Strengthen the Evidence Base for Maternal and Child Health Programs

Medical Home Evidence Review

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EXECUTIVE SUMMARY

Medical home is one of fifteen Maternal and Child Health (MCH) National Performance Measures (NPMs) for the State Title V MCH Services Block Grant to States program (hereafter referred to as the MCH Block Grant). The goal of this NPM is to increase the number of children with and without special health care needs who have a medical home. The purpose of this evidence review is to identify evidence-informed and evidence-based strategies that MCH Block Grant programs can implement to address NPM 11: Medical Home. While there is a broad array of research on the beneficial outcomes for children who have a medical home (Hadland & Long, 2013; Homer et al., 2008, Jackson et al., 2013; Rogers & Zeni, 2015; Rosenthal, 2008; Williams et al., 2012; Zutshi et al., 2013), a review of the literature revealed that limited evidence exists for strategies to ensure that children are receiving care consistent with the medical home model.

In a 2002 policy statement, the American Academy of Pediatrics (AAP) defined the medical home as a “model of delivering primary care that is accessible, continuous, comprehensive, family-centered, coordinated, compassionate, and culturally effective to every child and adolescent” (Medical Home Initiatives for Children with Special Needs Project Advisory Committee, AAP, 2002). For more than two decades, the Health Resources and Services Administration’s Maternal and Child Health Bureau (HRSA MCHB) has promoted this model of primary health care. The pediatric medical home model of care is described as a family-centered partnership within a community-based system that provides uninterrupted care with appropriate payment to support and sustain optimal health outcomes. The medical home model is capable of addressing preventive, acute, and chronic care from birth through transition to adulthood. The medical home model is also able to facilitate an integrated health system with an interdisciplinary team of patients and families, primary care physicians (PCPs), specialists and subspecialists, hospitals and health care facilities, public health, and the community.

EXECUTIVE SUMMARY

Importantly, the medical home model is seen as the standard of care for all children and youth. It recognizes the family as the constant in a child’s life and emphasizes partnership between health care professionals and families.\(^5\) The medical home is not a building or particular place, but an ideal approach for delivering good care. In essence, it is similar to the hub and spokes on a bicycle wheel.\(^6\) Each child has a primary care “hub” that is his or her first stop for most preventive, acute, and chronic health services. In addition, a child can access different “spokes,” including medical specialists, family resources, and community resources through and with the primary care “hub.” These connections and services are all coordinated to provide comprehensive, quality care. Also known as a patient-centered medical home (PCMH), the model is available across the life span and the literature is largely focused on the adult medical home. This evidence analysis review is focused on the pediatric medical home for children, adolescents and their families.

With the majority of research focused on the individual components of the medical home model of care as opposed to its entirety or among adults, the aim of this evidence analysis review is to identify interventions to increase access to care consistent with the medical home model for all children and youth.

The MCH Evidence Center defined access broadly as the ability to obtain care consistent with the medical home model. More specifically, we searched for interventions that enable children to receive a comprehensive array of preventive, primary, and specialty health services in a timely and coordinated manner within the medical home model of care. Increased access can mean gaining entry to care that is already consistent with the medical home model (either through insurance coverage or a new access point), or improving elements of existing care to make the care received consistent with the medical home model (e.g., by increasing timeliness of care, providing greater continuity of care, improving communication between providers and families, enhancing the patient experience). This definition combines elements from the Healthy People 2020\(^7\) and AAP\(^8\) definitions of access.

Studies focused on the positive benefits of a medical home. Investigations of the medical home model for children have primarily focused on their use and effectiveness including the impact, cost effectiveness, and quality improvement in satisfaction and service provision. There is an identified positive relationship between use of a medical home and health, quality of care, and family satisfaction outcomes; however, less is known about the effect on costs.

\(^5\) https://medicalhomeinfo.aap.org/overview/Pages/Whatisthemedicalhome.aspx
\(^6\) J. Lichstein, personal communication, May 22, 2019
\(^7\) According to Healthy People 2020, access to health services is defined as “the timely use of personal health services to achieve the best health outcomes.” Coverage, services, and timeliness are critical components for understanding access to health services. Access to health services requires three distinct steps: (1) Gaining entry into the health care system (usually through insurance coverage), (2) Accessing a location where needed health care services are provided (geographic availability), and (3) Finding a health care provider who the patient trusts and can communicate with (personal relationship) (https://www.healthypeople.gov/2020/topics-objectives/topic/Access-to-Health-Services).
\(^8\) With regard to the medical home model, access is defined by the AAP as “Care is easy for the child and family to obtain, including geographic access and insurance accommodation” (https://medicalhomeinfo.aap.org/overview/Pages/Whatisthemedicalhome.aspx).
Further, traditionally marginalized populations of children (diverse racial, ethnic, and cultural groups, non-English speakers, low-resourced neighborhoods, low-income families, children with multiple disabilities or complex conditions) are less likely to receive care consistent with a medical home model. Since health professions and agencies have agreed that a medical home has value for improvements in child and adolescent health, states and jurisdictions are increasingly concerned with how to get more children to receive care within the medical home model, particularly targeting those populations who have lower rates of access to care.

**Studies focused on access to a medical home.** Five peer-reviewed articles met study inclusion criteria and informed this evidence analysis review. These papers were categorized into interventions at the community, state, and policy levels. The articles described interventions focused on:

- Partnership and care coordination between primary care providers and school-based health centers (SBHCs) to create an expanded medical home.
- A neighborhood-based approach using care coordination and collaboration between primary care clinics and a home visiting program.
- Community outreach and coordination of primary care and specialty services through a provider alliance to create a “one stop” medical home model of care.
- A statewide expanded model to ensure that children in foster care obtain high quality health care by providing each child with a medical home.
- A policy-focused strategy transitioning children from a traditional fee-for-service model to a primary care case management model to assure access to a medical home.

Five key findings emerged:

1. There is limited rigorous evidence about effective interventions to increase access to a medical home for children with and without special health care needs.
2. The identified interventions were focused on all children with no strategy specifically targeting children and youth with special health care needs (CYSHCN).
3. The studies identified partnerships and care coordination as critical mechanisms to improve access to care within the medical home model.
4. Use of community collaborators, such as SBHCs and outreach via community care coordinators, resulted in more children receiving care within the medical home model. More specifically, collaborations with SBHCs, home visiting programs, or use of enhanced care coordination in underserved, urban neighborhoods or with children in foster care led to positive outcomes. These impacts include increased contact with the medical home model for well-child visits, access to specialty care, better adherence with disease management, and dental care.
5. A shift in state policy was also found to increase access to a medical home for children receiving Medicaid. Moving from a traditional fee-for-service model of health care financing and delivery to a primary care case management model by a Medicaid program resulted in more targeted identification and support for children and their families to enter into a medical home model of care.
**EXECUTIVE SUMMARY**

**Evidence-informed studies/strategies to increase access to a medical home.** The evidence analysis review categorized medical home interventions along an evidence continuum from *evidence against* (least favorable) to *scientifically rigorous* (most favorable). Given the scarcity of studies focused on increasing access to care within the medical home model, each included study was rated on its own merit. This is a departure from previous evidence reviews where assignment to the continuum required that interventions were evaluated in four or more peer-reviewed studies or three peer-reviewed studies with expert opinion from the grey literature to speak to the public health impact.

The evidence ratings include:\(^{10}\)

<table>
<thead>
<tr>
<th>EVIDENCE RATING</th>
<th>DEFINITION</th>
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<tbody>
<tr>
<td>Evidence Against</td>
<td>Studies with this rating are not good investments. These strategies have been tested in many robust studies, are not effective, and sometimes produce harmful results.</td>
</tr>
<tr>
<td>Mixed Evidence</td>
<td>Strategies with this rating have been tested more than once and results are inconsistent or trend negative; further research is needed to confirm effects.</td>
</tr>
<tr>
<td>Emerging Evidence</td>
<td>Strategies with this rating have limited research documenting effects. These strategies need further research, often with stronger designs, to confirm effects.</td>
</tr>
<tr>
<td>Expert Opinion</td>
<td>Strategies with this rating are recommended by credible, impartial experts and are consistent with accepted theoretical frameworks. However, the strategies have limited research documenting effects; further research, often with stronger designs, is needed to confirm effects.</td>
</tr>
<tr>
<td>Moderate Evidence</td>
<td>Strategies with this rating are likely to work, but further research is needed to confirm effects. These strategies have been tested more than once and results trend positive overall.</td>
</tr>
<tr>
<td>Scientifically Rigorous</td>
<td>Strategies with these ratings are most likely to make a difference. These strategies have been tested in many robust studies with consistently positive results.</td>
</tr>
</tbody>
</table>

**Emerging evidence** was found for interventions\(^{11}\) at the:

- **Community level** with:
  - Partnerships and care coordination between primary care practice partners and SBHCs to improve access to and provide high quality care for shared patients (Riley et al. 2016).
  - A neighborhood-based approach using care coordination and collaboration with a home visiting program to ensure that every child establishes and maintains a connection with a pediatric medical home (Brown et al. 2015).
  - Community outreach and a coordinated continuum of health services through a provider alliance (primary care and subspecialty organizations were operationally linked) to create a “one stop” medical home model by providing primary care, referrals to specialty care, health education, and case management support, and utilizing mid-level providers in primary care and sub-specialty care (Tataw et al. 2011).

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9 For the initial PubMed search, there was an unrestricted date range. The subsequent CINAHL and Cochrane Library searches had a date range of 01/2013-11/2018 based on studies included in identified systematic reviews.

10 https://www.mchevidence.org/tools/

11 The studies are arranged by intervention level (community, state, and policy) and then by date with the most recent studies described first.
• **State level** with a statewide system of health care for children in foster care, known as the HealthWorks model, consisting of a medical home model with coordinated delivery of comprehensive health services, continuity of care, and improvement in health status for children in state custody (Jaudes et al. 2012); and

• **Policy level** with a shift to a primary care case management model for children enrolled in Medicaid with a PCP taking responsibility for a child’s primary and preventive care, referrals to specialty care, and any needed care coordination (Petersen et al., 2002).

### Evidence-Informed Strategies to Increase Access to Care Consistent with the Medical Home Model

<table>
<thead>
<tr>
<th>TARGET AUDIENCE</th>
<th>INTERVENTION</th>
<th>EXAMPLE</th>
<th>EVIDENCE RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider/Practice and School System</td>
<td>School intervention</td>
<td>Partnership and care coordination with school-based health centers to create an expanded medical home</td>
<td>Emerging Evidence</td>
</tr>
<tr>
<td>Provider/Practice and Home Visiting Program</td>
<td>Collaboration with home visiting</td>
<td>Early connections to the medical home model through care coordination and collaboration with home visiting</td>
<td>Emerging Evidence</td>
</tr>
<tr>
<td>Provider/Practice</td>
<td>Provider alliance</td>
<td>Community outreach and coordination of primary care and specialty services to create a “one-stop” model of the medical home</td>
<td>Emerging Evidence</td>
</tr>
<tr>
<td>State</td>
<td>Statewide systems intervention</td>
<td>A statewide expanded health system for children in foster care</td>
<td>Emerging Evidence</td>
</tr>
<tr>
<td></td>
<td>Policy intervention</td>
<td>A policy intervention transitioning children from a fee-for-service model of health care to a primary care case management model</td>
<td>Emerging Evidence</td>
</tr>
</tbody>
</table>

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12 The term provider refers broadly to pediatric clinicians including pediatricians, nurses, physician assistants, therapists, and others.
EXECUTIVE SUMMARY

Strategies that have the potential to increase access to the medical home model of care, but require more study. Although additional articles did not contain sufficient data or did not directly measure access as an outcome variable, these supplemental studies (n=15), provided descriptions or outlined recommendations for expansion or enhancement strategies, public-private partnerships, telehealth or more specifically telehealth SBHCs, and health provider training with the potential to improve access to the medical home model of care. These strategies, however, require further study and more rigorous evaluation to determine efficacy and effectiveness.

More specifically, these studies show that:

- Medical home enhancements, such as using outreach coordinators or community health workers, have value to increase interaction with a pediatric medical home and follow through with health recommendations (Berry et al., 2017; Justvig et al., 2017; Treadwell et al., 2014).
- Families and adolescents indicate that telehealth and telemedicine are suitable modalities to receive information, communicate, and/or receive care from health or mental health care providers; however, further evaluation of these strategies is required to increase contact or sustain interactions with the medical home model of care (Herendeen et al., 2014; North, et al., 2014; Slaper et al., 2014).
- Practices that invested in training on the medical home model both at the practicing provider and resident levels may add value with those physicians being more likely to provide care within the medical home model (Butcher, et al. 2014).

To expand the evidence base around effective strategies to increase access to care consistent with the medical home model for children with and without special health care needs, more interventions need to focus specifically on growing access to the medical home concept and reducing inequities to ensure all children have access to care consistent with the model.

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13 These supplemental studies were identified during the full article review stage. Although they did not meet criteria for inclusion in the Results section, they highlighted strategies worth mentioning in the Discussion section.

14 HRSA defines telehealth broadly as the use of electronic information and telecommunications technologies to support and promote long-distance clinical health care, patient and professional health-related education, public health, and health administration (https://www.healthit.gov/topic/health-it-initiatives/telemedicine-and-telehealth). Telemedicine is a subset of telehealth and refers specifically to clinical services. According to the World Health Organization (WHO), telehealth is the integration of telecommunication systems in the practice of protecting and promoting health while telemedicine is the incorporation of these systems into curative medicine (Darkins & Cary, 2000; https://www.who.int/sustainable-development/health-sector/strategies/telehealth/en/).

15 Care coordinators in the cited studies were compensated in their role as professional staff members. However, details regarding the source of funding and compensation for care coordination activities were not specifically provided.
**Strategy Recommendations Needing More Study**

<table>
<thead>
<tr>
<th>STRATEGY</th>
<th>DESCRIPTION</th>
<th>REFERENCE</th>
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<tr>
<td>Inclusion of a dedicated care coordinator or</td>
<td>Primary care and medical home partner with a care coordinator or community</td>
<td>Berry et al., 2017; Justvig et al., 2017; Treadwell et al., 2014</td>
</tr>
<tr>
<td>outreach worker</td>
<td>health worker who has dedicated time for outreach15</td>
<td></td>
</tr>
<tr>
<td>Expansion of partnerships</td>
<td>Collaborations or partnerships with public or private organizations to</td>
<td>American Academy of Pediatrics Council on Children with Disabilities, 2007; Galligan, et al., 2018; Madrid, et al., 2008; McPherson-Corder, 1995; Rushton, et al., 1999; Tschudy, et al., 2013</td>
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<td></td>
<td>reduce barriers to accessing care within the medical home model</td>
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<tr>
<td></td>
<td>Examples: Early intervention, mental health, school-based health clinics,</td>
<td></td>
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<tr>
<td></td>
<td>emergency or tertiary care centers</td>
<td></td>
</tr>
<tr>
<td>Telehealth and telemedicine</td>
<td>Physician link/communication with patients in community settings via</td>
<td>Herendeen et al., 2014; North, et al., 2014; Slaper et al., 2014</td>
</tr>
<tr>
<td></td>
<td>electronic or mobile applications</td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td>Training primary care providers to implement all medical home components</td>
<td>Butcher, et al., 2014</td>
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Improvement and expansion strategies may add value to increase access to the medical home model of care, but it will be important to identify the effective components from specific interventions to improve care for different populations of children. States and jurisdictions with programs implementing the medical home model of care can contribute to the evidence by teaming up with researchers to build in evaluation systems. Strategies proven effective can be promoted as a means to increase access to the medical home model of care.

**Focus on health equity.** The goal of this evidence analysis review was to look beyond the question of the effectiveness of a medical home to those interventions that increased access to care consistent with the medical home model for children and youth. Based on the aforementioned studies, this review highlights that marginalized children and youth who disproportionately experience health inequities in the United States have the least access to care consistent with the medical home model. Further, children and adolescents who live in low-resource neighborhoods, in families with low incomes, and those from traditionally underserved and marginalized racial, ethnic, and linguistic groups were more likely to have barriers to access care within the medical home model. Marginalized populations were targeted in several of the interventions included in this report. These interventions can support MCH Block Grant programs in implementing strategies to increase access to care consistent with the medical home model for these groups.

**From evidence to action.** The final section of this document provides recommendations for intervention implementation strategies and recommendations for development of evidence-based or informed strategy measures (ESMs). This section also offers implementation resources, additional promising practices, and sample ESMs currently in use by Title V agencies.
ACKNOWLEDGMENTS

We are extremely grateful for the partnerships and collaborations that enabled us to complete this important evidence analysis review to help guide leaders from State Title VMCH Block Grant programs to increase the number of children who have access to the medical home model of care. We would like to extend a special thank you to the following individuals for their time, thoughtful guidance, and constructive feedback.

Cynthia Minkovitz, MD, MPP, Donna Strobino, PhD, and their team at the Women’s and Children’s Health Policy Center at Johns Hopkins University for their assistance during the transition of the initiative. For NPM 11: Medical Home, they shared the search terms and their proposed search strategy approach. Their team originally adapted the evidence continuum and created the report structure in collaboration with federal partners for the evidence analysis reviews.

Our colleague, Olivia Pickett, MA, MLS, for her expertise in constructing search strategies and running searches in several databases to provide the foundation for our review of the evidence. To Keisha Watson, PhD, for ensuring adherence to project methodologies.

Our project officer, Jessica Minnaert, MPH, and the Director of the Office of Epidemiology and Research, Michael Kogan, PhD, from HRSA MCHB for the consummate support and guidance throughout this review. We are extremely grateful for the invaluable insights and helpful feedback from the team of reviewers including Ashley Hirai, PhD, Lydie Lebrun-Harris, PhD, MPH, Jesse Lichstein, PhD, MSPH, Marie Mann, MD, MPH, and Ellen Volpe, MHSA.

We are especially thankful for our partners at the American Academy of Pediatrics (AAP), Christina Boothby, MPA, Müge Chavdar, MPH, Jamie Jones, MPH, and Bethany Mlodoch for providing guidance and feedback on our methodology and results and their thoughtful review of the results and report draft.

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INTRODUCTION

Strengthen the Evidence Base for Maternal and Child Health Programs is a Health Resources and Services Administration (HRSA)-funded initiative that aims to support states in their development of strategies to promote the health and well-being of maternal and child health (MCH) populations in the United States (US). This initiative, carried out through a partnership among the Georgetown University National Center for Education in Maternal and Child Health (NCEMCH), the National Maternal and Child Health Workforce Development Center (NMCHWDC) with assistance from the Association of MCH Programs (AMCHP), CityMatCH, and the Georgetown University Center for Child and Human Development (GUCCHD), was undertaken to facilitate implementation of the transformed State Title V MCH Services Block Grant to States program (hereafter referred to as the MCH Block Grant).16

One goal of the Strengthen the Evidence initiative is to conduct reviews that provide evidence of the effectiveness of possible strategies to address the National Performance Measures (NPMs) selected for the 5-year cycle of the MCH Block Grant program, beginning in fiscal year 2016. States are charged to select five NPMs, according to their identified priority needs, and incorporate evidence-based or evidence-informed strategies to achieve improvement for each NPM selected.

According to HRSA’s Maternal and Child Health Bureau (HRSA MCHB), the fifteen NPMs were determined using the following criteria:17

- There is a large investment of resources by states on MCH issues;
- The measure is considered to be modifiable by Title V activities;
- States could delineate measurable activities to impact the measure;
- Significant disparities are shown to exist in MCH population groups;
- Research indicates that the condition or activity has large societal costs; or
- Research indicates that health promotion of the behaviors, practices, or policies has resulted in improved outcomes.

Performance measure 11 is the percent of children with and without special health care needs having a medical home. By specifically focusing on interventions to increase access to a pediatric medical home, the aim of this evidence analysis review is to ensure that all children receive care consistent with the medical home model.

The MCH Evidence Center defined access broadly as the ability to obtain care consistent with the medical home model. More specifically, we searched for interventions that enable children to receive a comprehensive array of preventive, primary, and specialty health services in a timely and coordinated manner within the medical home model of care. Increased access can mean

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17 https://HRSA MCHB.tvisdata.hrsa.gov/PrioritiesAndMeasures/NationalPerformanceMeasures
gaining entry to care that is already consistent with the medical home model (either through insurance coverage or a new access point), or improving elements of existing care to make the care received consistent with the medical home model (e.g., by increasing timeliness of care, providing greater continuity of care, improving communication between providers and families, enhancing the patient experience). This definition combines elements from the Healthy People 2020 and American Academy of Pediatrics (AAP) definitions of access.

### ONLINE TOOLS

The report is supplemented by implementation resources for Title V programs that can be found in the MCH Evidence website’s NPM 11 Toolkit at https://www.mchevidence.org/tools/NPM/11-medical-home.php. These resources include links to introductory information, a summary of the evidence, examples of promising practices, sample evidence-based or informed strategy measures (ESMs), links to current, related ESMs in process across the country, learning opportunities, and resources from the leading proponents of the medical home model.

### BACKGROUND

This section defines and describes a pediatric medical home, highlights the importance of the medical home concept, summarizes the most recent national survey data, summarizes evidence on the impact and effectiveness of the medical home model based on systematic reviews, describes the aim and focus of this evidence analysis review, and lists states which selected NPM 11 in the 2018 grant application.

### Definitions

In 1967, the AAP introduced the medical home concept initially referring to a central repository for archiving a child’s medical record. In a 2002 policy statement, the AAP defined the medical home as a “model of delivering primary care that is accessible, continuous, comprehensive, family-centered, coordinated, compassionate, and culturally effective to every child and adolescent” (Medical Home Initiatives for Children with Special Needs Project Advisory Committee, AAP, 2002). For more than two decades, HRSA MCHB has promoted this model

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18 According to Healthy People 2020, access to health services is defined as “the timely use of personal health services to achieve the best health outcomes.” Coverage, services, and timeliness are critical components for understanding access to health services. Access to health services requires three distinct steps: (1) Gaining entry into the health care system (usually through insurance coverage), (2) Accessing a location where needed health care services are provided (geographic availability), and (3) Finding a health care provider who the patient trusts and can communicate with (personal relationship) (https://www.healthypeople.gov/2020/topics-objectives/topic/Access-to-Health-Services).

19 With regard to the medical home model, access is defined by the AAP as “Care is easy for the child and family to obtain, including geographic access and insurance accommodation” (https://medicalhomeinfo.aap.org/overview/Pages/Whatisthemedicalhome.aspx).

20 Other descriptions of the medical home model of care include the Joint Principles of the Patient-Centered Medical Home (PCMH) by the American Academy of Family Physicians, the American College of Physicians, the American Osteopathic Association, and the AAP at: https://www.aafp.org/dam/AAFP/documents/practice_management/pcmh/initiatives/PCMHJoint.pdf as well as the definition of PCMH by the Agency for Health care Research and Quality (AHRQ) at: https://pcmh.ahrq.gov/page/defining-pcmh.
of primary health care. A medical home is described as a family-centered partnership within a community-based system that provides uninterrupted care with appropriate payment to support and sustain optimal health outcomes.

A medical home is capable of addressing preventive, acute, and chronic care from birth through transition to adulthood. The medical home model of care is also able to facilitate an integrated health system with an interdisciplinary team of patients and families, primary care physicians (PCPs), specialists and subspecialists, hospitals and health care facilities, public health, and the community. Also known as a patient-centered medical home (PCMH), the model is available across the life span. As such, the literature is largely focused on the adult medical home. This evidence analysis review is focused on the pediatric medical home for children, adolescents and their families.

The seven essential qualities of a pediatric medical home, as defined by the AAP (Medical Home Initiatives for Children with Special Needs Project Advisory Committee, AAP, 2002), are the following:

1. **Accessible**: Care is easy for the child and family to obtain, including geographic access and insurance accommodation.
2. **Family-centered**: The family is recognized and acknowledged as the primary caregiver and support for the child, ensuring that all medical decisions are made in true partnership with the family.
3. **Continuous**: The same primary care clinician cares for the child from infancy through young adulthood, providing assistance and support to transition to adult care.
4. **Comprehensive**: Preventive, primary, and specialty care is provided to the child and family.
5. **Coordinated**: A care plan is created in partnership with the family and communicated with all health care clinicians and necessary community agencies and organizations.
6. **Compassionate**: Genuine concern for the well-being of a child and family are emphasized and addressed.
7. **Culturally effective**: The family and child’s culture, language, beliefs, and traditions are recognized, valued, and respected.

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21 This evidence analysis review focused on studies using the AAP definition of the medical home model of care. This decision was made to align with use of the AAP definition of a medical home by Title V programs.


25 Resources that address the essential qualities of the pediatric medical home are available at https://www.mchevidence.org/tools/npm/11-medical-home.php

26 https://medicalhomeinfo.aap.org/overview/Pages/Whatisthemedicalhome.aspx
For pediatric populations, family-centered care is especially critical given that families are the primary caregivers for children and youth. Within the medical home model, families and providers work together as partners to identify and arrange all the services needed to help a child or adolescent reach his or her full potential. Fundamental to family-centered care is family engagement and the ability for families and providers to properly communicate and understand one another. As such, health literacy and cultural considerations are paramount to operationalizing family-centered care within the medical home model of care. For example, having interpreters available is a tangible way to begin to bridge any divide between families and providers and can help enable more effective two-way communication.

Importantly, a medical home is seen as the standard of care for all children and youth. Establishment of the medical home model as the standard of care for children has been led by consensus at the highest level:

- The AAP states that “physicians should seek to improve the effectiveness and efficiency of health care for all children and strive to attain a medical home for every child in their community” (AAP, Committee on Community Health Services, 1999).
- The US Department of Health and Human Services’ Healthy People 2010 goals and objectives state that “all children with special health care needs will receive regular ongoing comprehensive care within a medical home” (US Department of Health and Human Services, Health Resources and Services Administration, 1999).
- The Future of Pediatric Education II goals and objectives arrive at the same conclusion: “all children should receive primary care services through a consistent ‘medical home’” (AAP, Task Force on the Future of Pediatric Education, 2000).

The medical home is not a building or particular place, but an ideal approach for delivering good care. In essence, it is similar to the hub and spokes on a bicycle wheel. Each child has a primary care “hub” that is his or her first stop for most preventive, acute, and chronic health care services.
services. In addition, a child can access different “spokes,” including medical specialists, family resources, and community resources through and with the primary care “hub.” These connections and services are all coordinated to provide comprehensive, quality care. See Figure A: Medical Home Model of Care Bicycle Wheel below.

The National Resource Center for Patient/Family-Centered Medical Home (NRC-PFCMH) also created a visual of the important tenets and benefits of the medical home concept. See Appendix A: Medical Home Infographic. As a widely accepted model for how primary care should be organized and delivered throughout the health care system, “the medical home is not a final destination, instead, it is a model for achieving primary care excellence so that care is received in the right place, at the right time, and in the manner that best suits a patient’s needs.”

And, its provision is intended to enable greater access to care, increased satisfaction, and improved health (Homer, 2008).

Figure A: Medical Home Model of Care Bicycle Wheel

History

Since the 1960s, the medical home concept has evolved from initially being a central repository of medical records for children and youth with special health care needs (CYSHCN) to the standard of care for all children and youth, particularly those with special health care needs. The MCH Evidence Center has created an interactive, online timeline that tracks the evolution of the medical home concept and its growing prominence as a model of care for all children, most especially those with special health care needs at https://www.mchevidence.org/tools/npm/11-medical-home-timeline.php.

32 https://www.pcpcc.org/about/medical-home
BACKGROUND

The Importance of Medical Home

With research demonstrating that CYSHCN have substantial unmet health care needs, the medical home model of family-centered, community-based care is critical for CYSHCN (Homer et al., 2008). HRSA MCHB defines CYSHCN as those “who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally.”

More specifically, nearly 20% of US children under 18 years of age have a special health care need, one in five families have a child with a special health care need, and CYSHCN and their families often require services from multiple child-serving systems, including health care, public health, education, mental health, and social services. As reiterated by Lichstein, Ghandour, & Mann (2018), “The medical home model is vital for the care of CYSHCN because they use more health care services and have more unmet health needs than other children” (Newacheck et al., 1998; Silver & Stein, 2001).

Further, Rogers & Zeni (2015) described CYSHCN as a population identified as requiring care within the medical home model since they have higher health care expenditures, need prescription medications, require medical specialists and other services, such as therapies, vision, and dental, experience unmet mental health needs, and their families have higher out-of-pocket expenses compared to the medical costs of all children (Inkelas et al., 2007; Newacheck & Kim, 2005; Thrall et al., 2012; USDHHS, 2013). Homer et al. (2008) found that CYSHCN receiving care within the medical home model had better outcomes than children receiving care in non-medical home settings. “Outcomes with the most compelling positive results included family centeredness, effectiveness, timeliness, health status, and family functioning” (Homer et al., 2008).

Although the medical home model is particularly important for CYSHCN, it is the standard for ensuring the provision of high quality health care for all children. All children need access to primary care services such as well-child check-ups, physicals, immunizations, developmental testing and screening, care for injuries and illnesses, ongoing care for special needs and health problems, as well as specialty care and community and support services consistent with the medical home model of care. Studies have shown that both children with and without special health care needs benefit from care consistent with the medical home model (Homer et al., 2008; Hadland & Long, 2014; Long et al., 2012; Cooley et al., 2009). More specifically, Hadland & Long (2014) described a broadly positive association among healthy children between the medical home and beneficial outcomes in multiple arenas of child health, from primary care services to health care utilization, and overall child well-being.

With research consistently indicating that children who receive care within the medical home model are more likely to receive appropriate preventive care, less likely to be hospitalized, and more likely to receive early diagnosis for chronic or disabling conditions, the aim of this evidence analysis review is to ensure that all children and youth with and without special health

care needs receive care within the medical home model. Therefore, the results section will focus specifically on interventions to increase access to care consistent with the medical home model. The discussion section will include implications from the study findings and outline recommendations for future research highlighting strategies that may add value for increasing medical home access for a greater number of children and youth and may contribute to the growing evidence base for how to increase access to care within the medical home model.

**National Survey Data**

Recent survey data from the 2016 National Survey of Children’s Health (NSCH) revealed that approximately 43.2% of CYSHCN and 50% of non-CYSHCN in the US had access to a medical home as reported by their parent or caregiver (Lichstein, Ghandour, & Mann, 2018). With regard to racial and ethnic make-up, for both CYSHCN and non-CYSHCN, the rate of reported medical home attainment was lowest among Hispanic children (36.3% and 36.1%), followed by non-Hispanic black children (38.9% and 40.2%), and it was highest among non-Hispanic white children (48.0% and 59.8%) (Lichstein, Ghandour, & Mann, 2018). Lichstein, Ghandour, & Mann (2018) also reported that children living in households in which English was not the primary language and those that were uninsured were less likely to have medical home access.

Consistently, studies found that the following groups are less likely to have access to or receive care within the medical home model:

- **CYSHCN (compared to non-CYSHCN):**
  - Although among CYSHCN, access varied by the quantity and type of health condition
- **Racial/ethnic minorities (compared to white children):**
  - Although access to individual components of the medical home model varied substantially by group
- **Children in economically marginalized families or neighborhoods (compared to children above specified multiples of the poverty line)**
- **Children with public health insurance (compared to children with private health insurance).**

These findings not only point to the need for greater access to the medical home model of care for different groups of children and their families, but also provide critical information and recommendations to inform future interventions and research efforts.

Although these cross-sectional studies were identified during our review of full articles for inclusion in the results, they are not interventions designed to increase access to care within a medical home model; therefore, detailed findings are included in an appendix to provide context to the more focused approach of this report. See **Appendix B: National Survey Overview and Findings.**
BACKGROUND

“If a medical home is the foundation of a system that promotes preventive services, timely care, appropriate management of health conditions, and care that is responsive to the needs of families, then it must be available for all children, regardless of race or ethnicity, health status, and developmental stage.”

— BENNETT, RANKIN, & ROSENBERG, 2012

Systematic Reviews

Multiple national, state, and local organizations have conducted and published research over the last 40 years that advance evidence in support of the pediatric medical home approach to care. In general, these studies show a positive association between access to and utilization of a medical home to improved health outcomes, increased satisfaction for children and families, and decreased cost of care. In 2010, with implementation of the Affordable Care Act, the uptake of the pediatric medical home model by individual practices, health care organizations, hospitals, states, and public and private payers was further encouraged.

Outcomes

Overall, the evidence base on the pediatric medical home model of care is emerging to indicate a positive relationship between access to and utilization of the model and desired outcomes. Such outcomes include improved health, improved quality of life, and increased satisfaction for children and families. Data from the three child-focused systematic reviews (Hadland & Long, 2013; Homer et al., 2008; Rogers & Zeni, 2015) found that a medical home is generally associated with increased provision of preventive services, decreased unmet medical needs, improved timeliness of care, improved quality of care, enhanced health outcomes and health status, and increased family satisfaction.

There is mixed evidence, however, regarding costs that requires further examination. For instance, although children in a medical home may be less likely to seek care in the Emergency Department (ED), considerations such as paying for a dedicated nurse care coordinator could lead to increased costs. In another example, Homer et al. (2008) cited one randomized controlled trial (RCT) targeting high-risk infants where participants received acute care, well-child care, and social services within the medical home model (Broyles et al., 2000). Fifty-seven percent fewer infants in this intervention group were admitted into the intensive care unit (ICU) and infants who were admitted to the ICU spent 42% fewer days there (Broyles et al., 2000). The increase in follow-up costs was offset by the decrease in ICU costs but did not result in overall costs savings (Broyles et al., 2000).

Further, Hadland and Long (2013) stated that evidence exists suggesting that social-economic status (SES) affects immunization outcomes (a proxy measure for receiving preventive care within the medical home model) among children; however, it was unclear as to whether the potential benefits of the medical home are the same, greater, or less than the benefits for children.

35 https://medicalhomeinfo.aap.org/overview/Pages/Evidence.aspx
36 https://medicalhomeinfo.aap.org/overview/Pages/Evidence.aspx
of higher SES. Studies are needed to examine the role of SES as well as other potential modifiers of health outcomes such as a location of care (e.g., community health center-based vs. office-based), geographic location (e.g., urban vs. rural), and type of insurance (e.g., public vs. private) (Hadland & Long, 2013).

See Appendix C: Summary of Systematic Reviews for an overview of each systematic review and data on the impact and effectiveness of the medical home model of care.

“Although tempered by weak designs, inconsistent definitions and extent of medical home attributes, and inconsistent outcome measures, the preponderance of evidence supported a positive relationship between the medical home and desired outcomes, such as better health status, timeliness of care, family centeredness, and improved family functioning.”

—HOMER ET AL., 2008

NATIONAL PERFORMANCE MEASURE

Medical home as a National Performance Measure (NPM). Medical home is one of the 15 MCH NPMs. For the current year (2016 Report/2018 Application), 44 states and jurisdictions selected NPM 11, including Alabama, Alaska, American Samoa, California, Colorado, Connecticut, Delaware, Florida, Guam, Idaho, Indiana, Iowa, Kansas, Louisiana, Maine, Maryland, Massachusetts, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, North Dakota, Northern Mariana Islands, Ohio, Oregon, Palau, Pennsylvania, Puerto Rico, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, and Wisconsin. Given the large number of states and jurisdictions that chose to focus on the medical home model, it is important to identify evidence-based, evidence-informed, and promising practices related to increased usage of a medical home to further transform health care delivery and continue proliferation of the model.

The goal of NPM 11 is to increase the number of children with and without special health care needs who receive care consistent with the medical home model, as measured by the NSCH. To support evidence-based decision making and resource allocation for MCH Block Grant programs, this evidence analysis review provides detailed information about the level of evidence for different strategies to strengthen access to and utilization of the medical home in order to increase the number of children and adolescents receiving care within the medical home model.
Medical home Evidence-based or informed Strategy Measures (ESMs). Across the states and jurisdictions that chose medical home as one of the NPMs, there are 74 ESMs that have been chosen by Title V agencies to monitor progress in advancing NPM 11. Of these ESMs:

- 16 represent activities directed to professionals (e.g., training activities, technical assistance),
- 36 are directed to families and their children (e.g., outreach materials to families, family-to-family support, development of care coordination plans), and
- 22 represent activities related to systems-building (e.g., engagement of stakeholder groups, quality improvement initiatives, collaboration between systems of care).

Against a matrix of the “MCH Pyramid,”37 (See Figure B: MCH Pyramid) the conceptual framework for services of the Title V MCH Block Grant program, of the 74 ESMs that focus on NPM 11:38

- 3 measure activities related to public health services and systems (foundational level of the pyramid) and
- 71 measure strategies related to enabling services (middle level of the pyramid).
- No Title V programs are currently funding strategies related to direct services in regards to medical home (gap-filling level of the pyramid).

The MCH Evidence Center uses Results-Based Accountability (RBA)39 as a conceptual framework to track how ESMs are measured. This framework consists of increasing levels of

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37 Title V Maternal and Child Health Services Block Grant to the States Program: Guidance and Forms for the Title V Application/Annual Report (OMB No. 0915-0172; Expires 12/31/2020).
38 The conceptual framework for the services of the State Title V MCH Block Grant is envisioned as a pyramid with three tiers of services and levels of funding that provide comprehensive services. See https://mchb.tvisdata.hrsa.gov/Glossary/Glossary for a graphical representation of the pyramid.
39 RBA is described in the RBA Implementation Guide http://raguide.org/index-of-questions/
measurement across four quadrants (Quadrant 1 being the simplest measurement and Quadrant 4 being the most complex). States and jurisdictions should focus efforts in expanding how they measure programs by moving up the RBA quadrant scale.40

• 69 current medical home ESMs measure effort:
  – 40 ESMs fall within Quadrant 1 (measuring the quantity of agency effort) and answer the question “what did we do?” (e.g., counts and “yes/no” activities).
  – 29 ESMs fall within Quadrant 2 (measuring the quality of effort) and answer the question “how well did we do it?” (e.g., reach, quality of materials, satisfaction of intervention).

• 5 current medical home ESMs measure effect (e.g., increases in skills/knowledge, change in behavior or circumstance):
  – 3 ESMs fall within Quadrant 3 (measuring the quantity of the effect) and answer the question “is anyone better off?” (e.g., numbers of providers with increased knowledge).
  – 2 ESMs fall within Quadrant 4 (measuring the quality of the effect) and answer “how are they better off?” (e.g., percentages of families whose self-efficacy improved).

Details of interventions tracked through ESMs can be found through the MCH Digital Library’s evidence databases and used as models when considering new programs.41 The final section of this report, From Evidence to Action, outlines how to translate the evidence base into actionable strategies and measures and includes sample ESMs based on this report.

41  https://www.mchlibrary.org/evidence/state-esms.php
METHODS

This section describes the approach used for the evidence analysis review. It includes information on the search terms used, databases searched, inclusion and exclusion criteria, the multi-phase screening process for article review, the grey literature screening process, and the evidence continuum that was used to rate the level of evidence for the studies.

Databases and Search Terms

Studies were identified for review by searching through the PubMed, Cumulative Index of Nursing and Allied Health Literature (CINAHL Plus), and Cochrane Library databases. Search strategies varied depending on the database due to differences in controlled vocabulary, indexing, and syntax. Table 1 highlights the detailed search terms used for each database. The same overarching concepts guided the search strategies across databases: children, medical home, and components of medical home, such as comprehensive health care and patient-centered care. These components were included to capture as many relevant articles as possible given the limited evidence for strategies to ensure that children receive care consistent with the medical home model.

A staggered approach was used to review the article titles. The PubMed search was first run in May 2018 with no date restriction. Review of these article titles led to the identification of seven systematic reviews, which helped provide the foundation for the review. See Appendix C: Summary of Systematic Reviews. Studies included in the reviews ran through 2013. Therefore, 2013 was chosen as the start date for the CINAHL and Cochrane searches. These searches were run in November 2018 with a date range of 01/2013 to 11/2018.

The MCH Evidence Center staff employed a holistic view of the medical home model of care with respect to all the important and interlocking qualities that make up the medical home model and differentiates it from primary care or other services, such as family-centered care or care coordination only.42 Therefore, studies were excluded that focused on only one aspect of the medical home model.

Inclusion and Exclusion Criteria

The following inclusion criteria were used:

- Studies evaluated the effectiveness of an intervention aimed at increasing the percentage of children with and without special health care needs with access to a medical home. The components of the intervention and the results were clearly described.
- Studies focused on more than one component of a medical home. As such, studies with two or more components of the medical home model of care were included.
- Studies focused on children. If a study included both children and adults, outcomes needed to be reported for children separately.

42This approach is consistent is HRSA MCHB’s current interpretation of the components necessary for all children to qualify as having a medical home. Per the redesigned NSCH, three components are needed for all children to qualify as having a medical home: personal doctor/nurse, usual source for sick care, and family-centered care.
• The receipt of care consistent with the medical home model was one of the outcome measures.

• Studies described interventions that fall within the scope of Title V MCH Block Grant programs as deemed by the authors and reviewers.

• Studies aligned with the *Standards for Systems of Care for Children and Youth with Special Health Care Needs Version 2.0.*[^43] At a minimum, studies included a control and intervention group, an appropriate comparison group, or a pretest-posttest design to assess intervention effectiveness.

• Studies were conducted in the US given the uniqueness of the health care system and the medical home model of care.

• Studies were published in English.

• Studies were published in peer-reviewed journals. Grey literature was included as promising practices.

The following exclusion criteria were applied:

• Studies that did not include the AAP definition of medical home or described a medical home using the Joint Principles of PCMH or AHRQ definition of a PCMH.[^44] This decision was made to align with use of the AAP definition of a medical home by Title V programs.

• Studies that focused on only one component of the medical home model.

• Studies that provided data from national surveys to contextualize the need for a medical home model of care.

• Implementation focused studies without data on whether access was specifically increased.

• Studies that described physician or staff-related interventions (e.g., to increase knowledge of the medical home model) or quality improvement initiatives that did not report on increased access.

### Screening Process

A multi-phase, sequential process was used to sort and identify articles including the following steps:

• **Literature searches:**
  
  - Extensive literature searches (n=14,357) were used to identify relevant studies for a pediatric medical home.
    
    • Step 1 (unrestricted date range):
      - A PubMed search led to the identification of 13,648 articles (date run: 05/17/2018).
    
    • Step 2 (date range from 01/2013-11/2018):
      - A CINAHL search brought back 494 results (date run: 11/15/2018).


[^44]: These alternative definitions of medical home can be found in a previous footnote in the Definition section.
METHODS

- **De-duplication:**
  - The article titles were de-duplicated across the databases (n=104).

- **Article title review:**
  - An initial review of article titles across the databases highlighted 378 article titles that seemed broadly relevant to different aspects of a medical home model of care.
  - One research team member completed the initial review of article titles.
  - A second team member completed a check of every 50th excluded title to ensure that no seemingly pertinent titles were missed in the first round.
  - In the second round of article title reviews, the broadly relevant article titles were categorized into four major buckets:
    1. Systematic reviews (n=7);
    2. Access (n=82);
    3. Models (n=75); and
    4. Impact (n=106).

- **Grouping the literature:**
  - The research team began by reviewing the seven systematic reviews to get an understanding of the evidence base around the medical home model of care. This information can be found in the background section of this report.
  - Since the systematic reviews provided a broad overview of evidence for a medical home model, articles from the impact category were not reviewed in-depth for inclusion in this report.

- **Article abstract screening:**
  - Next, the abstracts for articles that seemed pertinent to increasing access to care within the medical home model and/or describing medical home models (n=157) were reviewed to enable the research team to ultimately describe how to ensure that children obtain care within a medical home model or how to increase adoption of the medical home concept to provide comprehensive care for children.
  - Abstract reviews (n=157) were conducted by two members of the team, who double checked each other’s decisions for moving onto the next round.

- **Full text review:**
  - The final step was full article review of abstracts that seemed most relevant to increasing access to care within the medical home model.
  - Full text reviews (n=89) were completed by three members of the team.
  - Team members extracted data pertaining to the study characteristics, intervention, and results.
  - Research team meetings were held to review decisions related to the full articles.
    * One meeting was dedicated to articles marked for exclusion.
    * Two meetings were focused on articles flagged as maybe or include to make final decisions about what to include in this review.
    * The Director of Research joined the meetings and the team came to consensus around all articles for inclusion and exclusion.
– Of the 89 articles that went through full review, five studies met the inclusion criteria and are included in this review as ways to increase access the medical home model to help states and jurisdictions make evidence-informed decisions for the NPM.

– Articles that did not describe interventions, did not contain sufficient data, or did not directly measure access but nevertheless presented strategies of potential value were flagged for the discussion section as strategy recommendations needing more study. There were 15 of these articles.

– In addition, 2 state programs from the grey literature were included in the discussion section as illustrative examples.

See Figure 1: Flow Chart of the Review Process and Results for a visual display of these identification, screening, eligibility, and inclusion steps.

**Grey Literature**

A search of the grey literature (Technical Assistance Centers, Discretionary Grant Information System (DGIS), the MCH Digital Library, and guided Internet/Google Scholar searches) for medical home publications by a public health librarian led to the identification of several types of resources including websites, self-published monographs and reports, state reports, conference presentations, pamphlets, and distance learning tools. Although grey literature related to access and impact/outcomes for care within the medical home model were the primary points of interest, other resources seemed critical for implementation efforts especially with regard to promising practices. One research team member reviewed and summarized the pertinent grey literature resources. These are primarily summarized in the discussion section of this review as resources to assist states and jurisdictions in increasing access to and maintaining quality of the medical home model.

**Evidence Continuum**

An evidence continuum was created\(^{45}\) to assess evidence-based and evidence-informed strategies, along with criteria for each category along the continuum. The Robert Wood Johnson Foundation (RWJF) *What Works for Health* evidence ratings\(^{46}\) were adapted to create an evidence continuum tailored toward the Strengthen the Evidence Base for MCH Programs initiative (see Table 2: Evidence Rating Criteria).

\(^{45}\) The former Strengthen the Evidence Base for MCH Programs initiative research team at JHU originally adapted the RWJF evidence ratings to create the evidence continuum for the evidence analysis reports.

\(^{46}\) http://www.countyhealthrankings.org/take-action-improve-health/what-works-health/our-ratings
The evidence ratings include:\textsuperscript{47}

<table>
<thead>
<tr>
<th>EVIDENCE RATING</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence Against</td>
<td>Studies with this rating are not good investments. These strategies have been tested in many robust studies, are not effective, and sometimes produce harmful results.</td>
</tr>
<tr>
<td>Mixed Evidence</td>
<td>Strategies with this rating have been tested more than once and results are inconsistent or trend negative; further research is needed to confirm effects.</td>
</tr>
<tr>
<td>Emerging Evidence</td>
<td>Strategies with this rating have limited research documenting effects. These strategies need further research, often with stronger designs, to confirm effects.</td>
</tr>
<tr>
<td>Expert Opinion</td>
<td>Strategies with this rating are recommended by credible, impartial experts and are consistent with accepted theoretical frameworks. However, the strategies have limited research documenting effects; further research, often with stronger designs, is needed to confirm effects.</td>
</tr>
<tr>
<td>Moderate Evidence</td>
<td>Strategies with this rating are likely to work, but further research is needed to confirm effects. These strategies have been tested more than once and results trend positive overall.</td>
</tr>
<tr>
<td>Scientifically Rigorous</td>
<td>Strategies with these ratings are most likely to make a difference. These strategies have been tested in many robust studies with consistently positive results.</td>
</tr>
</tbody>
</table>

Using an “evidence-informed” approach, a continuum of evidence model was developed to help states use the best available MCH science while also encouraging innovation in evidence-informed programming.\textsuperscript{48} Evidence-based strategies are generally those that have either moderate evidence or are scientifically rigorous, while evidence-informed are those that have emerging evidence or are based on expert opinion.\textsuperscript{49} Evidence-informed is meant to convey that there is information suggesting that a certain strategy could be effective in addressing a NPM. Even though these strategies have not been rigorously tested or evaluated, they may incorporate a theoretical model from other effective public health practices or apply a novel approach grounded in scientific theory.

More specifically, evidence-based strategies have a majority of studies showing statistically significant or favorable findings. These studies tend to be peer-reviewed with results mostly drawn from a mix of RCTs, quasi-experimental studies with pre-post measures, with or without control groups, and/or time trend analyses. Evidence-informed strategies have a growing evidence base consisting of a varying mix of statistically favorable, unfavorable, and/or not significant findings. These studies can include peer-reviewed results as well as grey literature with a mix of study designs. Evidence against is a unique category wherein strategies could be labeled as evidence-based or evidence-informed, based on the state of the research, study design, and outcomes, with the preponderance of studies not having statistically significant findings or demonstrating unfavorable effects. See Table 2: Evidence Rating Criteria to learn about the evidence criteria applied to the studies.

\textsuperscript{47} https://www.mchevidence.org/tools/

\textsuperscript{48} The former Strengthen the Evidence Base for MCH Programs initiative worked to develop a continuum of evidence consistent with the evidence-informed approach

\textsuperscript{49} This evidence-informed approach was defined by the McMaster group: McMaster University. Health Evidence Glossary. Available: http://www.healthevidence.org/glossary.aspx#E
RESULTS

Given the scarcity of studies focused on increasing access to care consistent with the medical home model, each included study in this review has been rated on its own merit.\textsuperscript{50} By providing as much detail as possible about each study focused on increasing access to a medical home model of care, states and jurisdictions can make the most informed decisions based on their socio-cultural context and resources to strengthen NPM 11. Strategies with prospective utility, but needing more study to determine effectiveness will be further highlighted in the discussion section (See also the Promising Practices section of the Medical Home Toolkit on the MCH Evidence website)\textsuperscript{51} for consideration by states and jurisdictions.

RESULTS

This section includes summaries of each of the different identified strategies to increase access to a pediatric medical home. See Appendix D: Detailed Study Descriptions for a full description of each study including the background, methods, an overview of the intervention, outcomes, and limitations. The evidence rating for each intervention is also given at the end of its description.

The five studies included in this evidence analysis review varied in terms of the intervention type, study setting, sample, design, and data sources. However, they all represent attempts by states/jurisdictions and communities to increase access to care within a medical home model for children and youth. The detailed study characteristics across the interventions are reported in Table 3: Study Characteristics, Table 4: Data Sources, Definitions, and Outcome Measures, Table 5: Intervention Descriptions, and Table 6: Study Results.

Five key findings emerged from the analysis:

1. There is limited rigorous evidence about effective interventions to increase access to a medical home for children with and without special health care needs.

2. The identified interventions were focused on all children with no strategy specifically targeting CYSHCN.

3. The studies identified partnerships and care coordination as critical mechanisms to improve access to care within the medical home model.

4. Use of community collaborators, such as school-based health centers (SBHCs) and outreach via community care coordinators, resulted in more children receiving care within the medical home model. More specifically, collaborations with SBHCs, home visiting programs, or use of enhanced care coordination in underserved, urban neighborhoods or with children in foster care led to positive outcomes. These impacts include increased contact with the medical home model for well-child visits, access to specialty care, better adherence with disease management, and dental care.

5. A shift in state policy was also found to increase access to a medical home for children receiving Medicaid. Moving from a traditional fee-for-service model of health care financing

\textsuperscript{50} This is a departure from previous evidence analysis reports where assignment to the continuum required that interventions were evaluated in 4 or more peer-reviewed studies or 3 peer-reviewed studies with expert opinion from the grey literature to speak to the public health impact of the intervention type or category.

\textsuperscript{51} https://www.mchevidence.org/tools/npm/11-medical-home.php
and delivery to a primary care case management model by a Medicaid program resulted in more targeted identification and support for children and their families to enter into a medical home model of care.

### TABLE D: Evidence-Informed Strategies to Increase Access to Care Consistent with the Medical Home Model

<table>
<thead>
<tr>
<th>TARGET AUDIENCE</th>
<th>INTERVENTION</th>
<th>EXAMPLE</th>
<th>EVIDENCE RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider/Practice and School System</td>
<td>School intervention</td>
<td>Partnership and care coordination with school-based health centers to create an expanded medical home</td>
<td>Emerging Evidence</td>
</tr>
<tr>
<td>Provider/Practice and Home Visiting Program</td>
<td>Collaboration with home visiting</td>
<td>Early connections to the medical home model through care coordination and collaboration with home visiting</td>
<td>Emerging Evidence</td>
</tr>
<tr>
<td>Provider/Practice</td>
<td>Provider alliance</td>
<td>Community outreach and coordination of primary care and specialty services to create a “one-stop” model of the medical home</td>
<td>Emerging Evidence</td>
</tr>
<tr>
<td>State</td>
<td>Statewide systems intervention</td>
<td>A statewide expanded health system for children in foster care</td>
<td>Emerging Evidence</td>
</tr>
<tr>
<td></td>
<td>Policy intervention</td>
<td>A policy intervention transitioning children from a fee-for-service model of health care to a primary care case management model</td>
<td>Emerging Evidence</td>
</tr>
</tbody>
</table>

The studies are reported below by intervention level (community, state, and policy) and then by date with the most recent studies described first.

**Evidence Rating and Evidence Continuum**

Assignments of evidence ratings are based on the results described within each individual study. Due to the scarcity of studies focused on increasing access to care within the medical home model, we were unable to group the studies by intervention type. However, we believe each study can be judged on its own merit with regard to the evidence it is contributing to the medical home research portfolio. After considering the categories on the evidence continuum and carefully considering the findings reported within each study, we believe there is *emerging evidence* for each of the interventions or strategies to increase access to care consistent with the medical home model. The figure below displays the evidence-informed interventions along the evidence continuum for NPM 11.

Although the studies differed greatly in terms of their study characteristics, each seemed to offer positive preliminary data to suggest that access to the medical home model can be effectively increased through innovative and focused community and statewide interventions. Takeaways from these studies could be used to strengthen future iterations, enhancements, and replications of these strategies. Summaries of each intervention are presented below; additional details can be found in Appendix D: Detailed Study Descriptions.

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53 The term provider refers broadly to pediatric clinicians including pediatricians, nurses, physician assistants, therapists, and others
Intervention 1. Partnership and Care Coordination with a School-Based Health Center to Create an Expanded Medical Home Model

Background
Riley et al. in “The Adolescent ‘Expanded Medical Home’: School-Based Health Centers Partner with a Primary Care Clinic to Improve Population Health and Mitigate Social Determinants of Health” (2016) described a model wherein a primary care practice partners with local SBHCs to improve access to and provide high quality of care for shared patients.

Description of Intervention
In Michigan, a planned, coordinated program of collaboration with 6 SBHCs in middle and high schools serving youth 10-21 years and a primary care center was implemented across one school year to improve access to and provide high quality care for shared high-risk patients. The SBHCs (University of Michigan Hospital and Health Systems (UMHS) Regional Alliance for Healthy Schools (RAHS)) provided comprehensive physical health services, mental health counseling, and nutrition services. RAHS also provided assistance with meeting tangible needs such as housing and food with referrals to community resource along with insurance enrollment. It is staffed by a full-time nurse practitioner, full-time social worker, half-time registered dietician, and a primary care physician (PCP) (1 half day/week). The primary care practice (UMHS Ypsilanti Health Center (YHC)) housed family medicine and pediatric clinics with 11 attending PCPs, 18 resident physicians, and additional physicians providing child psychiatry and developmental pediatrics services. Physicians at YHC were the most common PCPs listed by patients who use RAHS clinics. The expanded medical home (YHC/RAHS) focused on the partnership between SBHCs and a primary care clinic and care coordination across both entities to increase the frequency of well-child visits and associated preventive services as well as improved completeness of care for asthma and obesity.
## RESULTS

<table>
<thead>
<tr>
<th>Country</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Setting</strong></td>
<td>Michigan primary care and consortium of school-based health centers</td>
</tr>
<tr>
<td><strong>Target Sample</strong></td>
<td>Adolescents</td>
</tr>
<tr>
<td><strong>Sample Size</strong></td>
<td>n=2200 adolescents; 9338 visits</td>
</tr>
<tr>
<td><strong>Study Design</strong></td>
<td>Quasi-experimental: Non-equivalent control group; Qualitative</td>
</tr>
</tbody>
</table>
| **Data Source(s)** | • Record review of preventive health measures  
• University of Michigan Health System Quality Management Program quality measures  
• Qualitative data |
| **Outcome Measures** | Medical needs; Quality of care |
| **Comparison Group** | All patients seen at the health clinic between baseline and during the intervention period |
| **Study Period** | • Baseline: September 2013 to August 2014  
• Study period: September 2015 to June 2015 |
| **Results** | • The number of shared patients increased from an average of 16 seen per month at baseline to 24 per month during the intervention reflecting a statistically significant increase in the proportion of shared patients from 13% at baseline (192 of 1471) to 19% (240 of 1275) at follow-up.  
• Shared patients being seen in the expanded medical home model also had a higher likelihood of receiving quality metric services than patients seen at YHC only.  
• The rates of patients who had a well-child visit in the expanded medical home model compared with YHC only was statistically different during the intervention period.  
• The difference in patients meeting asthma quality measures in the expanded medical home model compared to YHC only was also notably different at baseline than during the intervention.  
• In sum, adolescents seen at both an SBHC and by a PCP had better adherence with preventive and chronic disease management quality measures at baseline than those seen by a PCP alone. These shared patients had increased frequency of well-child visits and associated preventive services, in addition to improved completeness of care for asthma and obesity.  
• When appropriate, follow-up after PCP encounters were coordinated to occur at the SBHC, decreasing time away from school and averting a potential loss of parental income to attend multiple visits. |

### Evidence Rating
The novel contribution of this study is centered around the power of care coordination between PCPs and SBHCs and guidance on how to effectively implement a partnership to increase access to care consistent with the medical home model. This patient-centered approach to providing health care services to adolescents within the community was carefully mapped out engaging teams from the SBHCs and PCPs to favor the partnership. When PCPs and local SBHCs partnered in an expanded medical home model, more adolescents obtained care and were shared between the sites. Further, adolescents in the expanded medical home model had a higher likelihood of receiving quality metric services than patients seen only in a PCP’s office.
Overall, this expanded medical home model benefited adolescent patients and their parents, PCPs, and SBHCs. A partnership-focused, care coordination strategy increased the frequency of well-child visits and associated preventive services as well as improved completeness of care for asthma and obesity. Evidence from this study contributes to growing evidence on the role of SBHCs and the impact of strategic partnerships in bolstering care coordination and access to a medical home for a greater number of adolescents. The positive data seem to most appropriately fall within the emerging evidence rating of the evidence continuum.

**Intervention 2. Early Connections to a Medical Home Model Through Care Coordination and Collaboration with Home Visiting**

**Background**

Brown et al. in “A Neighborhood-Based Approach to Population Health in the Pediatric Medical Home” (2015) described population health management within a neighborhood requiring partnerships across sectors and shared measurement across pediatric clinics to increase the percentage of infants reached by the intervention.

**Description of Intervention**

The study developed and tested a care coordination program that would begin to address poor health among children from one economically disadvantaged neighborhood. The global aim was to improve connections to the medical home and a home visiting program for all infants in a low-income neighborhood. The specific aims were, among the infants in the intervention neighborhood, 1) to improve rates of timely attendance at well-child visits during the first four months of life by 20%, 2) to increase the number of infants with confirmed enrollment in a local home visiting program, and 3) to improve communication between medical home staff and home visitors. Planning the intervention included structuring the improvement team, developing the newborn registry with a plan for proactive outreach, and partnering with a home visiting program to improve referral processes and communication. Clinic 1 conducted Plan-Do-Study-Act cycles around outreach to families for well-child care and connection with the home visiting program. Successful interventions were spread and adapted within three other clinics caring for children from the neighborhood.

Four strategies were implemented to improve connections to care within an enhanced medical home model including:

1. Designating a nurse care coordinator with protected time to make outreach calls to families (1.5 hours per 60 patients).
2. Developing automated data support systems to identify patient needs.
3. Fostering partnerships between primary care practices and community agencies to solve system- and family-level problems.
4. Creating shared care coordination and measurement processes across multiple clinics to increase the percent of the neighborhood population that is reached.
### RESULTS

<table>
<thead>
<tr>
<th>Country</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting</td>
<td>Primary care clinics and a home visiting program in a neighborhood defined by two zip codes</td>
</tr>
<tr>
<td>Target Sample</td>
<td>All children born in the intervention and comparison neighborhoods</td>
</tr>
<tr>
<td>Sample Size</td>
<td>n=237 (cumulative number of babies on a registry); n=30 (cumulative number of families enrolled in home visiting)</td>
</tr>
<tr>
<td>Study Design</td>
<td>Quasi-experimental: Non-equivalent control group</td>
</tr>
</tbody>
</table>
| Data Source(s) | • Data from the local children’s hospital’s Emergency Department (ED) was used to identify the most common primary medical providers for children from the study zip codes  
• Newborn registry data (maintained manually with a Microsoft Excel spreadsheet)  
• Electronic health record data (with an automated newborn registry)  
• Manual chart review  
• Automated report of appointment data  
• Outcome measures using clinic data  
• Process measures using clinic and home visiting agency data |
| Outcome Measures | Medical needs; Quality of care |
| Comparison Group | Second low-income neighborhood, demographically similar neighborhood |
| Study Period | • Clinic 1 baseline data: September 2010 to December 2010  
• Interventions tested: January 2011 to May 2012 |
| Results | Overall, the care coordination and neighborhood-based approach led to more timely well-child care, confirmed enrollment in home visiting, and improved communication between the clinic staff and home visitors.  
In Clinic 1:  
• The interventions led to a 30% drop in age at the first attended newborn visit among infants from the intervention neighborhood and demonstrated increased timeliness of the newborn visit (from a mean of 14.4 days to a mean of 10.1 days). Infants from the comparison neighborhood showed no reduction in variation or decrease in mean age.  
• For the 2-month well-child visits, the median percentage increase for on-time 2-month well-child visits went from 68% to 79% (a relative 16% increase). No improvement was seen among infants from the comparison neighborhood during the same time period.  
• For the 4-month well-child visit, there was a significant increase in the monthly percentage of patients in the intervention neighborhood from a median of 35% to 59% (a relative 69% increase). No improvement was seen among infants from the comparison neighborhood during the same time period.  
• A reliable process for making and tracking referrals and for establishing two-way communication between the home visiting program and clinic that led to the confirmed enrollment of 18 families in the home visiting program (out of 33 eligible families). |
RESULTS

<table>
<thead>
<tr>
<th>Results</th>
</tr>
</thead>
</table>
| In Clinic 2:  
- The pediatrician developed working relationships with the newborn discharge coordinators at the local birth hospitals to identify high-risk families and ensure adequate follow-up, which led to a reduction in variation and a decrease in mean age at newborn visit from 14.8 to 7.2 days, a 51% decrease.  
- The median percentage of on-time 2- and 4-month well-child visits remained at 80% and 60%, respectively, throughout the data collection period, and 22 families were enrolled in the Care Team Approach. |
| In Clinic 3:  
- There was a reduction in variation and mean age in days at first newborn appointment from 13.3 to 9.1, a 32% decrease.  
- There was a median of 80% on-time for the 2-month well-child visit and 40% on-time for the 4-month well-child visit.  
- Unable to demonstrate improvement in the 2- and 4-month visit timeliness during the immediate post-intervention period. |
| Clinic 4 was unable to create a system for quantitative data collection on visit adherence or home visiting enrollment specifically for infants from the intervention neighborhood. |

Evidence Rating

Neighborhood-based newborn registries, proactive nursing outreach, and collaboration with a home visiting agency aligned multiple clinics in a low-income neighborhood to improve access to health-promoting services within a medical home model. An emphasis on care coordination, partnership between a medical home and home visiting program, focus on cross-system collaboration, communication, and sharing, use of features in the EHR, and roll out of strategies during times of transitions for children and families proved effective. Lessons learned could be used by other communities to piece together similar structures to support change. Overall, this collaborative approach with its specific strategies produced positive data worthy of further inquiry with more timely well-child care and improved communication channels. Given this encouraging evidence, this study seems to fall most appropriately within the emerging evidence rating of the evidence continuum.

Intervention 3. Community Outreach and Coordination of Services Using a Provider Alliance to Create a “One-Stop” Medical Home Model

Background

Tataw et al. in “Health Services Utilization, Satisfaction, and Attachment to a Regular Source of Care Among Participants in an Urban Health Provider Alliance” (2011) reported on a pilot program looking at the effect of a provider alliance (one PCP and one specialty care group) on creating “one-stop” care within the medical home model.

Description of Intervention

The South Central Los Angeles Health care Alliance (SCHCA) was an initiative between an academic medical institution and a community primary care center for the delivery of a coordinated continuum of health services for children and families living in South Central
Los Angeles. The Alliance created a “one-stop” medical home which enrolled children and families in health programs for which they qualified, attached families to medical homes, provided primary care to children, referred families to specialty services as needed, provided clinic-based health education to families, provided case management support in order to empower families to navigate the health care, and utilized mid-level providers in pediatric primary care and sub-specialty settings. As a provider alliance, the primary care and subspecialty/specialty organizations were operationally linked for the limited purpose of implementing the utilization improvement program. The educational, service, and nonclinical case management activities were spread over the two organizations. The SCHCA was a variation of the Preventive Health Education and Medical Home Project, a contextual and predictive health services utilization improvement approach.

The SCHCA medical home model was comprised of four intervention components:

1. Health assessment and medical treatment:
   - Conducted in the pediatric primary care clinic (St. John’s Well Child Center), the central site of coordination of all aspects of the patient’s medical care.
   - Physician assistants augmented services at both primary and sub-specialty sites.

2. Clinic-based health education to families:
   - Provided by the PCP, as needed, after the patient’s initial health screening at intake.

3. Fast-track referral system between primary and sub-specialty sites:
   - Created to lessen the waiting time between the child’s first encounter with a primary care source or the ED to sub-specialty care.
   - Staff at the Department of Pediatrics facilitated a smooth transition and communication between the Department’s sub-specialty services, PCPs, and patients.

4. Non-clinical case management:
   - Implemented by trained community health workers drawn from the same community to support families as they learned to navigate the health care system.
   - SCHCA case management was composed of assessment/screening, referrals, service coordination, individualized planning, coaching, monitoring, and third-party advocacy to maintain a continuum and regular source of care.

| Country | US |
| Setting | South Central Los Angeles primary and specialty care clinics |
| Target Sample | Children between the ages of 0-18 (“or are adolescents”) who reside within the geographic area of South Los Angeles |
| Sample Size | Estimated 727,000 children in the service area; n=11,533 children reach during outreach events; n=80,000 (10% of children in service area) children attached to a medical home; n=8545 children enrolled in available payer sources |
| Study Design | Prospective quasi-experimental; Survey |
**Data Source(s)**
- A 30 item parent survey to assess parents’ perceived difficulty in accessing services and their satisfaction with the services received
- Patient database was used to collect service utilization and financial data from operational and administrative tracking instruments and reports at both the primary and specialty care sites

**Outcome Measures**
Medical needs; Satisfaction; Health care costs

**Comparison Group**
Participants who reported having a child who needed continuous medical care as compared to those who reported their child did not need such services

**Study Period**
- Data collected from telephone interviews with parents: December 1 to 31, 2003
- Children received primary and sub-specialty care: January 2002 to November 2003
- Overall program: January 2002 to December 2004

**Results**
The SCHCA pilot program resulted in the following outcomes:
- After two years of community outreach services, 404 outreach events were completed reaching 11,533 children.
- These community outreach efforts led to 80,000 children (10% of the children in the service area), who previously did not have a regular source of care being attached to a medical home and 8,545 children being enrolled in available payer sources.
- The growth in new patients for the downtown Los Angeles primary care location averaged 50% in the first two years before leveling off in the third year.
- In the Compton primary care location, the growth was about 200% annually.\(^53\)
- Sub-specialty referral completion rate increased from 25% in 2001 to 78% in 2002, and 80% in 2003 then fell to 20% in 2004.\(^54\)
- The difference between the time a pediatric sub-specialty appointment was made and the time the patient was seen reduced from four months in 2001 to two and a half months in 2002, and one month in 2003, before rising to nine months in 2004.\(^55\)
- The majority of the respondents reported less difficulty to obtain medical care (48.4%), less difficulty to obtain routine checkups for their children (58%), and less difficulty to obtain referral (48%).

The program evaluation demonstrated that:
- The majority of the respondents reported less difficulty to obtain medical care (48.4%), less difficulty to obtain routine checkups for their children (58%), and less difficulty to obtain referral (48%) compared to 12 months ago.
- The majority of respondents reported being more satisfied compared to 12 months ago with the services received for their children including general medical care (52%), routine check-up (48%), and were holding the same level of satisfaction with sub-specialty services in comparison to the last 12 months (44%).

\(^{53}\) A bonus to the program was the linkage of 20,000 adults to the medical home model of care in the last two years of the program.

\(^{54}\) The authors did not provide a detailed explanation for the drop in 2004. Based on what was shared, it seemed like the study team could not get any or enough specialty care appointments at King/Drew medical center. The program’s solution seemed to be rapid on-boarding of additional specialty care providers, many in distant locations, to meet the demand. It was unclear whether the program concluded before this solution could be fully implemented and/or evaluated.

\(^{55}\) The authors did not provide a detailed explanation for the drop in 2004. See previous footnote.
RESULTS

| Results | In comparing groups, the study team found that:  
|---------|-------------------------------------------------------------------------------------------------|
|         | • Participants who reported having a child who needed continuous medical care, compared to those who reported their child did not need such services, had higher levels of satisfaction with the services received and less difficulty accessing needed services.  
|         | • Participants who received care from places other than the community clinic (e.g., private doctors’ offices, private medical group, hospital clinic, urgent care, and emergency room) were more likely to report difficulty with making an appointment for their children to receive sub-specialty care and more likely to report that the time between receiving a referral and seeing a sub-specialty care provider was much longer in comparison to the previous 12 months. |

Evidence Rating

Participants in the program reported high levels of satisfaction with the primary and sub-specialty care they received. Levels of satisfaction did not change when sub-specialty care was provided by a physician assistant. Rather, parents overall reported greater levels of satisfaction with the care provided by a physician assistant in comparison to a physician. Parents who brought their children to St. John’s Well Child Clinics reported reduced difficulty getting a sub-specialty appointment and a reduction in time to be seen by a specialist. These survey results were confirmed using operational data patterns showing a dramatic drop in time between making an appointment and the patient being seen in the first three years of the program.

These findings add to the existing evidence in support of the positive effects of community outreach, service coordination, and use of mid-level providers on health services utilization, satisfaction with health services, and self-efficacy among vulnerable populations. An innovative contribution is the successful use of physician assistants as pediatric sub-specialty providers to expand access to services within a medical home model. These positive data from the pilot program, along with a conceptual model with enough flexibility to adapt to specific age, geographic, cultural, and resource realities, seems to most appropriately fall within the emerging evidence rating of the evidence continuum.

Intervention 4. A Statewide Expanded Health Care System for Children in Foster Care

Background

Jaudes et al. in “Expanded Medical Home Model Works for Children in Foster Care” (2012) focused on the effectiveness of a health care delivery system using the medical home model for children in foster care.

Description of Intervention

Illinois developed a statewide system of health care for children in foster care to ensure access to comprehensive and coordinated health care by recruiting a network of qualified health care providers and community agencies statewide. The HealthWorks model offers the following features for all Illinois children in foster care: (a) a medical home with coordinated delivery of comprehensive health care services; (b) continuity in the delivery of care; and (c) improvement in the health status of children in state custody. To accomplish this, the central features of the
Illinois HealthWorks model included the following: 1) recruitment, training, and support of a statewide network of PCPs committed to serving children in out-of-home placement, 2) creation of local lead agencies to obtain, organize, and maintain health records for every child entering foster care, and 3) implementation of a statewide network of community-based medical case management agencies for all children in foster care under the age of 6. By working together, the lead agencies and medical case management agencies support PCPs in carrying out their medical home responsibilities by obtaining the health history of a child newly placed in custody and facilitating coordination of care.

<table>
<thead>
<tr>
<th>Country</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting</td>
<td>Illinois statewide health system</td>
</tr>
<tr>
<td>Target Sample</td>
<td>Children in foster care between July 2001 and June 2009</td>
</tr>
<tr>
<td>Sample Size</td>
<td>n=28934</td>
</tr>
<tr>
<td>Study Design</td>
<td>Observational: Cohort study; Survey</td>
</tr>
<tr>
<td>Data Source(s)</td>
<td>Medicaid paid claims data</td>
</tr>
<tr>
<td>Outcome Measures</td>
<td>Medical needs; Quality of care; Health outcomes; Cost</td>
</tr>
<tr>
<td>Comparison Group</td>
<td>Children who received Medicaid services between July 2001 and June 2009</td>
</tr>
<tr>
<td>Study Period</td>
<td>Paid Medicaid claims: FY 2002 through FY 2009</td>
</tr>
</tbody>
</table>

Results

- The children in foster care showed levels of medical attention, though slightly lower than ideal, that were substantially higher than children from the Medicaid only group.
- Children in foster care had annual well-child visits in 85% of the cases and annual dental care encounters in 66% of the cases.
  - However, children in foster care were more likely to have general inpatient experiences (3.7% vs. 1.9%) and psychiatric inpatient episodes (7.8% vs. 0.5%).
  - Children in foster care also had more ED visits (36.1% vs. 29.7%).
  - Immunization data revealed that approximately 80% of children in foster care were current with their immunizations.
- Controlling for population differences in race and ethnicity, age, region of the state, gender, and year56 for children in foster care compared to children in Medicaid, children in foster care were:
  - 3.58 times more likely to have an Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) exam.
  - 3.2 times more likely to see a dentist.
  - 1.39 times more likely to experience a visit to the ED.
  - 1.8 times more likely to have a general inpatient stay.
  - Over 13 times more likely to have a psychiatric inpatient stay.
- Controlling for chronic conditions accounted for the fact that children in foster care have poorer health than Medicaid only children. Chronic conditions may act as a stimulus to finding and obtaining medical care.

56 Analyses were also done controlling for demographic differences. The findings demonstrated that different service patterns exist for demographic subpopulations of children with chronic conditions.
RESULTS

Evidence Rating
The results of the Illinois experience document that HealthWorks offers other states a tested approach that improves health care for children in foster care using a medical home model complemented by coordinated health services. With all children in state custody immediately granted a Medicaid card and over 2,000 PCPs committed to taking care of these children with multiple health care needs, access to care consistent with the medical home model was provided to many more children. By working together, the lead agencies and medical case management agencies supported PCPs in carrying out their “medical home” responsibilities and enhanced care coordination enabling children in foster care to receive needed preventive, primary, chronic, and dental services within an expanded medical home. It is notable that this study is the first of its kind examining the effectiveness of a statewide health care system to ensure that children in foster care obtain quality health care through a medical home model and could provide guidance for states and jurisdictions looking to improve the health status of children in foster care. In considering the positive effects of this study, the approach seems to most appropriately fit within the emerging evidence rating of the evidence continuum.

Intervention 5. Policy Intervention with a Primary Care Case Management Model

Background
Petersen et al. in “Assessing the Extent of Medical Home Coverage Among Medicaid-Enrolled Children” (2002) described a policy intervention transitioning children from a traditional fee-for-service model of health care financing and delivery to a primary care case management (PCCM) model.57

Description of Intervention
In Alabama, with the transition of the Medicaid program to a PCCM model, the study team assessed the level to which children had access to care consistent with the medical home model before and after implementation of the model. The researchers explored whether Medicaid claims data could be used to assess medical home coverage and whether the shift would affect the medical home status of Medicaid-enrolled children in the first 26 implementation counties. The study team operationally defined a true “medical home” as use of a single primary care physician, rather than multiple physicians, combined with receipt of at least one well-child visit from that physician during the year. Under the PCCM model, Medicaid-enrolled children are assigned to a PCP who agrees to take responsibility for that child’s primary and preventive care, referrals to specialty care, and any necessary care coordination. The PCP served as the focal point and gatekeeper for the child’s health care. In addition to the goal of Medicaid cost savings, the goal of PCCM was to assure children access to care within a medical home. Implementation of the transition was done on a county-by-county basis over a two-year period.

57 The definition of medical home under PCCM may not necessarily match other definitions of medical home. The study team operationally defined medical home as use of a single PCP combined with receipt of at least one well-child visit from that physician during the year.
### RESULTS

**Country** US  
**Setting** Alabama Medicaid-financed primary care  
**Target Sample** Children with Medicaid in 26 counties  
**Sample Size** n=60752 (enrolled during baseline); n=64789 (enrolled during post-implementation period)  
**Study Design** Quasi-experimental: Pretest-posttest  
**Data Source(s)** Medicaid administrative/claims data  
**Outcome Measures** Medical needs; Quality of care  
**Comparison Group** N/A  
**Study Period**  
- Baseline period: October 1995 to September 1996  
- Post-implementation period: First 12 months of implementation for each county, with the time period ranging from January 1997 to September 1998

### Results

The table highlights the provider and source of well-child care for children continuously enrolled in Alabama Medicaid before and after PCCM implementation in the 26 counties and with state baseline data included for comparison.

<table>
<thead>
<tr>
<th>Medical home status</th>
<th>26 implementation counties before PCCM, n=60,752</th>
<th>26 implementation counties after PCCM, n=64,789</th>
<th>Alabama baseline, n=253,635</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saw a primary care provider (%)</td>
<td>67.6</td>
<td>72.9</td>
<td>65.9</td>
</tr>
<tr>
<td>Single provider, well-child visit from that provider (%)</td>
<td>6.7</td>
<td>9.1</td>
<td>11.8</td>
</tr>
<tr>
<td>Multiple providers, well-child visit from one of those providers (%)</td>
<td>11.1</td>
<td>17.9</td>
<td>19.2</td>
</tr>
<tr>
<td>One or more providers, well-child visit from another source (%)</td>
<td>31.1</td>
<td>21.6</td>
<td>18.9</td>
</tr>
<tr>
<td>One or more providers, no well-child visit (%)</td>
<td>18.7</td>
<td>24.2</td>
<td>16.3</td>
</tr>
<tr>
<td>Saw no primary care provider (%)</td>
<td>32.4</td>
<td>30.6</td>
<td>33.8</td>
</tr>
<tr>
<td>No provider, well-child visit (%)</td>
<td>11.2</td>
<td>9.4</td>
<td>10.7</td>
</tr>
<tr>
<td>No provider, no well-child visit (%)</td>
<td>21.2</td>
<td>21.2</td>
<td>23.1</td>
</tr>
</tbody>
</table>

**Importantly,** the overall proportion of children seeing any PCP increased after PCCM implementation. There was an increase from 6.7% to 9.1% in the portion of children who met the definition of having a medical home, that is, those seeing only one PCP and receiving well-child care from that physician during the year.

**In addition,** there was an increase in the portion of children seeing multiple physicians and receiving well-child care from one of those physicians during the year from 11.1% to 17.9%.

**Overall,** 45.4% of children who were continuously enrolled had no identifiable well-child care visit after PCCM implementation, an increase from 39.9% who had no well-child care before the program.

**The proportion of children with no physician visits and no well-child care remained the same at 21.2%.
RESULTS

Evidence Rating
The study analysis demonstrated that it is feasible to operationalize a definition of a medical home in a way that allows it to be measured using administrative data. Some of the mixed results for the first year of implementation may have been reflective of the difficulties inherent in systems-level change. As the health care system continues to see shifts in provider availability, it will be critical for MCH leaders to track these changes to assure that children have access to PCPs to meet their health care needs. As the authors noted, “The assessment of a medical home for all children remains a challenge for the MCH field, but the measurement strategy presented here offers a solid start.”

This state example could inspire other state-supported insurance programs, private insurance companies, or managed care organizations to try to improve on the methodology and replicate the results. Importantly, the overall proportion of children seeing any PCP increased as well as those seeing only one or multiple PCPs and receiving well-child care after PCCM implementation demonstrating greater access to care within the medical home model after the transition. As a rare policy level intervention, this approach to increasing access seems to most appropriately fit within the emerging evidence rating of the evidence continuum.

DISCUSSION AND IMPLICATIONS

A majority of states and jurisdictions in the US chose NPM 11: Medical Home as a programmatic focus for the current 5-year cycle of the State Title V MCH Block Grant program. The purpose of this review was to identify evidence-informed and evidence-based interventions that State Title V programs can implement to increase the percent of children with and without special needs that receive care consistent with the medical home model.

Studies focused on positive benefits of receiving care within the medical home model
Investigations of the medical home model of care for children have primarily focused on their use and effectiveness including the impact, cost effectiveness, and quality improvement in satisfaction and service provision. There is an identified positive relationship between use of care within the medical home model and health, quality of care, and family satisfaction outcomes; however, less is known about the effect on costs. See Appendix C: Summary of Systematic Reviews. Further, marginalized populations of children (diverse racial, ethnic, and cultural groups, non-English speakers, low-resourced neighborhoods, low-income families, children with multiple disabilities or complex conditions) are less likely to receive care within the medical home model. Since health professionals and agencies have agreed that the concept has value for improvements in child and adolescent health, states and jurisdictions are increasingly concerned with how to get more children to receive care consistent with the medical home model,
particularly targeting those populations who are less likely to receive care within the model. This review focused specifically on interventions to increase access to care consistent with the medical home model for children and youth with or without special health care needs.

**Studies focused on access to care within the medical home model**

The evidenced-informed findings from studies directly measuring access indicate there is emerging evidence that the:

- Interventions of expanding or enhancing the medical home with community collaborations or policy interventions increased medical home access for children and adolescents in specific populations. See Table E: Strategies with Emerging Evidence to Increase Access to Medical Homes.

- Expanding the medical home model with community collaborations increased access for children and adolescents from low-income households.

- Using community collaborators, such as school-based health centers or outreach community-care coordinators, to focus on children and adolescents that were not yet receiving primary care who were Medicaid eligible in primarily urban areas, resulted in more of those children receiving care consistent with a medical home (Brown et al., 2015; Jaudes, et al., 2012; Riley, et al., 2016; Tataw, et al., 2011).

- Across these studies, collaborations with SBHCs, home visiting programs or using enhanced care coordination in underserved urban neighborhoods or with children in foster care led to increased contact with a medical home for well-child visits, better asthma management, and dental care.

Brown et al. (2015) found four effective strategies that impacted access:

1. Having a nurse care coordinator with dedicated time for outreach
2. Using an automated data system to identify patient needs
3. Fostering partnerships between primary practices and community agencies
4. Creating shared coordination and measurement across clinics that was implemented with fidelity.

Shifts in state policies were also found to increase access for children receiving Medicaid (Petersen, et al., 2002). Moving from a traditional fee-for-service to a primary care case management model, which would be in today’s practice a more robust care coordination model, by a Medicaid program resulted in more targeted identification and support for families to have access to care within a medical home model.
# DISCUSSION AND IMPLICATIONS

## TABLE E: Strategies with Emerging Evidence to Increase Access to Care Consistent with the Medical Home Model

<table>
<thead>
<tr>
<th>STRATEGY</th>
<th>POPULATION</th>
<th>OUTCOME</th>
<th>REFERENCE</th>
</tr>
</thead>
</table>
| Partnership with school-based health centers | Adolescents with and without special health care needs in low income neighborhoods | • Increase in well-child visits  
| Neighborhood collaboration: Care coordination and a home visiting program | Infants and young children in 2 specific low income neighborhoods by zip code | • Increase in well-child visits for infants and young children  
• Increase in home visiting program participation | Brown, et al. (2015) |
| Provider alliance with a one-stop medical home model of care | Children 0-18 in South Central Los Angeles | • Increase in new patients  
• Better sub-specialty access  
• Parent reports of less difficulty getting health care (primary care and specialty care) | Tataw, et al. (2011) |
| Statewide medical home health care system for children in foster care | Children in foster care in Illinois | • Increase in primary care  
• Increase in preventive care  
• Increase in dental care | Jaudes, et al. (2012) |
| Policy transition with Medicaid program | Children receiving Medicaid in 26 counties in Alabama | • Increase of children seeing any PCP  
• Increase in children seeing only one PCP and receiving well-child care from that physician  
• Increase in children seeing multiple physicians and receiving well-child care from one of those physicians | Petersen, et al. (2002) |

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**Studies that presented interventions with prospective utility, but require more study**

Articles that did not contain sufficient data or did not directly measure access but nevertheless presented strategies of potential value were flagged (n=15). This included expansion or enhancement strategies, partnerships, telehealth, and health provider training on the medical home model. These recommended strategies have the potential to be helpful to improve access to care consistent with the medical home model but require evaluation and further study. See Table F: Strategy Recommendations Needing More Study.
Medical home enhancements, such as using outreach coordinators or community health workers, have promise to increase interaction with a medical home and follow through with health recommendations (Berry et al., 2017; Justvig et al., 2017; Treadwell et al., 2014). Partnerships and collaborations in communities and systems of care for children are encouraging for possibly increasing first contact with and help to maintain interactions with a medical home for children who receive Medicaid, live in households where English was not the primary language, and those with complex medical conditions (American Academy of Pediatrics Council on Children with Disabilities, 2007; Galligan, et al., 2018; Madrid, et al., 2008; McPherson-Corder, 1995; Rushton, et al., 1999; Treadwell et al., 2014; Tschudy, et al, 2013).

In addition, families and adolescents indicated that telehealth and telemedicine were suitable modalities to receive information, communicate, or receive care from health or mental health care providers; however, further evaluation of these strategies is required to increase contact or sustain interactions with the medical home model of care (Herendeen et al., 2014; North, et al., 2014; Slaper et al., 2014). Practices that invested in training on the medical home model both at the practicing provider and resident levels about medical home may also have value with those providers being more likely to participate in medical home practices and use the full complement of principles that define the medical home (Butcher, et al., 2014).

58 Care coordinators in the cited studies were compensated in their role as professional staff members. However, details regarding the source of funding and compensation for care coordination activities specifically were not provided.

59 HRSA defines telehealth broadly as the use of electronic information and telecommunications technologies to support and promote long-distance clinical health care, patient and professional health-related education, public health, and health administration (https://www.healthit.gov/topic/health-it-initiatives/telemedicine-and-telehealth). Telemedicine is a subset of telehealth and refers specifically to clinical services. According to the World Health Organization (WHO), telehealth is the integration of telecommunication systems in the practice of protecting and promoting health while telemedicine is the incorporation of these systems into curative medicine (Darkins & Cary, 2000; https://www.who.int/sustainable-development/health-sector/strategies/telehealth/en/).
State Programs

Review of the grey literature and personal communication with colleagues led to the identification of two illustrative\(^{60}\) statewide programs focused on increasing access to health services for children and youth consistent with the medical home model of care.

Oregon’s coordinated care organization (CCO)\(^{61}\) is a network of health care providers who have agreed to work together in their local communities to serve people who receive health care coverage under Oregon Medicaid. CCOs have the flexibility to support new models of care that are patient-centered, team-focused, and inequities driven. CCOs have to meet state specific benchmarks, often based on the most exceptional national performance, on at least 13 of 18 measures or have at least 60% of their members enrolled in a patient-centered primary care home to receive payments from the state. Through the coordinated care model, there has been an increase in adolescent well-care visits by 47% since 2013. Additionally, the percentage of children ages 6-14 who received a dental sealant on a permanent molar in the past year continued to increase with statewide performance surpassing the aspirational benchmark in 2016. CCOs also continued to make large strides in the percentage of children who are screened for risks of developmental, behavioral, and social delays (from 21% in 2011 to over 62% in 2016). Further, the percentage of children in foster care who received mental, physical, and health assessment increased 168% in 2 years. Overall, data from Oregon’s Medicaid policy change to create better access and better care consistent with the medical home model for all children, youth, and their families is encouraging and worth considering.

Rhode Island’s Patient-Centered Medical Home – Kids (PCMH-Kids) program\(^{62}\) was created to help transform pediatric care to better address the needs of children and to function in an environment driven by value-based payment (Flanagan & Lange, 2018). It is a multi-practice, multi-payer initiative through which practices share a common contract with all payers. Transformation is supported through technical support, collaborative learning, and per-member, per-month payments to practices. Ideal pediatric care is described as integrated pediatric behavioral health, pediatric care coordination that included a multidisciplinary team such as parent consultants and social workers, and family-focused support. Following planning efforts by a small steering committee in 2013, 9 pilot pediatric practices were the first PCMH-Kids cohort and served 48,480 children (24.8% of Rhode Island’s children), 48% of whom were insured by Medicaid (Flanagan & Lange, 2018). Since 2015, the initiative has involved a total of 20 pediatric practices with 120 providers and 85 pediatric residents covering nearly 100,000 lives or nearly half of the children living in the state with another expansion underway in 2019 (Flanagan & Lange, 2018).

\(^{60}\)The Association of Maternal & Child Health Programs (AMCHP) houses a promising practices portal, Innovation Station, containing practices from other states. Use this portal to search for more statewide programs related to NPM 11: http://www.amchp.org/programsandtopics/BestPractices/InnovationStation/Pages/Innovation-Station.aspx


\(^{62}\)An issue of the Rhode Island Medical Journal (December 2018, Volume 101, Number 10) chronicled the development and implementation of this statewide initiative. There are 5 articles focused on different aspects of the program.
A fundamental need for pediatric transformation included integrating behavioral health into primary care with many of the PCMH-Kids practices incorporating social workers into their care teams to attend to the mental health issues of parents and caregivers, social-emotional challenges of young children, and school and learning issues as well as anxiety, depression, and substance use among adolescents. Through year-long learning collaboratives dedicated to pediatric-relevant behavioral health topics, screening and referral rates improved from 28% to 77% among participating practices enabling more children to access integrated behavioral health services within the PCMH model (Flanagan & Lange, 2018). Looking at quality metrics, patient and family satisfaction was high at baseline and 67% of the practices met the improvement benchmarks for customer service measures for access, communication, and office staff (Flanagan & Lange, 2018). Further, PCMH-Kids practices successfully decreased ED utilization and had a 2.5% reduction in ED usage compared to the peer group (Flanagan & Lange, 2018). Given these positive data, this is another state model worth considering.

**Additional Tools to Use**

There are many states, jurisdictions, and organizations that are using tools and initiatives to increase the number of children and youth who access and use care consistent with the medical home model. Although these have not been evaluated for efficacy specifically in increasing access, states may find the information helpful in designing their efforts and use as a basis for evaluation to add to the evidence base of what works to improve access. The National Center for Care Coordination Technical Assistance partners with the National Resource Center for Patient/Family-Center Medical Home (NRC-PFCMH) (formerly known as the National Center for Medical Home Implementation) to support the implementation and evaluation of care coordination activities in child health.

The Association of Maternal & Child Health Programs (AMCHP) houses a promising practices portal, Innovation Station, containing practices from other states. The database can be searched by NPM, level of evidence, or population and gives descriptions of the state strategies and any evaluation results. In addition, highlighted strategies from Innovation Station are included in the MCH Evidence Center NPM 11: Medical Home Toolkit. This toolkit also includes a summary of the evidence, sample ESMs, links to current ESMs in use by Title V programs, learning opportunities, and focused resources from the NRC-PFCMH and other organizations. Details about the toolkit are presented in the “From Evidence to Action” section.

**Summary**

This evidence review highlights that children and youth from marginalized groups who disproportionately experience health inequities in the US have the least access to care within the medical home model. Children and adolescents who live in low-resourced neighborhoods, in families with low-incomes, and those from traditionally marginalized racial, ethnic, and

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63 [https://medicalhomeinfo.aap.org/](https://medicalhomeinfo.aap.org/)
64 [http://www.amchp.org/programsandtopics/BestPractices/InnovationStation/Pages/Innovation-Station.aspx](http://www.amchp.org/programsandtopics/BestPractices/InnovationStation/Pages/Innovation-Station.aspx)
linguistic groups were more likely to have more barriers to access and decrease use of care consistent with the medical home model. These populations were specifically targets of interventions to increase access to care in a medical home model, especially in those studies that showed emerging evidence. State agencies and their collaborating partners can consider these strategies in terms of promoting health equity with goals and measures for target populations based on the data in their states.

The approach of this review was looking beyond the question of the effectiveness of a medical home to those interventions that increased access to care consistent with the medical home model for children and youth. This information will be valuable to states or organizations that are attempting to understand how to reach and engage more children and their families in a medical home model. Of particular importance is the need to provide family-centered care to cultivate effective two-way communication and ensure a true partnership between families and clinicians to operationalize the essential qualities of a medical home model of care. There were also several limitations to this review. Importantly, not all studies used the same definition or considered all of the components of the medical home model making comparisons weak. Few studies looked at access specifically. None of the access-focused studies used a randomized controlled design or had small sample sizes reducing the ability to generalize findings to other populations. Each state, jurisdiction, or agency will need to consider how the interventions to increase medical home access are applicable to the populations they serve and team with researchers to build the evidence base.

This review provides evidence-informed strategies for states and jurisdictions to increase access to care within the medical home model for children and youth. More information is needed about strategies that increase access for children in marginalized populations who are often the focus of state goals and measures and use of care in a medical home model. Enhancement and expansion strategies may add value to increase access, but it will be important for evidence efforts to identify the key components and mechanisms of strategies that work for different populations of children. States and jurisdictions with programs that are elucidating strategies can contribute the evidence by building in evaluation systems and sharing information about strategies that are encouraging to increase access to the pediatric medical home model.
The MCH Evidence Center developed this report as part of a series of scholarly works focused on each NPM to identify and describe evidence-based and informed strategies from peer-reviewed and grey literature. Interventions identified by this process form the cornerstone by which Title V agencies can construct programs and measures that will affect change with their unique populations and advance their NPM topic areas. As such, this is a first step in a long process for meeting National Outcome Measures (NOMs).

If you are looking to build or strengthen medical home efforts in your state or jurisdiction, moving “from evidence to action” can seem daunting. The MCH Evidence Center has developed the following framework, tips, and resources to help you through the process. We have developed resources and provide TA for you at every step of this process:

1. **Evaluate the evidence to guide your work.** Aligning programs and measures with the evidence base helps to ensure programs meet the needs of infants, children, youth, and their families and have the most potential to affect change. We invite you to read through this report to understand the way each intervention identified root causes that were preventing change, produced a new, desired behavior change, and engaged partners and resources that yielded measurable effects.

You can also access additional evidence resources through our NPM 11: Medical Home Toolkit (https://www.mchevidence.org/tools/npm/11-medical-home.php) including:
- A summary of the evidence identified by this report.
- Select promising practices as identified by AMCHP’s Innovation Station and AAP’s NRC-PFCMH.
- Current ESMs used by other states and jurisdictions to use as examples.
- Examples of ESMs that include links back to the evidence and show ways to measure effect.

2. **Use a structured approach to integrate evidence into your work and measure outcomes.** There are many effective approaches for identifying needs and developing programs to address those needs. The MCH Evidence Center uses Results-Based Accountability (RBA) as a suggested method to align program performance (performance-based accountability; e.g., measurement of ESMs) with population goals (population-based accountability; e.g. NPMs and NOMs) and improve measurement of activities.

- RBA helps to ensure that ESMs advance achievement of NPMs (and eventually NOMs) through a series of 7 performance accountability questions that address:
  - Desired impact change on a targeted group.
  - Mechanisms to deliver services effectively.
  - Ways to engage appropriate partners.
  - How to identify what specifically works to produce measurable outcomes.
• RBA works to strengthen measurement of ESMs through a 4-quadrent system to increase measurement of ESMs by addressing:
  – Quantity of the effort (what did we do? – most basic measure).
  – Quality of the effort (how well did we do it?).
  – Quantity of the effect (is anyone better off?).
  – Quality of the effect (how are they better off? – most advanced measure).

3. **Incorporate MCH principles and needs to focus your work.** We are mindful of the needs of MCH programs and the need to strategically use and document Title V resources to advance NPMs. This is done by:
   • Linking your work back to MCH priorities in that interventions developed are meaningful, measurable, and achievable.
   • Ensuring that ESMs always measure the work that is directly related to the appropriate NPM, addresses inequities to advance health equity, and is effective with multiple population groups.
   • Leveraging the resources of and coordinating with HRSA MCHB-funded centers.

To accomplish these goals, the MCH Evidence Center suggests using Harvard University’s *Frontiers of Innovation* approach to ask the following questions about evidence-based and evidence-informed interventions as you incorporate them into your work:

• **What about it works?** If we understand the key ingredients, we can replicate them.
• **How does it work?** Being specific about underlying mechanisms can help us increase impact.
• **For whom does it work, and for whom does it not work?** When we know who is and isn’t responding, we can make targeted adaptations to improve outcomes.
• **In what contexts does it work?** By evaluating the context in which a program is implemented, we can adapt it for other settings.

As you work through the process of moving from evidence to action, please reach out to our staff with questions and for technical assistance. We are available to assist you when you need help. Email us at mchevidence@ncemch.org.
FIGURES AND TABLES

FIGURE 1. FLOW CHART OF THE REVIEW PROCESS AND RESULTS

IDENTIFICATION
Records identified through database searching (n = 14,357)
- PubMed (n = 13,648)
- Cochrane (n = 215)
- CINAHL (n = 494)
Additional records identified through reference lists and expert consultation (n = 0)

SCREENING
Records screened after duplicates removed (n = 14,253)
Records excluded in title and abstract screening (n = 14,164)

ELIGIBILITY
Full-text articles assessed for eligibility (n = 89)
Full-text articles excluded due to failure to meet all inclusion criteria (n = 69)

INCLUDED
Peer-reviewed studies included (n = 20)
Gray literature included (n = 2)
Sources included in this review (n = 22)
### TABLE 1: DETAILED SEARCH STRATEGIES

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<td>#3: #1 AND #2</td>
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<tr>
<td></td>
<td>S2: TI (Medical home*) OR AB (Medical home*)</td>
</tr>
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<td></td>
<td>S3: S1 AND S2</td>
</tr>
<tr>
<td></td>
<td>S4: (MH “Community Health Services”) OR (MH “Health Services Needs and Demand”) OR (MH “Health care Delivery”) OR (MH “Primary Health care”) OR TI(“community health service” OR “community health services” OR “primary health care” OR “health service need” OR “health service needs”) OR AB(“community health service” OR “community health services” OR “primary health care” OR “health service need” OR “health service needs”)</td>
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<td>S6: S1 AND S4 AND S5</td>
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<td>S7: S3 OR S6</td>
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<td>#10 #8 and #9</td>
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<td>#16 (or #11-#15)</td>
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<td>#23 (or #17-#22)</td>
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<td>#24 #8 and #16 and #23</td>
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<td>#25 #10 or #24</td>
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## TABLE 2: EVIDENCE RATING CRITERIA

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<th>EVIDENCE CRITERIA: TYPE</th>
<th>EVIDENCE CRITERIA: STUDY RESULTS</th>
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<td>• Randomized controlled trials, and/or</td>
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<td>• Quasi-experimental studies with pre-post measures and control groups</td>
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<td>Moderate Evidence</td>
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<td>Peer-reviewed study results are drawn from a mix of:</td>
<td>Preponderance of studies have statistically significant favorable findings</td>
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<td>• Randomized controlled trials</td>
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<td>• Quasi-experimental studies with pre-post measures and control groups</td>
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<td>• Quasi-experimental studies with pre-post measures without control groups</td>
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<td>• Time trend analyses</td>
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<td>Expert Opinion</td>
<td>Grey literature</td>
<td>Experts deem the intervention as favorable based on scientific review</td>
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<td>Emerging Evidence</td>
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<td>Peer-reviewed study results are drawn from a mix of:</td>
<td>Studies with a close-to-evenly distributed mix of statistically favorable and not significant findings Only cohort studies with preponderance of statistically significant favorable findings</td>
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<td>• Randomized controlled trials</td>
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<td>• Time trend analyses</td>
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<td>• Cohort studies</td>
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<tr>
<td>Mixed Evidence</td>
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<td>Grey literature</td>
<td>Experts deem the intervention as favorable</td>
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<td>Evidence-Based or</td>
<td>Evidence Against</td>
<td>Peer-reviewed study results are drawn from a mix of:</td>
<td>Studies with a close-to-evenly distributed mix of statistically favorable, unfavorable, and/or not significant findings</td>
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<tr>
<td>Evidence-Informed</td>
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<td>• Randomized controlled trials</td>
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<td>• Quasi-experimental studies with pre-post measures and control groups</td>
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<td>Experts deem the intervention as having mixed evidence</td>
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<td>Peer-reviewed study results are drawn from a mix of:</td>
<td>Preponderance of studies do not have statistically significant findings or have statistically significant unfavorable findings</td>
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<td>Grey literature</td>
<td>Experts deem the intervention as being ineffective or unfavorable</td>
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<tr>
<td>STUDY</td>
<td>COUNTRY</td>
<td>SETTING</td>
<td>TARGET SAMPLE</td>
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<td>---------------------------------------------</td>
</tr>
<tr>
<td>Riley et al., 2016</td>
<td>US</td>
<td>Michigan primary care and consortium of school-based health centers</td>
<td>Adolescents</td>
</tr>
<tr>
<td>Brown et al., 2015</td>
<td>US</td>
<td>Primary care clinics and a home visiting program in a neighborhood defined by two zip codes</td>
<td>All children born in the intervention and comparison neighborhoods</td>
</tr>
<tr>
<td>Tataw et al., 2011</td>
<td>US</td>
<td>South Central Los Angeles primary and specialty care clinics</td>
<td>Children between the ages of 0-18 (&quot;or are adolescents&quot;) who reside within the geographic area of South Los Angeles</td>
</tr>
<tr>
<td>Jaudes et al., 2012</td>
<td>US</td>
<td>Illinois statewide health system</td>
<td>Children in foster care between July 2001 and June 2009</td>
</tr>
<tr>
<td>Petersen et al., 2002</td>
<td>US</td>
<td>Alabama Medicaid-financed primary care</td>
<td>Children with Medicaid in 26 counties</td>
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</table>
## TABLE 4: DATA SOURCES, DEFINITIONS AND OUTCOME MEASURES

<table>
<thead>
<tr>
<th>STUDY</th>
<th>DATA SOURCE</th>
<th>MEDICAL HOME DEFINITION</th>
<th>OUTCOME MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riley et al., 2016</td>
<td>• Record review of preventive health measures</td>
<td>Medical home was not defined. The authors used primary care and community collaboration as proxies for the medical home model. Primary care was defined as the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community (Institute of Medicine Committee on the Future of Primary Care, 1996).1 Fragmentation of care has led the AAP to endorse collaborations between primary care providers (PCPs) and school-based health centers (SBHCs) to enhance the delivery of care. Collaboration of community PCP with SBHCs was described as facilitating communication between primary care sites and SBHCs with collaboration being one way to simultaneously improve quality and reimbursement.</td>
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<tr>
<td></td>
<td>• University of Michigan Health System Quality Management Program quality measures</td>
<td></td>
<td>Medical needs; Quality of care</td>
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<tr>
<td></td>
<td>• Qualitative data</td>
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<tr>
<td>Brown et al., 2015</td>
<td>• Data from the local children’s hospital’s Emergency Department was used to identify the most common primary medical providers for children from the study zip codes</td>
<td>Medical home was not defined. Cited better health outcomes and a better patient experience with a patient-centered medical home. Stated that the key to improving access to high quality health care in low-income neighborhoods is to ensure that every child establishes and maintains a connection with a medical home. Stated that proactive outreach by medical homes and coordination of care across sectors could ensure timely well-child care and could provide enhanced care to infants during vulnerable care transitions. Cited literature on care coordination, case management, and population management suggesting that these strategies are more effective at delivering services to families with complex needs than traditional reactive models of health care. Patient outcomes and/or patient experiences were improved by a supportive personal relationship between the care coordinator and the patient and strong relationships for addressing the social determinants of health. Used the American Academy of Pediatrics (AAP) Policy Statement on hospital discharge for healthy term newborns with recommended medical follow-up within 72 hours.</td>
<td>Medical needs; Quality of care</td>
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<tr>
<td></td>
<td>• Newborn registry data (maintained manually with a Microsoft Excel spreadsheet)</td>
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<td></td>
<td>• Electronic health record data (with an automated newborn registry)</td>
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<td></td>
<td>• Manual chart review</td>
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<td>• Automated report of appointment data</td>
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<td></td>
<td>• Outcome measures using clinic data</td>
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<td></td>
<td>• Process measures using clinic and home visiting agency data</td>
<td></td>
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</tr>
<tr>
<td>Tataw et al., 2011</td>
<td>• A 30 item parent survey to assess parents’ perceived difficulty in accessing services and their satisfaction with the services received</td>
<td>AAP 1992 definition of the medical home model: Preventive care, acute care, continuity of care, specialty referrals, interaction with school and community, and maintenance of a database with a child’s pertinent medical information.</td>
<td>Medical needs; Satisfaction; Health care costs</td>
</tr>
<tr>
<td></td>
<td>• Patient database was used to collect service utilization and financial data from operational and administrative tracking instruments and reports at both the primary and specialty care sites</td>
<td></td>
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<tr>
<td>Jaudes et al., 2012</td>
<td>• Medicaid paid claims data</td>
<td>AAP definition of the medical home model: Accessible, family-centered, continuous, comprehensive, coordinated, compassionate, and culturally competent.</td>
<td>Medical needs; Quality of care; Health outcomes; Cost</td>
</tr>
<tr>
<td>Petersen et al., 2002</td>
<td>• Medicaid administrative/claims data</td>
<td>Operationally defined “medical home” as use of a single primary care physician combined with receipt of at least one well child visit from that physician during the year.</td>
<td>Medical needs; Quality of care</td>
</tr>
</tbody>
</table>

https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-health/interventions-resources/access-to-primary
<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention Description</th>
<th>Comparison Group</th>
<th>Study Period</th>
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</thead>
<tbody>
<tr>
<td>Riley et al., 2016</td>
<td>All patients seen at the health clinic between baseline and during the intervention period</td>
<td>In Michigan, a planned, coordinated program of collaboration with 6 school-based health centers</td>
<td>Baseline: September 2013 to September 2014, Study period: September 2015 to June 2015</td>
</tr>
<tr>
<td>Brown et al., 2015</td>
<td>Second low-income neighborhood, demographically similar neighborhood</td>
<td>The study developed and tested a care coordination program that would begin to address poor health among children from one economically disadvantaged neighborhood. The global aim was to improve quality of care, reduce costs, and increase access to timely services. The specific aims were to increase the number of infants with confirmed enrollment in the local home visiting program, improve communication and coordination among medical care providers, and increase the number of infants with confirmed enrollment in the local home visiting program. Planning the intervention included developing a referral program for home visiting, developing a plan for a multi-disciplinary model of care, and developing a plan for a multi-disciplinary model of care.</td>
<td>Clinic baseline data: September 2010 to December 2010, Interventions tested: January 2011 to May 2012</td>
</tr>
<tr>
<td>Tataw et al., 2011</td>
<td>Participants who reported having a child who needed continuous medical care as compared to those who reported their child did not need such services</td>
<td>The South Central Los Angeles Health Care Alliance (SCHCA) was an initiative between an academic medical institution and a community primary care center for the delivery of a coordinated continuum of care to children in South Central Los Angeles. The Alliance created a &quot;one-stop&quot; medical home for children which enrolled children and families in health programs for which they qualified. The Project included a &quot;one-stop&quot; medical home for children which enrolled children and families in health programs for which they qualified. The Project included a &quot;one-stop&quot; medical home for children which enrolled children and families in health programs for which they qualified. The Project included a &quot;one-stop&quot; medical home for children which enrolled children and families in health programs for which they qualified.</td>
<td>Data collected from telephone interview with parents: December 2002 to November 2003, Overall program: January 2002 to June 2006</td>
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**TABLE 5: INTERVENTION DESCRIPTIONS**

<table>
<thead>
<tr>
<th>Study</th>
<th>Comparison Group</th>
<th>Description of Intervention</th>
<th>Study Period</th>
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<td>Riley et al., 2016</td>
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<tr>
<td>STUDY</td>
<td>COMPARISON GROUP</td>
<td>DESCRIPTION OF INTERVENTION</td>
<td>STUDY PERIOD</td>
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<tr>
<td>Jaudes et al., 2012</td>
<td>Children who received Medicaid services between July 2001 and June 2009</td>
<td>Illinois developed a statewide system of health care for children in foster care to ensure access to comprehensive and coordinated health care by recruiting a network of qualified health care providers and community agencies statewide. The HealthWorks model offers the following features for all Illinois children in foster care: (a) a medical home with coordinated delivery of comprehensive health care services; (b) continuity in the delivery of care; and (c) improvement in the health status of children in state custody. To accomplish this, the central features of the Illinois HealthWorks model included the following: 1) recruitment, training, and support of a statewide network of PCPs committed to serving children in out-of-home placement, 2) creation of local lead agencies to obtain, organize, and maintain health records for every child entering foster care, and 3) implementation of a statewide network of community-based medical case management agencies for all children in foster care under the age of 6. By working together, the lead agencies and medical case management agencies support PCPs in carrying out their medical home responsibilities by obtaining the health history of a child newly placed in custody and facilitating coordination of care.</td>
<td>Paid Medicaid claims: FY 2002 through FY 2009</td>
</tr>
<tr>
<td>Petersen et al., 2002</td>
<td>N/A</td>
<td>In Alabama, the study team was interested in measuring whether or not children enrolled in and receiving health care through the state’s Medicaid program had a medical home. The Alabama Medicaid Agency began transitioning children from a traditional fee-for-service model of health care financing and delivery to a Primary Care Case Management (PCCM) model. Under the PCCM model, Medicaid-enrolled children are assigned to a PCP who agrees to take responsibility for that child’s primary and preventive care, referrals to specialty care, and any necessary care coordination. The PCP served as the focal point and gatekeeper for the child’s health care. In addition to the goal of Medicaid cost savings, the goal of PCCM was to assure children access to a medical home. Implementation of the transition was done on a county-by-county basis over a two-year period.</td>
<td>Baseline period: October 1995 to September 1996 Post-implementation period: First 12 months of implementation for each county, with the time period ranging from January 1997 to September 1998</td>
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</tbody>
</table>
TABLE 6: STUDY RESULTS

RILEY ET AL., 2016

- The number of shared patients increased from an average of 16 seen per month at baseline to 24 per month during the intervention reflecting a statistically significant increase in the proportion of shared patients from 13% at baseline (192 of 1471) to 19% (240 of 1275) at follow-up.
- In terms of the quality measures, patients seen in the expanded medical home had higher compliance with most quality metrics compared to those at the clinic only with nutrition and physical activity counseling being statistically significant.
- Adolescents seen at both an SBHC and by a PCP had better adherence with preventive and chronic disease management quality measures at baseline than those seen by a PCP alone. These shared patients had increased frequency of well-child visits and associated preventive services, in addition to improved completeness of care for asthma and obesity.
- When appropriate, follow-up after PCP encounters were coordinated to occur at the SBHC, decreasing time away from school and averting a potential loss of parental income to attend multiple visits.

BROWN ET AL., 2015

This collaborative, neighborhood-based approach led to:
- More timely well-child care,
- Confirmed enrollment in home visiting, and
- Improved communication between the medical home and home visitors.

More specifically:
- When reliably performed, outreach by care coordinators to low-income families resulted in improvement in timely newborn, 2, and 4-month visits to primary care.
- The interventions in Clinic 1 led to a 30% drop in age at the first attended newborn visit among infants from the intervention neighborhood and demonstrated increased timeliness of the newborn visit (from a mean of 14.4 days to a mean of 10.1 days). Infants from the comparison neighborhood showed no reduction in variation or decrease in mean age.
- Changes led to a median percentage increase for on-time 2-month well-child visits from 68% to 79% (a relative 16% increase). No improvement was seen among infants from the comparison neighborhood during the same time period.
- Clinic 1 saw a significant increase in the monthly percentage of patients in the intervention neighborhood from a median of 35% to 59% (a relative 69% increase). Again, no improvement was seen among infants from the comparison neighborhood during the same time period.
- Clinic 1 developed a reliable process for making and tracking referrals and for establishing two-way communication between the home visiting program and clinic that led to the confirmed enrollment of 18 families in the home visiting program (out of 33 eligible families).
- Clinic 2 saw a decrease in mean age at newborn visit from 14.8 to 7.2 days, a 51% decrease. The median percentage of on-time 2- and 4-month well-child visits remained at 80% and 60%, respectively, throughout the data collection period, and 22 families were enrolled in the Care Team Approach.
- Clinic 3 showed reduction in variation and mean age in days at first newborn appointment from 13.3 to 9.1, a 32% decrease. Clinic 3 had a median of 80% on-time for the 2-month well-child visit and 40% on-time for the 4-month well-child visit. The study team was unable to demonstrate improvement in the 2- and 4-month visit timeliness during the immediate post-intervention period.
- Clinic 4 was unable to create a system for quantitative data collection on visit adherence or home visiting enrollment specifically for infants from the intervention neighborhood.

TATAW ET AL., 2011

The SCHCA pilot program resulted in the following outcomes:
- After two years of community outreach services, 404 outreach events were completed reaching 11,533 children.
- Two years of community outreach efforts led to 80,000 children (10% of the children in the service area), who previously did not have a regular source of care being attached to a medical home and 8,545 children being enrolled in available payer sources.
- The growth in new patients for the downtown Los Angeles primary care location averaged 50% in the first two years before leveling off in the third year.
- In the Compton primary care location, the growth was about 200% annually.67
- Sub-specialty referral completion rate increased from 25% in 2001 to 78% in 2002, and 80% in 2003 then fell to 20% in 2004.68
- The difference between the time a pediatric sub-specialty appointment was made and the time the patient was seen reduced from four months in 2001 to two and a half months in 2002, and one month in 2003, before rising to nine months in 2004.69

---

67 A bonus to the program was the linkage of 20,000 adults to the medical home model of care in the last two years of the program.
68 The authors did not provide a detailed explanation for the drop in 2004. Based on what was shared, it seemed like the study team could not get any or enough specialty care appointments at King/Drew medical center. The program’s solution seemed to be rapid on-boarding of additional specialty care providers, many in distant locations, to meet the demand. It was unclear whether the program concluded before this solution could be fully implemented and/or evaluated.
69 The authors did not provide a detailed explanation for the drop in 2004. See previous footnote.
The program evaluation demonstrated that:
• The majority of the respondents reported less difficulty to obtain medical care (48.4%), less difficulty to obtain routine checkups for their children (58%), and less difficulty to obtain referral (48%) compared to 12 months ago.
• The majority of respondents reported being more satisfied compared to 12 months ago with the services received for their children including general medical care (52%), routine check-up (48%), and were holding the same level of satisfaction with sub-specialty services in comparison to the last 12 months (44%).

With regard to use of health care services consistent with the medical home model of care:
• The children in foster care showed levels of medical attention, though slightly lower than ideal, that were substantially higher than children from the Medicaid only group. More specifically:
  - Children in foster care had annual well-child visits in 85% of the cases and annual dental care encounters in 66% of the cases.
  - However, children in foster care were more likely to have general inpatient experiences (3.7% vs. 1.9%) and psychiatric inpatient episodes (7.8% vs. 0.5%).
  - Children in foster care also had more ED visits (35.1% vs. 29.7%).
• Immunization data revealed that approximately 80% of children in foster care were current with their immunizations.
• Controlling for population differences in race and ethnicity, age, region of the state, gender, and year for children in foster care compared to children in Medicaid, children in foster care were:
  - 3.58 times more likely to have an Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) exam.
  - 3.2 times more likely to see a dentist.
  - 1.39 times more likely to experience a visit to the ED.
  - 1.8 times more likely to have a general inpatient stay.
  - Over 13 times more likely to have a psychiatric inpatient stay.
• Controlling for chronic conditions accounted for the fact that children in foster care have poorer health than Medicaid only children. Chronic conditions may act as a stimulus to finding and obtaining medical care.
  - For preventive medical services, the inclusion of chronic conditions actually reduced the differences between the groups slightly, although the children in foster care still show much higher levels of care:
    • Children in foster care were three times more likely to have an EPSDT exam.
    • Children in foster care were three times as likely to see a dentist.
  - For general inpatient stays, the odds ratio was reduced from 1.83 to 1.11.
  - For psychiatric hospitalization, the control dropped in half from 13.22 to 6.05.
  - For ED visit, the odds ratio decreased from 1.39 to 1.06.

Caregivers were also surveyed about the effectiveness of the model and 95% reported that their children in foster care were in good, very good, or excellent health and 88% received a well-child visit with a pediatrician in the last year.

The overall proportion of children seeing any PCP increased after PCCM implementation. There was an increase from 6.7% to 9.1% in the portion of children who met the definition of having a medical home, that is, those seeing only one PCP and receiving well-child care from that physician during the year.
• There was also an increase in the portion of children seeing multiple physicians and receiving well-child care from one of those physicians during the year from 11.1% to 17.9%.
• Overall, 45.4% of children who were continuously enrolled had no identifiable well-child care visit after PCCM implementation, an increase from 39.9% who had no well-child care before the program.
• The proportion of children with no physician visits and no well-child care remained the same at 21.2%.
• The site of well-child care shifted away from health departments into physician offices after PCCM implementation. For children who saw no PCP after PCCM implementation, there was a shift away from use of a health department well-child care to well-child care in specialist offices and hospitals. Overall, there was a net increase of 20,537 well-child visits to physician providers and a net decrease of 20,860 well-child visits to health departments.

Analyses were also done controlling for demographic differences. The findings demonstrated that different service patterns exist for demographic subpopulations of children with chronic conditions.
REFERENCES


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APPENDICES

APPENDIX A:
Medical Home Infographic

APPENDIX B:
National Survey Overview and Findings

APPENDIX C:
Summary of Systematic Reviews

APPENDIX D:
Detailed Study Descriptions
## APPENDIX A
### MEDICAL HOME INFOGRAPHIC

**What Is a Patient-Centered Medical Home (PCMH)?**

**It’s not a place... It’s a partnership with your primary care provider.**

- PCMH puts you at the center of your care, working with your health care team to create a personalized plan for reaching your goals.
- Your primary care team is focused on getting to know you and earning your trust. They care about you while caring for you.
- Technology makes it easy to get health care when and how you need it. You can reach your doctor through email, video chat, or after-hour phone calls. Mobile apps and electronic resources help you stay on top of your health and medical history.

**As you pursue your health care journey, you may make stops at different places:**

- Behavioral & Mental Health
- Specialists
- Primary Care
- Community Supports
- Hospital
- Patient and Family
- Pharmacy

Wherever your journey takes you, your primary care team will help guide the way and coordinate your care.

**A Patient-Centered Medical Home is the right care at the right time. It offers:**

- Personalized care plans you help design that address your health concerns.
- Medication review to help you understand and monitor the prescriptions you’re taking.
- Coaching and advice to help you follow your care plan and meet your goals.
- Connection to support and encouragement from peers in your community who share similar health issues and experiences.

**Studies show that PCMH:**

- Provides better support and communication
- Creates stronger relationships with your providers
- Saves you time
- To learn more about the PCMH, visit www.pcpcc.org

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The medical home infographic was created by the Patient-Centered Primary Care Collaborative to help communicate the definition and components of the medical home model of care to patients, families, and others. It can be found on the National Resource Center for Patient/Family-Centered Medical Home website at https://www.pcpcc.org/sites/default/files/page-files/PCMH-PCPCC-Infographic.pdf.
APPENDIX B
NATIONAL SURVEY OVERVIEW AND FINDINGS

Background

The National Survey of Children’s Health (NSCH) is a cross-sectional, nationally representative sample of noninstitutionalized children ages 0 to 17 years.\(^1\) It is funded and directed by HRSA MCHB and fielded by the US Census Bureau. It produces both national and state level estimates of children’s physical and emotional health as well as information on family, community, and health care-related factors that can impact children’s health and well-being (Lichstein, Ghandour, & Mann, 2018). Among other changes, between 2012 and 2015, the NSCH was redesigned integrating two surveys (the previous NSCH and the National Survey of Children with Special Health care Needs (NS-CSHCN)) into a single, annual assessment.\(^2\) The administration of the NSCH uses an address-based sample and a self-administered, web-based or mailed paper survey instrument (Ghandour et al., 2018). The NSCH is used to measure NPM 11: Medical Home.

Due to differences in sampling methodology and modes of administration, the 2016 NSCH represents a new set of baseline data for medical home access. Further, given the differences in need and use of health care services, estimates are provided separately for CYSHCN and non-CYSHCN along with an examination of the sociodemographic and health factors associated with medical home access in each group (Lichstein, Ghandour, & Mann, 2018). The medical home composite measure includes the following 5 subcomponents: 1) having a usual source of care, 2) having a personal doctor or nurse, 3) receiving needed referrals, 4) receiving needed care coordination, and 5) receiving family-centered care. In the redesigned NSCH, children no longer have to qualify on all components in order to qualify as having a medical home. For all children to qualify as having a medical home, they need to have the three components of a personal doctor/nurse, usual source of sick care, and family-centered care. If a child needs referrals or care coordination, they also have to qualify on those components.

Recent survey data from the 2016 NSCH revealed that approximately 43.2% of CYSHCN and 50% of non-CYSHCN in the US had access to a medical home as reported by their parent or caregiver (Lichstein, Ghandour, & Mann, 2018). With regard to racial and ethnic make-up, for both CYSHCN and non-CYSHCN, the rate of reported medical home attainment was lowest among Hispanic children (36.3% and 36.1%), followed by non-Hispanic black children (38.9% and 40.2%), and it was highest among non-Hispanic white children (48.0% and 59.8%) (Lichstein, Ghandour, & Mann, 2018). Lichstein, Ghandour, & Mann (2018) also reported that children living in households in which English was not the primary language and those that were uninsured were less likely to have medical home access.

For more information and data, the Medical Home Data Portal\(^3\) provides state-by-state information about the number of children and youth, including CYSHCN, who have access

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\(^1\) https://mchb.hrsa.gov/data/national-surveys
\(^2\) https://www.childhealthdata.org/learn-about-the-nsch/NSCH
\(^3\) http://action.cahmi.org/browse/medicalhome
to a medical home in the US to enable state and family leaders to quickly obtain data on how children in each state experience receiving care within a medical home model. Users can learn about the history and development of the medical home model, get state specific data, compare medical home prevalence across states, find examples of medical home data put into action, and explore resources describing new opportunities afforded by health care reform. In addition, the Data Resource Center for Child and Adolescent Health, a project of the Child and Adolescent Health Measurement Initiative, assists in the design, development, documentation, and public dissemination of user friendly information about, data findings on, and datasets and codebooks for the NSCH. Their mission is to expedite and support effective use of data from the NSCH to improve child, youth, family, and community health and well-being in the US.

Numerous studies have been conducted using datasets from the historic national surveys, which have contributed to a greater understanding of the demographics and number of how many children have access to care within the medical home model and what barriers need to be considered when developing interventions. With the pediatric medical home model established as the standard of care for all children, it is important to understand any inequities in access or outcomes related to racial, ethnic, and cultural backgrounds, geographic differences, social and economic status (SES), insurance status, and other factors.

Summary of National Survey Findings

As the medical home model continues to grow in use and significance, there are numerous findings and implications from our review of studies using data from the historic national surveys that can help contextualize the need for and importance of the pediatric medical home model. Consistently, studies found that the following groups are less likely to have access to or receive care within the medical home model:

- CYSHCN (compared to non-CYSHCN):
  - Although among CYSHCN, access varied by the quantity and type of health condition
- Racial/ethnic minorities (compared to white children):
  - Although access to individual components of the medical home model varied substantially by group
- Children in economically marginalized families or neighborhoods (compared to children above specified multiples of the poverty line)
- Children with public health insurance (compared to children with private health insurance).

These findings not only point to the need for greater access to the medical home model of care for different groups of children and their families, but also provide critical information and recommendations to inform future interventions and research efforts.

The following studies of cross-sectional, national survey data passed abstract review for topic relevancy, but were excluded after the full-text review on the basis that they did not attempt

74 http://action.cahmi.org/browse/medicalhome
75 https://www.childhealthdata.org/home
76 https://www.childhealthdata.org/home
an intervention. Most studies of national survey data that passed the abstract-level exclusion review focused on the prevalence of medical homes among various groups. Some focused on each individual component of a medical home instead of or in addition to an integrated definition of the medical home model. The remaining studies mostly focused on narrower details, such as likelihood of having unmet health care needs, quality of care received, access to just one individual PCMH component (e.g., care coordination), or very narrow population groups. With few exceptions, most studies focused on results from a single cross-sectional study and made no comparison to previous results.


<table>
<thead>
<tr>
<th>CATEGORY OF ISSUE ADDRESSED</th>
<th>STUDIES INCLUDED</th>
<th>FINDINGS BY POPULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of a medical home/Access to a medical home/Likelihood of having a medical home</td>
<td>Lichstein, Ghandour, &amp; Mann (2018); Knapp, Woodworth, Fernandez-Baca, Baron-Lee, Thompson, &amp; Hinojosa (2013); Zickafoose &amp; Davis (2013); Zickafoose, Gebremariam &amp; Davis (2012); Zickafoose, Gebremariam, Clark, &amp; Davis (2011); DeCamp, Choi &amp; Davis (2011); Mulvhill, Altarac, Swaminathan, Kirby, Kulczcki, &amp; Ellis (2007); Barradas, Kroelinger &amp; Kogan (2012); Aysola, Orav &amp; Ayanian (2011); Sheldrick &amp; Perrin (2010); Park, Tan, Patel, Reiff, Balkrishnan, &amp; Chang (2014); Conrey, Seidu, Ryan, &amp; Chapman (2012); Singh, Strickland, Ghandour, &amp; van Dyck (2009); Fulda, Lykens, Bae, &amp; Singh (2008); Diao, Tripodis, Long, &amp; Garg (2017); Baron-Lee, Bonner, Knapp, Bright, &amp; Hinojosa (2015)</td>
<td>Populations of children less likely to have a medical home/risk factors associated with lower access to medical home: CYSHCN. CYSHCN with behavioral health conditions. CYSHCN with mental disorders. CYSHCN with Autism Spectrum Disorder specifically. Publicly insured children (exact proportions varied by state) (primarily driven by disparities in family-centered care). Latino children with a Spanish-language parental interview. The children of some individual states (varies). American Indian and Alaska Native children (except in Arizona). Children who are adolescent, uninsured, black, live at or near the federal poverty level, in a household where no one completed high school, have less than excellent or good health, and/or live in a nontraditional family structure. Children from less socially cohesive neighborhoods, less safe neighborhoods, or neighborhoods with fewer amenities. Economically vulnerable children. Children in families or environments that experienced adverse childhood events.</td>
</tr>
<tr>
<td>Quality of care/Components of a medical home</td>
<td>Litt &amp; McCormick (2018); Raphael, Guadagnolo, Beal, &amp; Giradino (2009); Stevens, Seid, Pickering, &amp; Tsai (2009); Miller (2014); Strickland, Singh, Kogan, Mann, van Dyck, &amp; Newacheck (2011); Strickland, McPherson, Weismann, van Dyck, Huang, &amp; Newacheck (2011); Jalles &amp; Thomas (2018); Belue, Degboe, Miranda, &amp; Francis (2012)</td>
<td>Populations less likely to receive individual components of a medical home, or likely to have a lower quality medical home: Preterm children. CYSHCN. CYSHCN enrolled in CHIP or Medicaid. Racial/ethnic minority children (though prevalence of each component varies significantly among minorities). Children of families with income &lt;200% of federal poverty level. Uninsured children. Children living in a family where English is not primarily spoken as the primary language. Children living in a household where no adult has graduated from high school. Children of immigrant families.</td>
</tr>
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</table>

77 From Lichstein, Ghandour, & Mann (2018) article only. Other studies using the 2016 NSCH were not identified during the database searches in May and November 2018.
### APPENDIX B

<table>
<thead>
<tr>
<th>CATEGORY OF ISSUE ADDRESSED</th>
<th>STUDIES INCLUDED</th>
<th>FINDINGS BY POPULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmet health care needs</td>
<td>Bennett, Rankin, &amp; Rosenberg (2012); Miller, Nugent, Gaboda &amp; Russell (2013); Cheek-Zamora &amp; Farmer (2014)</td>
<td>Access to a medical home associated with lower likelihood of having unmet health care needs. Populations of children likely to report unmet health care or medical needs: Black CYSHCN. CYSHCN without a medical home.</td>
</tr>
<tr>
<td>Associations between having a medical home and health service use and expenditures</td>
<td>Romaire, Bell &amp; Grossman (2012)</td>
<td>An estimated 46% of children had a medical home. Children in a medical home had a greater incidence of preventive visits and dental visits and a lower incidence of ED visits compared with children without a medical home. Despite greater odds of incurring certain expenditures, expenditures were no different for children with and without a medical home.</td>
</tr>
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### APPENDIX C

**SUMMARY OF SYSTEMATIC REVIEWS**

**Methods and Inclusion Criteria**

An initial review of article titles and additional review of federal resources led the MCH Evidence Center research team to identify seven systematic reviews (Hadland & Long, 2013; Homer et al., 2008; Jackson et al., 2013; Rogers & Zeni, 2015; Rosenthal, 2008; Williams et al., 2012, and Zutshi et al., 2013) related to the medical home model that primarily examined their impact and effectiveness. The date range for the studies across the systematic reviews spanned the following years: 1975-2013. While not specifically US based, the reviews also included studies from the following countries: Canada, United Kingdom, Norway, Netherlands, Israel, and France.

Two of the seven reviews focused on children and one focused on adolescents of transition age. Six of the reviews included CYSHCN while one review did not specify the populations served. While all seven reviews included children, for the remaining reviews that were primarily adult focused, it was oftentimes difficult to parse out findings exclusively for a pediatric medical home. Across the seven reviews, 133 studies were selected for inclusion based on criteria set by each review team. The vast majority of articles were peer reviewed. Forty-nine of the studies were randomized control trials (RCTs) and the remaining were comparison or non-comparison group, prospective cohort (longitudinal), cross-sectional (survey design), and observational.

It is important to note that none of the reviews, or studies included within them, examined the medical home model in its entirety with all 7 components measured (Medical Home Initiatives for Children with Special Needs Project Advisory Committee, AAP, 2002). Currently, there is

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78 Inclusion criteria differed for each systematic review. For example, inclusion criteria for Homer et al. 2008 specified that studies needed to be quantitative, focused on populations of CYSHCN aged 0 to 18 years of age residing in the US, published between 1986 and November 2006 in a peer-reviewed journal that included abstracts, written in English, and based on primary or secondary data analysis. Further, studies could include adults but were required to report data on children separately.
no method to quantitatively measure all aspects of the medical home model of care. Given the complexity, early research tended to examine separate components of the medical home model. Although there are measures of the medical home concept that incorporate multiple aspects of a medical home, these studies are not comprehensive with regard to the definition of medical home. Even the measures of medical home that exist, such as use of the NSCH by HRSA MCHB, do not fully capture all aspects of a medical home. They do, however, quantitatively capture what is believed to be the core aspects of the medical home model of care. Interestingly, there have been efforts such as the development of the Medical Home Index (MHI)\textsuperscript{79} by the Center for Medical Home Improvement to quantify the “medical homeness” of a primary care practice. “The MHI contains twenty-five indicators which detail excellent, pro-active, comprehensive pediatric primary care.”\textsuperscript{80} Hopefully, more efforts will be made in future endeavors to study the entirety of the medical home model to better understand its unique impact for children, youth, and their families.

**Summary**

The systematic reviews focused on children are described first chronologically by year beginning with the most recent review. Although the other reviews included children, most of the included studies were adult focused, making it difficult to extrapolate findings to the pediatric medical home. Therefore, those reviews are described separately as they are not as applicable to our work focused on the medical home model of care for children with and without special health care needs.

\textsuperscript{79} https://medicalhomeinfo.aap.org/tools-resources/Documents/CMHI-MHI-Pediatric_Short-Version.pdf

\textsuperscript{80} https://medicalhomeinfo.aap.org/tools-resources/Documents/CMHI-MHI-Pediatric_Short-Version.pdf
## CHILD-FOCUSED REVIEWS

<table>
<thead>
<tr>
<th>OBJECTIVE</th>
<th>DEFINITION OF MEDICAL HOME</th>
<th>CONCLUSIONS</th>
<th>LIMITATIONS</th>
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<tbody>
<tr>
<td>To review medical home models for transitioning adolescents living with autism spectrum disorder (ASD) from pediatric primary health care practices to adult primary care practices</td>
<td>“Where health care services are accessible, family-centered, continuous, comprehensive, coordinated, and compassionate” with the medical home model considered the standard of care for all children</td>
<td>The results support the need to establish care consistent with the medical home model for children and adolescents living with ASD and conduct outcomes research to evaluate the effectiveness of transition interventions with the goal of seamless care delivery models into young adulthood. Based on the four included articles: • Golnik et al. (2012) had positive outcomes for children in an ASD medical home with the medical home model of care being effective in addressing health care issues • Park et al. (2011) addressed the need for care within a medical home model and transitions in health care although not specific to ASD, yet findings emphasize increase with mental health conditions • Watson et al. (2011) stressed the need to develop transition health care model for adolescents and young adults with complex health needs • The AAP (2011) described the health care transition (HCT) model that can be utilized with all adolescents transitioning into medical homes, including ASD.</td>
<td>None of the articles addressed medical home models to transition adolescents living with ASD into adult primary health care services.</td>
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<table>
<thead>
<tr>
<th>OBJECTIVE</th>
<th>DEFINITION OF MEDICAL HOME</th>
<th>CONCLUSIONS</th>
<th>LIMITATIONS</th>
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<tbody>
<tr>
<td>To assess the evidence associating the medical home with beneficial health outcomes among healthy children</td>
<td>AAP definition of medical home 1. Accessibility, 2. Family-centeredness, 3. Continuity, 4. Comprehensiveness, 5. Coordination, 6. Compassion, and 7. Cultural effectiveness</td>
<td>Based on the nine included studies, the data are encouraging demonstrating beneficial health outcomes among healthy children. The data describe a broadly positive association among healthy children between the medical home and beneficial outcomes in multiple arenas of child health, namely: • primary care services (improved rates of immunizations up-to-date status, increased delivery of anticipatory guidance, and solicitation of parental concerns) • health care utilization (decreased ED utilization and increased receipt of preventive care) • child well-being (improved health-related quality of life and fewer missed days at school)</td>
<td>Although, based on data analyzed, the medical home is associated with beneficial health outcomes among healthy children, the evidence is limited in comparison with that for CYSHCN.</td>
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The impact of a medical home for CYSHCN: Homer et al. (2008)

<table>
<thead>
<tr>
<th>OBJECTIVE</th>
<th>DEFINITION OF MEDICAL HOME</th>
<th>CONCLUSIONS</th>
<th>LIMITATIONS</th>
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</thead>
<tbody>
<tr>
<td>To determine the evidence for the Federal HRSA MCHB recommendation that CYSHCN receive ongoing comprehensive care within a medical home</td>
<td>AAP definition of medical home 1. Accessibility, 2. Family-centeredness, 3. Continuity, 4. Comprehensiveness, 5. Coordination, 6. Compassion, and 7. Cultural effectiveness</td>
<td>Based on the 30 included studies, the preponderance of evidence supported a positive relationship between the medical home and desired outcomes, such as better health status, timeliness of care, family centeredness, and improved family functioning. The evidence provides moderate support for the hypothesis that a medical home improves health-related outcomes for CYSHCN.</td>
<td>Additional studies with comparison groups encompassing all or most of the attributes of the medical home need to be undertaken.</td>
</tr>
</tbody>
</table>
### Primarily Adult-Focused Reviews

<table>
<thead>
<tr>
<th>Objective</th>
<th>Definition of Medical Home</th>
<th>Conclusions</th>
<th>Limitations</th>
</tr>
</thead>
</table>
| The short- and long-term benefits of PCMH models: Jackson et al. (2013) | AHRQ definition of a PCMH including 1. Team based, 2. Organization of care (having at least 2 of the following elements: enhanced access, coordinated care, comprehensiveness, system-based approach to improving quality, and safety), 3. Sustained partnership and personal relationship over time, and 4. Structural changes to traditional care reorganizing care delivery | Based on the 19 comparative studies (12 studies were non-comparative studies describing aspects of PCMH interventions), PCMH interventions had a small positive effect on patient experiences and small to moderate positive effects on the delivery of preventive care services (moderate strength of evidence).  
• Staff experiences were also improved by a small to moderate degree (low strength of evidence)  
• Evidence suggests a reduction in ED visits but not hospital admissions in older adults.  
• There is no evidence for overall cost savings; however, older adults had lower ED utilization and savings may occur with lengthy exposure to PCMH | In this review, children, including CYSHCN, were not represented enough to make the conclusions unique to them from the studies |
| Evidence on the effectiveness of PCMH: Zutshi et al. (2013) | AHRQ definition of a PCMH including 1. Team based, 2. Organization of care, 3. Sustained partnership and personal relationship over time, and 4. Structural changes to traditional care reorganizing care delivery. The authors required three or more of the five medical home components defined by AHRQ (delivering care that is 1. patient-centered, 2. comprehensive and team-based, 3. coordinated, 4. accessible, and 5. systems-based in its approach to quality and safety) | Based on the 12 interventions reviewed, many of which are often cited in support of the medical home, are best viewed as precursors to the medical home  
• While these early interventions varied, most essentially tested the addition of a care manager operating from within the primary care practice, rather than a fundamentally transformed practice  
• Most interventions were evaluated in practices that were part of larger delivery systems and targeted patients who were older and sicker than average.  
However, the authors found some favorable effects on quality of care, hospital and ED use, and patient or caregiver experience.  
• There were some unfavorable effects on costs. | • This review mostly covered adults and reported no statistically significant results  
• Although the PCMH is a promising innovation, rigorous quantitative evaluations and comprehensive implementation analyses are needed to assess effectiveness and refine the model to meet stakeholders’ needs |
### PRIMARILY ADULT-FOCUSED REVIEWS

<table>
<thead>
<tr>
<th>Evaluation of PCMH models and the state of the science: Williams et al. (2012)</th>
<th>AHRQ definition of a PCMH including 1. Team based, 2. Organization of care (having at least 2 of the following elements: enhanced access, coordinated care, comprehensiveness, system-based approach to improving quality, and safety), 3. Sustained partnership and personal relationship over time, and 4. Structural changes to traditional care reorganizing care delivery</th>
<th>Based on the 17 included studies, the authors found some evidence for decreased ED usage as well as small improvements to patient and staff experience • However, none of the studies on clinical outcomes included children; most studies covered older adults. • No studies reported statistically significant cost savings among PCMH patients.</th>
<th>• Only four studies included children • Only two studies included CYSHCN • No studies on clinical outcomes included children • Most studies covered older adults • No studies reported statistically significant cost savings among PCMH patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence supporting the principles of a medical home: Rosenthal (2008)</td>
<td>AAFP, ACP, AOA, and AAP Joint Principles of the PCMH when describing medical homes</td>
<td>• Based on the 30 included studies, evidence from multiple settings and several countries supports the ability of the medical home model of care to advance societal health • A combination of fee-for-service, case management fees, and quality outcome incentives effectively drive higher standards in patient experience and outcomes. • Patients who have a continuous relationship with a personal care physician have better health process measures and outcomes, • Multiple visits over time with the same provider create renewed opportunities to build management and teaching strategies tailored to individual progress and receptivity, • Minorities become as likely as non-minorities to receive preventive screening and have their chronic conditions well managed in a medical home model, • In primary care, patients present at most visits with multiple problems, • Specialists generate more diagnostic hypotheses within their domain than outside and assign higher probabilities to diagnosis within that domain, and • The more attributes of the medical home demonstrated by a primary care practice, the more likely patients are to be up-to-date on screening, immunizations, and health habit counseling, and the less likely they are to use emergency rooms.</td>
<td>• This review provided more of a scoping review of the principles of a medical home and the quality of the literature supporting each principle • It also did not focus exclusively on children</td>
</tr>
</tbody>
</table>
Outcomes. Overall, the evidence base on the pediatric medical home model of care is emerging to indicate a positive relationship between access to and utilization of the model and desired outcomes. Such outcomes include improved health, improved quality of life, and increased satisfaction for children and families. Data from the three child-focused systematic reviews (Hadland & Long, 2013; Homer et al., 2008; Rogers & Zeni, 2015) found that a medical home is generally associated with increased provision of preventive services, decreased unmet medical needs, improved timeliness of care, improved quality of care, enhanced health outcomes and health status, and increased family satisfaction.

There is mixed evidence, however, regarding costs that requires further examination. For instance, although children in a medical home may be less likely to seek care in the Emergency Department (ED), considerations such as paying for a dedicated nurse care coordinator could lead to increased costs. In another example, Homer et al. (2008) cited one RCT targeting high-risk infants where participants received acute care, well-child care, and social services within the medical home model (Broyles et al., 2000). Fifty-seven percent fewer infants in this intervention group were admitted into the intensive care unit (ICU) and infants who were admitted to the ICU spent 42% fewer days there (Broyles et al., 2000). The increase in follow-up costs was offset by the decrease in ICU costs but did not result in overall costs savings (Broyles et al., 2000).

Further, Hadland and Long (2013) stated that evidence exists suggesting that SES affects immunization outcomes (a proxy measure for receiving preventive care within the medical home model) among children; however, it was unclear as to whether the potential benefits of the medical home are the same, greater, or less than the benefits for children of higher SES. Studies are needed to examine the role of SES as well as other potential modifiers of health outcomes such as a location of care (e.g., community health center-based vs. office-based), geographic location (e.g., urban vs. rural), and type of insurance (e.g., public vs. private) (Hadland & Long, 2013).

Across the child-focused systematic reviews, general statements on impact of the medical home model can be made and are summarized in the following tables.
## TABLE A: IMPACT OF A MEDICAL HOME ON MEDICAL NEEDS, QUALITY OF CARE, HEALTH OUTCOMES, AND HEALTH STATUS

<table>
<thead>
<tr>
<th>OUTCOMES</th>
<th>STUDIES</th>
<th>REVIEWS</th>
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<tbody>
<tr>
<td><strong>Primary Care Services and Preventive Medical Care</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>↑ More likely to receive anticipatory guidance</td>
<td>Romaine &amp; Bell, 2010</td>
<td></td>
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<tr>
<td>↑ More likely to receive developmental screening</td>
<td>Guerrero, Rodriguez &amp; Flores, 2011</td>
<td></td>
</tr>
<tr>
<td>↑ More likely to achieve full immunization status (1 in 4 studies)</td>
<td>Allred, Wooten &amp; Kong, 2007; Ortega et al., 2000; Santoli et al. 1999; and Roberts &amp; Mitchell, 1990</td>
<td></td>
</tr>
<tr>
<td>↑ Less likely to have unmet medical needs</td>
<td>Strickland et al., 2011</td>
<td></td>
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<tr>
<td><strong>Health care Utilization</strong></td>
<td></td>
<td></td>
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<tr>
<td>↑ Decreased frequency of primary care physician (PCP) visits</td>
<td>Farmer, Clark, Sherman, Marien, &amp; Selva, 2005</td>
<td>Homer et al. 2008</td>
</tr>
<tr>
<td>↑ Decreased frequency of specialty visits</td>
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<tr>
<td>↑ Improved access to mental health services</td>
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<tr>
<td>= No difference in acute service use in a comparison study examining the effects of an asthma-focused breakthrough collaborative series</td>
<td>Mangione-Smith et al., 2005</td>
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<tr>
<td><strong>Emergency Department (ED)</strong></td>
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<tr>
<td>↑ Decreased ED risk with each asthma-related PCP visit in children seen at a large multi-specialty group</td>
<td>Lafata, Xi, &amp; Divine, 2002</td>
<td>Homer et al., 2008</td>
</tr>
<tr>
<td>= No association was found between having a usual source of care and ED visits for children with asthma</td>
<td>Kieckhefer, Greek, Joesch, Kim, &amp; Baydar, 2005</td>
<td>Homer et al., 2008</td>
</tr>
<tr>
<td><strong>Hospitalization</strong></td>
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<tr>
<td>↑ Fewer hospitalizations but no change in ED visits for a pediatric alliance for coordinated care intervention with a nurse practitioner visiting children with severe needs at home</td>
<td>Palfrey et al., 2004</td>
<td>Homer et al., 2008</td>
</tr>
<tr>
<td>↑ Decreased annual hospital admissions and median hospital length of stay for a care coordination expansion study</td>
<td>Liptak, Burns, Davidson, &amp; McAnarney, 1998</td>
<td>Homer et al., 2008</td>
</tr>
<tr>
<td>= No protective effect with regard to preventable hospitalization</td>
<td>Gadomski, Jenkins &amp; Nichols, 1998</td>
<td>Hadland &amp; Long, 2013</td>
</tr>
<tr>
<td><strong>Medication Use</strong></td>
<td></td>
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<tr>
<td>= No differences in appropriate asthma medication use</td>
<td>Homer et al., 2005</td>
<td>Homer et al., 2008</td>
</tr>
<tr>
<td>TABLE A: IMPACT OF A MEDICAL HOME ON MEDICAL NEEDS, QUALITY OF CARE, HEALTH OUTCOMES, AND HEALTH STATUS</td>
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<tr>
<td><strong>Timeliness of Care</strong></td>
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<td>↑ More timely return of telephone calls as reported by parents</td>
<td>Palfrey et al., 2004</td>
<td>Homer et al., 2008</td>
</tr>
<tr>
<td>↑ More children receiving asthma care from their PCP were able to get a same-day appointment and received after-hours telephone contact than those receiving asthma care from the ED</td>
<td>Dinkevich, Cunningham &amp; Crain, 1998</td>
<td></td>
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<tr>
<td>↑ More likely to seek or receive care (instead of delaying or foregoing care)</td>
<td>Strickland et al., 2004</td>
<td></td>
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<tr>
<td>↑ Higher rates of delayed or foregone care were associated with lower ratings of family-centered care (e.g., provider spends enough time, listens) by families</td>
<td>Smaldone, Honig &amp; Byrne, 2005</td>
<td></td>
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<tr>
<td><strong>Quality of Care</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>↑ Improved asthma process of care</td>
<td>Mangione-Smith et al., 2005</td>
<td>Homer et al., 2008</td>
</tr>
<tr>
<td>↑ Increased ease of service use was associated with family centered care factors and having a medical home</td>
<td>Ngui &amp; Flores, 2006; baruffi, Miyashiro, Prince, &amp; Heu, 2005</td>
<td></td>
</tr>
<tr>
<td><strong>Health Outcomes, Health/Functional Status, and Quality of Life</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>↑ Higher health-related quality of life (including higher physical health, emotional health, social functioning, and school/daycare functioning), missing &lt;3 days of school due to illness, and with improved overall school performance (including reading and math)</td>
<td>Stevens, Vane &amp; Cousineau, 2011</td>
<td>Hadland &amp; Long, 2013</td>
</tr>
<tr>
<td>↑ Fewer parents of children participating missed &gt;20 work days after the intervention, but no difference was found in missed school days</td>
<td>Palfrey et al., 2004</td>
<td>Homer et al., 2008</td>
</tr>
<tr>
<td>↑ A decrease in missed school days was found after an intensive care coordination intervention targeting rural families</td>
<td>Farmer, Clark, Sherman, Marien, &amp; Selva, 2005</td>
<td></td>
</tr>
<tr>
<td>↑ Fewer asthma symptom days per year and higher reduction of oral steroid bursts per year for children in the intervention group</td>
<td>Lozano et al., 2004</td>
<td></td>
</tr>
<tr>
<td>↑ Fewer infants receiving an acute and chronic care intervention had life threatening illnesses</td>
<td>Broyles et al., 2000</td>
<td></td>
</tr>
<tr>
<td>↑ Higher scores on a child mental health measure at 4-5 years follow-up</td>
<td>Stein &amp; Jessop, 1991</td>
<td></td>
</tr>
<tr>
<td>= No impact on illness status or missed school days for a community-based care coordination intervention</td>
<td>Smith, Layne &amp; Garrell, 1994</td>
<td></td>
</tr>
<tr>
<td>= No impact on missed school/work days or agonist prescriptions for an asthma-focused study</td>
<td>Mangione-Smith et al., 2005</td>
<td></td>
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<tr>
<td>= No difference in asthma exacerbations</td>
<td>Finkelstein et al., 2005</td>
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↑ positive outcome, = neutral outcome
### TABLE B: IMPACT OF A MEDICAL HOME ON FAMILY SATISFACTION

<table>
<thead>
<tr>
<th>OUTCOMES</th>
<th>STUDIES</th>
<th>REVIEWS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Family Centeredness</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>↑ Families significantly more likely to feel that their provider listened to their concerns</td>
<td>Jessop &amp; Stein, 1994</td>
<td>Homer et al., 2008</td>
</tr>
<tr>
<td>↑ Families were more likely to receive self-management education, a written action plan, instruction on inhaled medication use, peak flow measurement, and collaborative goal setting, but were not more satisfied with services after an asthma-focused intervention</td>
<td>Mangione-Smith et al., 2005</td>
<td></td>
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<tr>
<td>↑ More families who received coordinated care responded positively to ease of use of community services</td>
<td>Baruffi et al., 2005</td>
<td></td>
</tr>
<tr>
<td><strong>Family Satisfaction</strong></td>
<td></td>
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<tr>
<td>↑ Families seeing physicians participating in a family-centered care educational program reported higher rates of satisfaction both immediately after and 2 years after the intervention</td>
<td>Clark et al., 1998; Clark et al., 2000</td>
<td>Homer et al., 2008</td>
</tr>
<tr>
<td>↑ Parent-provider relationship was associated with smooth transition into adult health care and satisfaction</td>
<td>Denboba et al., 2006</td>
<td></td>
</tr>
<tr>
<td>↑ Ratings on 4 of 5 family-centeredness factors were associated with satisfaction</td>
<td>Ngui &amp; Flores, 2006</td>
<td></td>
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<tr>
<td><strong>Family Functioning</strong></td>
<td></td>
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<tr>
<td>↑ Family strain and need for financial and social support was lower</td>
<td>Farmer, Clark, Sherman, Marien, &amp; Selva, 2005</td>
<td>Homer et al., 2008</td>
</tr>
</tbody>
</table>

↑ positive outcome

### TABLE C: IMPACT OF A MEDICAL HOME ON COSTS

<table>
<thead>
<tr>
<th>OUTCOMES</th>
<th>STUDIES</th>
<th>REVIEWS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emergency Department</strong></td>
<td></td>
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<tr>
<td><strong>Hospitalization</strong></td>
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<tr>
<td>↑ Decrease in inpatient costs immediately after the implementation of a hospital-based primary care intervention did not offset an increase in outpatient costs to the hospital resulting in overall increased hospital costs</td>
<td>Berman, Rannie, Moore, Elias, Dryer, &amp; Jones, 2005</td>
<td>Homer et al., 2008</td>
</tr>
<tr>
<td><strong>Enhanced Care Coordination</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>↑ Resources to enhance care coordination in specialty programs at a children’s hospital had a positive impact on cost; however, significance was not measured</td>
<td>Liptak, Burns, Davidson, &amp; McAnarney, 1998</td>
<td>Homer et al., 2008</td>
</tr>
<tr>
<td>= No impact on cost was found in a community-based care coordination randomized control trial study</td>
<td>Smith, Layne, &amp; Garell, 1994</td>
<td></td>
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</tbody>
</table>

↑ positive outcome, = neutral outcome
APPENDIX D
DETAILED STUDY DESCRIPTORS

Intervention 1. Partnership and Care Coordination with a School-Based Health Center to Create an Expanded Medical Home Model

Background
Riley et al. in “The Adolescent ‘Expanded Medical Home’: School-Based Health Centers Partner with a Primary Care Clinic to Improve Population Health and Mitigate Social Determinants of Health” (2016) described a model wherein a primary care practice partners with local SBHCs to improve access to and provide high quality of care for shared patients. Access to high quality care is a crucial social determinant of health. Given that adolescents, especially those from families with lower SES and from marginalized racial and ethnic backgrounds, experience numerous barriers to accessing primary care, SBHCs have exhibited potential to improve access to primary care in an expanded medical home model. SBHCs overcome many barriers to care such as cost to the patient, culture, age, time, and transportation. Research has demonstrated that adolescents who use SBHCs have increased rates of preventive visits and immunizations, improved chronic disease management for asthma, obesity, and mental health care, and decreased health care costs (Keeton, Soleimanpour & Brindis, 2012; Council on School Health, 2012).

Methods
The Consolidated Framework for Implementation Research (CFIR), a validated structure used to describe and define the constructs that influence the success of change implementation, was used to guide implementation and assess the process and impact of the intentional partnership of a large primary care clinic with local SBHCs. The study used a quasi-experimental design with mixed methods. Record review of preventive health measures, chronic disease management measures, and quality management program measures as well as qualitative data allowed the study team to assess the quality of care, sharing of patients, as well as facilitators and barriers to the approach. Baseline data collection ran from September 1, 2013 through August 31, 2014 and the school-year period was from September 1, 2014 through June 30, 2015. The study sample included 2,200 adolescents across 9,338 visits. The intervention was focused on adolescents with low SES or non-CYSHCN.

Intervention
The need to improve access to primary care was a key issue in the health and health care domain of the Healthy People 2020 social determinants of health topic area. The authors used primary care and community collaboration as proxies for the medical home model. Primary care was defined as the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community (Institute of Medicine Committee on the Future of Primary Care, 1996). Fragmentation of care has led

81 https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-health/interventions-resources/access-to-primary
the AAP to endorse collaborations between PCPs and SBHCs to enhance the delivery of care. Collaboration of community PCPs with SBHCs was described as facilitating communication between primary care sites and SBHCs with collaboration being one way to simultaneously improve quality and reimbursement. The hypothesis is that implementing an expanded medical home partnership could help mitigate the social determinants of health through improved access and quality of care.

The partnership of a large primary care clinic with local SBHCs constituted an expanded medical home model for adolescents with low SES. The setting was a primary care practice, the Ypsilanti Health Center (YHC), and a consortium of local SBHCs, the University of Michigan Hospital and Health Systems (UMHS) Regional Alliance for Healthy Schools (RAHS), in Michigan. The YHC housed family medicine and pediatric clinics with its physicians being the most common PCPs listed by patients who use RAHS clinics (serving youth ages 10-21 years old). RAHS clinics provided comprehensive physical health services, mental health counseling, and nutrition services. They also provided assistance with housing and food needs by providing referrals to community resources, along with insurance enrollment. YHC and RAHS shared the UMHS Epic electronic health record (EHR); therefore, they can easily access and share patient information.

After a series of meetings by RAHS and YHC leadership to garner support and buy-in for the pilot, a meet and greet over lunch at YHC was arranged to provide an opportunity for providers and staff from YHC and RAHS to connect, establish rapport, learn about services available at the different centers, and begin to develop trust. Implementation of this expanded medical home model of care focused on coordinating care and obtaining quality measures to improve population health. A letter signed by leadership from both sites was sent to families of shared patients explaining that YHC is the patient’s “medical home” and meant to be the primary source of care; however, RAHS is an alternative if the patient cannot come to YHC, and providers and staff will communicate and work together to coordinate care.

Providers from both sites worked to determine the most optimal means for communicating about shared patients (e.g., a page was sent to the PCP for urgent questions and a note routed through the electronic health record (EHR) for routine communications) and to identify ways to offer complementary care at the two sites (e.g., a patient with an asthma exacerbation seen at YHC could get follow-up, spirometry, and reinforcement of the asthma action plan at RAHS). There was a commitment from PCPs and RAHS providers to routinely route notes to one another in the EHR for co-managed patients. YHC also had a “panel manager” who was responsible for running reports in the EHR to find shared patients who were missing recommended services, asthma measures, and well-child visits. For patients on these lists who were unable or unwilling to see their PCP, RAHS nurse practitioners would schedule them to be seen at the SBHC to close the gaps on any needed services.

Quality of care was assessed through compliance with recommended preventive health care measures including yearly well-child visit and influenza vaccination rates as well as chronic disease management measures for patients with asthma and/or obesity. The UMHS Quality Management Program determined compliance with these quality measures for patients seen
at YHC alone (YHC only) versus shared care between YHC and RAHS (YHC/RAHS). The intervention was a 10-month, school year-long, planned, coordinated program of collaboration with six SBHCs and a primary care center.

**Outcomes**

For this study, increased access was operationalized as gaining entry to care with a new access point leading to more adolescents or shared patients using preventive, primary, and chronic care health services within an expanded medical home model.

To assess the quantity of shared patients, the proportion of patients who were seen at the expanded medical home (YHC/RAHS) was compared with all patients seen at YHC between baseline and during the intervention period. Unfortunately, data was not collected/reported on patients seen at RAHS only at baseline. During the intervention period, the number of YHC/RAHS shared patients increased from an average of 16 seen per month at baseline to 24 per month during the intervention. This reflects a statistically significant increase in the proportion of shared patients since implementation of the expanded medical home model with shared patients increasing from 13% at baseline (192 of 1471) to 19% (240 of 1275) at follow-up. This is an increase in the number of shared patients accessing care through an expanded medical home partnership from baseline to follow-up.

Shared patients being seen in the expanded medical home model also had a higher likelihood of receiving quality metric services than patients seen at YHC only. The rates of patients who had a well-child visit in the expanded medical home model compared with YHC only was statistically different during the intervention period. The difference in patients meeting asthma quality measures in the expanded medical home model compared to YHC only was also notably different at baseline than during the intervention.

In sum, adolescents seen at both an SBHC and by a PCP had better adherence with preventive and chronic disease management quality measures at baseline than those seen by a PCP alone. These shared patients had increased frequency of well-child visits and associated preventive services, in addition to improved completeness of care for asthma and obesity. When appropriate, follow-up after PCP encounters were coordinated to occur at the SBHC, decreasing time away from school and averting a potential loss of parental income to attend multiple visits.

PCPs benefited from patient panels with improved adherence to recommended services, leading to increased reimbursement for better quality of care. PCPs also gained new patients as the SBHC shifted patients without an established PCP to their expanded medical home partner office. Finally, SBHCs benefited from increased patient visits from PCP referrals, increased legitimacy with patients and families because of the connection with the PCP, and improved institutional support through linkage with the PCP’s office. The model improved relationships between SBHC staff and PCPs leading to better communication, better coordination, and potential decreases in redundant care for the adolescents.
Limitations
Since this study was a pilot of an expanded medical home model with a large primary care center and six SBHCs, it may lack generalizability to other settings and systems. There was also difficulty with data management from running accurate reports of gaps in needed services and limited quality measures with some not available at the time of the study. Data analysis was limited by the small sample size. No data was collected and/or presented on the number of patients seen at RAHS only; therefore, comparisons could not be made between YHC/RAHS and RAHS only. Despite these limitations, the researchers found that adolescents with low SES seen at both an SBHC and by a PCP had better adherence with preventive and chronic disease management quality measures at baseline than those seen by a PCP alone. These findings are consistent with previous research highlighting that SBHC users attend more well-child visits, have increased immunization rates, and better compliance with asthma measures.

Evidence Rating
The novel contribution of this study is around the power of care coordination between PCPs and SBHCs and guidance on how to effectively implement a partnership to increase access to care consistent with the medical home model. This patient-centered approach to providing health care services to adolescents within the community was carefully mapped out engaging teams from the SBHCs and PCPs to favor the partnership. When PCPs and local SBHCs partnered in an expanded medical home model, more adolescents obtained care and were shared between the sites. Further, adolescents in the expanded medical home model had a higher likelihood of receiving quality metric services than patients seen only in a PCP’s office.

Overall, this expanded medical home model benefited adolescent patients and their parents, PCPs, and SBHCs. A partnership-focused, care coordination strategy increased the frequency of well-child visits and associated preventive services as well as improved completeness of care for asthma and obesity. Evidence from this study contributes to growing evidence on the role of SBHCs and the impact of strategic partnerships in bolstering care coordination and access to a medical home for a greater number of adolescents. The positive data seem to most appropriately fall within the emerging evidence rating of the evidence continuum.

Intervention 2. Early Connections to a Medical Home Model Through Care Coordination and Collaboration with Home Visiting

Background
Brown et al. in “A Neighborhood-Based Approach to Population Health in the Pediatric Medical Home,” (2015) described population health management within a neighborhood requiring partnerships across sectors and shared measurement across pediatric clinics to increase the percentage of infants reached by the intervention. Although research has indicated that children who receive health care in a PCMH have better health outcomes and better patient experiences, children from low-income families are less likely to receive care within a medical home model, less likely to receive on-time immunizations, and more likely to suffer poor health outcomes. The study team postulated that perhaps a critical step in improving access to high quality health care in low-income neighborhoods is to ensure that every child establishes and maintains a connection to care within the medical home model. With sparse literature on the
population health management of a geographically defined population, a care coordination program was developed to begin to address poor health among children from one economically disadvantaged neighborhood.

**Methods**
The interventions were designed and tested in a neighborhood (defined by two zip codes) with a total of 550 births per year and a median income of $27,364 per year. Data from the local children’s hospital ED were used to identify the most common primary medical providers for children from these zip codes. The quasi-experimental design examined change over time with a concurrent group that did not receive the interventions. The demographically similar comparison neighborhood had 198 births per year and median household income of $20,843. Both the intervention and comparison neighborhoods have strong infrastructures for community development, with active community councils, housing and job-training initiatives, and community service agencies.

Four clinics were identified as serving approximately 75% of the children from the neighborhoods. Interventions were spread to other clinics to increase the percentage of all neighborhood infants reached by the care coordination program. Primary outcome measures included patient age in days at the first attended newborn visit and the percentage of patients attending 2- and 4-month well-child visits on time. The aim was to improve each of these measures by 20%. The goal for age at newborn visit was based on the AAP Policy Statement on hospital discharge for healthy term newborns within 72 hours. The intervention was focused on infants from a low-income neighborhood or non-CYSHCN.

**Intervention**
The study was focused on local strategies low-income neighborhoods could use to connect every newborn to care within the medical home model and create a platform to link families with other health promoting community resources. The study team assessed whether proactive outreach by pediatric primary care clinics and coordination of care across sectors could begin to address poor health among children from one economically marginalized neighborhood by working to ensure timely well-child visits and provide enhanced care to infants during vulnerable care transitions.

The global aims were to:
1. Improve early connectivity to care in the medical home model among infants from one low-income neighborhood.
2. Develop a collaborative relationship between the pediatric primary care clinics and a home visiting program in the neighborhood.

The specific aims were, among the infants in the intervention neighborhood, to:
1. Improve rates of timely attendance at well-child visits during the first four months of life by 20%.
2. Increase the number of infants with confirmed enrollment in a local home visiting program.
3. Improve communication between medical home staff and home visitors.
The baseline mean of 14 days for newborn visits was incongruent with the AAP recommendation of 72 hours. “On-time” for the 2- and 4-month well-child visit was defined as 42-90 days or age and 104-150 days of age, respectively. Additional process measures included the number of infants with confirmed enrollment in a local home visiting program, the number of shared patients between the clinics and home visiting agency who enrolled in the “Care Team Approach,” and the percentage of all neighborhood infants reached by the care coordination program.

Testing of the interventions started at a clinic that services 20% of the neighborhood’s children (Clinic 1). Clinic 1 conducted Plan-Do-Study-Act (PDSA) cycles around outreach to families for well-child care and connection with the home visiting program. Clinic 1 was a large, urban practice based at an academic medical center with a total of 35,000 visits per year. Clinic 1 (which included a nurse care coordinator) started by testing a newborn registry to identify and manage patients from the intervention neighborhood and was maintained manually by the nurse care coordinator.

Staff at Clinic 1 built relationships with community partners and acquainted themselves with services available in the intervention neighborhood. The close collaboration with the home visiting program was critical to improving referral processes and communication across sectors. The care coordinator at Clinic 1 established early relationships by doing “welcome calls” to families congratulating them on the baby, welcoming them to the practice, reminding them of their appointment, and letting them know about a 24-hour triage line, and also acted as a point-of-contact for parents’ concerns.

Further, to improve communication between home visitors and the medical home, the home visiting program and clinic also worked together to develop talking points to diminish the number of parents who declined home visiting referrals due to misperceptions and misgivings. The goal of this “Care Team Approach” was to engage families, home visitors, and medical staff in working together to meet the child and family’s needs. This seamless communication between home visitors and pediatricians offered much greater utility to parents.

Successful strategies were adapted for Clinic 2, a city health department-affiliated clinic in the intervention neighborhood with less staff and limited EHR reporting capability. Therefore, Clinic 2 could not make welcome calls or run automated reports of infants overdue for well-child care. Clinic 2 kept a manual registry with assistance from volunteer college students and increased the number of appointments available to newborns. The pediatrician at Clinic 2 also developed working relationships with the newborn discharge coordinators at local birth hospitals to identify high-risk families and ensure adequate follow-up.

Clinic 3 shared an organizational structure and EHR with Clinic 1 so most of the interventions—welcome calls, automated data reports, and protected nursing time—were adopted without changes. With the addition of Clinics 3 and 4, weekly “huddle calls” were set up for teams to rapidly learn from each other. Clinic 4 was a federally qualified health center with no resources
for an infant registry. However, they were piloting a new reminder/recall system for all their patients and were able to share discussions on the huddle calls. They also engaged in the Care Team Approach with the home visiting agency, but they were unable to create a system for quantitative data collection on visit adherence or home visiting enrollment for infants from the intervention neighborhood.

**Outcomes**

For this study, increased access was operationalized as improving elements of existing care with more comprehensive care using the Care Team Approach, improved timeliness of care, greater continuity of care, and improved communication between providers and families. Increased access also occurred with more referrals to the local home visiting program, a new access point for expanded care consistent with the medical home model.

The interventions in Clinic 1 led to a 30% drop in age at the first attended newborn visit among infants from the intervention neighborhood and demonstrated increased timeliness of the newborn visit (from a mean of 14.4 days to a mean of 10.1 days). Infants from the comparison neighborhood received the standard of care, an automated telephone reminder, and showed no reduction in variation or decrease in mean age.

For the 2-month well-child visits, the nurse care coordinator was given 1.5 hours per week of protected time to manage the registry and contact families and an automated report of appointment data was created. These changes led to a median percentage increase for on-time 2-month well-child visits from 68% to 79% (a relative 16% increase). No improvement was seen among infants from the comparison neighborhood during the same time period.

Protected time and an automated report of appointment data also allowed the nurse care coordinator to call families of infants due for the 4-month well-child visit. Clinic 1 saw a significant increase in the monthly percentage of patients in the intervention neighborhood from a median of 35% to 59% (a relative 69% increase). Again, no improvement was seen among infants from the comparison neighborhood during the same time period.

Clinic 1 developed a reliable process for making and tracking referrals and for establishing two-way communication between the home visiting program and clinic that led to the confirmed enrollment of 18 families in the home visiting program (out of 33 eligible families). This allowed families to access and obtain care within an expanded medical home model of care who may not have received care previously when there were deficiencies with the referrals to the local home visiting program.

Further, the home visiting program and clinic worked together to create talking points to reduce the number of declined referrals due to parental misperceptions of the home visiting program. This Care Team Approach enabled more families to access these extended services within the medical home model of care.
For Clinic 2, the pediatrician developed working relationships with the newborn discharge coordinators at the local birth hospitals to identify high-risk families and ensure adequate follow-up, which led to a reduction in variation and a decrease in mean age at newborn visit from 14.8 to 7.2 days, a 51% decrease. The median percentage of on-time 2- and 4-month well-child visits remained at 80% and 60%, respectively, throughout the data collection period, and 22 families were enrolled in the Care Team Approach.

Clinic 3 showed reduction in variation and mean age in days at first newborn appointment from 13.3 to 9.1, a 32% decrease. Clinic 3 had a median of 80% on-time for the 2-month well-child visit and 40% on-time for the 4-month well-child visit. The study team was unable to demonstrate improvement in the 2- and 4-month visit timeliness during the immediate post-intervention period. Clinic 4 joined the huddle calls, trialed a new reminder/recall system for all patients, engaged in the Care Team Approach with the home visiting agency; however, they were unable to create a system for quantitative data collection on visit adherence or home visiting enrollment specifically for infants from the intervention neighborhood.

Overall, the care coordination and neighborhood-based approach led to more timely well-child care, confirmed enrollment in home visiting, and improved communication between the clinic staff and home visitors. The study team identified four effective strategies for improving connections to care within an enhanced medical home model:

1. Designating a nurse care coordinator with protected time to make outreach calls to families (1.5 hours per 60 patients).
2. Developing automated data support systems to identify patient needs.
3. Fostering partnerships between primary care practices and community agencies to solve system- and family-level problems.
4. Creating shared care coordination and measurement processes across multiple clinics to increase the percent of the neighborhood population that is reached.

Lastly, birth certificate data showed that 550 infants per year are born into the intervention neighborhood. After 20 months of the program, a total of 237 infants (43% of all infants under a year old in the neighborhood) were being tracked and managed on registries in Clinics 1, 2, and 3, and 30 infants under a year old were enrolled in a home visiting program. These numbers demonstrate connectedness to the medical home model of care and community resources due to the intervention.

**Limitations**

With regard to limitations, the intervention and comparison neighborhoods were different in terms of their racial and ethnic composition, the number of single parent households, and the proximity to Clinic 1. These factors could all influence health care utilization and introduce bias into the study design. The team also could not be sure that the same child was not counted twice if transferring from one clinic to another. Further, the team did not achieve all the study goals or implement the strategies in the same way when they spread from Clinic 1 to Clinics 2-4 thereby limiting the scope of the study. Finally, as the authors acknowledged, protected nursing time
might not be widely feasible in a fee-for-service reimbursement system and could be a non-starter for some states and jurisdictions.

Evidence Rating
Neighborhood-based newborn registries, proactive nursing outreach, and collaboration with a home visiting agency aligned multiple clinics in a low-income neighborhood to improve access to health-promoting services within a medical home model. An emphasis on care coordination, partnership between a medical home and home visiting program, focus on cross-system collaboration, communication, and sharing, use of features in the EHR, and roll out of strategies during times of transitions for children and families proved effective. Lessons learned could be used by other communities to piece together similar structures to support change. Overall, this collaborative approach with its specific strategies produced positive data worthy of further inquiry with more timely well-child care and improved communication channels. Given this encouraging evidence, this study seems to fall most appropriately within the emerging evidence rating of the evidence continuum.

Intervention 3. Community Outreach and Coordination of Services Using a Provider Alliance to Create a “One-Stop” Medical Home Model

Background
Tataw et al. in “Health Services Utilization, Satisfaction, and Attachment to a Regular Source of Care Among Participants in an Urban Health Provider Alliance” (2011) reported on a pilot program looking at the effect of a provider alliance (one PCP and one specialty care group) on creating “one-stop” care within the medical home model. To better enable community access to needed services, community partnerships seem to be critical for social change. The South Central Los Angeles Health care Alliance (SCHCA) was a strategic initiative between The Charles R. Drew University Department of Pediatrics at the King/Drew Medical Center, an academic medical institution, and St. John’s Well Child Center, a community primary care provider. The SCHCA was a partnership created to improve access to health care, knowledge of preventive practices, and encourage maximum utilization of health resources.

The SCHCA was the first variation or pilot program of the Preventive Health Education and Medical Home Project (PHEMHP), a predictive and contextual model developed to reduce low levels of health services utilization and improve preventive health techniques and disease self-management for low-income families (Tataw, James, & Bazargan, 2009). The PHEMHP was driven by community needs and used a family and community orientation in the planning and delivery of health services. The PHEMHP was meant to respond to health services access challenges by coordinating and maximally utilizing existing health and medical services within the community to improve the health of a child. In thinking about access, the PHEMHP looked beyond insurance and focused instead on client empowerment and provider accommodation as critical determinants of service utilization and health status for families from low-income backgrounds. The authors developed the PHEMHP model after two needs assessments and three focus groups.
Methods
The study used a prospective quasi-experimental design with three intervention sites: 1) St. John clinic located in downtown Los Angeles, 2) St. John clinic located in Compton, and 3) King/Drew Medical Center pediatric sub-specialty care. The study focused on children between the ages of 0-18 who resided within the geographic area of South Central Los Angeles, CA. There were an estimated 727,000 children in the service area. Trained community health workers conducted outreach activities including attending parent and teacher meetings, participating in health fairs, collaborating with other community agencies and churches, and distributing printed health materials at shopping malls.

To be eligible to enroll in the SCHCA program, parents/guardians had to meet the following criteria: 1) have a child between the ages of 0-18 or are adolescents, 2) reside within the geographic area of South Los Angeles, 3) provide consent signature or verbal consent indicating that they were aware of the objectives of the program and were willing to be a part of it, and 4) had no definite plans to leave the area in the next year. The intervention was focused on children and adolescents within South Central Los Angeles or non-CYSHCN.

The data sources included parent surveys, a patient database used to collect utilization and financial data from operational and administrative tracking instruments, and reports at both the primary and specialty care sites. After the consent process, children were screened using California and AAP well-child care standards. Based on this screening, children and their families were provided with treatment, education, and referrals, as needed. They were also mentored using non-clinical case management while navigating subspecialty care. Telephone interviews were conducted with parents using a 30 item 5-point Likert scale to assess perceptions and satisfaction. The parent survey instrument was administered in the second year of the program.

Intervention
The goal of the SCHCA was to facilitate the delivery of a coordinated continuum of health services for children and their families living in South Central Los Angeles. This was accomplished by providing care consistent with the medical home model for each child in alignment with the six recommended services of the AAP encompassing preventive care, acute care, continuity of care, specialty referrals, interaction with school and community, and maintenance of a database with a child’s pertinent medical information. This “one-stop” medical home model provided primary care to children, referred families to specialty care, as needed, provided clinic-based health education to families, provided case management support to empower families to navigate the health care system, and utilized mid-level providers in primary care and sub-specialty settings.

St. John’s Well Child Center provided a full range of pediatric primary care services at two clinics. Services included complete physical examinations, immunizations, pharmaceutical services, expanded care and treatment, and primary dental services. The King/Drew Medical Center operated comprehensive secondary and tertiary pediatrics service including a 24-hour pediatric service for acute care. Sub-specialty services, outpatient services, and special programs were provided for children.
More specifically, the SCHCA medical home was comprised of four intervention components:

1. Health assessment and medical treatment:
   - Conducted in the pediatric primary care clinic (St. John’s Well Child Center), the central site of coordination of all aspects of the patient’s medical care.
   - Physician assistants augmented services at both primary and sub-specialty sites.

2. Clinic-based health education to families:
   - Provided by the PCP, as needed, after the patient’s initial health screening at intake.

3. Fast-track referral system between primary and sub-specialty sites:
   - Created to lessen the waiting time between the child’s first encounter with a primary care source or the ED to sub-specialty care.
   - Staff at the Department of Pediatrics facilitated a smooth transition and communication between the Department’s sub-specialty services, PCPs, and patients.

4. Non-clinical case management:
   - Implemented by trained community health workers to support families as they learned to navigate the health care system.
   - Community health workers were drawn from the same community as the participants and had an average educational level of an associate degree.
   - They had no formal clinical training but received training for SCHCA on disease conditions and case management techniques.
   - SCHCA case management is composed of assessment/screening, referrals, service coordination, individualized planning, coaching, monitoring, and third-party advocacy to maintain a continuum and regular source of care.

The aim of the study was to examine the effect of a provider alliance on service utilization, satisfaction, self-efficacy, and attachment to a regular source of care for children from low-income backgrounds in an urban area and their families. As an alliance, the primary care and subspecialty/specialty organizations were operationally linked for the limited purpose of implementing the utilization improvement program. The educational, service, and nonclinical case management activities were spread over the two organizations. The alliance provided a one-stop medical home model for children and their families consisting of primary care and specialty services centered around consumer advocacy and empowerment and implemented within a network of community collaborators.

Outcomes
For this study, increased access was operationalized as gaining entry with a new access point enabling increased use of preventive, primary, and specialty care, as well as improving elements of care with greater continuity of care and enhanced patient experience with satisfaction measures.

The SCHCA pilot program resulted in the following outcomes:
- After two years of community outreach services, 404 outreach events were completed reaching 11,533 children.
• After two years of community outreach efforts led to 80,000 children (10% of the children in the service area), who previously did not have a regular source of care, being attached to care in the medical home model and 8,545 children being enrolled in available payer sources.

• The growth in new patients for the downtown Los Angeles primary care location averaged 50% in the first two years before leveling off in the third year.

• In the Compton primary care location, the growth was about 200% annually.\(^{82}\)

• Sub-specialty referral completion rate increased from 25% in 2001 to 78% in 2002, and 80% in 2003 then fell to 20% in 2004.\(^{83}\)

• The difference between the time a pediatric sub-specialty appointment was made and the time the patient was seen reduced from four months in 2001 to two and a half months in 2002, and one month in 2003, before rising to nine months in 2004.\(^{84}\)

The program evaluation demonstrated that:

• Nearly 39% of the sample reported having a child that required continuous medical care and the majority used St. John’s community clinic as a regular source of care for their children (74.2%) in the past 12 months.

• The vast majority reported that they preferred to have the same doctor for their child (84%).

• The majority of the respondents reported less difficulty to obtain medical care (48.4%), less difficulty to obtain routine checkups for their children (58%), and less difficulty to obtain referral (48%) compared to 12 months ago.

• The majority of respondents reported being more satisfied compared to 12 months ago with the services received for their children including general medical care (52%), routine check-up (48%), and were holding the same level of satisfaction with sub-specialty services in comparison to the last 12 months (44%).

In comparing groups, the study team found that:

• Participants who reported having a child who needed continuous medical care, compared to those who reported their child did not need such services, had higher levels of satisfaction with the services received and less difficulty accessing needed services.

• Participants who received care from places other than the community clinic (e.g., private doctors’ offices, private medical group, hospital clinic, urgent care, and emergency room) were more likely to report difficulty with making an appointment for their children to receive sub-specialty care and more likely to report that the time between receiving a referral and seeing a sub-specialty care provider was much longer in comparison to the previous 12 months.

\(^{82}\) A bonus to the program was the linkage of 20,000 adults to the medical home model of care in the last two years of the program.

\(^{83}\) The authors did not provide a detailed explanation for the drop in 2004. Based on what was shared, it seemed like the study team could not get any or enough specialty care appointments at King/Drew medical center. The program’s solution seemed to be rapid on-boarding of additional specialty care providers, many in distant locations, to meet the demand. It was unclear whether the program concluded before this solution could be fully implemented and/or evaluated.

\(^{84}\) The authors did not provide a detailed explanation for the drop in 2004. See previous footnote.
• There was a positive trend in the mean score of the parents who reported having a child who needed continuous medical care in comparison to those who did not report such need.
• There was also a positive trend between those who use community clinic care versus those who reported using other medical care places.

In looking at satisfaction with sub-specialty services by provider types, the results showed:
• High levels of satisfaction with both the Cardiology and Nephrology clinics.
• No statistically significant differences between clients’ satisfaction across services received from the physicians and physician assistants; however, satisfaction based on the summated scores for seven items revealed parents who receive services from a physician assistant were more likely to report a slightly higher level of satisfaction.

Limitations
With regard to study limitations, the content and delivery of patient education was not standardized so it is unclear how and what doses of patient education were delivered. Providers were not given an orientation as to the special needs of the population and expectations of the program. There was also no process evaluation and the primary care settings did not receive any orientation for data collection. There was no clear explanation for the drop in referral completions and specialty appointments in 2004. While it is important to note these limitations, this intervention was designed to explicitly connect children to care within a medical home model, therefore the focus on increasing access to care through a “one stop” model was noteworthy with community outreach efforts leading to 80,000 children (10% of the children in the service area), who previously did not have a regular source of care, being attached to care in the medical home model.

Evidence Rating
Participants in the program reported high levels of satisfaction with the primary and sub-specialty care they received. Levels of satisfaction did not change when sub-specialty care was provided by a physician assistant. Rather, parents overall reported greater levels of satisfaction with the care provided by a physician assistant in comparison to a physician. Parents who brought their children to St. John’s Well Child Clinics reported reduced difficulty getting a sub-specialty appointment and a reduction in time to be seen by a specialist. These survey results were confirmed using operational data patterns showing a dramatic drop in time between making an appointment and the patient being seen in the first three years of the program.

These findings add to the existing evidence in support of the positive effects of community outreach, service coordination, and use of mid-level providers on health services utilization, satisfaction with health services, and self-efficacy among vulnerable populations. An innovative contribution is the successful use of physician assistants as pediatric sub-specialty providers to expand access to services within a medical home model. These positive data from the pilot program, along with a conceptual model with enough flexibility to adapt to specific age, geographic, cultural, and resource realities, seems to most appropriately fall within the emerging evidence rating of the evidence continuum.
Intervention 4. A Statewide Expanded Health Care System for Children in Foster Care

Background
Jaudes et al. in “Expanded Medical Home Model Works for Children in Foster Care,” (2012) focused on the effectiveness of a health care delivery system using the medical home model for children in foster care. Limited funding and poor organization were key problems preventing good health care for children in state custody. With the 2008 Fostering Connections to Success and Increasing Adoptions Act, all states were required to create a plan for the ongoing oversight and coordination of health care services for all children in foster care, including continuity of care and the possible use of a medical home model (Child Welfare League of America, 2008).85 For state child welfare agencies to design an effective health delivery system including a medical home model for one of the unhealthiest populations in the US, several issues needed to be addressed: a) lack of funding, b) lack of individual health histories, and c) lack of coordinated care. The multi-component HealthWorks model was created to rectify these systemic issues. Illinois was the first state in the nation to develop a statewide system of health care for children in foster care (Jaudes, Bilaver, Goerge, Masterson, & Catania, 2004).

The HealthWorks data revealed that:
• A higher percentage of children in foster care were African American (64.9% vs. 31.2%) while the Medicaid only group had a high percentage of Hispanic children (29.3% vs. 5.5%).
• The foster care group was substantially older, on average, and had a slightly higher percentage of males and children from Cook County.
• Children in foster care have more chronic medical and mental health issues.
  – Across the study years, 60% of the children in foster care had an identified chronic condition compared to 30% of the Medicaid only group.
  – A significantly higher proportion of children in foster care were diagnosed with ADHD, developmental delays, and asthma.

Methods
The purpose of the study was to determine whether HealthWorks provided an effective medical home model for children in foster care. Effectiveness was measured by higher use of primary health care, especially well-child visits, better health outcomes, and a lower utilization of ED visits and hospitalizations. The health care service histories of children in foster care were examined by reviewing paid Medicaid claims for seven years documented in the Medicaid Management Information System managed by the Department of Healthcare and Family Services. Comparisons were made between the health status and health care services received by children in foster care with those obtained by all other Illinois children enrolled in Medicaid only who received health services. While the comparison group differed from children in custody in important ways, their Medicaid eligibility meant that they came from similar backgrounds.

The foster care study group contained all children who were in the custody of the state between July 2001 and June 2009 (fiscal years 2002-2009). The comparison group included all children who received Medicaid services between July 2001 and June 2009. To be included in the study population, a child under age 18 needed to be eligible for Medicaid through foster care or the comparison group for the entire 12 months of the fiscal year. Since the focus of the study was to describe routine and ongoing medical care and treatment provided by the HealthWorks program, all medical claims during the first six months of a new period of Medicaid eligibility were excluded for both groups given the atypical nature of mandated initial screenings when a child enters foster care. Medical histories were observed during 72,834 child-years of exposure for children in foster care (n=28,934) and compared to the medical histories observed during 5,008,289 child-years of exposure for children in Medicaid only (n=1,486,706). The intervention was focused on children in the statewide foster care system or non-CYSHCN.

**Intervention**

The Illinois HealthWorks model offered a) a medical home with coordinated delivery of comprehensive health care services, b) continuity in the delivery of care, and c) improvement in the health status of children in state custody. The study team used the AAP definition for the medical home model of care highlighting the guiding principles or the seven “C’s”: accessible, family-centered, continuous, comprehensive, coordinated, compassionate, and culturally competent. The medical home model in Illinois for children in foster care embraced these concepts. In particular, access and continuity were highlighted as the two major components required even to receive health care at all given that children without insurance and a usual source of care had the worst access to care consistent with the medical home model.

HealthWorks consisted of the following components to address systemic issues:

1. Recruitment, training, and support of statewide network of PCPs committed to serving children in out-of-home placement.
2. Creation of local lead agencies to obtain, organize, and maintain health records for every child entering foster care.

In the HealthWorks model, all children in state custody were immediately granted a Medicaid card and over 2,000 PCPs trained in pediatrics committed to taking care of these children with multiple health care needs. Illinois used state general funds and Medicaid to supplement the efficient use of three federal funding streams to support HealthWorks: Title XIX (Medicaid); Title V (MCH); and Title IV-E (Foster Care). The PCPs received an orientation to the unique needs of children in out-of-home placement and were expected to provide 24-hour care with admitting privileges at a local hospital. These PCPs became the cornerstone of this medical home model for children in foster care and formed a statewide network of PCPs. Since the PCPs needed a child’s health history to assure the provision of comprehensive services and coordinate care, a network of lead agencies was built.
Illinois reached out to nineteen local health departments and one community-based agency to act as “lead agencies” to obtain and coordinate medical records for each child entering care. Funding for the lead agency activities came from the Illinois General Revenue Fund (GRF) and a portion (50-55%) of the GRF funding qualified for federal match. Initially, the state attempted to use existing administrative data to piece together histories; however, it was determined that it would be more efficient and cost-effective to develop a new health care information system for children in out-of-home placement. The lead agencies gathered all previous health information available to compile a complete medical file called a “health passport.” This information was forwarded to the PCP and lead agencies worked to ensure that health histories moved with the child from placement to placement. Partnership enabled the lead agencies and medical case management agencies to support PCPs in carrying out their “medical home” responsibilities by obtaining the health histories of children and facilitating coordination of care.

Illinois then contracted with community-based medical case management agencies and/or local health departments statewide to address the specific needs of children under 6 years of age. They worked with the child’s PCP to 1) create an individualized service plan that identifies referrals to specialty services and ensures that appointments are kept and 2) monitor and document immunizations and well-child exams. Collaboratively, lead agencies and medical case management agencies carried out medical home responsibilities including assurance of comprehensive and coordinated care prior, during, and after the substitute caregiver selects a PCP. This creative use of resources addressed health care delivery issues and put PCPs in a better position to effectively provide care within a medical home model for children in out-of-home placement in accordance with AAP guidelines.

Outcomes
For this study, increased access was operationalized as gaining entry to care with insurance coverage (Medicaid) allowing for increased use of preventive, primary, chronic, and dental care services as well as improving elements of care, such as greater continuity of care with medical histories available for all children in foster care and improved timeliness of care with more current immunization status.

With regard to use of health care services consistent with the medical home model of care:
• The children in foster care showed levels of medical attention, though slightly lower than ideal, that were substantially higher than children from the Medicaid only group. More specifically:
  – Children in foster care had annual well-child visits in 85% of the cases and annual dental care encounters in 66% of the cases.
  – However, children in foster care were more likely to have general inpatient experiences (3.7% vs. 1.9%) and psychiatric inpatient episodes (7.8% vs. 0.5%).
  – Children in foster care also had more ED visits (36.1% vs. 29.7%).
• Immunization data revealed that approximately 80% of children in foster care were current with their immunizations.
• Controlling for population differences in race and ethnicity, age, region of the state, gender, and year\textsuperscript{86} for children in foster care compared to children in Medicaid, children in foster care were:
  – 3.58 times more likely to have an Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) exam.
  – 3.2 times more likely to see a dentist.
  – 1.39 times more likely to experience a visit to the ED.
  – 1.8 times more likely to have a general inpatient stay.
  – Over 13 times more likely to have a psychiatric inpatient stay.

• Controlling for chronic conditions accounted for the fact that children in foster care have poorer health than Medicaid only children. Chronic conditions may act as a stimulus to finding and obtaining medical care.
  – For preventive medical services, the inclusion of chronic conditions actually reduced the differences between the groups slightly, although the children in foster care still show much higher levels of care:
    * Children in foster care were three times more likely to have an EPSDT exam.
    * Children in foster care were three times as likely to see a dentist.
  – For general inpatient stays, the odds ratio was reduced from 1.83 to 1.11.
  – For psychiatric hospitalization, the control dropped in half from 13.22 to 6.05.
  – For ED visit, the odds ratio decreased from 1.39 to 1.06.

Overall, children in foster care across the state received significantly more preventive care, primary care, and dental care through HealthWorks. Care within this medical home model improved immunization status for children in foster care compared to both the state and national data for this most vulnerable group. Under HealthWorks, children in foster care used the health system more efficiently and cost-effectively as reflected in the higher rates of primary care and well-child visits and lower rates of ED care for those with chronic conditions as compared to children from the Medicaid only group. Due to the multitude of issues facing this very high-risk population, it is understandable that both inpatient care and mental health service utilization remained high for the children in foster care.

Caregivers were also asked about the effectiveness of the model in the Illinois Survey of Child and Adolescent Well-Being. An overwhelming majority (95\%) reported that their children in foster care were in good, very good, or excellent health and 88\% received a well-child visit with a pediatrician in the last year.

\textsuperscript{86} Analyses were also done controlling for demographic differences. The findings demonstrated that different service patterns exist for demographic subpopulations of children with chronic conditions.
Limitations
The study compared children in foster care with other children with Medicaid, who have similar circumstances but form different demographic groups. The control population had no comparable population to children in foster care. In addition, during the creation of the HealthWorks system, the state child welfare agency decided children’s mental health needs were the responsibility of the caseworker and the local area mental health networks. This policy decision resulted in a lack of coordination with or through the PCP and therefore was typically excluded from the model. The authors also noted that it was difficult to collect data on every component of a medical home model of care and there were limitations around use of the large Medicaid paid claims dataset including timeliness, accuracy, and completeness of the data. Despite these limitations, this statewide model was able to alleviate major systemic issues faced by child welfare agencies to improve the health and well-being of children in foster care by increasing access to care consistent with the medical home model.

Evidence Rating
The results of the Illinois experience documents that HealthWorks offers other states a tested approach that improves health care for children in foster care using a medical home model complemented by coordinated health services. With all children in state custody immediately granted a Medicaid card and over 2,000 PCPs committed to taking care of these children with multiple health care needs, access to care consistent with the medical home model was provided to many more children. By working together, the lead agencies and medical case management agencies supported PCPs in carrying out their “medical home” responsibilities and enhanced care coordination enabling children in foster care to receive needed preventive, primary, chronic, and dental services within an expanded medical home. It is notable that this study is the first of its kind examining the effectiveness of a statewide health care system to ensure that children in foster care obtain quality health care through a medical home model and could provide guidance for states and jurisdictions looking to improve the health status of children in foster care. In considering the positive effects of this study, the approach seems to most appropriately fit within the emerging evidence rating of the evidence continuum.

Intervention 5. Policy Intervention with a Primary Care Case Management Model

Background
Petersen et al. in “Assessing the Extent of Medical Home Coverage Among Medicaid-Enrolled Children” (2002) described a policy intervention transitioning children from a traditional fee-for-service model of health care financing and delivery to a primary care case management (PCCM) model. Under the PCCM model, “Medicaid-enrolled children are assigned to a PCP who agrees to take responsibility for that child’s primary and preventive care, referrals to specialty services, and any needed care coordination.” In short, the PCP served as the focal point and gatekeeper of the child’s health care. Ideally, children would have a long-term relationship with their PCPs and this relationship, within the context of a medical home model, which would lead to increased immunization, decreased ED visits and hospitalizations, reduced

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87 The definition of medical home under PCCM may not necessarily match other definitions of medical home. The study team operationally defined medical home as use of a single PCP combined with receipt of at least one well-child visit from that physician during the year (see “Intervention” section below).
duplication of services, increased identification of issues, and increased appropriate referrals for
early intervention. As the authors noted, these shifts in how medical care was delivered should
lead to long-term improvements in population-based indicators of health such as incidence of
vaccine-preventable disease, rates of school absenteeism and special education enrollment, and
preventable injuries and hospitalizations.

Methods
To explore whether or not medical home status could be determined from a state Medicaid-
claims database for Medicaid-enrolled children across the state and then examine whether a
shift in the Medicaid health delivery model would affect the medical home status of Medicaid-
enrolled children in the implementation counties, Alabama Medicaid administrative data was
used as a before-and-after assessment of this field program. For the analysis of change in sources
of well-child care before and after the implementation of PCCM, the study team considered
all visits provided during the year and distinguished between general and family physicians,
pediatricians, rural clinics and community health centers, health departments, physician
specialists, and hospitals as well as sites of well-child care.

The Alabama Medicaid agency chose to implement the transition to the PCCM model on a
county-to-county basis over a two-year period beginning in January 1997. This incremental
implementation was needed to negotiate contracts with providers and clinics, notify clients, and
engage in discussions with public health agencies and communities in each county. Children ages
birth through 13 years old were included in the assessment and were counted only if they were
enrolled for the entire 12-month period. The transition to PCCM began at the end of the baseline
period with the time period before PCCM running from October 1995 through September 1996.
Across the entire state, there were 253,635 children included in the baseline period.

Twenty-six of the 67 counties in the state were part of the initial implementation phase between
January and October 1997. These counties were home to about a quarter of Alabama’s Medicaid
enrolled children and were predominantly smaller, rural counties from the southern border of the
state with smaller provider networks, strong health departments, and somewhat better access to
pediatric health services. The proportion of children receiving Medicaid services were similar
among these counties prior to the transition. The baseline year for the comparison was again
October 1995 through September 1996, and there were 60,752 children continuously enrolled in
Medicaid in the 26 counties during this time period.

The post-implementation period was the first 12 months of implementation for each county
with the time period ranging from January 1997 through September 1998. There were 64,789
children enrolled in the post-implementation period in the 26 counties. There was a total of
100,502 well-child visits in the 26 counties before implementation and 99,835 well-child visits
after implementation. The study team did not present formal statistics; the data represent the
experiences of the full population of Medicaid participants and are not derived from samples of
those participants. The intervention focused on children enrolled in the state Medicaid program
or non-CYSHCN.
**Intervention**

The concept of a medical home is fundamental in efforts to develop systems of care that are family-centered, community-based, and comprehensive. In Alabama, the study team was interested in measuring whether or not children enrolled in and receiving care through the States’ Medicaid program had a “medical home.” In October 1996, with the transition of the Alabama Medicaid program to a PCCM model, the study team assessed the level to which children had access to care in a medical home model before and after implementation of the model. The researchers explored whether Medicaid claims data could be used to assess medical home coverage and whether the shift would affect the medical home status of Medicaid-enrolled children in the first 26 implementation counties.

The team operationally defined a true “medical home” as use of a single primary care physician, rather than multiple physicians, combined with receipt of at least one well-child visit from that physician during the year. The study team stated that children who see multiple physicians, those who see physicians but who receive well-child care from other sources, and those who use physician care without receiving well-child care, do not have a true medical home; however, they are more integrated into the health care system than those who use neither primary care or well-child care. Although PCCM may not precisely match definitions of the medical home model of care, its requirements as implemented arguably covered four de-facto AAP medical home components: usual source of care, personal doctor or nurse, referrals for specialty care, and care coordination. The primary goal of PCCM was to assure access to a medical home and a secondary goal was Medicaid cost savings.

Physicians were classified as being PCPs if their specialty was self-declared and recorded in the Medicaid provider files as general physician, family physician, emergency physician, or pediatrician, or if the provider type was rural clinic or community health center. Further, well-child visits were defined with well-child diagnoses and procedure codes for medical evaluation or immunizations provided or visits coded as EPSDT exams. Children were considered to have used a PCP for well-child care if they had any well visit to that provider during the year. Children could use a health department as a well-child care provider. The default category of other well-child provider was used if children’s well visits were provided only by hospitals or non-PCPs.

**Outcomes**

For this study, increased access was operationalized as gaining entry upon “enrollment” in the PCCM with linkages to PCPs and receipt of well-child care.

The table below highlights the provider and source of well-child care for children continuously enrolled in Alabama Medicaid before and after PCCM implementation in the 26 counties and with state baseline data included for comparison.
## APPENDIX D

### NPM 11: MEDICAL HOME EVIDENCE REVIEW

National Center for Education in Maternal and Child Health | Georgetown University

### MEDICAL HOME STATUS

<table>
<thead>
<tr>
<th></th>
<th>26 IMPLEMENTATION COUNTIES BEFORE PCCM, N=60,752</th>
<th>26 IMPLEMENTATION COUNTIES AFTER PCCM, N=64,789</th>
<th>ALABAMA BASELINE, N=253,635</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saw a primary care provider (%)</td>
<td>67.6</td>
<td>72.9</td>
<td>65.9</td>
</tr>
<tr>
<td>Single provider, well-child visit from that provider (%)</td>
<td>6.7</td>
<td>9.1</td>
<td>11.8</td>
</tr>
<tr>
<td>Multiple providers, well-child visit from one of those providers (%)</td>
<td>11.1</td>
<td>17.9</td>
<td>19.2</td>
</tr>
<tr>
<td>One or more providers, well-child visit from another source (%)</td>
<td>31.1</td>
<td>21.6</td>
<td>18.9</td>
</tr>
<tr>
<td>One or more providers, no well-child visit (%)</td>
<td>18.7</td>
<td>24.2</td>
<td>16.3</td>
</tr>
<tr>
<td>Saw no primary care provider (%)</td>
<td>32.4</td>
<td>30.6</td>
<td>33.8</td>
</tr>
<tr>
<td>No provider, well-child visit (%)</td>
<td>11.2</td>
<td>9.4</td>
<td>10.7</td>
</tr>
<tr>
<td>No provider, no well-child visit (%)</td>
<td>21.2</td>
<td>21.2</td>
<td>23.1</td>
</tr>
</tbody>
</table>

Importantly, the overall proportion of children seeing any PCP increased after PCCM implementation. There was an increase from 6.7% to 9.1% in the portion of children who met the definition of having a medical home, that is, those seeing only one PCP and receiving well-child care from that physician during the year. In addition, there was an increase in the portion of children seeing multiple physicians and receiving well-child care from one of those physicians during the year from 11.1% to 17.9%.

Overall, 45.4% of children who were continuously enrolled had no identifiable well-child care visit after PCCM implementation, an increase from 39.9% who had no well-child care before the program. The proportion of children with no physician visits and no well-child care remained the same at 21.2%. According to the authors, these mixed results for the first year of implementation could be reflective of the difficulties inherent in systems-level change of this magnitude than systemic bias against providing primary care to children within a medical home model.

Further, the site of well-child care shifted away from health departments into physician offices after PCCM implementation. For children who saw no PCP after PCCM implementation, there was a shift away from use of a health department well-child care to well-child care in specialist offices and hospitals. Overall, there was a net increase of 20,537 well-child visits to physician providers and a net decrease of 20,860 well-child visits to health departments. Even though there was an overall increase of 6.6% in the number of children continuously enrolled in Medicaid in the 26 counties, there was a slight decline of less than 1% in the total number of well-child visits.

### Limitations

Study limitations included an unwieldy operational definition of medical home. Well-child visits with disease diagnoses were also not counted as well-child visits (only visits with well-child diagnoses or EPSDT claims were counted as well-child visits) and at least one major insurer prior to the PCCM transition did not cover well-child visits. In addition, ED physicians often coded as PCPs possibly inflating the number of children who have PCPs, a group practice with multiple
PCPs could qualify as a medical home but would not present as a medical home by the operational definition used in this study, and no formal statistics were presented with the reported data. This is also an older study using a case management model, which in today’s practice would be a more robust care coordination model. Despite these limitations, this study was able to operationalize a definition of a medical home that could be measured using Medicaid paid claims data.

**Evidence Rating**

The study analysis demonstrated that it is feasible to operationalize a definition of a medical home in a way that allows it to be measured using administrative data. Some of the mixed results for the first year of implementation may have been reflective of the difficulties inherent in systems-level change. As the health care system continues to see shifts in provider availability, it will be critical for MCH leaders to track these changes to assure that children have access to PCPs to meet their health care needs. As the authors noted, “The assessment of a medical home for all children remains a challenge for the MCH field, but the measurement strategy presented here offers a solid start.”

This state example could inspire other state-supported insurance programs, private insurance companies, or managed care organizations to try to improve on the methodology and replicate the results. Importantly, the overall proportion of children seeing any PCP increased as well as those seeing only one or multiple PCPs and receiving well-child care after PCCM implementation demonstrating greater access to care within the medical home model after the transition. As a rare policy level intervention, this approach to increasing access seems to most appropriately fit within the emerging evidence rating of the evidence continuum.