

Strengthening Health Outcomes for Foster Care Children

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Foreword

This report is the result of collaboration between the Robert M. La Follette School of Public Affairs at the University of Wisconsin–Madison and the Wisconsin Department of Health Services and Department of Children and Families.

Our objective is to provide graduate students at La Follette the opportunity to improve their policy analysis skills while contributing to the capacity of local and Wisconsin state governments to provide public services to their residents.

The La Follette School offers a two-year graduate program leading to a master's degree in public affairs. Students study policy analysis and public management, and they can choose to pursue a concentration in a policy focus area. They spend the first year and a half of the program taking courses in which they develop the expertise needed to analyze public policies.

The authors of this report are all in their last semester of their degree program and are enrolled in Public Affairs 869 Workshop in Public Affairs. Although acquiring a set of policy analysis skills is important, there is no substitute for doing policy analysis as a means of learning policy analysis. Public Affairs 869 gives graduate students that opportunity.

This year the students in the workshop were divided into six teams, four under the direction of my La Follette School colleague Professor Andrew Reschovsky; I supervised two of the projects, including this one.

This study concerns children in out-of-home (foster) care. These children have comprehensive medical needs that differ from other child populations, largely due to their circumstances. This analysis examines Medicaid data for two groups of children: children in out-of-home care (who are automatically covered by Medicaid) and children enrolled in Medicaid but not in out-of-home care.

The study finds that the majority of children maintain Medicaid coverage even after discharge from out-of-home care, indicating a great degree of continuity in coverage. Children in out-of-home care also show a substantially higher incidence of almost all mental health conditions than both their non-out-of-home care Medicaid counterparts and Wisconsin's general child population.

Based on the analysis, the authors—Susan Cosgrove, Carlton Frost, Rebecca Chown, and Tawsif Anam—make specific recommendations for the implementation of the Foster Care Medical Home program that is being set up to better serve the needs of these children; this program will be implemented in six counties in southeastern Wisconsin. These focus on the delivery of routine, screening, and mental health services to out-of-home care children.

The Department of Health Services and the Department of Children and Families suggested the topic. The help and support of members of the staff of these two agencies—especially, Fredi-Ellen Bove—are acknowledged.

The report also benefited greatly from the support of the staff of the La Follette School. Cindy Manthe and Marjorie Matthews contributed logistic support, and Karen FASTER, the La Follette publications director, edited and managed production of the final bound and online document.

By involving La Follette students in the tough issues confronting the

public sector in Wisconsin, I hope they not only have learned a great deal about doing policy analysis but have gained an appreciation of the complexities and challenges facing public officials in Wisconsin and elsewhere. I also hope that this report will contribute to the development of a greater understanding of the out-of-home care program in Wisconsin and the possibility of improving the lives of the children involved.

Robert Haveman
John Bascom Emeritus Professor of Economics and Public Affairs
May 2013
Madison, Wisconsin

Acknowledgments

We thank the staff members at the Wisconsin Department of Health Services and the Department of Children and Families who assisted us throughout the project and offered their feedback over the course of writing this report. We are especially grateful to Fredi-Ellen Bove, Beth Wroblewski, David Hoffert, and Devon Syrjanen, who met with us and gave us valuable comments and advice. We extend our gratitude to our colleagues, the faculty, and the staff at the Robert M. La Follette School of Public Affairs for their support. In particular, we thank Professors Andrew Reschovsky and Robert Haveman for their guidance, and Karen FASTER, publications director, for her exceptional editorial support.

Executive Summary

Children in out-of-home care—commonly known as foster care children—have comprehensive medical needs that differ from those of other child populations. To better serve the needs of foster children, who are automatically enrolled in Medicaid, the Department of Children and Families and the Department of Health Services of Wisconsin are implementing a Foster Care Medical Home project in six counties. This analysis examines Medicaid data for two groups of children: children in out-of-home care and children enrolled in Medicaid but not in out-of-home care. Based on the analysis, we make specific recommendations for the implementation of the Foster Care Medical Home project.

First, we find that children in out-of-home care show a substantially higher prevalence of almost all physical and mental health conditions than their non-out-of-home care Medicaid counterparts and the general child population in Wisconsin. In terms of routine services, the out-of-home care population receives more routine services, including routine checkups, immunizations, and mental health screenings than the Medicaid population; however, our assessment indicates that children in out-of-home care still have unmet routine health care needs. Additionally, out-of-home care children utilize emergency room services more often than their Medicaid counterparts. Finally, the majority of foster care children maintain Medicaid coverage after discharge from out-of-home care, indicating a substantial degree of continuity in coverage.

Our recommendations for the Foster Care Medical Home project focus on the delivery of routine, screening, and mental health services. Delivering routine services would increase the likelihood that physical and mental health conditions are diagnosed and properly treated. Although screening for mental health conditions is the first step in detection, additional diagnostic tests, proper follow-up, and continued care are necessary to ensure that children in out-of-home care receive appropriate treatment. The Medicaid system in Wisconsin already has screening tools for children; we recommend full utilization of resources like HealthCheck to identify conditions within the out-of-home care population. Finally, because most of these children remain in Medicaid beyond their time in out-of-home care, we recommend the departments continue to monitor the health status of these children throughout the implementation of the Foster Care Medical Home.

Introduction

Children in out-of-home care¹ have unique health needs related to trauma, abuse, neglect, and instability (Chernoff, Combs-Orne, Risley-Curtiss, & Heisler, 1994). In Wisconsin, children are automatically enrolled in Medicaid as soon as they are placed in out-of-home care. However, due to their circumstances, children in out-of-home care usually require more complex health care than the Medicaid child population. For example, foster care children may have untreated or undiagnosed chronic illnesses, significant mental health needs, or limited availability of health histories. All these factors have the potential to affect children's health in the short and the long term.

In Wisconsin, both the Department of Health Services (DHS) and the Department of Children and Families (DCF) are interested in identifying specific health needs of these children and developing programmatic solutions to better serve them. To this end, the Departments have collected data that include all services, diagnoses, and the out-of-home care placement status for all children on Medicaid for 2009, 2010, and 2011. Analysts at the Department of Health Services have carried out preliminary descriptive analysis of the foster care population; however, further exploration is necessary.

DHS and DCF would like to use the data to explore several issues relevant to the design and implementation of the Foster Care Medical Home (FCMH), a pilot project to provide timely, comprehensive, and coordinated medical care to children placed in out-of-home care. The FCMH project uses a collaborative care model, with a primary care physician and a care coordinator assigned to each child to meet the complex health needs of these children. The FCMH will incorporate evidence-based practices for dealing with trauma and promote continuity of care, an important consideration for children who experience a great deal of instability in their lives. This pilot project will serve a six-county region in Southeast Wisconsin.

The purpose of our analysis is to gain a comprehensive understanding of the health status of out-of-home care children, especially relative to their peers, to inform the development and implementation of the FCMH so that it may best serve the specialized needs of this population. First, we compare the prevalence of certain common conditions (such as asthma and mental illness) in three populations: out-of-home care children enrolled in Wisconsin Medicaid, all children enrolled in Wisconsin Medicaid, and the general population of children in Wisconsin. To quantify unmet routine health needs, we use the American Academy of Pediatrics guidelines for routine health services and compare the receipt of these services in the foster children and Medicaid child populations. Next, we examine hospital utilization among the out-of-home care population, before, during, and after their out-of-home stays. Finally, we determine the

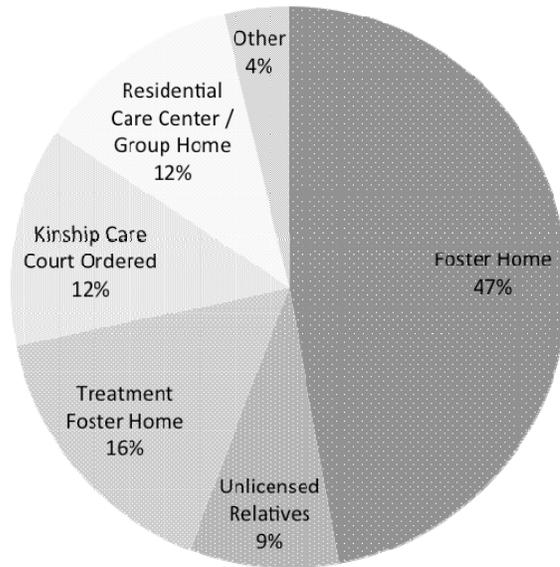
¹ In our report, we use the terms "children in out-of-home care," "foster children," and "foster care population" interchangeably. All of these terms may mean children in any of the out-of-home care placement settings listed in Appendix A. In addition, "foster care" and "out-of-home care" are used interchangeably.

Medicaid eligibility of foster children before and after their placements. This data analysis, combined with a thorough literature review, is the basis for our recommendations for effective implementation of the FCMH in Wisconsin.

Out-of-Home Care in Wisconsin

The child welfare system in Wisconsin is state supervised and county administered in 71 counties, and state administered in Milwaukee County through the DCF/Bureau of Milwaukee Child Welfare. The state also administers the Special Needs Adoption Program (Wisconsin Department of Children and Families (DCF), 2011). If a Child Protective Services worker determines there are threats to a child’s safety in the family home, the child is placed in out-of-home care via a court order or through a voluntary placement agreement. Placement settings for out-of-home care may include foster homes, relative and non-relative homes, group homes, residential care centers, and shelter care (DCF, 2011). For details of placement settings, see Appendix A. Thirty-three percent of children statewide were placed with relatives in 2011. Figure 1 breaks down out-of-home care placement settings in 2011. Licensed relative settings are included within the “foster home” and “treatment foster home” categories.

Figure 1: Out-of-Home Care Placement Settings in 2011



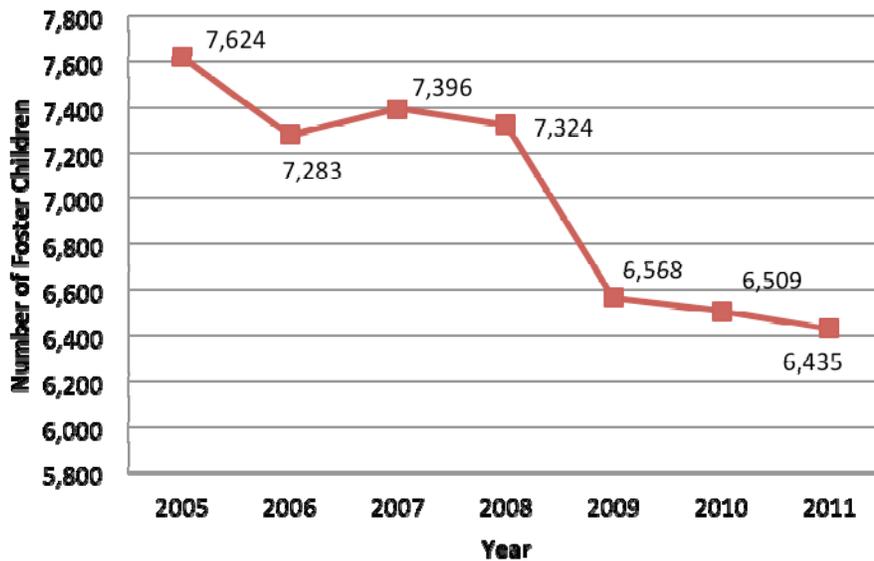
Source: Wisconsin Department of Children and Families

According to the 2011 *Wisconsin Children in Out-of-Home Care* report, 6,435 children were in out-of-home care in Wisconsin at the end of 2011, a decrease of 74 children from the end of 2010. There were 207 more discharges from out-of-home care than entries during 2011. A majority of children in out-of-home care are 10 or younger (58 percent), male (54 percent), and Caucasian

(53 percent). The Bureau of Milwaukee Child Welfare has placement and care responsibility for 32 percent of the out-of-home care population (DCF, 2013).

Figure 2: Children in Out-of-Home Care

Number of children as of December 31 each year from 2005 to 2011



Source: Wisconsin Department of Children and Families

Seventeen percent of children who entered out-of-home care in 2011 were identified as having at least one clinically diagnosed disability (DCF, 2013). Determined by the federal government for reporting purposes, recorded disability categories include physically disabled, visually or hearing impaired, emotionally disturbed, learning disabled, mentally retarded, or any other medical condition requiring special care (DCF, 2011). The annual report likely underreports the number of children with disabilities because it does not capture ongoing updates of a disability in the child’s case history (DCF, 2013).

The most commonly reported disability for a child in out-of-home care in 2011 was emotional disturbance, with almost 75 percent of these children with a disability identified as emotionally disturbed (DCF, 2011). Emotional disturbance is an inability to build or maintain satisfactory interpersonal relationship; inappropriate types of behavior or feelings under normal circumstances; a general pervasive mood of unhappiness or depression; or a tendency to develop physical symptoms or fears associated with personal problems. This diagnosis includes children who are schizophrenic or autistic and is based on the *Diagnostic and Statistical Manual of Mental Disorders*, Third Edition (National Resource Center for Child Welfare Data and Technology, 2003).

An out-of-home care placement ends when a child is discharged from out-of-home care. According to DCF, “The discharge date represents the date the child achieves a permanent outcome, such as reunification, adoption, guardianship, or permanent placement with a relative” (DCF, 2011). Reunification was the most frequent discharge reason (62 percent). Adoption

finalization (14 percent), age of majority (9 percent), and guardianship (9 percent) were other common reasons for discharge in 2010 (DCF, 2011). In 2011, the median length of stay—the time to discharge—was 326 days (DCF, 2013).

The Foster Care Medical Home Project

A medical home is a “patient-centered, multifaceted source of personal primary health care” (Rosenthal, 2008, p. 427) that is comprehensive, coordinated, and integrated. Comprehensiveness includes a provision of services that accounts for the majority of patient needs, including mental health (Peek 2009; Harkness & Bower, 2009; Nutting et al., 2008). Coordination of care requires guiding children’s access to more narrowly focused care when needed (Stange et al., 1998). Integration of care across multiple settings requires optimal care and prioritized delivery of services for acute and chronic illness, prevention, and mental health (Stange, 2009). The medical home model is suited for addressing the complex medical needs of children in out-of-home care. See Appendix B for a more detailed description of the medical home model.

DCF and DHS have received federal approval to pilot a medical home health services delivery system for children in the welfare system. Wisconsin’s FCMH pilot project is designed to improve quality, access, and timeliness of health services through care coordinated across multiple participants. The FCMH pilot will serve children in out-of-home care in six counties in southeastern Wisconsin: Milwaukee, Waukesha, Racine, Kenosha, Washington, and Ozaukee. Each month, approximately 3,550 children are in out-of-home care and enrolled in Medicaid in these six counties (DHS, 2012).

The FCMH project is designed to achieve five health care delivery goals (DHS, 2012):

1. An integrated and comprehensive health service delivery plan tailored to each individual child’s needs for physical, behavioral, and oral health care.
2. Timely and appropriate health care, including an initial health screening within 48 hours of the child entering the out-of-home care system, followed by a comprehensive health assessment within 30 days.
3. Trauma-informed and evidence-informed practices with the flexibility to deliver services in the most effective setting, including home settings.
4. Necessary transitional planning and follow-up services providing for continuity of health care after a child is discharged from out-of-home care.
5. Better well-being outcomes through improved behavior and mental health, enhanced resiliency, and positive permanency outcomes.

Recently, Illinois implemented a similar medical home model to serve children in out-of-home care. This program, called HealthWorks, has led to higher immunization rates, higher utilization of primary care and well-child visits, and

lower utilization of emergency room care for children with chronic conditions (Jaudes, Champagne, Harden, Masterson, & Bilaver, 2012). The success of this program, as described in greater detail in Appendix C, indicates that the medical home model can meet the health care needs of children in out-of-home care.

Health Outcomes of Foster Care Children

Research has consistently shown health disparities among children based on their placement status (Bruce, Fisher, Pears, & Levine, 2009; English, Morreale, & Larsen, 2003; Altshuler & Poertner, 2003). Before, during, and after their stay in out-of-home care, foster children routinely experience unmet health care needs, undiagnosed or untreated illness, and poor health outcomes (Chernoff et al., 1994; Eggerston, 2008; Fowler, Toro, & Miles, 2011). While these health issues typically begin before the child enters the out-of-home care system, longer stays and multiple placements tend to exacerbate problems. Children who enter the out-of-home care system at a young age are likely to have health problems that persist or worsen into adolescence, and the entire out-of-home care population is at risk of these problems continuing into adulthood (Bruce, et al., 2009; Villegas, Rosenthal, O'Brien, & Pecora, 2011).

Prior to entering out-of-home care, children are vulnerable to a number of risk factors, including abuse, neglect, poverty, and parental mental illness or substance abuse, that increase the incidence and prevalence of health problems and the likelihood of entrance into out-of-home care (Chernoff et al., 1994). In addition, these factors decrease the likelihood that health conditions are properly diagnosed, monitored and treated prior to the child's entrance into out-of-home care. Frequent changes in health care arrangements, doctors, and schools—events that are common prior to entrance into out-of-home care—further interfere with proper screening for common physical and mental health conditions (Jee et al., 2006; Petrenko, Culhane, Garrido, & Taussig, 2011). Finally, incomplete or non-existent medical records hinder physicians' abilities to identify ongoing patterns of illness or continue treatment of an existing illness (Heiligenstein, 2010).

Once children enter the out-of-home care system, the relationship between health status and placement stability may put unhealthy children at further risk. Children with health problems are more likely to experience multiple out-of-home placements and greater instability; this mobility further decreases the likelihood that illnesses are properly diagnosed, treated, and managed (Eggerston, 2008). Other risk factors for illness and multiple placements include delinquency and sexual abuse. Foster care children have been shown to have higher rates of health problems than other poor children receiving Medicaid (English et al., 2003).

Serious illnesses such as respiratory disease, diabetes, and tuberculosis are all common in foster care children (Sullivan & van Zyl, 2008). These children reported chronic conditions such as heart disease, seizure disorders, and sickle-cell anemia more often than children who remain in their home (Altshuler & Poertner, 2003). Furthermore, chronic and untreated physical conditions are associated with increased risk of mental health and behavioral problems (Woods,

Farineau, & McWey, 2013). Foster children are also shown to have higher cortisol levels than children who remain in their home, indicating greater stress levels, which can further exacerbate chronic physical health problems (Bruce, et al., 2009). The circular relationship between mental and physical health problems precipitates poorer outcomes for all chronic conditions.

Mental health problems are more prevalent in foster care children than other populations. Disorders such as depression, post-traumatic stress disorder, social phobia, attention disorders, and substance abuse have all been reported at higher rates in the out-of-home care population (Leslie et al., 2000; Villegas & Pecora, 2012). Despite having higher rates of utilization for mental health services, the out-of-home care population still has significant unmet mental health needs: Multiple studies estimate that half of all foster care children with a clinically diagnosable mental health problem receive treatment (Jee et al., 2010).

In addition to physical and mental health issues, adolescents in out-of-home care demonstrate increased risk behaviors such as sexual promiscuity, delinquency, substance abuse, and suicidality (Kools, Paul, Jones, Monasterio, & Norbeck, 2013). Upon aging out of the out-of-home care system, which occurs at age 18 or 19 in Wisconsin, depending on age at high school graduation, former foster children face barriers to health care that prevent the continued management of medical problems (Fowler et al., 2011). Chronic problems that remain undetected or untreated in childhood and adolescence can develop into life threatening conditions during adulthood. The medical treatment that children receive while they are in out-of-home care has an impact on their health for the rest of their lives (Villegas et al., 2011).

Research Questions and Data

In our analysis, we compare differences in the period prevalence of illness and health care utilization across three groups of children in Wisconsin: the out-of-home care population; the non-out-of-home care population of children on Medicaid (often referred to as the “Medicaid child population”); and the general child population of Wisconsin. We define the out-of-home care population as any child in out-of-home care at any point during the three-year period from 2009 through 2011 for which we have data. Medicaid children are those enrolled in Medicaid at any point during the same time period, but who were never in out-of-home care. The general child population consists of all children in Wisconsin.

Period prevalence refers to the total number of events that occur during a given time period (Ibrahim, Alexander, Shy, & Farr, 1999). In our analysis, we use period prevalence to describe initial diagnoses of mental and physical conditions in the populations of interest. While we lack diagnoses for children prior to the 2009 start date for our dataset and prior to their entry into foster care or Medicaid, we believe our results represent a reasonably accurate portrait of prevalence during the 2009 to 2011 time period. Most of the conditions of interest are chronic conditions. Children who have been diagnosed with these illnesses are highly likely to make a claim at some point during this period due to the ongoing

nature of these illnesses. If anything, our period prevalence rates will underestimate the number of children in the population with the disease. Unless otherwise specified in this report, “prevalence” refers to the three-year prevalence from 2009 to 2011.

DHS and DCF are interested in answers to four primary research questions relative to the out-of-home care population and the Medicaid child population:

1. What is the prevalence of common childhood ailments in these populations? How do these groups compare to one another? How do they compare to the general child population of Wisconsin?
2. How do the out-of-home care and the Medicaid child populations compare in receipt of routine health care services? Does either group have unmet needs for routine care?
3. What are the emergency room utilization rates for children before, during, and after they are placed in out-of-home care?
4. What is the Medicaid status of foster children before they are placed in out-of-home care and after they are discharged from out-of-home care?

We hypothesize that prevalence rates for mental health-related diagnoses and procedures are higher for children in out-of-home care relative to the Medicaid child population and the general child population in Wisconsin. We also hypothesize that although both groups have substantial unmet needs, out-of-home care children receive less routine care than the Medicaid child population. Finally, we expect to see higher rates of emergency room utilization and mental health in-patient care in the foster care population than in the Medicaid child population.

DHS provided the data for this project. The dataset contains information about all children on Medicaid in Wisconsin from 2009 through 2011, including information on eligibility, placement status, medical assistance plan, services received, costs, and diagnoses. For each service or procedure a child receives, he or she may receive up to nine concurrent diagnoses; unless otherwise noted, our analyses consider every diagnosis a child is given. During this time period, 16,989 children were in out-of-home care at some point. For these analyses, we use a random sample of children from the total Medicaid data, equivalent to 2 percent of the total population or 12,870 children. Additional figures for the general child population are drawn from state and federal agencies, academic research, and other literature.

Results

To better understand the needs of the foster care population and inform the FCMH program, we begin with an analysis of common chronic and acute illnesses in the foster care, Medicaid, and general child populations. Next, we analyze the receipt of routine medical care in the foster care and Medicaid populations to quantify unmet need. Then, we analyze emergency room and hospital utilization in the foster care population before, during, and after out-of-home care, and compare these rates to the Medicaid population; finally, we look at continuity of care related to children's Medicaid status before and after they are in out-of-home care.

Common Chronic Illnesses in Children

Chronic health conditions are those that last more than three months, affect daily activities, and require a great deal of medical care (Boyse, Boujaoude, & Laundy, 2012). Common chronic childhood illnesses include asthma, diabetes, cystic fibrosis, malnutrition, developmental disabilities, autism, and other mental illnesses. These conditions can result from genetic or environmental factors; some chronic conditions are even precipitated by prenatal exposure to substances such as tobacco or alcohol (Torpy, Campbell, & Glass, 2010). Foster children are especially predisposed to developing these conditions due to their exposure to environmental and situational risk factors.

To estimate the prevalence of common chronic illnesses in the foster care population, we count the first time a child receives a diagnosis of the condition of interest, aggregate the total number of diagnoses, and then divide this number by the number of children (16,989) who were ever in foster care from 2009 to 2011. The same process is used to estimate prevalence in the Medicaid population (approximately 643,500 children). The estimates for the general child population of Wisconsin (approximately 1.3 million children), when available, are drawn from the sources specified below (U.S. Census Bureau, 2013). Due to the specificity of diagnoses in our datasets for the foster care and Medicaid populations, prevalence rates for the general child population are unavailable for a number of conditions of interest. The diagnoses in Table 1 represent common chronic conditions supported by the literature, specific conditions of interest to the DCF and DHS, and diagnoses that appeared most frequently in the data.

Table 1: Common Chronic Conditions in Wisconsin Children

Prevalence of chronic physical health conditions and mental illnesses in the foster child and Medicaid child populations from 2009 to 2011

Chronic Health Conditions	Out-of-Home Care	Medicaid	Wisconsin
Asthma	21%	11%	10% ^a
Diabetes	1%	0.5%	0.3% ^b
Cystic Fibrosis	0.7%	0.4%	Not Available
Epilepsy	2%	1%	Not Available
Refraction Disorder (Eyesight)	31%	19%	Not Available
Nutritional Symptoms	14%	8%	Not Available
Mental Illness	Out-of-Home Care	Medicaid	Wisconsin
Child Mental Illness (Primary Diagnosis)	39%	11%	Not Available
Autism	2%	0.8%	0.8% ^c
Conduct Disorder	19%	4%	Not Available
Attention Deficit and Hyperactivity Disorder	27%	9%	9% ^d
Emotional Disturbance	18%	3%	11% ^e
Adjustment Reaction	30%	5%	Not Available
Behavioral Problems	17%	2%	Not Available
Neurotic Disorders	15%	5%	Not Available
Developmental Delays	14%	3%	Not Available
Mental Retardation	0.4%	0.2%	Not Available
Other Psychological Symptoms	0.1%	0.1%	Not Available

Source: The authors' calculations, based on Medicaid data provided by the DHS

^a2008 prevalence estimate (National Center for Environmental Health, n.d.)

^b2009 prevalence estimate (Wisconsin Diabetes Prevention Control Program, 2011)

^c2008 prevalence estimate (Baio, 2012)

^d2011 prevalence estimate (National Survey of Children's Health, 2012)

^e2010 prevalence estimate (Wisconsin Council on Mental Health, n.d.)

Estimates for Wisconsin's general child population are generally similar to our prevalence calculations for the Medicaid child population. As expected, the prevalence of physical conditions such as asthma (21 percent in the foster care population, 11 percent in Medicaid), nutritional symptoms (14 percent in the foster care population, 8 percent in the Medicaid population), and refraction disorder (31 percent in the foster care population, 19 percent in the Medicaid child population) is greater in the foster care population than the Medicaid child population. Less common disorders such as diabetes, cystic fibrosis, and epilepsy also show up in higher rates within the foster care population; however, these

differences are less stark due to the overall low prevalence of these conditions in foster and children on Medicaid.

Foster children experience mental illnesses at higher rates than the Medicaid and general child populations. We find that the prevalence of overall mental illness and many specific mental health diagnoses (such as emotional disturbance, adjustment reaction, and autism) is higher in the foster care population than in the Medicaid child population in Wisconsin. For example, 39 percent of foster children received a primary diagnosis of a childhood mental illness from 2009 through 2011, compared to 11 percent of the Medicaid children. Childhood mental illnesses encompass disorders that are typically diagnosed in childhood and include conduct disorder, hyperactivity, emotional disturbance, and developmental delays.

In addition to the chronic health conditions shown in Table 1, several common diagnoses within the foster care population indicate acute symptoms or conditions; we show these in Table 2. Like chronic and mental illnesses, many of these diagnoses appear at a higher rate in the foster care population than in the Medicaid child population, including health supervision, general symptoms, and abdominal or pelvic symptoms. However, two diagnoses appear in dramatically higher rates among foster children: no available medical facilities (4 percent in the foster care population, 0.4% in the Medicaid population) and other family circumstances (64 percent in the foster care population, 2 percent in the Medicaid population). Unavailability of medical facilities includes geographic barriers, wait time for admission to a facility elsewhere, or wait time for undergoing a social agency investigation. Other family circumstances include parent desertion, family disturbance, relationship problems, and ineffective coping.

Table 2: Acute Care Diagnoses

Prevalence of acute care diagnoses in the foster care and Medicaid child populations, 2009 to 2011

Acute Care Diagnoses	Out-of-Home Care	Medicaid
Complications of Medical Care	12%	8%
No Medical Facilities	4%	0.4%
Health Supervision Required	79%	70%
Other Family Circumstances	64%	2%
General Symptoms	34%	29%
Abdominal/Pelvic Symptoms	17%	14%
Gastroenteritis	7%	7%
Pneumonia	6%	6%
Urinary Tract Infection	10%	7%

Source: The authors' calculations, based on Medicaid data provided by DHS

Routine Medical Care

Routine medical care ensures children’s good health through prevention, early detection, and health maintenance. The percentage of children receiving routine medical care is a useful indicator to evaluate whether the population’s routine health needs are being met. Our standards for sufficient routine health care are based on the widely accepted guidelines released by the American Academy of Pediatrics and are shown in Appendix D. According to these guidelines, a child should receive a checkup each year that includes growth and development measurements, vision and hearing screenings, and recommended vaccinations. We examine the rates of medical checkups, immunizations, and dental exams in the foster care and Medicaid child populations to determine any unmet routine health needs of both and any routine health care disparities between these populations.

Table 3 shows the routine medical care services received by the foster care and the Medicaid child populations. Immunization rates for both groups are comparable, at 4 percent for foster children and 3 percent for Medicaid children. Overall, the receipt of routine health care by the Medicaid child population is lower than that of children in out-of-home-care. Seventy-five percent of our Medicaid sample received medical checkups in a given year and 22 percent received dental checkups, compared to 85 percent and 30 percent, respectively, of the foster care population. The foster care population received mental health screenings at more than twice the rate that the Medicaid children did (8 percent and 3 percent, respectively).

Table 3: Routine Medical Care

Children receiving routine medical services at least once, 2009 to 2011

Routine Medical Care	Out-of-Home Care		Medicaid	
	Count	Rate	Count	Rate
Medical Checkup	14,410	85%	9,590	75%
Dental Checkup	5,167	30%	2,807	22%
Immunization	761	4%	369	3%
Mental Health Screening	1,428	8%	377	3%

Source: The authors’ calculations, based on Medicaid data provided by DHS

The foster care and Medicaid child populations demonstrate an unmet need in primary care. Foster children are required to receive comprehensive medical checkups upon entering out-of-home care; therefore, we should see 100 percent of them receiving checkups at some point during the 3-year period for which we have data. Additionally, our calculations are likely to underestimate the extent of unmet need, because our count only represents children who received at least one checkup during the time period of interest. These children may not have received all recommended checkups.

Our analysis suggests an even greater unmet need for dental care in both foster care and Medicaid child populations. Both groups of children had low rates

of dental checkups, with less than one-third of all foster children and fewer than one-quarter of children on Medicaid, receiving one. The average stay in foster care is around 11 months, so we would expect that most foster children would receive dental checkups at some point during their time in out-of-home care.

Finally, very few children appear to have received vaccinations or mental health screenings. These services are frequently included during routine office visits, even if they are not billed or coded separately. In fact, age-appropriate immunizations that are administered during routine visits are often included and reported with the same procedure code as that for the general visit. Therefore, immunizations may not show up individually in this dataset. Similarly, mental health history and screening could be included as part of a routine checkup. Additionally, children may receive immunizations and other primary care services in other settings. For example, children may receive immunizations, growth and development measurements, and vision or hearing screenings in school. Still, establishing a relationship with a primary care physician and maintaining regular contact with this individual increases the chance that chronic physical or mental illnesses are diagnosed and treated in an appropriate manner.

Hospital Utilization

Hospital utilization can be broken down into the overlapping categories of emergency room visits, emergency room admissions, and in-patient mental health admissions. To calculate the hospital utilization prior to entering and after leaving out-of-home care, we look at two overlapping populations: children whose first foster care claims occurred in 2010 and children whose last foster care claims occurred in 2010. We selected these populations because we have data regarding their hospital utilization before and after out-of-home placement. However, we only have data for children who were in Medicaid before or after their placement in out-of-home care; once they are no longer eligible for Medicaid, we have no further information on them. We excluded children in 2009 and 2011 because we lack data that indicates their health care utilization before or after their out-of-home placement. Table 4 shows hospital utilization for children who had their first or last foster care claim in 2010 and Medicaid children who have never entered out-of-home care.

Table 4: Hospital Utilization

Claims per child per year for emergency room visits, hospital admissions, and in-patient mental health hospitalizations for the foster children in 2010 and Medicaid children from 2009 to 2011

	Annual Claims per Child in Out-of-Home Care			Annual Claims per Child on Medicaid
	Before	During	After	
Emergency Room Visits	0.09	0.41	0.14	0.08
Hospital Admissions	0.86	2.96	0.91	1.01
Inpatient Mental Health Hospitalization	0.23	0.60	0.19	0.07

Source: The authors' analysis of Medicaid data provided by DHS

We analyzed the volume of emergency room visits, hospital inpatient admissions, and mental health-related hospitalizations in foster care and Medicaid child populations. Individual claims were identified using unique internal control numbers. For foster children, we calculated the rate of hospital utilization before, during, and after their stays in out-of-home care in claims per child per year. Table 5 shows the rate of emergency room visits, admissions, and mental health hospitalizations for foster care children before, during, and after out-of-home care. The average number of annual claims per child is highest for each category of service when children are in out-of-home care. Utilization rates are similar before and after out-of-home placement. During out-of-home care, foster children average four times as many emergency room claims, more than three times as many hospital admissions claims, and three times as many inpatient mental health hospitalization claims than before or after out-of-home placement.

Several factors explain the increased number of hospital claims during out-of-home care. First, foster children have high rates of chronic physical and mental illness (as supported by the literature and our findings). They are also more likely to have undiagnosed or untreated chronic or acute illnesses that began before their placement in out-of-home care. Once these children enter foster care, they may need more medical treatment to counterbalance the cumulative impact of their previous lack of care. Finally, foster homes offer greater care for children who were removed from their homes for reasons such as abuse, neglect, or parental substance abuse.

Looking across datasets, the out-of-home care children have much higher rates of hospital utilization than Medicaid children. This difference is greatest in the number of inpatient mental health hospitalization claims. During out-of-home placement, foster care children receive inpatient mental health care almost nine times as often as Medicaid children. These rates are higher than the Medicaid population even for foster children before and after out-of-home placement. However, when the foster care children are not in out-of-home placement (before or after foster care), their emergency room and admissions utilization is similar to that of the Medicaid children.

Continuity of Medicaid Coverage for Children in Out-of-Home Care

As discussed, continuity of medical care is important in diagnosing and maintaining proper treatment of chronic illnesses. Changes in insurance provider often result in changes in doctors, lost medical records, and inconsistent diagnosis and treatment of common illnesses. Overall, the data indicate that 93 percent of children who entered foster care at any point from 2009 to 2011 were still on Medicaid at the end of 2011, regardless of their placement status. Our results suggest that once children enter the Medicaid system, either through out-of-home placement or by meeting program requirements, they are very likely to continue on Medicaid whether or not they remain in out-of-home care.

To calculate the percentage of children who are enrolled in Medicaid prior to entering out-of-home care and after leaving out-of-home care, we looked at two overlapping populations: children whose first foster care claims occurred in 2010 and children whose last foster care claims occurred in 2010. We selected these

populations because we are able to tell from the records whether they were in Medicaid before and/or after their time in out-of-home care. In particular, we judge that children whose first claims occurred in 2010 and who had no prior Medicaid claims were not on Medicaid prior to their time in out-of-home care, while those whose last claims occurred in 2010 without subsequent claims were not on Medicaid after leaving out-of-home care. We excluded children in 2009 and 2011 because we lack the data that could indicate their Medicaid status before or after their stays in out-of-home care. Table 5 shows the percentage of foster care children who had Medicaid coverage prior to making their first or last foster care claim in 2010.

Of the 16,989 children who were in out-of-home care for some length of time from 2009 to 2011, 3,984 made their first foster care claim in 2010. We found that 82 percent of these children (3,260) had made Medicaid claims prior to their first claims while they were in out-of-home placement. Of the 2,769 children who made their last foster care claim in 2010, 85 percent (2,363) made subsequent Medicaid claims. This finding indicates two important patterns: similar percentages of foster children are enrolled in Medicaid before and after their time in out-of-home care, and more than three-quarters of children have Medicaid coverage before and after their out-of-home stays. Although these patterns suggest that most foster children maintain continuity of coverage regardless of their placement status, due to the mobility of this population, this does not mean they necessarily receive continuous care.

Table 5: Medicaid Status Before and After Out-of-Home Placement

Count and percentage of children who had their first and/or last foster care claims in 2010 by Medicaid status prior to and after out-of-home placement

	Count	Percentage
Children who made their first foster care claim in 2010 and ...	3,984	100%
... made their first foster care claims, with no prior Medicaid claims.	724	18%
... made a Medicaid claims before their first foster care claims.	3,260	82%
Children who made their last foster care claim in 2010 and...	2,769	100%
... made their last foster care claim in 2010 (and did not make any subsequent Medicaid claims in the dataset).	406	15%
... made Medicaid claims after their last foster care claims.	2,363	85%

Source: Authors' analysis of Medicaid data provided by DHS

Limitations

Our data and our subsequent analysis have a number of limitations that must be noted. In this analysis, features of the available data serve to limit the scope and confidence of our conclusions. The three-year period that was captured provides sufficient detail for a short-term analysis—that is, pertaining to subjects' changes in medical status—but not for longitudinal, within-subjects analysis. For instance, it cannot be determined whether foster children were eligible for Medicaid or out-of-home care status before 2009 and after 2011, which limits our results to a snapshot of the children who entered and exited out-of-home care and Medicaid during this time frame. More significantly, no information is available for disease incidence, prevalence, or health care utilization during any period in which foster children or children on Medicaid are not enrolled in Medicaid or did not file claims. Therefore, we have no knowledge of their health insurance or health status outside of their Medicaid eligibility and their appearance (through claims filed) in the dataset. Additionally, any medical services received while a child is on Medicaid but not billed to Medicaid are absent from this dataset. As is common in large datasets, clerical and reporting errors appeared as our analysis progressed. Furthermore, prevalence rates were not available for all conditions of interest in the general child population.

Discussion

In this report, we identify differences in prevalence of illness, receipt of routine health care, and hospital utilization between different child populations in Wisconsin. First, we hypothesized that the prevalence of chronic conditions and mental health-related diagnoses would be higher for children in out-of-home care relative to the Medicaid child population and the general child population. Overall, our analysis confirms this hypothesis. The prevalence of physical conditions such as asthma, nutritional symptoms, and refraction disorder is greater in the foster care population than in each comparison population. For example, the prevalence of asthma in the foster care population (21 percent) is almost twice that of the Medicaid child population (11 percent) and the general child population (10 percent). The relatively high prevalence rates of chronic conditions for foster care children that we find in our analysis means this population needs consistent, quality medical care.

Our analysis also confirms our hypothesis that foster care children receive more mental health diagnoses than the Medicaid child population. We find that more than three times as many foster care children (39 percent) have childhood mental illness as a primary diagnosis relative to the general Medicaid child population (11 percent); almost every other mental health diagnosis is more than twice as high as the prevalence rate for the Medicaid population. For example, foster care children are diagnosed with a hyperactivity disorder at three times the prevalence rate for our Medicaid sample, and emotional disturbance at six times the prevalence rate for our Medicaid sample. The foster population also has

higher rates of mental illness than the general child population. The prevalence rates for mental illnesses such as conduct disorders, adjustment reactions, emotional disturbances, and behavior problems within the foster care population indicate a significant need for comprehensive mental health screenings and treatment of foster children.

We also hypothesized that rates of routine medical care such as well-child checks and immunizations are lower for children in out-of-home care than Medicaid children. However, our analysis reveals that foster care children receive routine services at rates greater than or comparable to the Medicaid population. Eighty-five percent of foster care children received routine medical checkups while in out-of-home care compared to 75 percent of the Medicaid child population. The requirement that a foster child have a comprehensive medical exam within 30 days of entering out-of-home care could explain why rates of routine checkups are higher for foster children. Fifteen percent of foster children did not receive routine checkups at any point. Given that the average stay in foster care is close to one year, we expected all children to receive at least one dental checkup. However, only 30 percent of foster care children received routine dental checkups, compared to 16 percent of the Medicaid population receiving dental care.

Additionally, we used our data to compare the number of routine medical checkups received with an anticipated number of routine medical checkups needed, based on recommendations from the American Academy of Pediatrics. We find an unmet routine health care need of 76 percent for foster care children and 90 percent for the Medicaid child population. Because routine checkups serve to detect, diagnose, and treat the chronic health conditions noted above, regular checkups and screening are critical for the foster care population. We also find that foster care children receive routine mental health screenings at a higher rate (8 percent) than the Medicaid child population (3 percent). The high rate of mental illness diagnoses for the foster care population means mental health screenings are imperative for the treatment and management of mental illness in foster care children.

Corresponding with our expectation of unmet primary care needs, we hypothesized that foster care children would have higher rates of emergency room utilization and mental health in-patient care than the Medicaid child population. Our analysis confirms this hypothesis. Hospital admissions make up the overwhelming majority of hospital utilization by foster care children. Foster children have the highest utilization rates during out-of-home placement; their rates before and after placement are comparable to those of the Medicaid child population.

Lastly, we looked at Medicaid status before and after out-of-home care placement to determine continuity of care. We hypothesized that foster care children would enter Medicaid through foster care and might fall out of the system after their discharge from out-of-home care. Our analysis refutes this hypothesis. By looking only at children who entered out-of-home care in 2010, we determined that 82 percent made Medicaid claims prior to their out-of-home care placements. We also looked at children who made their last foster care claims in 2010 and

determined that 85 percent of them made subsequent Medicaid claims. This important finding indicates that the majority of children have Medicaid coverage before and after their out-of-home stays. Nevertheless, although most foster children appear to maintain continuity of coverage regardless of their placement status, this may not necessarily translate directly into continuity of care.

Our analysis identifies two critical targets for meeting the complex health needs of the foster care population: consistent routine care and comprehensive mental health care. Our findings indicate that foster children have significant mental health and routine care needs. Concurrently, an increase in primary care or routine services has the potential to decrease hospital visits and emergency room utilization overall (Almgren & Marcenko, 2001). While we included mental health screening as a routine health care service, any indicators of mental illness require appropriate follow up with mental health professionals that may include further diagnostic assessments or ongoing treatment.

Recommendations for the Wisconsin Foster Care Medical Home

Our findings suggest that foster children have a greater need for physical and mental health care than the Medicaid child population due to higher prevalence. Furthermore, although foster children are receiving routine health care at a higher rate than their counterparts on Medicaid, they still have significant unmet health care needs. Our recommendations for the medical home model focus on addressing these needs through routine care and increased mental health screening and services. Focusing on these services will help the FCMH project achieve its health care delivery goals.

Routine care, a cornerstone of the medical home model, is defined as “comprehensive, first-contact, acute, chronic, and preventive care across the life span, delivered by a team of individuals led by the patient’s personal physician” (Rittenhouse & Shortell, 2009, p. 2038). Good routine care in a medical home model involves care coordination and integration across multiple care settings and clinicians. Therefore, the medical home model, by emphasizing routine care, can incorporate the principles of care coordination and integration to significantly improve access to mental health screening and treatment for children in need.

Children entering out-of-home care need to receive timely and appropriate routine health care, starting with an initial health screening within 48 hours of removal from the home. The FCMH project should ensure ease of access to primary care physicians for all enrolled children. After the initial screening, a comprehensive health assessment is required no more than 30 days after placement. The receipt of these two key services is the first step in diagnosing and treating physical and mental health conditions. Foster children are already receiving routine examinations at a high rate, but every foster care child should receive these initial screenings. Furthermore, foster children need to maintain strong relationships with their primary care physicians so that chronic health problems can be detected and treated throughout their stay in out-of-home care and beyond.

In addition to an increased focus on routine care, children in a medical home model should be given mental health screenings. In general, children with poor mental health often face significant barriers to care, such as absence of insurance, underinsurance, lack of parental awareness of children's medical needs, lack of transportation to health care providers, absence of screening to diagnose conditions, and stigma associated with mental health problems. This situation is particularly true for children from low-income families, many of whom are at higher risk for entering out-of-home care at some point in their lives.

Screening tools that identify mental illness can be administered in the routine care setting. While standardized mental health screening tools do not always diagnose or provide the basis for a treatment plan, they have been shown to identify 60 to 80 percent of children with mental health problems (Health Resources and Services Administration, n.d.). In general, a screening tool has a systematic set of questions for the respondent to answer; items that he/she can rank; direction to use the tools and information on scoring; and psychometric properties known through testing on relevant populations. Screenings can be incorporated in routine care settings as part of Medicaid-mandated early and periodic screening, diagnostic, and treatment visits and well-child visits. Standardized screenings should generally be brief, easy to administer, and affordable (Health Resources and Services Administration, n.d.).

Wisconsin already has a comprehensive behavioral health screening tool to assess children's well-being and mental health needs that complies with federal Medicaid early and periodic screening, diagnostic, and treatment standards (Semansky, Koyanagi, & Vandivort-Warren, 2003). In fact, Wisconsin is considered a leader in assessing child and family background factors, which are considered essential to a behavioral health assessment (Bazelon Center for Mental Health Law, 2010). A comprehensive assessment is especially key for the out-of-home care population, as those children are more likely to suffer from risk factors, including parental substance abuse or neglect, and to have incomplete medical histories that may omit these critical details. Since Wisconsin has a screening tool in place, we encourage maximizing its utilization to identify the mental health needs of foster care children.

Although screenings are essential, they only form the first step of addressing mental health needs of children. Based on information provided by the Health Resources and Services Administration of the U.S. Department of Health and Human Services, screenings should be followed by any or all of the following steps:

- Discussing the needs of the children with their legal guardians
- Coordinating care among the behavioral health and primary care providers
- Integrating behavioral health interventions and primary care services by creating a network of consultants who would provide holistic care to the patient or by connecting providers by telemedicine technology
- Using case management services to ensure proper coordination and facilitate referrals
- Fostering informed decision-making while maintaining confidentiality of patient records

In implementing the FCMH project, continuity of care, particularly care of mentally ill children, should be ensured. While screenings will help identify problems, proper follow-up, treatment plans, and delivery of appropriate services to address mental health challenges are necessary. According to our analysis, most children remain on Medicaid after they are discharged from out-of-home care; their health needs also continue beyond their time in an out-of-home placement. Because these children remain in the system, DCF and DHS should continue monitoring them and tracking their health outcomes and use the data to evaluate the FCMH.

Conclusion

Children in out-of-home care face a unique set of circumstances that put them at risk for untreated and undiagnosed chronic and acute health conditions. To address their comprehensive health needs, the DCF and DHS will implement an FCMH pilot project in six counties in southeastern Wisconsin. To make recommendations for developing this program, we analyzed statewide child Medicaid data to determine the disparities between foster children and the Medicaid child population in their access to health care. According to our analysis, foster children have significant routine physical and mental health needs that any effective comprehensive model of care must address. The medical home model is an ideal framework to take care of these needs, as it promotes primary care coverage, screenings, and coordinated care. Since the majority of foster children remain in the Medicaid system after leaving out-of-home care, DCF and DHS can monitor their health outcomes. The data they collect can inform an evaluation of the FCMH project.

Appendix A: Out-of-Home Care Placement Settings

Placements setting for out-of-home care may include foster homes, group homes, residential care centers, shelter care, and relative and non-relative homes. These placement settings, as found in Wisconsin's Children's Code, are defined below:

- **Foster home:** According to Wis. Stat. § 48.02(6), a “foster home” means any facility that is operated by a person required to be licensed by Wis. Stat. § 48.62(1) and who provides care and maintenance for no more than four children or, if the Department of Children and Families promulgates rules permitting a different number of children, for the number of children permitted under those rules.
- **Group home:** A “group home,” as identified in Wis. Stat. § 48.02(7), means any facility operated by a person required to be licensed by the department under Wis. Stat. § 48.625 for the care and maintenance of five to eight children, as provided in Wis. Stat. § 48.625(1).
- **Residential care center:** As stated in Wis. Stat. § 48.02(15d), a “residential care center for children and youth” means a facility operated by a child welfare agency licensed under Wis. Stats. 48.60 for the care and maintenance of children residing in that facility.
- **Shelter care facility:** Wis. Stat. § 48.02(17) states that a “shelter care facility” means a nonsecure place of temporary care and physical custody for children, including a holdover room, licensed by the department under Wis. Stat. § 48.66(1)(a).
- **Relative and non-relative homes:** Relative and non-relative homes depend on the definition of “relative.” According to Wis. Stat. § 48.02(15), “relative” means a parent, stepparent, brother, sister, stepbrother, stepsister, half-brother, half-sister, brother-in-law, sister-in-law, first cousin, second cousin, nephew, niece, uncle, aunt, stepuncle, stepaunt, or any person of a preceding generation as denoted by the prefix of grand, great, or great-great, whether by blood, marriage, or legal adoption, or the spouse of any person named here, even if the marriage is terminated by death or divorce. Different regulations apply to the placement in out-of-home care of Indian children.

Appendix B: The Medical Home Model

The American Academy of Pediatrics first introduced the concept of a medical home in 1967. Originally, a medical home referred to a single source of all medical information pertaining to a patient (Sia, Tonniges, Osterhus, & Taba, 2004). In the 1960s and 1970s, the health system lacked a complete source of medical information. According to the Academy's Council on Pediatric Practice, if children received from providers in different locations, diffused medical information resulted in service duplication and lack of communication and coordination (American Academy of Pediatrics Council on Pediatric Practice, 1967). The Council advocated that the concept of the medical home for children be promoted to physicians and all agencies such as "schools, guidance clinics, well-infant health stations, surgical specialists, emergency departments," and more (Sia et al., 2004, p. 1473).

Over time, the concept of a medical home went beyond the domain of pediatric care, influencing health care delivery in general. In 2007, four organizations whose members form the majority of primary care physicians in the United States—the American Academy of Family Physicians, American Academy of Pediatrics, American College of Physicians, and American Osteopathic Association—released a joint statement identifying seven core principles of a patient-centered medical home: personal physician, physician-directed medical practice, whole person orientation, coordinated/integrated care, quality and safety, enhanced access, and value-based payment (Stange et al., 2010). According to the joint principles, every patient should have a personal physician supported by a team of paraprofessionals. Care would be provided based on a holistic approach that uses evidence-based and safe practices in coordination with other providers, such as hospitals, specialists, and so on. The joint principles also suggest that care should be accessible, and that payment should reflect the value of care (Stange et al., 2010).

Outcomes associated with medical homes are promising. The medical home model can lead to high-value care in the health care system (Stange et al., 2010). The model improves health outcomes, resulting in higher levels of patient satisfaction (Rosenthal, 2008). For children with chronic conditions, the medical home model leads to reduction in hospitalization and emergency visits (Cooley, McAllister, Sherried, & Kuhlthau, 2009).

Appendix C: Illinois HealthWorks

The state of Illinois has implemented a medical home model for children in out-of-home care similar to Wisconsin's proposed FCMH project. Known as HealthWorks, the system was collaboratively developed by the Illinois Department of Children and Family Services, Department of Public Aid, and Department of Human Services. HealthWorks provides children in out-of-home care with access to quality health care; routine and special care as and when needed; and proper documentation of health care needs and services that are easily accessible by relevant entities such as caregivers, health care providers, and the Department of Children and Family Services (Illinois Department of Children and Family Services, 2002). The system recruits and trains a statewide network of primary care physicians; creates local lead agencies to compile and maintain health records of children in out-of-home care; and implements a statewide network of case management agencies (Jaudes, Champagne, Harden, Masterson, & Bilaver, 2012). As in Wisconsin, children in Illinois become eligible for Medicaid when they are placed in out-of-home care.

Illinois HealthWorks is similar to the FCMH project; therefore, understanding HealthWorks is useful for the development and implementation of the FCMH. Jaudes et al. (2012) examine the history of health care services provided to children in out-of-home care by reviewing claims paid through Medicaid. In the first group, the authors include all children who were in custody of the state between July 2001 and June 2009. The comparison group consists of all other children in Illinois who received health services funded through Medicaid during the same period, excluding children who have ever been in out-of-home care. The composition of the two groups in this study is similar to the groups we have included in our analysis of the FCMH.

In HealthWorks, mandatory initial health screenings are conducted as soon as a child is placed in out-of-home care. Therefore, to maintain focus on ongoing medical care and treatment, the authors excluded from the study all medical claims that occurred during the first six months of a new period of Medicaid eligibility, the "startup" time required to establish a medical home for each child (Jaudes et al., 2012).

In their analysis, Jaudes et al. (2012) took all medical contacts by type and aggregated these by child-years. This one-year period was used as a risk period to examine utilization of more expensive or intensive medical services, such as hospitalization and emergency room visits. Other relevant medical services include routine care such as well-child visits and dental checkups. In addition, the authors created a variable named "chronicity," using health conditions identified from diagnosis codes that include four subcategories:

1. *No Chronic Conditions* includes children with no diagnosis for a chronic condition during the year.
2. *Chronic Physical Conditions Only* includes children who receive at least one diagnosis of a chronic medical condition during the year but have no diagnosis of a chronic mental health condition.
3. *Chronic Mental Health Conditions Only* includes those children who

receive at least one chronic mental health related diagnosis during the year, but have no diagnosis of a chronic medical condition.

4. *Both Chronic Physical and Mental Health Conditions* includes children who are diagnosed with a chronic medical problem and a chronic mental health problem during the year.

For the analysis, Jaudes et al. (2012) used two models. In the first model, which presents the relative likelihoods of service utilization by the two groups, the authors controlled for demographic differences and calculated relative odds of a specific type of service for a group, age category, gender, year of claim, etc., to adjust for the differences in the other variables in the model. In the second model, the authors controlled for chronicity and repeated the analysis (Jaudes et al., 2012).

Using the first model, Jaudes et al. (2012) found that children in out-of-home care are more likely to have a chronic medical condition, along with a chronic mental health condition, similar to the findings from our research. Sixty percent of out-of-home care children had an identified chronic condition, compared to 30 percent of the comparison group. The authors find that compared to the control group, a higher percentage of children in out-of-home care have attention deficit hyperactivity disorder (16.3 percent vs. 3.3 percent), developmental delays (14.8 percent vs. 5.5 percent), and asthma (9.5 percent vs. 6.2 percent) (Jaudes et al., 2012). Children in out-of-home care were 3.58 times more likely to have an early and periodic screening, diagnostic, and treatment (EPSDT) exam, 3.2 times more likely to see a dentist, 1.39 times more likely to experience a visit to the emergency department, 1.8 times more likely to have a general inpatient stay, and more than 13 times more likely to have a psychiatric inpatient stay than children in the comparison group. Overall, children in out-of-home care were more likely to have poorer health than the control group (Jaudes et al., 2012).

The second model by Jaudes et al. (2012) showed that children in out-of-home care are three times more likely to have an EPSDT exam, and three times as likely to see a dentist, 1.11 times likely to have a general inpatient stay, 6.05 times more likely to have a psychiatric inpatient stay, and 1.06 times likely to visit the emergency department, compared to the Medicaid-only group. Although the odds of service utilization for children in out-of-home care in the second model are lower than those in the first model, these children are still more likely to use health care services compared to children in the control group. The authors concluded that chronic conditions may have led to seeking medical care (Jaudes et al., 2012).

Immunization rates are also high for out-of-home care children in Illinois HealthWorks. Eighty percent of all children in out-of-home care have been properly immunized since 2003, with 86 to 90 percent of those children younger than 3 years completing 15 recommended immunization series. These vaccination rates compare favorably to 72 to 75 percent across Illinois and 69 to 77 percent of children under the age of 3 nationwide being immunized through 2010. These results suggest that HealthWorks is successful in improving health care (Jaudes et al., 2012).

Appendix D: Routine Health Services and Immunizations

Guidelines from the American Academy of Pediatrics (2008) and Children’s Hospital of Philadelphia (2008) recommend children receive a full physical examination at every checkup, along with height, weight, and blood pressure measurements. From birth to 24 months, head circumference, weight, and length should be recorded; after that, a record of body mass index is recommended. Vision and hearing surveillance is recommended for children of all ages, with appropriate screenings to take place if deemed necessary.

Table D1: Schedule of Routine Health Services and Immunizations

Newborn	First pediatric check-up after leaving hospital.
1 month	Growth and development; vision and hearing screening; hepatitis B vaccination if not done at hospital or previous visit.
2 months	Growth and development; vision and hearing screening; hepatitis B, pneumococcal, rotovirus, diphtheria, tetanus, pertussis, Hib, and IBV vaccinations.
4 months	Growth and development; vision and hearing screening; pneumococcal, rotovirus, diphtheria, tetanus, pertussis, Hib, and IBV vaccinations.
6 months	Growth and development; vision and hearing screening; hepatitis B, Prevnar 13, Rotateq, Pentacel.
9 months	Growth and development; vision and hearing screening.
12 months	Growth and development; vision and hearing screening; Hib, chicken pox, and pneumococcal vaccinations.
15 months	Growth and development; vision and hearing screening; measles, mumps, rubella, and hepatitis A vaccinations.
18 months	Growth and development; vision and hearing screening; diphtheria, tetanus, and pertussis vaccinations.
2 years	Growth and development; vision and hearing screening; hepatitis A booster.
2.5 years	Growth and development; vision and hearing screening.
3 years	Growth and development; vision and hearing screening.
4 years	Growth and development; vision and hearing screening; diphtheria, tetanus, pertussis, measles, mumps, rubella, chicken pox, and polio vaccinations.
5 years	Growth and development; vision and hearing screening.
6-7 years	Growth and development; vision and hearing screening.
8 years	Growth and development; vision and hearing screening.
9-10 years	Growth and development; vision and hearing screening.
11 years	Growth and development; vision and hearing screening; diphtheria, tetanus, pertussis, meningitis, and HPV vaccinations.
12-15 years	Growth and development; vision and hearing screening.
16 years	Growth and development; vision and hearing screening.
17-21 years	Growth and development; vision and hearing screening; college-bound children may require tuberculosis testing.

Source: American Academy of Pediatrics (2008) and Children’s Hospital of Philadelphia (2008)

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