Improving Inpatient Asthma Management: The Implementation and Evaluation of a Pediatric Asthma Clinical Pathway

Teresa G. Magruder, MD, MPH*; Sridaran Narayanan, MD*; Susan Walley, MD*; Tony Powers, RRT†; Hollace Whitlock, MPH‡; Kathleen Harrington, PhD, MPH§; Terry C. Wall, MD, MPH*

ABSTRACT

Introduction: Asthma exacerbations are a leading cause of pediatric hospitalizations. Despite national guidelines, variability exists in the use and dosing of bronchodilators, oxygen management, and respiratory assessments of patients. We aimed to implement an inpatient Asthma Clinical Pathway (Pathway) to standardize care and reduce length of stay (LOS). Methods: A respiratory therapy-driven Pathway was designed for inpatient asthma management. The Pathway included standardized respiratory therapy assessments, bronchodilator dosing, and protocols for progression and clinical worsening. We monitored key process measures. Patients admitted to the Pathway during pilot implementation (March to December 2011) were compared retrospectively with a “Usual Care” cohort admitted during the same period. We compared average LOS, average billed charges per hospitalization (charges), and 30-day readmissions between groups. Statistical process control charts were utilized to analyze LOS and charges for all asthma admissions following Pathway implementation (March 2011 to September 2016). Readmissions and Pathway removals were balancing measures. Results: During pilot, Pathway patients (n = 153) compared with “Usual Care” patients (n = 166) had shorter LOS (0.95 versus 1.86 days; P < 0.001) and lower charges ($7,413 versus $11,078; P < 0.001). Readmission rates were not significantly different between groups. LOS for all asthma admissions (n = 3,429) decreased from 2.30 to 1.44 days (P < 0.001) following Pathway implementation. Charges remained stable. The readmission rate (per 100 discharges) for all asthma was 2.42 and not significantly different between Pathway and non-Pathway groups. Conclusions: Pathway implementation reduced LOS and stabilized charges while not increasing readmission rates. The Pathway facilitated sustainable widely adopted improvements in asthma care. (Pediatr Qual Saf 2017;2:e041; doi: 10.1097/pq9.0000000000000041; Published online August 22, 2017.)

INTRODUCTION

Asthma is one of the most common chronic diseases of childhood, affecting over 6 million children in the United States. Despite the existence of national care guidelines for over 20 years, asthma remains a leading cause of pediatric hospitalizations, school and work absences, and emergency department (ED) visits. The rate of pediatric asthma-related hospitalizations nationwide was 130 per 100,000 children in 2010, one of the highest rates of any chronic illness. In 2009, due to institutional trends of increasing average length of stay (LOS) and average billed charges per hospitalization (charges) for inpatient acute asthma exacerbations, the Quality Improvement Council at our institution chose asthma as the primary target condition for improvement.

National quality improvement (QI) efforts have focused on inpatient asthma. These efforts have demonstrated that inpatient care pathways have improved inpatient asthma outcomes such as LOS and costs. The purpose of this descriptive time-series study is to detail the development, implementation, and evaluation of an inpatient Asthma Clinical Pathway (Pathway) with the aim to standardize inpatient asthma management and reduce LOS.

METHODS

This QI initiative took place at Children’s of Alabama (COA; Birmingham, Ala.), a large (300+ beds) urban tertiary care facility. COA is the only free-standing pediatric...
hospital in Alabama and serves as the primary source of pediatric inpatient care in the area. Annually, there are over 2,000 asthma-related ED visits and over 650 inpatient admissions. Except for patients requiring intensive care, asthma patients experiencing an acute exacerbation are admitted to a general pediatric service or the pulmonary service.

Pathway Development
A physician champion from the Division of Pulmonary and Sleep Medicine and an inpatient respiratory therapist (RT) led the multidisciplinary inpatient Asthma QI Team (QI team). Physician leaders from the Divisions of Hospital Medicine and General Pediatrics, bedside nurses and RTs, pharmacists, and support staff from acute care units were members of the QI team. As the majority of COA asthma admissions are admitted through the ED, ED physicians and patient placement coordinators also participated in Pathway development.

The QI team chose to utilize the Clinical Microsystems\(^4,15\) approach to create a safe, evidence-based RT-driven Pathway. Early work included the collection of baseline LOS and charge data for inpatient asthma management at COA. The QI team conducted benchmarking trips to other institutions utilizing inpatient asthma care pathways. They also reviewed the literature including the National Heart Blood Lung Institute National Asthma Guidelines.\(^2\) The QI team identified the following key drivers (Table 1) for Pathway development: (1) patient assessment and documentation; (2) dosing and spacing of bronchodilators; (3) pulse oximetry monitoring and supplemental oxygen weaning; (4) communication among clinical care team members; and (5) discharge criteria.

Table 1. Pathway Key Drivers and Interventions

| Key Drivers | Intervention |
|-------------|--------------|
| Standardized patient assessment, staff response, and clinical documentation | • Developed Pathway admission criteria and ED checklist for admission • Developed respiratory assessment scoring tool • Developed respiratory RT flow sheet to document all key clinical aspects of patient care in 1 location in chart • Developed standardized timing intervals for patient assessments and documentation of clinical status/Pathway progress • Created standardized order set with weight-based albuterol dosing and guidelines for oral steroid dosing • Created criteria for transition from nebulizer to MDI • Limited ipratropium bromide on Pathway to use only in patients with clinical worsening • Standardized dosing and use of higher dose albuterol and ipratropium bromide in patients with clinical worsening • Spot check pulse oximetry made standard with RT assessments and reserved continuous monitoring for patients receiving supplemental oxygen • Developed criteria for RT staff to decrease oxygen to keep saturations ≥ 92% and for the discontinuation of checking pulse oximetry as patients transitioned to phase 4 if not on oxygen therapy prior during admission (the last phase in Pathway before discharge) • Developed criteria for RT to contact physician regarding patient status at various points on Pathway (i.e., a clinical worsening, patient advancing to phase 4) • Created Pathway discharge criteria: off oxygen, with respiratory scores all good, on phase 4 (q 4 hour albuterol dosing) for a minimum of 8 hours |
| Standardized medication dosing, delivery, and spacing of albuterol | • Created criteria for transition from nebulizer to MDI • Limited ipratropium bromide on Pathway to use only in patients with clinical worsening • Standardized dosing and use of higher dose albuterol and ipratropium bromide in patients with clinical worsening • Spot check pulse oximetry made standard with RT assessments and reserved continuous monitoring for patients receiving supplemental oxygen • Developed criteria for RT staff to decrease oxygen to keep saturations ≥ 92% and for the discontinuation of checking pulse oximetry as patients transitioned to phase 4 if not on oxygen therapy prior during admission (the last phase in Pathway before discharge) • Developed criteria for RT to contact physician regarding patient status at various points on Pathway (i.e., a clinical worsening, patient advancing to phase 4) • Created Pathway discharge criteria: off oxygen, with respiratory scores all good, on phase 4 (q 4 hour albuterol dosing) for a minimum of 8 hours |
| Standardized pulse oximetry monitoring and discontinuation (weaning) of supplemental oxygen | • Created criteria for transition from nebulizer to MDI • Limited ipratropium bromide on Pathway to use only in patients with clinical worsening • Standardized dosing and use of higher dose albuterol and ipratropium bromide in patients with clinical worsening • Spot check pulse oximetry made standard with RT assessments and reserved continuous monitoring for patients receiving supplemental oxygen • Developed criteria for RT staff to decrease oxygen to keep saturations ≥ 92% and for the discontinuation of checking pulse oximetry as patients transitioned to phase 4 if not on oxygen therapy prior during admission (the last phase in Pathway before discharge) • Developed criteria for RT to contact physician regarding patient status at various points on Pathway (i.e., a clinical worsening, patient advancing to phase 4) • Created Pathway discharge criteria: off oxygen, with respiratory scores all good, on phase 4 (q 4 hour albuterol dosing) for a minimum of 8 hours |
| Consistent communication among clinical care team (nurses, RT, physicians) | • Created Pathway discharge criteria: off oxygen, with respiratory scores all good, on phase 4 (q 4 hour albuterol dosing) for a minimum of 8 hours |
| Standardized discharge planning | • Created Pathway discharge criteria: off oxygen, with respiratory scores all good, on phase 4 (q 4 hour albuterol dosing) for a minimum of 8 hours |
Table 2. Respiratory Assessment Scoring Tool with Pathway Advancement and Discharge Criteria

| Assessment/Classification | Advancement to Next Phase | Discharge Criteria |
|---------------------------|---------------------------|-------------------|
| **Respiratory Assessment** | **Wheeze/air exchange**  | **SpO2**          | **FEV1 (if performed) % predicted** |
|                           | Good*                     | Stable O2 requirement, OR > 92% on room air when moving from phase 3† to phase 4 | > 70 |
|                           | Poor (P)                  |                   |                                |
|                           |                             |                   |                                |
|                           | Good*                     | Age < 4 y < 35    | Age < 4 y < 35                |
|                           |                             | Age 5–8 y < 30    | Age 5–8 y < 30                |
|                           |                             | Age 9–12 < 26     | Age 9–12 < 26                 |
|                           |                             | Age 13+ < 23      | Age 13+ < 23                  |
|                           |                             |                   |                                |
|                           | Good*                     | Age < 4 y < 35    | Age < 4 y < 35                |
|                           |                             | Age 5–8 y < 30    | Age 5–8 y < 30                |
|                           |                             | Age 9–12 < 26     | Age 9–12 < 26                 |
|                           |                             | Age 13+ < 23      | Age 13+ < 23                  |

Table 3. Pathway Overview and Progression

- **Assess eligibility**: > 2 years old; primary admission diagnosis of acute asthma exacerbation; no comorbid respiratory disease*; admitted through COA ED†; all respiratory assessment score components either good or fair‡.
- **Admit to phase 2**: Admit to specified general acute care unit§; patient receives bronchodilator treatments and RT assessment every 2 hours (phase 2).
- **Advance to phase 3**: Advance criteria met; space to every 3 hour (phase 3) treatments and assessments, transition to MDI.
- **Advance to phase 4**: Advance criteria met; space to every 4 hour (phase 4) treatments and assessments; RT notifies primary team at time of first 4-hour spacing.
- **Discharge**: Patient will be eligible for discharge when meeting discharge criteria after (2) 4-hour intervals in phase 4.
- **Clinical worsening**: Phases 2–4‡: any poor score, worsening of 2 scores from previous assessment, or a worsening of 1 score accompanied by an increased oxygen requirement.
- **Staff response to clinical worsening**: Phases 2–4‡: patient experiences clinical worsening, RT to notify physician and administer a standardized weight-based intensification treatment of nebulized albuterol and ipratropium bromide to patient. Physician to assess patient. If patient is improved after intensification, patient can reenter Pathway at phase 2.
- **Pathway removal criteria**: By order of physician; change in diagnosis that excludes patients from Pathway; physician orders additional therapy not included in the Pathway (e.g., epinephrine, scheduled ipratropium bromide, bronchodilator dosing outside Pathway range, IV magnesium in phases 2–4).

*Bronchopulmonary dysplasia managed with chronic oxygen or diuretic therapy, chronic aspiration, cystic fibrosis, pneumonia requiring intravenous antibiotics, sickle cell disease, or other chronic lung disease.

†Pathway was later expanded to include direct admissions and transfers (see Pathway Implementation).

‡Phase 1 (severe asthma) patients do not have to meet all good or fair scores on admission and admitted to intermediate care unit. Patients receive continuous albuterol therapy until they meet phase-specific advancement criteria; RT assessments are hourly and patients monitored with continuous pulse oximetry, cardiac monitoring. Physicians notified for phase-specific clinical worsening and every 4 hours while patient on continuous albuterol and when patient meets advancement criteria to transition to intermittent bronchodilator therapy.

§Pathway was later expanded to 4 acute care units and 1 intermediate care unit (see Pathway Implementation).

COA, Children’s of Alabama; IV, intravenous.

This process allowed for close follow-up of Pathway patients and reduced care variability by limiting the number of staff involved in Pathway care. Additionally, during the pilot period, only patients admitted through COA ED were eligible for Pathway to ensure patients met clinical eligibility criteria upon admission. The QI team supported Pathway implementation through daily review of Pathway patients by RT, physician champion, and on-call QI team physician. The physician champion met daily with ED staff to raise Pathway awareness and review Pathway eligibility checklists. The QI team met

physician champion. Training for RT and nursing staff was performed as interactive simulation-enhanced case-based sessions. Physician training was performed through in-person meetings, electronic access to Pathway materials, ongoing e-mail updates, and the provision of quick reference pocket cards.

We implemented the Pathway as a pilot in March 2011. The pilot period lasted through December 2011. During first 30 days of implementation, patients were admitted to a general pediatric attending-only service on a specific acute care nursing unit with respiratory nursing expertise.

We used the Respiratory Assessment Scoring Tool to assess patient status.

Wheeze/air exchange, Accessory muscle use, Dyspnea (if patients are sleeping, please substitute respiratory rate (RR)), Discharge planning...
weekly during the first 6 months of pilot implementation to discuss progress and review outcomes. As Pathway progressed, QI team met monthly, and an RT was designated each shift to carry a specific pager to be first-call for Pathway-related questions.

The Pathway changed key components of asthma care. These changes included (1) standardization of patient assessment and documentation; (2) empowerment of RT(s) to space bronchodilators according to protocol versus relying on physician assessment and orders; (3) standardization of bronchodilator dosing and utilization of metered dose inhalers (MDIs); (4) standardization of spot check pulse oximetry versus continuous pulse oximetry; (5) standardization of physician notifications for clinical worsening and at specific Pathway points to facilitate ongoing management; and (6) standardization of discharge criteria.

The Pathway was modified and expanded through multiple Plan-Do-Study-Act cycles. In June 2011, the Pathway expanded to all inpatient General Pediatric and Pulmonary teams on 2 acute care units. By December 2011, all 3 general pediatric acute care units and the pulmonary unit were open for Pathway patients. Following Pathway pilot implementation period, the RT champion continued to review charts daily. The QI team met regularly each month to review key measures. In August 2012, Pathway expanded to include direct admissions and patients transferred from higher acuity units if they met Pathway eligibility criteria upon transfer to acute care. In August 2013, patients who had an acute worsening that required 4 hours or less of continuous albuterol could stay on Pathway and restart in phase 2 as they improved. In October 2014, the Pathway expanded to include an intermediate care unit protocol (phase 1, severe asthma) for continuous albuterol therapy necessary for management of more severe asthma exacerbations. This final expansion created a continuous inpatient care pathway for asthma management outside the intensive care unit (ICU) setting.

Throughout the expansion, Pathway age and diagnostic eligibility criteria remained the same with 1 exception: patients admitted to the higher acuity (phase 1) protocol did not have to meet good or fair assessment scores on admission. Phase 1 patients also could advance to phase 2 when assessment scores were all good or fair which differs from advancement score criteria in phases 2–4 (Table 2).

Pathway Evaluation
Short-Term Evaluation
To rigorously evaluate short-term outcomes of the Pathway, we obtained institutional review board exemption to retrospectively identify and evaluate a convenience sample group as a comparison for the Pathway patients during the pilot phase. This comparison or “Usual Care” group included patients who were admitted for asthma during Pathway pilot but, for logistical reasons or physician preference, were not admitted to the Pathway. Otherwise, this group met the same clinical and age eligibility criteria as Pathway patients. We confirmed Pathway eligibility by manual electronic chart review. We compared LOS, charges, and 30-day readmissions for patients admitted to the Pathway versus Usual Care from March 2011 to December 2011. Comparisons between groups were performed using chi-square tests for categorical variables and 2-sided independent t tests.

Long-Term Process and Outcome Evaluation
During the initial 3 year evaluation of the Pathway, QI team tracked compliance with key process measures for each Pathway patient. These included (1) RT assessment within 20 minutes of arrival to inpatient unit; (2) appropriate physician notification when patient approached discharge criteria; and (3) proper use of spot check and continuous pulse oximetry.

Long-term outcome measures were LOS and charges for all asthma admissions after Pathway implementation (March 2011 to September 2016). All asthma admissions were defined as children between 2 and 18 years of age admitted to COA outside the ICU setting (Pathway and non-Pathway) with a primary diagnosis of asthma and no secondary comorbid respiratory diagnosis at the time of admission. We defined LOS from Pediatric Health Information System (PHIS) Database query as days between admission date and discharge date. Charges were billed charges per hospitalization and included ED charges when applicable. Outcomes were analyzed through statistical process control Individuals (I) charts and compared with baseline LOS and charges.

Thirty-day readmission rates were monitored as a balancing measure and applied to all asthma admissions. We also compared readmissions for Pathway and non-Pathway groups. Comparisons between groups were performed utilizing 2-Sample t tests. Pathway removals for clinical worsening were monitored as an additional balancing measure.

RESULTS
Pathway Short-Term Evaluation
During the initial implementation period (March to December 2011), 319 patients met inclusion criteria and were thus Pathway eligible by clinical criteria; 153 patients were admitted to the Pathway, leaving 166 patients in the “Usual Care” group. Patients were 74% black, 66% male, with an average age of 6.4 years. Pathway patients were more often male, but there were no other significant demographic differences between Pathway and Usual Care groups (Table 4). Compared with Usual Care patients, children assigned to the Pathway had a significantly shorter average LOS (0.95 versus 1.86 days; P < 0.0001) and significantly lower average hospital charges ($7,413 versus $11,078; P < 0.0001). Thirty-day readmissions were not significantly different between groups (2 versus 2; P = 0.93).
**Long-Term Process and Outcome Evaluation**

Compliance with Pathway process measures was better at the 3-year postimplementation evaluation than during the initial 6 months. RT assessment within 20 minutes of arrival to floor improved from 88% to 95%. Appropriate physician notification when patient approaches discharge criteria improved similarly, 88–95%. Appropriate use of intermittent and continuous pulse oximetry improved from 64% to 77%. During the first year of implementation, physicians removed 12% of patients from Pathway. This percentage slowly decreased to 7.7% and 7.3% at 3 and 5 years, respectively. Clinical worsening was the reason for 61% of removals. This percentage remained stable over 5 years.

LOS for all asthma admissions (n = 3,429) decreased significantly following Pathway implementation (2.30–1.44 days; P < 0.001; Fig. 1). Charges were not significantly different ($13,040 versus $13,279; P = 0.6; see Table 4. Pilot Implementation: Pathway Versus Usual Care $7,413 ($2,486) $11,078 ($7,475) < 0.0001). Pathway admissions (n = 2,375) increased annually to a peak 80% of all asthma admissions in 2016. The thirty-day readmission rate (per 100 discharges) for all asthma was 2.42. Thirty-day readmission rates for Pathway and non-Pathway groups were not significantly different (2.26 versus 2.66; P = 0.50).

**DISCUSSION**

In this report, we have described the successful development and implementation of a physician-ordered RT-driven inpatient Asthma Clinical Pathway. The Pathway standardized key components of inpatient asthma management that led to a significant reduction in LOS and stabilized charges without increased asthma readmission rates. Reductions in LOS for a high-volume diagnosis such as asthma improves bed availability for additional patients awaiting transfer from outside facilities or admission from within the facility. The Pathway has controlled inpatient asthma charges despite inflation and annual hospital-wide charge increases since 2011. Inpatient charges are often front-loaded, with higher charges occurring early in hospitalization. As asthma historically has a short LOS, we did not anticipate a reduction in charges. The QI team had initial concerns that decreasing LOS may result in increased readmissions. However, our findings confirmed that 30-day readmissions were not increased in the Pathway group. The percentage of Pathway removals decreased over time, but those related to clinical worsening remained a stable percentage throughout the study period. We anticipated clinical worsening would be the most common reason for Pathway removal. However, we were reassured when less than 10% of patients were removed.

Our work provides further evidence that standardized care pathways can improve asthma outcomes as reported by other investigators. Inpatient asthma pathways were first established by Bierman and Pierson in 1974 to educate house staff on established physician practice and prevent unnecessary morbidity, but additional key outcomes of pathways have focused on decreasing LOS and cost. McDowell et al. reported a 30% decrease in cost and LOS with an inpatient pathway in 1995 to 1996, and Wazeka et al. showed similar improvements with a pulmonologist-driven inpatient pathway in use from 1995 to 1998. As in our project, these studies used standardized scoring systems to guide clinical management.

Through our improvement efforts, we have shown sustainable long-term (greater than 5 years) outcome improvements for a high-volume inpatient asthma population at our institution. There was a progressive reduction in LOS for all asthma (Pathway and non-Pathway) admissions following Pathway implementation. With gradual expansion to include more nursing units and higher acuity patients, the Pathway showed continued reductions in LOS. These reductions in LOS occurred simultaneously as the percentage of Pathway patients was increasing.

The Pathway changed inpatient care in substantial ways and was the first multidisciplinary inpatient clinical pathway at our institution. Before the Pathway, asthma patients could be admitted on all acute care floors. This practice led to significant care variation related to disparities in nursing expertise and availability of physicians and RTs. The QI team had initial concerns about Pathway acceptance. However, Pathway adoption went surprisingly well. In an institution that previously relied entirely on physician assessment and direct order to adjust asthma therapy, the Pathway empowered RT staff to decrease or escalate therapy based on standardized scoring and protocol. We believe the Pathway reduced delays associated with waiting for physician orders and patient assessment that allowed bedside care to progress more efficiently throughout hospitalization.

Our institution historically used nebulized bronchodilators for inpatient care. The QI team anticipated pushback about transitioning to MDI use; however, this transition was embraced by providers and clinical staff. Before the Pathway, it was not uncommon for patients to stay overnight until primary team rounds the following morning. Having standard discharge criteria allowed patients and
clinical care team to anticipate time of discharge more reliably. Cross cover teams may have been more comfortable discharging patients during evening hours when they knew patients had met standardized discharge criteria. Having a standardized respiratory assessment tool also served as a teaching tool for less experienced resident physicians making clinical care decisions.

The QI team attributed successful Pathway development and implementation to the Clinical Microsystems approach that involved frontline staff leadership, defined roles for clinical care team members, availability of QI team, and sharing process improvement results quickly through real-time transparent data collection. The QI team attributes the sustainability of the Pathway to extensive ongoing training and early success which led to early provider acceptance. Pathway success facilitated institutional acceptance of care pathways and provided the foundation for additional COA asthma QI initiatives, such as the development of an asthma pathway in ED, consistent inpatient asthma education, and advanced discharge planning.

There are some limitations to our findings. We lacked baseline performance on process measures before Pathway implementation. Treatment assignment in the Pathway pilot implementation was not random, potentially reflecting a bias in assignment as physicians may have been more likely to place lower acuity patients on the Pathway, predisposing that group to shorter LOS and decreased hospital charges. However, it is also possible that higher acuity patients were placed in either the intermediate care unit or ICU and thus not eligible for inclusion in the Pathway pilot. Furthermore, the comparison evaluation is for only 10 months due to limited resources for data collection and analysis.

In the months following the pilot implementation, COA initiated the use of a new financial information system. As a result, we experienced significant delays in accessing LOS for non-Pathway and charge data for all asthma patients after December 2011. We were unable to capture LOS in hours for non-Pathway patients. This limitation required the team to use LOS (days) as calculated through PHIS database query when analyzing our long-term outcomes. This limitation may have underestimated our improvement effect.

Throughout Pathway implementation, there were patients included in the all asthma data set that were not eligible for Pathway care until complete expansion in 2014. This fact could explain the more gradual decline in LOS for the all asthma group in comparison with the marked reductions in LOS for Pathway patients seen during pilot implementation. The use of total charge data is nonspecific and may not reflect specific charges related to the Pathway. Charge data do not directly correlate with costs. However, we did not have access to cost data. Lastly, 30-day Pathway readmission data are only available for our institution. Readmissions to community hospitals outside our hospital system would be missed.

Fig. 1. All asthma average LOS. Each dot represents average LOS for patients admitted during corresponding month. Numbered dots represent our Plan-Do-Study-Act cycles. 1, Pathway implementation. 2, Pathway expanded to all general pediatric and pulmonary services on 2 acute care units. 3, Pathway expanded to 2 additional acute care units. 4, Pathway expanded to include direct admissions and patients transferred from higher acuity units. 5, Pathway allowed patients who experienced a clinical worsening and improved after ≤4 hours of continuous albuterol to stay on Pathway and restart in phase 2 as they improved. 6, Pathway expanded to include an intermediate care unit protocol (phase 1, severe asthma) for continuous albuterol therapy. All asthma: 2–18 years old, primary diagnosis of asthma, non-ICU patients with no secondary comorbid respiratory diagnosis, combined Pathway, and non-Pathway. All asthma baseline n = 773, all asthma (Pathway and non-Pathway) n = 3,429. UCL, upper control limit; LCL, lower control limit. Two-sample t test for average LOS, 95% CI for difference: (0.6926–1.0152), P value < 0.001. Data source: COA Performance Improvement Department, PHIS Database, Children’s Hospital Association.
CONCLUSIONS
Using a multidisciplinary Clinical Microsystem approach, we were able to demonstrate widespread adoption and sustainability of an evidence-based pathway to standardize key components of inpatient asthma management. The implementation of the inpatient Asthma Clinical Pathway significantly reduced LOS and stabilized charges without increasing readmission rates.

DISCLOSURE
The authors have no financial interest to declare in relation to the content of this article.

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