



Childhood Adversity and Behavioral Health Costs for Adolescents in Washington State

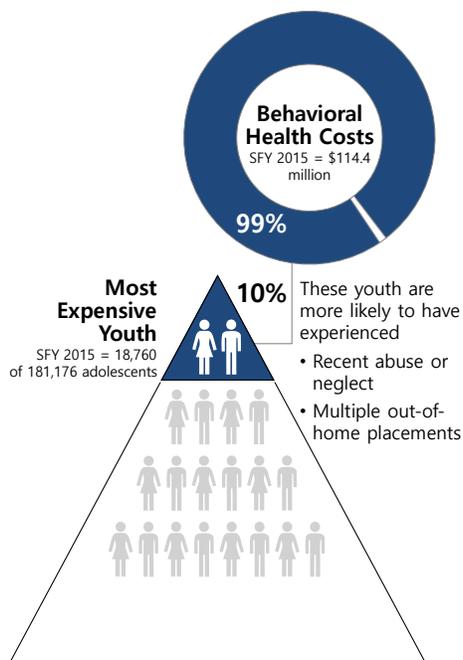
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Report to the DSHS Behavioral Health Administration, Division of Behavioral Health and Recovery

THIS RESEARCH BRIEF highlights results from a study examining the relationship between adverse experiences and healthcare costs of adolescents enrolled in Medicaid in Washington State. The brief focuses on findings about the association between adverse experiences and *behavioral health* service costs. RDA published a companion research brief that highlights findings about the association between childhood adversity and *medical* costs. Taken together, these two briefs highlight the relationship between childhood adversity and increased healthcare costs.¹

FIGURE 1.

Ten percent of youth account for 99 percent of behavioral health spending among adolescents



Key Findings

- Youth in the top 10 percent of the distribution of behavioral health costs accounted for 99 percent of all behavioral health costs among 12 to 17 year olds with Medicaid.** Most of the behavioral health costs for adolescents were driven by a small number of youth with very high costs since most adolescents on Medicaid did not use services provided by the behavioral health system (87 percent).
- Youth who experienced recent abuse or neglect had significantly higher behavioral health system utilization and costs compared to other youth.** Youth with these experiences were more likely to use behavioral health services, and when they did, the costs were much higher.
- Recent maltreatment and placement instability were associated with greater utilization and cost increases in the behavioral health system than other risk factors such as a having a parent with a mental illness or substance abuse problem.** Abuse and neglect stand out as particularly harmful and costly adverse childhood experiences (ACEs).

¹ For complete results, consult Patton DA, Liu Q, Adelson JD, Lucenko BA. Assessing the social determinants of health care costs for Medicaid-enrolled adolescents in Washington State using administrative data. *Health Serv Res.* 2018;00:1–12. <https://doi.org/10.1111/1475-6773.13052>

Data and Methodology

We identified all young people aged 12 to 17 who were enrolled in Medicaid for at least one month in State Fiscal Year (SFY) 2015 (N = 233,054). From this population, we selected youth who had at least one parent identified in the ICDB (N = 181,176). The population with at least one parent identified comprised our cohort for this analysis because we wanted to include both child experiences and parent risk factors in the model.

We identified each young person's behavioral health costs during SFY 2015. Our definition of behavioral health costs included the following service categories: crisis services, community hospital, evaluation and treatment, outpatient (non-crisis), Children's Long-term Inpatient Program (CLIP), state hospital, substance use disorder (SUD) treatment, and Behavioral Rehabilitation Services (BRS).

Of 181,176 youth in the cohort, 23,790 (13 percent) had incurred behavioral health costs according to our definition. These 23,790 adolescents had \$114.5 million in behavioral health costs in SFY 2015. The majority of costs (58 percent) were for Behavioral Health Organization services including crisis services, community hospital, evaluation and treatment, and other outpatient. Twenty-two percent of behavioral health costs were BRS costs, 10 percent were SUD treatment costs, and 9 percent were CLIP or state hospital.

FIGURE 2.

Distribution of Behavioral Health Costs



The total behavioral health costs served as our dependent variable in a series of regression models. Predictor variables in the models fell into four broad categories:

- Child and family demographics,
- Child social and health risk factors,
- Child maltreatment history, and
- Parent risk factors.

The purpose of this study was to assess how the child maltreatment history variables and parent risk factors were associated with costs, after controlling for the effects associated with demographic and social/health risk factors included in the model. The child maltreatment and parent risk factors included in this study (e.g. abuse, neglect, parent substance use, parent criminal justice involvement) were akin to factors defined as ACEs. A complete list of predictor variables and descriptive statistics for the study cohort are available in the Appendix.

The analysis consists of a two-stage regression model. The first stage uses logistic regression to identify risk factors associated with the likelihood of receiving any behavioral health service in the outcome year. The second stage uses ordinary least squares regression to identify risk factors associated with the costs of behavioral health services in the outcome year.

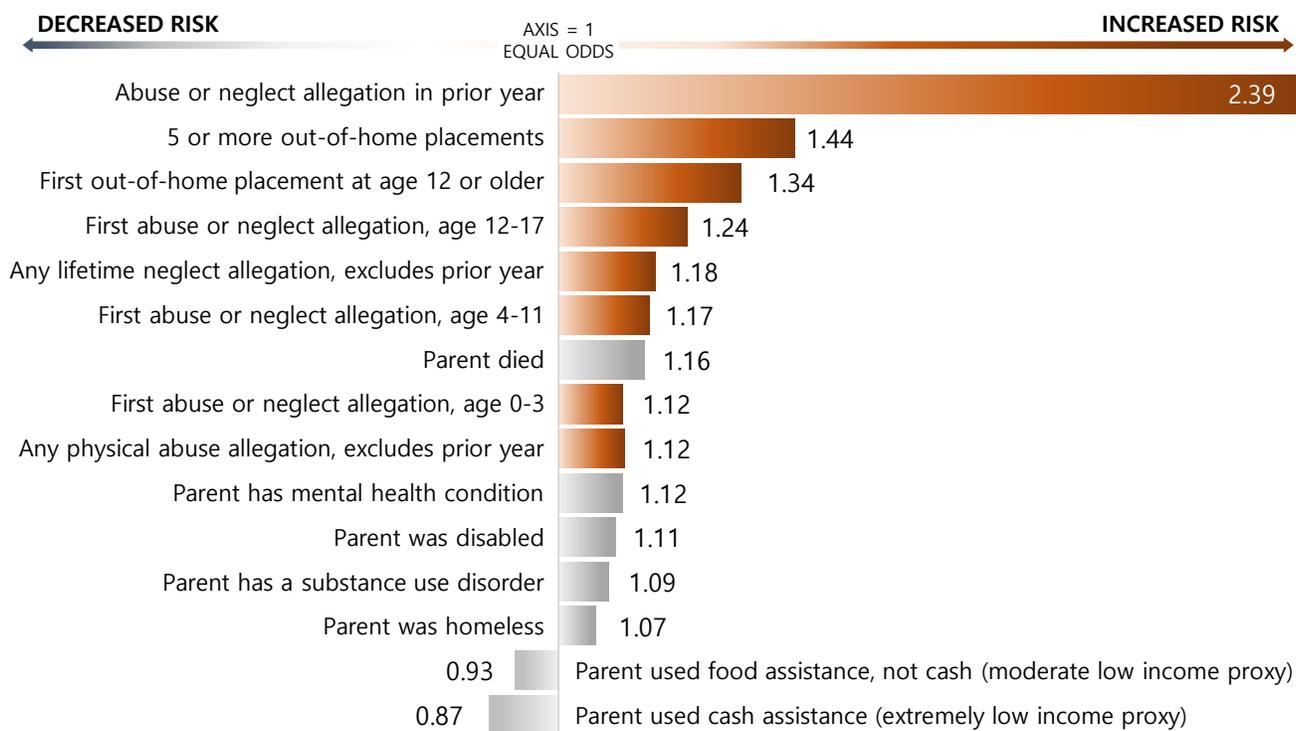
Findings: Child Adversity and Behavioral Health Utilization

In the first stage of the analysis, we assessed whether the predictor variables of interest were associated with greater likelihood of having any behavioral health costs. Because only 13 percent of the cohort accounted for all behavioral health costs, we modeled the factors associated with greater likelihood of being in the group that received any behavioral health services.

Figure 3 displays odds-ratios obtained from a logistic regression predicting any behavioral health costs among our cohort of youth. Odds-ratios greater than 1.0 denote a factor associated with increased odds of having any behavioral health costs, while odds-ratios less than 1.0 denote a factor associated with decreased odds of any costs. We display in Figure 3 below factors that were significant ($p < .05$) after controlling for demographics and other social and health risk factors, such as having a chronic condition, mental health diagnosis, or juvenile justice involvement. The factors highlighted in orange correspond to maltreatment experiences, while the factors in grey correspond to parental risk factors.

FIGURE 3.

Odds of Utilizing Any Behavioral Health Services



NOTES: 1. This chart shows a subset of factors in the model—those that were statistically significant at $p < 0.05$ only. 2. Bars shown in orange color represent maltreatment risk factors.

In general the maltreatment history variables had the largest odds-ratios, indicating that they increased the odds of an adolescent receiving behavioral health services the most. A recent abuse or neglect allegation more than doubled the odds of an adolescent receiving behavioral health services in the following year. Experiencing multiple (5 or more) out-of-home placements was associated with a 44 percent increase in the odds of receiving behavioral health services, while experiencing a first out-of-home placement in adolescence (no previous placements) increased the odds by 34 percent. Age of first abuse or neglect allegation variables demonstrated that a first abuse or neglect experience at any age increases likelihood of receiving behavioral health services as an adolescent, though having a first experience of maltreatment more recently was associated with greater increases.

While recent maltreatment allegations had the largest association with odds of utilization, two lifetime maltreatment measures were also significant: any lifetime neglect allegation, which increased odds by 18 percent and any lifetime physical abuse allegation, which increased odds by 12 percent. The contrast in the magnitude of impact of recent maltreatment and past maltreatment highlights the need for focused intervention with youth experiencing abuse or neglect in late childhood and adolescence.

Parental measures had more modest impacts on the likelihood of receiving behavioral health services, and the associations were more mixed. Adolescents whose parent had died, had mental health issues, a disability, substance use disorder, or who were homeless exhibited a greater likelihood of receiving behavioral health care, while those whose parents had used cash and food assistance had less likelihood of receiving care, when compared to other children with similar health backgrounds. The parent factors that were significant had a much smaller association with the odds of having behavioral health costs than the maltreatment factors. Of all the adversities which can impact adolescents over childhood, maltreatment was the most impactful on accessing behavioral health care.

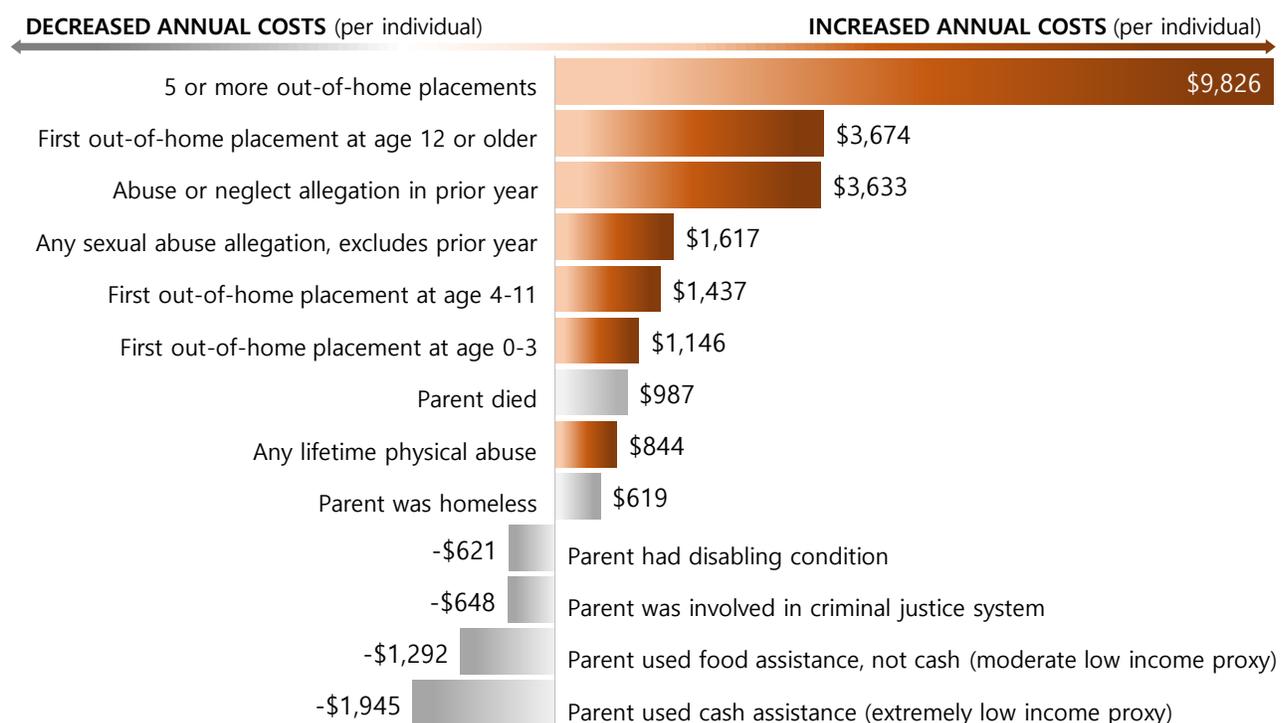
Findings: Child Adversity and Behavioral Health Costs

In the second analysis, we assessed whether the predictor variables were associated with greater costs in the behavioral health system for adolescents who had any costs in the year. This analysis focused on the 23,790 adolescents in the study cohort who received a behavioral health service in SFY 2015.

Figure 4 displays additional costs associated with each predictor variable, which come from an ordinary least squares regression predicting behavioral health costs. We highlight factors that were significant after controlling for demographics and other social and health risk factors, such as having a chronic condition, mental health diagnosis, or juvenile justice involvement. All factors in Figure 4 were found significant at the $p < .05$ level.

FIGURE 4.

Increases in Annual Behavioral Health Costs Per Individual Adolescent



As with the previous analysis, the maltreatment history variables top the list of factors that increase behavioral health costs. Severe placement instability (5 or more lifetime placements) was associated with \$9,826 in increased behavioral health costs over the outcome year, while a first time out-of-home placement (no previous placements) after age 12 and abuse or neglect allegation in the prior year were associated with increases of \$3,674 and \$3,633, respectively. The large magnitude of the estimate of the impact of 5 or more out-of-home placements is likely a combination of the causal impact of placement instability and unmeasured high behavioral health acuity that is common among children who are hard to place.

First placements occurring earlier in life were also associated with greater costs, but the magnitudes were somewhat lower (\$1,437 for a first placement between ages 4 and 11, and \$1,146 for a first placement between ages 0 and 3). While these findings indicate that recent out-of-home placements were associated with higher costs, placement experiences from earlier in childhood also appeared to have long-lasting impacts on behavioral health costs in adolescence. Two of the three lifetime maltreatment indicators were significant: any sexual abuse allegation, excluding the prior year, was associated with \$1,617 in increased behavioral health costs over the year and any allegation of physical abuse, excluding the prior year, was associated with \$844 in increased costs.

Parent risk factors had mixed associations with behavioral health costs. Parent death and homelessness were associated with increased behavioral health costs, while parent disability, criminal justice involvement, and food or cash assistance were associated with lower costs.² Of all the childhood adversities we could measure using administrative data, the child welfare-related experiences were associated with the largest increases in costs.

Discussion

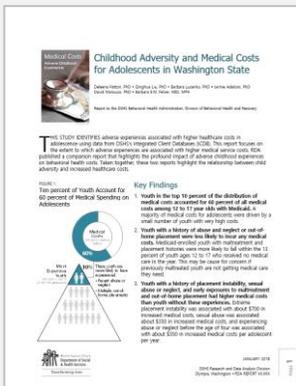
Multiple state agencies serve children and young people. With the passage of HB 1661 in 2017, the Department of Children, Youth, and Families (DCYF) was created to focus on the “safety, development, and well-being of children” through “prevention, early childhood development, and early intervention.” DCYF will absorb functions of the Department of Early Learning, Children’s Administration, and Juvenile Rehabilitation. At the same time, child behavioral health services will continue to be managed by DSHS Behavioral Health Administration, Division of Behavioral Health and Recovery, with a transfer of non-state hospital services to HCA planned for the future. We believe this policy brief can be informative to behavioral health programs, as well as to the vision of the new child-focused agency. These implications apply cross-system to all state agencies who serve children and youth. Key policy takeaways from this report include the following:

- **Young people may experience a number of adversities, but the experience of childhood maltreatment is by far the most impactful on behavioral health costs for adolescents.** While this research brief focuses on behavioral health costs, prior research has demonstrated that maltreatment increases costs across domains (e.g. health care, criminal justice, education, productivity, social service use). Maltreatment also leads to immeasurable personal costs to the youth who experience it. In designing prevention and intervention approaches, programs that reduce the incidence of abuse and neglect will have the greatest impact on behavioral health costs.
- **The impact of maltreatment on behavioral health costs occurs regardless of whether the child was subsequently placed in foster care.** In our analysis, maltreatment experiences, out-of-home

² While parent cash and food assistance were associated with less utilization and lower costs, we do not want to imply that low income is a protective factor for adolescents. Instead, this pattern of findings may indicate that lower income adolescents did not access the care they needed, given their level of risk and health history.

placement, and placement instability all had independent effects, meaning they increased costs with other factors held constant. Child-serving programs should consider the behavioral health needs and potential family interventions for all children who have reported abuse and neglect whether or not they enter dependency.

- **Not all vulnerable families will experience abuse and neglect.** In our sample of adolescents on Medicaid, 79 percent had at least one parent risk factor while 41 percent had experienced abuse or neglect within their lifetime. Within the population of families with adverse experiences, identifying those most at risk of abuse and neglect for targeted prevention work should be prioritized, given limited resources.
- **Interventions must be targeted across the age spectrum, including prevention, early intervention, and late intervention.** Recent maltreatment and out-of-home placements had the largest impacts on behavioral health utilization and costs in adolescence. Investments should be made in interventions that focus on behavioral health needs and resilience for abused or neglected youth at all ages. Interventions for youth experiencing maltreatment in late childhood and early adolescence will have large impacts on later behavioral health costs.



Childhood Adversity and Medical Costs for Adolescents in Washington State

PATTON, LIU, LUCENKO, ADELSON, MANCUSO, and FELVER

<https://www.dshs.wa.gov/ffa/research-and-data-analysis>

In this companion brief, RDA examined the impact of adverse experiences on medical costs. Key findings included:

- **Youth in the top 10 percent of the distribution of medical costs accounted for 60 percent of all medical costs among 12 to 17 year olds with Medicaid.** This was in contrast to behavioral health costs, where the top 99 percent of costs were accounted for by the top 10 percent. Behavioral health costs are much more concentrated among a few adolescents.
- **Youth with a history of abuse and neglect or out-of-home placement were less likely to incur any medical costs.** This may be cause for concern if previously maltreated youth are not getting medical care they need. In contrast, youth with maltreatment histories are more likely to receive behavioral health services.
- **Youth with a history of placement instability, sexual abuse or neglect, and early exposures to maltreatment and out-of-home placement had higher medical costs than youth without these experiences.** Extreme placement instability was associated with about \$700 in increased annual medical costs, sexual abuse was associated with about \$350 in increased annual medical costs, and recent abuse or neglect was associated with about \$450 in increased annual medical costs for each adolescent. Behavioral health costs increases were much larger in magnitude than medical costs increases, and taken together with costs increases in the medical system, point to the profound impact of maltreatment on later healthcare costs.

APPENDIX

TABLE 1.

Demographic Characteristics and Prevalence of Risk Factors within the Population

Demographic Characteristics	NUMBER	PERCENT
Total Number	181,176	100%
Gender		
Female	89,165	49.2%
Male	92,011	50.8%
Age		
Average (SD)	14.4 (1.7)	
Months of coverage in SFY2015		
Medicaid months (SD)	11.0 (2.5)	
Third party liability months (SD)	1.2 (3.4)	
Biological parents identified		
One	30,483	16.8%
Two	150,693	83.2%
Race or ethnicity		
Hispanic	52,820	29.2%
Non-Hispanic White	77,587	42.8%
Non-Hispanic Black	9,279	5.1%
Non-Hispanic Indian	3,119	1.7%
Non-Hispanic Asian	4,834	2.7%
Non-Hispanic Pacific Islander	2,031	1.1%
Multiple races (non-Hispanic)	27,239	15.0%
Unknown race	4,258	2.3%
Limited English proficiency (parent)	30,101	16.6%
Child Maltreatment History		
Maltreatment type		
Any abuse or neglect allegation	74,072	40.9%
Physical abuse allegation	31,343	17.3%
Sexual abuse allegation	12,536	6.9%
Neglect allegation	66,896	36.9%
Any out-of-home placement	15,862	8.8%
Number out-of-home placements (for ≥ 1 placement)		
1-2 placements	9,800	61.8%
Number out-of-home placements, continued		
3-5 placements	4,458	28.1%
6-8 placements	1,070	6.7%
9+ placements	534	3.4%
Age at first placement (for ≥ 1 placement)		
0-3	7,876	49.7%
4-11	6,270	39.5%
12+	1,716	10.8%

Child Social and Health Risk Factors		
Mental health condition	65,702	36.3%
Substance use disorder	10,388	5.7%
Arrest or conviction	6,387	3.5%
Has a biological child	1,872	1.0%
Pediatric Medical Complexity Algorithm		
Non-chronic	126,604	69.9%
Chronic non-complex	38,167	21.1%
Chronic complex	16,405	9.1%
Parent Risk Factors		
Domestic violence	30,224	16.7%
Low income		
Cash or food assistance (proxy for low income)	128,842	71.1%
Food assistance only (proxy for moderate low income)	80,990	44.7%
Cash assistance (proxy for extremely low income)	47,852	26.4%
Medical		
High medical risk score (CDPS)	42,049	23.2%
Disability	24,693	13.6%
Died	5,647	3.1%
Mental health condition	71,761	39.6%
Substance use disorder	44,142	24.4%
Arrest or conviction	57,737	31.9%
Homeless	41,417	22.9%
Number of parent risk factors (Adverse Childhood Experiences)		
0	38,472	21.2%
1-3	88,610	48.9%
4-6	43,442	24.0%
7+	10,652	5.9%

TECHNICAL NOTES

STUDY DESIGN AND OVERVIEW

This study examines the association between childhood experiences of adversity and behavioral health care utilization and costs.

STUDY POPULATION

The population for this report consists of 181,176 adolescents age 12 to 17 who were enrolled Medicaid in SFY 2015 and could be matched to at least one parent in the ICDB. For each adolescent, all behavioral health care costs in SFY 2015 were calculated using data in the ICDB. Two main analyses comprise the report

- 1) **Utilization of behavioral health services.** A logistic regression analysis was conducted on all 181,176 adolescents to identify the risk factors that are associated with utilization of behavioral health services.
- 2) **Behavioral health costs.** An ordinary least squares regression analysis was conducted with the 23,790 adolescents who utilized behavioral health services to assess which risk factors were associated with greater behavioral health costs, given a youth had any service.

DATA SOURCES AND MEASURES

Variable	Period (SFY)	Description
Outcome Variable		
Behavioral Health Costs	SFY 2015	Behavioral health costs calculated from payments to behavioral health service providers in Washington state.
Child and Family Demographics		
Sex	N/A	From social and health service records.
Race	N/A	From social and health service records.
Months of Medicaid coverage	SFY 2015	Number of months with Medicaid enrollment in 2015, according to state Medicaid records.
Months of 3rd party liability coverage	SFY 2015	Number of months with third party liability coverage in 2015, according to state records.
Limited English Proficiency	SFY 2010-2014	Non-English language spoken at home by parent and record of interpreter need at benefit eligibility determination appointment.
Age at Eligibility	SFY 2015	Age as of the first month in the outcome period with Medicaid coverage (restriction to ages 12-17). Source is DSHS service records.
Child Maltreatment History		
Physical Abuse	Lifetime (excl. SFY 2014)	Lifetime reported physical abuse comes from child welfare investigation records.
Sexual Abuse	Lifetime (excl. SFY 2014)	Lifetime reported sexual abuse comes from child welfare investigation records.
Neglect	Lifetime (excl. SFY 2014)	Lifetime reported neglect comes from child welfare investigation records.
Recent Abuse or Neglect	SFY 2014	Any physical abuse, sexual abuse or neglect reported in SFY 2014
Age at 1 st Abuse or Neglect	Lifetime	Based off of first reported abuse or neglect from child welfare investigation records. Grouped into age categories: 0-3, 4-11, 12+ years old.
Age at 1 st Placement	Lifetime	Age at first out-of-home placement (stratified by age: 0-3, 4-11, 12+) recorded by child welfare system.
5+ Placements Out-of-Home	Lifetime	Record of 5 or more different out-of-home placements over the lifetime of the child as recorded by child welfare system.
Child Social and Health Risk Factors		
Is a Parent	Lifetime	Child is a parent (has a biological child), as identified in birth certificate records, child support enforcement records from Division of Child Support, or prison visitation records from Department of Corrections.
Pediatric medical complexity algorithm	2012-2014	Measure of medical risk from pediatric medical complexity algorithm – chronic vs non-chronic, complex if comorbidity of conditions. Source data is medical claims data from ProviderOne (Medicaid claims). The PMCA is based on claims over 3 years (here 2012-14).
Substance use disorder	2010-2014	Substance-related diagnosis, service or encounters recorded in medical claims or publicly funded mental health records; any arrest for which a charge recorded is in a substance-related crime category.
Criminal Justice Involvement	2010-2014	Any arrest or conviction recorded by state patrol or court filings, including adjudication in state court database, for any crime category.
Mental Health Condition	2010-2014	Mental health diagnosis, service encounters, procedures or prescribed psychotropic medications recorded in medical claims or publicly funded mental health records.
Medical Risk Score	2014	Risk score via Medicaid (based on diagnoses and prescriptions) using Chronic Illness and Disability Payment System (CDPS)

Variable	Period (SFY)	Description
Parent Risk Factors		
Parent Death	Lifetime	Death of biological parent any time through SFY 2014 as recorded by State Health Department death certificate.
Parent Mental Health Condition	2010-2014	Mental health diagnosis, service encounters, procedures or prescribed psychotropic medications recorded in medical claims or publicly funded mental health records for either biological parent.
Parent Substance use disorder	2010-2014	Substance-related diagnosis, service or encounters recorded in medical claims or publicly funded mental health records; any arrest for which a charge recorded is in a substance-related crime category.
Parent Cash Assistance	2010-2014	Received Temporary Assistance for Needy Families (TANF) or Washington State Family Assistance (SFA) benefits (extremely low income).
Parent Food Assistance	2010-2014	Received benefits through federal Supplemental Nutrition Assistance Program (formerly known as food stamps) or Washington SFA Program, but never TANF (moderately low income).
Parent Homelessness	2010-2014	Indicates 1+ spell of homelessness, including shelter stays and couch-surfing/families who are doubled up, recorded by a financial eligibility worker during eligibility determination.
Parent Qualifies for Disability	2010-2014	SSI-related medical coverage (i.e.: disability-related coverage), or received services from the developmental disabilities administration, or received services from division of vocational rehabilitation.
Parent High Medical Risk Score	2010-2014	Received a risk score at or above the average level of health risk in the Disabled Medicaid population. The score is based on anticipated future costs compared to average costs expected for one patient.
Parent Domestic Violence	2010-2014	Any arrest for which a charge recorded is in a domestic violence crime category. Report of domestic violence in comprehensive evaluation (TANF families only), participant in address confidentiality program, or non-cooperation with division of child support is allowed due to domestic violence concerns.
Parent Criminal Justice Involvement	2010-2014	Any arrest or conviction recorded by state patrol or court filings, including adjudication in state court database, for any crime category for either biological parent. Any incarceration in department of corrections facility.
Number of Parent Risk Factors	Depends on factor	Sum of the number of unique types of parent risk factors. Score ranges from 0-9 (TANF and SNAP are combined into one broad poverty category).



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ACKNOWLEDGEMENT

We want to acknowledge the work of our colleagues throughout the research and data analysis division and our partner programs for all the work they do in serving Washington's vulnerable populations.