



Top Diagnoses of Emergency Department Visits among Children in Foster Care

and among a Matched set of Children not in Foster Care in Colorado

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Overview

This data brief describes the top diagnosis categories associated with emergency department (ED) visits paid fee-for-service (FFS) for two groups of children enrolled in Health First Colorado (Colorado's Medicaid Program). The first group are children and youth (younger than 18 at the time of entry into foster care) with foster care involvement and the second group is a matched set of children and youth not in foster care.

Foster care children and youth with at least one month of coverage from July 2011 to September 2019 were included. This analysis, conducted by the University of Colorado School of Medicine (CUSOM) in collaboration with the Colorado Department of Health Care Policy & Financing (Department), is intended to highlight reasons for ED use among the foster care population during this period and shed light on areas of possible interventions or policy changes that may better serve Colorado's foster care population.

Key Findings

- Respiratory infections; other lower respiratory disorders; and symptoms, signs and ill-defined conditions (for example, fever; allergic reactions; abdominal pain, nausea and vomiting; and dermatitis) were the top three diagnosis categories for foster and non-foster care children and youth (younger than age 18 at the time of entry into foster care).
- Children and youth in foster care had higher rates of ED visits associated with the following diagnosis categories: factors influencing health care (a wide-ranging category that ranges from health care maintenance to radiation exposure to medical services not available at home and also includes pertinent diagnoses such as routine infant or child health check, child in welfare custody, parent-child conflict, encounter for exam and observation following alleged child physical abuse and homelessness); suicide and intentional self-injury; and fractures.
- For older children and youth that enter foster care, ED visits related to suicide and self-intentional injury occurred at higher rates leading up to and during the month of entry, and for those ages 7 to 12, the rates continued to increase up to one-year post-entry.
- For younger children that enter foster care, ED visits related to fractures occurred at higher rates leading up to and during the month of entry. For those between 0 and 2 years old, rates leading up to and during the month of entry into foster care increased substantially but returned to pre-entry levels in the following quarter. Children between ages 3 and 6 showed increases of fracture-related ED visits in every quarter following entry into foster care, as well.

Introduction

Existing health disparities for children and youth in foster care have been demonstrated in a number of studies to date.¹⁻³

Chronic conditions, along with behavioral and developmental disorders, have higher presence in the foster care population compared to children and youth with no involvement in the U.S. foster care system.^{4,5} Additionally, due to the transitory nature of foster care placements, children and youth in foster care often lack comprehensive medical histories and experience fragmented health care, which can collectively contribute to disproportionately high use of ED services.^{6,7} Although it is known that children and youth that enter foster care utilize the ED more often than their non-foster care peers,⁶ little research describes the reasons (i.e. related diagnoses) for the ED visits or the changes in these reasons over time.

Furthermore, little is known about the ED utilization patterns of children and youth prior to their entry into foster care. To this end, the University of Colorado School of Medicine (CUSOM) in collaboration with the Colorado Department of Health Care Policy & Financing (Department) analyzed Health First Colorado (Colorado's Medicaid Program) fee-for-service (FFS) claims data from July 2011 through September 2019 to understand the most prevalent diagnoses associated with ED visits among children and youth for one year prior to foster care entry and for the year following entry into foster care. These children were compared to a matched cohort of non-foster care Health First Colorado children youth members.

This brief addresses three research questions:

- 1 Were there differences in the top 10 ED diagnoses among foster care and non-foster care youth? What were common between both groups?**
- 2 Were there differences in top ED diagnoses before entry into foster care compared to after entry into foster care?**
- 3 Were there differences in top ED diagnoses before entry into foster care compared to after entry into foster care, by age?**

Children and youth in foster care were identified using the Department's foster care-specific aid codes. Children and youth enrolled in Health First Colorado that never had a foster care-specific aid code from July 2011 through September 2019 were used to develop a matched comparison cohort of non-foster care Health First Colorado members.

A reference month was assigned for each member of the foster care and matched comparison cohorts. For children and youth members in the foster care cohort, the reference month was the month of entry into foster care. The comparison cohort members were matched based on sex, age (within 6 months), presence of medical complexities and the same months of Health First Colorado enrollment for the foster care members reference month as well as the 12 months before and after the reference month. As such, the reference month for a comparison cohort member is the same month as the matched foster care cohort member's reference month.

The time frame of our analysis includes the 12 months prior to the reference month, the reference month, and the 12 months that follow the reference month, equaling a 25-month analysis period. Over this 25-month period, only the months where the foster care and matched comparison members are enrolled in Health First Colorado are included in the analysis. This analysis period is separated into quarters before and after the reference month with the reference month being considered time zero. To enable comparisons with the reference month, each quarter is presented as a monthly average. This resulted in a study population of 59,709 with equal numbers of children and youth in the foster care and matched comparison cohorts. All children and youth were grouped into one of four age groups according to their age in the reference month.

ED diagnoses were categorized using the Clinical Classification System (CCS) for ICD-9 and ICD-10. The CCS was developed by the Agency for Healthcare Research and Quality to cluster diagnoses and procedure codes into meaningful categories. The CUSOM team applied this tool to Health First Colorado FFS claims data from July 2011 to September 2020. All ICD-9 and ICD-10 codes associated with ED visits were included into the CCS categorization software. ED visits that resulted in an inpatient admission were excluded from the analysis.

Research Questions and Findings

1 Were there differences in the top 10 ED diagnoses among foster care and non-foster care youth? What were common between both groups?

The top 10 CCS diagnosis categories for ED visits for children and youth without foster care involvement remained consistent across the analysis period as seen in Table 1. Respiratory infections; other lower respiratory diseases; and symptoms, signs and ill-defined conditions (for example, fever; allergic reactions; abdominal pain, nausea and vomiting; and dermatitis) were consistently the top three CCS categories in both groups (foster and non-foster), accounting for approximately 50% to 60% of all ED visits in the comparison group and 45% to 50% of all ED visits in the foster care group. The following CCS categories occurred in similar magnitude among the foster care and non-foster care comparison groups: remained consistent across the analysis period as seen in Table 1. Respiratory infections; other lower respiratory diseases; and symptoms, signs and ill-defined conditions (for example, fever; allergic reactions; abdominal pain, nausea and vomiting; and dermatitis) were consistently the top three CCS categories in both groups (foster and non-foster), accounting for approximately 50% to 60% of all ED visits in the comparison group and 45% to 50% of all ED visits in the foster care group. The following CCS categories occurred in similar magnitude among the foster care and non-foster care comparison groups:

- | | |
|--|------------------------------------|
| 1 viral infection | 4 superficial injury, contusions |
| 2 ear conditions | 5 other gastrointestinal disorders |
| 3 other injuries and conditions due to external causes (for example, hypoxemia, head injuries to nerves and muscles; frostbite; and shock in addition to physical, psychological and sexual abuse) | 6 open wounds |
| | 7 asthma |

The rates of these diagnoses categories fluctuated throughout the analysis period. Three CCS categories were seen in the foster care group that weren't seen in the comparison group: factors influencing health care (a wide-ranging category that ranges from health care maintenance to radiation exposure to medical services not available at home and also includes pertinent diagnoses such as routine infant or child health check, child in welfare custody, parent-child conflict, encounter for exam and observation following alleged child physical abuse and homelessness); suicide and intentional self-injury; and fractures. All of these CCS categories had increased presence leading up to the reference month (month of entry) for children and youth in foster care.

2 Were there differences in top 10 ED diagnoses before entry into foster care compared to after entry into foster care?

Generally, diagnoses categories associated with ED visits among children and youth in foster care remained consistent throughout the analysis period as shown in Table 1. Seven of the top ten diagnoses categories appeared in every quarter of the analysis including the reference month (month of entry):

- 1 respiratory infections
- 2 symptoms, signs, and ill-defined conditions (for example, fever; allergic reactions; abdominal pain, nausea and vomiting; and dermatitis)
- 3 other lower respiratory disease
- 4 viral infections
- 5 other injuries and conditions due to external causes (for example, injuries to nerves and muscles; frostbite; and shock in addition to physical, psychological and sexual abuse)
- 6 superficial injury, contusions
- 7 ear conditions

However, there were six diagnoses categories that moved in and out of the top 10 as children and youth approach the reference month:

- 1 open wounds
- 2 other gastrointestinal disorders
- 3 asthma
- 4 factors influencing health care (a wide-ranging category that ranges from health care maintenance to radiation exposure to medical services not available at home and also includes pertinent diagnoses such as routine infant or child health check, child in welfare custody, parent-child conflict, encounter for exam and observation following alleged child physical abuse and homelessness);
- 5 suicide and intentional self-injury
- 6 fractures

Notably, ED diagnoses associated with suicide and intentional self-injury and fractures increased sharply leading up the reference month. Suicide and intentional self-injury accounted for 8.2% of ED visits the quarter before entry and 4.6% of ED visits during the month of entry. Fractures account for 7.8% of ED visits during the entry month leading it to the 6th highest proportion of diagnoses but subsequently fell out of the top 10 categories in the quarters that follow the month of entry.

Table 1. Top ED diagnosis categories as a proportion of total ED visits for children and youth in foster care and comparison group

CCS Category/Diagnosis	-Q4	-Q3	-Q2	-Q1	Reference Month	Q1	Q2	Q3	Q4
Foster Care (N=27,851)									
Average number of unique patients	5,518	5,963	6,551	8,233	5,700	9,735	8,944	8,200	7,664
Average number of monthly ED visits	2,142	2,279	2,506	3,161	6,758	3,734	3,275	3,007	2,806
Other injuries and conditions due to external causes	7.6%	8.6%	8.5%	9.0%	15.7%	8.2%	8.3%	8.5%	9.5%
Factors influencing health care	3.3%	4.1%	4.5%	6.9%	14.2%	5.6%	4.7%	4.4%	4.2%
Symptoms, signs, ill-defined conditions	19.8%	19.2%	19.9%	17.5%	14.1%	19.9%	20.9%	19.4%	19.3%
Superficial injury, contusion	7.3%	6.4%	7.9%	8.2%	12.0%	7.1%	7.2%	7.1%	8.2%
Respiratory Infection	21.3%	20.8%	20.4%	17.9%	10.3%	19.5%	21.5%	21.6%	19.3%
Fractures	3.5%	3.4%	3.3%	4.3%	7.8%	3.7%	3.9%	3.9%	4.6%
Other lower respiratory disease	9.3%	9.8%	9.7%	8.6%	6.4%	10.2%	10.4%	10.1%	8.2%
Suicide and intentional self-injury	2.2%	3.5%	3.5%	4.7%	4.6%	3.7%	3.3%	3.2%	3.1%
Ear Conditions	7.0%	7.3%	6.6%	5.9%	3.7%	6.8%	7.5%	7.8%	7.5%
Viral Infection	7.8%	6.6%	6.4%	5.7%	3.6%	6.3%	7.1%	7.6%	7.6%
Other gastrointestinal disorders	4.4%	4.1%	4.2%	4.3%	3.6%	4.7%	4.7%	4.5%	4.0%
Open wounds	6.1%	5.5%	5.3%	4.5%	3.4%	4.9%	5.8%	6.2%	5.9%
Asthma	3.5%	3.9%	3.9%	3.7%	2.4%	3.4%	3.2%	3.6%	3.7%
Comparison, Children and Youth Non-Foster Care (N=27,858)									
Average number of unique patients	4,565	5,015	5,170	5,444	3,037	8,854	8,723	8,480	8,028
Average number of monthly ED visits	1,707	1,863	1,925	2,017	3,318	3,199	3,056	2,989	2,828
Other injuries and conditions due to external causes	7.4%	6.5%	7.5%	6.8%	5.5%	6.1%	6.6%	7.1%	7.1%
Factors influencing health care	1.6%	2.3%	2.3%	1.9%	3.1%	2.3%	2.3%	1.9%	2.1%
Symptoms, signs, ill-defined conditions	22.2%	24.4%	21.7%	23.4%	22.8%	23.4%	23.9%	23.9%	24.2%
Superficial injury, contusion	6.3%	6.0%	5.4%	5.9%	5.2%	5.3%	4.9%	5.7%	5.2%
Respiratory Infection	24.3%	23.4%	22.9%	22.5%	19.3%	23.5%	25.2%	23.0%	22.3%
Fractures	3.5%	3.5%	3.7%	4.0%	3.1%	2.7%	2.9%	3.4%	3.3%
Other lower respiratory disease	8.7%	10.4%	10.2%	10.0%	9.0%	10.6%	10.3%	9.8%	9.5%
Suicide and intentional self-injury	0.8%	0.6%	0.8%	1.0%	1.2%	1.0%	0.8%	1.3%	1.1%
Ear Conditions	9.6%	8.1%	8.1%	7.0%	6.7%	6.7%	8.1%	8.5%	9.4%
Viral Infection	8.3%	8.6%	8.0%	8.4%	8.7%	8.4%	9.4%	9.7%	9.9%
Other gastrointestinal disorders	5.4%	6.0%	5.4%	5.7%	5.4%	5.9%	6.2%	5.9%	6.2%
Open wounds	4.3%	4.2%	4.5%	4.7%	4.2%	4.5%	4.7%	4.3%	5.2%
Asthma	4.4%	4.3%	3.8%	4.4%	3.3%	3.3%	4.4%	4.3%	4.2%

Note: Numbers in blue indicate the condition was not among the top 10 for quarter or reference month.

3 Were there differences in top 10 ED diagnoses before entry into foster care compared to after entry into foster care, by age?

Top 10 ED diagnoses varied by age when comparing diagnoses before entry into foster care and after entry into foster care. Four ED diagnosis categories occurred in the top 10 of every quarter of the analysis including the reference month (month of entry), regardless of age (Tables 2 – 5):

- 1 Respiratory Infections
- 2 Superficial Injuries, Contusions
- 3 Other injuries and conditions due to external causes (for example, injuries to nerves and muscles; frostbite; and shock in addition to physical, psychological and sexual abuse)
- 4 Symptoms, signs, and ill-defined conditions (for example, allergic reactions, abdominal pain, fever, syncope and vomiting).

Although these diagnoses categories were present in the top 10 throughout the analysis period, it is important to note that the rates at which they occurred differed. A sharp increase in the rate of Superficial injury, contusion and other injuries and conditions due to external causes (for example, injuries to nerves and muscles; frostbite; and shock in addition to physical, psychological and sexual abuse) were seen in the 0-2 and 7-12 age groups at the month of entry but subsequently returned to pre-foster care entry rates. This pattern was less pronounced in the older age groups.

A number of diagnoses moved in and out of the top 10 depending on the age of the child, these categories of diagnoses were:

- | | |
|------------------------------------|--|
| 1 Open wounds | 7 Viral Infection |
| 2 Other lower respiratory disease | 8 Asthma |
| 3 Ear conditions | 9 Disease of the urinary tract infection |
| 4 Other gastrointestinal disorders | 10 Sprains and strains |
| 5 Fractures | 11 Suicide and intentional self-injury |
| 6 Factors influencing health care | |

Among older children in foster care (ages 7-12 and 13-18), there was higher variability of the top 10 diagnoses compared to the younger age groups (ages 0-2 and 3-6).

With respect to differences in ED diagnoses before entry into foster care and after, higher rates of suicide and intentional self-injury were present among older children in foster care with heightened rates in the quarter before entry into foster care and in the month of foster care entry. For children ages 7 to 12, the rates of suicide and intentional self-injury continued to increase up to one-year post-entry. Additionally, rates of visits with an ED diagnosis related to viral infection and ear conditions seemed to decrease among this age group after entry into foster care.

For children between 0 and 2 years old, rates of fractures increased substantially at the month of entry but returned to pre-entry levels in the following quarter. Children between ages 3 and 6 showed increases of fracture-related ED visits in every quarter following entry into foster care.

Summary and Discussion

Brief #9 demonstrated that there is an increase in ED utilization prior to placement, suggesting a potentially leading indicator that could be used to further evaluate these members' need for placement services. This brief builds off that analysis by showing that suicide and intentional self-injury (for older children), fractures (for younger children) and factors influencing health care which are top diagnoses during these months could allow for further refinement of a predictive model. Such a model can be provided to child welfare case workers for members that already have open child welfare cases to provide additional family preservation services. Alternatively, for members without open cases, the Regional Accountable Entities could be tasked with providing additional care coordination services to members with increasing ED usage and for ensuring that these children and youth receive universal and robust behavioral and maltreatment prevention services.

Table 2. Top ED diagnosis categories as a proportion of total ED visits for children and youth in foster care and comparison group (Age 0-2)

CCS Category/Diagnosis	-Q4	-Q3	-Q2	-Q1	Reference Month	Q1	Q2	Q3	Q4
Foster Care (N = 9,143)									
Average number of unique patients	1709	1858	2235	2920	2797	4049	3748	3478	3101
Average number of monthly ED visits	1819	1955	2341	3069	3016	4206	3892	3621	3212
Factors influencing health care	3.1%	3.3%	3.2%	6.0%	16.3%	4.3%	3.2%	3.6%	3.0%
Symptoms, signs, and ill-defined conditions	26.1%	23.5%	26.5%	21.6%	16.2%	24.0%	24.2%	22.6%	22.9%
Other injuries and conditions due to external causes	4.6%	7.4%	7.6%	8.5%	15.8%	5.7%	6.4%	7.3%	8.0%
Respiratory Infections	31.2%	30.7%	30.4%	25.4%	13.3%	30.7%	35.8%	34.1%	30.9%
Fractures	0.5%	2.1%	1.2%	3.2%	10.2%	1.5%	0.9%	1.4%	2.1%
Superficial Injury, contusion	3.5%	4.5%	3.6%	5.4%	9.9%	4.0%	4.2%	4.5%	5.7%
Other lower respiratory disease	15.2%	14.5%	16.6%	14.2%	8.4%	16.4%	17.5%	15.3%	12.9%
Other gastrointestinal disorders	6.5%	6.6%	6.8%	6.8%	5.2%	6.7%	7.5%	7.1%	6.1%
Ear Condition	10.8%	11.6%	9.9%	8.6%	4.3%	10.8%	12.2%	13.0%	13.0%
Viral Infection	11.9%	10.6%	10.3%	9.0%	4.2%	10.2%	11.8%	13.2%	13.2%
Open Wounds	2.8%	2.6%	2.9%	2.0%	2.1%	3.0%	3.3%	4.0%	4.7%
Asthma	1.4%	1.4%	1.5%	1.0%	0.6%	2.4%	1.8%	2.1%	3.1%
Comparison, Children and Youth Non-Foster Care (N = 9,137)									
Average number of unique patients	1505	1956	2091	2339	1516	4495	4286	4217	4007
Average number of monthly ED visits	1555	2052	2192	2418	1575	4645	4433	4379	4135
Factors influencing health care	1.5%	2.7%	2.7%	2.4%	3.2%	2.5%	2.0%	1.6%	2.0%
Symptoms, signs, and ill-defined conditions	0.9%	1.4%	1.1%	1.0%	0.8%	1.3%	1.2%	1.6%	1.1%
Other injuries and conditions due to external causes	6.5%	5.1%	6.4%	6.3%	5.1%	5.1%	5.8%	6.6%	6.6%
Respiratory Infections	31.8%	28.6%	29.5%	29.4%	22.4%	28.5%	32.2%	29.6%	28.2%
Fractures	0.6%	1.3%	0.8%	1.0%	1.3%	1.2%	1.0%	1.3%	1.5%
Superficial Injury, contusion	3.2%	3.1%	3.0%	3.4%	2.6%	3.3%	3.3%	4.1%	3.7%
Other lower respiratory disease	12.9%	12.3%	15.1%	14.0%	12.7%	13.6%	14.5%	12.6%	12.6%
Other gastrointestinal disorders	7.4%	7.9%	8.1%	6.7%	6.3%	8.0%	8.2%	7.8%	8.7%
Ear Condition	13.7%	10.7%	10.8%	8.8%	8.9%	8.1%	9.7%	11.8%	13.4%
Viral Infection	12.4%	11.8%	11.1%	11.8%	11.4%	11.4%	14.2%	13.8%	14.0%
Open Wounds	2.0%	2.5%	2.8%	2.1%	2.3%	2.8%	3.0%	3.4%	4.6%
Asthma	1.7%	1.5%	2.2%	1.3%	1.3%	1.2%	2.0%	2.5%	2.7%

Table 3. Top ED diagnosis categories as a proportion of total ED visits for children and youth in foster care and comparison group (Age 3-6)

CCS Category/Diagnosis	-Q4	-Q3	-Q2	-Q1	Reference Month	Q1	Q2	Q3	Q4
Foster Care (N = 6,142)									
Average number of unique patients	1133	1167	1100	1295	813	1367	1218	1181	1062
Average number of monthly ED visits	1216	1245	1173	1373	881	1437	1290	1253	1122
Other injuries and conditions due to external causes	8.9%	10.0%	6.5%	9.8%	17.8%	9.9%	8.2%	6.9%	8.1%
Factors influencing health care	2.1%	3.1%	3.3%	4.9%	16.9%	5.6%	3.8%	4.5%	3.6%
Superficial Injury, contusion	6.7%	7.1%	7.8%	7.5%	13.8%	6.5%	7.2%	6.4%	7.5%
Respiratory Infections	25.7%	26.4%	26.4%	24.7%	13.2%	25.1%	25.3%	26.7%	25.0%
Symptoms, signs, ill-defined conditions	20.2%	20.9%	19.2%	18.6%	12.5%	18.4%	19.8%	19.9%	15.5%
Ear Condition	10.3%	11.2%	9.6%	9.7%	7.5%	9.9%	11.2%	8.8%	9.2%
Other lower respiratory disease	8.8%	10.8%	11.3%	10.3%	7.3%	11.2%	10.6%	12.7%	8.4%
Open wounds	10.4%	7.7%	7.8%	7.6%	6.9%	7.3%	8.4%	9.9%	8.8%
Viral Infection	8.4%	9.2%	8.7%	8.3%	6.4%	7.7%	8.6%	8.4%	7.6%
Asthma	4.5%	6.4%	6.3%	6.3%	4.0%	7.2%	5.7%	7.8%	6.2%
Disease of the urinary system	3.8%	2.4%	3.2%	2.8%	2.0%	2.6%	3.4%	2.7%	3.4%
Other gastrointestinal disorders	3.1%	5.3%	4.5%	3.9%	2.3%	3.9%	3.9%	3.7%	3.9%
Fractures	3.5%	2.1%	3.4%	4.2%	3.6%	5.8%	4.3%	4.6%	5.2%
Comparison, Children and Youth Non-Foster Care (N = 6,155)									
Average number of unique patients	1159	1179	1070	1062	454	1408	1549	1309	1320
Average number of monthly ED visits	1220	1245	1116	1113	488	1480	1633	1369	1389
Other injuries and conditions due to external causes	6.6%	4.8%	6.4%	4.9%	5.1%	6.4%	6.2%	6.1%	8.0%
Factors influencing health care	1.8%	2.1%	2.9%	1.3%	2.9%	2.4%	2.1%	2.1%	1.9%
Superficial Injury, contusion	7.8%	4.4%	6.4%	7.0%	8.0%	6.4%	4.8%	6.4%	5.5%
Respiratory Infections	30.4%	29.4%	24.7%	24.9%	21.1%	28.2%	29.2%	25.8%	22.9%
Symptoms, signs, ill-defined conditions	21.8%	26.3%	21.4%	25.1%	23.0%	25.3%	22.4%	26.5%	25.5%
Ear Condition	11.5%	10.7%	10.8%	9.3%	9.2%	8.1%	11.5%	8.2%	8.1%
Other lower respiratory disease	9.9%	13.8%	8.9%	10.1%	7.8%	10.6%	8.8%	9.6%	9.2%
Open wounds	6.4%	7.1%	8.2%	7.9%	9.6%	9.1%	7.9%	5.9%	7.5%
Viral Infection	8.1%	10.8%	8.7%	8.7%	8.0%	9.3%	9.1%	9.6%	10.8%
Asthma	5.5%	6.2%	4.7%	6.6%	4.5%	7.2%	6.6%	8.8%	6.3%
Disease of the urinary system	3.5%	2.7%	3.8%	5.2%	4.5%	2.9%	5.2%	2.1%	2.6%
Other gastrointestinal disorders	---	---	---	---	---	---	---	---	---
Fractures	3.4%	2.7%	2.7%	4.3%	4.3%	2.7%	3.1%	5.9%	4.8%

Table 4. Top ED diagnosis categories as a proportion of total ED visits for children and youth in foster care and comparison group (Age 7-12)

CCS Category/Diagnosis	-Q4	-Q3	-Q2	-Q1	Reference Month	Q1	Q2	Q3	Q4
Foster Care (N=6,179)									
Average number of unique patients	1022	1098	1182	1482	782	1472	1330	1194	1272
Average number of monthly ED visits	1105	1174	1243	1554	851	1553	1388	1266	1364
Other injuries and conditions due to external causes	8.6%	9.2%	8.5%	7.5%	15.3%	10.0%	8.9%	10.1%	11.6%
Superficial Injury, contusion	10.0%	6.0%	10.1%	9.9%	14.7%	12.8%	9.4%	8.6%	11.9%
Symptoms, signs, ill-defined conditions	16.4%	16.3%	18.6%	15.6%	14.3%	16.4%	20.3%	14.8%	15.9%
Factors influencing health care	2.1%	3.1%	2.3%	4.4%	9.8%	5.2%	3.6%	4.8%	4.5%
Respiratory Infections	19.5%	18.6%	19.1%	15.6%	8.6%	11.3%	12.8%	14.1%	11.6%
Suicide and intentional self-injury	0.9%	3.2%	2.3%	5.7%	8.3%	6.9%	5.7%	6.6%	7.7%
Fractures	6.6%	3.6%	5.6%	6.6%	5.3%	5.9%	6.1%	6.6%	7.4%
Asthma	5.8%	7.7%	7.0%	5.8%	5.2%	5.2%	5.2%	5.2%	3.8%
Other lower respiratory disease	8.6%	9.2%	6.4%	5.9%	4.3%	3.7%	3.7%	4.6%	5.4%
Open Wounds	7.3%	5.7%	5.2%	5.5%	3.6%	6.8%	7.6%	7.1%	5.4%
Viral Infection	6.0%	6.0%	4.3%	3.6%	2.9%	3.7%	4.0%	2.8%	3.2%
Ear Condition	5.5%	5.8%	4.8%	5.3%	2.8%	3.8%	3.5%	4.6%	4.2%
Sprains and Strains	4.2%	4.3%	5.1%	4.3%	2.7%	5.5%	5.5%	6.3%	4.8%
Comparison, Children and Youth Non-Foster Care (N=6,182)									
Average number of unique patients	864	804	831	847	425	1234	1175	1187	1151
Average number of monthly ED visits	930	855	892	886	448	1311	1248	1252	1218
Other injuries and conditions due to external causes	9.5%	8.3%	7.5%	8.9%	6.0%	7.2%	8.0%	7.8%	6.0%
Superficial Injury, contusion	7.2%	10.5%	8.4%	9.3%	10.0%	8.2%	7.1%	7.5%	7.6%
Symptoms, signs, ill-defined conditions	20.1%	24.2%	16.5%	21.0%	22.5%	23.6%	22.2%	20.4%	20.9%
Factors influencing health care	1.4%	1.8%	0.8%	2.0%	2.5%	2.1%	2.2%	1.6%	2.2%
Respiratory Infections	19.8%	17.7%	20.3%	19.2%	18.3%	19.0%	17.7%	17.3%	16.3%
Suicide and intentional self-injury	0.3%	0.5%	0.3%	0.2%	1.1%	1.5%	1.5%	1.7%	1.6%
Fractures	6.0%	5.3%	8.4%	6.7%	4.0%	5.8%	6.2%	5.7%	7.6%
Asthma	6.0%	7.1%	5.9%	8.9%	9.2%	5.5%	8.8%	5.5%	7.1%
Other lower respiratory disease	5.6%	8.0%	6.3%	6.1%	6.7%	7.5%	6.3%	5.5%	5.8%
Open Wounds	5.7%	5.6%	5.7%	5.8%	5.4%	4.4%	5.9%	5.2%	5.7%
Viral Infection	6.7%	6.4%	7.3%	6.0%	5.8%	3.9%	4.8%	5.8%	4.8%
Ear Condition	8.7%	4.8%	5.2%	6.1%	5.6%	6.9%	7.0%	5.4%	5.3%
Sprains and Strains	4.2%	3.5%	5.3%	7.2%	5.8%	6.8%	6.5%	5.8%	6.8%

Table 5. Top ED diagnosis categories as a proportion of total ED visits for children and youth in foster care and comparison group (Age 13-18)

CCS Category/Diagnosis	-Q4	-Q3	-Q2	-Q1	Reference Month	Q1	Q2	Q3	Q4
Foster Care (N=6,397)									
Average number of unique patients	1654	1840	2034	2536	1308	2847	2648	2347	2229
Average number of monthly ED visits	1768	1957	2163	2675	1381	3014	2796	2491	2355
Symptoms, signs, ill-defined conditions	14.6%	15.1%	14.9%	14.2%	15.1%	17.1%	17.7%	16.9%	17.7%
Superficial injury, contusion	10.8%	8.7%	11.9%	11.4%	14.5%	9.6%	11.0%	11.0%	10.2%
Suicide and intentional self injury	6.7%	8.8%	9.0%	11.4%	14.2%	7.9%	7.4%	7.9%	6.3%
Other injuries and conditions due to external causes	10.3%	9.1%	9.7%	10.2%	13.8%	10.9%	11.2%	10.6%	11.1%
Factors influencing health care	4.1%	5.8%	7.1%	10.9%	11.2%	7.6%	7.8%	5.7%	6.5%
Fractures	5.3%	5.8%	4.4%	4.4%	5.4%	5.1%	6.3%	5.4%	5.4%
Sprains and Strains	6.5%	6.6%	4.9%	5.0%	4.5%	5.2%	6.2%	6.7%	5.9%
Open Wounds	6.8%	6.8%	7.0%	5.6%	4.4%	5.4%	7.2%	6.7%	6.8%
Asthma	3.9%	2.9%	4.1%	4.6%	4.1%	2.7%	3.3%	3.3%	3.6%
Respiratory Infections	11.2%	10.5%	8.7%	7.5%	4.1%	5.2%	5.5%	6.2%	6.8%
Other lower respiratory disease	4.8%	5.0%	4.4%	3.5%	3.5%	3.4%	3.9%	4.3%	4.2%
Viral Infection	4.8%	1.7%	2.4%	1.9%	1.7%	1.0%	1.5%	1.6%	2.8%
Comparison, Children and Youth Non-Foster Care (N=6,384)									
Average number of unique patients	1037	1076	1178	1196	642	1717	1713	1767	1550
Average number of monthly ED visits	1120	1154	1263	1279	679	1828	1812	1885	1645
Symptoms, signs, ill-defined conditions	20.1%	18.8%	18.8%	18.4%	20.6%	19.8%	19.8%	19.8%	20.8%
Superficial injury, contusion	10.3%	10.1%	6.5%	8.9%	6.8%	7.9%	7.6%	7.6%	7.2%
Suicide and intentional self injury	3.1%	2.4%	3.8%	3.9%	4.4%	4.2%	3.1%	4.9%	4.2%
Other injuries and conditions due to external causes	8.3%	10.1%	10.9%	8.6%	8.0%	8.1%	7.7%	8.5%	9.1%
Factors influencing health care	2.1%	2.3%	3.0%	2.5%	3.5%	2.2%	3.3%	3.1%	2.9%
Fractures	5.5%	5.6%	5.8%	7.1%	6.8%	4.2%	4.5%	4.3%	3.5%
Sprains and Strains	7.7%	9.3%	9.0%	8.8%	6.8%	8.2%	9.1%	7.4%	7.6%
Open Wounds	3.8%	3.7%	3.9%	5.1%	4.6%	5.2%	4.4%	4.2%	4.1%
Asthma	5.5%	5.4%	4.8%	6.3%	4.3%	4.5%	5.5%	4.3%	4.3%
Respiratory Infections	11.8%	14.4%	13.3%	10.8%	10.8%	10.7%	11.1%	10.5%	11.0%
Other lower respiratory disease	4.6%	4.8%	6.7%	5.8%	5.3%	4.3%	5.4%	5.9%	4.7%
Viral Infection	3.8%	3.1%	3.2%	2.3%	3.8%	2.7%	2.6%	3.0%	3.6%

Definitions

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 September 2019 excluding members who had foster care aid codes on or prior to July 1, 2011. Seven 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)

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 September 2019.

Reference month: The month of entry into foster care for children and youth in foster care. Reference month is the same month and year for matched comparison children and youth as their foster care match.

Data Source and Methods

The University of Colorado School of Medicine (CUSOM) assessed emergency department (ED) visits among children and youth in foster care from July 2011 to September 2019 and compared ED diagnoses to a matched comparison group of children eligible for Health First Colorado during the same time period. Individuals were matched by age (within 6 months), sex, months of eligibility for Health First Colorado during the analysis period and medical complexity based on the Pediatric Medical Complexity Algorithm (Version 3). This analysis uses medical claims provided by the Department of Health Care Policy and Financing (HCPF). Health First Colorado claims were used to ascertain information about ED visits. CUSOM excluded unpaid claims that occurred during the study period.

Clinical Classification Software: ED diagnoses were categorized according to the Clinical Classification Software (CCS) for ICD-9 and ICD-10 codes, which was developed through the Agency for Healthcare Research and Quality (AHRQ).⁸ The CCS categorizes procedure and diagnosis codes into clinically meaningful categories by 21 body systems and three levels. For the purpose of this analysis, CUSOM used the multi-level CCS diagnoses categories.

Comparisons of the foster care population and the non-foster population of Health First Colorado children and youth examined the prevalence of each diagnoses group identified by using the CCS.

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