

1a-b. **Title:** Clinical Decision Support Helps Memorial Healthcare System Achieve 97 Percent Compliance With Pediatric Asthma Core Quality Measures

2. **Background Knowledge:** Asthma is one of the most prevalent and growing chronic diseases in children, and is a leading cause of pediatric morbidity. In 2003, it was estimated that in the United States there were 200,000 pediatric admissions and readmissions associated with asthma at a cost of \$3 billion. Asthma impacts hospitals throughout the country, including specialized pediatric hospitals and medical centers, as well as other hospitals offering pediatric care via their emergency departments. While there is no cure for the disease, there is a substantial body of literature showing the relationship between specific clinical practices (particularly asthma education for the patient and family, as well as the development of a home management plan of care) and improved asthma outcomes.

3. **Local Problem:** In 2006, as part of its continuing efforts to improve quality of care and clinical outcomes, the Joint Commission announced the Children's Asthma Care (CAC) measures as the initial set of pediatric ORYX core measures. The measures included:

- CAC-1—the use of reliever medications for inpatient asthma
- CAC-2—the use of systemic corticosteroids for inpatient asthma
- CAC-3—the use of a home management plan given to the patient/caregiver upon discharge for inpatient asthma

Data collection for the first two measures began with April 2007 discharges. The third measure was endorsed in 2008, and data collection began in the third quarter of 2008.

While the pediatric asthma core measures are required only for freestanding hospitals, Joe DiMaggio Children's Hospital (JDCH), part of Memorial Healthcare System in South Florida, adopted the initiatives based on its desire to be at the forefront of quality patient care. However, healthcare providers at JDCH found that it was difficult to capture all pediatric asthma patients to ensure compliance, especially those admitted with other diagnoses or symptoms, or those whose diagnoses were subsequently changed to asthma at discharge. In some cases, length of stay was only 1-2 days, further complicating identification of asthma patients and reducing the amount of time staff had to implement an asthma plan. Missing pediatric asthma patients made it difficult to comply with the CAC measures and provide the appropriate asthma education and individualized home management plan of care.

4a-b. **Intended Improvement:** Joe DiMaggio Children's Hospital was committed to **decreasing the need for readmission and achieving a high compliance rate with the measures.** Initially, it used several diagnosis codes, including the code for asthma, provided by the hospital's mainframe computer to identify potential asthma patients. Clinical staff then had to track the patient down in person to verify an asthma diagnosis. In order to ensure identification of patients, the hospital then decided to look at prescription medication data collected automatically by a computerized patient surveillance and clinical decision support system in use at the hospital. **A team from pediatrics, respiratory therapy, and information technology worked together on a plan to streamline the process and improve compliance with the CAC measures using the information technology system.**

**5a-c. Planning the Intervention:** The plan to implement the core measures at JDCH focused on identifying pediatric asthma patients based on children admitted with a primary diagnosis of asthma and children admitted with other diagnoses or symptoms identifying them as asthma patients, as well as prescription medication data. The information technology system would be utilized to review patient information, as a manual review of data would be labor intensive, would miss patients, and would limit the ability to achieve compliance with the CAC measures.

This automated surveillance would be handled by a clinical decision support system (TheraDoc, Salt Lake City, Utah) employed by the hospital since 2007 for infection prevention, medication safety, and other applications. The technology automates the collection and analysis of raw patient clinical data from a range of sources within the hospital and alerts caregivers to clinically significant information or changes in patients' conditions so that appropriate interventions can be made. The software also helps coordinate communication among patient care teams and hospital executives, and facilitates reporting to public health officials and quality organizations.

Healthcare providers at the hospital were familiar with the system's ability to provide alerts based on patient data (EZ Alerts Assistant, TheraDoc). To better capture all pediatric asthma patients, IT staff members used the alert module (screen based/DNC) to build alerts that flagged all patients ages 2-17 who were prescribed systemic steroids and bronchodilators (CAC-1 and CAC-2), as well as those with hospital admission diagnoses for asthma. The alerts would be directed to respiratory therapy supervisors via email or pager. Those supervisors could then follow up with the nursing and education staff to ensure compliance with the core measures, including providing patients and caregivers with asthma education as well as detailed home management plans (CAC-3) that outlined follow-up physician visits, environmental triggers, information on medications and their appropriate use, steps to manage asthma symptoms at home, when to call their physicians, and when to seek emergency care, among other details, prior to discharge. The alerts were tested for several weeks. Once finalized, staff members were trained on how to use the system, including utilizing an alert subscription screen that told staff to watch the alerts through email using Outlook Express.

5d is not applicable.

6. No. 6 is missing from the Submission Form

**7a-c. HIT Dimensions Utilized:** The JDCH utilizes a patient safety surveillance and clinical decision support system to help achieve a high level of compliance with three core measures from the Joint Commission that address children's asthma care. Using a core technology platform that receives patient data from multiple hospital information sources, the system normalizes the data and applies standard medical vocabularies so that consistent, reliable results are achieved. This vital step ensures that clinical and administrative data from diverse hospital systems—which may be entered using various terminology and codes—are captured accurately and comprehensively. The software continuously monitors lab orders and results, microbiology results, pharmacy data, patient demographics, ADT (admission, discharge, transfer) data, vital signs, and data from departments such as radiology and surgery, notifying clinicians about potential pediatric asthma patients so that appropriate interventions can be made. The system

combines this patient data with clinical knowledge and practice guidelines to provide real-time surveillance and clinical decision support.

At JDCH, the TheraDoc Children's Asthma Care alert is set up to send an e-mail to three JDCH Respiratory Therapy Team members, a manager, a day shift supervisor, and an asthma educator. The chart for patients meeting criteria triggering the Children's Asthma Care alert is reviewed, and an asthma action plan is initiated for those patients with a primary diagnosis or history of asthma. The patient's family is interviewed and education is provided. The action plan serves as a guideline and provides instructions on care based on patient asthma symptoms. The family is provided with a copy of the action plan upon discharge.

The software also helps with reporting—data are collected into a database with the National Association of Children's Hospital, which in turn uploads the information to the Joint Commission.

8(a). **Outcomes:** 8(a)a-b are not applicable or were previously addressed.

8(a)c. While pediatric asthma core measures are required only for freestanding hospitals, JDCH adopted the initiatives based on its desire to be at the forefront of quality patient care and now is in the top 10 percentile in compliance for all three measures. The JDCH has documented degrees of success in implementing the CAC core measures. **The hospital began reporting to the Joint Commission in the second quarter of 2007 using only alerts based on diagnosis codes flagged by the hospital's mainframe computer. For the period of April to December 2007, the compliance rate with CAC-3 (home management care plan) was 12%. This was followed by 63% compliance for the second quarter of 2008. The hospital then began using the TheraDoc Children's Asthma Care alert in July 2008, with dramatic results. Compliance with CAC-3 increased to 83% for the third quarter of 2008 and to 92% for the fourth quarter. This level remained unchanged during the first half of 2009, but increased to 97% compliance for the third quarter of 2009.**

8(a)d. Upon review, the team at JDCH learned that there was a group of asthma patients who were not receiving the vital home management education prior to discharge. By working together and using the hospital's automated patient surveillance and clinical decision support system to mine available patient data, the hospital was able to greatly improve compliance rates, and now it is rare that a child leaves without an asthma home management care plan.

8(b)a-d were previously addressed.

9. **Barriers Encountered:** There were few barriers to overcome in connection with this intervention, with the exception of a small learning curve required by staff members who needed to become familiar with the alerts and how to read them via their email systems.

10a-d. **Challenges Faced:** At JDCH, the challenges faced in implementing the intervention to improve compliance with the CAC measures were minimal. Staff members from pediatrics, respiratory therapy, nursing, and information technology worked as a team to develop a plan, including identifying patient criteria to be flagged by the automated system. No selection process

was need, as the system had been in use at JDCH since 2007. An in-house IT staff member used the alert module (screen based/DNC) to build alerts that flagged all patients ages 2-17 who were prescribed steroids and bronchodilators, as well as hospital admission diagnosis data. No communication or specific action was required from the system's vendor, TheraDoc.

11a-b. **Summary:** JDCH is at the forefront in meeting new quality initiatives for pediatric asthma, thanks to a team approach and aided by tools from an automated patient surveillance and clinical decision support system. The team used computer-generated alerts to identify pediatric asthma patients based on prescription medication and admissions data as a first step in implementing a new Joint Commission core measure for providing pediatric asthma home management care plans to patients and caregivers—achieving a 97% compliance rate.

A home care plan is vital to improving outcomes for asthma—the most common chronic disease in children and one of the most frequent reasons for hospital admissions and readmissions. It is one of three Children's Asthma Care core measures created by the Joint Commission as part of broader quality and public reporting initiatives. While the first two measures, which focus on providing appropriate medications, typically have higher levels of compliance, meeting the more complex and detailed home management plan requirement presents significant challenges for hospitals. The plan must outline follow-up physician visits, medications, steps to manage asthma attacks, and environmental triggers, among other details. The hospital identified a need for a tracking system that could capture children admitted with a diagnosis of asthma, as well as those admitted with other diagnoses or symptoms identifying them as asthma patients. The hospital turned to its computerized patient safety surveillance and clinical decision support system, which had been used at the facility for more than a year for infection prevention and medication safety applications, to create reliable alerts flagging all patients ages 2–17 prescribed steroids and bronchodilators. The alerts allowed JDCH to streamline and accelerate the process of identifying pediatric asthma patients so that they could receive the best quality care.

12a-d. **Interpretation:** Questions about interpretation do not fit with this case study example. In this instance, JDCH identified a problem—not all pediatric asthma patients were being identified and provided with a home management plan prior to discharge—and the care team worked to recognize what contributed to that problem. Once areas for change were identified, the hospital utilized an existing automated patient surveillance and clinical decision support system to leverage raw patient clinical data and provide meaningful alerts sent to appropriate clinical staff. The alerts allowed staff to achieve and sustain a high level of compliance with CAC measures.

13a-b. **Conclusions:** JDCH's clinical decision support system provided clinicians with real-time tools to address important pediatric core quality measures for pediatric asthma and achieve a high level of compliance. Importantly, it helps JDCH support the national patient safety goals and priorities of the National Priorities Partnership (NPP) and The Joint Commission, including the NPP goal of engaging patients and families in managing their health and making decisions about their care.

14a-b. **Financial Considerations:** There were no funding sources for this intervention, as the system was already deployed at the hospital and only staff members were involved in its creation

and implementation. Cost savings and a return on investment information also are not applicable.