Eugene S. Farley, Jr. Health Policy Center
UNIVERSITY OF COLORADO **ANSCHUTZ MEDICAL CAMPUS**

Behavioral and Physical Health Complexities of Children and Youth in Foster Care

with Health First Colorado Coverage

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Brief #11
November 2020

COLORADO
Department of Health Care Policy & Financing

COLORADO
Department of Human Services

Overview

This data brief analyzes the medical and behavioral health needs of children and youth with foster care involvement and at least one month of health insurance coverage under Health First Colorado (Colorado's Medicaid Program) from July 2011 through August 2020 as compared to non-foster care children and youth covered by Health First Colorado during the same period.

This analysis, conducted by the University of Colorado School of Medicine in partnership with the Colorado Department of Health Care Policy & Financing (Department), supports greater understanding of the distinctive needs and disparities, in particular greater behavioral health needs, of children and youth (defined as under 18 at the time of entry into foster care) in foster care. This information can support Colorado's efforts to improve the health and well-being of children and youth in foster care.

Key Findings

During the study period of July 2011 through August 2020:

- The overall presence of behavioral health conditions was three times higher for children and youth in foster care than for those with Health First Colorado (Colorado's Medicaid Program) coverage not in foster care (36.5% compared to 12.1%). This difference was particularly pronounced for males (27.8 percentage point difference compared to 20.2 percentage point difference for females).
- Presence of behavioral health conditions was generally higher for the older birth year cohorts for children and youth with and without foster care involvement.
- Compared to children and youth covered by Health First Colorado without foster care involvement, children and youth in foster care had a higher presence of nearly all body system specific physical health conditions. The differences were greatest for neurologic, pulmonary and any progressive conditions.
- Children and youth with Health First Colorado coverage in foster care were more likely to have chronic diseases (noncomplex or complex) than non-foster care children and youth. With the inclusion of behavioral health conditions, 28.7% of foster care children and youth were classified as having a noncomplex, chronic disease (NC-CD) and 26.4% were classified as having a complex, chronic disease (C-CD) compared to 17.7% classified as NC-CD and 12.1% classified as C-CD for the non-foster care Health First Colorado children and youth members.
- The differences in the presence of chronic conditions persisted when only including body system specific physical health conditions with the percentages classified with the presence of chronic conditions (both complex and noncomplex) for children and youth in foster care were 22.0% classified as NC-CD and 16.6% classified as C-CD compared to 15.4% NC-CD and 8.9% C-CD for children and youth members who were not in foster care during this time.

Introduction

Each year more than 650,000 US children and youth are served by the foster care system.[1]

Compared to non-foster care peers, these children and youth are recognized as having more physical, mental and developmental conditions,[1-3] are less likely to have received preventative care prior to involvement in foster care,[2] have more unmet health needs, and face multiple challenges accessing health care during their foster care stay.[3] As such, children and youth in foster care have distinctive health needs with resultant health disparities that manifest in higher presence of and risks for chronic physical[4-6] and mental health[7] conditions. This data brief analyzes the presence of medical and behavioral health complexities for children and youth with at least one month of health insurance coverage under Health First Colorado (Colorado's Medicaid program) from July 2011 through August 2020. Specifically, the analysis compared children and youth with at least one month of participation in foster care to Health First Colorado children and youth members that did not have foster care involvement. The goal of the analysis is to support greater understanding of the needs of children and youth in foster care such that the Colorado Departments of Health Care Policy & Financing and Human Services can refine policies and programs to improve the health and well-being for this population.

This brief addresses five research questions:

1. **Did the presence of behavioral health conditions differ between children and youth with foster care involvement and non-foster Health First Colorado members? Were there differences by sex?**
2. **Did the presence of behavioral health conditions differ by age, as measured by birth year, among children and youth with foster care involvement and non-foster care Health First Colorado members? Were there differences by sex and birth year cohort?**
3. **Did the presence of body system specific health conditions differ between children and youth with foster care involvement and non-foster Health First Colorado members?**
4. **Did the presence of medical complexity differ between children and youth with foster care involvement and non-foster Health First Colorado members?**
5. **Did the presence of medical complexity differ by sex for children and youth with foster care involvement and non-foster Health First Colorado members?**

All children and youth, age 18 years or younger and with at least one month of Health First Colorado coverage from July 2011 through August 2020, were included in the analysis. Using the Department's foster-specific aid codes (provided in the definition section at the end of this document), children and youth with foster care involvement were differentiated from children and youth without foster involvement. For the foster care cohort, only children and youth with a foster care aid code during the study period when they were under 18 years of age were included. This resulted in 34,971 Health First Colorado members in the foster care cohort and 1,049,055 Health First Colorado members in the non-foster care cohort. Eligible children and youth were then grouped into one of eight birth year cohorts according to date of birth. Table 1 provides the number of children and youth in the foster care and non-foster care populations included in the analysis overall and separately by sex and birth year cohort.

Table 1: Number of Children and Youth in Foster Care and Non-foster Care Population by Sex and Birth Year Cohort

Birth Year Cohort	Total	Foster Care	Non-foster Care*
All Years	1,084,026	34,971	1,049,055
Female	544,735	15,965	528,770
Male	539,288	19,006	520,282
Born after December 2017			
Female	32,863	760	32,103
Male	34,418	864	33,554
Born January 2015 – December 2017			
Female	60,902	2,281	58,621
Male	63,828	2,672	61,156
Born July 2011 – December 2014			
Female	81,347	3,658	77,689
Male	84,966	3,862	81,104
Born July 2008 - June 2011			
Female	74,058	2,461	71,597
Male	78,167	2,730	75,437
Born July 2005 – June 2008			
Female	71,738	2,053	69,685
Male	75,255	2,249	73,006
Born July 2001 – June 2005			
Female	84,393	2,425	81,968
Male	87,257	2,822	84,435
Born July 1997 – June 2001			
Female	75,669	1,863	73,806
Male	72,216	2,807	69,409
Born July 1993 – June 1997			
Female	63,405	464	62,941
Male	43,181	1,000	42,181

** Note that there were three non-foster care children and youth with missing data for sex. In this brief, calculations that do not include sex uses the population of 1,049,055 non-foster care children and youth while the analysis including sex uses the non-foster care populations of 520,282 for males and 528,770 for females.*

To identify children with medical complexity, the Pediatric Medical Complexity Algorithm (PMCA) was applied. The PMCA is a publicly available algorithm which identifies children with medical complexity with good sensitivity and high specificity.[4] Using either hospital discharge or claims data, the PMCA identifies children and youth with the presence of specific behavioral or physical health conditions and classifies them into one of three categories:

- Complex chronic disease (C-CD) which impacts two or more body systems (organized groups of tissue that forms a particular function, i.e. digestive, circulatory, respiratory)
- Noncomplex chronic disease (NC-CD) which afflicts one body system
- No chronic disease (no CD) which indicates either acute, non-chronic disease or the absence of acute or chronic disease

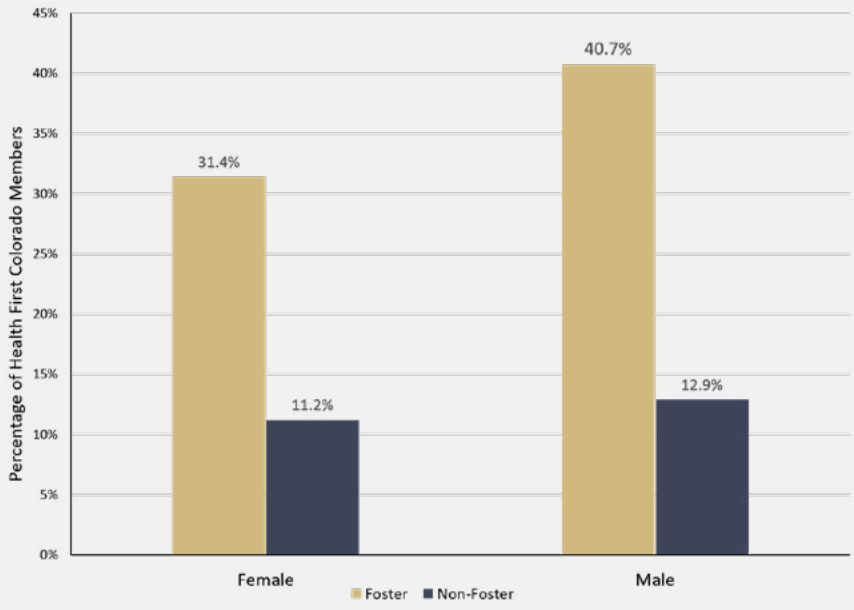
The PMCA was applied using all available paid medical claims and behavioral health encounters for Health First Colorado members with dates of service between July 2011 and August 2020 when the members were 18 years of age or younger.

Research Questions and Findings

1 Did the presence of behavioral health conditions differ between children and youth with foster care involvement and non-foster Health First Colorado members? Were there differences by sex?

Overall, 36.5% of Health First Colorado children and youth with foster care involvement were identified with the presence of chronic behavioral health conditions compared to 12.1% of Health First Colorado children and youth without foster care involvement; this resulted in a 24.4 percentage point difference between these two populations. Figure 1 presents the percentage (rate) of foster care and non-foster care cohorts with the presence of a behavioral health condition separately for males and females.

Figure 1: Presence of Behavioral Health Conditions among Health First Colorado Children and Youth with Foster Care Involvement and not Involved in Foster Care by Sex



Examining this difference by sex reveals:

- Near equivalence in the presence of behavioral health conditions for Health First Colorado members in the non-foster care cohort (12.9% for males and 11.2% for females), but a 9.3 percentage point difference when comparing foster care males (40.7%) to foster care females (31.4%).
- A 27.8 percentage point difference in the presence of behavioral health conditions for males in the foster care population (40.7%) compared to males in the non-foster care population (12.9%)
- A 20.2 percentage point difference in the presence of behavioral health conditions among females in the foster care population (31.4%) compared to females in the non-foster care population (11.2%).

2 Did the presence of behavioral health conditions differ by age, as measured by birth year, among children and youth with foster care involvement and non-foster care Health First Colorado members? Were there differences by sex and birth year cohort?

As indicated in Figure 1, male and female children and youth in foster care had a higher presence of behavioral health conditions compared to males and females not in foster care. Figure 2 and Table 2 present the breakdown of the percentages with a behavioral health condition by sex and birth year cohort.

Figure 2: Presence of Behavioral Health Conditions among Health First Colorado Children and Youth with Foster Care Involvement and not Involved in Foster Care by Sex and Birth Year

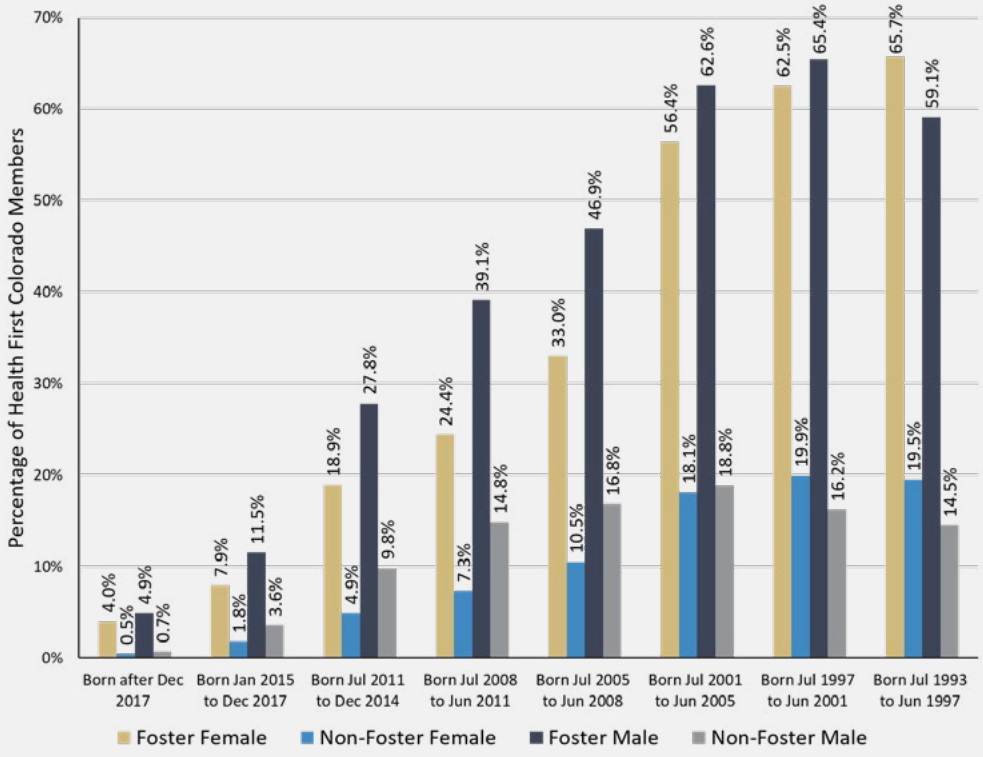


Table 2: Presence of Behavioral Health Conditions among Health First Colorado Children and Youth with Foster Care Involvement and not Involved in Foster Care by Sex and Birth Year Cohort

Birth Year Cohort	Foster Female (n)	Non-foster Female (n)	Foster Male (n)	Non-foster Male (n)
Born after Dec 2017	4.0% (30)	0.5% (162)	4.9% (42)	0.7% (229)
Born Jan 2015 – Dec 2017	7.9% (181)	1.8% (1,060)	11.5% (306)	3.6% (2,205)
Born Jul 2011 – Dec 2014	18.9% (693)	4.9% (3,818)	27.8% (1,072)	9.8% (7,940)
Born Jul 2008 - Jun 2011	24.4% (600)	7.3% (5,248)	39.1% (1,068)	14.8% (11,176)
Born Jul 2005 – Jun 2008	33.0% (677)	10.5% (7,279)	46.9% (1,055)	16.8% (12,276)
Born Jul 2001 – Jun 2005	56.4% (1,367)	18.1% (14,808)	62.6% (1,767)	18.8% (15,894)
Born Jul 1997 – June 2001	62.5% (1,165)	19.9% (14,684)	65.4% (1,835)	16.2% (11,231)
Born July 1993 – June 1997	65.7% (305)	19.5% (12,298)	59.1% (591)	14.5% (6,117)

Examining Figure 2 and Table 2 by birth year cohort reveals:

- In general, the presence of behavioral health conditions rose with age as the three earliest birth year cohorts in both the foster care and non-foster care populations had the highest rates. Across the three earliest birth cohorts, rates did not increase and in some instances declined (the earliest birth year cohort for foster males and non-foster females and for the earliest two birth year cohorts for non-foster males).
- Among foster care children and youth members, males had a higher presence of behavioral health conditions than females in all birth year cohorts except for the earliest birth year cohort. A similar pattern is displayed for the non-foster care population with the exception of the two earliest birth year cohorts (born between July 1993 and June 2001).

These findings also indicate there were differences in the presence of behavioral health conditions between children and youth in foster care and similar aged non-foster care Health First Colorado members, both within and between birth year cohorts.

- The presence of behavioral health conditions for foster care children and youth was at least two-fold, and approached three or even four-fold higher than it was for non-foster care Health First Colorado members of the same sex and within the same birth year cohort.
- For the earliest birth year cohorts, this difference was more than 40 percentage points and was almost 50 percentage points different for males born between July 1997 and June 2001.

3 Did the presence of body system specific health conditions differ between children and youth with foster care involvement and non-foster Health First Colorado members?

As demonstrated in Table 3, there were differences in the presence of body system specific conditions (organized groups of tissue that form a particular function, i.e. digestive, circulatory, respiratory) between children and youth with foster care involvement and children and youth Health First Colorado members not in foster care. In fact, children and youth with foster care involvement had higher rates of all but one body system specific physical health condition (otolaryngolic). The difference in rates was greatest for neurologic (9.5 percentage points) and pulmonary (5.6 percentage points) conditions. Other differences of at least one percentage point occurred for any progressive (3.8 percentage points); ophthalmologic (2.9 percentage points); musculoskeletal (2.0 percentage points); cardiac (1.4 percentage points) and otologic (1.0 percentage points) conditions.

Table 3: Presence of Body System Specific Health Conditions for Foster Care and Non-foster Care Health First Colorado Populations

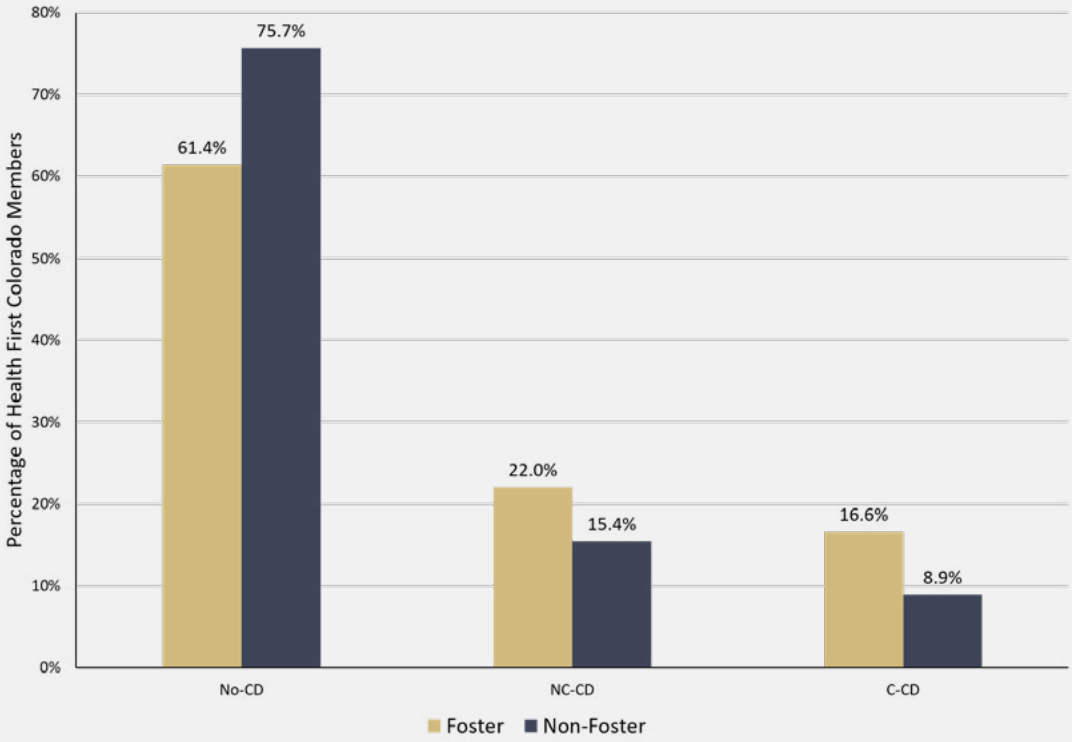
		Foster Care		Non-foster Care	
Health Condition	Total	Number	Rate	Number	Rate
Any malignancy	3,223	130	0.4%	3,103	0.3%
Any progressive	48,410	2,830	8.1%	45,580	4.3%
Cardiac	23,556	1,224	3.5%	22,332	2.1%
Craniofacial	2,811	190	0.5%	2,621	0.3%
Dermatologic	1,558	103	0.3%	1,455	0.1%
Endocrinologic	19,146	732	2.1%	18,414	1.8%
Gastrointestinal	12,778	708	2.0%	12,070	1.2%
Genetic	6,731	479	1.4%	6,252	0.6%
Genitourinary	8,024	343	1.0%	7,681	0.7%
Hematologic	4,278	203	0.6%	4,075	0.4%
Immunologic	5,249	226	0.7%	5,023	0.5%
Metabolic	16,910	683	2.0%	16,227	1.6%
Musculoskeletal	34,028	1,781	5.1%	32,247	3.1%
Neurologic	69,771	5,454	15.6%	64,317	6.1%
Ophthalmologic	36,833	2,155	6.2%	34,678	3.3%
Otologic	11,952	737	2.1%	11,215	1.1%
Otolaryngolic	-*	-*	-*	648	0.1%
Pulmonary/Respiratory	117,436	5,695	16.3%	111,741	10.7%
Renal	8,970	475	1.4%	8,495	0.8%

** Number suppressed because fewer than 30 individuals were identified with the presence of the body system specific condition*

4 Did the presence of medical complexity differ between children and youth with foster care involvement and non-foster care Health First Colorado members?

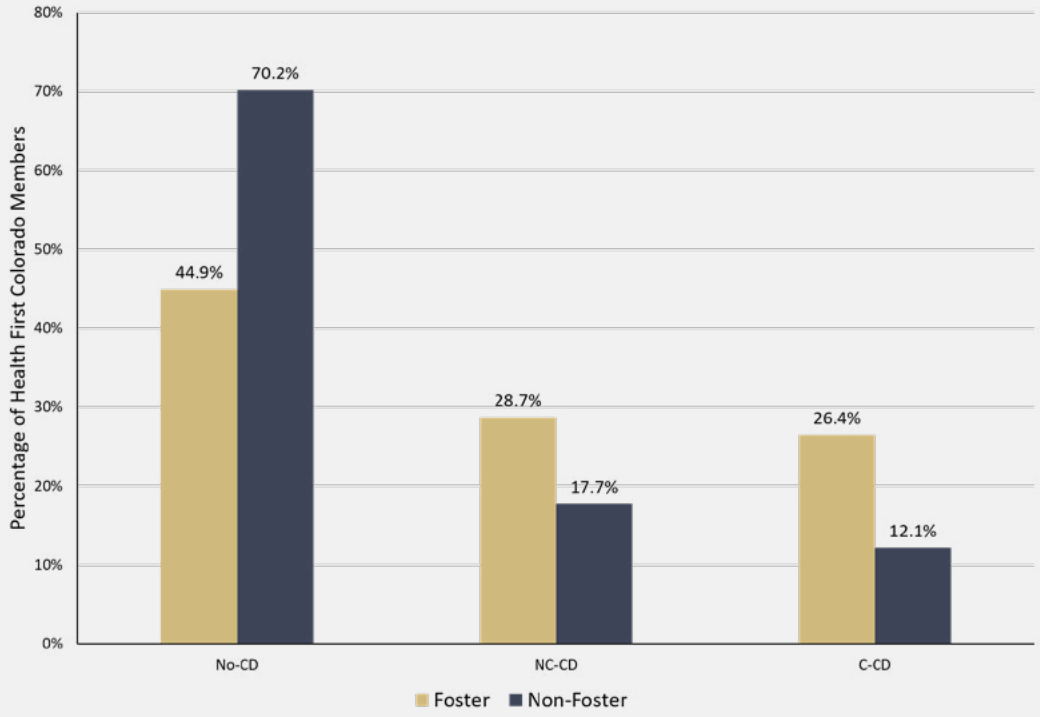
Consistent with the differences in the presence of individual behavioral and physical health conditions, there were differences in the presence of overall medical complexity between Health First Colorado members in foster care and those not in foster care. Applying the PMCA excluding behavioral health conditions, Figure 3 shows that children and youth with foster care involvement were more likely to have chronic (complex and noncomplex) physical health conditions compared to non-foster care children and youth with Health First Colorado coverage. Focusing on physical health conditions and not considering the presence of behavioral health conditions, 38.6% of foster-care children and youth were categorized as having a chronic condition (complex and noncomplex) compared to 24.3% of non-foster care children and youth, resulting in a difference of 14.3 percentage points. When distinguishing between C-CD and NC-CD, the difference between foster care and non-foster care, was slightly larger for C-CD (7.7 percentage points) than NC-CD (6.6 percentage points).

Figure 3: Percentage of Health First Colorado Children and Youth with Foster Care Involvement and not Involved in Foster Care Assigned to PMCA Complexity Categories without Consideration of Behavioral Health Conditions



As indicated in Figure 1, there was a greater presence of behavioral health conditions for children and youth in foster care than for those not in foster care. Figure 4 below shows that with the inclusion of behavioral health conditions in the PMCA the presence of chronic disease increased for both populations, as expected. Specifically, the percentage of children and youth with foster care involvement classified with a chronic disease increased, to 55.1% (a 16.5 percentage point increase) and the percentage of non-foster care members with a chronic disease increased to 29.8% (a 5.5 percentage point increase).

Figure 4: Percentage of Health First Colorado Children and Youth with Foster Care Involvement and not Involved in Foster Care Assigned to PMCA Complexity Categories with Consideration of Behavioral Health Conditions



While the presence of chronic disease was higher for both groups when behavioral health conditions were included, the impact of including these on medical complexity was not equal. There was a greater impact on the foster-care population classified as C-CD, with a 9.8 percentage point increase (16.6% to 26.4%) with the inclusion of behavioral health conditions. In contrast, the percentage of the non-foster care population classified as C-CD only increased by 3.2 percentage points (8.9% to 12.1%). Finally, inclusion of behavioral health conditions in the classification increased the percentage classified as NC-CD by 6.7 percentage points (22.0% to 28.7%) for the foster care population and only 2.3 percentage points (15.4% to 17.7%) for the non-foster care population.

5 Did the presence of medical complexity differ by sex for children and youth with foster care involvement and non-foster care Health First Colorado members?

Among Health First Colorado members, there were consistent differences in medical complexity between sexes as demonstrated in Figure 5 and Table 4. Males had greater medical complexity in comparison to females regardless of foster care involvement. Specifically, 28.1% of Health First Colorado male members in foster care were classified as C-CD and 31.3% were classified as NC-CD compared to 24.4% of females in foster care that were classified as C-CD and 25.7% that were classified as NC-CD when behavioral health conditions were included. As expected given the findings presented in Figure 1, excluding behavioral health conditions from the classification reduced the differences between males and females in foster care but the higher complexity among males in foster care persisted with presence of a C-CD at 17.3% and NC-CD at 23.1% for males compared to 15.8% and 20.7%, respectively, for females.

Health First Colorado children and youth without foster care involvement had a lower presence of C-CD and NC-CD categories compared to foster care members of the same sex: 12.6% of males in the non-foster care population were classified in the C-CD category when including behavioral health conditions and 9.1% were classified in the C-CD category when excluding behavioral health conditions. Females in the non-foster care population had the lowest presence of a C-CD with 11.6% of female, non-foster care in this category when including behavioral health conditions and 8.8% when excluding behavioral health conditions.

Figure 5: Percentage of Health First Colorado Children and Youth with Foster Care Involvement and not Involved in Foster Care Assigned to PMCA Complexity Categories by Sex

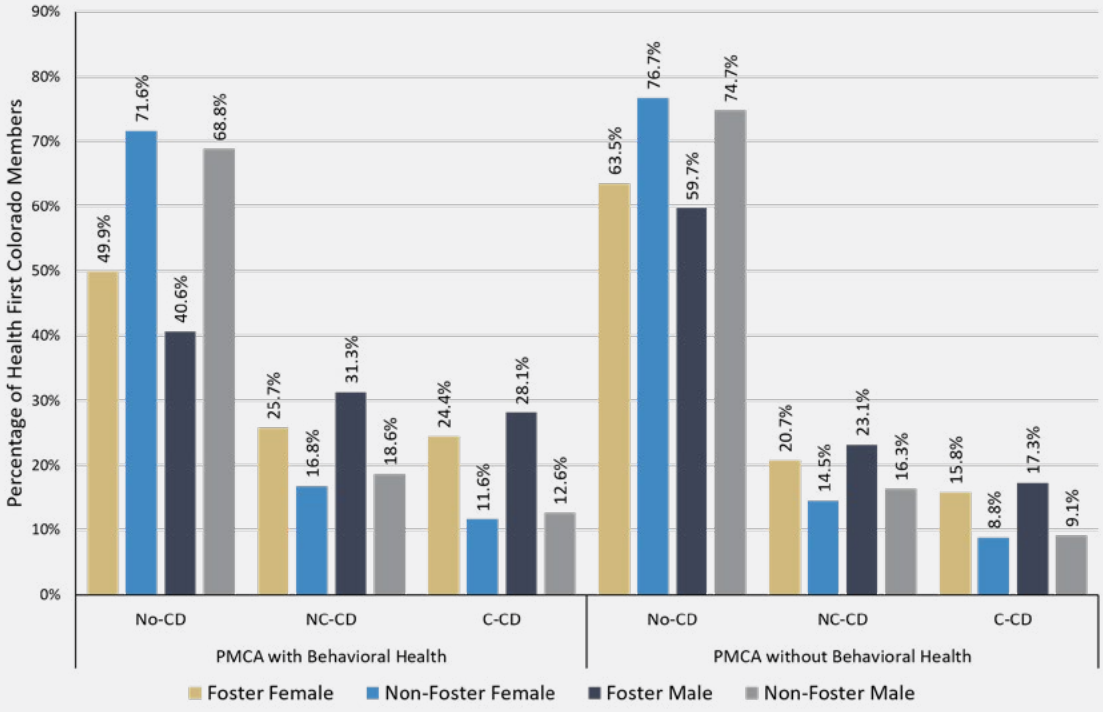


Table 4: Percentage of Health First Colorado Children and Youth with Foster Care Involvement and not Involved in Foster Care Assigned to PMCA Complexity Categories without and with Behavioral Health Conditions by Sex

	PMCA Complexity Category	Foster Female	Non-foster Female	Foster Male	Non-foster Male
With Behavioral Health	Complex chronic disease	24.4%	11.6%	28.1%	12.6%
	Noncomplex chronic disease	25.7%	16.8%	31.3%	18.6%
	No chronic disease	49.9%	71.6%	40.6%	68.8%
Without Behavioral Health	Complex chronic disease	15.8%	8.8%	17.3%	9.1%
	Noncomplex chronic disease	20.7%	14.5%	23.1%	16.3%
	No chronic disease	63.5%	76.7%	59.7%	74.7%

Summary and Discussion:

The presence of behavioral health conditions was higher among Health First Colorado foster care members compared to Health First Colorado non-foster care members. For Health First Colorado members in the earlier birth year cohorts the differences in the presence of behavioral health conditions was upwards of 40 percentage points higher. Yet, differences in the presence of behavioral health conditions were not exclusive to earlier birth year cohorts. For example, differences of 3.5 to 7.9 percentage points were found even among the two most recent birth year cohorts, indicating early and persistent behavioral health disparity for Health First Colorado members in foster care.

Children and youth covered by Health First Colorado with foster care involvement also had a higher presence of all but one body system specific physical health conditions during the study period compared to their non-foster care peers. Specifically, foster care children and youth had higher presence of neurologic (9.5 percentage points), pulmonary (5.6 percentage points), any progressive (3.8 percentage points), ophthalmologic (2.9 percentage points), musculoskeletal (2.0 percentage points), cardiac (1.4 percentage points) and otologic (1.0 percentage points) conditions. The one exception was otolaryngolic where there were fewer than 30 foster care children and youth identified with the presence of this condition.

When looking at medical complexity, focusing on physical health complexity and not considering behavioral health conditions the rates of chronic diseases, both complex at 16.6% (C-CD) and noncomplex (NC-CD) at 22.0% were higher among Health First Colorado members in foster care compared to non-foster care Health First Colorado members with rates of 8.9% C-CD and 15.4% NC-CD, respectively. These results are consistent with prior literature regarding health status of children and youth in foster care.[3,5-7] These analyses adds to prior work by including behavioral health conditions and highlighting differences by sex regarding medical complexity among these children. Among the cohort of Health First Colorado children and youth with foster care involvement, with the inclusion of behavioral health conditions, the classifications of chronic conditions was higher among males (28.1% C-CD and 31.3% NC-CD) compared to females (24.4% C-CD and 25.7% NC-CD).

The findings presented in this brief suggest there is a significant burden of behavioral health conditions among children and youth in foster care, even among the youngest Health First Colorado members. Inclusion of behavioral health conditions when evaluating medical complexity, therefore, would contribute to higher medical chronicity and complexity for foster care children and youth compared to their non- foster care peers. To illustrate this difference, this analysis examined medical chronicity and complexity including and excluding behavioral health conditions. Excluding behavioral health conditions, children and youth with

foster care involvement still had a greater presence of C-CD (16.6 %) and NC-CD (22.0 %) when compared to children and youth in the non-foster care population at 8.9% (C-CD) and 15.4% (NC-CD), respectively. However, including behavioral health conditions resulted in intensified differences between these two populations. Specifically, including behavioral health conditions in the categorization of medical complexity increased the difference in those classified with a C-CD increasing from 7.7 percentage points to 14.3 percentage points and those classified with a NC-CD increasing from 6.6 percentage points to 11.6 percentage points.

Definitions

Complex, chronic disease: Presence of significant chronic conditions which effect two or more (≥2) body systems that can include either a physical, mental or developmental condition that is expected to persist at least one year and expected to use more healthcare resources compared to a healthy child or to require treatment for control and to debilitate frequently or consistently; or a progressive condition; or require continuous, technologic support; or metastatic or progressive malignancies limiting daily living.

Foster Care Population: Health First Colorado members with at least one month of Medicaid eligibility assigned to a foster care aid code between July 2011 and August 2020 excluding members who had foster care aid codes on or prior to July 1, 2011. Eight Foster Care Aid codes were used: Subsidized and Non-Subsidized Adoptions; Supplemental Security income – Foster Care; Child Welfare – Foster Care; Foster Care – removed by CT/AF; Subsidized Adoption Foster Care; Foster Care – Voluntary; and, Division of Youth Corrections (DYC) Without Regard to Income and Child Welfare Without Regard to Income. (10, 11, 12, 13, 19, 20, 23, and 70)

No chronic disease: Presence of an acute, non-chronic physical, mental or developmental condition which may lead to increased healthcare utilization for less than 12 months OR the absence of an acute or a chronic condition.

Noncomplex, chronic disease: Conditions, limited to one (1) body system, which persist for more than one year but are not progressive and may resolve by natural history or intervention. Healthcare utilization varies according to varied severity with intervals of good health between exacerbations.

Non-foster care population: Health First Colorado members with at least one month of Medicaid eligibility and no months of Medicaid eligibility with a foster care aid code between July 2011 and August 2020.

Progressive condition: A medical condition which leads to deteriorating health and shorter life expectancy in adulthood (defined as death in the fourth to fifth decade, e.g. cystic fibrosis, malignancy, complex congenital heart disease).

Data Source and Methods

The analyses used administrative, medical claims and behavioral health encounter data provided by the Department of Health Care Policy and Financing from July 2011 through August 2020. Foster care-specific aid codes (10, 11, 12, 13, 19, 20, 23, and 70) were used to identify 34,971 children and youth eligible for Health First Colorado that were included in the foster care population. The analyses included 1,049,055 non-foster care Health First Colorado members between July 2011 and August 2020.

Pediatric Medical Complexity Algorithm: The Pediatric Medical Complexity Algorithm (PMCA) (version 3.0) is a publicly available algorithm that identifies children with varying medical complexity and was developed and tested in a Medicaid population of children 0 to 18 years old. The PMCA originated from the Center of Excellence on Quality of Care Measures for Children with Complex Needs (COE4CCN) effort to assess disparities in care for children with special health care needs. Since initial publication in 2014, the PMCA has been validated through use of Medicaid claims data[4] and modified to incorporate International Classification of Diseases, Ninth and Tenth Revisions, Clinical Modification (ICD-9/10-CM) codes for children with at least one emergency department, day surgery and/or hospital encounter.[8] The algorithm categorizes children and youth using administrative medical and behavioral/mental health claims into three categories: (1) no chronic health disease (No CD); (2) noncomplex, chronic disease (NC-CD); and, (3) members with complex, chronic disease (C-CD).

Comparisons of the foster care population and the non-foster care population of Health First Colorado children and youth examined the percentage of each population with a behavioral health condition or body system specific physical health condition as identified by applying the PMCA. Similar comparisons of the foster care and non-foster care populations classified into each of the three PMCA complexity categories with and without consideration of behavioral health conditions examined the percentages of each population in each category.

Acknowledgements

The Farley Health Policy Center acknowledges John Bartholomew, Jessie Gunter, Sally Langston, Michelle Miller, and Bettina Schneider from the Colorado Department of Health Care Policy and Financing and Mollie Bradlee from the Colorado Department of Human Services for their contributions to this report.

Suggested Citation

Kaferly J, Mathieu S, Alishahi M, Hosokawa P, Sevick C, Orsi R, Gritz RM. Behavioral and Physical Health Complexities of Children and Youth in Foster Care with Health First Colorado Coverage. Farley Health Policy Center Brief, 11. Aurora, CO: University of Colorado School of Medicine. 2020.

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