



Case Study

INNOVATIONS IN CARE TRANSITIONS

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The Cincinnati Children's Hospital Medical Center's Asthma Improvement Collaborative: Enhancing Quality and Coordination of Care

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ABSTRACT: Building on earlier initiatives, Cincinnati Children's Hospital Medical Center launched an Asthma Improvement Collaborative in 2008 to enhance the quality and coordination of asthma care for low-income, Medicaid-insured children in Hamilton County, Ohio. A multidisciplinary team made improvements across the continuum of care and strengthened linkages with managed care and community-based organizations to help patients and families overcome barriers to asthma control. A lengthening time between hospital encounters among those who received intensive care coordination services suggests a positive effect of this approach for participants. Hospital data showed promising improvement in a combined rate of readmissions or emergency department revisits for asthma at Cincinnati Children's, although an analysis of Medicaid data found the initiative had not yet achieved its objectives at the county level. Findings from this initiative should be of interest to others seeking to achieve ambitious goals for population health improvement.



THE INITIATIVE AT A GLANCE

Organization: The Asthma Improvement Collaborative (AIC) was developed by Cincinnati Children's Hospital Medical Center (Cincinnati Children's), an integrated, not-for-profit pediatric academic medical center in Cincinnati, Ohio, that encompasses a large teaching hospital and outpatient facilities, including primary care clinics and urgent care centers serving the Greater Cincinnati metropolitan area (Exhibit 1).

Objective: Improve children's health and experience of care while reducing health care costs among Medicaid-enrolled children with asthma. Specifically, the AIC aspires to eliminating all asthma-related hospitalizations and emergency department (ED) visits in the target population by July 2013. To measure progress toward that goal, the AIC tracks rates of asthma-related hospital admissions, ED

Exhibit 1. Profile of Cincinnati Children's Hospital Medical Center (as of fiscal year 2011)

523	Licensed beds
30,951	Admissions
589	Asthma-related admissions within the target Asthma Improvement Collaborative (AIC) population (2011)
121,875	Emergency department (ED) visits
1,561	Asthma-related ED visits (not admitted to the hospital) within the target AIC population (2011)
65,446	Primary care visits
12,654	Employees

Source: Cincinnati Children's Hospital Medical Center, *2011 Annual Report*, available at <http://www.cincinnatichildrens.org>.

visits, hospital readmissions, and return ED or urgent care visits following an asthma admission.

Target Population: An estimated 11,000 Medicaid-enrolled children (ages 2–17) with asthma in Hamilton County, Ohio (pop. 850,000), where Cincinnati Children's is located. These patients rely on Cincinnati Children's for the majority of their asthma-related inpatient hospital care. Approximately 4,000 of these children see physicians and nurse practitioners in the medical center's primary care clinics.

Project Team: A multidisciplinary team led by the Cincinnati Children's Division of General and Community Pediatrics. It includes inpatient, outpatient, emergency, pharmacy, home health, and subspecialty care units in partnership with community-based organizations, such as the health department, schools, and legal aid and managed care organizations (MCOs).

Approach: Redesigning care processes to address key issues underlying poor asthma control and associated preventable hospital use. Improvements focused on consistently providing evidence-based asthma care in the hospital, reliably sharing critical information with the patient's managed care organization and primary care clinic, improving care transitions and access to medications to support treatment adherence following a hospitalization, enhancing patient and family self-care education, helping at-risk patients and their families remove environmental barriers to asthma control

by strengthening linkages to community resources, and using data to measure progress.

Timeline and Funding: The AIC was formed in July 2007 and launched its quality improvement teamwork effort in January 2008. The AIC initially operated without any dedicated funding, but later secured internal funding to hire a care coordinator as part of a pilot program. In 2011, the AIC began receiving external funding from the Beacon Community Cooperative Agreement Program, funded by the federal Office of the National Coordinator for Health Information Technology, to demonstrate the ability of HIT to transform local health care systems.

Results in Brief: Among a cohort of high-risk children who received intensive-care coordination services, average time between hospital encounters (ED visit or admission) increased by more than 100 days from May 2009 to January 2012, suggesting the effectiveness of this approach. Hospital data also showed that, between 2008 and 2011, a combined rate of 30-day readmissions or ED revisits for asthma at Cincinnati Children's fell by 50 percent among hospital patients in the target population. Results of an independent evaluation suggest that the program had not reduced asthma-related hospital use at the county level relative to trends in other urban counties.

THE CHALLENGE

Asthma affects one of 10 U.S. children under 18 years old.¹ The disease is characterized by chronic inflammation of the airways that leads to reversible episodes of obstructed breathing, which can be life-threatening when managed poorly. Economically vulnerable groups are disproportionately affected by asthma.² For example, children covered by Medicaid or other public insurance are 50 percent more likely to have an asthma diagnosis than those with private insurance.³ Poorly controlled asthma results in 640,000 ED visits, 157,000 hospital admissions, and millions of lost school days among U.S. children each year.⁴ Many of these adverse outcomes could be prevented with asthma controller medications, which are underused by asthmatic children.⁵

Many children hospitalized with asthma are subsequently readmitted, indicating missed opportunities for effectively intervening to address poor asthma control.⁶ Hospital readmission rates for asthma are one-third higher among Medicaid-enrolled children than among those with private insurance.⁷ Multifactorial approaches to asthma management seek to address the range of health system, environmental, and social factors that contribute to asthma episodes, especially among vulnerable populations. Early use of these approaches has reduced asthma-related hospital use by children in research projects such as the National Cooperative Inner-City Asthma Study.⁸ Further demonstration is needed to show how improvements can be replicated in practice across the country. Urban children's hospitals are an important setting for such interventions, given their critical role as safety-net institutions serving lower-income children in their communities.

THE IMPETUS FOR CHANGE

In 2001, Cincinnati Children's joined the Robert Wood Johnson Foundation's Pursuing Perfection initiative, which spurred its leaders to set the strategic objective of transforming health care through organization-wide quality improvement.⁹ This commitment led to successful initiatives to improve asthma care among students

in school-based health centers and among privately insured patients of community physicians participating in a physician-hospital organization (PHO) affiliated with Cincinnati Children's. The PHO-led initiative resulted in improvements in the provision of "perfect" asthma care (asthma severity classification, written self-management plan, and controller medication for persistent asthma), lower rates of ED and urgent care visits, fewer asthma-related admissions at Cincinnati Children's, and increases in school attendance and parental confidence in managing asthma (see [Appendix A](#)). Similarly, the initiative in school-based health centers was associated with a large increase in students receiving "perfect" asthma care and with significantly less activity restriction and fewer ED visits compared with students in other Cincinnati schools.¹⁰

Inspired by these and other successes, Cincinnati Children's leaders made it a goal to spread quality improvement more widely across its many departments and programs in a way that would support the medical center's clinical, teaching, research, and advocacy mission. Responding to this institutional charge, the Division of General and Community Pediatrics formed the Asthma Improvement Collaborative (AIC) in July 2007 to improve the health of children with asthma in Hamilton County, where Cincinnati Children's is located. Given the medical center's prominent role in treating Medicaid-insured children, the AIC's leaders decided to focus their improvement work on this low-income population, for whom barriers to care can be severe (Exhibit 2).¹¹ The will to take action grew from the group's collective experience with asthma care, its knowledge of the health burden imposed by uncontrolled asthma in a disadvantaged population, and the opportunity to build on successful asthma initiatives already under way.

The AIC set a strikingly "audacious" goal that would require substantial and sustained improvements in care for this population: to eliminate within five years all asthma-related hospitalizations and ED visits, which were seen as markers of poor asthma control and patient well-being. That goal supports the medical center's strategic plan to "deliver demonstrably superior

Exhibit 2. Profile of Urban Primary Care Patients Using Cincinnati Children's Hospital Medical Center

In the neighborhoods of Cincinnati surrounding Cincinnati Children's, 47 percent of children live in poverty and 26 percent of those live in extreme poverty, according to the Cincinnati Child Health-Law Partnership.^a Within this urban population, the Partnership reports that:

- 16 percent of mothers are under the age of 18
- only 28 percent of new mothers receive adequate prenatal care
- 36 percent live in neighborhoods that are unsafe for outside play or lack social support or child care
- 69 percent lack funds to buy medications, provide sufficient food, or avoid living in substandard housing
- 9 percent of families experience adult physical violence in the home

The prevalence of childhood asthma is much greater among children living in the city of Cincinnati than among those in the Greater Cincinnati region (17.3% vs. 13.9%), and among local children insured by Medicaid than among those with private insurance (20.0% vs. 12.1%), according to a 2005 survey conducted by the medical center.^b

^a <http://www.cincinnatichildrens.org/service/g/gen-pediatrics/services/child-help/>.

^b Cincinnati Children's Hospital Medical Center, James M. Anderson Center for Health Systems Excellence, *2005 Child Well-Being Survey*, available at <http://www.cincinnatichildrens.org/service/j/anderson-center/health-policy/well-being>.

outcomes and experience at the lowest possible cost and discover and apply better ways to improve the health of more children, here and around the world.”¹² The team viewed a hospitalization for asthma as a sentinel event representing potential failures in outpatient management and, as such, an opportunity to identify and intervene with high-risk patients to take preventive action that would break the cycle of hospital use in the future.

The team identified barriers to achieving the goal as well as strategies to surmount them, which formed a “logic model” for carrying out the work. From their collective experience in asthma care, leaders in the AIC understood that many aspects of health care delivery contributed to poor asthma control. The high rate of asthma-related ED visits and hospitalizations suggested the presence of gaps in preventive asthma management. Lack of coordination and planning during patients’ transition back to primary care prevented some children from receiving ideal asthma care. This deficiency was apparent in low attendance at follow-up visits, failure to connect families with social services, and irregular collaboration among providers and with Medicaid managed care organizations (MCOs).

Beyond these care delivery issues, the AIC also sought to identify and address the wide array of

environmental barriers to asthma control faced by low-income families. Those barriers were defined broadly to include not only conditions of the physical environment such as air quality, moldy homes, and allergen exposure, but also social and financial factors such as lack of accessible transportation to the pharmacy or doctor, complex familial situations, and other impediments to appropriate care. Given this framework, the AIC recognized that significant progress would require improving inpatient care and postdischarge care transitions, linking families to social and/or legal services, and intensifying community-based care management for complex, high-risk cases.

THE STEPS OF CHANGE

Improvements to Inpatient and Emergency Care

Work began on the inpatient unit, where there was a robust quality improvement infrastructure. Because the team knew from experience that low-income patients often face barriers to filling prescriptions, they determined that asthma patients should leave the hospital with a 30-day supply of asthma medications to establish the habit of good asthma control. To make this service more affordable and efficient, the team worked with the inpatient pharmacy department to expand a pilot process for relabeling medications left over from

the inpatient stay so that patients can use them at home. These perfectly usable medications were previously being discarded, a common practice that could be modified to reduce waste while complying with prescription labeling laws. In addition, the team worked with the outpatient pharmacy to ensure that patients had access to additional necessary asthma medications at discharge.

Discussions with Medicaid MCOs informed changes to improve information coordination during hospitalization. The MCOs requested that the medical center notify them when an asthma patient is admitted to the hospital so that the family may quickly obtain information about and coverage for available services. This notification engages the MCO's case managers early in the episode of care to help families get timely access to tangible resources, including transportation and durable medical equipment (such as a nebulizer), or prior authorization for medications. This communication strengthens the collaborative relationship between the medical center and payers to support transitions in care and reinforce the plan of care. As a result, notification of the MCO has become the norm when an asthmatic child enrolled in Medicaid arrives at Cincinnati Children's, occurring in over 95 percent of these hospital visits.

Building on the medical center's prior quality improvement work, the team developed protocols so that patients are reliably provided an evidence-based bundle of care for asthma in children.¹³ Then, to determine the child's level of asthma severity and risk for readmission, a respiratory therapist uses a revised version of the Child Asthma Risk Assessment Tool (CARAT) to assess medication adherence and knowledge of asthma management, identify potential barriers to effective asthma control, and recommend next steps.¹⁴ These may include referral to an asthma specialist, social services, care coordination, or the hospital's new Home Health Asthma Pathway (HHAP) (described on [pages 8–9](#)). The medical center is currently testing methods for consistently engaging both nurses and physicians in reviewing the CARAT as a means of ensuring that referrals are made reliably and to appropriate resources.

Children are not discharged from the hospital or ED until the following criteria are met:

1. the child is on room air and stable on current therapies;
2. required acute and maintenance therapies can be continued safely and competently at home, as discussed and agreed with the primary care physician;
3. follow-up plans are arranged; and
4. individualized patient/family education is completed.

Improvements in Transitional Care and Ambulatory Care Management

Other changes were designed to improve postdischarge care transitions. The medical center had previously created a process to ensure timely provision of the discharge summary (prepared by the attending physician) and asthma action plan (prepared by the respiratory therapist) to the patient's primary care physician. This process was extended to include provision to the MCO. Because many factors can interfere with a low-income family's ability to schedule and keep a follow-up appointment, the medical center schedules an appointment at the medical center's (or another) primary care clinic to occur if possible within three to five days of discharge, when patients have typically finished their dose of oral steroids prescribed at discharge. If a patient misses a follow-up appointment at one of the medical center's primary care clinics, a primary care triage nurse calls to reschedule the appointment within 30 days of discharge, by which time the family will need to refill the initial 30-day supply of controller medication.

Those leading the initiative also knew there would be a need for intensive care coordination to manage a limited number of highly complex cases, which they defined as children having one or more hospital admissions and/or two or more ED or urgent care visits within the past year. The AIC applied for financial support from the medical center's internal innovation fund to hire and train a social worker to

serve as a full-time care coordinator in one of its primary care clinics (Exhibit 3). Showing promising results from this pilot (see “[Results](#)” section), the medical center subsequently obtained external funding for two asthma care coordinators through its participation in the Greater Cincinnati Beacon Collaboration as part of a broader intervention to transform chronic care management using health information technology. The Greater Cincinnati Beacon Collaboration is one of 17 sites participating in the Beacon Community Cooperative Agreement Program, funded by the federal Office of the National Coordinator for Health Information Technology.¹⁵

Asthmatic children who meet the criteria for care coordination are referred to the program during the hospital stay or by their primary care clinics or the family’s Medicaid MCO. The asthma care coordinators see patients in the medical center’s three primary care clinics (Exhibit 4) or at any location within the hospital. When a child is hospitalized, one of the coordinators will meet with the child and family during the hospital stay, if possible. At the primary care follow-up visit, the care coordinator will assess barriers to the child’s asthma care (using the CARAT tool), determine what is needed to overcome these barriers, provide education on asthma self-care such as how to avoid asthma triggers and use medications, and make sure that the family has followed through on referrals for services. The coordinator typically meets with the family before they see the doctor so that they are better prepared to address both medical and nonmedical needs affecting the plan of care and to make the best use of their time with the doctor.

A large part of the care coordinator’s role is to work with the family to identify and overcome factors in the family’s home life that may be a barrier to maintaining good health. Common barriers faced by families include a lack of money or means of transportation, exposure to harmful substances, housing issues such as the presence of mildew or mold that can exacerbate asthma, and a multiplicity of caregivers, making it difficult to establish a self-care routine. The care coordinators also help the family navigate the complex web

of social service, public, and health care organizations with which a family may be involved, such as:

- the Medicaid MCO, to obtain coverage for needed services such as transportation to the doctor;
- the child’s school, to facilitate asthma medication use during the school day;
- the local health department, to connect families with programs to mitigate environmental barriers;
- legal aid services, to help resolve issues such as substandard housing or qualification for public assistance (described in [Appendix B](#)); and
- the housing agency, to obtain permission (under Section 8 rules governing subsidized housing) to move the family to better living conditions when housing issues cannot be resolved.

The care coordinators attempt to connect with targeted patients at every primary care clinic visit, regardless of whether the child is sick or well, and by telephone for as long as needed to sustain successful self-care habits and good asthma control. They collaborate with the medical center’s home health agency to monitor home conditions and care needs for patients receiving home health care. If a patient is readmitted to the hospital, care coordinators visit the patient in the hospital and work with inpatient staff to build common understanding of the patient’s history, care plan, medication regimen, and other issues that need to be addressed. This cross-site visit also creates continuity when the patient returns to the outpatient setting for follow-up care.

Given the rotations among the medical residents and attending physicians that staff the academic clinics, the care coordinators also play a valuable role in promoting continuity in the patient’s outpatient care. The care coordinators fulfill this role in a more intensive and sustained fashion than could be done by social workers on the team, who have significant caseloads and responsibilities for the overall clinic population. Together, the two care coordinators manage a caseload of more than 180 children with asthma. Because it

Exhibit 3. Training Provided to Asthma Care Coordinators

- Attendance at the American Lung Association's Asthma Educator Institute to develop core knowledge and skills in asthma management^a
- Training in "healthy homes" assessments by an environmental health specialist affiliated with the public health department^b
- Self-management training through the Self-Management Collaborative at Cincinnati Children's
- Shadowing experiences in the primary care clinics and the medical center's specialty asthma center

^a For more information on the Asthma Educator Institute, see <http://www.lung.org/lung-disease/asthma/resources/for-health-professionals/asthma-educator-institute.html>.

^b City of Cincinnati Health Department, Healthy Homes Assessments, available at <http://www.cincinnati-oh.gov/health/pages/-44225-/>.

represents such a small portion of the target population, they have begun to prioritize cases that need greater attention. The criteria they use are low asthma-control score, poor readiness for self-management of care, and the coordinators' clinical assessments of families' level of engagement in their care.

Improvements Facilitated by Information Technology

Health IT is an important component of the medical center's quality improvement work. After piloting an initial electronic health record (EHR) in the primary care clinics in 2004, the medical center transitioned the hospital and primary care clinics to a new EHR that went live in 2011. The new common system facilitates the exchange of information and communication between these care settings, increasing the probability of executing high-quality transitions. The medical center customized the EHR so clinicians could reliably collect information about social and environmental factors during routine primary care visits, and make electronic referrals to resources from community agencies just as they would for specialty care. Care coordinators use a specially designed module in the EHR to document patients' progress on self-management education and coordination with community services. Contact notes can be routed directly to a physician's electronic inbox, or the clinician can review them in the electronic record. In addition, the practices receive an electronic notification when patients are admitted to the hospital or visit the ED.

Because it had developed a collaborative relationship with the state Medicaid agency, Cincinnati Children's was quick to learn about a new CyberAccess service enabling Medicaid providers to view historical pharmacy claims data for Medicaid patients. AIC care coordinators make use of this information to confirm whether or not patients have filled their prescriptions. They use this knowledge to provide further education on treatment adherence, recognize barriers to medication access, and identify discrepancies in the medications patients are prescribed by multiple providers. This information access is now in question, as management of pharmacy services for the state's Medicaid enrollees has been transferred back to MCOs. The medical center still has access to pharmacy data through a Web portal operated by one large MCO, and is working with the state to explore feasible options for continuing providers' access to these data for other Medicaid MCO patients.

As part of a research study funded by the National Institutes of Health, researchers are geocoding the home addresses of participating asthma patients to map asthma episodes across the city (Exhibit 5). These data are combined with neighborhood-level data on income, education, poverty, and housing characteristics to identify common issues and opportunities for intervention. For example, working with the Health Department and Legal Aid Society, the team discovered common environmental factors at play among a number of children whose asthma was likely exacerbated by squalid housing conditions in apartments owned by a single developer. Legal Aid helped the

Exhibit 4. Primary Care Clinics at Cincinnati Children's Hospital Medical Center

The Pediatric Primary Care Clinic (PPCC) at the medical center's main campus provides more than 35,000 patient visits annually, seven days per week. Approximately 85 percent of patients are insured by Medicaid and 10 percent are uninsured. The PPCC is staffed by physicians from the medical center's Division of General and Community Pediatrics, supported by a care team that includes nurse practitioners, registered nurses, social workers, and medical assistants. The PPCC also serves as a community-based teaching site for medical interns and residents.

Services offered at the clinic include:

- Child life specialists who work with children and their families to promote normal growth and development as well as support during challenging procedures in the clinic;
- Nutrition specialists who help patients and families understand and meet nutritional needs in the context of their community setting and culture;
- Social workers who help patients and their families deal with concerns about an illness or disorder and help families find resources to support optimal health, among other things;
- Legal aid to help resolve legal and social issues that can undermine children's health (described in [Appendix B](#));
- The Reach Out and Read program, which promotes parenting and literacy skills by providing an age-appropriate book to each child at clinic visits; and
- Colocated psychiatry nurse practitioner to take direct referrals of children with behavioral and mental health needs.

The medical center also operates the Hopple Street Health Center—an urban neighborhood health center that colocates community services such as a WIC office with a primary care and dental clinic—as well as a new primary care center, Fairfield Primary Care in Butler County, just north of Cincinnati. Both sites offer weekend hours, social services, and referrals to legal aid. Nurses are available by telephone to all primary patients 24 hours per day.

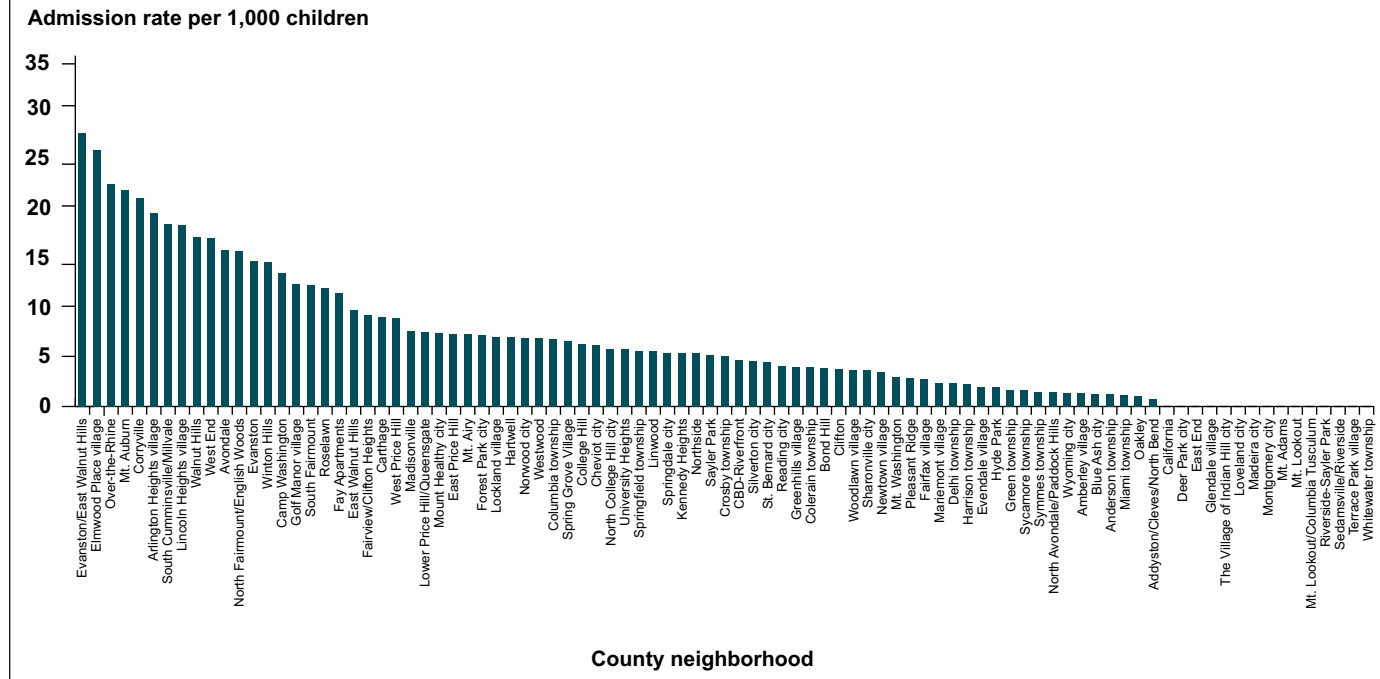
residents to form a tenants' association and advocate for repairs.¹⁶

Improvements in Home Health Care

Using Wagner's Chronic Care Model as a framework, the AIC viewed home health services as another valuable opportunity to support families in managing their children's asthma in the home, where environmental challenges can be identified and addressed on the spot. The medical center's home health agency served as a natural, integrated partner for developing a Home Health Asthma Pathway (HHAP) to serve patients with severe asthma requiring a heightened level of attention after leaving the hospital. A patient is eligible for a referral to HHAP if she or he has had admissions or ED visits for asthma, has difficulty with treatment adherence, the family requires in-depth education on asthma control, or there are environmental issues at

home that must be resolved. Seventy percent of the children who complete the program have well-controlled asthma, according to the medical center.¹⁷

The HHAP provides a standard set of baseline services during the first two home visits. During the first visit, the home care provider assesses the quality of a patient's care transition and ensures that the family has the necessary medications, education on asthma and on the use of a metered dose inhaler, a follow-up primary care appointment, and an understanding of the child's care plan. The second visit involves reinforcing asthma control skills and education (e.g., identifying and responding to triggers), assessing the family's self-management skills, and measuring the child's health status with the *Asthma Control Test*, a five-question survey used to measure the elements of asthma control defined by the National Heart, Lung, and Blood Institute (NHLBI).¹⁸ Subsequent visits are more

Exhibit 5. Variation in Asthma Admission Rates within a Single County

flexible and tailored to the particular needs of each family, with a primary focus on supporting the family's self-management ability.

RESULTS

The Joint Commission reported that, from October 2010 to September 2011, Cincinnati Children's achieved 100 percent compliance on two quality measures of inpatient asthma care for children: the use of relievers and systemic corticosteroid medications. This performance is consistent with the national average of 100 percent compliance on these measures. The hospital provided a home management plan of care to 87 percent of asthmatic children at discharge, compared with a national average of 83 percent on this measure, according to the Joint Commission.¹⁹ Currently, 67 percent of hospitalized children with asthma receive a primary care follow-up visit within seven days of discharge, and 85 percent receive a follow-up visit within 30 days, according to the hospital.

Cincinnati Children's data show that the combined rate of asthma-related ED revisits and inpatient

readmissions within 30 days of inpatient discharge for asthma fell 50 percent among Medicaid-enrolled children (ages 2 to 17) in Hamilton County from a median monthly rate of 11.1 percent in the baseline period from 2003 through 2007, to 5.8 percent in the intervention period from 2008 through 2011. The current median monthly rate has since fallen further to 3.9 percent (based on a rule that a new median is not calculated until there have been eight consecutive months with a rate below the previous monthly median). The medical center also reports a reduction in the rate of 90-day readmissions for asthma within this population.

For the cohort of 185 high-risk children who received intensive-care coordination services, the medical center reports that average time between visits to Cincinnati Children's (ED visit or hospital admission) lengthened from a baseline of 173 days in May 2009 to 275 days by January 2012. A combined rate of asthma-related ED/urgent care visits and hospital admissions declined from 5.5 to 3.5 per 1,000 days of enrollment in care coordination.²⁰

Limitations

This case study utilized data collected by Cincinnati Children's for this quality improvement project on pediatric asthma care. These data measure changes over time in the intervention population only (Medicaid-insured children with asthma in Hamilton County who received asthma care at Cincinnati Children's). It is not possible to determine the relative contribution of each intervention component (including legal aid services) to the observed improvements based on these data alone, nor possible to attribute changes directly to the set of AIC interventions as a whole. Temporal associations suggest that reductions in rates of hospital readmissions and ED revisits began with medication access and accumulated with the intensification of outpatient care coordination (e.g., addition of a second full-time care coordinator in July 2011, referrals to the Home Health Asthma Pathway). Additional results are forthcoming from an external evaluation of the AIC's impact conducted by Mathematica Policy Research as part of the Business Case for Quality Phase II initiative sponsored by the Center for Health Care Strategies and funded by the Robert Wood Johnson Foundation and The Commonwealth Fund.²¹ Results from the independent evaluation are not directly comparable to the hospital data reported here because of differences in data sources, analytic methods, timeframes, and primary outcome measures.

NEXT STEPS

Building on the work of the AIC, Cincinnati Children's has set an institutional strategic goal of creating an integrated community asthma program that will reduce hospital use (inpatient admissions and ED visits) by 20 percent overall among asthmatic children in Hamilton County by 2015. This initiative is one of several that support an overall community health goal: to "lead, advocate and collaborate to measurably improve the health of local children and reduce disparities in targeted populations." Components of this objective include the following:

Expanding the scope of improvement work across the community

The AIC's leaders are interested specifically in spreading this innovative care approach to the other key safety-net providers in the Greater Cincinnati area: federally qualified health centers (FQHCs) and primary care clinics funded and operated by the Health Department. They acknowledge that incorporating these organizations is essential if they hope to achieve their ambitious goal of eliminating all asthma-related hospital use among children on Medicaid. Cincinnati Children's has committed to working collaboratively with an array of community-based organizations and the residents of several urban neighborhoods to better understand the scope of asthma and other targeted health issues and to identify effective and innovative ideas for addressing them.²²

They also hope to spread school-based asthma care improvements to other school-based health centers that were not involved in the earlier Pursuing Perfection project ([Appendix A](#)),²³ and to discover how to apply the approach in schools lacking a dedicated health center. Toward that end, the AIC is partnering with the health department and the local school district to create a pilot project in which school nurses and school health assistants will assess asthma control for all children with asthma in the district. The idea behind this pilot is that routine screening will improve the identification of children in need of attention before they have an emergency, and help children who lack a usual provider to establish a relationship with a primary care "medical home." This model of school-based screening and referral, however, may not have the capacity to provide all severely asthmatic children with the kind of care coordination currently available through the medical center.

Shifting the focus toward prevention

The AIC's leaders also see an opportunity for expanding the application of this improved model of care. Initially, the redesigned care approach began once an asthmatic child was admitted to Cincinnati Children's or treated in its emergency department. Now, however,

patients can be referred by any outpatient primary care provider in the community or by the MCO to the Home Health Asthma Pathway. Mona Mansour, M.D., director of primary care and school health services, suggested that even greater progress might be made by proactively engaging with families soon after children are diagnosed with asthma. Ideas such as these are challenging the team to further improve the population's health by spreading the approach to more providers and care settings.

Expanding medication access in the outpatient setting

While Cincinnati Children's has greatly improved patients' access to asthma medications by providing the medications to nearly all patients *before* hospital discharge, ensuring continued access once the child returns home is a challenge to which the AIC is seeking innovative answers. Working on this challenge requires modifying clinic processes and collaborating with local pharmacies to overcome patients' common barriers to obtaining medication, such as lack of transportation. For example, the medical center is currently testing methods of automating pharmacy refills at hospitals and through a community pharmacy that delivers medications directly to patients' homes. The primary care clinician asks families of care-coordinated patients if they want home delivery; if so, the clinician provides instructions with the electronic prescription to the pharmacy. Clinic support staff then follow up with the pharmacy and notify a care coordinator if necessary to resolve any problems with home delivery.

Pursuing an integrated system of electronic health information exchange across the medical community

Cincinnati Children's is applying learning from the AIC and related initiatives to participate in the Greater Cincinnati Beacon Collaboration, which is advancing the use of information technology and electronic data exchange among 40 community PHO practices and three hospital clinics engaged in child asthma care improvement.

INSIGHTS AND LESSONS LEARNED

Setting an ambitious goal for population health improvement requires a shared vision and a will for change grounded in adaptable strategies to achieve it. Cincinnati Children's generated momentum by beginning this work on the inpatient unit, where they believed the capacity for change was greatest because of previous experience of improvement and because there were clear evidence-based interventions to be implemented. Engaging service leaders and units across the care continuum (inpatient, ED, asthma specialty services, primary care, pharmacy) was important to fostering teamwork and a shared vision. This unified effort led to a shared commitment to spread the work into the outpatient setting, where there was even greater opportunity for achieving results by following strategies that were linked to overcoming barriers to good health at the patient level. Ultimately, achieving this holistic approach depends on a "culture change," according to Mona Mansour. "It requires changing the mind-set for asthma care from 'here are your breathing treatments and steroids' to one where you look to see what can be initiated to alter the overall trajectory of care for the patient once they leave the hospital," she says.

Aligning population health improvement with the organization's mission and strengths builds institutional support for innovative approaches. Cincinnati Children's has been institutionally invested in quality improvement for many years, particularly in the field of asthma care. The AIC gained institutional support because it was seen as a logical means of realizing the institution's mission and strategy, which ultimately embraced a broader community focus for work that helped to address the social determinants of health. Of particular interest is that this support was not initially expressed in the form of dedicated financing. Instead, a culture of improvement and innovation empowered the Division of General and Community Pediatrics to seek creative solutions such as medication relabeling. Only later did this support translate into dollars for hiring an ambulatory care coordinator on a pilot basis.

Collaborating with payers can produce mutual benefits supporting care improvement in the short term, even without a formal incentive structure for sharing savings. A willingness to maintain open communication with payers, in this case three Medicaid managed care organizations, led to shared transparency regarding what was wanted and needed to have a successful relationship and advance the common goal of improving patient health and reducing costs. The MCOs wanted to know in real time when patients were admitted; the hospital wanted to connect patients' families to important resources and coordinate ongoing asthma care. The care coordinators found that coordinating benefits for high-risk asthma cases was much easier when the payer identified a dedicated person (usually one of their case managers) who could be contacted without repeatedly going through the routine phone network.

Understanding common barriers to effective asthma control and strategies for their mitigation led to a broader focus that included community resources for addressing social determinants of health. Consistent with the Chronic Care Model, the AIC recognized explicitly the importance of establishing relationships with a broad array of community services and organizations to address nonmedical determinants of health that are particularly salient for a low-income population. A close working partnership with legal aid services proved to be a critical mediator for addressing housing issues that trigger asthma and thereby increased the effectiveness of the intervention. From a clinical perspective, understanding and addressing patients' difficulty in accessing and effectively using medication was a key factor in improving care, according to Mansour.

The effectiveness of care coordination in supporting chronic disease management in this population has been enhanced by face-to-face human interactions aided by information technology. The opportunity for coordinators to meet with families in the primary care setting has been important in establishing a rapport, understanding the full array of needs and barriers that

children face, and providing individualized education to promote self-care at home, according to Brandy Wiener, who was first hired for the care coordinator role. Wiener also accompanied a nurse on a home visit to gain an appreciation of how interacting with home health services maximizes the value of information from in-home assessments. The value of face-to-face care management is substantiated by literature that finds this modality more effective than telephone encounters alone.²⁴ The care coordinator's job has been enhanced by the ability to use the electronic health record to share documentation with and receive notifications from the clinical team.

Defining the success of an intervention depends on the available data and outcomes chosen.

Organizations and leaders engaged in quality improvement must rely on available data to assess the effects of their work as it proceeds, using measures that are likely to detect meaningful changes that will help them gauge whether their efforts are on the right track. The independent evaluation of this initiative offered another perspective using population-based data that were not available to the medical center. While internal results of the initiative appear promising, the external data suggest it may not yet have impacted county-level outcomes during the time period of the study. Such evaluation can provide useful insight to recalibrate quality improvement to achieve goals over a longer time horizon.

POLICY IMPLICATIONS

There is currently no national policy that offers incentives for Medicaid providers to reduce unnecessary hospital use. Because Medicaid is a federal–state partnership, some innovative payment approaches are occurring at the state level, though they have been aimed primarily at managed care organizations rather than providers.²⁵ In an effort to make its model effective and self-sustaining, Cincinnati Children's leaders have begun talks with Medicaid MCOs to design a shared savings mechanism to help fund the interventions.

The Cincinnati Children's Asthma

Improvement Collaborative took place in the context of an urban pediatric academic medical center. The degree to which the approach can be replicated at other health care organizations may depend on their leadership and quality improvement infrastructure, their ability to marshal internal and external resources to support change, the relative size of the target patient population, and the institution's mission and commitment to promoting integrated asthma care. Widespread adoption of this type of intervention seems unlikely without supportive changes in state and national policy.

The other case studies in our *Innovations in Care Transitions* series examine UCSF Medical Center's heart failure care management initiative and the Visiting Nurse Service of New York's managed care plan for lower-income, vulnerable patients. To read them, along with a synthesis of findings from all three case studies, visit our website at <http://www.commonwealthfund.org/Publications/Case-Studies/2013/Jan/Care-Transitions-Synthesis.aspx>.

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Appendix A. Laying the Foundation for Collaborative Asthma Improvement

The Asthma Improvement Collaborative, for Medicaid-insured children treated at Cincinnati Children's Hospital Medical Center, built on the experience of an earlier initiative involving community physicians. The primary care independent practice association (Ohio Valley Primary Care Associates, L.L.C.) and physician-hospital organization (Tri State Child Health Services, Inc.) affiliated with Cincinnati Children's Hospital Medical Center launched a large-scale asthma improvement initiative in October 2003 across 38 community-based pediatric practices, affecting population-based process and outcome measures for nearly 13,000 children with asthma (approximately 40% of the pediatric asthma population of Greater Cincinnati). This is an ongoing initiative that targets a predominantly commercially insured population.

In early 2004, the PHO approached Anthem Blue Cross and Blue Shield of Ohio, the largest commercial insurer in Greater Cincinnati, to solicit support for an asthma pay-for-performance (P4P) program. The asthma P4P program offered a three-tier incentive structure to accelerate practice engagement in improvement work and to reward measurable improvements in asthma care at both the network and the practice level.ⁱ The program has since become part of Anthem's community-wide P4P program that includes asthma metrics.

The PHO asthma initiative couples P4P with a comprehensive approach to quality improvement. Strategies to drive system changes include:

- Strong physician leadership at the board and practice levels;
- Network-level goal-setting by the board (network-level improvement defines success);
- Measurable practice-level expectations or requirements for quality improvement participation (linked to American Board of Pediatrics Maintenance of Certification approval and payer reward programs);
- Multidisciplinary practice quality improvement teams;
- A Web-based registry with all-payer population reconfirmation at regular intervals;
- Real-time patient-, practice-, and network-level data/reporting; transparent, comparative practice data on process and outcome measures;
- Concurrent use of data collection and a decision support tool at point of care through high-reliability principles/workflow changes (to generate disconfirming data at point of care);
- P4P and other incentive models aligned with improvement objectives;
- Focus on key components of evidence-based care ("perfect care" composite measure);
- Standardized criteria for segmenting population with a significant focus on "high-risk" cohort;
- Cross-practice communication and shared learning forums to spread successful interventions;
- Integration of multiple administrative and electronic data sources (hospital, practice, regional health information exchange); and
- Network- and practice-level sustainability measurement and interventions.

ⁱ K. E. Mandel and U. R. Kotagal, "Pay for Performance Alone Cannot Drive Quality," *Archives of Pediatrics and Adolescent Medicine*, July 2007 161(7):650–55.

Through a health information technology innovation enabled by the PHO's participation in the Greater Cincinnati Beacon Collaboration, the PHO is combining data from regional hospitals and Cincinnati Children's to provide secure e-mail alerts to community practices when a patient with asthma is admitted to the hospital or visits the ED or another urgent care setting. The alerts transmitted by the PHO to physician practices include a hyperlink to the PHO's Web-based asthma registry. The alerts are linked to a comprehensive root cause analysis process conducted by practices to identify and address factors underlying asthma exacerbations. This process includes recruiting parents to share their perspectives so as to help prevent future recurrences. In another health information technology intervention linked to the Beacon grant, physician practices are using a Web-based decision support tool, developed by the Asthma Center at Cincinnati Children's, that generates evidence-based treatment recommendations based on national asthma guidelines.

The PHO asthma initiative has also informed the American Academy of Pediatrics (AAP) Chapter Quality Network (CQN) program, which is designed to build improvement capability across AAP state chapters and member practices, with an initial focus on asthma. To date, the AAP CQN program has improved asthma care and outcomes across five states.ⁱⁱ

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Appendix B. Cincinnati Child Health-Law Partnership (Child HeLP)

The Cincinnati Child Health-Law Partnership (Child HeLP)ⁱⁱⁱ is a collaboration between Cincinnati Children’s Hospital Medical Center and the Legal Aid Society of Greater Cincinnati that seeks to break the link between poverty and poor child health in two ways: 1) by training and educating physicians to screen for legal and social issues that may be affecting their low-income patients, and 2) by providing information, advice, and advocacy to resolve legal issues that may affect the health and well-being of children and families.

More than 550 families are referred to Child HeLP each year. While social workers at the medical center can address many environmental barriers that patients experience, the care team can offer families a referral to Child HeLP when it identifies legal issues. A team of attorneys and paralegals is available in the clinic five days a week to provide information, advice, or representation. Outcomes may include helping families to:

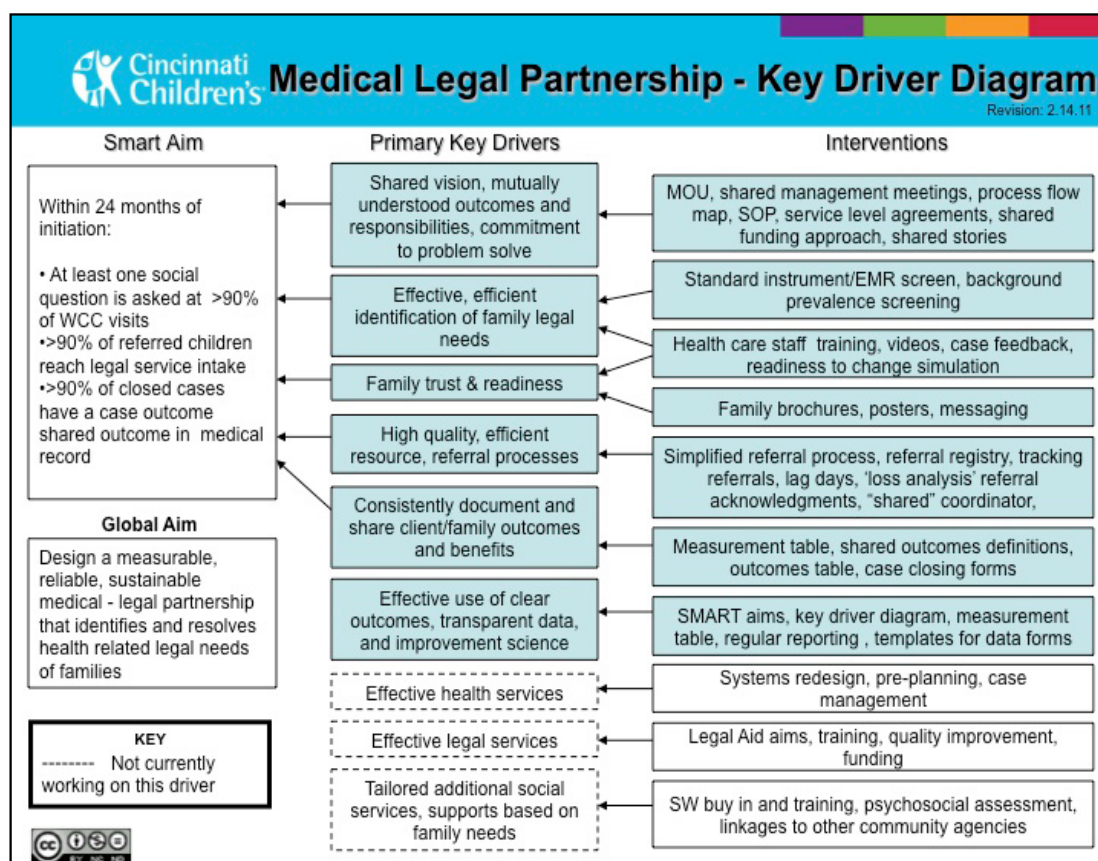
- Prevent or postpone eviction from rental housing;
- Maintain subsidized housing;
- Secure repairs for substandard housing conditions;
- Retain or obtain child custody;
- Secure public benefits for health and welfare;
- Obtain health insurance;
- Prevent loss of steady income;
- Resolve legal issues that are barriers to employment;
- Secure special education services in school; and
- Prevent or mitigate school expulsion.

Since the Partnership became fully functional in 2008, the Child HeLP team has worked to create a “culture of advocacy” that promotes the adoption of regular screening, identification, triage, and referral for social and legal issues affecting health. First-year residents serving in the Cincinnati Children’s Pediatric Primary Care Clinic visit Hamilton County Job and Family Services and a food bank to learn about their services, and attend lectures and interactive sessions on social determinants of health, budgeting, public benefits, housing, and education. The program also provides short noon refreshers about its role and resources by reviewing Child HeLP cases and outcomes, and holds short meetings during the residents’ daily continuity clinic to discuss housing, family law, education, and public benefits.

To translate this new culture into meaningful improvements for patients, the medical team had to start reliably collecting information on social and legal issues that might adversely affect a family’s health and well-being. Clinicians, lawyers, and social workers collaborated to create a core set of questions that were added to the EHR so that they could be asked and made accessible by providers engaged in a family’s care across all Cincinnati Children’s primary care settings. This cross-disciplinary effort succeeded in creating an effective tool for identifying the families that could benefit most from legal assistance made available through the Partnership.

ⁱⁱⁱ Information on Child HeLP was adapted from <http://www.cincinnatichildrens.org/service/g/gen-pediatrics/services/child-help/> and from *Removing Barriers to Care with Medical-Legal Partnership*, a January 12, 2012, webcast produced by the Institute for Healthcare Improvement, available at <http://www.ihl.org/knowledge/Pages/AudioandVideo/WIHIRemovingBarriersto-CareMedicalLegalPartnerships.aspx>.

The sharing of relevant information by the medical and legal teams is a critical component of the program, and one that comes with its own set of challenges. The cultural gap between medicine and law, along with separate legal protections for medical and legal information, needed to be overcome to enable a more communicative partnership. Child HeLP bridged that gap by developing a shared understanding of what processes needed to happen and when, and getting individuals' committed consent to speak with one another. The Legal Aid Society uses a referral registry to track patients and communicate the information to physicians and social workers so the medical team knows what happened to the patient it referred, and is able to follow up with the family during subsequent visits. The Partnership has developed a driver diagram that identifies interventions for achieving its aims:



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