



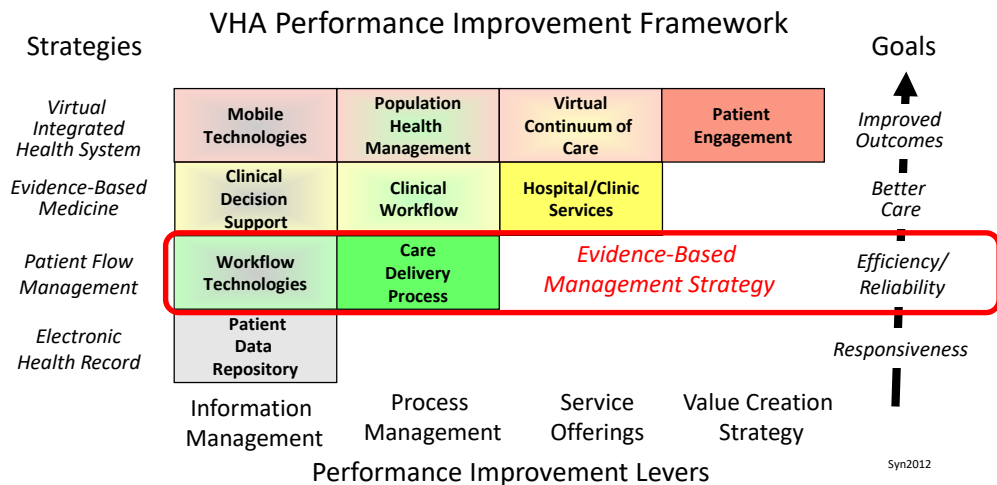
Evidence-Based Management in the ED: VA's Emergency Medicine Improvement (EMI) Initiative

The Veterans Health Administration (VHA) operates the nation's largest integrated health care system, with more than 1,700 hospitals, clinics, community living centers, domiciliary, readjustment counseling centers, and other facilities. Emergency Medicine began in VHA as its own service line in 2006 recognizing that even though few VA hospitals provided care to patients with severe trauma or in cardiac arrest, the specialty of Emergency Medicine (EM) was needed to manage the delivery of unscheduled acute care to Veterans.^{i ii iii iv} Generally accepted operational metrics were still being established by the Emergency Medicine community and organizing a service line across such a vast enterprise required robust change management and metrics to guide change.^v This review describes the process of defining and standardizing emergency care in VHA using national policy, building an IT system to collect operational data, and building robust data analytics to drive change. The program implemented to direct this change process is the Emergency Medicine Improvement (EMI) Initiative.

Introduction

The EMI Initiative is based on the VHA Performance Improvement Framework (Figure 1), a framework used to organize change efforts within VHA EM.

Figure 1: EMI Initiative Strategy Map



Four objectives were defined to implement change around an improvement strategy called evidence-based management^{vi}:

- Standardize Emergency Department (EDs) and Urgent Care Centers (UCCs) operations to maximize efficiency across the system by improving the ability to compare performance and share best practices.

- Reduce missed opportunities to provide care to patients who choose to leave the ED/UCC without being treated because of delays and time required to obtain service.
- Reduce elapsed time of ED/UCC visits by eliminating delays and reduce the time patients spend waiting for service.
- Enable standardized emergency care services around evidence-based protocols to ensure high-quality care across the system.

To achieve these objectives, VHA EM leaders deployed a novel information technology (IT) application, standardized the care delivery process, and established an organization-wide focus on performance improvement.

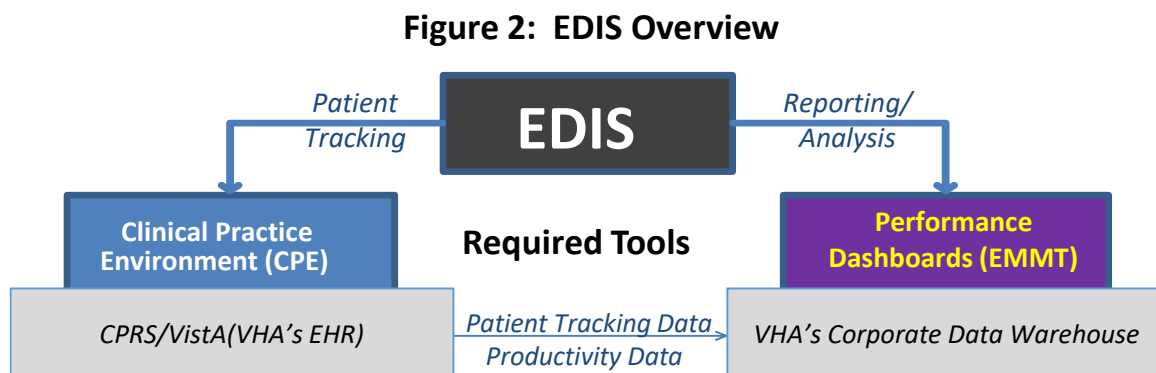
Defining Emergency Medicine and Getting Data

With publication of VHA directive, *Standards for Nomenclature and Operations in VHA Facility Emergency Department (EDs) and Urgent Care Centers (UCCs)*, VHA identified all of the venues across the nation that were appropriate for Veterans to receive emergency care and began standardizing the care delivery process. Local facilities employed various manual and electronic systems to track patients during their ED/UCC stays, but there was no regional or national database for overseeing that care.

An IT application called Emergency Department Integration Software (EDIS) was built to address these weaknesses by placing all care events into a common data base, standardizing the tracking process for all ED/UCC visits and exporting the data for national review.^{vii} EDIS employed two tools:

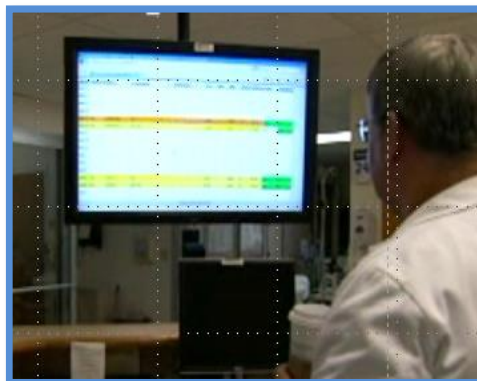
- Clinical Practice Environment (CPE)—display boards in every ED/UCC facilitating the movement and tracking of patients from arrival through departure.
- Emergency Medicine Management Tool (EMMT)—management and analytical dashboards for viewing care delivery metrics locally and nationally.

Figure 2 shows how those tools complement each other and operate in conjunction with VHA's electronic health record and corporate data warehouse.



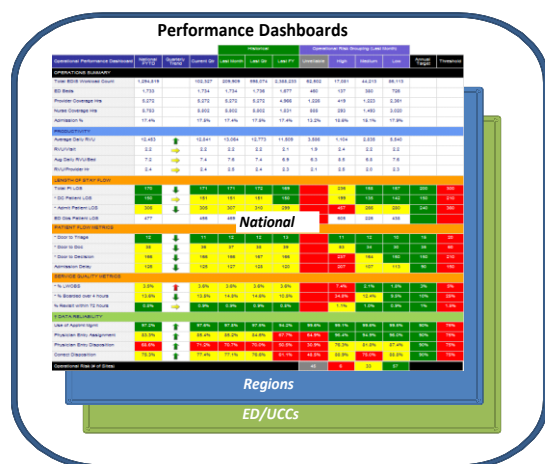
The CPE was initially deployed in 2011, successfully replacing and standardizing local approaches for tracking patients and key aspects of delivery operations across all 140 EDs/UCCs. The CPE tracks every patient seen in the ED/UCC from arrival to discharge. It captures the Emergency Services Index (ESI) triage score, and tracks the care delivery process and patient flow for all phases of the stay. In its initial iteration it served as an electronic grease board, but through a series of upgrades it has become the central communications hub for the ED/UCC, accessible on desktop computers and a highly visible “big board” display (Figure 3).

Figure 3 EDIS CPE



EMMT (Figure 4) was initially deployed in 2013. It uses data produced by EDIS CPEs across the

Figure 4 EMMT



VA to produce daily metrics for all levels of EM management—local, regional, and National. Initially deployed to measure EDIS adoption and key patient flow metrics, it has evolved into a comprehensive operations management tool for managing patient flow, service delivery quality, productivity, data reliability, and operational risk. It provides access to 25 operational metrics and underlying patient visit data through a process analysis tool for comparing metrics across EM sites, dashboards for comparing metrics against historical benchmarks, and standard reports for addressing specialized management needs.

From Data to Discipline

Once EDIS became available, users in the field were trained in the use of the tools, targeting three important management disciplines:

- Process management—implementing standard practices for using the CPE as a communications hub “utility”.
- Patient flow management—using the CPE in real-time to reduce delays and waits and using EMMT to identify systemic bottlenecks.
- EM performance management—identifying issues that matter to patients and internal stakeholders and comparing the data to peers.

Educating users on these three disciplines required on-going efforts and represented the primary change management challenge in implementing the EMI Initiative.

Process Management: Standardizing Local Practice

A series of group training workshops and one-on-one process redesign sessions were held with each ED/UCC prior to EDIS deployment to translate various workflow scenarios into a standardized process. Most processes were similar across facilities, but others required significant change in local policy. The key initial processes were:

- Tracking all patients entering VA EDs and UCCs from arrival until their physical departure.
- Assigning a 5-level ESI acuity to all patients seen.
- Using a standard approach to record completion of triage, initiation of medical screening evaluation, and admission disposition.

Quarterly adoption and usage “audits” indicated rapid success implementing the first two process changes but less success in standardized recording of key care delivery events.

To facilitate this change, the National Director of EM published a monthly newsletter and EM Leadership held monthly on-line User Group calls to help facility champions understand the standard process in depth and to provide them with tools and advice to assist them in reaching higher levels of implementation. Performance metrics were established that reflected full implementation of the EDIS program at all sites. Minimum acceptable levels of adherence to these practices were defined and these EDIS adoption metrics were elevated to VHA’s overall performance management system for VHA management action. This effort helped established the discipline of process management in EM.

Patient Flow Management: Eliminating Process Delays

Improved process management discipline was a pre-requisite to improving ED/UCC patient flow, which was the primary focus of the early EMI initiative. The EDIS CPE provided a starting point through features incorporated into the patient tracking display boards:

- Identifying patients who are waiting to be seen.
- Place visible timers on the CPE showing elapsed time from arrival until physical departure from the ED/UCC.
- Providing color-coded alerts for identifying patients waiting beyond threshold levels.
- Requiring explanations by providers for patient visits exceeding threshold limits.
- Establishing alerts for returned labs, images and other orders.
- Providing local reports from EDIS for reviewing delays and wait times.

Through the monthly EM newsletters and EDIS User Group calls, the EMI initiative supported process improvement efforts focused on flow management. EMI specifically targeted reducing the number of patients who leave prior to evaluation and the number of patients boarding in the ED following an admission decision. With the deployment of EMMT in 2013, facilities could see their own performance with visual comparisons to peer sites. The discipline of patient flow

management was established in EM as sites began to see the impact produced by their attention to patient flow and by their implementation of process improvements.

Performance Management: Improving Operational Performance

EMMT facilitated the third discipline of the EMI Initiative, performance management. Metrics representing key EM operations contributing to flow delays and associated increased risk of complications were defined by the VHA Emergency Medicine Field Advisory Committee (EMFAC). Facilities failing to meet the minimum levels of acceptable performance on these metrics generated facility “risk points”. Sites were rated as operating at low, medium, or high operational risk based on the number of “risk points” generated to help focus attention on assuring a minimum level of performance across the system. Risk ratings helped identify sites in need of support or remediation prior to an actual adverse event occurring.

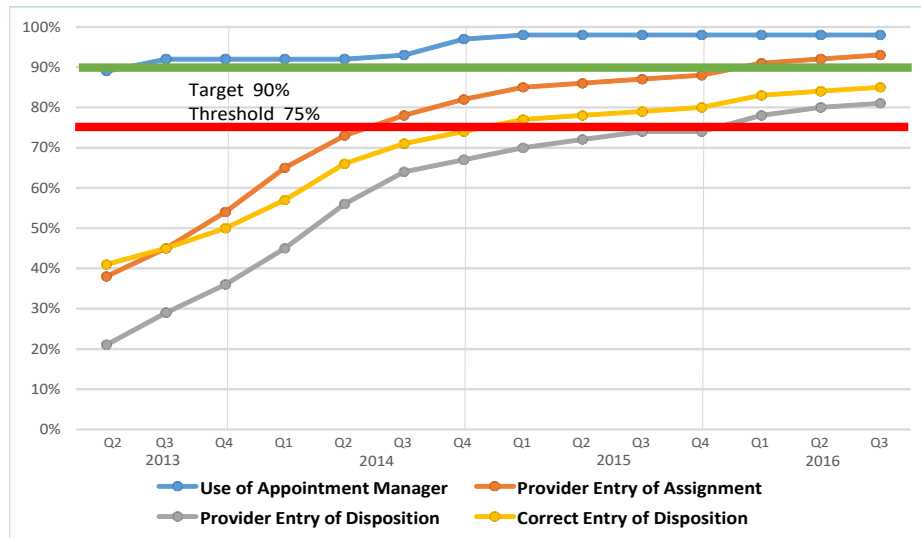
Training and education sessions accompanying deployment of EMMT emphasized the links from individual metrics to operational risk and to broader EM operations improvement goals. Training and education sessions were reinforced through a cascading series of one-on-one sessions between national leaders, EMFAC members, and ED/UCC directors “reading” site dashboards and discussing areas in which the evidence presented on the dashboard supported conclusions about site-level risk and performance. Those sessions proved to be invaluable to successful implementation of the performance management discipline across EM and to demonstration of the benefit of evidence-based management.

From Discipline to Results

Use of these new management capabilities to achieve improved results required coordinated top-down and bottom-up improvement efforts. Top-down improvement efforts, managed directly by EM Leadership, were required to accomplish the first objective of the EMI Initiative. Standardizing provider practices for recording key patient care events required a significant change effort, on-going communication, and ultimately, the elevation of metrics associated with the capture of reliable data for tracking by the VHA performance management system.

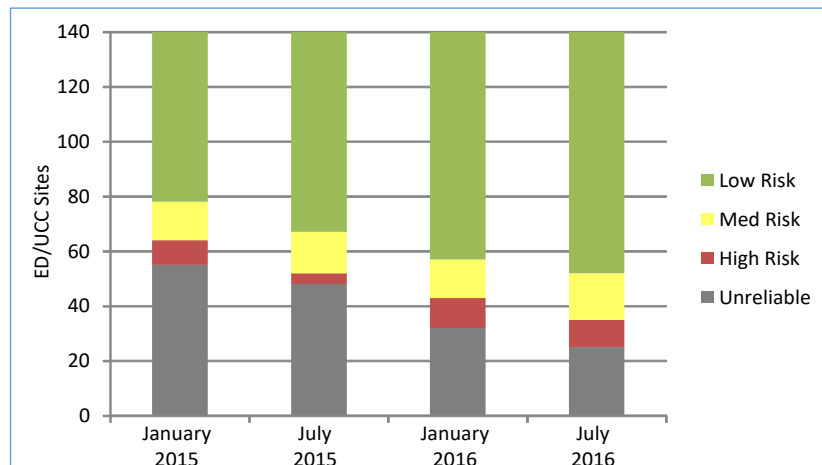
Figure 5, below, shows practice standardization progress and resulting EDIS adoption/data reliability improvement. As shown, minimum threshold performance was achieved on all metrics in March 2016—three years after EDIS process redesign activities were initiated.

Figure 5: Practice Standardization Progress



A second top-down improvement initiative was implementation of the operational risk reduction effort. The EMI initiative targeted sites that had not achieved threshold levels of data reliability by defining them as “unreliable” and sites with multiple patient flow and service quality metrics threshold levels as “high risk” sites. Figure 6 shows the improvement that occurred from January 2015 through July 2016 as a result of these efforts.

Figure 6 Operational Risk Progress



The first sites addressed by this effort were those with unreliable data. Sites with unreliable data had inadequate local buy-in to the EMI initiative and often reflected an absence of clinical leaders focused on Emergency Medicine at the site. As the initiative progressed, the number of sites with unreliable data got progressively smaller. Also, while the number of “high” risk sites has remained constant overall, several “high” risk sites improved but were replaced by facilities with newly reliable data. Overall, the number of facilities with a low risk designation increased significantly with the percentage of medium/low risk sites improving from 50% to 75% of the 140 EDs/UCCs operated by VHA.

Continuous improvement and the desire to improve beyond meeting minimum standards requires a culture of improvement and the active involvement and ownership of front-line managers and staff. Developing that culture requires leadership, performance feedback, and communication about what is possible, along with a bottom-up focus on improvement. The EMI Initiative implemented a number of strategies to encourage the development of that culture:

- Transparent access to daily performance information across ED/UCC operational metrics and comparisons to other sites, national averages, and target performance levels on the EMMT.
- Monthly EMI Newsletters and EDIS User Group meetings providing direct communication about improvement efforts at the national and local site levels.
- One-on-one coaching sessions between EM leaders and ED/UCC site managers discussing metrics, improvement opportunities, and best practices.
- Support for site-level Lean management efforts to identify and implement improvements.

Figure 7 shows progress that has resulted from this effort against metrics tracked to determine progress against EMI Initiative flow improvement objectives.

Figure 7 VHA Emergency Medicine Improvement Progress (Medians)

Time Period (Oct-Sep Fiscal Years)	Patient Waits		Patient Flow (minutes)				Elapsed Time (minutes)		
	% LWOBS	% Boarded >4Hr	Door to Triage	Door to Doc	Door to Dec	Admit Delay	Total Pt LOS	DC Pt LOS	Admit Pt LOS
FY13	3.9%	6.2%	15	46	180	106	171	154	296
FY14	3.6%	10.5%	13	39	166	124	169	150	299
FY15	3.4%	13.2%	11	36	165	123	169	149	304
FY16	3.1%	13.8%	10	33	168	123	169	147	306
% Diff FY13-16	-20%	123%	-33%	-28%	-7%	16%	-1%	-5%	3%

As shown, significant improvement can be seen in three areas: the percent of patients leaving without being seen (LWOBS) (down 20%) and cycle times measuring time patients wait to be triaged (down 33%) and waiting to see a provider (down 28%).

The impact of improvement efforts on other process delays and patient wait times early in the initiative were unclear due to data reliability issues, specifically the timing of an admission disposition decision. The time of that decision is used to calculate patient boarding percentages as well as time for process activities that occur once a patient is seen by a provider. Even disregarding those early years, however, little improvement has been detected in these areas to date. Improving those metrics requires a focus on processes beyond the direct control of the ED/UCC that necessitate hospital-wide improvement efforts. As of 2016, this represents the frontier for continued VHA EM patient flow improvement.

In 2016 the National Director of EM developed a new Performance Plan intended to continue the journey of improving EM performance. The plan establishes an on-going management

process for reviewing operational risk and developing corrective action plans at sites with “unreliable” data or “high” risk designations. The plan also includes initiatives to further emphasize the importance of bottom-up efforts to improve performance. It is intended to institutionalize and strengthen bottom-up improvement efforts already underway in EM.

Conclusion

Evidence-based management was instrumental in the successful establishment of a new EM clinical service line in VHA and in managing operational constraints within the ED across a vast enterprise. Future improvements include development of a mobile platform for the EDIS CPE to allow its use at the point of care, development and/or integration of decision support clinical pathways, and integration of the ED flow programs with inpatient care management applications and business intelligence applications. The goal is to institutionalize evidence-based medicine in VHA EDs/UCCs. The institutionalization of evidence-based management in EM, however, is well underway and realizing improvements in the services provided today.

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