

# Emergency Department Performance Measures and Benchmarking Summit: The Consensus Statement

## Introduction

Emergency leaders are increasingly faced with challenges that go beyond the scope of traditional clinical medicine and department staffing. A thorough understanding of quality improvement principles and benchmarking is now necessary for Emergency Department (ED) leaders to be successful in providing patient centered care, improving customer satisfaction and evaluating service initiatives. Correctly treating emergent complaints is no longer the only focus, and emergency physicians are now being asked to also provide safe, timely, efficient and cost effective care.

Outside agencies are also intensely interested in ED operations. With the potential for terrorist activity, pandemic flu, and natural disasters creating human casualties, government leaders are developing preparedness plans for communities. Those plans require forecasting of hospital surge capacity, and ED capability. Communities have been made aware of diversion and rerouting of EMS patients, but there are no definitions for those activities, and they do not reliably predict the state of available resources for any individual ED or hospital. Further, the Centers for Medicare and Medicaid Services (CMS) are interested in applying pay for performance (P4P) to organizations and physicians, and they are seeking definitions of adequate and outstanding performance. Without industry driven standards in place, CMS will likely develop its own definitions and indicators.

While others have written about clinical quality measures (Graff 1, Lindsay 2) and indeed many of these parameters are being tracked via the regulatory requirements mentioned below, the establishment of operational benchmarks for emergency medicine has been slower to evolve. The measurement of time intervals in the ED and the tracking of patients who leave before they are seen have become de facto markers for quality and efficiency in the literature (Liew 3, Lewandrowski 4, Pierhoples 5, Lorne 6, Bazarian 7), though no standardized definitions for these markers have been put forth or accepted.

There are three major reasons compelling emergency practitioners to standardize the language, terminology and implementation of Performance Measures and Benchmarking Practices:

**Regulatory Burdens:** The Joint Commission is now pursuing clinical quality improvement data in the form of Core Measures. Any facility that does not have in place the infrastructure to track this data risks its accreditation. These measures are likely to be under double scrutiny as the Centers for Medicare and Medicaid Services launch the Pay for Performance (P4P) Program that will reward hospitals that perform better along those same parameters (JCAHO 8, O'Reilly 9). The Joint Commission has also just levied additional regulatory burdens in the form of the so-called "Flow Standards" (JCAHO Standard LD3.15 10). If an ED wants to maintain its credentials and be reimbursed maximally, data tracking and following measures of quality will be an imperative. It is also imperative that further regulatory requirements use parameters that come from within the specialty and experts in emergency medicine who understand the nuances of data collection and analysis lead these endeavors.

**ED Operations Management:** ED operations management (with principles readily adaptable from other service industries) is a developing area within emergency medicine, and EDs will be searching for techniques to improve ED patient flow and processes (Beach 11). In order to determine whether ED process innovations are effective, standardized markers for efficiency and quality will be required.

**Areas for Research and Publication:** The fundamentals of quality improvement research are more similar to business models than the model used for performing human research. These principles are still not widely accepted in the traditional medical research environment. To advance the growing body of knowledge relative to quality improvement the standardization of terminology and methodology are necessary (Davidoff 12, Berwick 13, Thomson 14). To date much QI work goes unpublished and therefore emergency medicine quality improvement workers are failing to build a body of research pertinent to operational efficiency. This is to everyone's loss. By standardizing the discipline we can begin to aggregate knowledge and create a solid knowledge base.

## **Proposal for an ED Performance Measures and Benchmarking Summit**

### **Problem Statement**

There is a recognized lack of consistency in definitions regarding basic elements of ED operations. This is a recurring theme voiced directly by hospital and ED leaders, and increasingly by outside agencies that are attempting to improve patient care. There have been no meetings to address this basic element of operations, particularly by the organizations representing the providers of care in the ED. The literature regarding ED operations cannot provide scientific guidance to this process unless hospitals and EDs understand and apply routine definitions.

### **Mission Statement:**

Increasingly EDs and their leaders are under scrutiny regarding efficiency and timeliness of care. As hospitals begin analyzing patient flow and ED processes, there is a need for the standardization of metrics for benchmarking purposes. To date there are no set definitions for performance measures, nor is there a simple cohort scheme for comparing EDs. This summit attempted to bring together representatives from various alliances and associations that have demonstrated interest in performance data and quality improvement of EDs. This influential group was tasked with defining a set of ED Benchmarking terms and their definitions, which could be used to monitor ED processes or operations. Further, these terms could serve as markers for quality in research relative to ED operations. Finally, the group drafted a simple scheme for hospitals to find appropriate cohorts for benchmarking partners.

The summit was conducted with the following objectives

- To discuss, debate, and complete a set of definitions for elements of basic ED operations.
- To draft a consensus statement regarding benchmarking in emergency medicine.
- To develop a comprehensive set of benchmarks for ED Patient Flow and Operations, that could also be used as markers for operational quality.
- To define those benchmarks clearly so they may be applied uniformly in various ED settings.
- To develop a simple cohort scheme for categorizing hospital EDs for the purposes of benchmarking.
- To disseminate and publish the results of this summit so that all organizations and hospitals will be aware that uniform definitions have been prepared regarding ED operations.

## **Summit Participation and Attendance**

Individuals/agencies/programs that contributed to the proceedings:

- Shari Welch, MD. Summit Chair, EDBA, LDS Hospital Salt Lake City. [sjwelch@networld.com](mailto:sjwelch@networld.com)
- Charles Reese, MD, (Emergency Department Benchmarking Alliance), Christiana Care, Delaware
- Brent Asplin, MD, Regions Hospital, St Paul, and works with AHRQ (Agency for Healthcare Research and Quality)
- Pam Owens, PhD, AHRQ
- Bruce Siegel MD, Urgent Matters Project/ The George Washington University School of Public Health and Health Services
- Khoa Nguyen, MPH, Urgent Matters Project/ The George Washington University School of Public Health and Health Services
- Marcia Wilson, MBA, Urgent Matters Project/ The George Washington University School of Public Health and Health Services
- Susan Nedza MD, Chief Medical Officer, Region V, The Centers for Medicare and Medicaid Services
- Kirk Jensen, MD, IHI (Institute for Healthcare Improvement), Best Practices
- Karen Humphreys, RN, VHA (Volunteer Hospital Association)
- Charlotte Thompson VHA
- Carlos Camargo, MD, National ED Inventory Project
- American College of Emergency Physicians
  - Nick Jouriles, MD, Board of Directors
  - Barbara Marone, Director Federal Affairs
  - Rick Bukata, MD, ACEP's Benchmarking Taskforce (Unable to Attend)
- Emergency Nurses Association
  - India Owens, RN BSN Clinical Manager, IU Emergency Department Clarian Health Indianapolis
- Jim Adams, MD, SAEM's Clinical Director's Group. Northwestern Univ, Chicago (Unable to Attend)
- John Lyman, MD. Chair, ED Practice Management Association (EDPMA)
- Jim Augustine, MD EDBA

## Results of the Performance Measures and Benchmarking Summit:

### I. The ED Cohort Scheme:

The following is a schematic of the Cohort System developed by the summit. This scheme takes into account both volume and acuity. Recognizing that there is a large cohort of lower volume EDs, defined as those seeing less than 10,000 patients per year, the scheme affords stratification at the lower volume end. The Acuity Designation takes into account the Trauma Designation of the department as well as the Admission Rate and the presence or absence of Transplant Services. The summit has observed that certain parameters serve as markers for high acuity ED Services:

- Admission Levels greater than 20% of ED volume
- Presence of Transplant Services in the hospital
- Designation as a Level I or II trauma center, using criteria developed and verified by the American College of Surgeons Committee on Trauma

### Cohort Scheme

Volume and Acuity	<10,000	10-29,999	30-49,999	>50,000
<b>Low</b>	Trauma – Admission Rate < 20% Transplant –	Trauma – Admission Rate < 20% Transplant -	Trauma 3 or – Admission Rate <20% Transplant -	Trauma 3 or – Admission Rate <20% Transplant -
<b>High</b>	Trauma 1,2,3 Admission Rate >20% Transplant +	Trauma 1,2,3 Admission Rate > 20% Transplant +	Trauma 1,2 Admission Rate >20%, Transplant +	Trauma 1 Admission Rate >20% Transplant +

### Utilizing the Cohort Scheme:

- 1) First, the annual volume of the ED is used to assign it to one of four volume categories.
- 2) Second, the Acuity Function is applied to designate high or low acuity. These acuity markers and the function are described above.
- 3) It is anticipated that the EDs would first identify other EDs in hospitals in the same geographic area for benchmarking purposes. Benchmark cohorts would likely be built first at the state level, then at the regional level.

## II. General Definitions/Concepts for ED Performance:

- Emergency Department-** A 24 hour location serving an unscheduled patient population with anticipated needs for emergency medical care. This definition is provided by the Centers for Medicare and Medicaid Services (CMS) on an ongoing basis.
- Psychiatric ED-** An ED developed and held out to the community as one that serves the unscheduled needs of patients with mental health conditions.
- Arrival Time-** The time that the patient is first recognized and recorded by the Emergency Department system as requesting services in the department.
- MD/LIP Contact-** The time of first contact in minutes of the physician or licensed independent practitioner (LIP) with the patient to initiate the Medical Screening Exam
- Decision to Admit-** The time at which the physician or licensed independent practitioner makes the decision to admit the patient; time of bed request may be used as a proxy
- Conversion Time-** The time at which the disposition is made for a patient to be admitted to the hospital as an inpatient or observation patient; or a patient is designated for observation within a Clinical Decision area of the ED.
- Discharge Time-** The time of physical departure of a discharged patient from the Emergency Department treatment area
- Physician Disposition Time-** The time from physician notification (generally an emergency physician, but may be medical staff physicians responsible for patients in the ED) that all results are available until disposition time
- Left ED-** The time at which an admitted or transferred patient physically leaves the Emergency Department treatment area
- ED Length of Stay-** The patient time in the ED with these markers  
For admitted patients: Arrival time to conversion time  
For discharged patients: Arrival time to discharge time  
For transferred patients: Arrival time to transfer conversion time
- Active Acuity Level-** Utilize ESI for analysis of severity level of patients in the ED
- Boarding-** The process of holding patients in the ED for extended periods of time who have been directed for admission by a physician with admitting privileges. This process then has certain elements of the admission process and ongoing patient care provided by ED staff members.
- Boarded Patient-** An admitted patient for whom the time interval between decision to admit and physical departure of the patient from the Emergency Department treatment area (Decision to Left ED Time) exceeds 120 minutes
- Daily Boarding Hours-** The sum of boarded patient (see above) minutes in a 24 hour period. Divide total minutes by 60 to get hours of care provided by ED.

**ED Boarding Load-** This is a snapshot of the Boarded Patient load being cared for in an ED and an indirect marker for complexity/severity of patients being held in the ED. Calculated as (number of admitted patients + observation patients+ transferred patients)/total ED patient care spaces. It can be calculated at any time, and can be reported as a daily maximum value for a period of time.

**Radiology Turnaround Time-** The time from the placement of an order for a radiographic test until the time the results are returned.

**Laboratory Turnaround Time-** The time from the placement of an order for laboratory testing until the time the results are returned.

**Decision to Transfer-** The time at which the physician or licensed independent practitioner makes the decision to transfer the patient to another facility; time of transfer request may be used as a proxy

**Transfer Accepted-** The time at which the patient is accepted for transfer by the receiving facility.

**Pediatric Patients-** Age cut-off for performance measures to describe and monitor this population needs to be tied to the resources required to manage these patients. However the group is recommending that key performance indicators be specific for the pediatric population in two age ranges:

- Age 0 to 2<sup>nd</sup> birthday
- Age 2 (2<sup>nd</sup> birthday) to 18<sup>th</sup> birthday

### **Pediatric Emergency Departments-**

Those EDs that are designed to serve the needs of a pediatric patient group. They should be defined as those EDs that see a patient population less than 18 years of age, for over 80% of the total volume. This designation should also be applied to portions of a multi-function ED that serve this targeted population

## **III. Performance Measures/Time Measures**

### **A. For Discharged Patients**

- **Door to Doctor Time-** The time difference in minutes between arrival time and MD/LIP contact with the patient
- **Doctor to Discharge Time-** The time difference in minutes between MD/LIP contact with the patient and discharge time
- **ED LOS for Discharged Patients-** the time difference in minutes between arrival time and discharge time

### **B. For Admitted Patients:**

- **Door to Doctor Time-** the time difference in minutes between arrival time and MD/LIP contact with the patient

- **Doctor to Decision to Admit Time-** the time difference in minutes between MD/LIP contact with the patient and the decision to admit is made
- **Decision to Left ED Time-** the time difference in minutes between the decision to admit and the physical departure of the patient from the ED treatment area
- **ED LOS for Admitted Patients-** time difference in minutes between arrival time and physical departure of the patient from the ED treatment area (sum of Door to Doctor time + Doctor to Decision to Admit time + Decision to Left ED time)
- **Daily Boarding Hours-** Sum of (Decision to Left ED Time – 120 minutes for each boarder)/60 for all boarders in a 24 hour period

C. For Transferred Patients:

- **Door to Doctor Time-** the time difference in hours between arrival time and MD/LIP contact with the patient
- **Doctor to Decision to Transfer Time-** the time difference in hours between MD/LIP contact with the patient and the decision to transfer is made
- **Decision to Transfer Time to Transfer Accepted Time-** the time difference in hours between the decision to transfer the patient and the acceptance of the transfer
- **Transfer Accepted to Left ED Time-** the time difference in hours between the acceptance of transfer and the physical departure of the patient from the ED treatment area
- **ED LOS for Transferred Patients-** time difference in hours between arrival time and physical departure of the patient from the ED treatment area (sum of Door to Doctor Time + Doctor to Decision to Transfer Time + Decision to Transfer Time to Transfer Accepted Time + Transfer Accepted to Left ED time)

#### IV. Performance Measures/Proportion Measures

##### “People Who Left Before They Were Supposed To”

The language used to describe and monitor this population needs to be tied to specific, predictable events in every patient encounter across the industry. EMTALA has defined the Medical Screening Exam (MSE) as a defining event in emergency care. The causes of a patient’s unofficial departure and actions taken vary and warrant monitoring. The group is therefore recommending that the key performance indicators for patients leaving before the provider deemed treatment is complete to be referred to as:

- **Patients Leaving Before the Medical Screening Exam (PLBM)** – This term refers to any patient who leaves the ED before initiation of the MSE. It is expressed as a rate of occurrences per 100 visits.
- **Patients Leaving After the Medical Screening Exam (PLAM)** – This term refers to any patient who leaves the ED after their MSE, but before the provider documented treatment complete. It is expressed as a rate of occurrences per 100 visits.
- **Patients that Leave Against Medical Advice (LAMA):** Any patient recognized by the institution and leaving after interaction with the ED staff but before the Ed encounter is officially ended. This differs from PLAM in that it includes documentation of patient competence, discussion about risks and benefits, and completion or refusal to complete document confirming the intent to leave against the recommendation of medical care staff.

## **Complaints**

The definition should be standardized to include all spontaneous concerns about service delivery in the ED, written or verbal, that are brought to the attention of ED leaders. Separate categories of service concerns should be those identified during a survey process or during the billing process. Complaints are typically counted as one complaint per communication, and tracked in rates per 1000 ED visits.

## **Diversion**

The reasons, methods and responses to diversion of patients from the ED are felt to be widely variable and inconsistent. Regardless of the root cause, the reason an organization chooses to divert a patient from their ED is that in their judgment they are unable to provide appropriate services to that patient at that time. Quantifying the number of hours an ED maintains diversion status provides an indicator of frequency within that facility without indication of the cause or any way to compare to like facilities.

## **Hospital Diversion**

ED Diversion, better named hospital diversion, is an occurrence communicated to the community and emergency medical services providers indicating that resources in a hospital are compromised (due to relative shortages of available staff, equipment, or beds). It is a request for patients being transported by EMS to be taken to another hospital for service. There may be specific inclusion or exclusion groups of patients, according to local EMS protocol. The diversion occurrences are tracked by the number of hours per time period where that request has been made.

## **Emergency Department Patient Flow**

This group is recommending benchmarking key process indicators for hospital capacity and throughput by breaking the time measures down into fractiles. From there, outliers based on cohort groups can be identified and root-causes of barriers to patient flow may be identified and targeted for improvement.

For instance, using medians as opposed to averages is generally preferred for comparing facilities to one another. Most interval data is not normal, and averages can be misleading. Medians are far less sensitive to extreme outlier values, and are more appropriate for comparing non-parametric sets one to another.

As an example, arrange all the lengths of stay from given period of time from lowest to highest value and identify the middle value, that is, the median length of stay for all ED patients (50<sup>th</sup> percentile). If a similar function is done in multiple facilities, then a second array of values can be created with its own median and other percentile values. Similar exercises can be done for almost all of the performance measures noted above.

A given facility can then understand where it stands compared to other facilities within the same cohort (see above). Facilities using this indicator, (regardless of region, size, acuity, and specialty) will recognize when they fall outside the 50<sup>th</sup> percentile of comparatives which might then trigger performance reviews and initiatives.

## **Greater Than Six Hour Stays**

Capacity is reflected by patient length of stay but the definition of “extended length of stay” is arbitrary and not useful. In addition to monitoring minutes or hours of the patient stay, consider breaking length of stay into fractiles. As with measures of flow and throughput, this group is recommending benchmarking to identify outliers and target root-causes of barriers to throughput. (see above)



## **V. Census and Utilization Definitions and Markers**

### **Definitions Related to Patient Numbers**

- Patients per day
- Pediatric Patients per day

### **Definitions Related to Patient Acuity**

- Patients Admitted Per day
- Patients Transferred per day
- High Acuity Patients served. Physician coded patients Level 99284, 99285, and 99291

### **Definitions Related to Patient Mix**

- Patient payor class divided into 3 groups:
- Medicare patients
- Medicaid
- Self pay
- All patients with other payors

### **Defined Elements of Emergency Service Units**

- EKGs done per 100 patients seen
- Simple imaging procedures done per 100 patients seen
- Ultrasounds per 100 patients seen
- CT or MRI scan done per 100 patients seen
- Trauma panel utilization per 100 patients seen
- Cardiac biomarker tests done per 100 patients seen
- Medication doses administered per 100 patients seen

\* Note- more detailed definitions of what a study or procedure is will need to be worked out. I.e.: Is a CT of the abdomen and pelvis one study or two?

### **ED Patient Service Areas**

- Designated “Complete Patient Service Care Areas (CPCAs)”, defined as an area where complete health service can be delivered to patient and family for a specific period of time. Does not include hall areas, parking spaces, holding areas
- ED Crowding is defined as the number of hours (reported as a per day element) where patient census exceeds designated CPSCAs

### **ED Service Personnel**

- ED personnel should be defined as to their general function area, not the cost center they are assigned to. The reporting element is service hours per day.
- Physician or physician extender
- Resident physician
- Nursing and other direct patient care service
- Ancillary patient care service (radiology, lab, respiratory therapy, orthopedic technician)
- Ancillary non-patient service (clerical, maintenance, security, cleaning, IT, supply)

### **Patient Care Specific Factors designated by ED staff**

- Designated Prisoners
- Designated patients presenting for care primarily related to mental health, chemical dependency, or both
- Designated patients for observation services in the ED (may or may not be in an area designated as a Clinical Decision Unit, but are undergoing lengthy evaluation or treatment services under the medical direction of the emergency physician, with the intent to finish that evaluation and treatment and be discharged out of the ED)

## REFERENCES:

- 1) Graff L, Stevens C, et al. Measuring and Improving Quality in Emergency Medicine. Acad Emerg Med. 2002; 9 (11): 1091-1107.
- 2) Lindsay P, Schull M, et al. The Development of Indicators to Measure the Quality of Clinical Care in EDs Following the Modified-Delphi Approach. Acad. Emerg. Med. 2002; 9(11): 1131-1139.
- 3) Liew D, Kennedy MP. Emergency department length of stay independently predicts inpatient length of stay. Med J Aust. 2003;179(10): 516-517.
- 4) Lewandrowski K. How the clinical laboratory and the emergency department can work together to move patients through quickly. Clin Leadersh Manag Rev. 2004; 18(3): 155-9.
- 5) Pierhoples W, Zwemer FL et al. Point of care testing provides staff satisfaction but does not change ED length of stay. Am J Emerg Med. 2004; 22(6):460-464.
6. Holland L, Smith L et al. Reducing Laboratory Turnaround Time Outliers Can Reduce Emergency Department Patient Length of Stay. Am J Clin Pathol. 2005; 125(5) 672-674.
7. Bazarian JJ, Schneider SM et al. Do admitted patients held in the emergency department impair throughput of treat and release patients? Acad Emerg Med. 1996; 3(12): 1113-1118.
- 8) A Comprehensive Review of Development and Testing for National Implementation of Hospital Core Measures. [www.jcaho.org/pms](http://www.jcaho.org/pms), March 2005.
- 9) O'Reilly, K. Panel sets primary care standards for Medicare pay-for-performance. American Medical News. September 5, 2005.
- 10) Meeting the JCAHO Patient Flow Standard, presented by Richard W. Anderson MD, MBA, MPH, FACEP, JCAHO Field Representative, Urgent Matters Regional Conference, October 27, 2005.
- 11) Beach, C, Haley L, et al. Clinical Operations in Academic Emergency Medicine. ACAD EM MED. 2003; 10(7): 806-808.
- 12) Davidoff F, Batalden P. Toward stronger evidence on quality improvement. Draft publication guidelines: the beginning of a consensus project. Qual. Saf. Health Care. 2005;14: 319-325.
- 13) Berwick DM. Broadening the view of evidence-based medicine. Qual Saf. Health Care. 2005; 14: 315-316.
- 14) Thomson RG. Consensus publication guidelines: the next step in the science of quality improvement? Qual. Saf. Health Care. 2005; 14: 317-318.