



CHAP Demonstration Project Evaluation Report

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1 Executive Summary

The Children's Healthcare Access Program (CHAP) is a demonstration project that is based on the premise that children on Medicaid have less access to primary care than privately insured children and that lack of access leads to poorer health outcomes. CHAP began in August 2008 as a partnership of First Steps, Priority Health, and the Helen DeVos Children's Hospital. Since then, it has expanded to include additional community partners and address broader issues that disproportionately impact the health of children with Medicaid.

CHAP was implemented as a collaborative, community-based, family-centered medical home program, with the goal of improving the health of children on Medicaid, while better utilizing existing resources and decreasing costs.

The intended goals of CHAP can be divided into three "aims" that reflect a common approach to optimizing health system performance – otherwise known as the Triple Aim.

Stated simply, the three aims are: better quality care, improved health outcomes and reduced cost. Each of these aims can be viewed as one leg of a three-legged stool. To truly improve the health of children on Medicaid, the stool needs support from all three. This report will show that, since its inception in 2008, CHAP has demonstrated significant successes across the three aims.

This report represents the findings from the full three year CHAP demonstration project (through 2011) and is based on the Long Term Evaluation Plan developed by SRA International, Inc. Although outcomes have been reported previously for the first two years of CHAP, this report offers the opportunity to conduct a more robust analysis of the anticipated program outcomes in two important ways. First, we now can assess outcomes for a larger number of children impacted by CHAP either through direct services or as a patient at a participating CHAP practice. Second, for many of the health outcomes presented in this report, we now have access to a comparison population by which to measure CHAP results. The addition of a comparison population allows us to more confidently attribute outcomes to CHAP as opposed to other contextual factors.

The factors that have contributed to the disparities in access to care and health outcomes are multi-faceted and complex. CHAP works at three levels to address those factors. System level efforts are focused on increasing access to primary care and improving the quality and efficiency of care delivered. At the healthcare practice level, CHAP strives to connect healthcare providers to resources and mobilize family-centered, continuous, comprehensive, coordinated, compassionate, and culturally effective medical homes. Family level strategies are intended to remove the barriers that keep children on Medicaid from receiving quality, preventive care in their medical home. Efforts at all three levels have produced outcomes that positively impact the Triple Aim.

Better Quality Care

In an effort to improve the care for children on Medicaid in Kent County, CHAP has been shown to:

- Expand access to medical care for children on Medicaid at partnering primary care practices by increasing openings (1,445 new openings) and increasing and maintaining practice hours of service.
- Facilitate integration of services and coordination of care among healthcare practice partners, and between community organizations and those practice partners.
- Expand and strengthen community partnerships that promote increased access to healthcare for children in Kent County.
- Facilitate community-wide workgroups aimed at improving the quality and coordination of children's behavioral and oral health services.
- Implement a community initiative to address childhood obesity.
- Increase practice use of the Asthma Network of West Michigan, a key provider of asthma case management services for children.

- Improve fidelity to asthma control and management best practices among participating primary care practices.
- Expand the CHAP model to improve the quality of care for children on Medicaid outside of Kent County through the provision of leadership and technical assistance to program managers and physicians implementing the model in other Michigan communities.

Improved Health Outcomes

To improve the health of Kent County children on Medicaid, CHAP has sought to decrease Emergency Department (ED) and Inpatient Hospitalization (IP) rates, increase well child visits, and improve asthma-related health outcomes. During the first three years, CHAP demonstrated:

- 5-15% decrease in ED visits for the CHAP eligible population (children who are patients at a CHAP healthcare practice and have Priority Health Medicaid) from baseline to subsequent calendar years
- 35% decrease in ED visits for CHAP clients (children who have received direct support services from CHAP) after one year of program involvement; 43% decrease in ED visits for CHAP clients aged 1 to 5 years.
- 46% decrease in IP visits for CHAP clients after one year of program involvement; 45% decrease in CHAP clients aged 1 to 5 years.
- 25% decrease in otitis media-related ED visits as well as a 36% increase in the number of ear numbing drop prescriptions for the CHAP eligible population following the start of CHAP's otitis media initiative
- 24% increase in children up-to-date on their well-child visits between 2010 and 2011 by practices participating in CHAP and Priority Health joint well child initiative
- 23% increase in the number of children receiving CHAP asthma services who had an asthma action plan
- 54% increase in the number of children receiving CHAP asthma services who improved their scores on an asthma control test to acceptable levels
- 50% decrease in exposure to tobacco smoke in the home environment among children receiving CHAP asthma services.
- 78% decrease in the average number of school days missed due to asthma by children receiving CHAP services

Reduced Cost

Because children are relatively inexpensive to the health care system, it is very unlikely for programs that address health needs in young children to demonstrate cost savings in the short term. The benefits of a program such as CHAP are longer term and span financial, health and social aspects of a child's life over several decades. The results of cost benefit analyses conducted for CHAP demonstrate cost savings in as little as two years; these savings will grow over time as additional benefits are realized.

Summary

CHAP has demonstrated significant positive outcomes in each of the three Triple Aim areas across a wide variety of initiatives. As CHAP continues to mature, we recommend careful attention to staking out its future path including possibilities to broaden in scope to align with increased funding streams as well as utilizing evaluation results to limit activities to those anticipated to be most impactful. Similarly, because CHAP has demonstrated its outcomes through its demonstration period, we offer additional recommendations for future evaluations.

2 Demonstration Project Background

2.1 Rationale and Context for the CHAP Demonstration Project

The Children's Healthcare Access Program (CHAP) is a partnership between First Steps, a non-profit organization that is developing a coordinated system of early childhood services in Kent County; Priority Health, a west Michigan-based managed care plan that provides commercial and Medicaid coverage; and the Helen DeVos Children's Hospital, a 214-bed children's hospital in Grand Rapids, MI.

CHAP began providing services in 2008 based on research finding that a primary reason children on Medicaid in Michigan have poorer health outcomes than children with commercial insurance is that children with Medicaid have less access to primary care. It is known that:

- More than 40% of all children in Kent County receive Medicaid.¹
- 43% of all births in Kent County hospitals were covered by Medicaid in 2010.
- 35% of families with children on Medicaid report having difficulty finding providers who will accept their coverage.²

In addition, many private practice physicians limit the number of children with Medicaid they admit into their practices because of low reimbursement. Michigan's Medicaid reimbursement rate for primary care physicians is approximately 54% of Medicare rates, limiting acceptance of children on Medicaid by private providers and shifting the significant majority to federally funded and teaching clinics, which often are overwhelmed by the number of clients they serve.

Michigan children with Medicaid have poorer health outcomes than privately insured children, including³:

- Significantly higher hospitalization rates;
- Higher rates of mortality when hospitalized;
- Significantly higher rates of respiratory illnesses, including asthma;
- More visits to the emergency room; and
- Higher readmission rates for newborns after discharge from the hospital.

CHAP is based on models from other states (such as Colorado⁴ and North Carolina⁵), but adapted to fit Michigan's climate of Medicaid managed care and the local healthcare environment.

2.2 Community and State Context

Healthcare navigation processes are constantly undergoing changes. CHAP is designed to work with ongoing community and state planning processes and participates in conversations that are occurring about healthcare navigation. A number of community planning processes occurred parallel to CHAP in Kent County, all of which include access to primary care and healthcare resources as well as medical home improvement as key needs:

- Community Health Needs Assessment (CHNA): Conducted jointly in 2011 by the three Kent County hospitals and the Kent County Health Department. Five priorities were identified, two of which are focused on access to affordable healthcare and healthcare resources. A key strategy is the formation of a "community healthcare hub" to link patients to community services.

¹ *Kids Count in Michigan Data Book 2012*, Michigan League for Human Services

² *Cover Michigan Survey 2010*, Center for Healthcare Research & Transformation

³ Peterson T., Peterson T., Armon C, and Todd J. *Insurance-Associated Disparities in Hospitalization Outcomes of Michigan Children*. The Journal of Pediatrics. 2011;158:313.

⁴ <http://www.cchap.org/>

⁵ <http://www.communitycarenc.com/>

- United Way Health Vision Council Planning: Access to healthcare (medical home, dental, vision/hearing, mental health) has emerged as a top priority
- Early Childhood Implementation Plan: Strategy D, Tactics 1 and 2, focus on access to primary care and medical home improvement.

The state of Michigan received a large federal grant to support the formation of “Community Linkages Hubs” in three pilot communities to identify and connect at-risk populations to services that address “life challenges,” including access to a medical home. Finally, as the state and federal healthcare landscape continues to change, two key Affordable Care Act measures will have significant effect on how CHAP operates: the expansion of Medicaid in 2014 to include a large number of previously uninsured adults, and the scheduled increase in the Medicaid reimbursement rate in 2013 to 100% of Medicare rates (currently, Michigan’s Medicaid rate is 54% of Medicare rates).

HEALTHCARE ENVIRONMENT

The healthcare environment changes rapidly. CHAP has evolved over the relatively brief demonstration project period in response to the larger healthcare landscape changes.

2.3 CHAP Implementation and Context

CHAP was designed to work on three levels: family, provider and system.

- Family-level strategies include parent education, home-based asthma education and case management, care coordination, patient navigation, and referral to community resources. Interpretation and same day/next day transportation services also are provided as needed.
- Provider-level strategies include provision of technical assistance to improve office efficiency and increase the office’s “medical homeness,” opportunities to participate in special projects to address specific health issues (e.g. behavioral health, asthma, childhood obesity, oral health, etc.) and opportunities to learn about best practices and share information with other providers through Practice Manager and Provider Meetings.
- System-level strategies have focused on increasing access to primary care by partnering with Medicaid health plans to enhance Medicaid reimbursement and provide incentives for physicians to expand access and improve care by expanding office hours and increasing the overall number of primary care slots available in the community for children on Medicaid.

At the start of CHAP, the goal of improving health outcomes among children on Medicaid utilized the concept of a ***pediatric (or family-centered) medical home***: *a collaborative, community-based, family-centered medical home program with the goal of improving the health of children on Medicaid while better utilizing existing resources and decreasing costs.* As the project evolved, the focus shifted to the larger healthcare conversation about the ***patient-centered medical home (PCMH)***: *a health care setting that facilitates partnerships between individual patients, and their personal physicians, and when appropriate, the patient’s family.*

As the development of CHAP progressed, it became clear that while the national trend toward PCMH certification was a positive development that assisted practices to improve efficiency through the implementation of electronic medical records and other technological advancements, there was as great a need for improved care coordination and community linkages. A pediatric (or patient-centered) medical home must assure that all the healthcare provided to a family/patient (hospital-based care, specialists, mental health, etc.) is coordinated and that the family is connected to appropriate community resources that can assist with the social determinants of health (such as access to safe

Many states, including Michigan, have received grants and are devoting significant resources to moving primary care practices toward NCQA (National Center for Quality Assurance) and/or PGIP (Blue Cross Blue Shield of Michigan’s Physician Group Incentive Program) PCMH certification.

Patient Centered Medical Home



housing, healthy food, and enrollment in community programs). Primary care practices are not currently structured to provide significant support in these areas. It became clear that the CHAP model was evolving to fill a significant gap.

Much of the focus of PCMH initiatives is on the adult care world (due to the fact that adults with chronic conditions are most costly to the healthcare system), and it has been important for CHAP to link with these efforts to be a voice for pediatric medical home.

2.4 CHAP Partners

The Children's Healthcare Access Program is a broad community collaboration involving Priority Health, local hospitals, medical clinics, pediatric practices, human services agencies and foundations. It is only possible because of the willingness of all participants to be innovative so that the community's children can best be served.

Major (system-level) Partners and Funders:

- First Steps - a community organization that is developing a coordinated system of early childhood services in Kent County. Houses CHAP management and a multidisciplinary team responsible for delivering direct services to families. Has taken the lead in raising funds to operate CHAP.
- Priority Health - a west Michigan-based managed care plan that provides commercial and Medicaid coverage. Provided enhanced reimbursement and pay-for-performance incentives to participating practices, as well as access to patient claims data and significant staff time.
- Helen DeVos Children's Hospital: a 214-bed children's hospital in Grand Rapids. Employs the CHAP medical director, whose time is donated in-kind.
- Asthma Network of West Michigan (ANWM) - partners in delivering the home-based asthma case management services, which are Medicaid-billable. ANWM also provides content expertise about asthma to CHAP.
- Great Start Collaborative of Kent County: Kent County's early childhood collaborative, comprised of representatives from more than 60 early childhood organizations.
- Early Childhood Investment Corporation: Founded in 2005 to be the state's focal point for information and investment in early childhood in Michigan. Has provided funding to First Steps as well as participated in replicating the model in other communities in Michigan and participating in a state-level leadership team.
- American Academy of Pediatrics, Michigan Chapter: Has advised and participated in CHAP program development, as well as assisting to replicate the model in other communities in Michigan and participating in a state-level leadership team.

CHAP demonstration project funders include the W.K. Kellogg Foundation, the Grand Rapids Community Foundation, Spectrum Health Healthier Communities, Heart of West Michigan United Way, Medicaid Outreach funding (via a partnership with the Kent County Health Department), and the Early Childhood Investment Corporation.

2.5 CHAP Participating Practices and Target Population

All of the children participating in CHAP are enrolled in Priority Health Medicaid and are clients at one of the following sites:

- **Federally Qualified Health Center (FQHC)** - Cherry Street Health Services. The following Cherry Street locations participate in CHAP: Belknap Commons Health Center, Cherry Street Health Center, four school-based health centers, Heart of the City Pediatrics (formerly Grand Rapids Pediatrics), Salvation Army Booth Clinic, and Westside Health Center
- **Private Practices:** ABC Pediatrics, Alger Pediatrics, Forest Hills Pediatrics, and Kent Pediatrics
- **Community Clinics:** Baxter Community Center Clinic
- **Pediatric Residency Clinic:** Helen DeVos Children's Hospital General Pediatrics Clinic (HDVCH)
- **Nurse-Managed Clinic:** Grand Valley State University Family Health Center

2.6 CHAP Demonstration Project Timeline

A demonstration project's purpose is to test ideas, learn the environment, and adapt activities and strategies as needed to fit what is happening in "real time". Demonstration projects are useful for providing the project an opportunity to be part of the system, which leads to understanding, a better view, and a chance to become part of the conversation. Successful demonstration projects should be flexible, adapt to a changing environment, able to be nimble in responding to new trends and ideas, and can achieve established goals or adapt goals to meet need.

CHAP Timeline	
2007	
Summer/fall	Research study conducted: Insurance-Associated Disparities in Hospitalization Outcomes of Michigan Children
Fall	First Steps (then Early Childhood Children's Commission) commits to housing/funding demonstration project
December	Priority Health commits to participating in demonstration project
2008	
January	CHAP program manager hired
March – July	Demonstration project practices recruited and enrolled
July	CHAP practices oriented to referral process
August	CHAP Year 1 service delivery begins; Contract/partnership with ANWM initiated for asthma education; Monthly CHAP Practice Manager meetings begin; Behavioral health workgroup begins meeting
September	Regular CHAP meetings initiated with HDVCH General Pediatrics clinic
November	CHAP Provider meetings begin
December	Evaluation contract with SRA International initiated
2009	
January	Regular meetings with Cherry Street managers begin
February	Early Childhood Investment Corporation Pediatric Medical Home Summit (Wayne County learned about CHAP)
April	GVSU Family Health Center becomes a CHAP practice
June	Otitis Media demonstration project begins
July	Priority Health decides to continue with CHAP partnership beyond initial year; demonstration project period defined as through 2011
2010	
January	Fit Kids 360 project meetings begin
February	Wayne CHAP begins planning
March	CHAP Year 1 Evaluation report released; CHAP presentation at Patient Centered Primary Care Collaborative (PCPCC) meeting in Washington DC; Kalamazoo begins planning for CHAP
May	MI-CHAP meetings begin (initially called "CHAP Learning Community")
July	Statewide "funder to funder" videoconference
2011	
February	CHAP Toolkit for replicating CHAP project completed Wayne CHAP receives start-up funding
May	Fit Kids 360 project coordinator hired; Saginaw CHAP begins planning; Bi-monthly psychiatrist breakfasts begin; Meeting with Molina Health Plan (results in contract for CHAP services to begin in 2013)
July	Dental workgroup begins meeting CHAP Year 2 evaluation report released
August	Connection with Michigan Department of Community Health Community Linkages workgroup begins
September	MI-CHAP legislative breakfast held Wayne CHAP begins service delivery
October	Article "Insurance-Associated Disparities in Hospitalization Outcomes of Michigan Children" published in The Journal of Pediatrics

3 Methodology

3.1 Evaluation Team and Approach

The evaluation team used a mixed methods approach to collect program data. The evaluation team consisted of First Steps Director of Health Initiatives Maureen Kirkwood, CHAP Medical Director Tom Peterson, MD and CHAP program staff; SRA Evaluation Director Cynthia Klein, PhD and Evaluation Project Manager Jacqui LaCoste, MPA; Rebecca Malouin, PhD, Michigan State University, who served as the medical home consultant; and Clive Belfield, PhD, City University of New York, who developed the framework for an ongoing cost-benefit analysis independent of Priority Health.

The primary outcomes evaluated for CHAP during the demonstration project are presented in the figure below, depicting the three levels of outcomes expected from CHAP: system, healthcare practice partner and children and family levels.

CHAP DEMONSTRATION PROJECT ACTIVITIES AND OUTCOMES

ACTIVITIES	OUTCOMES
<p>SYSTEMS</p> <ul style="list-style-type: none"> Enable access to services (Access) Support high quality of services (Quality) Identify efficiencies and gaps in service delivery in asthma care and other healthcare (Integration) Engage partners in key discussions across the community (Community Support) Convene partners for system wide changes in key areas including Behavioral Health, Dental Health and Obesity/Nutrition (Integration/Community Support) Provide leadership/resources to other communities interested in adopting the CHAP model (Community Support) Organize Parent Advisory Groups to facilitate feedback and train as key informants (Community Support) Provide Medicaid Incentives (Priority Health) <p>PRACTICE PARTNERS</p> <ul style="list-style-type: none"> Convene Provider and Practice Manager meetings Support/Provide Provider Education Engage providers in specific projects of interest <p>CHILD/FAMILY</p> <p><i>Services</i></p> <ul style="list-style-type: none"> Referral/follow-up services Transportation services Family education services Linkage to other services Assist in navigating the behavioral health system <p><i>Initiatives</i></p> <ul style="list-style-type: none"> Asthma Control and Management Otitis Media Well-Child Care Childhood Obesity Oral Health 	<p>SYSTEMS</p> <ul style="list-style-type: none"> Expanded access to medical care at practice partners Enhanced quality in early childhood service Enhanced quality in institutional practices Integrated and efficient delivery of services Expanded community partnerships to achieve goals Full continuity of asthma care is supported through activities across six key domains System-wide leadership in Behavioral Health, Dental Health and Obesity/Nutrition CHAP model expands to other counties in Michigan and across the country Cost savings to healthcare systems <p>PRACTICE PARTNERS</p> <ul style="list-style-type: none"> Pediatric Leadership is encouraged and facilitated across Kent County Improved fidelity to Asthma Management and Control and Otitis Media Initiatives Improved medical homeness (family-centered, coordinated, compassionate, culturally effective medical homes) Favorable feedback from health care partners on CHAP services and relationship Practice partners adopt CHAP Initiatives and engage in community health efforts <p>CHILD/FAMILY</p> <p><i>Services</i></p> <ul style="list-style-type: none"> Expanded services to CHAP's target population Relevant, useful services are delivered to CHAP's target population Improved experience with the behavioral health system that includes better access, increased education, and greater connections to resources following services. <p><i>Initiative Related Health Outcomes</i></p> <ul style="list-style-type: none"> Increased percentage of children who attend recommended well-child visits. Increased percentage of children who receive flu shots (at practices where outreach is conducted) Increased percentage of children who are screened for lead exposure during visit. <p>ED / Inpatient (IP) Visits</p> <ul style="list-style-type: none"> Decreased ED and IP use at partnering CHAP practices Decreased asthma related ED and IP use Decreased otitis media related ED and IP use <p>Asthma</p> <ul style="list-style-type: none"> Improved asthma-related outcomes at practice partner level in Spirometry, Primary Care Provider visits, and Asthma Action Plans Improved asthma-related outcomes at client-level in Asthma Control Test scores, exposure to smoke, number of missed work/school days, and quality of life <p>Otitis Media</p> <ul style="list-style-type: none"> Increased prescription filled for ear numbing drops

Mapped onto the three levels of CHAP operations, the long-term goals of the program are as follows:

- At the **system-level**, CHAP strives to a) change the healthcare delivery system within Kent County such that children in low-income families have the access to the quality primary healthcare services and support they need to stay healthy, and b) affect cost savings associated with increased access to primary healthcare services and support for children receiving Medicaid.
- At the **healthcare practice partner-level**, CHAP strives to connect healthcare providers to community resources, promote collaboration among different types of providers, and provide technical assistance to help primary care practices become accessible, family-centered, continuous, comprehensive, coordinated, compassionate and culturally effective medical homes.
- At the **child/family-level**, CHAP strives to improve health outcomes as a result of expanded access to health care for children and provision of education, support services, and navigation to families.

Another framework that guides CHAP program activities and evaluation is the Institute for Healthcare Improvement **Triple Aim**⁶ that describes an approach to optimizing health system performance. Developed in 2007 by the Institute for Healthcare Improvement (IHI), and adopted by the federal Centers for Medicare and Medicaid Services (CMS) as an overarching vision, the Triple Aim has three goals:

- 1) **Improving the experience of care for individuals**, described by the six dimensions of healthcare performance listed in the Institute of Medicine's 2001 report "Crossing the Quality Chasm": safety, effectiveness, patient-centeredness, timeliness, efficiency, and equity.
- 2) **Improving the health of populations**, through attacking "the upstream causes of so much of our ill health," such as access to preventive care, i.e. well child visits, immunizations; preventing obesity; and early identification of developmental delays.
- 3) **Reducing per-capita costs of health care**, such as hospital and ED utilization rates

Figure 1 provides examples of how CHAP uses the Triple Aim model to address needs identified in the Kent County healthcare environment.

CHAP Triple Aim⁷

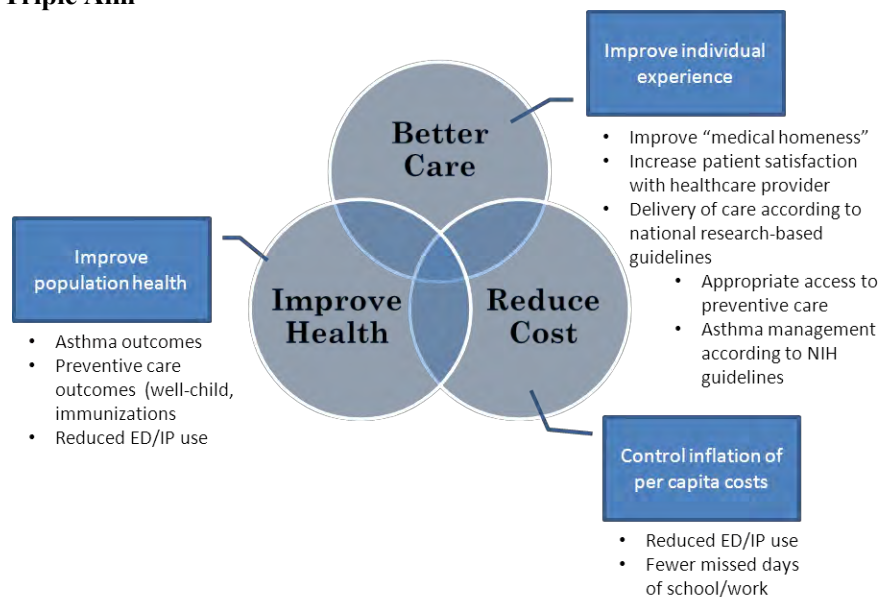


Figure 1

⁶ (<http://www.ihi.org/offering/Initiatives/TripleAim/Pages/default.aspx>)

⁷ Adapted from http://www.philblock.info/hitkb/_images/the_triple_aim.jpg

3.2 Evaluation Methods and Data

Table 1 presents the evaluation data collection methods, followed by brief explanations of each method.

Table 1. Demonstration Project Data Methods

Evaluation Area	Surveys	Staff and Community - Level Informant Interviews	Focus Groups	Data Analysis	Health Plan Claims Data	Activity Tracking Spreadsheets	Document Review
Process and Implementation		X		X			X
Children and Families	X		X	X	X	X	X
Healthcare practice partner	X	X				X	X
System-level		X				X	X

INTERNAL FEEDBACK

- **Activity Tracking Spreadsheets:** Over the demonstration project period, CHAP staff documented meetings and outcomes from collaborative efforts using the First Steps evaluation website online trackers. SRA reviewed this information and obtained contextual clarifications on outcomes.
- **CHAP Data Analysis:** CHAP client service data was transferred to SRA annually from the CHAP Access database, covering clients served from program inception through December 31, 2011. SRA analyzed descriptive demographic and services data.
- **Staff Interviews:** SRA conducted in-person interviews with CHAP staff annually.

EXTERNAL FEEDBACK

- **Focus Groups:** Focus groups were conducted in 2009 and 2011 with parents of CHAP clients to learn how they perceived and used services provided by CHAP. In 2009, SRA conducted three focus groups, each with a target client group, including one with asthma clients, one with general service clients and one with Spanish-speaking clients. Overall, 28 CHAP clients participated in the 2009 focus groups. In 2010, two focus groups were conducted with asthma clients – one with English-speaking clients and one with Spanish-speaking clients. The English-speaking focus group was moderated by Dr. Rebecca Malouin on March 9, 2011, while contractors Ricardo and Tricia Zelaya moderated the Spanish-speaking (SS) group on March 10, 2011. Overall, 17 CHAP clients participated in the 2011 focus groups. A total of 45 parents participated in the focus groups across both years.
- **Document Review:** SRA reviewed minutes from the CHAP advisory committee, provider meetings, and practice manager meetings annually.
- **Asthma Practice Profile Surveys:** CHAP conducted asthma practice profile surveys annually with healthcare practice partners from 2010-12 to assess their adherence to asthma care best practices. Paper surveys were completed by each practice and analysis was conducted by SRA.
- **PCAT Survey:** Dr. Rebecca Malouin at Michigan State University (MSU) conducted Primary Care Assessment Tool (PCAT) surveys of providers, staff and patients at practices participating in CHAP for Year 1.

The provider survey was conducted using the PCAT – Provider Short Survey and the staff survey was conducted using the PCAT – Facility Short Survey. In addition to the PCAT, a brief questionnaire about the CHAP services was included in the survey packets for providers and staff. Both the provider and staff surveys were conducted from May to

June 2009. Questionnaires, consent forms, and self-addressed, stamped envelopes were mailed to each practice from MSU. Participants (providers and staff) were asked to complete and return the consent forms and questionnaires, by post, to MSU by May 22, 2009. No incentives were provided to providers and staff.

The patient survey was conducted using the PCAT – Consumer-Client Child Short Survey. The surveys were conducted in person, by survey assistants (MSU students and staff), from July 28 to October 7, 2009. The family survey occurred over an extended period of time due to the time needed to translate the PCAT and consent form into Spanish and a change in survey assistants. All families of children seeing a general pediatrician within the clinic were approached after signing into the clinic at the front desk and invited to participate in the survey. Each family was offered a children's book as an incentive for participation.

The PCAT was selected as an instrument to assess “medical homeness.”⁸ The PCAT consists of parallel consumer-client (patient), facility, and provider questionnaires to assess both the structure and process elements related to the four key domains of primary care:

- **Accessibility** – the primary care provider either provides care directly or serves as a facilitator, directing patients to more appropriate sources of care at the appropriate time.
- **Comprehensiveness** – refers to the availability of a wide range of services in primary care and their appropriate provision across the entire spectrum of types of needs for all but the most uncommon problems in the population by a primary care provider.
- **Continuity** – refers to the longitudinal use of a regular source of care over time, regardless of the presence or absence of disease or injury.
- **Coordination** – the linking of healthcare visits and services so that patients receive appropriate care for all of their health problems, physical as well as mental.

PCAT use for this evaluation study was approved by the Michigan State University Biomedical and Health Institutional Review Board. (For further methods information of PCAT implementation, please see Appendix A “PCAT methods”.)

- **Practice-level Key Informant Interviews:** Dr. Rebecca Malouin conducted key informant interviews in 2010 and 2012 with practice-level physicians, practice managers, and staff.
 - In the summer and fall of 2010, key informant interviews were conducted by faculty at Michigan State University with physician champions, practice managers and staff from practices participating in CHAP. The purpose of the interviews was to determine the perceptions and opinions of CHAP. All key informant interviews were conducted by phone, audio-recorded with permission from the participant, and transcribed. The project was approved by the Michigan State University Biomedical and Health Institutional Review Board. Six physicians, six practice managers, and three staff members participated in the key informant interviews for a total of fifteen participants.

⁸ The American Academy of Pediatrics defines a medical home as “primary care that is accessible, continuous, comprehensive, family centered, coordinated, compassionate, and culturally effective.” The PCAT, developed by Barbara Starfield, MD, MPH, at Johns Hopkins University, is a group of questionnaires designed to measure the attainment of evidence-based primary care attributes within a primary care practice.

- In April/May 2012, key informants from 7 of the 10 participating CHAP sites were interviewed via telephone. When possible, both a physician champion and staff member directly involved with CHAP were interviewed regarding their perspective on and experience with the CHAP initiatives and their impact on their respective practices and the delivery of services to the practice's patients.
- **Community-level Key Informant Interviews with Key CHAP Leadership:** Key informant interviews were held in March 2011 by Dr. Rebecca Malouin. The purpose of the interviews was to better understand the leadership and stakeholder views on project collaborations, successes, barriers, and changes. A total of 16 interviews were conducted, each lasting 30-60 minutes. Examples of stakeholder participants include First Steps Commission members, CHAP funders, organizational collaborators and lead program staff.
- **Priority Health Data Analysis:** SRA received and analyzed de-identified Priority Health claims data to determine rates of use for the CHAP client population and the comparison population.
- **Asthma Network of West Michigan (ANWM) Data Analysis:** ANWM client service data was transferred to SRA annually in the CHAP Access database, covering clients served from program inception through December 31, 2011. Asthma services and outcome indicators were analyzed by SRA.

Analysis Terms Defined:

Three population groups were identified for use in analyzing CHAP outcomes based on CHAP services data and Priority Health claims data.

- 1) CHAP client population – Includes children served by CHAP during the demonstration project period. Depending on the analysis, clients may be filtered for diagnosis types, such as asthma, or by services received, such as transportation or asthma case management. Unless otherwise noted, the CHAP client population is defined as the 5227 clients that received a tangible service at some point during the demonstration project period.
- 2) CHAP eligible population (hereafter referred to as CHAP membership) – Includes the approximately 30,000 Kent County children receiving Medicaid coverage through Priority Health that were eligible for CHAP services (regardless of whether they actually received tangible CHAP services) during the demonstration project period (2008 to 2011). The CHAP eligible population is commonly referred to throughout this report as “Practice-level” analyses, because it is the practice-level outcome for Priority Health members in Kent County.
- 3) Comparison population – Includes approximately 27,000 children in Muskegon and Ottawa counties receiving Medicaid coverage through Priority Health during the demonstration project period. Any child who was enrolled in Medicaid in both Kent County and the comparison counties at any point during 2008 to 2011 was removed from matched comparison analyses.

Individuals in the CHAP eligible population (which included the CHAP client population by definition) were matched to individuals in the comparison population using a propensity scoring method that took into account the following variables: child's age, child's gender, number of ED visits in the baseline year (2007-2008), number of asthma related ED visits in the baseline year, and association with an FQHC as the child's medical home at baseline.

3.3 Alignment of Evaluation Years for Practice and Client Levels

Quantitative outcome data was analyzed on two levels: practice-level and client-level. For detailed information on our comparison group and analysis methods, see Appendix A.

Practice-level: Where appropriate, practice-level data was used to assess trends over time in both the CHAP eligible population (Priority Health Medicaid enrollees assigned to primary care practices participating in CHAP in Kent County) and a matched comparison population (Priority Health Medicaid enrollees assigned to primary care practices in Muskegon and Ottawa Counties). For reporting purposes, CHAP practice-level data utilized evaluation years aligned to calendar years 2007 to 2011. The 2007 (pre-CHAP) calendar year served as the baseline year for most practice-level outcome comparisons.

Because CHAP implementation began in August 2008, calendar year 2008 served as a partial year of implementation with calendar year 2009 serving as the first full year of program implementation. In select cases, such as when an initiative began later in the demonstration period (e.g. 0-15 month well child initiative in 2011), calendar years 2010 or 2011 were used as the first full year of program implementation. All year by year comparisons were made relative to the baseline year – usually calendar year 2007.

Client-level: Client-level outcomes were assessed based on the client's start date of tangible CHAP services. Tangible services are those services provided to clients that involve direct client interactions and exclude attempts at service that are unsuccessful or only involve indirect services such as mailing materials to clients. For each CHAP client, we assessed a specified outcome 12 months prior to the client's tangible services start date (referenced as "pre- program" involvement) and 12 months subsequent to their start date (referenced as "post- program" involvement).

Matched comparison group individuals were assigned the same start date as their associated CHAP client and a similar method of outcome assessment was applied.

3.4 Statistical Tests

SRA performed statistical testing on select outcome data to determine whether significant differences were found between the baseline year and subsequent program years. The primary statistical test used in this report is the z-test which can be interpreted by looking at the associated p-value.

- z-test: The z-test is a common statistical test that standardizes data on one scale so a comparison can be made between two populations. This test yields a z-score in which higher z-scores indicate larger differences between the populations.
- p-value: A p-value measures the likelihood that the results are due to chance. By convention, a p-value less than .05 (i.e., $p < .05$) is typically considered "statistically significant" and indicates the results are not due to chance.

3.5 Purpose and Scope of Report

CHAP is a demonstration project based on the premise that children on Medicaid have less access to primary care than children with commercial insurance, resulting in poorer health outcomes. Beginning implementation in August 2008, CHAP has been used to test ideas, learn about the environment, and adapt project activities and strategies to meet needs encountered in the healthcare environment.

SRA developed an initial long-term evaluation plan for CHAP that has been adapted over time to examine outcomes at system, healthcare practice partner and children/families levels. The purpose of this report is to evaluate the CHAP demonstration project at the three levels of outcomes – systems-level, practice-level, and child/family-level. In addition, CHAP increasingly aligns outcomes to the Triple Aim framework (see section 3.1) used in healthcare as a vision for reform along the goals of 1) improving the experience of care for individuals, 2) improving the health of populations, and 3) reducing per-capita costs of healthcare. The scope of this report covers evaluation findings from the demonstration project period (August 2008 – December 2011) and expands upon evaluations conducted in 2009 and 2010.

4 System-level Outcomes

4.1 System-level Activities & Context

At the system-level, CHAP strives to address disparities within the health care system in Kent County such that children on Medicaid have the access to the quality primary healthcare services and support services they need to stay healthy. As a result of any improvements in access and quality, it is hoped that cost savings associated with increased access to primary healthcare services and support for children receiving Medicaid will be realized.

As described in section 2.2, system-level strategies have focused on increasing access to primary care by partnering with Medicaid health plans to enhance Medicaid reimbursement and providing incentives for physicians to expand access and improve care by expanding office hours and increasing the overall number of primary care slots available in a community for children on Medicaid.

As part of the demonstration project, Priority Health offered financial incentives to primary care medical homes to encourage them to open access to additional children enrolled in Medicaid. First Steps provides CHAP services designed to facilitate access for patients and families in participating practices. Services provided by CHAP include initial and ongoing education about the importance of the medical home, health care system navigation, asthma disease management, transportation, language interpretation, social work services, and connection to community resources. CHAP hopes to demonstrate that by providing publicly insured children in Kent County with a high-quality, consistent medical home the result will be healthier kids as well as reduced costs to the community.

Evaluation findings are based on the goals and activities that comprise the system-level of the CHAP program (Figure 1). Project system-level goals include:

- 4.2.1 Expanded access to primary care at healthcare practice partners
- 4.2.2 Enhanced quality in health care and institutional practices
- 4.2.3 Integrated and efficient delivery of services
- 4.2.4 Expanded community partnerships to achieve goals
- 4.2.5 System-wide facilitation to address disparity and access issues in the areas of behavioral health, oral health, asthma care and childhood obesity.
- 4.2.6 Replication of CHAP model in other counties in Michigan

4.2 System-level Outcomes

4.2.1 Expanded Access to Medical Care at Healthcare Practice Partners

Outcome: CHAP achieved success in expanding access to medical care as evidenced by adding healthcare practice partners, increasing openings, and extending practice hours of service.

As part of the strategy for expanding access at healthcare practice partner sites, Priority Health provided enhanced reimbursement and pay-for-performance incentives. These incentives factored significantly into both the willingness of the private practices to be involved in CHAP, as well as the FQHC's (Cherry Street) willingness to expand evening hours.

ACCESS

One of CHAP's goals is to expand primary care access for children on Medicaid in Kent County.

CHAP uses work plans developed with each practice partner to expand access to services.

Adding Healthcare Practice Partners

The number of practices associated with CHAP increased from 11 original practices to 14 practices by 2010. After the first year of the project, a decision was made to not add new practices, but rather to focus efforts on the existing 14 practices. This kept demonstration project practices consistent and allowed CHAP to focus on site-based quality improvement efforts.

Increasing Openings at Healthcare Practice Partners

Using the total number of member months per year divided by 12, CHAP estimates the number of openings at partnering CHAP practices as:

Table 2. Estimated Openings at Healthcare practice partner Sites

Year	Estimated number of openings (includes all healthcare practice partners)	Change Year to Year
Baseline	13,392	
2009	15,099	+ 1707
2010	15,358	+259
2011	14,837	-521
Net Benefit:		+1445

Although the number of openings decreased from 2010 to 2011, from baseline there was a net increase of an estimated 1445 openings at partnering CHAP practices. The decrease seen in 2011 is believed to be due to practices discharging patients who were noncompliant (i.e. had large numbers of no-shows). CHAP practices continued taking new patients on a limited basis throughout the demonstration project, but these numbers were likely offset by the discharges and by attrition (i.e. families leaving the area, children aging out of the pediatric population, etc.). It is important to note also that only about 50% of the CHAP-eligible population was retained throughout the course of the project, due in large part to the month-by-month eligibility requirements for Medicaid. This adds to the difficulty in ascertaining actual access increases.

Expanded Hours of Service

There was an initial push to achieve expanded service hours in the early stages of CHAP. In 2009, Cherry Street increased clinical time for providers by 13% and added evening and weekend hours. This expansion of hours was a criterion for Cherry Street to receive incentive payments from Priority Health. This incentive did not go to Cherry Street's bottom line, but was delivered as regular bonus payments to all staff working in CHAP clinics throughout the demonstration project.

The Helen DeVos General Pediatrics Clinic adjusted its schedule to add same-day appointments. Once these expanded hours and same-day access occurred, the goal became to maintain this expanded access. It should be noted that CHAP is just one collaborator among many seeking to move practices to expand hours of service. From the 2011 stakeholder interviews, one practice respondent commented:

...One of the goals of being involved in the CHAP program was to convince others to have expanded hours of service. There are other influences working on that too. For instance, to become a patient-centered medical home you have to have a certain amount of clinical time to see kids and most of that does involve having an expansion of the amount of available appointment slots, so there's a lot of pressure to do that overall.

Anecdotally, from the 2010 practice-level key informant interviews, 11 of 14 practice staff interviewed reported CHAP had improved access at their practices. The most frequently mentioned changes were:

- practices opened to new patients on Medicaid
- practices have increased their same-day appointments
- CHAP has allowed practices to hire more providers and increase their hours of operation
- CHAP transportation assistance has helped to improve accessibility and contributed to reduced no-show rates

Defining and Addressing Access Issues

Early on, CHAP focused on impacting access by increasing financial incentives to primary care practices to accept more Medicaid patients, providing supportive services to families, and working closely with providers to improve quality.

Access was initially narrowly defined as simply increasing the ability of primary care practices to accept additional Medicaid patients by providing enhanced revenue to those practices. However, it became clear that access needed to be defined much more broadly. CHAP learned that *access* involved assisting some CHAP practices to provide more same-day appointments, increase evening hours, and improve phone triage.

Access for CHAP came to be defined in layperson's terms as:

"Patients who need the service know about it, know where it is, can afford it, and can get to it; it's available at convenient times; it's provided in a way that is sensitive to different cultures and languages; the patients who need it actually use it; and there is enough capacity to meet the community need."

4.2.2 Enhanced quality in children's health services and in institutional practices

Outcome: Key informant interviews with practices in 2012 confirmed CHAP increased practice use of Asthma Network of West Michigan (ANWM) services, a key provider of asthma case management services.

All of the practices interviewed referenced their increased use of and interactions with ANWM. Nearly all respondents agreed that use of the Asthma Network services through CHAP referral to identify triggers in the home, confirm appropriate storage of medications, educate patients/families on the appropriate use and administration of medications, and facilitate timely follow-up was extremely beneficial to patients, and ultimately contributed to lower ED usage rates within their respective practices.

As one provider noted,

We have to give CHAP huge credit for contributing to the decrease in the number of ED visits in general. Not only asthma patients but for all our patient population. (There have been) less (appointment) no shows. And again, you know when [CHAP] specialists make a home visit to find out what was the barrier for the family to bring their child in typically the family recognizes that...number one, it's important to keep your appointments, and two, the help is out there - they're not alone. They can always call and ask for help. I've heard only good things about CHAP from my colleagues and my patients.

Many of the practices were connected to the Asthma Network before CHAP began, but experienced an improved, stronger relationship with ANWM since CHAP started. As one provider stated:

We've always had that contact, but not nearly as much as we do now, and that is because of CHAP.

One provider noted the particular usefulness of having an asthma educator visit the patient's home:

They are better able to see roadblocks to care than we can by just being in the office.

Apart from an increased emphasis on spirometry, most providers noted little difference in the actual treatment of asthma cases in their office. For these providers, the major difference in care management was focused on the educational component of treatment, insuring that the patient and family understood the triggers, appropriate medication use and administration, and how to use the Asthma Action Plan they were given.

Providers reported the in-service presentations for providers and staff helped increase awareness of the Asthma Network services available through CHAP.

In addition, CHAP facilitated improved communication and collaboration among behavioral health care providers from 2010 to 2011 (Section 4.2.5) and improved practices' fidelity to asthma case management best practices (Section 5.2.3), both of which can lead to improved services and institutional practices.

QUALITY

At the system level, CHAP seeks to change institutional practices in line with industry best practices related to "medical homeness".

When viewed in aggregate across all CHAP sites, the program should see an increase in best practices utilized by decide on "practice partners" or "CHAP practices" and an improvement in medical homeness scores over

4.2.3 Integrated and efficient delivery of services

Outcome: Key informant interviews in 2012 confirmed CHAP has facilitated more integration among healthcare practice partners and between other community organizations and healthcare practice partners.

Respondents overwhelmingly cited the benefits of the periodic practice and provider meetings. As one respondent stated:

I would definitely miss our monthly meetings to see how the practice is doing, because you want to know how you're doing, what is your current state. And both CHAP and Priority Health have been very helpful in archiving this data for us, and making sure that the providers know – what is our readmission rate? what is our ER visit rate?...and things like that.

Practice managers also indicated that the periodic meetings were helpful for informing them of available community resources. One practice manager went further to say:

The biggest piece would just be missing them as a resource when we needed a little guidance or direction on how to proceed with this patient where we were running into roadblocks."

Other practice respondents noted:

The most interesting thing is that the whole program has enhanced communication among physicians between practices that don't take much Medicaid and practices that do. Also between physicians and the insurance companies. It's been a win-win for just about everybody.

While specific efficiency improvements were not noted by partners in key informant interviews, it is possible those interviewed might not have been aware of CHAP efforts in Year 1 regarding efficiency. For example, the CHAP Medical Director visited several FQHC sites and GVSU to observe and consult with providers on improving issues such as phone triage, scheduling, and provider "throughput."

It was reported to CHAP that changes resulted from those visits, such as one clinic training the nurse assigned to phone triage about pediatric cases to set up same-day appointments when possible, instead of sending the family immediately to the emergency department.

INTEGRATION

For the Integration impact area, a key goal is to integrate delivery of services in order to minimize gaps and avoid overlap in these services. Integration of services is tracked qualitatively through CHAP trackers and summaries of practice manager, provider, and workgroup meetings describing outcomes of partnership activities

4.2.4 Expanded community partnerships to achieve goals

Outcomes: CHAP has successfully expanded community partnerships that advance the agenda of expanding access to healthcare services for children in Kent County.

Community Partnerships

- CHAP Advisory Committee: This group meets quarterly to provide strategic input and program review. The group consists of key stakeholders throughout the community, including representatives from the three hospitals, Priority Health, the Alliance for Health, the Grand Rapids Chamber of Commerce, the Kent County Medical Society, key CHAP funders, the health department, local university health programs, behavioral health agencies, community mental health agencies, the Great Start Parent Coalition, and other community leaders.
- CHAP provides regular program updates and serves as a member of the Great Start Collaborative, a coalition of more than 60 organizations working on early childhood issues in Kent County.
- CHAP leadership has been involved in a number of community health planning processes, including:
 - The Community Health Needs Assessment (CHNA): Conducted jointly by the three Kent County hospitals and the Kent County Health Department. Five priorities have been identified, two of which are focused on access to affordable healthcare and healthcare resources. A key strategy is the formation of a “community hub” to link patients to community services.
 - The United Way Health Vision Council Planning: This process involves numerous community stakeholders to provide direction and input as United Way plans strategies for its next funding cycle. Access to healthcare (medical home, dental, vision/hearing, mental health) has emerged as a top priority.
 - The Early Childhood Community Plan: Developed by the Great Start Collaborative and First Steps to provide a tangible resource to the community with regard to the next steps needed to realize the vision that every child arrive at kindergarten healthy and ready to succeed in school and in life. Strategy D, Tactics 1 and 2, focus on access to primary care and medical home improvement.
- Expanding CHAP Funding Base:
 - As the demonstration project began to show promising results, CHAP has been able to leverage public dollars by accessing Medicaid Outreach funding through a partnership with the Kent County Health Department.
 - Priority Health will begin providing direct funding to First Steps to support continuation and expansion of CHAP to new practices in 2012.
 - In addition to the ongoing partnership with Priority Health, meetings have been held with three of the other Medicaid health plans operating in Kent County. This has resulted in the initiation of a contract to provide some direct funding to CHAP from one of these health plans, with services to begin in late 2012 or early 2013.

COMMUNITY SUPPORT

Expanded partnerships enable CHAP to achieve its goals and objectives. Not only is the number of partners across the community an important indicator of partnership development but so, too, is the level of collaboration with each partner.

4.2.5 System-wide facilitation to address disparity and access issues in the areas of behavioral health, oral health, asthma care and childhood obesity

Outcomes: CHAP has successfully begun community health initiatives centered on asthma, behavioral health, oral health, and childhood obesity/nutrition.

Asthma

- CHAP developed a new linkage between the Helen DeVos Children's Hospital and asthma services provided by CHAP/Asthma Network of West Michigan. This collaboration ensures that all inpatient asthma admissions, regardless of insurance, are referred to CHAP. CHAP also continues to coordinate services with Priority Health Medicaid to avoid duplication.
- In 2010, CHAP and ANWM collaborated to initiate the Not One More Life program, an Atlanta-based model that promotes partnerships between area churches and health care providers to provide free spirometry and asthma education at church locations for underserved populations. This effort, targeted primarily at the African American and Latino populations, strives to identify previously undiagnosed cases of asthma and connect patients to appropriate health care services.

Behavioral Health

- To increase behavioral health capacity and provide care coordination/navigation of the behavioral health system for families, CHAP hired a social worker in the fourth quarter of 2010.
- The Behavioral Health Workgroup, begun in August 2008 and consisting of representatives from primary care, mental health agencies and inpatient facilities, the health plan and psychiatrists, continued to meet monthly throughout the project to work on issues of communication and access for children on Medicaid. As an offshoot of the behavioral health workgroup, CHAP began hosting bi-monthly child psychiatrist breakfasts in May 2011 to: 1) facilitate a conversation and ongoing communication between local pediatricians and child psychiatrists; 2) start a community dialogue with the goal of creating short and long-term solutions to address issues regarding access to psychiatric services, particularly for children on Medicaid; and 3) provide a mechanism for area child and adolescent psychiatrists to network with each other.
- The workgroup developed a plan to increase communication opportunities between primary care providers and child psychiatrists. The first forum was held in December 2011 at a CHAP provider meeting; this will be an ongoing strategy.
- CHAP facilitated meetings between leaders of the Helen DeVos Children's Hospital and network180, to discuss a potential partnership in behavioral health. This work is ongoing, and it is hoped will result in better integration of the Children's Hospital into community-based efforts to improve access to mental health services.

Oral Health

- In July 2011, CHAP convened a Dental Health Workgroup to discuss access issues for children on Medicaid. Initial participants included the West Michigan District Dental Society, pediatric and general dentists, dental clinics, pediatricians, early childhood agencies, the Helen DeVos Children's Hospital, representatives from dental hygiene and dental assistant schools, the health department, home visiting agencies and Head Start.
- As the workgroup began meeting regularly, membership broadened to include representatives from senior citizen groups and adult clinics; this has led to a broader focus on access to dental services for children and adults.
- The group has continued to meet, and is now known as the Kent County Oral Health Coalition. The large group meets every other month, and two subcommittees have been identified, one focusing on expanding access to clinical services, and the other on prevention and education. A three-year plan to guide community efforts is currently being developed.

Childhood Obesity

One of the issues that rose to the surface through the early CHAP practice manager and provider meetings was childhood obesity, specifically the lack of intervention programs for children and teens who are already overweight or obese. The development of these “Level II” obesity intervention programs had long been discussed as a planned part of the Helen DeVos Children’s Hospital’s childhood obesity strategy, as the hospital worked toward a continuum of care approach in the community. CHAP was thus the vehicle for the development of Fit Kids 360, a seven-week, multidisciplinary program for children ages 5 to 17 that gives parents and children a positive, safe approach to healthy living. The program is designed to prevent and treat obesity and serve as an educational resource for parents and children. The pilot phase of the project was launched on September 30, 2010.

Partners in this broad-based community collaborative include First Steps, the Helen DeVos Children’s Hospital, Spectrum Health Healthier Communities, the Kent Medical Foundation, Gazelle Sports, the YMCA, the Salvation Army Kroc Center, the Camp O’Malley Boys and Girls Club, Claystone Clinical Associates, Forest Hills Pediatrics, Grand Rapids Public Schools, Grand Valley State University, Helen DeVos Children’s Hospital Healthy Weight Center and Pediatric Clinic, Kent Intermediate School District, MAC/East Hills Athletic Club, MVP Sports, MSU College of Human Medicine, MSU Kinesiology, Priority Health, Reagan Marketing + Design, LLC, Spectrum Health Gerber Memorial Hospital, Tamarac, and Spectrum Health Zeeland Community Hospital.

Funding through 2011 was provided by First Steps, Healthier Communities, Kent Medical Foundation, and Founders Bank, with in-kind support from the Helen DeVos Children’s Hospital. First Steps/CHAP housed a part-time coordinator position, and acted as a convener to provide leadership and opportunity for the program to get off the ground.

Outcomes from evaluation of Fit Kids 360 include:

- From 2010 - 2011, seven class series were held, and 118 children completed the program.
- 42% were severely obese (>99th percentile); of this population, 76% had positive outcomes of either a decrease or no change in their BMI z-score.
- The Fit Kids classes had a 65% retention rate, one of the highest for this type of class
- 70% of families improved their “obesigenic” environment, based on pre- and post-Family Nutrition and Physical Activity (FNPA) survey scores
- 65% of participants reduced their screen time, and 45% reduced TV time by an hour or more
- Participants demonstrated a 50% increase in physical activity

In general, key informant interviews revealed CHAP has been perceived as instrumental to establishing or facilitating collaborations among community partners:

They’ve been the reason to start or restart talks with people who have balked at helping develop systems of care before (ex. dental). Overall they’ve really improved communication and that’s been so important and so rewarding. They jump in, in a non-judgmental way and have a real good focus on what they want to do.

4.2.6 Replication of CHAP model in other counties in Michigan

Outcome: CHAP has played an instrumental role in promoting the CHAP model in other counties in Michigan.

Leadership to other Michigan communities

CHAP has provided leadership to other Michigan communities interested in improving access to healthcare through the replication of the CHAP model across the state.

- Kent CHAP has played an instrumental role in promoting the CHAP model in other counties in Michigan. First Steps/CHAP provided technical assistance to Wayne, Kalamazoo, Genesee and other counties' CHAP development efforts. Wayne County CHAP received funding from the Kresge and Kellogg Foundations to develop and implement a CHAP; Wayne CHAP began providing services in October 2011. In addition, the Michigan CHAP collaborative (MI-CHAP) was formed, composed of counties in various stages of CHAP development as well as state-level agencies.
- CHAP has provided state and national advocacy and connection to pediatric medical home initiatives. From the beginning of the CHAP demonstration project, there have been consistent efforts to connect with the Michigan Department of Community Health (MDCH), Medicaid, and other state agencies. This has involved presentations to the directors and staff of various agencies, participation in state-level workgroups, and frequent email and phone communication.
- The CHAP director has participated in a Community Linkages workgroup at MDCH, connected to a larger patient-centered medical home grant that was received by the state. This group is working to design the formation of "Community Linkages Hubs" throughout the state to identify and connect at-risk populations to services that address "life challenges" including access to a medical home, unemployment, safe housing, transportation, mental healthcare, access to literacy/education/translation services, and other support systems.

First Steps/CHAP provided technical assistance to Wayne, Kalamazoo, Genesee and other counties' CHAP development efforts.

- First Steps' Kent CHAP is developing and leading a coordinated, statewide implementation strategy through a partnership with the Early Childhood Investment Corporation (ECIC). Partnering counties include Wayne, Kalamazoo, Genesee, Ingham, Saginaw, and a four-county northwest Michigan region. The Kent County CHAP director and medical director are providing leadership to the MI-CHAP collaborative.

CHAP partnerships have resulted in implementation resources for other communities to use to successfully launch similar programs.

- First Steps contributed to an informational video about CHAP. Detroit Public TV and the ECIC worked with CHAP to produce a high-level, informational video for use with funders, legislators, and communities thinking about implementing the CHAP model. Doug DeVos, First Steps Commission co-chair, was featured in the video.
- First Steps created a CHAP Toolkit. Through funding provided by the Early Childhood Investment Corporation, CHAP created detailed, step-by-step instructions on how to implement the CHAP model in a community. This resource is being promoted by the Early Childhood Investment Corporation in community discussions. In addition, CHAP presented the toolkit in 2011 to more than 15 communities from across the state during a four-hour workshop hosted by ECIC.

CHAP has furthered awareness of the importance of access issues at the state and national levels.

- Several national organizations have written about the CHAP model, including the Agency for Health Care Quality (AHRQ), which featured an article on CHAP on its Innovations Exchange website (*Financial Incentives and Support for Primary Care Practices Improve*

Access and Reduce Emergency Department and Hospital Use for Children on Medicaid) and The Advisory Board Company. CHAP has also been presented at several national forums, including the Patient-Centered Primary Care Collaborative (PCPCC).

- In addition, legislative advocacy has occurred throughout the demonstration project, both with Kent County legislators through First Steps advocacy efforts, as well as at a state-level in partnership with the American Academy of Pediatrics, Michigan Chapter (MIAAP) through the hosting of a legislative breakfast in September 2011.

5 Healthcare Practice Partner Outcomes

5.1 Activities/Context

At the healthcare practice partner-level, CHAP strives to connect healthcare providers to resources and mobilize family-centered, continuous, comprehensive, coordinated, compassionate, and culturally effective medical homes.

All of the children participating in the Children's Healthcare Access Program are enrolled in Priority Health Medicaid and are patients at one of the following sites:

- ABC Pediatrics
- Alger Pediatrics
- Forest Hills Pediatrics
- Kent Pediatrics
- Baxter Community Center Clinic
- Cherry Street Health Services – 9 sites:
 - Belknap Commons Health Center
 - Cherry Street Health Center
 - Heart of the City Pediatrics (formerly Grand Rapids Pediatrics)
 - Salvation Army Booth Clinic
 - Westside Health Center
 - Four school-based health centers (Burton, Creston, Ottawa, Union)
- GVSU Family Health Center
- Helen DeVos Children's Hospital General Pediatrics Clinic

Evaluation findings are based on the goals and activities that comprise the practice-level of the CHAP program (Figure 1). Project practice-level goals include:

- 5.2.1 Encourage and facilitate pediatric leadership in healthcare initiatives
- 5.2.2 Improve fidelity to asthma control and management best practices
- 5.2.3 Improved medical homeness
- 5.2.4 Satisfaction/favorable feedback from healthcare practice partners

5.2 Healthcare Practice Partner-level Outcomes

5.2.1 Encourage and Facilitate Pediatric Leadership in Healthcare Initiatives

Outcome: CHAP successfully encouraged and facilitated leadership within the pediatric healthcare community in the areas of: asthma, behavioral health, otitis media, and childhood obesity.

During 2010 and 2011, pediatric leaders provided updates on workgroup activities at CHAP provider meetings and were part of the agenda as presenters, rather than just attendees.

The Otitis Media (ear infection) project was brought to CHAP by CHAP pediatrician Sue Wakefield. As a result, in June 2009 First Steps initiated the Otitis Media project at CHAP healthcare practice partners. The goal of this effort was to decrease inappropriate ED visits due to otitis media complaints by training CHAP practices to deliver parent education and provide prescriptions for ear numbing drops at the 9 or 12 month well child visit.

In addition to Tom Peterson, CHAP Medical Director, some of the other CHAP pediatricians became more involved in community-based efforts.

For example:

- Bill Stratbucker (HDVCH) participated in the early childhood indicators workgroup for health last summer.
- Karen Vanderlaan (HDVCH), Sue Wakefield (Forest Hills), and Jeff Hoogstra (ABC Peds) are involved in the asthma initiative.
- Candace Smith-King (HDVCH), Kristin Stout, and Jenny Bush (Westside Health Center) are involved in the behavioral health initiative.
- Kathy Howard (Forest Hills), Lana Gagin (HDVCH), and Bill Stratbucker (HDVCH) are involved in the childhood obesity/Fit Kids 360 project.
- Ed Cox (HDVCH) is involved in the oral health initiative.

BEST PRACTICES

At the system level, CHAP seeks to change institutional practices in line with industry best practices related to “medical homeness”. When viewed in aggregate across all CHAP sites, the program should see an increase in best practices utilized by practice partners and an improvement in medical homeness scores over time. The tool used to measure outcomes in institutional practices in 2010 was qualitative (anecdotal) descriptions of key institutional practices.

5.2.2 Assist Practices to Improve Fidelity to Asthma Control and Management Best Practices

Context: CHAP healthcare practice partners completed annual surveys that assessed adherence to the twelve elements of fidelity to asthma control and management best practices. A total of 8 healthcare practice partners (80% of the 10 healthcare practice partners) completed surveys consistently across the three-year demonstration project.

Outcome: Findings for the eight practices were positive for implementation of asthma case management, with all but one practice improving in at least one indicator area and one improving in four areas.

As shown in Figure 2, changes on asthma practice profiles from 2009 to 2011 show success in efforts to improve continuum-based care with healthcare practice partners. There were increases from 2009 to 2011 in asthma in-service trainings, spirometry performed, asthma action plans provided to patients, and in-office asthma education provided to patients. The majority of these increases were realized from 2009 to 2010 and maintained in 2011. Practices averaged 22% improvement in scores from 2009 to 2011, ranging from 0% to 44% at individual practices.

12 Scored Elements of Program Fidelity for the Asthma Control and Management Initiative

1. Annual asthma in-service for staff
2. Asthma education for patients
3. Availability of an in-office asthma educator
4. Referral to CHAP/ANWM
5. Peak flow monitoring education
6. Environmental tobacco smoke assessment
7. Availability of in-office spirometry
8. Up-to-date asthma action plans in place
9. Administration of the Asthma Control Test
10. Maintenance of an asthma registry
11. Routine 6-month asthma visits
12. Document flu shots

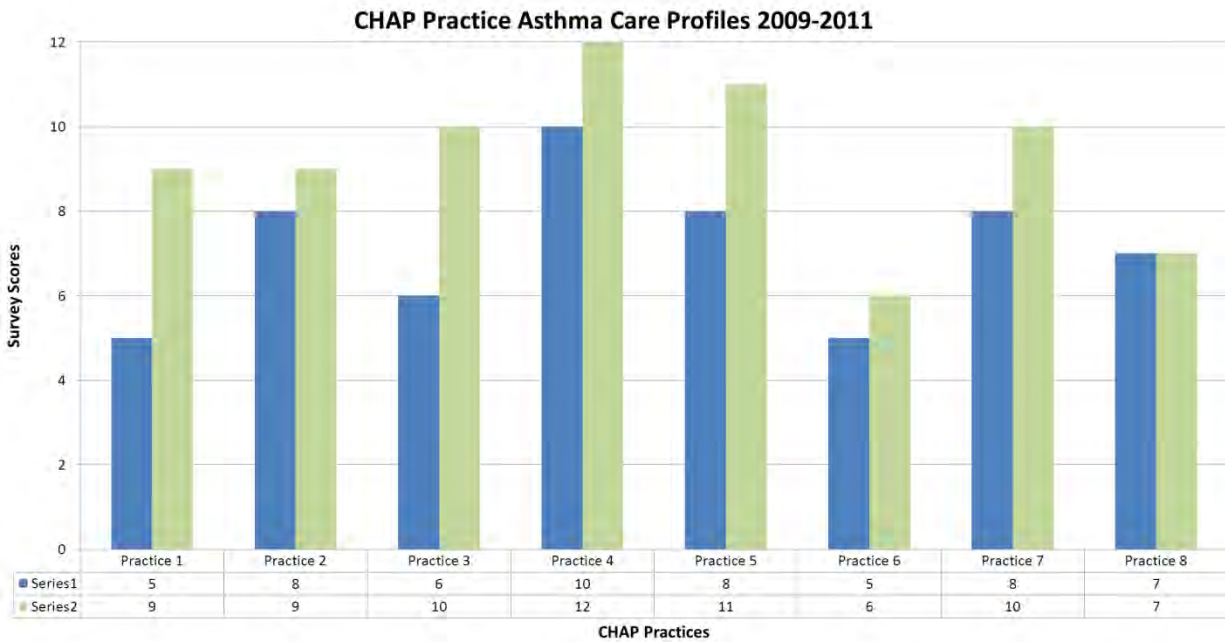


Figure 2

5.2.3 Improved medical homeness

Outcome: Practices interviewed at the conclusion of the demonstration project reported the most change in the primary care domain *Coordination of Care* and attributed the change as being facilitated by CHAP.

Of note, 3 out of 5 practices interviewed credited CHAP with facilitating their having more staff/resources dedicated to care coordination and referral tracking and more efficient use of the EMR/EHR to track patient status regarding immunizations, well-child visits, and more, as well as referral status and results.

PCAT Domains Assessed

The Primary Care Assessment Tool assesses the following patient-centered medical home domains:

- Accessibility
- Family Centeredness
- Continuity and Longitudinal Care
- Comprehensiveness of Services
- Coordination of Care
- Cultural Effectiveness & Sensitivity
- Quality & Safety Improvements

Table 3. Practice Changes – Listed by Primary Care Domain:⁹

	# of practices reporting change	# of practices indicating this activity was facilitated by CHAP
Accessibility		
▪ Extended clinic hours	6	0
▪ Additional same-day appointment slots available mainly due to changes in scheduling practices	3	0
▪ Increased availability/use of transportation services	3	3
▪ Additional provider	2	0
Family-Centeredness		
▪ Improved communication	4	1
Continuity and Longitudinal Care		
▪ Creation of provider “teams” to insure patients are seen by a familiar provider if their primary provider is unavailable (especially in practices where a number of the providers are part-time or residents)	2	0
Comprehensiveness of Services		
▪ Co-location of psychiatric/behavioral health services	2	0
▪ Increased screening (Ages & Stages Questionnaire, post-partum depression, dental preventive screening, in-home smoke exposure screening, up-to-date immunizations, etc.)	3	0
Coordination of Care		
▪ More staff/resources dedicated to care coordination and referral tracking	5	3
▪ More efficient use of the electronic medical/health records to track patient status re: immunizations, well-child visits, etc., as well as referral status and results	5	3
▪ Increased patient/parent education and instruction, including use of otitis media educational flip-book, provision of written care plans/instructions at the conclusion of each visit, time spent with the patient/parent(s) explaining the child’s diagnosis and treatment, etc.	3	3
▪ Pre-visit and/or reminder phone calls to facilitate transportation and/or collect information pertinent to the patient’s upcoming visit	3	3
▪ Linked patients/families to appropriate community resources	5	3
Cultural Effectiveness & Sensitivity		
▪ Translation services via in-person translator and/or telephone	2	0
▪ Printed materials available in languages other than English	2	1
▪ Hiring of bilingual providers/staff	2	1
Quality & Safety Improvements		
▪ Better use of data to drive improvement (such as ER usage reports, status reports from EMR, etc.)	3	1
▪ Collection of additional data metrics to inform future decision-making and process improvement	2	1
▪ Process changes to increase efficiency	3	1

Contextually, it is important to remember that practices are not partnered exclusively with CHAP and were participating in other patient-centered medical home initiatives during the demonstration project

⁹ Responses with n=1 or less for practices reporting change have been excluded in order to simplify reported findings

period. Nearly all of the practices interviewed are either currently involved in or have completed the process of becoming a recognized Patient-Centered Medical Home through Blue Cross Blue Shield of Michigan's (BCBSMi) and have also been involved in BCBSMi's Physician Group Incentive Program (PGIP). Many have participated in Lean for Clinical Redesign Collaborative Quality Initiatives (CQIs) as part of PGIP, are involved in the Michigan Primary Care Transformation project (the multi-payer CMS demonstration), and/or plan to earn NCQA recognition as a Patient-Centered Medical Home.

5.2.4 Satisfaction/Favorable Feedback from Practices

Outcome: Overall, practice key informant interview respondents credited CHAP mainly with improving transportation services for patients/families, decreasing “no shows,” decreasing ED visits through encouraging patients/parents to seek care from the child’s primary care provider first, as well as linking families to community support services, such as the Asthma Network.

However, for many of the respondents it was unclear as to the actual impact of CHAP on other changes within the practice, as many of the practice improvement measures were either in place before CHAP began and/or were, in their opinion, initiated as a result of the practice’s participation in other Patient-Centered Medical Home (PCMH) or practice improvement initiatives.

From 2010 key informant interviews, practice managers and providers reported the regular provider meetings were helpful because they:

- were able to meet and connect with other professionals,
- liked hearing what other practices are doing, and
- liked meeting colleagues working through some of the same practice issues.

Providers, practice managers, and staff all mentioned that CHAP helps to reach the patients when the practice has trouble reaching them regarding appointments. Additionally, practices liked that CHAP staff visit patient homes to provide education to the families regarding ED use or how to use their medications.

Transportation was mentioned the most as one of the services that was thought to be the most valuable to the patients. Other valuable services included following up after services, referrals to community resources, asthma information, education, and general support. Practice managers and providers thought that following up and discovering barriers was valuable because it is a service they do not have the resources to provide.

Frequently mentioned valuable services included asthma services, trainings, care coordination, and providing a forum for collaboration.

Over the course of the demonstration project, education and knowledge sharing occurred during practice manager meetings. Collaborative education and presentations on various health topics/initiatives occurring regionally included:

- Priority Health representatives attended program meetings (practice manager, provider, CHAP advisory and most workgroups) and provided program updates
- Family Futures discussed the Connections Program
- American Academy of Pediatrics, Michigan Chapter presented their ABCD developmental screening project
- Healthy Kent 2010 presented
- Practices shared their practice-specific medical home materials
- CHAP announced partnerships with libraries - providing calendars for Literacy and Early Learning, along with copies of the monthly books for CHAP practice waiting rooms.
- The Healthy Homes Coalition presented services for pest management, lead abatement, other home-based services, and discussed partnership with CHAP asthma initiative
- The Kent County Health Department presented information about the WIC program
- Patient-centered medical home certification was discussed regularly
- Dentists from the West Michigan District Dental Society and Cherry Street Health Services presented information about fluoride varnishing in primary care practices
- First Steps’ Welcome Home Baby program was presented

Potential Impact on Practices in the Absence of CHAP Services:

CHAP healthcare practice partners interviewed were split on their opinions of what might happen if CHAP services were to disappear. Some felt that though their practice would not have easy access to

the community resources CHAP linked their patients to, the overall quality and availability of services available to their patients would not be significantly impacted. However, most respondents, including a few of those who initially denied any impact on patients if CHAP were to disappear, stated that transportation coordination services and “no show” follow-up for patients would decrease significantly, as practices would not have the staff resources to provide these services. Many felt that although many of the initiatives and changes completed as a product of their practice’s involvement in CHAP would carry over even if CHAP were to dissolve, as these changes had become ingrained in the day-to-day functioning of their practice, in most cases the practices would have trouble maintaining the same level of care coordination established through the additional reimbursement uplifts associated with participation in the CHAP initiative.

6 Child/ Family Outcomes

6.1 Population and Services

6.1.1 Clients Served and Referrals

CHAP was designed to serve children ages 0 to 17 receiving Medicaid at primary care practice partners. During the demonstration project (Aug 2008 to Dec 2011), eligibility was restricted to those children on Priority Health Medicaid and at selected practices. Approximately 30,000 were eligible for CHAP during the demonstration project period. Children can receive services across multiple calendar years. Figure 3 provides the unique number of clients CHAP served each year.¹⁰

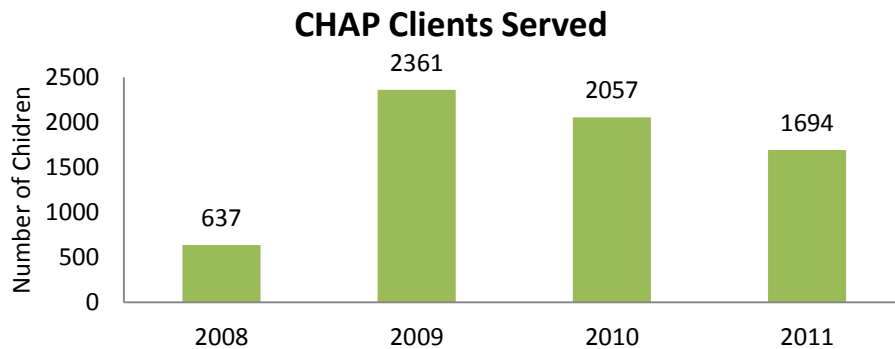


Figure 3

As shown in Figure 3, CHAP served an average of 2037 children each year¹¹. Children remain eligible for CHAP services as long as they are actively enrolled in PH Medicaid, assigned to a CHAP healthcare practice partner, and are less than 18 years old.

Population Referred to CHAP

Across the entire demonstration project period, 7016 unique children were referred to CHAP services (each child is only counted once, using their first date of referral).

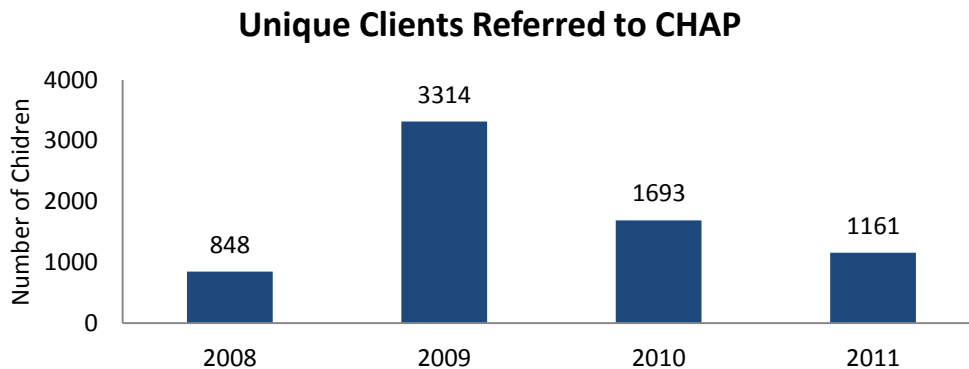


Figure 4

As shown in Figure 4, there was a decrease in the number of new children being referred to CHAP from 2009 to 2011. This is partly due to the expected drop off in referrals from program startup (from 2009 to 2010) and may explain later evaluation findings related to ED use rates (i.e., as referrals declined, ED use rates increased over time).

¹⁰ Clients served is defined as clients who receive tangible services. Tangible services are defined as the following types: Asthma Social Worker home visit, Asthma educator home visit, Asthma care conference, Bus Tickets, Community Health Worker Asthma Home Visit, Community Health Worker Asthma phone calls, MSW CHAP home visit, MSW CHAP phone consult, Home visit, Interpretation, Telephone consultation, Follow-up, Transportation, Follow-up on transportation

¹¹ Average is based on full calendar years only, not the 5 month 2008 time period

Referrals

Overall, 6168 unique children were referred to CHAP from January 2009 through December 2011. The total number of referrals for children during this timeframe was 11,709 and averaged 1.4 per child across the demonstration project.

Table 4. Referrals

Referral Year (unique clients)	2009 (n=3602)	2010 (n=2613)	2011 (n=2046)	Total (n=8261)
Referrals	4976	3866	2867	11709
Average per client	1.4	1.5	1.4	1.4

Referral Reasons

A child can be referred to CHAP for multiple reasons per referral. For example, a child could be referred to CHAP for both transportation and delinquent well-child exams. As shown in Table 5, there was variation across years for reasons for referral, including:

- referrals for Frequent No Shows increasing from 19% in 2009 to 35% in 2011
- a decrease for repeated ED use from 23% in 2009 to 17% in 2011¹²
- an increase in transportation requests from 13% in 2009 to 23% in 2011

Table 5. Reasons for Referrals to CHAP (non-unique)

Reasons	2009		2010		2011		3 Year Total	
	n	%	n	%	n	%	n	%
Repeat Use ED	1461	23%	1096	25%	541	17%	3098	22%
Frequent No Shows	1210	19%	1266	29%	1138	35%	3614	26%
Needs Transportation	812	13%	975	22%	746	23%	2533	18%
New Patient	1334	21%	391	9%	197	6%	1922	14%
Delinquent Well Child Exams	619	10%	260	6%	267	8%	1146	8%
Plan For Asthma	343	5%	118	3%	132	4%	593	4%
Social Resource	270	4%	81	2%	77	2%	428	3%
Delinquent Immunizations	174	3%	128	3%	106	3%	408	3%
Behavioral Health	127	2%	66	2%	59	2%	252	2%
Total	6350	100%	4381	100%	3263	100%	13994	100%

¹² Of note, as shown on page 43, emergency department rates increased in 2011 within Kent County among the CHAP eligible population. Future analyses are recommended to determine whether the decrease in the number of clients referred to CHAP for repeated ED use may be related to the increase in ED visit rates in 2011.

6.1.2 Demographics

Demographics for CHAP clients (children) were analyzed according to their first date of referral to the program. CHAP began in August 2008 and the five months of 2008 reflect a start-up period, during which the project was establishing service processes and activities. Evaluation findings for referral and services data are presented from a calendar year perspective beginning in 2009 in order to compare findings consistently across project years.

Child Age: The majority of children (80%) referred to CHAP during the demonstration period were aged 10 or younger, with 29% (2006) less than one year old, 26% (1811) ages 1 to 5, and 25% (1778) ages 6 to 10.

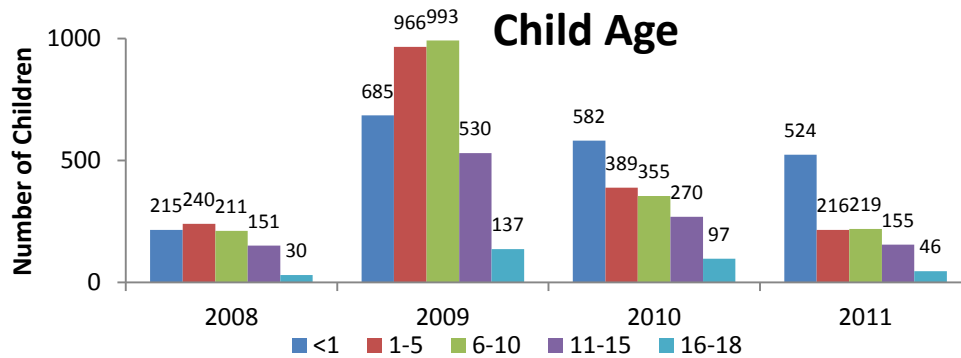


Figure 5

Across the demonstration project years, the percentage of children ages 1 to 5 entering services dropped from 29% in 2009 to 19% in 2011, while the percentage of children less than 1 year old entering services increased from 21% in 2009 to 45% in 2011. This continues the trend seen from 2009 to 2010, and may be reflective of most CHAP practices limiting new members to newborns during 2010 and 2011. Table 4 provides detail on percentages of client age for all program years (columns total=100%).

Table 6: Child Age Percentages by Year

Age	2008	2009	2010	2011	Overall
<1 (n=2006)	25%	21%	34%	45%	29%
1-5 (n=1811)	28%	29%	23%	19%	26%
6-10 (n=1778)	25%	30%	21%	19%	25%
11-15 (n=1106)	18%	16%	16%	13%	16%
16-18 (n=310)	4%	4%	6%	4%	4%

Child Race: As in 2010, in 2011 CHAP had a high number of clients referred that did not report their race (49% 2010, 43% 2011). It should be noted that CHAP has limited opportunity to inquire about race with some clients, particularly when contact is limited to telephone only. Additionally, some parents decline to report their child's race.

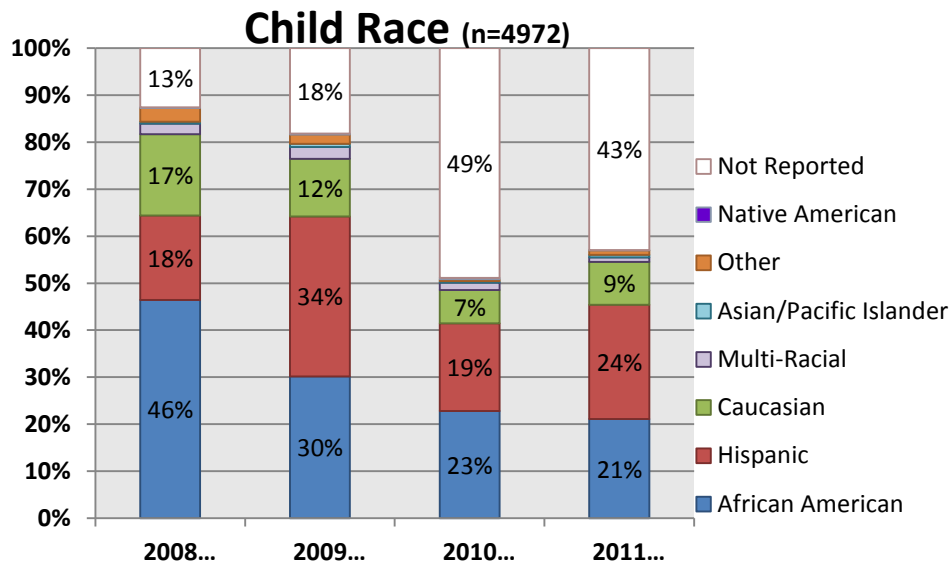


Figure 6

For the 4972 clients for whom the program was able to obtain race data, 56% of those referred to services across the demonstration period were African American (29%) and Hispanic (27%), with 11% Caucasian, 2% multi-racial, 1% Asian or Pacific Islander, and 2% Other.

Parent Language: Across the demonstration period, the majority of parents were identified as speaking English (72%), with 16% Spanish and 11% unable to be identified due to lack of contact (the program records data about parent language when the client is contacted). Table 7 details the language percentages for each year.

Table 7: Child Race

Race	2008 (n=848)	2009 (n=3313)	2010 (n=1693)	2011 (n=1161)	Overall (n=7004)
English	87%	67%	71%	77%	72%
Spanish	11%	20%	13%	13%	16%
Unable to Identify	1%	12%	15%	10%	11%
Other	0%	1%	0%	0%	0%

Child Gender

The distribution of gender of the children served remained consistent across the demonstration project years, as shown in Table 8.

Table 8. CHAP Child Gender by Year and Overall

Gender	2008 (n=848)		2009 (n=3314)		2010 (n=1693)		2011 (n=1159)		Overall (n=7014)	
	n	%	n	%	n	%	n	%	n	%
Female	421	50%	1609	48%	824	49%	563	49%	3411	49%
Male	427	50%	1711	52%	869	51%	596	51%	3603	51%

Clients Served

It is important to note that children receiving services can be served across program years. Children remain eligible for CHAP services as long as they are actively enrolled in PH Medicaid and assigned to a CHAP healthcare practice partner until they reach 18 years of age. For this reason, we have also provided the context of looking at children non-uniquely by service provision, including the abbreviated 2008 five month period (Table 9).

Table 9. Service Provision (non-unique across years)

<i>Year</i>	<i># Children Attempted to Serve</i>	<i># Children Served including CHAP mailings¹³</i>	<i># Children Served excluding CHAP mailings¹⁴</i>
2008*	778	731	637
2009	3602	3494	2361
2010	3464	2741	2057
2011	3615	2129	1694
Total	11459	9095	6749

From the evaluator's perspective, the number of children served excluding those who received CHAP mailings only (6749) comes closest to the true number of children touched by CHAP services each year.

Across the demonstration project period, 75% of children referred to CHAP actually received a tangible service from the program (calculated as the percentage of children served vs. referred overall using the unique numbers of both groups, i.e. 5227/7016). Nearly 25% of children referred to CHAP did not receive services. The reasons noted for non-service included refusal of services, inability to contact, and contact by mail only.

¹³ Includes services: Asthma Social Worker home visit, Asthma educator home visit, Asthma care conference, Community Health Worker Home Visit, Community Health Worker phone calls, MSW CHAP home visit, MSW CHAP phone consult, Home visit, Interpretation, Telephone consultation, Follow-up, Letter Mailed, CHAP materials mailed, Transportation, Follow-up on transportation.

¹⁴ Includes services: Asthma Social Worker home visit, Asthma educator home visit, Asthma care conference, Community Health Worker Home Visit, Community Health Worker phone calls, MSW CHAP home visit, MSW CHAP phone consult, Home visit, Interpretation, Telephone consultation, Follow-up, Transportation, Follow-up on transportation

Services Provided to Clients

Again, as 2008 was an abbreviated timeframe, services evaluated in this report cover full program years 2009 to 2011. Direct client services provided by CHAP during the demonstration project include transportation, ongoing education, home visits, asthma disease management, and connection to community resources. Service data are presented in Table 10 for all CHAP services - tangible and attempted - delivered from 2009 to 2011.

Table 10. Services Provided to Unique Children by Year

Service Types	Non-Unique Services Provided			Unique Children			Average # Per Child		
	2009	2010	2011	2009	2010	2011	2009	2010	2011
Asthma social work home visit completed	89	109	228	34	56	84	2.6	1.9	2.7
Asthma home visit completed¹⁵	684	498	454	179	145	117	3.8	3.4	3.9
Asthma care conference	54	59	81	43	48	48	1.3	1.2	1.7
CHW asthma home visit*	0	1	140	0	1	65	0	1	2.2
CHW asthma phone follow-up	0	3	122	0	3	48	0	1	2.5
MSW CHAP home visit*	0	24	68	0	12	35	NA	2.0	1.9
MSW CHAP phone consult	0	18	78	0	10	44	NA	1.8	1.8
Home visit completed	342	330	216	333	300	194	1.0	1.1	1.1
Interpretation	24	42	23	22	32	16	1.1	1.3	1.4
Telephone consultation	1828	1737	1558	1518	1364	1173	1.2	1.3	1.3
Follow-up	1059	549	632	811	385	383	1.3	1.4	1.7
Letter mailed	1699	1013	648	1585	956	616	1.1	1.1	1.1
CHAP materials mailed	1347	816	603	1291	771	575	1.0	1.1	1.0
Transportation	697	1026	655	316	437	335	2.2	2.3	2.0
Follow-up on transportation	163	149	106	142	125	89	1.1	1.2	1.2
Total Completed Services	7986	6374	5612	6274	4645	3822	NA	NA	NA
Asthma home visit unsuccessful	33	6	13	29	5	9	1.1	1.2	1.4
CHW asthma hv unsuccessful	0	1	25	0	1	19	0	1	1.3
Home visit unsuccessful	913	756	297	766	678	269	1.2	1.1	1.1
Unsuccessful call	2643	2201	1532	1852	1523	1077	1.4	1.4	1.4
Case closed – no contact	379	696	482	367	648	460	1.0	1.1	1.0
Total Attempted Services	11954	10034	7961	9288	7500	5656	NA	NA	NA

* CHW asthma services began in 2011; MSW home visits began in the last quarter of 2010

Across all three demonstration project years, CHAP provided 2522 asthma disease management services, 980 non-asthma home visits, 5219 phone consultations, and 2378 transportation services.

Transportation

As needed, CHAP pays for and arranges transportation via a taxi for patients who require a same-day or next-day acute care visit.

¹⁵ Asthma home visits completed included visit types of home visit, school visit, and discharge visit.

- In 2009, a total of 316 clients made 697 transportation requests, averaging 2 requests per client (range 1-13).
- In 2010, a total of 437 clients made 1026 transportation requests, averaging 2 requests per client (range 1-16).
- In 2011, a total of 335 clients made 655 transportation requests, averaging 2 requests per client (range 1-15).

While the average number of requests per client was 2.2, the distribution of requests per client by year (Figure 7) shows an increasing percentage of CHAP clients (55% 2009; 51% 2010; 59% 2011) use transportation once, while transportation use of 3 times or more is declining (31% 2009; 30% 2010; 19% 2011).

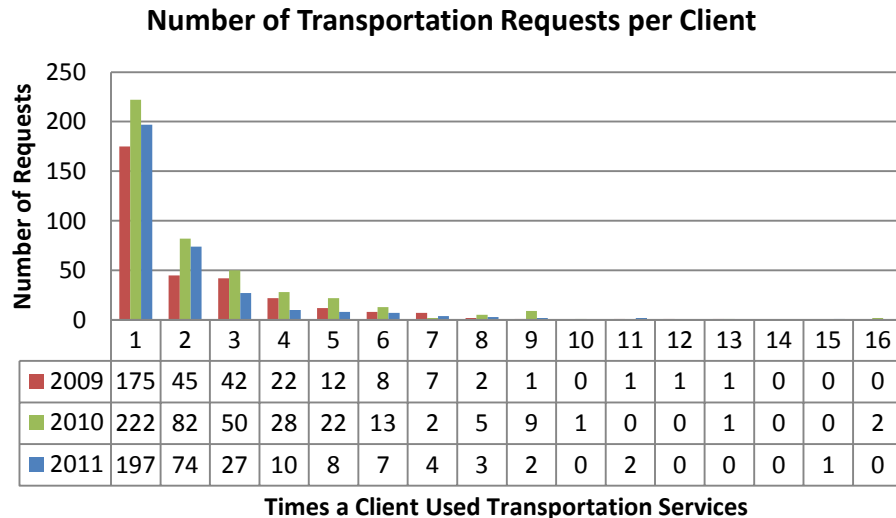


Figure 7

As in 2009, the majority of 2010 requests were for transportation to DeVos Pediatrics (Table 11).

Table 11. Transportation Destinations

Destination	2009 (n=692)	2010 (n=1020)	2011 (n=655)
DeVos	60%	54%	62%
Other	13%	11%	7%
Heart of the City (formerly Grand Rapids)	9%	10%	7%
Cherry Street	7%	6%	4%
Westside	4%	6%	4%
Baxter Health Clinic	-	3%	3%
Booth	2%	2%	2%
Alger	2%	2%	2%
GRAPES*	1%	2%	2%
GVSU Family Health Center	-	2%	2%
Forest Hills	1%	1%	2%
Kent	1%	0%	2%
Burton	0%	0%	0%
ABC – Grandville	0%	-	1%
Adolescent – DeVos	-	0%	0%
Creston	-	0%	-
ABC – Walker	-	-	0%
Ottawa Hills	-	-	0%

*Grand Rapids Area Pediatric Evening Service: an after-hours urgent care clinic that a number of local offices use as a referral source for evening and weekend care.

Ongoing Education

Once a child is referred to CHAP, an assigned CHAP team member calls to discuss the family's needs. In general, the team member asks about the child's current health status, reviews current preventive health needs (such as well-child visits or immunizations), emphasizes that providers may be contacted 24 hours a day in lieu of going to the ED, and discusses how to access the provider when needed. The frequency of ongoing contact varies with family need; some families receive only one call, while others communicate regularly with the CHAP team member. Following the initial call, the CHAP team member mails written materials that describe CHAP services, emphasize the value of the medical home, provide contact information for the child's doctor/clinic, and outline circumstances under which the provider (rather than the ED) should be visited. If the team member cannot contact the family by telephone, he/she will drop by the home to provide face-to-face education and printed materials (a.k.a., a home visit).

As noted in Table 12, CHAP staff conducted 1828 phone consultations in 2009, 1737 in 2010 and 1558 in 2011. Educational materials mailed to clients included 1347 in 2009, 816 in 2010, and 603 in 2011.

Home Visits

The majority of CHAP non-asthma home visits are "stop-bys", meaning that staff visit someone's house because they have not been able to get in touch with them by phone or mailing efforts. CHAP home visits are expected to deliver education regarding the client's medical home and reasons for referral to CHAP.

From January 2009 through December 2011, 874 CHAP clients received a total of 980 home visits from a CHAP community health worker, nurse, or social worker (home visits in Table 12 do not include asthma home visits).

Table 12. Home Visits

<i>Home Visits</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>
Number Home Visits Completed	342	354	284
Number Unique Children for visits completed	330	300	194
Average Per Child (=n visits/n unique children)	1	1.1	1.1
Number Home Visits Attempted to Conduct	913	757	322
Number Unique Children for Attempted Visits	766	678	269
Total Number Visits Attempted (=n completed + n attempted)	1679	1435	591
Number Unique Clients (=n unique children completed + n unique children attempted)	1096	978	463
Percentage Successfully Completed (=n visits completed/n total number visits attempted)	20%	25%	48%

While there was a noticeable decrease in the number of home visits from 2010 to 2011, this was due mainly to the fact that CHAP community health workers were trained to become part of the asthma case management team and began doing increased home visits for asthma patients – conducting 140 asthma home visits in 2011.

The program is not expected to conduct ongoing home visits to address reasons for referral, thus CHAP is meeting project expectations by averaging 1 home visit per client across the years.

Asthma Services

CHAP partners with the Asthma Network of West Michigan to deliver the home-based case management services for children with asthma. An asthma educator and social worker provide ongoing, home-based asthma care management and education. Services include medication instruction and management and education on various asthma-related topics, including elimination of asthma triggers, inhaler use, the importance of regular medical home visits, and appropriate asthma care. The asthma educator works with the child's primary care provider to develop an asthma action plan that outlines treatment/medications, asthma triggers, how to handle an attack, and when to call the doctor

or go to the ED. The social worker works with the family's landlord to address mold, mildew, and pest control issues and refers parents for behavioral health services if psychosocial issues prevent an adequate focus on the child's health. CHAP community health workers are part of the asthma care management team, providing social support, connection to community resources, and reinforcement of the education delivered by the certified asthma educators.

Asthma services counted in Table 13 include asthma social work home visits, asthma home visits, asthma care conferences, and CHW asthma home visits.

Table 13. Asthma Services Visits

<i>Asthma Services</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>
Number Asthma Visits Completed	827	667	903
Number Unique Children for visits completed	181	154	124
Average Per Child (=n visits/n unique children)	4.6	4.3	7.3

As shown in Table 13, CHAP has increased the intensity of services for asthma children over the course of the demonstration project considerably from 2009 to 2011.

Behavioral Health Home Visits

In October 2010, CHAP hired a social worker to provide home visits to assist families in navigating the mental/behavioral health care system, connecting families to community resources, and encouraging follow-through with counseling services. As shown in Table 10, in 2010¹⁶ CHAP provided 24 behavioral health home visits to 12 clients (average of 2 per client) and in 2011 provided 78 behavioral health home visits to 44 clients (average of approximately 2 per client).

¹⁶ Note: this represents only 3 months of activity in 2010

6.2 Satisfaction/Feedback from Parents

CHAP conducted focus groups for Years 1 and 2 to gauge client satisfaction and usefulness of services. For Year 1, SRA conducted three focus groups, each with a target client group, including one with asthma clients, one with general service clients and one with Spanish-speaking clients. Overall, 28 CHAP clients participated in Year 1 focus groups. To assess client feedback for Year 2, two focus groups were conducted, each targeting asthma clients, one with English-speaking clients and one with Spanish-speaking clients. A total of 45 parents participated in the focus groups across both years.

Outcome: Overall, client feedback on CHAP services was positive and feedback on CHAP asthma services specifically was very positive. Clients reported highly favorable opinions of the CHAP asthma educators and CHAP staff and stated that they use the emergency room less since they began using CHAP services.

Focus groups conducted with CHAP asthma clients provided insight into ways CHAP services are useful. Overall, client feedback from the focus groups on CHAP asthma services was very positive. Clients reported asthma action plans are very useful, giving them a roadmap to follow when their child has an episode and putting their family, school and doctor's office on the same page.

The majority of clients reported involvement with asthma program had:

- helped them gain confidence in managing their child's asthma, and
- had a positive impact on their child's health.

"We wouldn't know what we were doing. You can't get that kind of time from your pediatrician. He's got you on the clock. He's got you answering questions before you get there so he's got all his answers lined up and you're out the door."

"We were having a hard time because, when our boy tells us something and the doctors tell us something else... I don't know what I'm talking about and then [the asthma educator] comes in and she knows what she talking about and what to ask for. I feel good that somebody knows my kid and the doctor's telling me 'you don't know what you're talking about' and....it's helpful to have [the asthma educator] around."

Clients emphasized how much the asthma educators helped them in interactions with their children's doctors, including ensuring doctors' interactions with clients were accurate and effective and spotting quality issues:

"My son was in a room getting a treatment when (the asthma educator) came up there... It was the head doctor... he hooked him up to the machine...(The asthma educator) came in the room and she opened up the machine and said it didn't even have a filter. That doctor looked so dumbfounded, he didn't know what to do."

7 Triple Aim

As described in an earlier section, CHAP outcomes can be divided into three “aims” that reflect a common approach to optimizing health system performance – otherwise known as the Triple Aim. Stated simply, these aims are: 1) Better Quality Care, 2) Improved Health Outcomes, and 3) Reduced Cost. Excellence in each of these areas is required for optimal health system performance. Similarly, CHAP strives to demonstrate improvements in each of these areas to measure its performance.

7.1 Better Quality Care

Many of the CHAP outcomes related to quality care are covered elsewhere in this report. Key highlights include:

System-level Outcomes

- Expanding access to medical care for children on Medicaid at partnering primary care practice sites by increasing openings and increasing and maintaining expanded practice hours.
- Increasing practice use of the Asthma Network of West Michigan, a key provider of asthma case management services.
- Facilitating integration among healthcare practice partners, and between community organizations and healthcare practice partners.
- Expanding and strengthening community partnerships that advance the agenda of promoting healthcare services access to children in Kent County.
- Facilitating key community health initiatives to advance work in behavioral health, oral health, and childhood obesity.
- Promoting the CHAP model across other Michigan communities through leadership and provision of technical assistance.

Practice-level Outcomes

- Encouraging and facilitating leadership within the pediatric provider community in the areas of: asthma, behavioral health, otitis media (ear inflammation/infection), oral health, and childhood obesity.
- Working collaboratively with ANWM to improve fidelity to asthma control and management best practices.
- Contributing to positive changes in practice coordination of care

7.2 Improved Health Outcomes

Improved health outcomes for children lie at the core of CHAP’s mission. Emergency department (ED) visits are costly to the healthcare system; inappropriate use of the ED for routine needs can reflect poor access to medical care. CHAP services are delivered at both the healthcare practice partner level and individual client level to impact the rate of ED and subsequent inpatient admissions (IP) visits among children on Medicaid in Kent County. CHAP healthcare practice partner level activities include education at practice and provider meetings, asthma and otitis media initiatives and others. At the individual client level, CHAP also provides transportation services and home visiting services (asthma and non-asthma). Each of these activities is expected to contribute to reduced ED and IP visit rates. To assess changes in ED and IP visit rates, SRA conducted z-tests and interpreted associated p-values less than .05 as statistically significant as described in Section 3.4.

In this section, we review the key health outcomes CHAP strives to impact including:

- Reduction in Emergency Department Visits
- Reduction in Inpatient Hospitalization Visits
- Increase in Well Child Visits
- Improvement in Asthma Care, Control and Maintenance

7.2.1 ED Visits

CHAP practice and client enrollment fluctuates from year to year. As such, we will utilize a rate for visits per 1000 member months in the analysis of ED and IP health outcomes. This is a standard measure used by insurance companies and Medicaid to look at utilization, adjusting for variations in the number of children assigned to each practice or enrolled in the CHAP program in any given year. The rate also accounts for seasonal variation in ED/IP use over the course of a 12 month period. For the analyses that follow, we only included data for participants who had 6 months or more of Medicaid program eligibility in a calendar year to ensure adequate dosage of CHAP initiatives¹⁷.

Furthermore, to assess change in ED (and IP) visit rates, we will compare rates in the baseline year to subsequent years. Although this may tell us if CHAP had its intended effect, we will also seek to measure this same difference over time for a matched comparison group in two neighboring counties, as one step toward ruling out alternate explanations for differences in the CHAP population. In order to create a matched comparison group, we used a propensity scoring method to match children in the CHAP eligible population (which included the CHAP client population by definition) with a child in either of the two neighboring counties based on variables such as age, sex, and number of ED visits in the baseline year.

The rate of ED visits per 1000 member months is a significant outcome variable in the measurement of CHAP's impact. Therefore, we have analyzed the ED visit rate for a number of aspects of the CHAP program: overall, by initiative (i.e., Otitis Media initiative) and by service type (i.e., transportation, home visits and asthma)

Goal: To decrease ED visits among children on Medicaid in Kent County

If CHAP's practice and client level activities led to improvements at healthcare practice partners as expected, then the CHAP eligible population (i.e., patients who are assigned to CHAP practices) should experience a decrease in ED visits.

CHAP Eligible Population (i.e., CHAP healthcare practice partner level)

Outcome: As shown below, the CHAP eligible population demonstrated significantly fewer ED visits between baseline and 2008, 2009, and 2010, while members of the comparison group demonstrated a greater rate of ED visits per 1000 members for these same years compared to their baseline. Furthermore, the rate of ED visits declined between 5% and 15% compared to the baseline year for the CHAP eligible population.

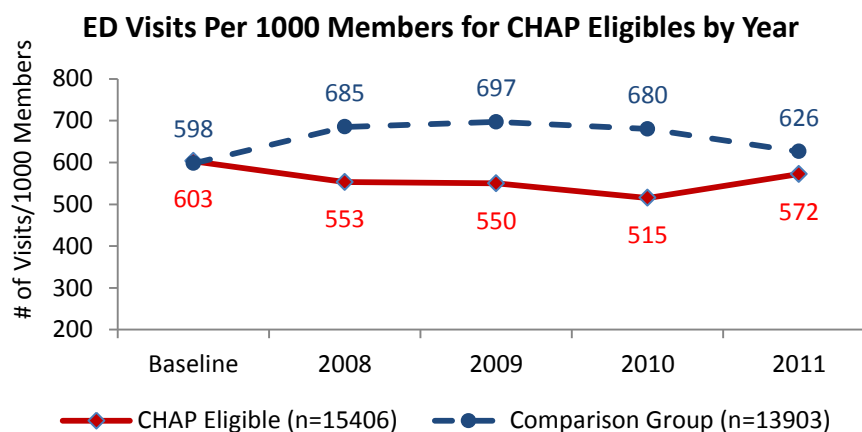


Figure 8

¹⁷ We also considered using 11 months or more of Medicaid eligibility per year to simulate continuous enrollment, and presumably exposure to CHAP initiatives, for all analyses; however, for some of the asthma-related outcomes, this stringent requirement narrowed our population unnecessarily. Therefore we chose a more modest measure of CHAP initiative exposure – 6 months or more – for the sake of consistency across all ED and IP outcome analyses as a balance.

Of note, the rate of ED visits for the CHAP eligible population increased significantly from 2010 to 2011 (from 515 to 572 ED visits per 1000 members). The increase in 2011, while still lower than the baseline year, may be explained by contextual factors such as the opening of the new Helen DeVos Children's Hospital in early 2011, which experienced an extraordinarily high volume of first time ED visits, and the implementation of electronic medical records in many of the participating practices, which systematically limited the number of sick child appointments available for patients to be seen by their regular physician. Additionally, the referral data in Table 5 (Section 6) indicates that referrals for repeated ED use decreased significantly from 2010 to 2011 (from 1096 to 541 referrals). If the increase in the overall number of ED visits is at least partially due to repeated use, the lack of referrals and services provided to this population between 2010 and 2011 by CHAP practices may have contributed to the increase in ED visits.

CHAP Client ED Visits

In addition to reducing ED visit rates in the CHAP eligible population, the program could expect to see a similar and possibly more marked reduction in ED visit rates for the CHAP client population. To assess a reduction in ED visit rates among the CHAP client population, we compared the rate of ED visits for the 12 months prior to the client's CHAP start date with the 12 months following that start date. Because children less than 12 months of age at their program start date would not have a full year of pre-program data available, we excluded these children from the analyses.

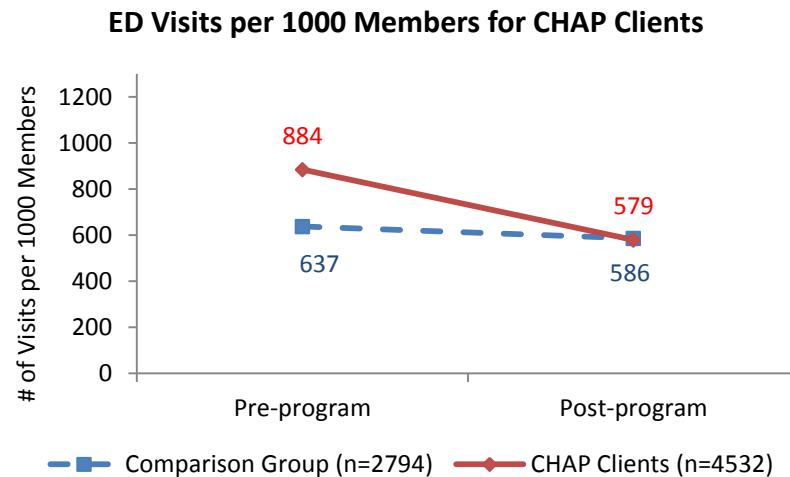


Figure 9

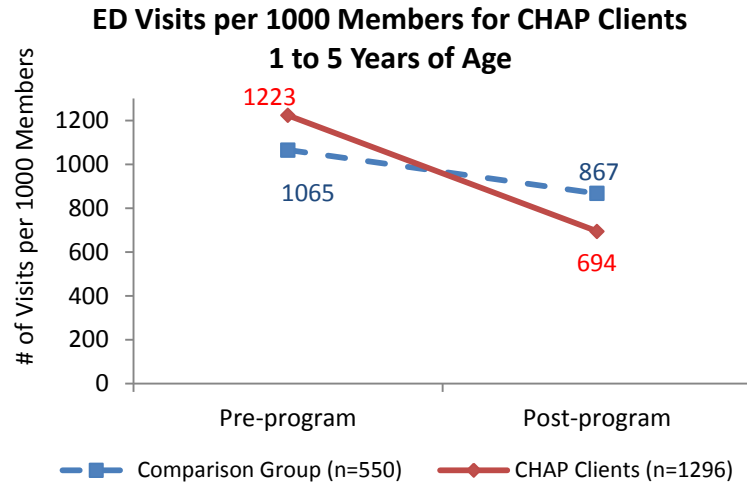
Outcome: CHAP clients between 1 and 17 years of age as of their program start date experienced a 35% decline in ED visits after one year of program involvement compared to the year prior to program involvement ($z=.14.26$, $p<.0001$)¹⁸. While the comparison group also experienced a decline of 8% over a similar timeframe ($z=2.13$, $p=.033$), this decline was smaller than that for CHAP clients¹⁹.

¹⁸ Past CHAP evaluations have included children under 1 year of age in the analysis of ED visits. Although children under 1 year of age do not have a full 12 months of data included in their pre-program involvement, their ED visit rates in the first year are typically much higher than in subsequent years. It should be noted that past evaluations showed a higher pre-program ED visit rate and more notable decline against the post-program ED visit rate because children under 1 year of age were included. In the present evaluation, we have opted for a more conservative approach of excluding children under 1 year of age but either data could be reported with sufficient justification.

¹⁹ p-values less than .05 are considered statistically significant.

ED Visits for CHAP Clients 1-5 Years Old

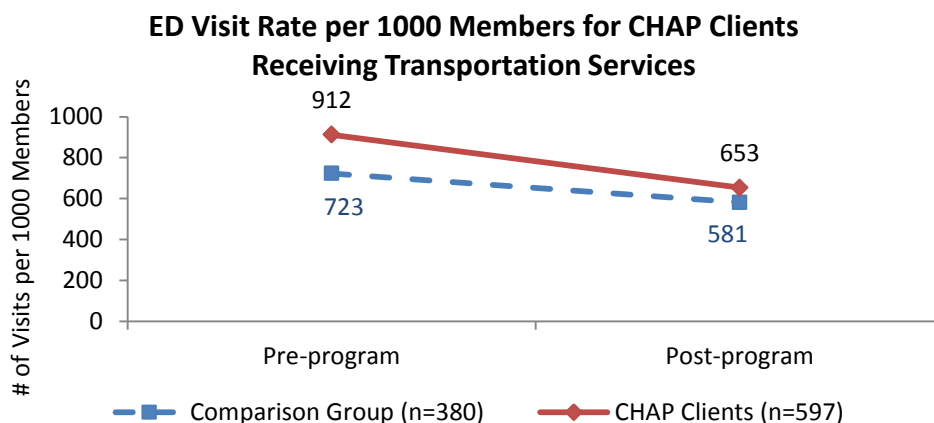
Additional analyses indicated that CHAP clients experienced a reduction in ED visits over time, but the effect may be in part due to child's age such that the longer the child was in the program, the older the child was and the less likely that child was to experience an ED visit. Therefore, we also analyzed ED visits for CHAP clients separately for children 1 to 5 years of age.

**Figure 10**

Outcome: CHAP clients aged 1 to 5 years, experienced a 43% decrease in ED visits after one year of program involvement compared to the year prior to program involvement ($Z=11.44$, $p<.0001$). If this effect was due to age alone, one would expect a similar trend in the matched comparison group; however, children in the comparison group experienced a smaller decrease of 19% in visits over time ($z=2.54$, $p=.01$).

ED Visits by Services for CHAP Clients - Transportation²⁰

We also analyzed ED visit rates for specific services provided by CHAP to determine whether more intensive services such as transportation, home visit and asthma services yielded significant decreases in ED use.

**Figure 11**

Outcome: CHAP clients who received transportation services showed a 28% decrease in ED visits after one year of program involvement compared to the year prior to their program involvement

²⁰ Excludes children under 1 year of age at their program start date.

($z=4.74$, $p<.0001$). Individuals in the matched comparison group showed a slight, but not statistically significant, decline over a similar period ($z=1.56$, $p=.12$).

ED Visits by Services for CHAP Clients - Home Visit²¹

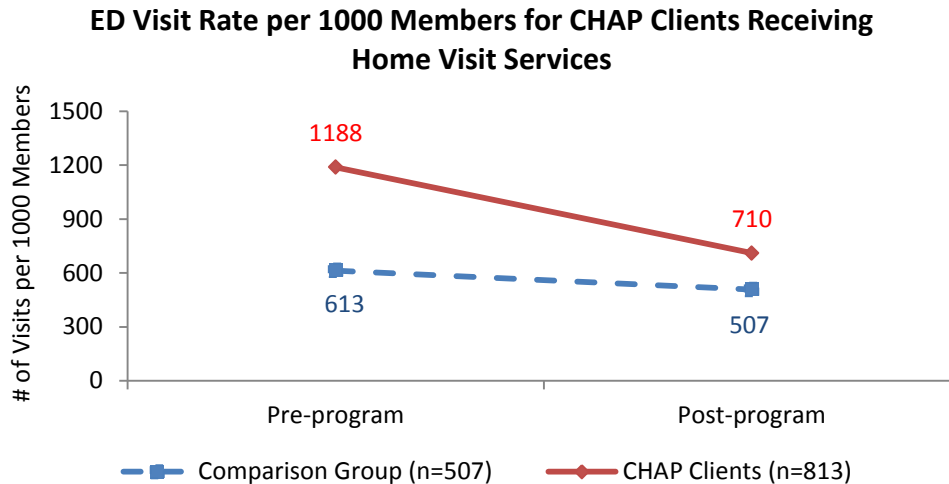


Figure 12

Outcome: CHAP clients who received home visit services showed a 40% decrease in ED visits after one year of program involvement compared to the year prior to their program involvement ($z=7.75$, $p<.0001$). Individuals in the matched comparison group again showed a slight, but not statistically significant, decline over a similar period ($z=1.43$, $p=.15$).

ED Visits by Services for CHAP Clients - Asthma²²

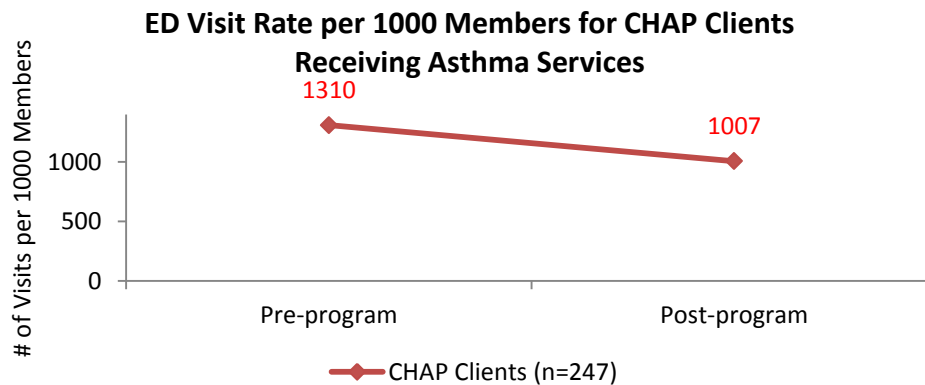


Figure 13

Outcome: CHAP clients who received 3 or more asthma home visits demonstrated a 23% decrease in ED visits after one year of program involvement compared to the year prior to their program involvement ($z=2.95$, $p=.003$). Because these data utilized CHAP program data (rather than Priority Health claims data) to identify asthma clients, no comparison data were available for children in the neighboring counties.

²¹ Excludes children under 1 year of age at their program start date.

²² Excludes children under 1 year of age at their program start date.

7.2.2 IP Visits

For the same reasons as indicated in the previous section, IP visits²³ could similarly be expected to decrease over time due to CHAP's efforts to increase access to healthcare and provide specialized services. Because IP visits, especially for children, are so rare, the rates are typically very low. When rates are so low – such as these – even a handful of hospitalizations can greatly impact the findings. Therefore, we have reported these data, and note decreases between baseline and each subsequent calendar year for the CHAP eligible population, but caution against drawing strong inferences from these data because of the small number of IP visits in this population.

Goal: To decrease IP visits among children on Medicaid in Kent County

CHAP Eligible Population (i.e., CHAP healthcare practice partner level)

Table 14 shows the IP visit rates per 1000 member months for both the CHAP eligible population and matched comparison group. These results show small, but statistically significant, decreases in the CHAP eligible population IP visit rates between the baseline year and subsequent years (2009 and 2010). The matched comparison group also demonstrated small, but statistically significant, decreases in the IP visit rates between the baseline year and subsequent years (2008, 2010 and 2011).

Table 14. IP Visit Rates for the CHAP Eligible Population per 1000 Members

Group	2007 (Baseline)	2008	2009	2010	2011
CHAP Eligible (n=15406)	23	23	20	19	22
Comparison (n=12607)	25	18	24	19	18

IP visits for CHAP Clients

Similar to procedures used to assess change in ED visit rates over time, we analyzed IP visit rates from the 12 months prior to program involvement to the 12 months following program involvement for CHAP clients (those receiving tangible CHAP services) who are a subpopulation of the CHAP eligible population. As with the ED visit rates, we also excluded children under 1 year of age in the present analyses because they did not have 12 full months of outcome data available in the year prior to program involvement²⁴.

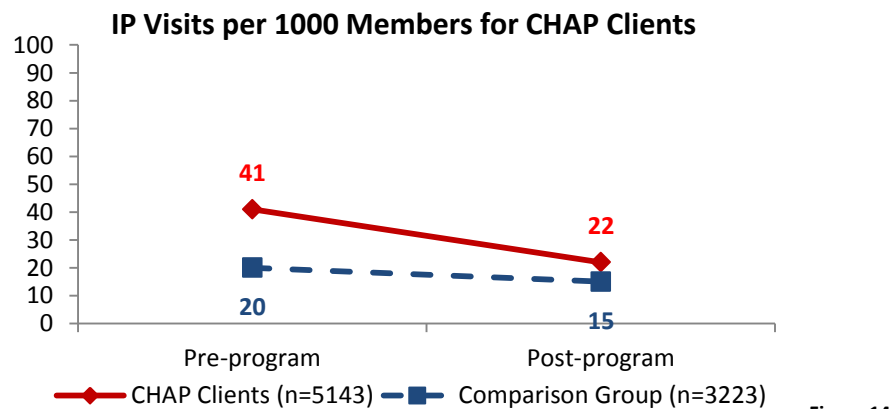


Figure 14

Outcome: CHAP clients between 1 and 17 years of age as of their program start date experienced a 46% decline in IP visits after one year of program involvement compared to the year prior to program involvement ($z = 5.34$, $p < .0001$). While the comparison group also experienced a 25% decline over a

²³ IP visits related to births were excluded from this data - both maternal (teen moms) and infant (newborns at the time of birth).

²⁴ Data include children 1 to 17 years of age as of their program start date.

similar timeframe ($z=1.54$, $p=.12$), this decline was not statistically significant and smaller than that for CHAP clients.

IP visits for CHAP Clients 1-5 Years Old

Additional analyses indicated that CHAP clients experienced a reduction in IP visits over time, but that again the effect may be partly dependent on child's age. Therefore, we again decided to analyze IP visits for CHAP clients separately for children 1-5 years of age²⁵ for the 12 months prior to program involvement (i.e., baseline) to the 12 months after program involvement.

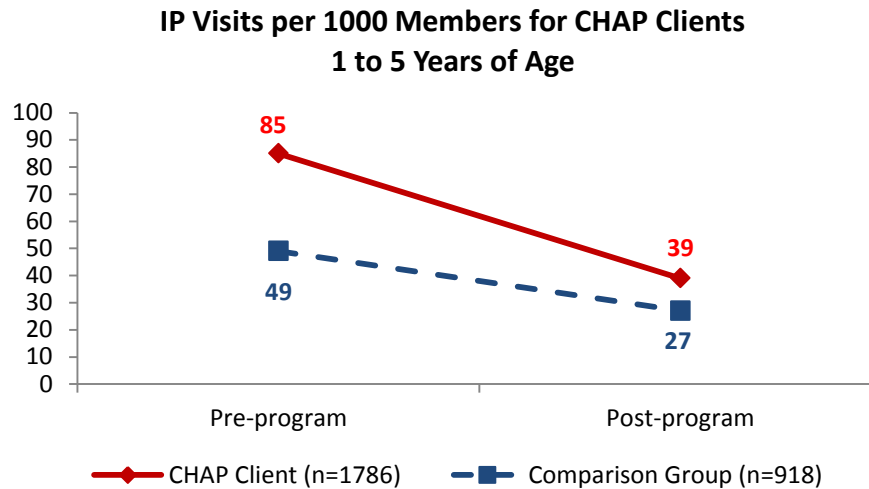


Figure 15

Outcome: CHAP clients who began program services between 1 and 5 years of age showed a 45% decline in IP visits compared to pre-program involvement ($z=5.02$, $p<.0001$). Individuals in the matched comparison group experienced a similar decline (54%) in IP visits indicating that this effect may not have been due solely to CHAP program involvement. Anecdotally, an initiative similar to CHAP, but targeted at 0-5 year olds assigned to a large FQHC was begun in Ottawa County in 2010. This effort may have contributed to the decline in inpatient admissions over that time period in the comparison group.

7.2.3 Otitis Media-related ED & Ear Numbing Prescriptions

In June 2009, First Steps initiated otitis media parent education that was delivered to all CHAP Kent County healthcare practice partners, specifically targeting younger children approximately 6 months to 5 years old. The primary strategy of this effort was to provide education to parents on ways to address ear infections, educating on alternatives to taking children to the ED.

Goal: To decrease inappropriate ED visits due to otitis media complaints by increasing prescriptions for ear numbing drops and providing parent education.

²⁵ Child's age as of their program start date. Children under 12 months of age at their program start were excluded from this analysis.

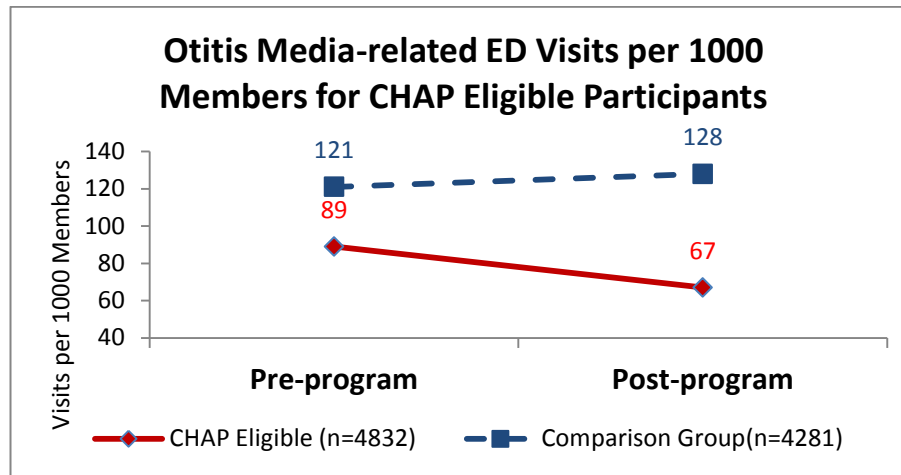
CHAP Eligible Population

Figure 16

Outcome: For members of participating CHAP practices²⁶ (i.e., CHAP eligible population), the otitis media-related ED visit rate decreased 25% from the 12 month period prior to program implementation (89 visits per 1000 members) to the 12 month period following program implementation (67 visits per 1000 members) ($z=3.24$, $p=.001$). Members of the matched comparison group showed a slight increase in otitis media-related ED visit rates over the same time frame (from 121 to 128 visits per 1000 members).

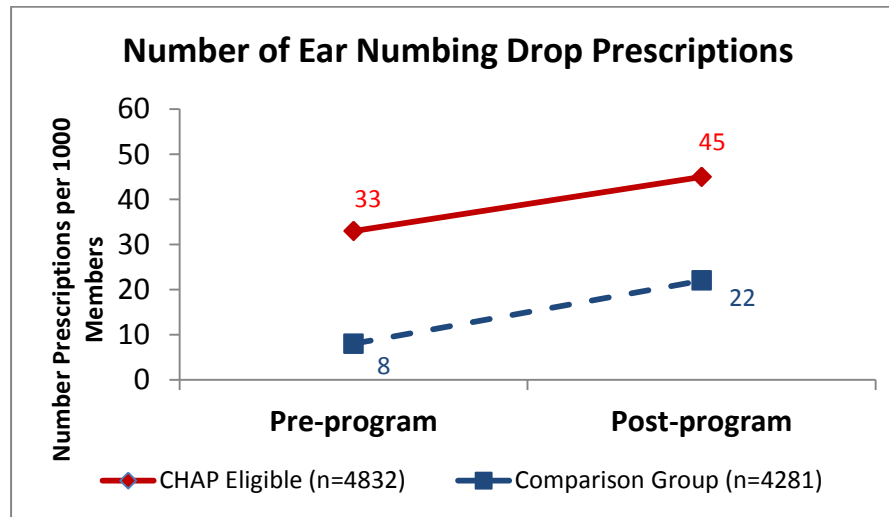


Figure 17

Outcome: The CHAP eligible population demonstrated a 36% increase in the number of ear numbing drop prescriptions filled in the 12 months following implementation ($z=2.68$, $p=.007$). The matched comparison group also demonstrated a statistically significant increase in the number of ear numbing drop prescriptions filled in the 12 months following implementation ($z=.2.55$, $p=.01$). Although the matched comparison group experienced an increase in the number of prescriptions filled, we cannot determine from available data whether these prescriptions were issued at a primary care visit or an ED visit. Only ear numbing drops that are prescribed as part of a primary care visit for the purpose of avoiding a subsequent ED visit should be included in this analysis. Ear numbing drops prescribed as part of an otitis media-related ED visit that has already taken place would not have effectively avoided that ED visit. Therefore, additional data are needed to determine whether these prescriptions originate from a primary care visit or an ED visit before a conclusion can be drawn on this outcome.

²⁶ Analyses included only children ages 12 months to 5 years as of August 2009.

7.2.4 Well-Child Visits

The well-child initiative was a joint initiative between CHAP and Priority Health to increase well-child visits for children ages 0 to 15 months. Key activities for this initiative included:

- Adding well child visits to Priority Health provider performance measures
- Educating primary care practices about appropriate billing for well child visits
- Educating parents about the importance of well child visits
- Conducting outreach to parents whose children were behind on well child visits
- Facilitating bi-monthly practice manager meetings (by CHAP staff) in which Priority Health provided reports on well child visit rates

Goal: To increase the percentage of children aged 0 to 15 months who are up to date on well child visits between 2010 (before the initiative began) to 2011 (after the initiative began).

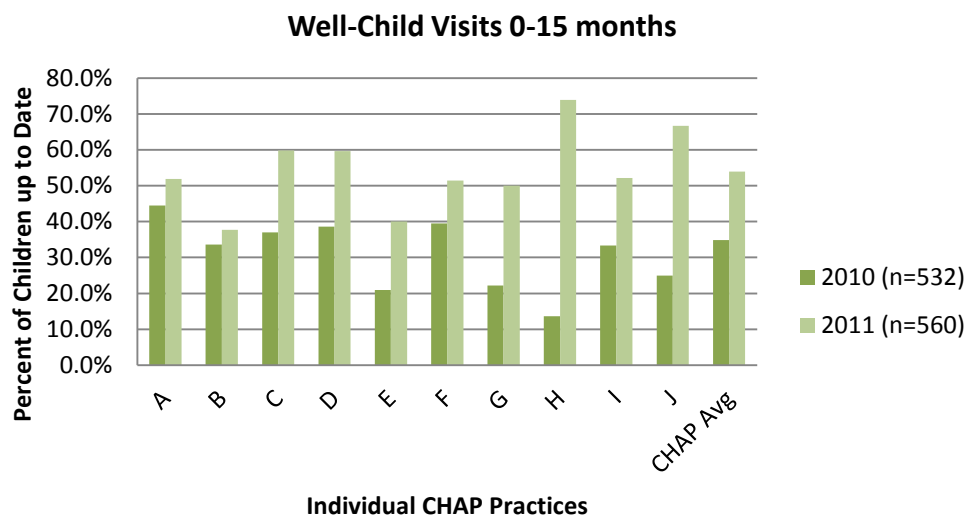


Figure 18

Outcome: As shown in Figure 16, the percentage of children up-to-date on their well-child visits increased from 2010 to 2011 at each participating practice. On average, the number of children who were up to date²⁷ on their well-child visits by age 15 months increased 24%.

7.2.5 Asthma Impacts

A major component of CHAP is its partnership with the Asthma Network of West Michigan (ANWM) to promote asthma care, control and management. To this end, participants receiving asthma services from CHAP/ANWM should experience improved health outcomes related to use of spirometry, flu shots, PCP visits, presence of up-to-date asthma action plans, asthma control tests and asthma-related quality of life.

Spirometry

Spirometry is a common pulmonary function test that measures lung function, or more specifically, the amount and speed of air that can be inhaled and exhaled. Systematic use of spirometry is critical in assessing the severity of asthma, the patient's responses to therapy, and the disorder's course over a lifetime.

²⁷ Up to date in this case is defined using the HEDIS measure of 6 well child visits by the 15 month birthday.

Goal: To increase the percentage of CHAP/ANWM asthma clients with an insurance claim for spirometry in the previous 12 months.

Outcome: Results show that prior to program involvement, only 15% of CHAP/ANWM asthma clients (n=297) had an insurance claim for spirometry in the previous 12 months; however, in the 12 months following involvement almost 30% of clients had a claim, indicating an increase in spirometry claims even though rates overall remained low²⁸. While the small population size should be considered, this improvement doubled the percent of claims submitted and should be considered a positive program outcome.

Flu Shots

Research suggests the influenza vaccine (flu shot) decreases the risk of asthma exacerbations in patients by as much as 22% to 41%. In addition, the vaccine also protects against acute asthma exacerbations in children. Vaccinating children could prevent up to 78% of pediatric asthma hospitalizations and ED visits during influenza seasons²⁹.

Goal: To increase the percentage of CHAP/ANWM asthma clients (n=297) who had received a flu shot in the previous 12 months.

Outcome: For this evaluation period, CHAP/ANWM asthma clients showed no increase in flu shots from 12 months prior (36%) to 12 months post (36%) program involvement, based on claims data.

Evaluator's Note: Data for the following outcomes (asthma action plans, asthma control tests, exposure to tobacco smoke, and school and work days missed) was not consistently collected from all participants. In many cases, data was missing for either pre-program or post-program outcomes. This missing data resulted in a different number of clients evaluated for each outcome measure. Furthermore, wherever possible, analyses were limited to clients who received 3 or more home visits to ensure adequate dosage of the CHAP/ANWM asthma intervention.

²⁸ Because spirometry is not typically indicated in children less than 5 years of age, only children older than 5 years of age were included in this analysis.

²⁹ Richard A. Nicklas, MD, FAACAP, Chair of the AAAAI's Asthma Diagnosis and Treatment Interest Section.
<http://glcofe.com/html/ydate/2011/08>

Asthma Action Plan

Over the course of the demonstration project, ANWM collected data on 342 CHAP/ANWM clients entering services with or without an established Asthma Action Plan (AAP). Of those, 288 clients had received adequate dosage of CHAP/ANWM asthma services (defined as 3 or more visits) and were included in subsequent analyses.

Goal: To increase the number of clients who have an asthma action plan.

Outcome: During the demonstration project period, there was a 23% increase in the number of clients with an asthma action plan from initial asthma intake to discharge, as shown in Figure 17.

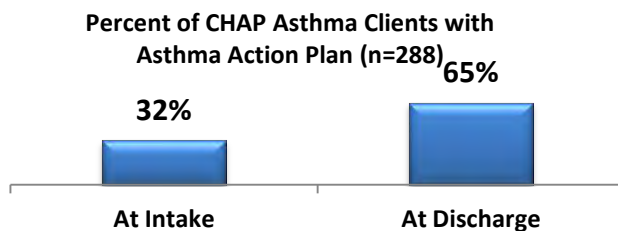


Figure 19

AAP

An asthma action plan is a written plan developed by a doctor or asthma specialist to help the asthma patient or another family member manage asthma and prevent asthma attacks. The plan is designed to educate users on what to do when there are changes in the severity of asthma symptoms and in peak flow numbers.

Written action plans are particularly recommended for patients who have moderate or severe asthma, a history of severe exacerbations, or poorly controlled asthma.

Asthma Control Test (ACT) Results

Over the course of the demonstration project, ANWM collected data on client's scores on the Asthma Control Test (ACT). This data was only collected on approximately 10% of CHAP/ANWM asthma clients.

Goal: To increase scores on the ACT for children receiving CHAP/ANWM asthma services

Outcome: Of the 41 children for which data was collected during the CHAP demonstration period, 54% scored 19 or below at intake and increased to 20 or above by last home visit. This suggests that CHAP/ANWM asthma case management improved asthma control for nearly 50% of clients surveyed.

ACT

The ACT is a validated, quick, easy, self-administered test using 5 questions for ages 12 and up and 7 questions for children ages 4-11. A score of 20 or more suggests the patient's asthma may be well-controlled. A score of 19 or less suggests the patient's asthma may not be well-controlled.

Smoke Exposure

During home visits, asthma educators instruct the family on the importance of reducing home environment asthma triggers. As a result, there is an expectation of a decrease in the number of clients exposed to tobacco smoke in their home environments.

Goal: To decrease the number of CHAP/ANWM asthma clients exposed to smoke in the home.

Outcome: Findings for the demonstration project period show an approximately 50% decrease in children exposed to smoke in their home environment³⁰.

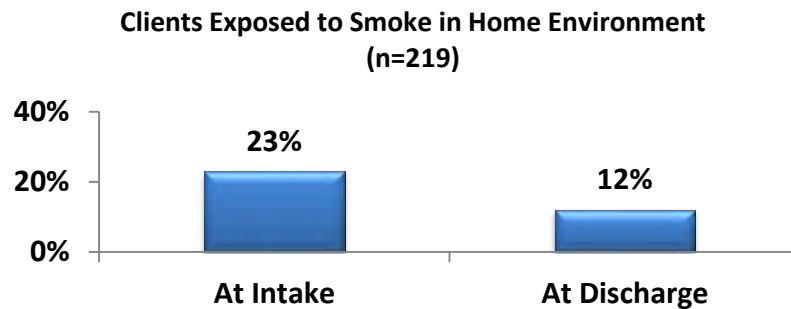


Figure 20

Number of Missed School and Work Days

ANWM collected data on the number of parent reported missed school and work days prior to and at the conclusion of receiving asthma case management services.

Goal: To decrease the number of missed school and work days due to asthma

Outcome: Findings were positive for both measures, with parents of clients reporting a decrease in the average number of school days missed from 6.3 to 1.4, equal to approximately 442 days for all clients³¹. Clients reported decreases in the number of work days missed as well, from an average of 4.8 to 0.5.

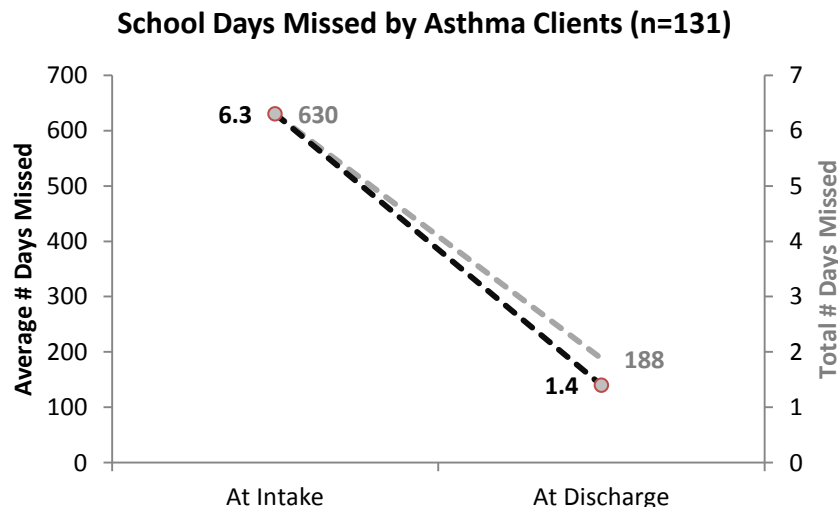


Figure 21

³⁰ Only clients with 3 or more asthma home visits were included in the analysis.

³¹ Only clients with 3 or more home visits were included in the analysis of both the missed work days and missed school days.

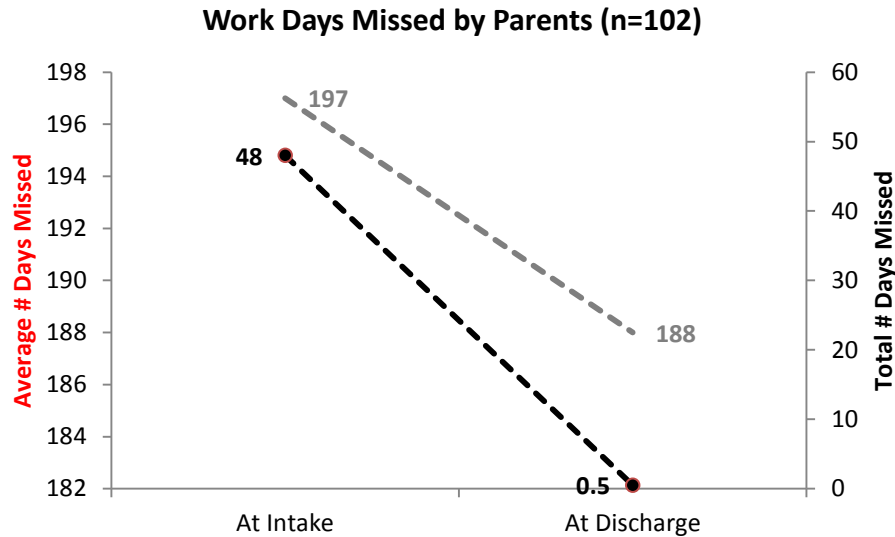


Figure 22

Quality of Life Surveys

Quality of life (QOL) data was collected from patients participating in the ANWM program and the patients' caregivers since 2010 using Juniper QOL surveys. Data collection consisted of administering the QOL surveys toward the beginning of the program (pre-test) and then again toward the end of the program (post-test). The data were then analyzed by determining mean responses to the items on the survey and comparing the pre-test mean scores and post-test mean scores. Table 15 contains the number (and percentage) of patients and caregivers who scored significantly higher on the post-test (as defined by the Juniper test manual).

The NIH asthma guidelines state that "the importance of (QOL) to people who have asthma warrants that clinicians assess and monitor the effect of asthma on quality of life." Thus, a positive effect on quality of life is deemed a useful development in the course of a chronic illness like asthma. Table 15 presents findings from the surveys collected during 2010-11.

Table 15. ANWM Quality of Life Surveys (2010 to 2011)

QOL Survey	# of patients/caregivers surveyed	Domains	Patients/Caregivers with a significant positive change
PACQLQ	63	Activity Limitation	40 (63%)
		Emotional Function	29 (46%)
PACQLQ: QOL survey for parents or caregivers of children with asthma 7 – 17 years of age			

Goal: To increase the quality of life of parents and caretakers of children receiving CHAP/ANWM asthma services

Outcome: At least 46% of the adults taking the PACQLQ survey showed significant improvement in all QOL measurement domains as a result of participating in the ANWM program.

The results above seem to indicate that participation in the CHAP/ANWM program has a meaningful impact on this important aspect of asthma management.

Limitations of this study include small sample sizes and a lack of standardization in the timing of survey administration. These limitations were addressed in a recent QOL workshop that was attended by both the asthma educators of ANWM and the community health workers of CHAP. Subsequent collection and analysis of QOL data will incorporate the changes suggested in the workshop.

7.3 Reduced Cost

In the section that follows, we provide the details of a cost-benefit analysis conducted on behalf of CHAP by Clive Belfield, PhD³², Consultant Economist.

7.3.1 Overview

The goal of CHAP is to improve child health and wellbeing while also using healthcare resources more efficiently. Families will benefit from improved health status and, if health conditions are diagnosed early and treated effectively, health systems may save over the long run if future treatment expenses are lower.

Here, we evaluate the success of CHAP using Cost-Benefit Analysis (CBA). This method treats CHAP as an investment and investigates whether the returns on this investment exceed the expenditures, i.e. whether the benefits of the program (valued in monetary terms) exceed the costs. We apply both a social perspective (looking at all the costs and benefits) and the fiscal perspective (looking only at the consequences in terms of direct health care expenditures). Both perspectives are informative. The social perspective is the one conventionally used; it takes account of all resource use and allows investments in health to be compared against other public investments. The fiscal perspective is narrower; it only counts a subset of all the benefits of health interventions.

To perform CBA it is necessary to consider the full set of benefits, i.e. all the outcomes from providing CHAP services³³. These outcomes should include the value of being in good health, which is not just the savings in medical bills. As well, it is necessary to count the health benefits over an extended time frame: poor health in early childhood is associated with poor health later, even through adolescence and adulthood.³⁴

This report updates our earlier cost-benefit analyses.³⁵ For 2010, we found that the social benefits exceeded the costs by 20% and the fiscal benefits were 90% of the costs (expressed as annual amounts). Sensitivity analysis showed that the program offered value for money. Here, we extend this analysis. Sections 7.3.2 and 7.3.3 below present the costs and benefits of CHAP using data across a longer time horizon. This allows us to derive a social cost-benefit ratio for CHAP. These results are then compared with a cost-benefit analysis from the fiscal perspective.

7.3.2 The Costs of Providing CHAP

CHAP provides a range of services, including telephone counseling, asthma case management, transportation, family education, and connections to community resources. CHAP also liaises with practices/providers and other agencies and works to improve the quality of primary care medical homes. Using data from 2008 to 2011, the cost is the annual total expenditure. Taking the average across the three full fiscal years, this was \$558,740 per year. This amount does not include Priority Health Medicaid reimbursements for sick child visits. Critically, these Medicaid enhanced reimbursements reflect improved medical care for children and so may not be counted in the direct costs of providing the program.³⁶ In our sensitivity testing we do include these reimbursements.

³² Dr. Belfield is an Associate Professor of Economics, Queens College, City University of New York, and Co-Director, Center for Benefit-Cost Studies in Education, Teachers College, Columbia University.

³³ For this reason, it should be noted that the CBA draws its outcome data from the broader CHAP population as opposed to the earlier section (i.e. Triple Aim) where we often targeted subpopulation data for more in-depth analysis.

³⁴ See Walsemann et al. (2008).

³⁵ Reports available from author.

³⁶ ³⁶ These costs were collected using the ingredients method (Levin and McEwan, 2001) based on data from questionnaires completed by CHAP staff for financial years 2008-2011. These cost estimates also do not include: payments for rental space; contributions from the Early Childhood Investment Corporation and the Great Start Collaborative (for capital and research and development); and indirect costs to the provider sites. Some of these cost items should be included but it was not possible to separate out the exact amounts allocated specifically for CHAP. Finally, the CHAP program is delivered over multiple years and so initial capital costs need to be amortized over their useful duration.

7.3.3 The Benefits of CHAP

The primary goal of CHAP is to improve health and wellbeing for children. Improved health reduces costs in two ways: there are savings from more efficient use of medical resources (direct savings); and there are savings to families and children who value improved health itself (social savings). From Kent County's perspective, both direct and social savings should be counted and these are based on identifying the impacts of CHAP services.

Identification of the impacts of health interventions is challenging. Absent random assignment of some children to CHAP services and others to a control group, it is not possible to establish a causal link between the program and improved health status. Health interventions may have many diverse impacts and these may persist over many years (and have spillover effects on others, such as siblings). Finally, access to health services changes over time: locally, a new children's hospital was opened during the evaluation period and there was a spike in flu cases in 2011; and, more broadly, the program was offered during the worst economic conditions since the 1930s.

For this CBA, the monetary benefits of CHAP are derived from impacts in several key domains. The two direct domains are changes in emergency department visits and inpatient stays. From the family perspective, we also look at school and work absenteeism. However, there are other direct impacts of CHAP which may be independently valuable. These include the percentage of CHAP asthma clients with an Action Plan, the percentage of clients with asthma that is under control, the percentage of children receiving flu shots, and the percentage of clients exposed to smoke in the home.³⁷ This last impact may be particularly powerful given the long-run association between smoke and ill health (Levy et al., 2011). In addition, there are many social impacts of CHAP services which may be especially valuable, such as reduced pain and suffering for children. Importantly, all benefits should be measured over an extended time period.

There are several ways to derive program impacts. CHAP practices can be evaluated against a set of comparable practices for changes in ED visits and inpatient stays; alternatively, CHAP clients can be compared to matched comparison group clients; a third alternative is to look at the unadjusted rates per 1,000 members.³⁸ For our main estimates we use the changes from baseline (Year 1, August-to-August 2008-2009) for each subsequent year, i.e. the gain in that year relative to the baseline frequency. We calculate the changes for CHAP eligible children, not just CHAP clients. These methods yield quite different estimates of the impacts of CHAP, so we perform sensitivity testing below. Finally, in 2011 CHAP asthma clients missed 950 days of school in the year pre-enrollment; at discharge from the services, these children had missed only 232 days. This means 718 extra days of schooling. In 2010, CHAP asthma clients gained 490 extra days of schooling. We emphasize that these are the benefits each year for the clients served in that year (so if there are benefits in 2011 for a one-time client in 2010, these benefits are not included).

The direct medical benefits are calculated simply as the numbers of reduced emergency department (ED) visits and hospitalizations (for all treatments) times the unit cost of each. For the purposes of this analysis, we estimate the cost per ED visit at \$240-\$480 and the cost per hospitalization at \$2,600-\$4,700 for an average 2-day length of stay.³⁹ These cost figures represent the value of the actual resources required by the healthcare system, which is not necessarily the amount of Medicaid

³⁷ The percentage of CHAP asthma clients with an asthma action plan rose from 33% at intake to 61% at discharge (N=342). The proportion of clients whose asthma was newly controlled (ACT>20) was 54% (of a small sample, N=41). The proportion of clients exposed to smoke in the home fell from 23% at intake to 12% at discharge (N=252).

³⁸ The impacts depend critically on how they are measured. Using the unadjusted rate per 1,000 members, this yields a net saving in ED visits of 106 visits annually across all CHAP clients, although this decline is estimated with very high variance. For inpatient stays, there appears to be a net saving of 65 stays, although again this estimate is very sensitive to how it is calculated. For the two measured benefits, the effect depends on whether we look year-on-year or from baseline. Looking year-on-year, i.e. taking the rate at the start of the year and comparing it to the end of year, there were 526 fewer ER visits and 102 fewer patient visits. Looking from baseline, i.e. taking the difference between the 2009 rates and the rate at the end of each subsequent year, there were 2,327 fewer ER visits and 232 fewer patient visits.

³⁹ These are all in 2012 dollars. The ED visits are from the Medical Expenditure Panel Survey (2004) and the hospitalization costs are adjusted from Stanford et al. (1999) and Gendo et al. (2003).

reimbursement or the amount a hospital might charge per ED visit or inpatient stay.⁴⁰ For the social savings associated with more days in school, this analysis utilizes the ‘health production function’ estimate by Dickie (2005) where each lost day of school is valued at \$130.⁴¹

7.3.4 The Social Value of CHAP

The costs and benefits of CHAP over the three year period are shown in Table 16. The annual cost of CHAP per year is on average \$558,740. The annual benefits of CHAP on average each year are \$649,310. The annual net benefit of CHAP is therefore \$90,560 annually. The benefit-cost ratio is therefore 1.16; for every \$1 spent each year, the program yields \$1.16 in return. However, the returns vary across the years: the only year when benefits clearly exceeded costs was 2010.

Table 16. Economic Costs and Benefits of CHAP 2009 to 2011

	2009	2010	2011	Average annual amount
Program delivery cost [C]	\$534,100	\$554,070	\$588,070	\$558,740
Benefits of CHAP [B]:				
Fewer ED visits	\$204,630	\$415,940	\$138,930	\$253,170
Fewer hospitalizations	\$206,970	\$415,350	\$355,180	\$325,830
More school days	<u>\$58,800</u>	<u>\$58,800</u>	<u>\$93,340</u>	<u>\$70,310</u>
Total	\$470,400	\$890,090	\$587,450	\$649,310
Net saving [B - C]	-\$63,700	\$336,020	-\$620	\$90,560
Benefit-Cost ratio [B/C]	0.88	1.61	1.00	1.16

Notes: Savings are in 2012 dollars to nearest \$10. Benefits calculated for CHAP-eligible children from baseline.

This is likely to be a conservative calculation of the social benefits: not all benefits are counted (especially from the family’s perspective), and the benefits are only counted over a relatively short time frame. The full value of health is at least as much as, and possibly more than, the value associated with ED visits and hospitalizations by themselves.⁴² The value of early investments is typically found to be much greater when longer time horizons are accounted for.⁴³ Also, CHAP is likely to improve access to care, lead to more effective and regular care, and provide the advantages of having a ‘medical home.’ Therefore, it is likely that CHAP passes a social CBA test if these benefits are accounted for.

7.3.5 The Fiscal Value of CHAP

A fiscal CBA was conducted by Priority Health and looks at selected costs and benefits. This analysis yielded net expenses (costs minus savings) of \$56,350 in 2009 and \$10,350 in 2010. Priority Health found that its 2011 expenses due to increased provider payments for the program were \$237,560. However, because it identified additional ED visits associated with CHAP (but no change in IP stays), there were additional expenditures of \$63,700, i.e., the benefits are *negative*. Thus, the total net expense for Priority Health was \$301,250. This is a result of using the ‘year-on-year’ calculation method rather than the ‘from-baseline’ method (as applied above).

Fiscal CBAs differ from social CBAs in several ways, fundamentally because they take different perspectives. A fiscal CBA is not intended to consider the social value of health, either in the short run or the long run; it also assumes that all the benefits of CHAP are captured in ED and inpatient hospital

⁴⁰ Reimbursement rates are typically much lower than actual costs.

⁴¹ Approximately, families value each lost day of school at the same amount as if it were a lost day of work; this is the case regardless of whether the parents are employed or not (for full details of the model, see Dickie, 2005). We use daily wage rates from <http://www.milmi.org/?pageid=67&subid=124>. Estimates from Levy et al. (2011) are slightly higher, but to conservative we apply the rates from Dickie (2005).

⁴² See Schoeni et al. (2011). Families also incur direct medical expenses.

⁴³ See Neidell (2004) and Nores et al. (2006).

stays. In this case, the fiscal CBA also uses different unit cost estimates for ED visits and for inpatient stays (lower for ED visits but higher for inpatient stays).⁴⁴

**Table 17. Economic Costs and Benefits of CHAP 2009-2011
Including Medicaid Reimbursements**

	Average annual amount
Program delivery cost [C]	\$558,740
Enhanced reimbursement [C2]	<u>\$281,400</u>
	\$840,150
Benefits of CHAP [B]:	
Fewer ED visits	\$253,170
Fewer hospitalizations	\$325,830
More school days	<u>\$70,310</u>
Total	\$649,310
Net saving [B - C]	-\$190,840
Benefit-Cost ratio [B/C]	0.77

Notes: Savings are in 2012 dollars to nearest \$10.

Benefits calculated for CHAP-eligible children from baseline.

One key issue is the Medicaid reimbursement from Priority Health. This reimbursement is intended to improve healthcare services and access for children in their medical home. If we interpret this purely as a cost where the only benefit is subsequent avoided ED visits and hospitalizations, then this reimbursement amount should be counted in the cost-benefit calculation. Most likely, these visits to the doctor will yield many other benefits beyond simply avoiding ED visits and hospitalizations.

However, to apply an extremely conservative model, we assume that the reimbursements are a cost and there are no additional benefits. The results are given in Table 17. The annual Priority Health fee is \$281,400. Setting this cost plus the program delivery cost against the benefits yields a negative benefit of \$190,840. The program benefits now cover 77% of the total costs.

7.3.6 Sensitivity Tests on the Economic Value of CHAP

Here we test the robustness of the results on the economic value of CHAP. We incorporate the information from the Priority Health fiscal CBA and consider a wider array of benefits. These results are summarized in Table 18.

The models show that the cost-benefit ratios depend critically on the assumptions made. Under the most pessimistic assumptions (Priority Health unit costs and a narrow conception of benefits) the CHAP program returns 107% of the total expenditure [column 1]. Using an alternative analysis based on impact estimates from the previous year, the benefit-cost ratio falls to 1.02 [2]. If we include the value to families from improved health (e.g. in reduced stress and medical expenses), the benefit-cost ratio rises to 1.35 [3]. It is also possible to use the year-on-year method for calculating benefits for each of the three years. This is more conservative because it assumes that the effectiveness of the program is based on how much improvement is made each year over the previous year. This generates a benefit-cost ratio of 0.45 [4]. Finally, if the program is anticipated to have durable impacts over two years, the benefits will clearly exceed the costs even if reimbursement costs are included [5]. (In an alternative model for 2011, the unadjusted rates yield net savings in ED visits of 106 visits and net

⁴⁴ Most ED visits involve the same fixed costs of diagnosis and administration and so even if reimbursement rates differ, costs might not. A further consideration is whether Medicaid reimbursements are accurate to the types of ED visits and hospitalizations averted. Given the low cost per ED visit, it is unlikely that any Medicaid difference will affect the results.

savings of 65 inpatient stays, which are considerably below the rates assumed in the main model. However, applying these rates as a sensitivity test yields an average benefit–cost ratio of 1.03).

Table 18. The Economic Costs and Benefits of CHAP, Average Annual Amounts 2009-2011, Sensitivity Tests

	[1] Using PH unit costs	[2] Using alternate 2010 estimates	[3] Including value of health to family	[4] Year on year method for impacts	[5] Two-year impacts and reimbursement costs
Program delivery cost [C]	\$558,740	\$558,740	\$558,740	\$558,740	\$840,150
Benefits of CHAP [B]	\$601,270	\$554,750	\$757,020	\$251,970	\$1,282,390
Net saving [B - C]	\$42,520	\$15,680	\$198,270	-\$306,770	\$442,240
Benefit-Cost ratio [B/C]	1.07	1.02	1.35	0.45	1.53

Notes: Savings are in 2012 dollars to nearest \$10. Second year impacts discounted at 3.5%. Alternate estimates in Table 2 based on prior estimate of 2010 benefit-cost analysis. Benefits include: ED visits, inpatient stays, and school days missed.

Across the seven models in Tables 16 to 18, the benefit-cost ratio is 1.05, i.e., the program returns 105% of its expenditures in savings either to the health care system or to families in terms of reduced school absenteeism.

7.3.7 Cost Benefit Conclusions

This economic analysis of CHAP shows that, after three years of implementation, the program had a financial impact related to improving children's health across a range of outcomes. Ill health imposes such a large and growing fiscal and social burden that this program is likely to yield a positive return for society. Given current trends in health expenditures, programs that improve health early are likely to become more cost-effective over time. However, the impacts of the program are very hard to identify and this means that cost-benefit analysis is sensitive to the assumptions made. In particular, the results for 2011 are very sensitive to assumptions about which method to use. Lastly, these results suggest that the economics of CHAP would be even stronger if more was known about how much patients value CHAP and how highest risk (highest cost) patients might best be served.

8 Conclusion and Recommendations

8.1 Evaluation Findings Summary

CHAP has demonstrated multiple “triple aim” outcomes in improved health and improved quality of healthcare. CHAP served 75% of children referred to service, successfully reaching a primary population of children younger than 10. Findings show that CHAP-eligible clients experienced a rate decrease of between 5% and 15% ED visits compared to the baseline year and CHAP clients experienced a 35% decline in ED visits after one year of program involvement. Achievements occurred in reducing otitis media-related ED visits; the percentage of children aged 0-15 months who were up to date on their well-child visits increased an average of 24% from 2010 to 2011 at each participating practice. CHAP/ANWM clients had noted increases in asthma action plans from intake to discharge and a large decrease in the average number of school days missed (from 6.3 days pre-program involvement to 1.4 days post-program involvement).

At the healthcare practice partner -level, CHAP encouraged and facilitated leadership within the pediatric healthcare community in the areas of asthma, behavioral health, otitis media, and childhood obesity. There were also improvements in practice fidelity to asthma control and management best practices and positive changes in practice coordination of care attributed to CHAP.

At the system-level, CHAP expanded access to medical care at partnering sites, facilitated integration between community organizations and healthcare practice partners, and provided leadership and played an instrumental role in promoting the CHAP model in other Michigan communities.

8.2 Evaluator Program Recommendations

- The data involving IP admissions are difficult to interpret due to very low rates in this population of young children. Because the number of admissions is low, we recommend CHAP look closely at how significantly its services can be expected to impact these rates. If CHAP were to have continued interest in monitoring IP admissions, we would also recommend additional review of each IP admission to determine whether the visit was preventable and potentially impacted by CHAP services.
- This evaluation was limited by the data available to assess the impact of CHAP/ANWM’s asthma services. Outcomes such as missed school days and presence of an Asthma Action Plan were not universally collected for all CHAP clients receiving asthma services. Additionally, data related to specific outcomes such as asthma related preventative PCP visits were not available to the level of detail needed for this analysis. To the extent possible, we recommend a careful review of asthma-related data collection procedures and available data to determine if additional asthma-related outcomes can be mined for further analysis.
- The state and federal healthcare landscape will continue to change, and CHAP will need to remain nimble to stay ahead of the curve. Sustaining the outcomes may need to take priority over sustaining the current model itself, e.g., if sustaining partners want to invest in CHAP-like functions but their incentive to “invest” comes with the payoff of larger savings, the program may consider being part of a broader approach as a “Children’s” HAP portion of a potential broader “Community” HAP that includes services for adults.
- Care should be taken to handle the CHAP transition strategically, so as not to jeopardize its mission or important systems changes achieved.
- Ideally, CHAP would continue to be housed in a neutral entity (i.e. not one formally affiliated with an existing health system)

8.3 Evaluation Recommendations

- Create updated methods for tracking transportation data in order to track not only the number of requests, but the actual number of transportation services provided. This may be accomplished by using the cost data submitted by transportation companies for reimbursement (counting those) rather than trying to track services through client data.

- Create semi-annual or annual questionnaires for provider and practice meeting participants in order to document and evaluate partner feedback of practice-level activities. These questionnaires should include questions designed to capture outcomes and recommendations from the practice perspective and scale items that evaluate CHAP collaboration and facilitation efforts.
- Include evaluation participation requirements in partnering practice agreements, detailing what participation is expected and provisions for additions to be made as needed in the future.
- Create a methodology for measuring the actual (not estimated) number of openings at healthcare practice partners, including establishing baselines as new practices come online and measuring over time.
- Implement an independent survey of asthma clients on the targeted outcomes based on the logic of services provided. For example, there seems to be a clear correlation between asthma service provision and improvements in clients who have an asthma action plan. A clear methodology of survey at intake and follow up at specific time points based on services provided should be created. Other measures that could be included are the ACT, missed school days and missed work days. Follow-up on items such as missed work days should be client specific, so rather than asking parents on an annual basis the number of days they missed, follow up would ask if their specific number of days has decreased (i.e., “Last previously you reported your child missed 8 days during the 2010 to 2011 school year. How many days did your child miss during the 2011 to 2012 school year?”)
- Establish an updated evaluation plan and logic model aligned to the Triple Aim Framework, tightening the focus of evaluation efforts to target strategic research or community questions of value in order to maximize evaluation efforts
 - Detail outcomes to be evaluated
 - Update evaluation timeline
 - Examine appropriateness of evaluation metrics depending on outcomes chosen
 - Review and refine analysis methods

Appendix A

Comparison Group Propensity Score Matching:

SRA employed nearest neighbor propensity score matching algorithm as implemented in MatchIt R-package⁴⁵ to match CHAP clients and CHAP eligible children to comparison subjects from Muskegon and Ottawa counties independently. The propensity score was computed with a logistic regression model using age, gender, FQHC status, number of asthma ED visits, number of all ED visits and number of Medicaid membership months in year 2007 as matching covariates. Due to the lack of matchable controls from Muskegon and Ottawa counties, we employed a with-replacement matching algorithm to allow for multiple CHAP clients and CHAP eligibles to be matched to the same comparison subject, resulting in unequal weights for each subject in subsequent cross-county analysis.

Data Analysis:

The relationship between evaluation outcomes and CHAP eligibility was assessed using repeated measurement Generalized Linear Models⁴⁶ where the outcome mean was regressed to adjust for the CHAP eligibility year along with demographic covariates such as age, gender, FQHC practice status and Medicaid membership months via canonical link function. For discrete count evaluation outcomes we used Poisson marginal distribution with log link function, whereas for binary evaluation outcomes we used Binomial marginal distribution with logit link function. The within-subject measurement was assumed to follow exchangeable correlation structure. The regression coefficients and corresponding standard error estimates were obtained by solving Generalized Estimating Equations⁴⁷ from SAS. The model predicted Least Square Means were used to test significance of all critical pairwise difference tests.

⁴⁵ Ho D, Imai K, King G and Stuart E. (2007). *Matching as Nonparametric Preprocessing for Reducing Model Dependence in Parametric Causal Inference*. Political Analysis 15(3): 199-236. <http://gking.harvard.edu/files/abs/matchp-abs.shtml>

⁴⁶ McCullagh, P and Nelder, JA (1989). *Generalized Linear Models*. Second ed. London: Chapman and Hall.

⁴⁷ Liang K-Y and Zeger SL (1986) *Longitudinal data analysis using generalized linear models* Biometrika, 73(1): 13-22
doi:10.1093/biomet/73.1.13