

Quality improvement program in an Emergency Department

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ABSTRACT

الهدف: وصف البرنامج المقدم لتحسين الجودة النوعية للرعاية الطبية بقسم الطوارئ.

الطريقة: يتكون البرنامج من جمع البيانات والملاحظات وتحليلها، وبموجبها تتم تحديد طرق معالجة تحسين الجودة النوعية للرعاية الطبية، وتشمل تعليم الطاقم الطبي والموظفين طرق تحسين الجودة للفترة من 2003-2006.

البيانات والملاحظات التي تم جمعها هي: حجم عدد المراجعين، ومراجعة الملفات من الناحية الطبية والعلاجية وتتضمن البيانات المستمرة منذ بداية برنامج تحسين الجودة النوعية التي تتكون من:

1- مدة إقامة المريض بالطوارئ منذ قدوم المريض إلى الطوارئ حتى الخروج من الطوارئ أو التنويم بالمستشفى.

2- المرضى الذين رفضوا العلاج المقدم لهم وخرجوا على مسؤوليتهم.

3- المرضى الذين غادروا الطوارئ قبل تقديم الرعاية الطبية لهم من قبل الطبيب.

4- المرضى الذين مكثوا أكثر من 3 ساعات بالطوارئ.

5- عدد المرضى الذين عادوا إلى الطوارئ خلال 48 ساعة

6- عدد تحويل المرضى إلى المستشفيات الأخرى

7- مراقبة جميع الأحداث أو الأخطاء الحرجة التي تحدث عند معالجة المرضى

8- شكاوى المرضى

النتائج: خلال فترة الدراسة وضع البرنامج تحسنا ملحوظا في جميع البيانات بالرغم من زيادة عدد المراجعين لقسم الطوارئ بنسبة 47% (51,698 مراجعة في السنة) حيث ثبت متوسط إقامة المرضى بالطوارئ دون تغيير يذكر، كما نقص عدد المرضى الذين يعودون إلى قسم الطوارئ للمرة الثانية خلال 48 ساعة إلى 50% (-2% إلى 1%). كما قل عدد المراجعين الذين خرجوا من الطوارئ قبل إكمال العلاج وكذلك الذين ذهبوا قبل فحصهم من قبل الطبيب من (1,5% إلى 1,2% و 1,6% إلى 1%) على التوالي. كما اتضح تراجع عدد الشكاوي المقدمة من المراجعين إلى قسم الطوارئ خمسة أضعاف (1,3 لكل 1000 مراجع إلى 0,25% لكل 1000 مراجع).

خاتمة: وضع أن برنامج تحسين الجودة النوعية للرعاية الطبية المقدمة من قسم الطوارئ قد حسن جميع البيانات والملاحظات والدالات.

Objective: To describe the quality assurance/improvement program in our emergency department (ED).

Methods: This program involved monthly data collection and analysis, data-driven process change, staff education in the core concepts of quality, and data reanalysis from the years 2003 to 2006 at the King Abdul-Aziz Hospital, Al-Ahsa, Kingdom of Saudi Arabia. Data captured during the program included census data, chart review, and focused clinical audits. Continuous quality improvement measures collected at the beginning of the program and quarterly included: 1) quality indicators (length of stay [LOS] and rates of left against medical advice [AMA] or left without being seen [LWBS]), 2) percentage of patients that stay ≥ 3 hours in ED, unscheduled returns within 48 hours, inter-hospital transfer data, sentinel events tracking rates, and 3) nature of patient complaints.

Results: During the study period, the program demonstrated improvement in all measured areas. Despite an increase in patient volume of 47% to 51,698 visits/year, the mean monthly LOS remained static, the unscheduled returned visits dropped by 50% (2% to 1%), and patients leaving AMA decreased from 1.5% to 1.2%, and LWBS decreased from 1.6% to 0.8%. The rate of complaints dropped by 5 fold (1.3 per 1000 patients to 0.25).

Conclusion: Our program demonstrated improvement in all the measured parameters.

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Public reporting on performance and quality improvement is increasingly recognized as a professional and institutional priority. Performance measures are an essential component of both of these activities. These measures allow health care providers, funders, accreditors, and researchers to identify areas in clinical care that require improvement, benchmark performance, and set minimum standards of care. Emergency medicine is the medical specialty with the principal mission of evaluating, managing, treating, and preventing unexpected illness and injury.¹ Quality assurance (QA) has been defined as “the sum of all activities undertaken to provide confidence that the products or services available maintain the standard of excellence for those products or services”.² The Joint Commission on Accreditation of Health Care Organizations has fostered this concept, and also favored a shift in philosophy from QA to quality improvement (QI) that has an advantage of continuous commitment to improvement of care.³ Quality improvement is defined as the “sum of all activities undertaken to continuously examine and improve products and services”.² The continuous quality improvement (CQI) provides organizational excellence in patient care, education, and research. Quality improvement is a major target in a CQI environment, and the process of reaching this target requires the joint effort of the whole team of employees fulfilling the task. Improving quality of care requires first defining what constitutes quality care. There is still no consensus on the definition of quality in emergency medicine. There is also lack of adequate benchmarking data. Many emergency departments (EDs) have developed QA/QI plans across the world. The goal of these plans is to ensure high-quality and appropriate medical care for patients by optimizing the health care environment.^{4,5} Data on structure, process, and outcome of patient care are vital to improving the quality of that care.⁵⁻⁷ The objective of our study was to describe the designing and implementation of a CQI program in our ED. The purpose of this report is to present the process and outcomes of the CQI.

Methods. This program involved monthly data collection and analysis, data-driven process change, staff education in the core concepts of quality, and data reanalysis from the years 2003-2006. The study was conducted at King Abdul-Aziz Hospital, which has a 300-bed capacity and provides primary and secondary care to National Guard personnel, their dependents, and the citizens of Al-Ahsa in the eastern region of the Kingdom of Saudi Arabia. The hospital was commissioned in late 2002. The hospital is dedicated to delivering services of the highest international standard.⁸ The ED of the study hospital is broadly divided into ER1 with 5 monitored

beds, and serves as a high dependency unit, and ER2 with 5 treatment beds. There is also one trauma room with 2 monitored beds, one resuscitation room, one isolation room, one procedure room, and a triage area with 2 consultation rooms.⁹ In 2006, the annual ED patient census was near 52,000, and the admission rate was approximately 9%. The rapid increase in volume led to a high rate of complaints and low patient satisfaction. The hospital and its parent organization, National Guards Health Affairs, have a Joint Commission International Accreditation, with a history of quality improvement projects.¹⁰ The study proposal was approved by the regional research committee. The study population consisted of all patients who visited the ED from 2003 to 2006. Patients presented before 2003 were excluded. Since the inception of the hospital most data collection systems were in place, however, the actual QI program was initiated in 2004 with identified benchmarks. The ED physician staff consists of full time doctors with adult and pediatric emergency medicine experience, supervised by ED consultants. The ED nursing staff consists of nurses with backgrounds in both adult and pediatric emergency and critical care nursing. All have completed a competency-based orientation and are Basic Cardiac Life Support, and most are Advanced Cardiac Life Support certified. The ED paramedics function as assistance personnel under the direction of an emergency nurse. In the early stages of the CQI program, a physician led committee of ED personnel, including physicians, nurses, and unit receptionists, discussed ideas for process improvement. The committee decided to allocate a separate designated area, “Fast Track” for patients with minor illnesses and injuries for their rapid and quality care. A new registration system was put in place, where the patient requires only a brief assessment in the triage area, and then is immediately taken to an appropriate room based on chief complaint and acuity. Patient care protocols were implemented for patients with sickle cell painful crisis and bronchial asthma, (our most frequent chief complaints). These protocols expedite and standardize care, and improve efficiency. This team approach also helps avoid unnecessary variation in patient care, and thus likely decreases medical errors.¹¹ Finally, a regular lecture series was implemented to educate physicians and nursing staff. Our QI program was initially focused on data collection and baseline analysis in 4 main areas: ED census data, physician chart review, focused clinical audits, and measuring quality indicators. The latter served as our main outcome measures. Standard census information was tracked including patient volumes and admission rates. These data elements are automatically captured through the computer system. The system is an integrated hospital information system providing

services to a wide variety of clinical areas such as laboratory, radiology, pharmacy, and so forth. Two types of reviews were conducted as part of our QI program, 1) comparison of medical records with pre-established criteria 2) analysis of all ED deaths. In addition to general clinical contents, charts were reviewed for specific clinical and laboratory criteria. Other records for review included where patients returned within 48 hours with the same chief complaint, the patient was discharge from the ED by a consulting service, or patients that stayed ≥ 3 hours in ED. Focused clinical audits were performed after identifying a specific clinical problem or sentinel event, through an occurrence/variance/accident report. The audits evaluated and track both clinical care and the documentation of that care, and identified deficiencies in optimal care. Educational initiatives were then instituted to remedy those weaknesses, and was followed by a second audit to assess and document improvement. One of the examples of such focused audits included an analysis of pain management. Our main outcome measures were: 1) quality indicators, and 2) rates and nature of patient complaints. The ED patient care and ED process indicators included length of stay (LOS) in ED and rates of left AMA or left without being seen (LWBS). Essentially this group represented patients who left before their treatment was complete and was reported as a percentage of total ED presentations. Later, the following indicators were also included in the program: 1) percentage of patients that stay ≥ 3 hours in the ED, 2) unscheduled returns within 48 hours, 3) inter-hospital transfer data, 4) all cardiopulmonary resuscitations and deaths in the ED, and 5) sentinel events tracking. These quality indicators were compared with international benchmarks, as unfortunately, there were no national standards, and followed for improvement.¹² Complaints had been tracked in a consistent fashion for over 4 years. Categories of complaints included misdiagnosis, inadequate treatment, delay in triage, long waiting time, unprofessional conduct by staff, over-zealous evaluation, and delays in admission.¹³ We entered the data into a computerized database and calculated complaint frequency as the number of complaints per 1,000 patient visits.

Measurements are reported using descriptive statistics. Continuous data are presented as means. Statistics were performed using Statistical Package for Social Sciences version 11, Chicago, Illinois, United States of America.

Results. Without any physical remodeling and without increasing any budget, we were able to demonstrate improvement in all measured parameters. During the study period, ED volumes rose by 47%, whereas the admission rate remained near 9%. As

Table 1 - Changes in volume and staffing during the 4-year quality improvement period.

ED volume and staffing	2003	2006
ED volume	35,146 visits	51,698 visits
Physician coverage	48 hours/day	64 hours/day
Nursing coverage	72 hours/day	108 hours/day
ED receptionist support hours	24 hours/day	36 hours/day

ED - Emergency department

the patient volume increased, we increased physician coverage, by 33%, from 48 hours a day to 64 hours a day. Periodically the physician group has assessed staffing based on census data and has increased accordingly. Specifically, based on increases in ED census, the group changed from 3 shifts to 4 shifts a day (each shift at 8 hours). Similarly, the nursing management made more modest increases in nursing and the receptionists' coverage (Table 1). Our QI indicators showed steady improvement during the period. In particular our LOS did not increase, as shown in Figure 1, and this is reflective of a decrease in disease specific diagnostic and treatment times. Although there was some fluctuation during the study period, the overall trend in LOS was unchanged. This static LOS occurred even as the census increased by 47% and other institutional factors threatened ED efficiency. Despite such changes, we were able to hold onto these gains in turnaround time. Over time, the rate of patients leaving AMA and LWBS fell steadily from 1.5% and 1.6% to 1.2% and 0.8% respectively by the fourth quarter 2006, as shown in Figure 1. Our average door-to-doctor times fell from 32 minutes to 10 minutes during the study period. Similarly, the unscheduled return visits dropped from 2% to 1%. At the start of the program, we had 46 complaints for an annual patient volume of 35,146, or 1.3 complaints per 1000 ED visits. The 3 most common categories

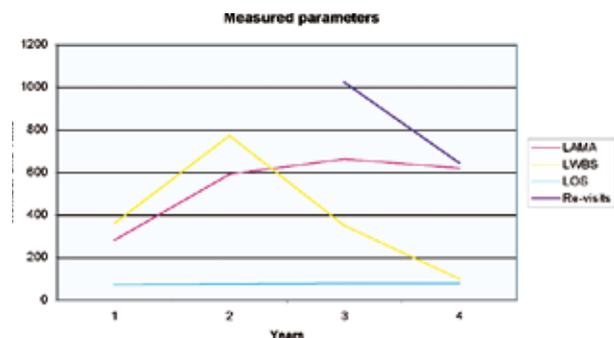


Figure 1 - Changes in measured parameters during the study period.

were the long waiting time, delays in admission, and perceived inadequate treatment. By the end of 2006, we had dropped to 13 complaints for over 51,698 ED visits, or less than 0.25 complaints per 1000 visits in the entire 2006 calendar year. The complaints related to waiting times dropped to zero by the fourth quarter of 2006.

Discussion. Our objective was to examine the impact of a physician-led CQI program in the emergency department on various outcome measures, and the study results indicate that CQI implementation has a favorable affect on all the measured parameters, as shown in the literature.^{14,15} We believe that by adopting the concepts of CQI, a health care institution can transform an organizational culture. The concept of quality in emergency medicine (EM) is broad and nebulous. In the absence of standard nomenclature for quality measures, surrogate markers and indicators are therefore used to define quality in emergency care. We have used 4 specific indicators and measures to describe “quality” EM before and after the institution of a QI program. We hope our experience will help advance the quality in the field.

Our QI program consisted of a 4-pronged approach to encompass the broadness of the specialty. The first component involved tracking detailed census data. This information allowed us to schedule nurses, physicians, and technicians more efficiently, and to better anticipate the type, number, and needs of patients presenting to our facility. The ongoing collection of this data helps us to meet the needs of our patients. The second part of the QI program involved reviewing of medical charts. Many authors have demonstrated different types of chart audits; including random chart audit, direct observation with record review, and comprehensive and ongoing chart audit. Chart-auditing data continues to be part of the environment of accountability within the quality process. Focused audits were the third arm of the program and were performed to examine specific clinical problems, and inefficiencies commonly encountered in our department. Although some of these audits were based on anecdotal or formalized incident reporting, they were mostly encouraged by data analysis. This process resulted in suggesting process or clinical change. Implementation of the process change led to new data that was reanalyzed, leading to further process improvements. Clinical processes were revised and fine-tuned until maximum efficiencies were reached. The fourth (outcome) arm of the program involved the measurement of quality indicators. We found improvement in all our indicators, and we believe this is related to 2 factors. The improvement in leaving AMA and LWBS is a direct result of the shortened door-to-doctor times that occurred after changes were

made in the intake process. The initiation of designated separate “Fast Track” for patients with minor illnesses and injuries. Patient care protocols led to consistent and uniform care and caused significant reduction in number of return visit patients. Formal complaints by patients are relatively infrequent in our ED. Even the initial overall frequency of 1.3 complaints per 1,000 visits was lower than that observed in a general sub-urban ED that reported 3.8 complaints per 1,000 visits.¹⁶ The data also show that patients who were seen in the non-urgent medical portion of the ED had the greatest number of complaints, whereas those who were very ill and treated immediately were less likely to complain. This is understandable because patients with more severe illness and injury received higher priority and more intensive medical attention. During the period of our QI program, the number of complaints was reduced, and the number of complaints related to waiting times nearly vanished.

Our study had a number of limitations. First, this is a result of a QI program at one institution. Therefore, the results may not be generalized to other institutions. Second, this program was not conducted under a distinct research protocol, and thus many variables were introduced into our practice environment that may have contributed to the success of the program. Organizational commitment to CQI creates an atmosphere of support and collaboration among the employees. The information collected, allows for identification of the areas in need of improvement and often suggests what steps should be taken for continuous achievement of the improvement, a process congruent with the notions of CQI. We strongly advocate defining the essential components of quality in EM and establishing national standards of service and clinical quality.

References

1. Rehmani R. Emergency Medicine: a relatively new specialty (Editorial). *J Pak Med Assoc* 2004; 54: 232-233.
2. Polsky SS, Weigand JV. Quality assurance in emergency medical service systems. *Emerg Med Clin North Am* 1990; 8: 75-84.
3. Gausche M, Rutherford M, Lewis RL. Emergency Department quality assurance/improvement practices for the pediatric patient. *Ann Emerg Med* 1995; 25: 804-808.
4. O’Leary DS, O’Leary MR. From quality assurance to quality improvement: The Joint Commission on Accreditation of Healthcare Organizations and Emergency Care. *Emerg Med Clin North Am* 1992; 10: 477-492.
5. Berwick DM. Health services research and quality of care: Assignments for the 1990s. *Med Care* 1989; 27: 763-771.
6. Berwick DM. Continuous improvement as an ideal in health care. *N Engl J Med* 1989; 320: 53-56.
7. Levy R, Goldstein B, Trott A. Approach to quality assurance in an emergency department: a one-year review. *Ann Emerg Med* 1984; 13: 39-42.
8. National Guards Health Affairs. Available from: URL: <http://www.ngha.med.sa/ngha/en/about-ngha/index.htm>

9. Rehmani R, Norain A. Trends in emergency department utilization in a hospital in the Eastern region of Saudi Arabia. *Saudi Med J* 2007; 28: 236-240.
10. Iqbal M, Rehmani R, Venter J, Alaitan AM. Quality assurance in an adult intensive care unit, Eastern region, Saudi Arabia. *Saudi Med J* 2007; 28: 408-411.
11. Risser DT, Rice MM, Salisbury ML, Simon R, Jay GD, Berns SD. The potential for improved teamwork to reduce medical errors in the emergency department. The MedTeams Research Consortium. *Ann Emerg Med* 1999; 34: 373-383.
12. Fernandes CM, Price A, Christenson JM. Does reduced length of stay decrease the number of emergency department patients who leave without seeing a physician? *J Emerg Med* 1997; 15: 397-399.
13. Griffey RT, Bohan JS. Healthcare provider complaints to the emergency department: a preliminary report on a new quality improvement instrument. *Qual Saf Health Care* 2006; 15: 344-346.
14. Spaite DW, Bartholomeaux F, Guisto J, Lindberg E, Hull B, Eyherabide A, et al. Rapid process redesign in a university-based emergency department: decreasing waiting time intervals and improving patient satisfaction. *Ann Emerg Med* 2002; 39: 168-177.
15. Welch SJ, Allen TL. Data-driven quality improvement in the Emergency Department at a level one trauma and tertiary care hospital. *J Emerg Med* 2006; 30: 269-276.
16. Schwartz LR, Overton DT. Emergency department complaints: a one-year analysis. *Ann Emerg Med* 1987; 16: 857-861.

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