likely to experience timely discharge from out-of-home care and more likely to have longer stays. However, parental substance abuse or domestic violence in the household is less common among children with high costs. This finding was somewhat unexpected given that several studies found that parental substance abuse was associated with longer out-of-home stay (Akin et al., 2015; Barth et al., 2006; Lloyd & Akin, 2014; USDHHS, 2017). High cost children are more likely to have physical health problems and serious behavioral problems perhaps reflecting the severity of the severity of these problems. Children with behavioral problems, particularly in cases where the parent has abandoned the child or relinquished custody, may be challenging to place in a permanent placement. In addition, some children require intensive residential placements and thus have higher child welfare costs. These findings are consistent with previous studies that found chronic health problems (James et al., 2012) and mental health diagnosis (Glisson et al., 2000; Kemp & Bodonyi, 2002) were associated with a longer time in out-of-home care.

Thus, overall we find that high cost children tend to spend longer time in care, although the higher costs are not solely due to length in care. High cost children are more likely to be in child welfare due to a caregiver loss. The challenge of a caregiver loss may be further compounded when relatives are unavailable, as evidenced by the low use of kinship care among high cost children. High cost children appear to have greater needs as evidenced by a higher rate of physical and behavioral problems. Consequently, high cost children spend more time in group home care, out-of-home mental health placements, and correctional placements. The greater severity is also evidenced by a lower rate of adoptions, although their older age may also influence the likelihood of adoption. Such findings are consistent with studies that found placement in congregate care settings was associated with longer stays in out-of-home care, and a substantial decrease in the likelihood of permanence (Lee et al., 2011; Park & Ryan, 2009; Whitaker, 2011).

The higher rate of Extended Foster Care and Educational services among children with high costs may have very different implications. Young adults using extended foster care may face substantive behavioral and health challenges that limit their ability to transition out of the child welfare system. The existence of extended foster care and educational services may be important in this transition process. Children who enter the child welfare system when they are older may particularly benefit from these programs. On the other hand, extended foster care may simply delay the inevitable if programs and services do not enable the young adult to effectively transition into independence.

Given the high cost for children with complex needs, the question becomes whether new programs could be developed that provide parents with the needed services and supports to maintain the child in the home. For example, caregiver loss was associated with a higher probability of being a high cost case when services were not accounted for in the regression. However, caregiver loss was not associated with the likelihood of being a high cost case when accounting for child welfare services. Thus, children who enter out-of-home care due to loss of a caregiver typically receive services that are associated with a higher

risk of being a high cost case. The development of interventions specific to children without available caregivers with the goal of enabling them to leave the child welfare system might be beneficial. Children in group home care are at higher risk for being high cost cases. To some degree, this may reflect a resource issue such as a lack of qualified foster homes. In other cases, children may be placed in group homes when foster home placement is challenging, for example due to physical health problems. An enhanced foster care placement may be an option for such youth. Foster parents would receive additional training and receive higher payments for caring for such youth.

As with any study using administrative data, there are several limitations to this analysis. First, the child welfare cost data are not complete. Dependency case management and prevention services are not captured in the child level data. A number of questions could be answered by additional research. First, this study focused exclusively on child welfare costs. Children in the child welfare system often receive services funded by the Medicaid program and/or juvenile justice. Studies that incorporate all costs associated with the child would be useful. Another question is whether the type and amount of child welfare services are associated with better outcomes (e.g., permanency, reunification, guardianship, and adoption) for high cost children in child welfare. This question is important, yet challenging to answer. It is necessary to examine youth that have similar needs. Services can differ for youth with similar needs due to a variety of factors including geographic location (urban versus rural) and availability of specific services.

Study Implications. Policy implications of this study are primarily related to its findings regarding the high cost group of children served in out-of-home. Study findings suggest that 10% of children care accounted for 52% of the total costs. Given concerns over substantial economic burden and well-being of these children, the results support the need for developing policies and interventions aiming at provision of services that address individual child needs. Therefore, an appropriate service delivery model focusing on children with high needs should be developed. In addition, child welfare system and mental health system should strengthen and intensify services and supports targeting this population of children. Considering that children in high cost groups are likely to experience child maltreatment and suffer from severe mental health issues, child protection agencies should collaborate with health care agencies, including mental health providers to enhance effective communication and to respond more effectively to the issues of children and their families who are involved in multiple systems. Given that caregiver loss makes a separate contribution to the probability of being in a high cost group, efforts should be made to expedite a permanent arrangement with a new caregiver for these children and provide caregiver training to help form bonds with the child. The study findings provide further empirical support for the need to increase investment in community-based interventions aimed at preventing child maltreatment.

Conclusions. The current research adds to the growing body of literature discussing disproportionate distribution of health care costs among recipients. This study confirms the trend indicating that among children placed in out-of-home care there are high utilizers who are a small percentage of youth utilizing a disproportionate share of resources. The results also suggest that to some degree, being a high utilizer of child welfare services is due to specific risk factors including sexual abuse, neglect, behavioral problems, and caregiver loss. As such, these findings bring researchers and practitioners closer to understanding what contributes to the consumption of the huge amount of resources and how to tailor prevention and intervention efforts.

CRediT authorship contribution statement

Svetlana Yampolskaya: Data curation, Writing - original draft, Formal analysis. **John Robst:** Conceptualization, Methodology, Formal analysis, Writing - original draft. **Mary I. Armstrong:** Funding acquisition, Writing - review & editing.

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.childyouth.2020.104853.

References

Agency for Healthcare Research and Quality (2019). Management of high-need, high-cost patients: A realist and systematic review. Washington, DC: Evidence-based Practice Center Systematic Review Protocol, Agency For Healthcare Research and Quality.

Akin, B. A., Brook, J., & Lloyd, M. H. (2015). Co-occurrence of parental substance abuse and child serious emotional disturbance: Understanding multiple pathways to improve child and family outcomes. *Child Welfare, 94*, 71.

Anderson, H. D. (2011). Suicide ideation, depressive symptoms, and out-of-home placement among youth in the U.S. child welfare system. *Journal of Clinical Child & Adolescent Psychology, 40*, 790–796.

Barth, R. P., Gibbons, C., & Guo, S. (2006). Substance abuse treatment and the recurrence of maltreatment among caregivers with children living at home: A propensity score analysis. *Journal of Substance Abuse Treatment, 30*, 93–104.

Bellamy, J. L. (2008). Behavioral problems following reunification of children in long-term foster care. *Children and Youth Services Review, 30*, 216–228.

Brown, S. M., & Shillington, A. M. (2017). Childhood adversity and the risk of substance use and delinquency: The role of protective adult relationships. *Child Abuse & Neglect, 63*, 211–221.

Dregan, A., & Gulliford, M. C. (2012). Foster care, residential care and public care placement patterns are associated with adult life trajectories: Population-based cohort study. *Social Psychiatry and Psychiatric Epidemiology, 47*, 1517–1526.

Farmer, E. M., Mustillo, S., Burns, B. J., & Holden, E. W. (2008). Use and predictors of out-of-home placements within systems of care. *Journal of Emotional and Behavioral Disorders, 16*, 5–14.

Fawley-King, K., & Snowden, L. R. (2012). Relationship between placement change during foster care and utilization of emergency mental health services. *Children and Youth Services Review, 34*, 348–353.

Ferrara, P., Corsello, G., Basile, M. C., Nigri, L., Campanozzi, A., Ehrich, J., & Pettoello-Mantovani, M. (2015). The economic burden of child maltreatment in high income countries. *The Journal of Pediatrics, 167*, 1457–1459.

Fisher, P. A., Mannering, A. M., Stoolmiller, M., Takahashi, A., & Chamberlain, P. (2011). Foster placement disruptions associated with problem behavior: Mitigating a threshold effect. *Journal of Counseling and Clinical Psychology, 79*, 481–487.

Glisson, C., Bailey, J. W., & Post, J. A. (2000). Predicting the time children spend in state custody. *Social Service Review, 74*, 253–280.

GovTrack.us (2019). H.R. 253 — 115th Congress: Family First Prevention Services Act of 2017. Retrieved from https://www.govtrack.us/congress/bills/115/hr253.

Griffith, A. K., Ingram, S. D., Barth, R. P., Trout, A. L., Hurlkey, K. D., Thompson, R. W., & Epstein, M. H. (2009). The family characteristics of youth entering a residential care program. *Residential Treatment for Children & Youth, 26*, 135–150.

Halfon, N., Berkowitz, G., & Klee, L. (1992). Mental health service utilization by children in foster care in California. *Pediatrics, 89*, 1238–1244.

Harris, M. S., & Courtney, M. E. (2003). The interaction of race, ethnicity, and family structure with respect to the timing of family reunification. *Children and Youth Services Review, 25*, 409–429.

Heneghan, A., Stein, R. E., Hurlburt, M. S., Zhang, J., Rolls-Reutz, J., Kerker, B. D., ... Horwitz, S. M. (2015). *Journal of Adolescent Health, 56*, 508–514.

James, S., Leslie, L. K., Hurlburt, M. S., Slymen, D. J., Landsverk, J., Davis, I., ... Zhang, J. (2006). Children in out-of-home care: Entry into intensive or restrictive mental health and residential care placements. *Journal of Emotional and Behavioral Disorders, 14*, 196–208.

James, S., Landsverk, J., Leslie, L. K., Slymen, D. J., & Zhang, J. (2008). Entry into restrictive care settings: Placements of last resort? *Families in Society, 89*, 348–359.

James, S. S., Zhang, J. J., & Landsverk, J. (2012). Residential care for youth in the child welfare system: Stop-gap option or not? *Residential Treatment for Children & Youth, 29*, 48–65.

Jones, R., Everson-Hock, E. S., Papaioannou, D., Guillaume, L., Goyder, E., Chilcott, J., ... Swann, C. (2011). Factors associated with outcomes for looked-after children and young people: A correlates review of the literature. *Child: Care Health and Development, 37*, 613–622.

Kemp, S., & Bodonyi, J. (2002). Beyond termination: Length of stay and predictors of permanency for legally free children. *Child Welfare, 81*, 58–86.

Lee, B. R., Bright, C. L., Svoboda, D. V., Fakunmoju, S., & Barth, R. P. (2011). Outcomes of group home care for youth: A review of comparative studies. *Research on Social Work Practice, 21*, 177–189.

Lloyd, E. C., & Akin, B. A. (2014). The disparate impact of alcohol, methamphetamine, and other drugs on family reunification. *Children and Youth Services Review, 44*, 72–81.

Morriss, R., Kai, J., Atha, C., Avery, A., Bayes, S., Franklin, M., ... Yang, M. (2012). Persistent frequent attenders in primary care: Costs, reasons for attendance, organisation of care and potential for cognitive behavioural therapeutic intervention. *BMC Family Practice, 13*, 1–14.

Park, J. M., & Ryan, J. P. (2009). Placement and permanency outcomes for children in out-of-home care by prior inpatient mental health treatment. *Research on Social Work Practice, 19*, 42–51.

Pasic, J., Russo, J., & Roy-Byrne, P. (2005). High utilizers of psychiatric emergency services. *Psychiatric Services, 56*, 678–684.

Persi, J., & Sisson, M. (2008). Children in foster care: Before, during, and after psychiatric hospitalization. *Child Welfare, 87*, 79–99.

Peterson, C., Florence, C., & Klevens, J. (2018). The economic burden of child maltreatment in the United States, 2015. *Child Abuse and Neglect, 86*, 178–183.

Pottick, K., Hansell, S., Gutterman, E., & White, H. R. (1995). Factors associated with inpatient and outpatient treatment for children and adolescents with serious mental illness. *Journal of American Academy Child and Adolescent Psychiatry, 34*, 425–433.

Rienks, S., Phillips, J., McCrae, J., Bender, K., & Brown, S. (2017). Complex health concerns among child welfare populations and the benefit of pediatric medical homes. *Child Abuse & Neglect, 65*, 212–225.

Rosinsky, K., & Williams, S. C. (2018). Child welfare financing SFY 2016: A survey of federal, state, and local expenditures. Rep., Child Trends, Bethesda, MD.

Rubin, D., Alessandrini, E., Feudtner, C., Mandell, D., Localio, R., & Hadley, T. (2004). Placement stability and mental health costs of children in foster care. *Pediatrics, 113*, 1336–1341.

Thackeray, J., Leonhart, K., Yackey, K., Cooper, J., & Kelleher, K. (2016). Emergency department use for injuries by adolescents in foster care. *Children and Youth Services Review, 62*, 18–21.

Traube, D. E., James, S., Zhang, J., & Landsverk, J. (2012). A national study of risk and protective factors for substance use among youth in the child welfare system. *Addictive Behaviors, 37*, 641–650.

U.S. Department of Health & Human Service, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau (2017). Child Maltreatment 2015. Available from: https://www.acf.hhs.gov/cb/resource/child-maltreatment-2015.

Whitaker, T. (2011). Administrative case reviews: Improving outcomes for children in out-of-home care. *Children and Youth Services Review, 33*, 1683–1708.

Yampolskaya, S., McNeish, R., Cruz, A., Sowell, C., Teague, G., Hanson, A., & Levin, B. (2016). Access, integration of care, and service utilization for child welfare involved children in Florida's managed medical assistance (MMA) program. Tampa, FL: University of South Florida, College of Behavioral and Community Sciences, Child and Family Studies, Louis de la Parte Florida Mental Health Institute.