Attacking Childhood Asthma—Two Approaches to Chronic Care Management
June 2, 2016 Webinar
Selected Resources

Children’s Medical Center Dallas:
- Integrated Medicaid System Diagram (included below)
- *Attacking Childhood Asthma: A Dallas Success Story* (included below)

Le Bonheur Children’s Hospital CHAMP Program:
- Changing High-Risk Asthma in Memphis through Partnership (included below)
- *CHAMP Asthma Program Executive Summary* (included below)

2015 CHA Pediatric Quality Award Submissions Related to Asthma:
- **Asthma: Delivering Evidence-Based Care and Studying the Outcomes**
  - Dell Children's Medical Center of Central Texas/Austin
- **Multifaceted Intervention to Reduce 30 Day Pediatric Asthma Related Readmissions**
  - Riley Hospital for Children at Indiana University Health/Indianapolis, IN
- **Community Asthma Management Program**
  - Our Lady of the Lake Children’s Hospital/Baton Rouge, LA

*JAMA Pediatrics*
- **The “Black Box” of Racial Disparities in Asthma**
  - Published online May 16, 2016
- **Explaining Racial Disparities in Child Asthma Readmission Using a Causal Inference Approach**
  - Published online May 16, 2016
Community Agency Contracts

Platform for Ecosystem Integration

- Interoperable Data Layer
- Clinical Integration Program
- Stakeholder Portal
- Health and Wellness Alliance Backbone
- Electronic Resource Directory (PCCI)

Support Families in Improving Their Own Well-Being

Activities
- Coaching for navigation and customization
- Customized resources that catalyze action
- Real-time data that informs change
- Experiential learning of health skills

Continued Engagement Through Trusted Agents

Venues: Design Thinking Studios • School-based Programs • Faith-based Programs

Medical Care Systems
- Children's Health Physician Group
- Complex Care Medical Home
- Virtual Health
- MD Medical Group
- Contracted Providers
- Acute and Long-term Care

Financing Vehicles
- Children's Medical Center HMO
- Philanthropy
- Research Grants

Community Agency Contracts
- Health and Wellness Alliance Members
- YMCA
- City of Dallas EMS
- Other Service Providers


February 26th, 2016
Attacking Childhood Asthma:
A Dallas Success Story

AN INITIATIVE OF CHILDREN’S HEALTH AND
THE HEALTH AND WELLNESS ALLIANCE FOR CHILDREN

By Chad Brands, M.D., Vice-President, Clinical Integration, Children’s HealthSM
Peter Roberts, President, Population Health and Insurance Services, Children’s Health; Co-Chair, Health and Wellness Alliance for Children
Robert Shaum, Senior Director, Process Improvement, Population Health, Children’s Health
INTRODUCTION

Children’s HealthSM, a leading academic pediatric system in Dallas, has achieved a remarkable reduction in asthma visits to its emergency departments. From 2012 to 2015, the number of unique patients visiting Children’s Health emergency departments with a primary clinical diagnosis of asthma decreased by 49% while overall volume remained relatively flat.¹

The complexity of the topic, combined with overlapping contributing factors, makes it virtually impossible to identify a specific singular source of measurable impact.

Instead, ours is a success story about uncommon partnerships and progressively linking clinical, social, community, public health, philanthropy, education, environment and governmental programs to successfully reduce the burden of childhood asthma in our community.

BACKGROUND

It is estimated that the State of Texas is home to one out of every nine children in the United States.¹ Within Texas, Children’s Health receives the most federal funding for pediatric-only projects through the Delivery System Reform Incentive Payment (DSRIP) program.¹ These two facts presented the opportunity and incumbent responsibility for Children’s Health to take on a mantle of leadership with regard to pediatric care transformation on a national scale.

Since 2012, Children’s Health has continued to build a range of new capabilities within a population health model. The focus of this model is to optimize health for children before they require care due to illness or injury. Aspiring to achieve the tenets of the Triple Aim — improving the experience of care, improving the health of populations and reducing costs — Children’s Health is
forging a new path for the future, one in which the resources to achieve these goals are distributed in new ways and decision-making shifts to a family/child-centric approach.

THE TRIPLE AIM

- Improving the patient care experience
- Improving the health of populations
- Reducing the per capita cost of health care

WHY ASTHMA?

Nationally, childhood asthma is the most common chronic condition to affect children younger than 18.2 In 2010 and 2011, asthma was among the Top 5 reasons for emergency department visits in the Children’s Health℠ system, as well as in most pediatric centers nationwide. Asthma and its related complications also rank as one of America’s top five costliest health conditions.³

SCOPE OF PROBLEM

Of Dallas County’s 650,000 children, approximately 60,000 of them, or 9%, have asthma.⁴,⁵

When poorly managed, even mild asthma can restrict a child’s ability to play, participate in school and get adequate rest. In Texas, 54% of children with asthma missed at least one school day per year due to their condition.³ When children cannot go to school due to asthma, parents miss work, negatively impacting the whole family. At the extreme, children can require a visit to the emergency room, be admitted to the hospital or even die as a result of asthma.

In 2012, nearly 1,500 children in Dallas County visited an emergency room or were admitted to a hospital due to asthma.⁶

A CALL TO ACTION

Given the profound burden that children’s asthma was placing on our community, and motivated by the support of state administered federal health care reform incentives (DSRIP), our call to action was clear: We had to find a way to dramatically reduce the burden asthma inflicts on children, their families and the health care system overall.

While effective high-quality “sick care” clinical treatments for asthma are a hallmark at Children’s Health, poor asthma control is strongly affected by factors largely outside the control of clinicians. These realities, also known as the “social determinants of health,” include economic, behavior and environmental factors, such as...
smoking, indoor air pollution, poor housing codes/enforcement and household pests.

Therefore, pediatric asthma represented an excellent opportunity to explore greater coordination of clinical, non-clinical and community resources to improve the status quo.

OUR APPROACH

We became convinced that we had to move effectively upstream from the emergency department and begin to meet the families we serve closer to home: where they live, work and play. In short, it was time to listen to the voices of our at-risk families and to actively partner within their communities to press for solutions. There, we could begin to organize and engage the clinical system and the community in a laser-focused, collective initiative that could finally bend trends and measurably improve the lives of children and families burdened by asthma.

SEARCHING FOR THE WHOLE STORY

After a thorough investigation1, we believe that at least four specific Children’s HealthSM system initiatives had a strong correlation with reduced asthma visits to the emergency department during the years 2012–2015. They are the following:

- Expanding the primary care network
- Establishing the Health and Wellness Alliance for Children
- Expanding care management for asthma patients
- Focusing on high-risk asthma patients

This finding in no way implies that many other aggressive activities begun during this same time period between 2012 and 2015 did not have impact. In general, we believe that any of the initiatives that are founded on evidence-based practices for improving asthma outcomes had a subsequent positive impact on our patients. This is especially true in light of the high degree of overlap between more than 15 various activities. However, these four initiatives do have the benefit of meaningful data that correlate conclusively.

EXPANDING THE PRIMARY CARE NETWORK

In a critical first step, we took advantage of the DSRIP “medical homes” project funding through our Children’s Health Pediatric Group of primary care clinics. From 2012 to 2015, our primary care network grew from six to 20 clinics covering targeted underserved zip codes in our primary service area. We developed a measurement, “Asthma Opportunity Achieved” (AOA), for each clinic practice and monitored the execution of evidence-based best practices for asthma, including asthma action planning, severity assessment and controller therapy. Additionally, our physicians

The call to action was clear. Find a way to dramatically reduce the burden that asthma inflicts on children, their families and the health care system overall.
were incentivized to improve their 2015 AOA results by means of a small financial reward.

This project had key indicators that correlated to the timing and magnitude of the hospital emergency department reduction. It was also unique in that it did not share outcome measurements with other asthma-focused projects and, moreover, the metric is a proactive leading indicator compared to others.

Given that AOA intervention focused only on the patients of Children’s Health Pediatric Group, it is not the only driver of the reduction in asthma-related ED visits. However, it is noteworthy given that the reduction of asthma-related ED visits, as a percentage of overall visits, declined more rapidly for the patients of Children’s Health Pediatric Group than the overall decline.

Another key point is that the asthma usage reduction in both the emergency department and throughout the Children’s Health Pediatric Group occurred during this time of explosive growth for the clinic network. During the four-year period, visit volumes more than doubled, which effectively doubled the effort required to sustain current AOA scores. Yet, the Children’s Health Pediatric Group improved AOA performance by 19% — a truly astounding accomplishment.

“Before, we tended to focus almost exclusively on addressing the immediate asthma symptoms that brought the child to our doors. But by moving upstream into communities and partnering closely with families and cross-sector organizations, we learned that whatever happened in the past 24 hours wasn’t the whole story. All the other things going on in a child’s everyday life can be just as important.”

Peter Roberts, President, Population Health and Insurance Services, Children’s Health; Co-Chair, Health and Wellness Alliance for Children
“The Health and Wellness Alliance for Children is a shining example of cross-sector organizations coming together with focus, grit and determination to help make Dallas the best city in America for kids to grow up.”

The Honorable Mike Rawlings, Mayor, City of Dallas

ESTABLISHING THE HEALTH AND WELLNESS ALLIANCE FOR CHILDREN

In another seminal step, Children’s Health℠ established the Health and Wellness Alliance for Children in 2012. This group now represents a broad coalition of more than 75 cross-sector community organizations focused on measurably impacting health and wellness for children — at scale. The Alliance made childhood asthma its initial priority and immediately began serving as a powerful bridge between community and clinical partners.

Providing a dedicated and much-needed focus on the asthma issue, the Alliance catalyzed a number of active, but fragmented, internal clinical services at Children’s Health. These expert clinical stakeholders then moved alongside other local health care partners, in particular Parkland Health System, one of the nation’s largest and most progressive public health centers. The Alliance began to track its progress through tactical working groups with specific goals built to move two indicators for children in Dallas county:

- Emergency room visits due to asthma
- Pediatric hospitalizations due to asthma

By adhering closely to the guiding principles of a collective impact organizational model, the Alliance has provided a rallying cry for critical cross-sector stakeholders and has become an essential voice for families and children struggling with the harsh impact of asthma. It has received national commendation for its work from the U.S. Environmental Protection Agency, the City of Dallas and the National Center for Healthy Housing.

EXPANDING CARE MANAGEMENT FOR ASTHMA PATIENTS

The care management program dramatically expanded its scope and staff in 2012–2013 under the new population health model. Most importantly, it included a specific focus on asthma management. We reviewed a cohort of 3,614 patients participating in the care management program who had a primary or secondary diagnosis of asthma.

In the six months prior to becoming involved in the care management program, 516 members (14.3%) of this cohort had one or more
visits to the emergency department. In the six months following the encounter, only 332 patients had one or more asthma-related visits, representing a 35.7% reduction in overall unique patient visits.

**EMPHASIZING CARE MANAGEMENT FOR HIGH-RISK CHILDREN**

Another effort that shows a very high correlation with reducing emergency department visits is the set of activities funded by a grant from the Crystal Charity Ball in Dallas. This grant allowed our team to specifically focus attention on a small subset of the larger care management group. This cohort involved 170 children who were considered at especially high risk for asthma-related illness. Specifically, the funds were used to mitigate environmental triggers for asthma discovered during individual visits to the patient's homes.

Like the larger group, this higher-risk group also showed a significant decline of 28.7% in emergency department visits. Because there were only 170 children in the group, this initiative cannot be identified as a major contributor to overall reduction. However, it does corroborate the overall trend. It also serves to remind us that measurable impact to a small group of children still carries a positive impact on the lives of these families. In particular, this group had previously endured tremendous stress due to the more serious and crisis-oriented nature of their children’s asthma.

**ALIGNING MORE CLINICAL AND COMMUNITY-BASED CAPABILITIES**

During this same four-year time period, Children’s HealthSM, in collaboration with partners from the Health and Wellness Alliance for Children, deployed many other ambitious initiatives across the system — all aimed at asthma.

Examples of these efforts include:

- Evidence based guidelines for management of asthma
- Primary Care Acute Asthma Pathway
- Disease management registry*
- Extended primary care hours*
Many ambitious initiatives were deployed across the health system and the community — all aimed at asthma.

- Nurse advice line*
- Telemedicine*
- School-based telehealth
- Care coordination efforts
- Physician maintenance of certification for implementing evidence-based guidelines for asthma management
- AVANCE Promatora in-home education partnership
- My Asthma Pal mobile app for asthma management
* DSRIP funding

WHAT ELSE COULD BE DRIVING FACTORS?
Within the clinical body of knowledge, and based on scientific evidence and professional experience, we believe that the following factors are of paramount importance to the health of children with asthma:

- Access to care, specifically a relationship with a primary care physician in a medical home
- Implementing asthma action plans individualized to each patient
- Routine vaccinations, including annual influenza vaccination and pneumococcal vaccination
- Knowledge of and mitigation of environmental triggers (particularly cigarette smoke)
- Use of corticosteroid inhalers as disease controlling therapy to prevent flares of disease necessitating acute treatment, often in emergency departments

SUMMARY AND FUTURE DIRECTION
As a system, Children’s Health℠ has significantly improved health outcomes and reduced emergency department admissions for children with asthma in the greater Dallas region. By listening to our patient families and becoming laser-focused on relieving the asthma burden for them, we found answers. We learned that moving upstream into our communities and partnering with cross-sector, non-clinical stakeholders impacted the social determinants of health in sustainable ways. We validated that providing more primary care options and establishing medical homes for our asthma patients keeps them pro-actively healthier and avoids unnecessary trips to the emergency department. We also learned that expanded, asthma-focused care management and a particular emphasis on those children that were at highest risk for dangerous asthma attacks produced extremely positive outcomes.
Our determination to improve the health trajectory of children living with asthma is only further ignited by these impressive results. Our care strategy has shifted to a focus on effective home- and community-based management for patients, assisted by medical home physicians and a large team of skilled health care professionals and volunteer partners.

We believe this broad, long-term investment in mitigating the physical, emotional and economic impact of childhood asthma offers a tremendous return by providing a healthier future for the children we are privileged to serve. We intend to share all that we have learned and to become a beacon for others to follow throughout the state and nation.

1. Internal Analysis of System Ambulatory Care Sensitive Conditions and Asthma-related Emergency Department Utilization Per DSRIP Measurements, Chad Brands, M.D., Vice-President - Clinical Integration, Ray Tsai, M.D., President - Children’s Health Pediatric Group, Robert Shaum, Senior Director - Process Improvement - Population Health, Children’s Health, Dallas, TX, November 2015
2. Pediatric Asthma Burden, Pediatric Asthma Initiative. www.pediatricasthma.org/about/asthma_burden
4. Texas Asthma Control Program, Texas Department of State Health Services, Whitney Harrison MPH, Epidemiologist
5. Direct and Indirect Cost of Asthma in School-age Children, Preventing Chronic Disease, Li Yan Wang et al. (applied to number of Dallas County children with asthma), January 2005
6. Dallas Fort Worth Hospital Council Foundation, 2013
CHAMP (Changing High-Risk Asthma in Memphis through Partnership) was a CMS funded project designed to improve the health and wellbeing of children with high-risk asthma by improving self-management, reducing unplanned medical encounters, and reducing health care costs. The current patient census is 587 children.

**Goals of CHAMP**

- Reduce emergency room and hospital encounters
- Lower health care costs

**Components of CHAMP Program**

- High-risk Asthma Clinic based out of Clinical Immunology – Develop the plan of care, sick call triage. Dedicated APN, RN, and RT
- Community Team – 2 Community Asthma Educators and 3 Community Health Workers – Enroll in the community, provide individual patient information to school nurses, address environmental and social concerns.
- Registry - Records all CHAMP staff activity and monthly update of all TennCare encounters from State of Tennessee, TennCare administration. Registry built and maintained by University of TN Health Science Center, Division of Biomedical Informatics
- Community Connections – Link with primary care physicians, schools, and environmental services.

**Utilization Outcomes as of 12/31/2015**

- 43.5% reduction in the average number of children who visited the ED or Urgent Care at least one time in a 6 month period.
- 48% reduction in the percentage of children hospitalized per quarter due to asthma.

**Cost Outcomes**

- 49.7% reduction in the average cost of care per child as compared to the baseline.

**Future Challenge:** Working with Green and Healthy Homes Initiative, Baltimore, MD to develop sustainable funding through Pay for Success strategy that involves a Le Bonheur, TennCare administration, mediator, and a private impact investor.

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CHAMP serves children meeting the following criteria:
  • Residents of Memphis, Shelby County TN
  • Recipients of TennCare (Tennessee’s Medicaid Program)
  • Ages 2-18 at admission,
  • Identified as having high-risk asthma by meeting criteria in ONE of these categories:
    • 3 or more emergency room or Urgent Care visits for asthma-related events in a one year period
    • 2 or more emergency room visits for asthma in the past 3 months.
    • 2 or more hospital admissions for asthma in the past year.
    • 1 or more intensive care unit admissions in the past 2 years, or
    • Physician discretion for patients who are on the cusp of these guidelines or have special circumstances.

95% of these patients are African-American children. Almost all of the children live in one-parent households where resources fall below poverty guidelines. These children suffer from poorly controlled asthma that results in preventable hospital and emergency room encounters, missed school days, and diminished quality of life. They primarily live in rental properties characterized by environmental hazards (mold, mildew, cock-roaches) that exacerbate asthma episodes. Many of them are housing insecure, moving frequently or spending significant periods of time in more than one residence over the course of a week or a month.

CHAMP’s theory of change is based on the concept that asthma care is not typically well managed due to a fragmented delivery system; inability to share information among providers; and the absence of a focused effort to provide ongoing education, environmental modifications, and social supports that will support self-management.

The primary drivers in this change effort are:
  • Improved Information sharing among providers;
  • Improved Coordination of Health Care;
  • Improved Patient/Family Engagement; and
  • Higher prevalence of asthma self-management.
  • Greater engagement of key stakeholders to improve asthma care in Memphis.

The components of CHAMP related to addressing these drivers are:

1) An Asthma Registry that includes medical encounter data from TennCare (Medicaid) and medical data from electronic medical records,
2) Team of sub-specialist medical providers utilizing the NIH EPR-3 guidelines for asthma assessment and management.

3) Community based staff persons that engage and enroll patients in the field, conduct asthma education in the field, address environmental concerns, and provide advocacy and information on problems that present a barrier to adhering with the asthma action plan.

4) 24/7 call line staffed by EMTs and RNs, and

5) Partnerships with families, schools, primary care physicians, and programs/services that address environmental concerns of at-risk patients.

**CHAMP Staff**

The medical providers include Medical Director, Dr. Christie Michael, sub-specialist in Clinical Immunology and Nurse Practitioner Regina Perry. These clinicians employ NIH EPR-3 guidelines for asthma assessment and management. Their work in clinic is supported by a dedicated nurse asthma specialist and a respiratory therapist both of whom are certified asthma educators (nurse currently in preparation).

Susan Steppe, LAPSW is the CHAMP Program Director and supervises the day to day work of the team including 5 community based staff members and an administrative assistant. This group includes 2 community asthma educators who have social service degrees and are certified asthma educators (one currently in preparation and the other certified). These persons conduct enrollments, deliver asthma education in the homes, and connect with school and child care centers for all CHAMP patients. The 3 community health workers maintain ongoing relationships with the families, reinforcing asthma education basics, monitoring medication adherence, addressing environmental concerns, and providing advocacy and support for problems that present barriers to following the asthma action plan.

**CHAMP Program Model**

The Champ program model involves these key components (also a flow sheet attached):

1. Identify potential CHAMP patients – CHAMP receives a daily report generated from the MLH electronic medical record on all patients who are admitted or were seen in the previous 24 hours in any Methodist Le Bonheur hospital or facility with an asthma related diagnosis or condition. These patients are screened for eligibility. Eligible patients are assigned to a Community Asthma Educator for follow-up and enrollment.

2. Enrollment – Patients are enrolled in CHAMP by the Community Asthma Educators (CAE) who take the families through the Informed Consent process, provide asthma education, conduct an asthma control test, and do medication reconciliation. The assigned Community Health Worker (CHW) attends this visit with CAE to meet the family and lay the groundwork for the working relationship. Having two persons attend the initial visit is also a safety feature for staff. Patients are typically enrolled in their homes (common for patients who were identified due to an ED or Urgent Care visit). If the family is initially resistant to a home visit, enrollment can occur at a location that the family chooses. Once the relationship is
established CHAMP has always been able to gain access to the home.

Enrollment may also occur in the hospital if the patient is admitted at the time he/she is identified as meeting CHAMP criteria. Hospital enrollments are always followed by in-home visits to do asthma education, conduct environmental assessments, and provide other services as needed. After enrollment the patient will be scheduled for the initial CHAMP clinic visit.

3. Second Home Visit - Prior to the initial clinic visit, the Community Health Worker (CHW) conducts a second visit to the family to continue to build the relationship with the parents and conduct the environmental assessment, utilizing the Environmental Protection Agency screening form (built into the registry). Based on the identification of asthma triggers in the home, the CHW will bring a bucket of supplies relevant to that patient’s issues to family at the next (3rd) visit. This visit provides the opportunity to assess other issues that require the CHW to provide advocacy and information. CHAMP is particularly concerned about environmental issues in the home, although any problem that disrupts the family can interfere with asthma management.

4. Initial Clinic Visit - The initial clinic visit is an essential component of the CHAMP program. If families have transportation needs, CHAMP provides round trip cab rides for families to attend clinic. This is particularly helpful when a child must be scheduled in one our locations that is not close to home. The first clinic visit includes medical assessment of impairment and risk, asthma education, lung function testing, allergy testing, and development of the all-important asthma action plan (AAP) by the physician sub-specialist or nurse practitioner. The patient’s family also receives instructions on how and when to access the 24/7 CHAMP call line and a loading dose of prednisone that may be administered at the direction of the call line staff. Parents of children in school or child care receive a packet of information and rescue inhaler that is to be delivered to the school or child care center. (CHAMP Community Asthma Educators follow up on this as described below.) Clearly the initial clinic visit provides the road map for future CHAMP team interaction with all team members focusing on supporting families in their adherence to the AAPs. This visit provides the gateway to ongoing CHAMP follow-up services and access to 24/7 call line. **Patients who fail to attend the initial visit cannot be active participants in the program.**

5. Distributing AAPs to Schools and Primary Care Physicians - After the initial clinic visit, the AAPs are faxed to the child’s school or child care center and the central school health office for Shelby County Schools (if the child is attending a Shelby County School). The Community Asthma Educators (CAEs) follow-up with school or child care staff personally to assure that the packets that were given to parents in the clinic are taken to the schools and that staffs who may be called upon to aid the CHAMP patient during an asthma episode can locate that medication and use it properly. The AAPs are faxed to the office of the primary care physicians for each patient. (NOTE: Primary Care physicians also have access to a portion of the CHAMP asthma registry for their specific patients as described below.)

6. Third Home Visit - After the initial clinic visit the CHW conducts the 3rd home visit for the purpose of reviewing the AAP (just one more time), conducting medication reconciliation, supporting and reinforcing asthma education with a special focus on consistently using the asthma medications prescribed in the AAP. There is discussion about the importance of taking the medications as prescribed and strategies that each family may employ to “hard wire” this activity into the family lifestyle. The CHW assesses each family’s’ understanding of the plan and barriers that might get in the way of following the plan.

7. Team Staffing - After the third visit there is a team staffing with all medical and community
members to discuss the next steps for the CHWs. This can include more contacts by the CHW to check progress and reinforce previous information or making referrals for specific services. If no other specific activities or needs are identified at that time, the CHW will proceed to use the CHAMP registry to monitor prescription fills and reach out to families as needed. The “reaching out” may occur because of a refill problem, the medical team requests follow up on a specific issue, or the family calls and asks for help.

8. Subsequent Clinic Visits - Follow-up clinic appointments occur at 3, 6, 9, and 1 year intervals. Additionally patients may be seen for sick visits. The CHAMP medical team operates clinics 4 days per week on most weeks. This includes every other Monday in Germantown, new patients on Wednesday morning at Le Bonheur, follow-up patients on Wednesday afternoon at Le Bonheur, Thursday at the Le Bonheur Clinic at 100 N. Humphreys, and Friday mornings at le Bonheur. The CHAMP medical team’s availability for sick call triage and follow-up to 24/7 calls or ED/hospital visits is a critical part of this model. The availability of skilled asthma specialists at the moment you need one is labor intensive yet highly successful in helping families call for help when there is time to provide advice or services that will not involve an ED or hospital encounter.

9. Ongoing Follow-up Activities and opportunities.

a. After hours and on weekends, patients have access to the 24/7 call line to receive help and instruction from a trained RN or EMT located in the Le Bonheur Emergency Department. As stated above, patients were given a loading dose of prednisone at the clinic visit and may be instructed to take that during this call or sequence of calls. After each CHAMP 24/7 call is formally ended, all CHAMP staffs receive an email showing that the patient called the line and the outcome of the call (whether they were directed to take medication, come to the ED, etc.). The CHAMP Nurse Asthma Specialist follows up with these families to check status and arrange a visit with the PCP or in the CHAMP clinic.

b. During work days, the Asthma Nurse Specialist or the NP take calls on the CHAMP cell phone (separate from the 24/7 line), performing sick call triage and connecting patients to PCP or clinic.

c. Case Management – CHWs respond to calls and requests from the medical team when they identify concerns in clinic visits. Additionally, CHWs scan the TennCare data looking for medication refills or the lack thereof. This information is flagged and easily observed on each patient file. In order to get the patient and family back on track the CHW will reach out to the family either by phone or in person to identify the problems in getting refills and to correct that problem. For example, if transportation to the pharmacy is a problem, the CHW will pick up the medication at the pharmacy and take it to family. If the situation involves the need for a new PA or other medical issue, this is directed to the Asthma Nurse Specialist. In some situations where it is clear that the family simply cannot (for whatever reason) assure the consistent administration of controller medications, the medical team and CAEs will work with school staff to arrange for the child to receive daily medication at school, then focusing parents and the patient (according to age) on taking meds on weekends and school vacation days.

e. CHAMP staffs receive a daily report of any CHAMP patient who has a medical encounter in any Methodist Le Bonheur Healthcare facility in Shelby County, Tennessee (5 hospitals and 2 urgent care centers). When an encounter occurs, the asthma Nurse Specialist or the Respiratory Therapist calls families to check their
status and help them arrange any subsequent follow-up care or prescription refills.

10. PCP Connection – Connection with PCPs is critical and continues to represent an opportunity for the CHAMP program. CHAMP has established a strong relationship with some practices and found that these physicians appreciate that the CHAMP medical providers follow these high risk patients. Often the PCP office simply cannot provide the same accessibility to care through 24/7 call line and sick call triage that CHAMP can provide. All PCPs receive copies of AAP for their patients and have the ability to access the Risk Assessment to aid in assessing risk and impairment and the most current AAP (which was already faxed to them).

CHAMP Registry

A distinguishing feature of the CHAMP program is the high-risk asthma registry developed with the technological expertise of the University of Tennessee Health Science Center, Division of Bio-medical Informatics. The registry is a means of compiling and storing key pieces of information that pertain to 55 data elements forming the core of the CHAMP quality metrics. The data elements cover 13 categories, each with a list of indicators and measures. These data elements provide the basis for self-monitoring which includes measuring outcomes, measuring process, and efforts to achieve the triple aim. Staff persons who have contacts with patients and families enter information in the registry to document activities completed. Additionally, key pieces of medical data on each patient are imported from existing EMR.

Perhaps the most unique aspect of the CHAMP registry is that the TennCare administration allows CHAMP to download an updated listing of all CHAMP patient encounters each month, including cost data. When CHAMP patients sign the IRB informed consent, they allow CHAMP to receive any TennCare encounter data available as far back as 1/1/11 and monthly updates every month after enrollment. This data provides information to see all medical encounters and prescription fills, providing the basis for pre-CHAMP and post enrollment cost comparison as well as the most accurate measurement of emergency room and hospital encounters – key metrics in measuring progress in reaching goals. This information offers the opportunity to use the registry as a case management tool, complete with flags and automatic “fires” to note absence of prescription fills, prompting CHAMP to contact families and provide assistance with these issues.

The registry is web-based and can be accessed via I-Pad by CAEs and CHWs in the field staff in the clinic setting. There is a report development function to aggregate data as well as sorting of patient information (by school, by zip code, by PCP, etc.). The easy access of the registry provides a means to develop reports quickly to support the PDSA (Plan Do Study Act) process.

The CHAMP registry is available via web-based portal to Primary Care Physicians to aid them in the care of these patients. There is a plan to make Asthma Action Plans available to school nurses via a similar portal. This sharing of information operationalizes a key driver to share information to facilitate consistency in asthma care.
Environmental Management Activities:

The CHAMP program performs activities to improve environmental conditions for children with asthma and their families at two levels, through individual family intervention and collaborating with community partners to address concerns involving laws, codes, and community policies.

The CAEs with the program attended numerous trainings opportunities in 2014 (there were performing as CHWs at that time) to gain knowledge to develop a CHAMP strategy to address environmental concerns. They first developed a product list. Then using home intervention funds available through the grant, they compiled a store of products to provide to families. They also developed a written protocol to address distribution of these items, according to needs. This protocol is below:

All newly enrolled families will receive the healthy home remediation supply bucket based on the following:

I. The CHW must be able to fully assess the home and verify the “problems” in the home such as mold, mildew, pest, etc…

II. The remediation supply bucket will not be given out until the family has made their initial CHAMP clinic visit UNLESS the initial visit is greater than 6 weeks out and family has an immediate need for the supplies.

III. If the CHW is not able to fully assess the home to verify problems in the home, the family will not receive a remediation supply bucket, they will instead be able to receive the original CHAMP bag with the paper towels, handi- wipes, cleaning spray, etc…*

Every family will not receive the same items. Items will be determined based on the following criteria after the full assessment of the home and completion of the environmental tracking form:

I. Homes that are problem free, meaning there are no mold/mildew issues, pest problems, and are well kept will receive a Level I Bucket that contains the basic items: Bucket, Swiffer 360 dusters, empty spray bottle, paper towel roll, pack of reusable handi wipes, Simple Green all-purpose cleaning spray, brush and dustpan set, and mop**.

II. Homes that are somewhat problematic (i.e. may have mold issues but doesn’t have rodent or pest problems or vice versa) will get the Level II Bucket that contains the items specific for the problems in the homes:

Example 1: Bucket, Mold testing kit, Mold/mildew spray remover, Swiffer 360 duster, empty spray bottle, paper towel roll, pack of reusable handi wipes, Simple Green all-purpose cleaning spray, brush and dustpan set, and mop**. NO RODENT/PEST CONTROL ITEMS

Example 2: Bucket, Combat roach gel, Combat roach bait traps, rodent glue traps, Swiffer 360 duster, empty spray bottle, paper towel roll, pack of reusable handi wipes, Simple Green all-purpose cleaning spray, brush and dustpan set, and mop**.
May or may not contain Rodent glue trips, NO MOLD/MILDEW ITEMS

III. Homes that are very problematic and have mold issues, pest problems such as rodents and cockroaches, heavily filled with dust (visible dust…) will receive Level III buckets that contain all items:

Example: Bucket, Mold testing kit, Mold/mildew spray remover, Combat roach gel (clear or brown), Combat roach bait traps, Rodent glue traps, Swiffer 360 duster, Mop**, brush and Dust pan set, Empty spray bottle, Paper towel roll, Reusable handi wipes, Simple Green all- purpose cleaning spray.

*If there are no identified problems that warrant a full assessment then CHW should request to see the patient’s sleeping area at the very least in order for the family to be eligible for the home remediation bucket. Other situations that may warrant a bucket without a full assessment will be at CHW’s discretion.

**The mops will be given out solely at the CHW’s discretion, particularly with the Level I buckets.

Community Collaboration

In addition to the bucket system, CHAMP collaborates with community partners in housing services to more widely address environmental conditions that address asthma. As part of the Division of Le Bonheur Community Health and Well-Being, CHAMP has been an active participant in the development of the Healthy Homes Partnership. This is a group of government and environmentally conscious agencies that support that common goal: Every child in Memphs should grow up in a health home.

The CHAMP model includes forming working partnerships with housing and legal service providers. Le Bonheur was one of six public and nonprofit entities to establish the Healthy Homes Partnership in 2013, with the aims to advance policy/code reform, create an integrated healthy homes service sector, and support advocacy/education around healthy homes. In 2014 the partnership was awarded a capacity building grant from the Strengthening Communities Initiative, and, working with students at the University of Memphis School of Law, has developed a draft “Housing Impacts on Health” study and recommendations to strengthen Memphis’ housing code. The Partnership also helped organize a series of four EPA-funded “Healthy Homes” trainings for 80 participants from multiple sectors. In June 2014, the Partnership piloted a healthy homes intervention for a CHAMP family, working with an AmeriCorps NCCC team “loaned” from a local sponsor to repair and clean the home. The pilot attracted the interest of Habitat for Humanity of Greater Memphis, which joined the Partnership and has since been engaged in multiple discussions about healthy homes with Le Bonheur.

In 2013, Le Bonheur, University of Memphis School of Law and Memphis Area Legal Services (MALS) initiated formation of a medical-legal partnership, Memphis CHLD (Children’s Health Law Directive), to assist Le Bonheur families with legal matters outside the scope of the hospital. Based on other medical-legal partnerships, 50 percent of cases are expected to be housing-related. Services began in September 2015.

In March 2014, representatives from Le Bonheur, Tennessee Department of Health's
Program Outcomes

Most current outcome data (quarter ending December 31, 2015)

**Quarterly ED Utilization**

Asthma-Related Emergency Department Utilization
Percent of Participants

34.2% reduction over 12 quarters.

**ED Utilization – 6 months**

Asthma-Related Emergency Department and Urgent Care Visits in Past 6 months
Percent of Participants

43.5% reduction in 6-month utilization over quarters (11 reporting periods).

* This data is drawn from TennCare encounter records but has not been independently verified.
Avoidable Hospitalizations*

Avoidable Asthma-Related Hospitalizations

Quarterly Hospital/Obs.*

Asthma-Related Hospitalizations and Observations

* This data is drawn from TennCare encounter records but has not been independently verified.
Baseline data “Before CHAMP” calculated using the participants enrolled by the end of 8th qtr. 
Average cost of care per year, per child is $1,917 or 49.7% cost reduction per year, per child.

Cost information is based solely on Pre-Champ and During Champ cost information drawn from TennCare cost data. This has not been independently verified by a third party. However, NORC, the third party evaluator has written their report where they compared the CHAMP cohort to a control group drawn from statewide TennCare data. This report states a statistically significant reduction in encounters and cost. This report is due to be made public by CMMS soon.

**Sustaining the Program**

CHAMP is currently funded by a mix of Foundation funds and Le Bonheur Children’s Hospital. Efforts to sustain the CHAMP program are well under way with exploration of numerous strategies. CHAMP is exploring a variety of funding options including:

- **Social Impact Bonds** - CHAMP was awarded the opportunity to receive technical assistance from the Green and Healthy Homes Initiative to develop Pay for Success (PFS) transaction to pay for the program. This concept involves expanding CHAMP the model to bolster the environmental interventions and provision of legal services and being funded by a private investor (impact investor). Through a transaction with the TennCare administration, the program would yield a return on investment (ROI) to repay the funder and still save Medicaid dollars. This project is still in development.

- **Health Care Payment** - The new era of health care reform offers opportunities to work creatively with health care payers to support programs that manage population health at a reduced cost to the health care system. CHAMP’s capacity to gather and report on patient outcomes positions the program to engage payers in this conversation. CHAMP leadership has begun communication with the TennCare Administration in Nashville and Health Management Organizations locally to continue funding for the program utilizing options that may include strategies like return on investment (ROI) with shared cost savings or a value-based care package.

- **Grants** – CHAMP provides an excellent platform to seek grant funding opportunities for further research and development on management of asthma with populations experiencing disparities. LCHWB division has employs a grant specialist and a Ph.D. evaluator to help seek out and respond to these opportunities.

- **Foundation** - Additionally, In May 2014 Le Bonheur Children’s Hospital Foundation received a $2.5M award from the Plough Foundation of Memphis to fund the development of a Center...
for Excellence in Asthma. $500,000 of these funds is designated to continue support of the CHAMP program. There was an additional Foundation grant of $400,000 in 2015.

**Conclusion**

Finally, the CHAMP program is still in a whirlwind of development, taking the approach of “building the airplane while we fly it”. Our most intense efforts have been around building clinic capacity and the community based team, clarifying roles and responsibilities, and engaging our patients and families. We began enrolling patients in January 2013 and at the end of 2015 served 555 enrollees. We are still enrolling patients.

Our future challenges are:

- Building the program “to scale” with current staffing which is estimated to be around 700 patients.
- Contributing to the knowledge on successful strategies to address pediatric asthma in high risk Medicaid populations.
- Aggressively pursuing community linkages and partnerships to address environmental concerns, building on our newly developed Healthy Homes Partnership, and
- Establishing stronger links with primary care physicians, and
- Establishing a sustainability plan.