Measurement Issues for an Adult Asthma Clinical Improvement Initiative

by Loralie Sweeney, RRA, Judith A. Miller, MHSA, RRA, and Patti Ludwig-Beymer, PhD, RN

Advocate Health Care, a multiple-hospital integrated delivery system in the Chicago, IL, area, recently established its Advocate Adult Asthma Clinical Improvement Team. The team undertook the data planning and analysis needed to start up a complex continuous quality improvement (CQI) project, which was implemented and continues to evolve within the organization. A key player in the team was the clinical information analyst, who supported the CQI project by identifying and resolving data quality issues.

The Project Environment

Created by a merger of two large health systems, Advocate is a complex, integrated system with multiple information systems. Upon merging, each system had its own health information system (HIS), decision support system, and CQI/care management systems. Now, most of Advocate's eight hospitals use the SMS Allegra system to support patient registration, medical records, and finance functions. However, other Advocate hospitals have other HIS products installed. Only five Advocate hospitals have the Transition System (TSI) decision support system, a historical database and cost accounting system that integrates clinical and financial information.

The system clinical quality improvement department, at Advocate's corporate offices, consists of three clinical information analysts and a database specialist who support multiple system initiatives, including systemwide clinical improvement projects. Several staff members are RRAs. The clinical information analyst's primary responsibilities include collecting data from multiple data sources, developing computer databases, providing data support for quality improvement projects, producing statistical and graphic displays of data, and performing appropriate statistical analyses of data. Outcomes measurement is also a vital function to integrating clinical processes throughout the organization. This is accomplished through systemwide clinical projects such as Advocate's asthma program.

Description of Asthma Program

The need to improve care for patients with asthma has been well documented across the US, but the delivery of care has not substantially changed.[1] This led to the establishment of the Advocate Adult Asthma Clinical Improvement Team, which was set up to address local asthma data trends. The interdisciplinary team consisted of staff members from administration, CQI, medicine (including specialists in various fields), nursing, pharmacy, and respiratory care. The team goals were to:

- improve management of Advocate's adult asthma patients in outpatient settings, including physician prescribing practices
- enhance partnership between patients and healthcare providers to improve patients' self-management skills and use of medical resources
- improve identification and care of the most severe asthma patients
- adopt and implement systemwide inpatient and emergency department care pathways

Measurement Plan

The team developed a measurement plan to evaluate the effectiveness of the program. Table 1 shows the plan's five primary areas: clinical outcomes, functional status, patient satisfaction, resource utilization, and process measures. When possible, the team used data that were retrievable from existing databases rather than creating additional data collection tools. For example, resource utilization was monitored using TSI as much as possible.

Relating the Clinical Information Analyst Role to the Asthma Program

The clinical information analyst collected, analyzed, and reported various types of data—based on the asthma team's needs. Using the COMPdata system, the team examined hospitalization data. Also reviewed was the number of emergency visits and physicians' practice patterns. A variation in the management of adult asthma patients was discovered, and opportunities to improve patient care were identified. The analyst was responsible for obtaining data for the measurement plan, which presented a variety of challenges.

The inpatient and emergency department data arrived in many formats due to multiple data sources. The majority of the data was obtained by the data analyst using TSI. For the three hospitals that do not have TSI, the analyst obtained data from different information systems or on a manual basis. Retrieving data from these sites within certain time parameters was a challenge, and the analyst's ability to compile and standardize the data into a user-friendly format allowed the team to pursue its goals. Once standardized, data was reported to the asthma team for further analysis and discussion.

Issues

Several issues emerged while collecting, standardizing, analyzing, and reporting the data. The definition of asthma, readmission rate calculations, HIS system conversions, and quality-of-life database manipulation proved problematic.

The team had to reach a consensus regarding the method in which adult asthma patient data would be selected for inclusion in the project. If the patients were selected by using DRGs 096 and 097, non-asthma diagnoses such as bronchitis would be included in the database. But if the patients were selected by an ICD-9-CM code (i.e., 493.00-493.91), only asthma patients would be identified. Therefore, the asthma team agreed to use the principal or first listed ICD-9-CM diagnosis code to identify patients for the project.

One of the indicators in the asthma project for both inpatient and emergency department patients involved patient readmissions or revisits. Excel was the primary data manipulation system used at the time the project began. A spreadsheet application, Excel can sort and calculate small data sets. However, in order to obtain asthma readmission data, the analyst had to manually locate the readmissions after sorting the data by patient identifier. With thousands of patients in the spreadsheet, the task became quite cumbersome. Errors in the database were discovered when attempts to verify the readmission rates were unsuccessful.

To solve this data integrity problem, an Access database was developed and data was imported into the database from Excel and TSI. Access was selected because, as a relational database, it can store large data sets and query against them. Queries are constructs that can perform tasks like pulling predefined data from single- or multiple-linked data sets. Queries can be stored and rerun, as the database grows. Once built, the database and queries automated the calculation of readmission rates. The end result was a more accurate, reliable database.

Discharges and patient emergency visits from a two-year span were retrieved for the asthma project. When the data from one of the hospitals was found to be unreliable, the asthma team decided to exclude this portion of the data from the project database.

Monitoring the patient's quality of life is increasingly important for clinical improvement projects. The question as to how to collect and display outcomes data had to be resolved. In consultation with the data analyst, the Asthma Quality of Life (AQOL)[2, 3] survey was selected by the team, with the data entered into an Access database, which included patient demographic information and pre- and post-treatment survey findings. By linking this information, the analyst created a longitudinal record for each patient, which allowed the team to measure the impact of the program on the patient's perception of quality of life.

Finally, a discrepancy in data was noted in the information received from two data sources. One hospital's HIS system acts as the source of data for two data repositories, TSI and MIDAS—a system that supports quality management and care management functions. This facility's asthma admission data was found to be different between the two systems. Initially, the asthma team planned to perform a chart review to determine which was the correct readmission rate. Instead, the analyst was able to validate the TSI data by viewing the original data in the source system. When the analyst found the data in the source system matched the TSI data, the need for a chart review was eliminated.

Conclusion

The HIM professionals who serve as data analysts for the CQI department have developed skills in project measurement plans, data collection, and database building, among others. They brought to light issues that were essential to the project's progress during implementation by resolving data quality issues. Without the resolutions, the analyst would have spent countless, unproductive hours correcting the data and initial goals of the project would not have been accomplished. Growing healthcare systems faces ongoing data challenges. As additional sites of care—and their divergent information systems—are added to Advocate, ensuring common data sets will become difficult. Therefore, clinical improvement teams must constantly review operational definitions to equalize data. Advocate's goal is to introduce all sites of care onto the same HIS system.

table 1—Advocate Health Care Adult Asthma Project Measurement Plan

Key Concept	Specific Measure	Operational Definition	Data Source(s)	Collection Schedule, Method, & Responsibility	Collaborating Site, Department, Division	How Will this Measure be Used to Improve Care?
Hospital Use	Number of hospitalizations (*Resource utilization*)	Number of patients with ICD-9 codes 493.00 - 493.91 as principal diagnosis admitted to the hospital (not observation or ED stays)	TSI, business objects (with audit system to verify data)	CQI monthly report per site and also overall	System support quality management; quality liaison at three sites	Better understanding of trends
	Average length of stay (ALOS) (*Resource utilization*)	LOS in days	As above	CQI monthly report per site and also overall	As above	Understand trends
	Average charge per case (*Resource utilization*)	Total charges for inpatient asthma divided by number of cases	TSI, business objects	CQI monthly report per site and also overall	As above	Understand trends
	Hospital readmissions within one year (*Clinical outcome*)	% of patients readmitted to hospital for ICD-9 codes 493.00 - 493.91 as principal diagnosis	As above	CQI annual report per site and also overall	As above	Identify further opportunities for improvement
Urgent Care Encounters	Number of emergency department visits (*Resource utilization*)	Number of patients with ICD-9 codes 493.00 - 493.91 as first listed diagnosis seen in the emergency department (not in observation)	As above	CQI monthly report per site and also overall	System support quality management; quality liaison at three sites	Better understanding of trends
	Emergency department revisits within 30 days (*Clinical outcome*)	% of patients readmitted to emergency department for ICD-9 codes 493.00 - 493.91 as first listed diagnosis	As above	CQI monthly report per site and also overall	As above	Identify further opportunities for improvement
	Average charge per case (*Resource utilization*)	Total charges for ED asthma divided by number of cases	TSI, business objects	CQI monthly report per site and also overall	As above	Understand trends
Drug use	Number of patients receiving excessive beta-agonists (*Process measure*)	Number of patients prescribed more than one canister of beta-agonists per month	To be determined	Quarterly reports CQI	Managed care organizations	Feed data back to physician; identify additional opportunities for improvement
Exposure to peak flow meter	% of patients who report having a peak flow meter on questionnaire (*Process measure*)	Item on questionnaire	Patient questionnaire	Monthly CQI	Sites of care; readminister by health advisor at three and 12 months	Feed data back to physician; identify additional opportunities for improvement
Impact of asthma on life	Days lost from work or school (*Functional status*)	Item on questionnaire	Patient questionnaire	Monthly CQI	Sites of care; readminister by health advisor at three and 12 months	Track patients longitudinally to see changes in their status
Patient satisfaction with care	Patient satisfaction survey (*Patient satisfaction*)	Four questions from Parkside patient satisfaction survey	Patient questionnaire	Monthly CQI	Sites of care; readminister by health advisor at three and 12 months	Identify additional opportunities for improvement
Functional status	Asthma quality of life questionnaire (*Functional status*)	Total score and subscores for breathlessness, mood disturbance, social disruption, and concern for health	Patient questionnaire	Monthly CQI	Sites of care; readminister by health advisor at three and 12 months	Track patients longitudinally to see changes in their status

Notes

1. Harter, T.V., et al. "Inadequate Outpatient Medical Therapy for Patients with Asthma Admitted to Two Urban Hospitals." *American Journal of Medicine* 1010, no. 4 (1996): 386-394.

2. Marks, G.B., S.M. Dunn, and A.J. Woolcock. "A Scale for the Measurement of Quality of Life in Adults with Asthma." *Journal of Clinical Epidemiology* 45, no. 5 (1992): 461-472.

3. Marks, G.B., S.M. Dunn, and A.J. Woolcock. "An Evaluation of an Asthma Quality of Life Questionnaire as a Measure of Change in Adults with Asthma." *Journal of Clinical Epidemiology* 46, no. 10 (1993): 1103-1111.

References

Adult Asthma Clinical Improvement Team. "A Functional Status Assessment of Adults with Asthma." *Naurice M. Nesset Research Forum Proceedings, Research Partnering Across Advocate* 1997, 1: 3-4.

Ludwig-Beymer, P., S. Peterson, and C. Gorman. "Improving Care for Adults with Asthma Across the Continuum." *Journal of Nursing Care Quality* 12, no. 6 (1998).

National Asthma Education and Prevention Program, National Heart, Lung and Blood Institute. *Guidelines for the Diagnosis and Management of Asthma*. Bethesda, MD: US Department of Health and Human Services, National Institutes of Health, 1997.

National Asthma Education Program, National Heart, Lung and Blood Institute. *Guidelines for the Diagnosis and Management of Asthma*. Bethesda, MD: US Department of Health and Human Services, National Institutes of Health, 1991.

National Heart, Lung, and Blood Institute. *Global Initiative for Asthma*. Bethesda, MD: US Department of Health and Human Services, National Institutes of Health, 1995.

National Heart, Lung and Blood Institute. *Morbidity and Mortality Chart Book*. Washington, DC: US GPO, 1996.
Rachelefsky, G. "Helping Patients Live with Asthma." Hospital Practice 30, no. 11 (1995): 51-64.

Shoolin, J., et al. "Advocate Health Care's Adult Asthma Improvement Project." *Medical Staff Journal* 7, no. 1 (1997): 12-13.

Weiss, K.B., and K. Burdetti. "Examining Issues in Health Care Delivery for Asthma." *Medical Care* 31, no. 3 (1993): 9-19.

***Loralie Sweeney**, RRA, is a clinical information analyst, Clinical Quality Improvement Department; **Judith A. Miller**, MHSA, RRA, is director, quality improvement and clinical information services, Clinical Quality Improvement Department; **Patti Ludwig-Beymer**, PhD, RN, is director, care management, Care Management Department at Advocate Health Care in Oak Brook, IL.*

Article Citation:

Sweeney, Loralie, Judith A. Miller, and Patti Ludwig-Beymer. "Measurement Issues for an Adult Asthma Clinical Improvement Initiative." *Journal of AHIMA* 69, no. 6 (1998): 66-71.