Toolkit to Reduce Ambulance Patient Offload Delays in the Emergency Department

Building Strategies for California Hospitals and Local Emergency Services Agencies

CALIFORNIA HOSPITAL ASSOCIATION

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Preface

The availability and effective functioning of the emergency medical services (EMS) system and hospital emergency departments are of vital importance to all Californians. Ambulance patient offload delays — the delay that can occur when transferring care of a patient from emergency service personnel to hospital emergency department staff — affect some regions in California. While not well studied, these delays have obvious links to patient safety, patient and provider satisfaction, and emergency department (ED) throughput efficiency and effectiveness. When ambulance providers and crews are delayed, they are out of service, thereby decreasing their ability to provide lifesaving support in the community.

The California Hospital Association (CHA) and the California Emergency Medical Services Authority (EMSA) created the CHA/EMSA Ambulance Patient Offload Delay Collaborative to analyze and develop solutions to the problem of ambulance patient offload delays. Recognizing the inherent complexities and the need to involve multiple stakeholders, CHA, the regional hospital associations, and EMSA embarked on a multi-phased project to minimize ambulance patient offload delays in California.

A White Paper was written by CHA and EMSA to kick off the Ambulance Patient Offload Delay Collaborative, which began its work in March of 2013. A broad range of stakeholders were brought together to identify the problems, and develop an action plan and strategies for hospitals and local emergency medical services agencies (LEMSAs) to use to reduce ambulance patient offload delays. A survey of hospitals and LEMSAs was conducted to identify both problems and solutions. The collaborative formed workgroups and developed this toolkit to help local communities of LEMSAs and hospitals reduce ambulance patient delays.

This document presents a *Toolkit to Reduce Ambulance Patient Offload Delays in the Emergency Department* developed for statewide consideration in California. It includes key materials as essential ingredients for successful, sustainable process improvement. It is divided into sections and can be used from start to finish, or used as needed by groups who seek assistance in certain areas, such as how to set up a continuous quality improvement group or how ambulance patient offload delay is defined.

The toolkit is intended for all providers, most importantly for those who are actively involved in assuring quality and patient safety in transition from ambulance to hospital personnel. The handoff of a patient and their information in a highly reliable and timely manner is critical to successful emergency services. This guidebook can help initiate your discussion, construct your quality improvement team, and develop a

regional learning laboratory to identify solutions. The guidance, tools, and information included in the toolkit are intended to stimulate discussion among hospitals, LEMSA providers and community stakeholders.

On behalf of CHA and EMSA, we acknowledge the commitment and participation of the Ambulance Patient Offload Delay Collaborative in their effort to solve problems collectively and improve patient quality and safety in California.

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Acknowledgments

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Emergency Medical Services Administrators' Association of California President, Dan Burch, and Emergency Medical Services Administrators' Association of California (EMSAAC) Directors were key in soliciting a robust response to the LEMSA survey. Riverside EMS Director, Bruce Barton, was key in leading the metrics workgroup and providing leadership throughout the course of this work. Special thanks to the hospitals who participated in the hospital survey, which offered numerous strategies for the benefit of other hospitals.

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Jim Finkelstein of FutureSense and Michael Williams of Abaris are acknowledged for their assistance with portions of this collaborative. FutureSense initiated the full collaborative engagement work, and Abaris designed and assisted with survey development and result compilation.

Thanks, too, for all the LEMSA and hospital walltime learning laboratories of the future who will continue to broaden our understanding and knowledge of this issue as they discover and share new solutions.

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Overview

Emergency medical services systems (EMS), hospitals and their emergency departments (ED), are fundamental components of California's health care delivery network. Together they provide the state's safety net for health care with 24/7 access to emergency health care services. California's hospital ED volume has grown substantially by 20 percent between 2007 and 2012, and presently California's hospitals average more than 12.5 million visits per year (as reported by hospitals to the Office of Statewide Health Planning and Development). The availability and effective functioning of the EMS system and the EDs are of vital importance to all Californians.

A significant concern among emergency medical services and emergency departments across California is ambulance patient offload delays (also called walltime or offload delays in this document). Offload delays in EDs can cause extensive wait times for patients, while also impacting resource availability for hospitals and EMS providers that serve their community for emergency response.

The California Hospital Association (CHA) and the California Emergency Medical Services Authority (EMSA) agreed to bring multiple stakeholders together to analyze the extent, impact and possible approaches to reducing offload delays. The goals of the collaborative were:

1. To develop standardized language, definitions, metrics and reporting opportunities for ambulance patient throughput;
2. Identify ways to reduce delays and improve transfer times; and,
3. Assist local jurisdictions in developing processes and sustainable goals to reduce the incidence of ambulance patient offload delays.

This toolkit presents the work product of the collaborative, including statewide results of a survey of hospitals and LEMSAs perception of the scope, severity and potential solutions for the problem. Further, the toolkit process improvement models and approaches to assist California hospitals and local EMS Agencies' experiencing delays to reduce ambulance patient offload delays, and enhance patient care, and stakeholder outcomes.[1]

I. SCOPE OF THE PROBLEM

Ambulance patient offload delays have been a concern in the health care community for some time due to the potential impact on patient safety and quality of care. In a national study involving 200 cities (including California cities), the national average

1 Portions of this Overview have been summarized from Appendix A, "White Paper: EMS Patient Offload Delay in the ED."

wait time for handing off ambulance patients has doubled, from 20 minutes to over 45 minutes since 2006, resulting in a loss of nearly 5 million hours of EMS system productivity.[2] A study from Los Angeles (2004) revealed 21,240 incidents (one out of every eight transports) in a one-year period where EMS providers were out of service for more than 15 minutes waiting to transfer a patient to the ED staff. 8.4 percent of the incidents were greater than one hour and the maximum wait time reported was 6.75 hours. Some urban areas in California report ambulance wait times to transfer care in the ED reaching 2-4 hours.[3]

A. Survey Findings

Through survey research, the Ambulance Patient Offload Delay Collaborative learned that the offload delay problem in California is not uniform or consistently reported. Specific hospitals and regions are disproportionately affected. Many hospital and health care systems do not have a bed delay problem or they have resolved their previous challenges using new techniques.

Of 124 hospitals who responded to the survey, 74 (60 percent) said that ambulance patient offload delays were "neutral" or "not significant." Similarly, 33 Local EMS Agencies were surveyed and 19 (58 percent of respondents) claimed that ambulance patient offload delays were "neutral" or "not significant." In contrast, 45 hospitals and 13 LEMSAs (36 and 39 percent of respondents, respectively) reported that ambulance patient offload delays were "extremely significant," "very significant," or "somewhat significant" in response to our survey. It is important to note, that these LEMSAs reporting a problem represent regions that constitute 70 percent of the State's population. *(See the complete details in "Chapter 4 — Survey Findings and Strategies to Mitigate Offload Delays.")*

In some jurisdictions or ambulance zones, the problem has not been measured and evidence is anecdotal. In other jurisdictions, local emergency services agencies have sophisticated data collection systems that measure and report their ambulance patient delay statistics.

II. ASSOCIATED FACTORS CAUSING DELAYS

Ambulance offload delays are not an isolated issue, but are often symptoms of a larger problem. Research and expert opinion connect emergency department crowding, ambulance diversion, patient offload delay, and emergency department patient boarding with obstructions in hospital throughput.[4,5,6] Many factors have been identified as contributing to decreased patient throughput, including:

1. Decreased inpatient capacity,
2. Nurse patient ratios,

2 Williams DM. "2005 JEMS 200 City Survey," J. Emer. Med. Serv. Vol. 31(2):44-100, 2006.

3 Eckstein M, Chan LS. The effect of emergency department crowding on paramedic ambulance availability. Ann Emerg Med; 43(1):100-105.

4 Eckstein M, Chan LS. Op. Cit.

5 www.chcf.org/publications/2009/07/reducing-ambulance-diversion-in-california-strategies-and-best-practices

6 United States Government Accountability Office. Hospital Emergency Departments: Crowding Continues to Occur, and Some Patients Wait Longer than Recommended Time Frames. GAO-09-347 April 2011.

3. Hospital regulations limiting areas of care, and
4. Inability to rapidly turn over hospital beds.

Additional issues affecting emergency department crowding are:

1. Increasingly complex medical conditions,
2. Lack of hospital beds,
3. Increased 5150s or psychiatric holds due to fewer mental health community resources,
4. Delays in radiology, laboratory and ancillary services,
5. Shortage of specialists,
6. Lack of community primary care providers,
7. Lack of physical plant space,
8. Increased medical record documentation requirements, and
9. Increased difficulty in placement and arrangements for follow-up care.

The common endpoint is that emergency department beds are full, including admitted patients, and the ED cannot free gurneys and staff to accept new patients arriving by EMS. The fact that many ambulance patients do not have critical or even emergent conditions limits the incentive to rapidly clear existing patients from ED gurneys. This problem can also impact other hospitals, if the first overcrowded hospital initiates ambulance diversion when allowed in their jurisdiction.

III. IMPACT ON PATIENT CARE

When pre-hospital providers must wait to transfer care to the ED staff, it creates issues of patient safety. The paramedics or emergency medical technicians (EMTs) must continue to care for the patient they brought to the ED, rather than transferring the patient to the higher level of care within a hospital ED. Delay in ED patient transfer has not been well studied in relation to patient care outcomes, but the associated factors of diversion status and ED boarding both have been linked to increases in patient morbidity and mortality. The Government Accounting Office (GAO) report on ED crowding used ambulance diversion and patients leaving the ED without being seen as proxy measures for treatment delays. Waiting for an open ED bed also leads to delays in medication administration and failure to meet standard of care for treatments such as antibiotics for sepsis, as the clock starts when the patient enters the ED.[7] Delays in patient throughput in the ED decreases hospital cost efficacy and increases subsequent hospital stays; both of which are of concern to hospital and have negative financial impact.[8,9,10]

7 Pines JM, et al., "The Association between Emergency Department Crowding and Hospital Performance on Antibiotic Timing for Pneumonia and Percutaneous Intervention for Myocardial Infarction," Academic Emergency Medicine, vol. 13 no. 8 (2006).

8 U.S. GAO. Op.Cit.

9 Emergency Nurses Association White Paper, 2006. Holding Patients in the Emergency Department. www.ena.org/SiteCollectionDocuments/Position percent20Statements/Holding_Patients_in_the_Emergency_Department_-_ENA_PS.pdf

10 Rabin E, Kocher K, McClelland M. Solutions to emergency department boarding and crowding are underused and may need to be legislated. Health Affairs, 2012; 31(8):1757-1766.

The National Association of EMS Physicians (NAEMSP) position paper states:

> Patient-level consequences have not been well studied. Despite this fact, one might hypothesize that offload delay leads to delay to definitive care, poor pain control, delayed time to antibiotics, increased morbidity, and possibly even mortality. Ultimately, there is a reasonable concern that ambulance offload delay will compromise patient safety.[11]

The Emergency Nurses association had published a white paper that reviews data on the effects of holding patients in the ED.[12]

The widespread practice of holding or boarding patients in the emergency department is a major contributing factor to ED crowding and may lead to ambulance diversion or a delay in ambulance unloading, a delay in the provision of emergency care, and/or prolonged lengths of stay for ED patients being admitted to the inpatient hospital or transferred to another facility. Further, holding and crowding may result in reduced quality of care and increased risks to patient safety.

IV. IMPACT ON EMS SYSTEM

As stated earlier, the ambulance unit and staff that are delayed in the ED are effectively out of service, decreasing advanced life support coverage in the community, which can increase response time for subsequent critical cases, including cardiac arrest and major trauma. ED delays of the EMS professionals back up the entire system; dispatch centers have increased task times and EMS supervisors spend their time in the hospital attempting to make their units available. The compilation of these additional non-productive unit-hours are costly to the company and to the community, since readiness accounts for a large portion of the cost associated with ambulance coverage in a community, and ambulance contracts mandate maximal response times to critical calls.

The cost to fully supply and staff an ambulance for 60 minutes is termed a "unit hour." This varies by type of system, but averages $100/hour. By adding up the total hours that EMS personnel wait to hand over their patients and then multiplying by the cost of a unit hour, the result is a tremendous financial loss to the system.

In 2012, Riverside and San Bernardino Counties logged approximately 20,535 total delay hours, which accounted for $3 million in lost unit hours during that year (not counting potential lost revenue). Also in 2012, Sacramento Metro Fire Department accumulated 17,345 hours of delays in patient offload time at one hospital with an estimated system cost for this time of $2.6 million. When multiple ambulances are delayed, Sacramento Fire has to pull paramedic firefighters from other stations, meaning fire suppression units are unavailable to respond.

V. EMSA, LOCAL EMSA, HOSPITAL ED INFRASTRUCTURE

The California Emergency Medical Services Authority (EMSA) provides statewide oversight for the 33 local emergency medical services agencies or LEMSAs. Together they form the state's pre-hospital emergency medical system. The pre-hospital

11 Cooney DR, et al, 2011. Op. Cit.

12 Emergency Nurses Association White Paper. Op. Cit.

emergency medical system and hospital emergency departments operate as separate and distinct entities, but are linked through policies, procedures and regulations. Collectively, these entities provide effective patient care from the initial notification of an emergency and response in the field to the time the EMS provider drops off the patient at the emergency department and returns to the community, while the patient receives evaluation, care and hospitalization, if needed. The efficiency and effectiveness of each component in the evaluation and treatment process fundamentally affects each other; therefore, all members of the system must work together to ensure a coordinated, synchronized response. Since each local EMS system and its hospital emergency departments are unique, collaborative problem solving must be used to identify and solve problems. A recent (2009) study on ambulance diversion in California found that when hospitals and their local emergency services agency were focused and united in reducing diversion, collaborative processes and best practices helped achieve a reduction of ambulance diversion, improved patient flow and opened lines of communication among participants.

The collaborative survey findings validate the 2009 study findings and demonstrate the value of future collaboration among hospitals and local EMSAs. For the 74 hospitals with "neutral" and "non-significant" ambulance patient offload delays, three factors for success were identified:

1. Optimized ED intake process
2. Successful continuous quality improvement (CQI) measures
3. Hospital and LEMSA collaboration

The most frequently implemented hospital mitigation strategy was focused on ED intake measures and the least frequently selected mitigation strategy was ED output measures. *(See "Chapter 4 Survey Findings and Strategies to Mitigate Offload Delays," for complete comments regarding strategies used by hospitals to mitigate offload delays.)*

VI. COLLABORATIVE PROCESS IMPROVEMENT

This toolkit offers definitions, process guidelines and strategies to be considered as future regional collaboratives evaluate current practices and develop specific process improvements at the local level. These tools are not to be viewed as fixed protocols that must be followed, nor is the toolkit entirely inclusive of all approaches to improve delays. The legal workgroup determined legal and regulatory issues that impact bed delays, the metrics group developed common language and defined metrics, and the best practices group scanned the environment to understand the incidence of bed delays and best practices to decrease them. The collective knowledge developed by the three workgroups became the fundamental elements of the toolkit to define, measure, analyze, improve, and control ambulance patient delays.

How to Use This Toolkit

This toolkit was produced to support your local process improvement initiative, either as you begin a new collaborative or support work already in progress. The chapters reflect focal concepts of each workgroup. You may choose to begin your collaborative and use the toolkit from cover to cover, or focus on specific chapters to support existing work in progress.

Chapter 1 — Quality Improvement Framework — Use of a framework or model is strongly suggested to realize your walltime goal attainment.

Chapter 2 — Metrics — Measurement is a critical part of testing and implementing changes; measures tell a team whether the changes they are making actually lead to improvement. Important metrics were determined by the Metrics workgroup to assist local collaboratives as they assess their current and projected performance of ambulance patient handoffs.

Chapter 3 — Legal & Regulatory FAQs — Related legal and regulatory issues of interest were identified by the collaborative and can assist teams developing improvement ideas, assessing the viability and feasibility of an improvement idea or educating stakeholders.

Chapter 4 — Survey Findings and Strategies to Mitigate Offload Delays — Use this section to understand the landscape of patient ambulance offload delays, and as a guide to successful strategies to minimize delays.

I. HOW TO GET STARTED

The collaborative recommends you:

1. Identify your team,
2. Delineate team roles and responsibilities,
3. Define the problem,
4. Develop goals and objectives,
5. Use the metrics developed by the collaborative in chapter 2,
6. Analyze the measures through the use of a measurement plan,
7. Make improvements through innovation or use of best practices identified in chapter 4, and,
8. Control and sustain improvements in patient ambulance delays.

Definitions

One of the first goals of the collaborative was to establish common definitions among participants to ensure that all members had shared meanings during discussions. The following terms and definitions framed our efforts and will be useful in your work to reduce ambulance patient offload delay.

Ambulance arrival at the ED — The time the ambulance stops (actual wheel stop) at the location outside the hospital ED where the patient is unloaded from the ambulance.

Ambulance at hospital time interval — The period of time between ambulance arrival at the hospital ED and ambulance return to service time.

Ambulance patient offload delay (APOD) — Resulting period of time produced when the ambulance patient offload time interval exceeds the established ambulance patient offload time interval standard.

Ambulance patient offload time — The period of time between ambulance arrival at the ED and ambulance patient offload time when the patient is physically removed from the ambulance gurney to hospital equipment.

Ambulance patient offload delay interval — The resulting period of time produced when the ambulance patient offload time interval exceeds the established ambulance patient offload time interval standard.

Ambulance patient offload time interval — The resulting period of time produced when the ambulance patient offload time interval exceeds the established ambulance patient offload time interval standard. It is the time accumulated when a patient remains on the ambulance gurney in excess of the offload time interval standard.

Ambulance patient offload time interval standard — The established system performance standard for the period of time between ambulance arrival at the ED and patient ambulance offload time.

Ambulance patient offload delay occurrence — The occurrence of an ambulance patient remaining on the ambulance gurney in excess of the offload time interval standard.

Ambulance return to service time — The time the ambulance is response ready after transporting a patient to a hospital ED.

Ambulance transport — The transport of a patient from the pre-hospital EMS system by emergency ambulance to an approved EMS receiving hospital.

Annual system ED visits — Annual number of ED visits per emergency department.

Annual system ED visits/1000 population — Annual number of ED visits per emergency department.

Bed delay incidence — Incidence of bed delay occurrences usually per month or year.

Bed delay impact — Consequences of bed delay.

Capacity (in relation to hospitals accepting patients) — Refers to the ability of a hospital to accommodate a patient. Capacity encompasses such things as the number and availability of qualified staff, beds and equipment, and the hospital's past practices of accommodating additional patients in excess of its occupancy limits.

ED boarding — Holding admitted ED patients in the ED when inpatient beds are unavailable.

ED throughput — Activities occurring throughout the entire ED, from patient arrival to hospital ED to disposition from ED. These activities are separated into ED Intake, throughput, and output factors.

FirstWatch — Automated EMS-centric reporting and real-time, web-based data visualization tools.

ICEMA — Inland County Emergency Medical Agency, a California EMS agency that serves Inlad, Mono and San Bernardino counties.

MSE — Medical screening exam — the process required to evaluate the presenting condition of the patient to determine, within reasonable clinical confidence, if an emergency medical condition exits.

Number of ED beds or treatment stations by individual hospital — Number of ED beds or treatment stations listed on a hospital's license.

Number of licensed beds by hospital — Number of licensed inpatient beds listed on a hospital license.

Number of system ED beds or treatment stations — Number of ED beds or treatment stations within a system.

Number of ED beds or treatment stations/1000 population — Number of ED beds or treatment stations per 1000 people.

Number of system licensed hospital beds — Number of licensed hospital beds within a system.

Number of system licensed hospital beds/1000 population — Number of licensed hospital beds per 1000 people.

Offload time interval — Same as ambulance patient offload time interval and represents the period of time between ambulance arrival at ED and the ambulance patient offload time.

Offload time interval standard — The established system performance standard for the period of time between ambulance arrival at ED and ambulance patient offload time.

Parking patients — Used to describe ambulance patients waiting in the ED hallway for an ED bed.

Patient throughput — Describes the activities that make up the movement of a patient from one point to another.

Pre-hospital providers — A general term depicting providers such as EMTs, paramedics and firefighters who deliver care before the patient enters into the hospital.

Program flexibility — A program alternative that allows hospitals to apply for permission from CDPH for exceptions to requirements defined in California regulations.

RRT (rapid response team) — A team of health care providers that responds to hospitalized patients with early signs of clinical deterioration on non-intensive care units to prevent respiratory or cardiac arrest. The health care providers are trained in early resuscitation interventions and advanced life support and often include a physician, nurse, and respiratory therapist.

Takt time — A process improvement lean tool used to calculate how often something is processed or produced to meet customer demand. Used in conjunction with value stream mapping to determine staffing requirements.

Time interval metrics — Points captured by the pre-hospital EMS providers to measure specific components of the transport of a patient from the pre-hospital EMS system by emergency ambulance to an approved EMS receiving hospital.

Time stamp metrics — A single number variable that must be known if it either begins or ends measurement of a time interval metric.

Title 22 — The majority of California hospital licensing regulations are found here within the California Code of Regulations.

Triage — The initial screening of the patient's presenting complaint, signs and symptoms, typically by a triage nurse, to determine the appropriate order for the patient to receive a medical screening exam.

Unit hour — A fully equipped and staffed vehicle in the EMS system. For example, in a system that has 10 ambulances around the clock (24 hours), there are 240 unit hours.

Unit hour utilization (UHU) — Calculated by dividing the number of transports by the number of unit hours. For example, if 10 ambulances complete 120 transports in 24 hours, you would calculate the UHU by dividing 120 transports by 240 unit hours equaling .5 UHU.

Wait time or walltime — Also known as ambulance patient offload delay or APOD, which is the occurrence of an ambulance patient remaining on the ambulance gurney beyond the ambulance patient offload time interval standard.

1 Quality Improvement Framework

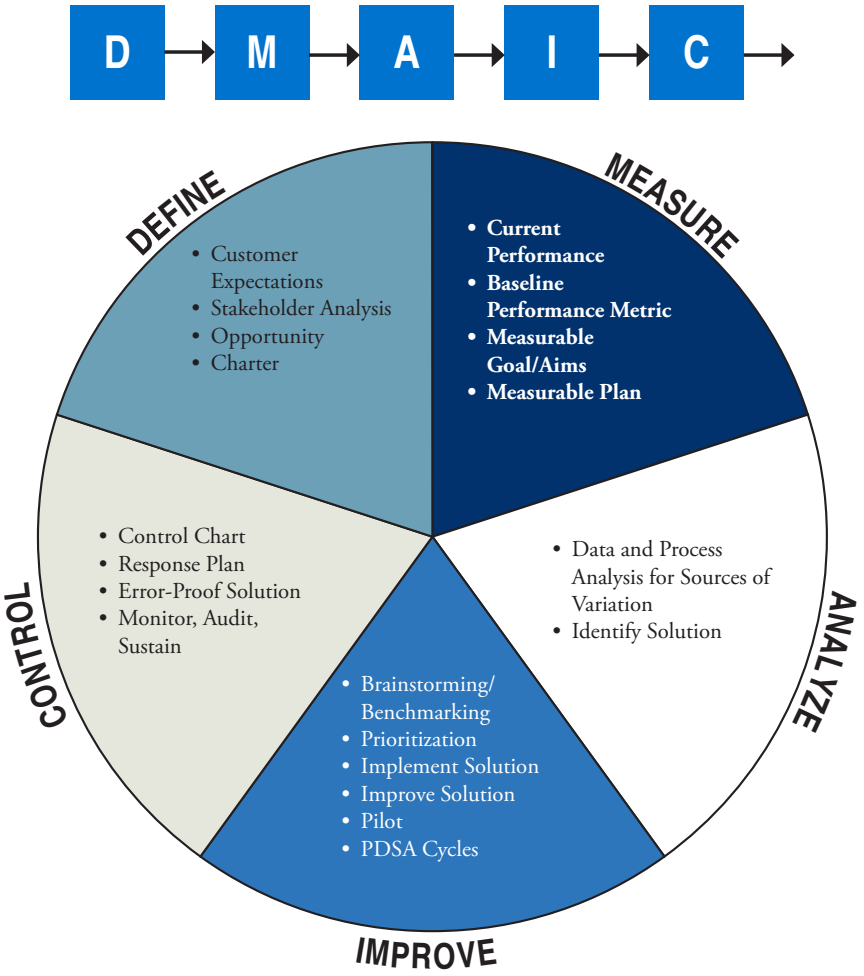
Improvement strategies, tools, and resources are essential to realize significant change. Improvement work is new to many leaders who find themselves in quality roles, and new improvement teams charged with change are often not familiar with the tools.

This section provides a road map for setting up your collaborative by using the DMAIC model, which stands for define, measure, analyze, improve and control.

The DMAIC model is based on the Institute for Healthcare Improvement, IHI Model for Improvement, and the Hospital Quality Institute's Improvement Pocket Guide.

This guide gives an overview of a process that can be used to solve walltime issues. It helps the stakeholders set up an infrastructure to delineate roles and responsibilities, define the problem, establish measurement indicators and a measurement plan, analyze the data and, finally, improve and control the walltime problem over the long term.

The walltime items implanted in this section are examples only. They are not to be misconstrued as absolute or an exclusive list.



DMAIC OVERVIEW

DMAIC is an acronym that means **D**efine, **M**easure, **A**nalyze, **I**mprove and **C**ontrol.

It is a step-by-step approach to process improvement that is grounded in structure, discipline and rigor. The goal of DMAIC is not only to *improve the process,* as defined by your problem statement, but also to *sustain the improvements*.

Define: The objective of the first phase in DMAIC, Define, is to determine the problem that needs to be solved. This is accomplished by establishing a purpose, scope and goal of the project. The major outputs of this phase are:

- Project charter
- Customer requirements/expectations
- High-level process map
- Stakeholder analysis

Measure: During the Measure phase, the current situation is assessed, baseline performance is calculated, and the process measures are established. The major outputs of this phase are:

- Focused problem statement
- Data collection plan
- Process variables and measurements
- Baseline measurements
- Measurements system capability

Analyze: During the Analyze phase, one to three sources of process variation — root causes — are determined. This phase is statistically intensive:

- Examine data and create a list of potential contributory causes of the problem (fishbone diagram)
- Prioritize list using general and graphical tools (Pareto chart)
- Perform a hypothesis test and statistical analysis to validate process variability (if necessary)

Improve: The goal of Improve is to identify a solution, implement a solution, and improve the solution using PDSA cycles:

- Identify driving causal factors and associated solution(s)
- Assess, prioritize and test solution(s)
- Pilot the selected solution(s)
- Conduct small tests of change

Control: In Control, the final solution becomes part of standard operating procedure and is evaluated over time for sustained results. It is essential during this phase to:

- Create and validate the measurement system of the new process
- Error-proof the process
- Measure the process against the specification limits (defined by the customer) and the control limits (determined by the process)
- Document the new improvement/process/system
- Close project and celebrate
- Periodically audit to sustain or restart cycle of DMAIC, if needed

Executive Sponsor	Project Sponsor Partnership	Improvement Leader/ Process Owner	Improvement Team

DMAIC ROLES AND RESPONSIBILITIES

The **Executive Sponsor (ES)** is the member of senior management who *provides overall guidance and accountability for the project*. The ES approves the final charter and recommendations, ensures timely implementation, secures any necessary resources and financial support, removes organizational barriers to project success, and makes certain that the project has sustained results.

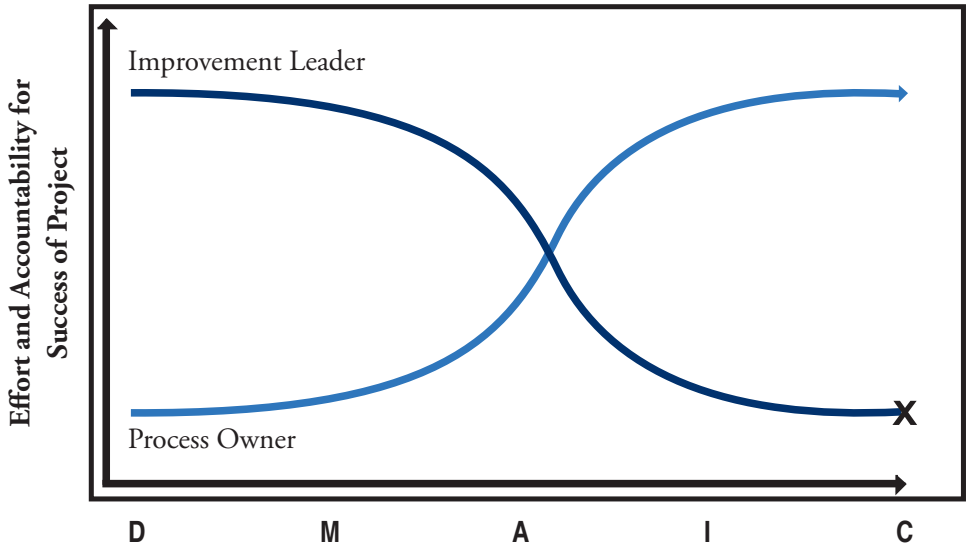
The **Project Sponsor(s) (PS)** is *accountable for the timely and successful implementation of the project*. The PS has close contact and meets regularly with the Improvement Leader. The PS helps charter the project, reviews progress, removes project barriers, and utilizes the Quality Improvement Framework to measure progress. The PS may also be a key decision maker for approval of final recommendations.

In the clinical environment, the Project Sponsors are typically the nurse manager — medical director dyad.

The **Improvement Leader (IL)** is the DMAIC methodology expert or quality advisor/consultant, who is *accountable for using DMAIC to manage the project and assure deliverables are met*. The IL partners with the Process Owner to engage all project constituents to ensure that project goals are met within the required time frame and budget. As the project approaches Control, management of the outputs and improvements transition to the Process Owner.

The **Process Owner (PO)** is *accountable for implementing, controlling, and measuring the project outputs and improvements*. The PO works side-by-side with the IL and fully understands the project plan, deliverables and goals. This is typically a line manager, supervisor or charge position.

The **Improvement Team (IT)** is composed of individuals who will make a significant and focused contribution to the timely and successful implementation of the project. The IT, with their in-depth knowledge of the problem, *contributes ideas and significantly impacts the direction of the project*.



D → M → A → I → C →

D — DEFINE

Objectives

- Identify and validate the improvement opportunity
- Determine the customer needs and stakeholder needs/expectations
- Prioritize the opportunity
- Understand the process
- Define the scope of the project
- Establish an effective project team

Key Questions

- What is the problem being addressed? When, where and to what extent does the opportunity exist?
- Who are the customers? Patients and families? Hospital staff? Faculty and residents? Community or population? What are the customers' needs?
- What is the strategic goal or reason for completing this project? Is this project tied to strategic goals? What is the high-level process? What portion of the end-to-end process (whole system process) is within the scope of this project?
- What are the objectives (in measurable terms) of the project? Is the goal achievable in the time frame established?
- Is the time frame expressed in days, weeks, months? (not years)
- Who are the team members? What are their roles, responsibilities and time commitments?

Deliverables

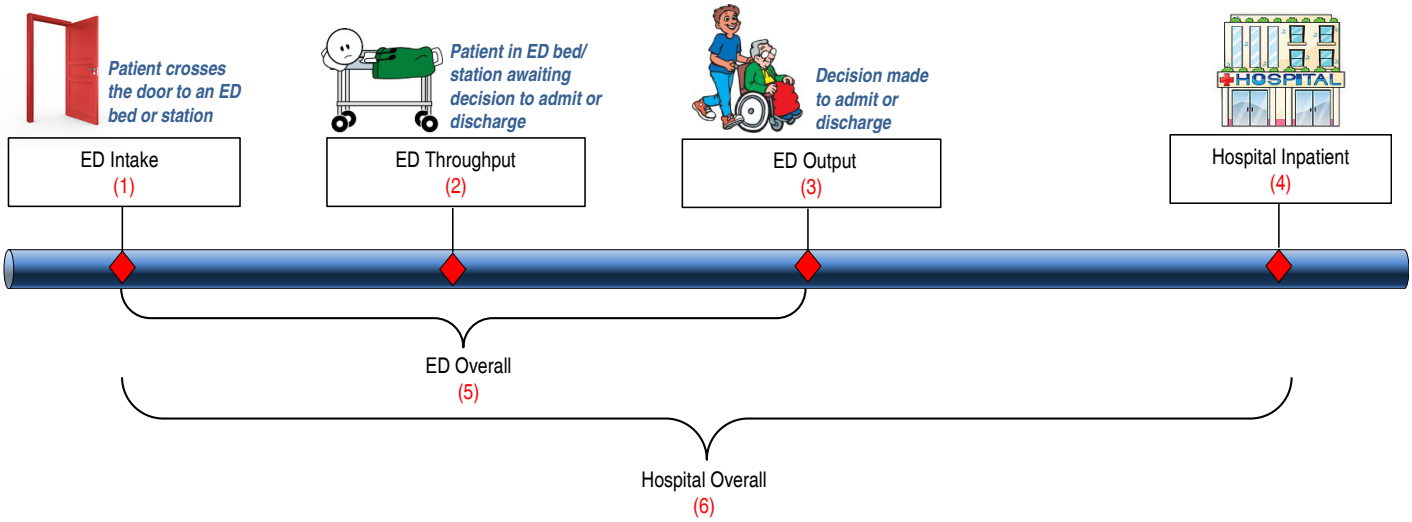
❒ Project Charter
❒ Customer Expectations
❒ High-Level Process Map
❒ Project Plan
❒ Prepared

Team Change Management

❒ Stakeholder Analysis
❒ Elevator Speech

Tools

❒ Voice of the Customer
❒ High-Level Process Map
❒ Lean Methods



Project Charter Template

Overview	*Project Name*
Linkage to Strategic Priorities and Pillar Goals	Select relevant goal that aligns with strategic priorities
Problem Statement	Describe in measurable terms from the Metrics chapter what is specifically wrong with the current process and the impact to the strategic priorities and strategic goals
Goal/Benefit	Express in measurable terms the expected improvement resulting from the project
Scope	Articulate the areas under analysis, the time frame of the project and the actions that will be performed
System Capabilities/Deliverables	Depict the functionality, items, or outputs of the project that are critical to achieving the goals
Resources Required	List the people, money, or systems necessary for the success of the project (separate out team members)

Key Metric(s)

List the measurements and statistics that will gauge the outputs of the process

- Ambulance patient offload time
- Ambulance patient offload delay interval
- Ambulance patient offload delay occurance
- Annula EMS ambulance transports
- Annual ED visits
- Etc...

Milestones

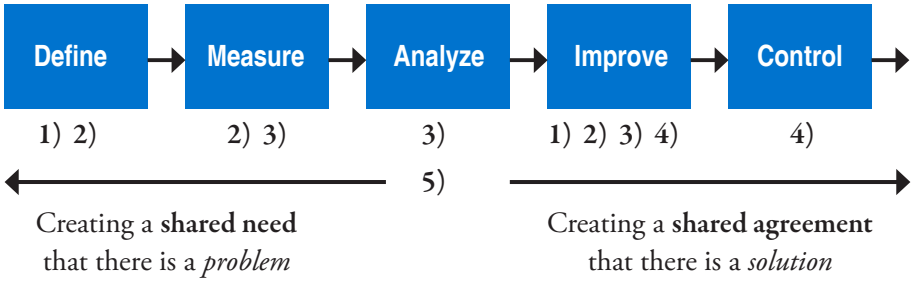
"Here's how you'll know I'm on track"

Description	Date (mo/yr)
1. Customer Expectations	
2. Process Map	
3. Measurement Plan	

CHANGE MANAGEMENT FOR DMAIC

Change Management encompasses all of the phases of DMAIC with the purpose of:

1. Creating a Shared Need
2. Shaping a Vision
3. Mobilizing Commitment
4. Sustaining the Gains
5. Changing Systems and Structures



Change Management Tools

- WIFM — "What is in it for me?"
- Elevator Speech
- Stakeholder Analysis

Change Management within DMAIC

Stakeholder Analysis

Name	Strongly Against (-2)	Moderately Against (-1)	Neutral (0)	Moderately Supportive (+1)	Strongly Supportive (+2)
Person 1	X →			✓	
Person 2			X →	✓	
Person 3		X →	✓		
Person 4				X →	✓

Tip: Also include the person's resistance (technical, political or cultural) and a statement on how the resistance will be addressed.

Remember: Resistance to change is natural and expected. What makes a successful project is how that resistance is managed.

Telling the Story

Elevator Speech
Elevator Speech is used to shape a vision for the project or the improvement

- "Our project is about ..."
- "Here's why it is important to do ..."
- "Success will look like ..."
- "Here's what we need from you ..."

*Try to limit speech to 90 seconds

Project Update
In seven minutes you should be able to convey:

- The DMAIC Phase you are in
- The problem and why it is important to address, described using key measures
- What the analysis tells us about the drivers of error
- Planned/Implemented improvements
- The key outcome metric, expected improvement, and when we should see the outcome measure move

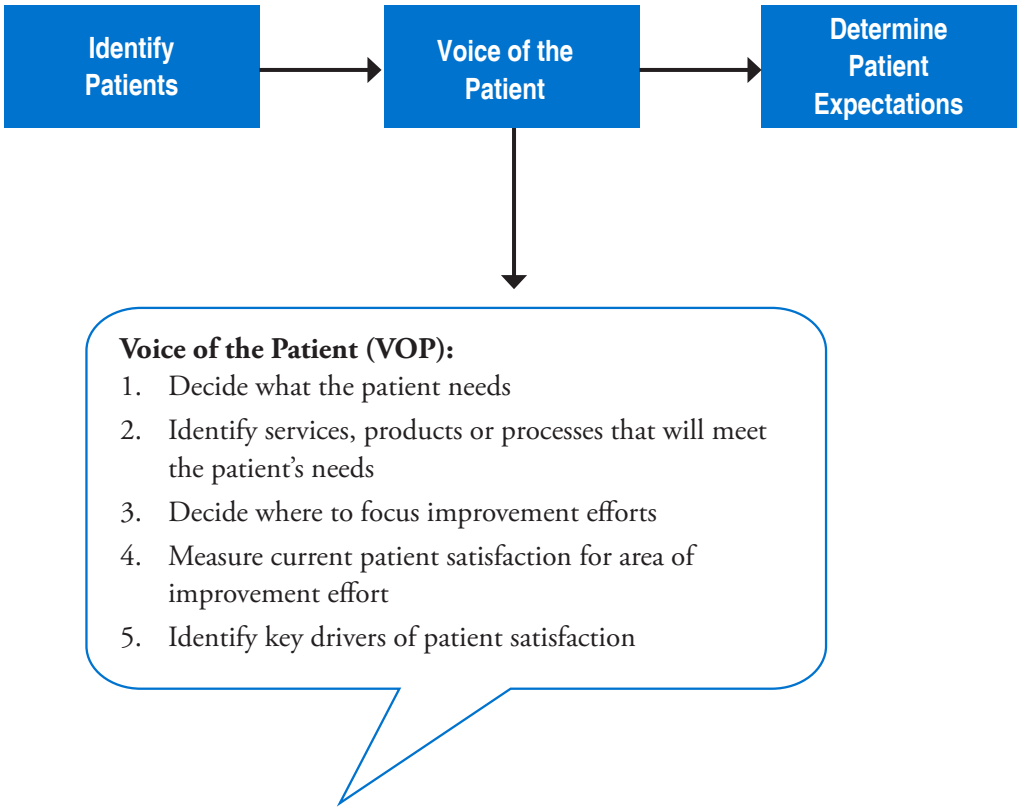
TIME AND SPEED MATTERS — A CHECKLIST OF FACTORS

Slow — Paced — Limiting Factors	Fast — Speed Factors
Mixed loyalties and commitment to an outcome by members: – Hidden agenda – Political process	Common threat — urgency
Unclear/lack of accountability for results: – Time – Authority – Ability to implement	Problem of strategic importance
Unclear/absent commitment of resources to implement	Shared vision for desired outcome
Absence of senior leadership sponsorship; unclear messages	Focus
Lack of staff support	Senior management commitment
Lack of focus	Just-in-time training
Changes or drift in definition of project scope	Clear charter
Environment changed	Dedicated team
Definition of problem changed	Expert facilitation
No team formation: – Inconsistent participation – No preparation for team members – Turnover in team members	Data
No time frame	
Back-tracking and rework	
Data needs not met	
Not connected to strategy	

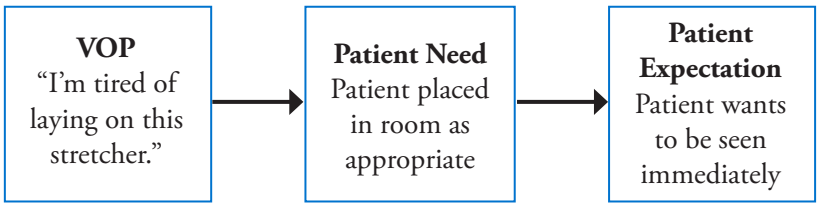
Components of Successful Change Efforts

1. A desire or mandate to finish the project quickly
2. A clear aim
3. A way to measure performance
4. Access to exciting research
5. Good data collection on site, analysis, and project management
6. Support from leadership
7. A willingness to make incremental changes
8. The ability to do quick, small-scale tests
9. Impatience
10. These, plus the need for team skill development and effective facilitation, are criteria to consider when engaging a team with the task of improving a process

Customer aka Patient Expectation Process



Example:



Key Outcomes:

- List of patients and patient segments
- Identification of reactive and proactive data sources
- Verbal or numerical data that identify patient needs
- Defined patient expectations
- Specifications for each patient expectations

M — MEASURE

Objectives

- Identify elements seen as potential factors for measuring the current process performance and determine whether customer expectations are being met
- Assess current performance of the process
- Establish current performance metrics with targets or specification limits (determined by the customer) prior to an improvement so that the success of the project can be quantified

Key Questions

- How do you measure the process today? (i.e., volumes, rates, events, ratios, wait times, productivity, cycle time?)
- If you don't measure the process, see Metrics chapter.
- What is your data collection plan? How much data should you collect? Has the data been collected over a sufficient period to demonstrate variation by day, by week, by season, by location, by time of day?
- Does the data appear to be relevant, representative and reliable? Have you compared this data set to other data sources to validate data elements?
- How does the current performance data compare to the project goals? Is it possible to further quantify the project opportunity? Have you exhausted all ways to look at the data?
- Can you develop a measureable financial benefit for the project (value equation)?

Deliverables

❒ Finalized Customer Expectations
❒ Detailed Process Map
❒ Data Collection Plan
❒ Measurement Systems Analysis
❒ Baseline Current Performance

Tools

❒ Detailed Process Mapping
❒ Data Collection Plan Template
❒ Measurement Systems Analysis
❒ Current Performance Graph:
  – Histogram/Box Plot
  – Pareto Chart
  – Run Chart
  – Chronograph
❒ Failure Mode Effects Analysis (FMEA)
❒ Lean Value Stream Map
❒ Fishbone diagram
❒ RCA

NOTE: Determine if your data is *Discrete* (count data, yes/no, binary, etc.) or if your data is *Continuous* (height, dollars, time, etc.). This will help you decide which graph to create or analysis to conduct.

D → M → A → I → C →

Measurement Plan

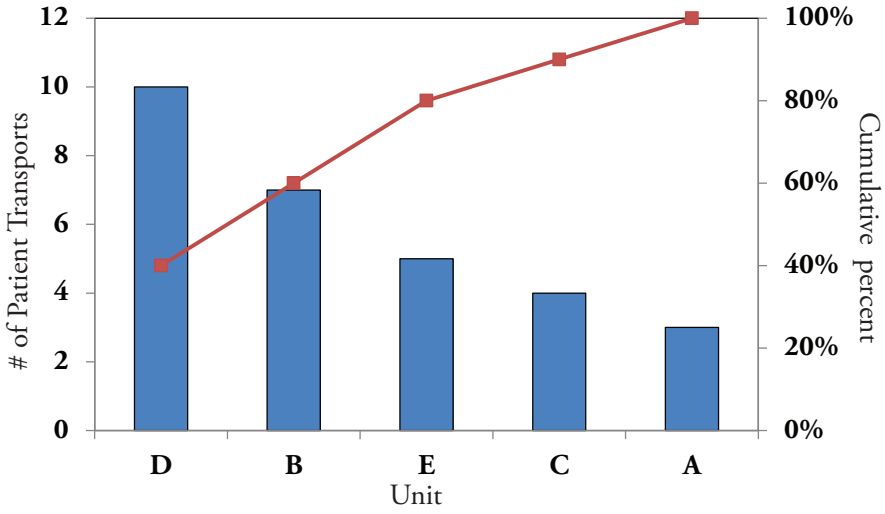
How will the data be used?
Identification of ambulance patient offload delay over time
Identifying whether the data is normally distributed

How will the data be displayed?		
Pareto Chart (individual values are represented in descending order by bars, and the cumulative total is represented by the line)	Histogram (an estimate of the probability distribution of a continuous variable)	Run Chart

Performance Measure	Operational Definition	Data Source	Sample Size
Ambulance patient offload delay	Offload time exceeds standard	EMS computer aided dispatch (CAD)	EMS transports by month
Who will be collecting the data?	**When will data be collected?**	**How will data be collected?**	**Other data that should be collected — Same time**
EMS or hospital	After every transport	Data will be collected for all transports	# of ambulance transports # ED visits Division status

In addition to graphing the data, which should always be completed first, one should also run *univariate statistics* (statistics on a single variable). Examples of univariated statistics are: mean, median, mode, range, standard deviation, variance, counts and cumulative percentages.

Pareto Chart — Focus on Key Problems (80/20 Rule)



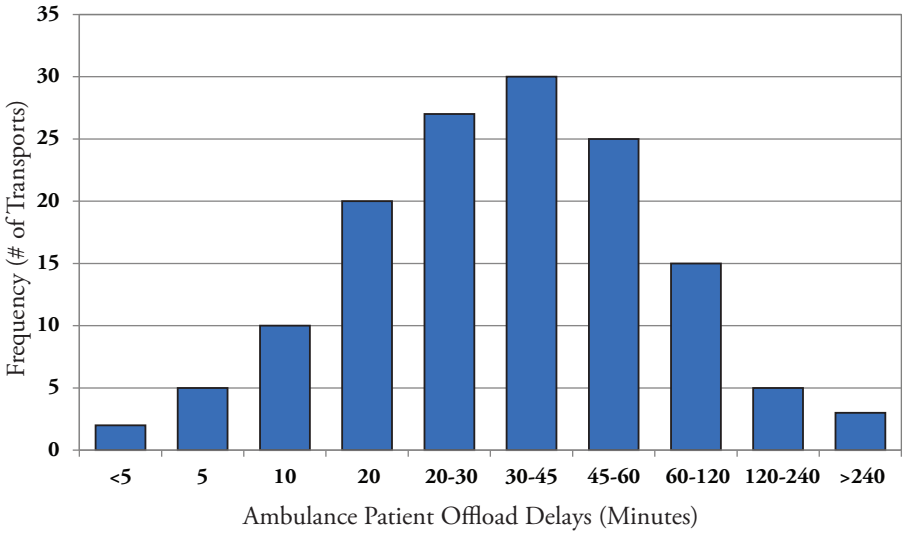
Pareto Chart Tips

Create another linked Pareto Chart where the "tallest bar" is broken into sub causes.

Interpreting the Pareto Chart

Generally, the tallest bars indicate the biggest contributor to the overall problem, but sometimes the most frequent or expensive is not always the most important. Always ask: What has the most impact on the goals of our patients and processes?

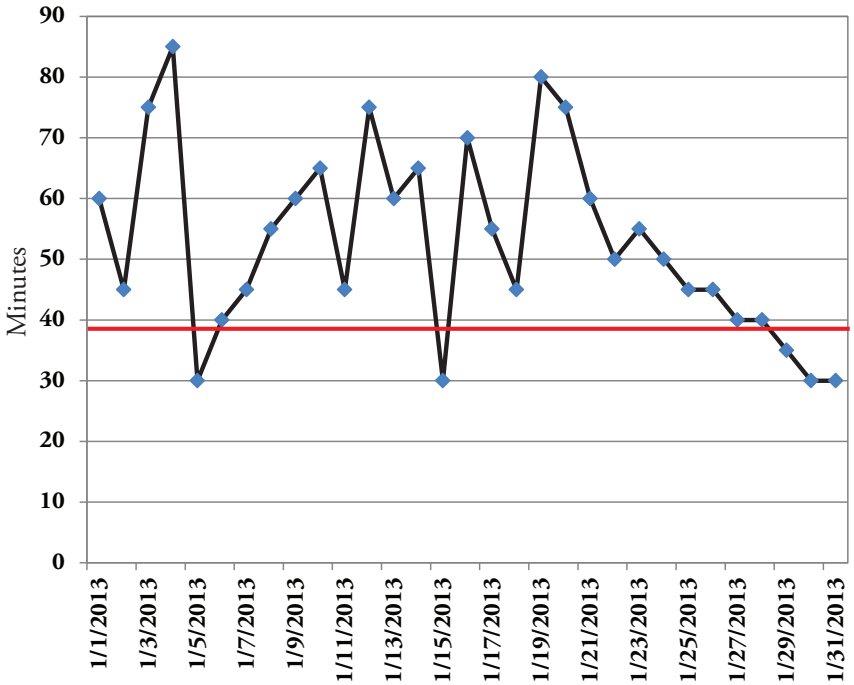
Histogram — Process Centering, Spread and Shape



Interpreting the Histogram

- Centering:
  - Where is the distribution centered?
  - Is the process running high or low?
- Variation:
  - What is the spread of the data?
  - Too variable?
- Shape:
  - What is the shape — left or right skewed?
  - Multiple peaks?

Run Chart — Tracking Trends



Run Chart Tips

- Redraw the average line after there has been a significant change in the process.
- Do not focus on every variation in the run chart, only those that are significant. (You may need to create control limits or trend lines.)

Interpreting the Run Chart

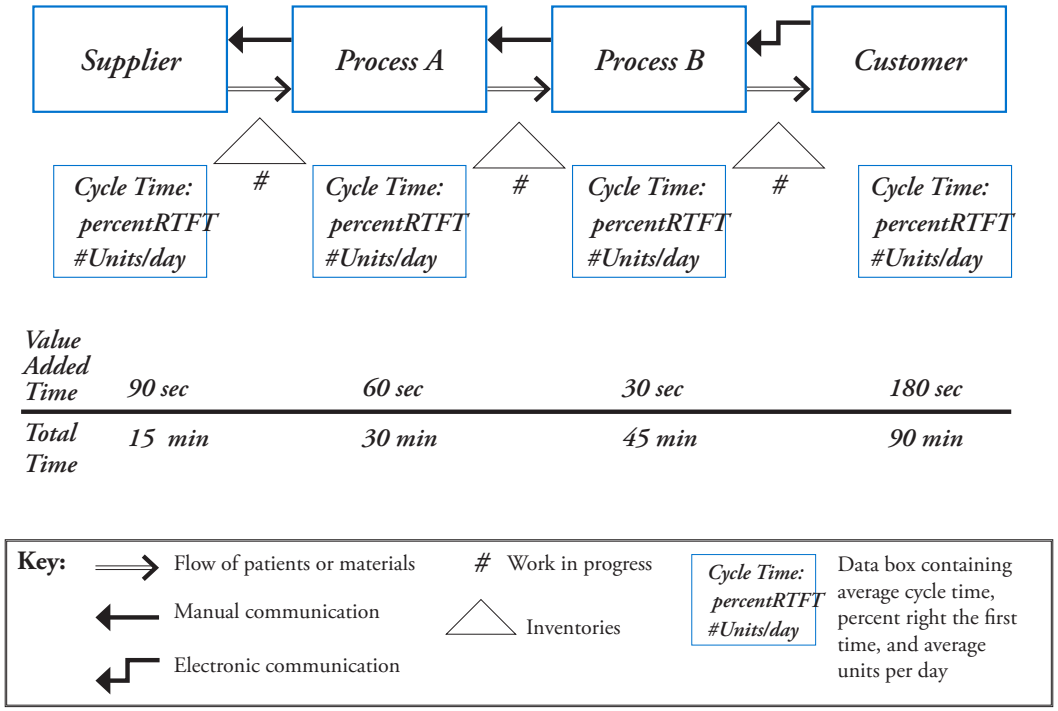
- How is the process performing when compared to your customer expectation (specification limits)?
- Are there identifiable trends: positive or negative?

LEAN TOOLS/METHODS

- Lean is an improvement philosophy and methodology that focuses on flow and waste reduction with respect to addressing customer expectations
- The basic philosophy of Lean is to deliver most economically:
  - What is needed
  - When it is needed
  - Using the absolute minimum resources
- Lean is often integrated with DMAIC, and the Lean approaches are typically used during the Measure and Improve phases
- Lean Tools
  - Value Stream Mapping *(see chart below)*
  - 5-S Improvement *(see chart on page 19)*
  - 8 Ways We Waste — DOWNTIME *(see chart on page 19)*
  - Bottleneck Analysis
  - Takt Time *(see page 19)*
  - 8 Flows in Health Care *(see page 19)*

Value Stream Mapping

Estimate the value-added time and the total time for each piece of the process and place at the bottom.



Source: Value Stream Mapping from Roth and Shook *"Learning to See"*

Steps to 5-S

1. **S**ort
2. **S**et in Order
3. **S**can
4. **S**tandardize
5. **S**ustain

8 Ways We Waste

D	Defects
O	Overproduction
W	Waiting
N	Not Highest and Best Use
T	Transportation
I	Inventories
M	Motion
E	Extra Processing

Takt Time

What is it and when is it used?

- Calculation that describes how often something is processed or produced to meet customer demand
- Use Takt Time in conjunction with value stream mapping to determine staffing requirements (great for scenario testing!)

Calculation

From the value stream map, use the value-added processing time (processing time that is important to the customer) to calculate required staffing:

$$\textbf{Takt Time} = \frac{\text{available working time per day}}{\text{customer demand rate per day}}$$

Central Sterile Example:

$$\text{Takt Time} = \frac{(3 \text{ shifts/day} * (7 \text{ work hours/shift}) * (60 \text{ min/hour})}{650 \text{ trays/day}} = 2 \text{ minutes per tray}$$

Flows in Health Care

Central Sterile Example:

$$\text{Required staffing} = \frac{10 \text{ minutes value added processing per tray}}{2 \text{ minutes takt time per tay}} = 5 \text{ FTEs}$$

- Patient
- Family
- Staff
- Communication
- Teaming/Rounding
- Materials/Supplies
- Equipment
- Information

D → M → A → I → C →

A — ANALYZE

Objectives

- Identify and validate multi-causes that assure the elimination of the specific problem
- Determine sources of variation that cause failure to meet patient expectations

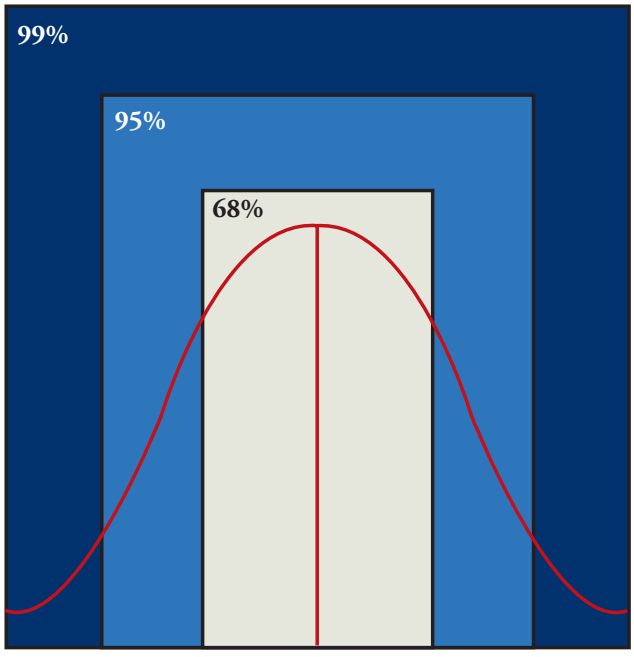
Key Questions

- How does the current data differ from what was expected (target performance)? How often, when and how much?
- Does displaying the data on a Pareto Chart highlight the principle causes? The 80/20 rule or Pareto's Principle state that 80 percent of the problem comes from 20 percent of the sources of variation.
- What is the null and alternative hypothesis of the problem? Which statistical analysis was utilized and what is the result?
- What is the relationship between pairs of variables? Is one variable a root cause for the other variable? What is the best tool for illustrating this relationship?
- Using the process map, is it possible to identify a single source that is responsible for the largest problem, bottlenecks, or defects?

Deliverables

- Validated Multi-Causal Map
- Graphical Analysis
- Identified Variability and # of Defects
- Revised Problem Statement and Potential Solutions

Normal Curve



3 SD 2 SD 1 SD Average 1 SD 2 SD 3 SD

How to graph the data (example)

		X	
		Discrete	Continuous
Y	Discrete	Pareto Chart	Time Series Plot Run Chart
	Continuous	Dot Plot Histogram Box Plot Multi Variate Chart	Time Series Plot Run Chart Scatter Plot Matrix Plot

Tools

- Data Analysis — Run Chart, Pareto, Histogram, etc.
- Hypothesis Testing — ANOVA, T-test, Chi Square Test, F-test, Z score, Correlation, Regression
- Priority/Control Matrix

Statistical Analysis

- First, create the null hypothesis (H_O) and the alternate hypothesis (H_A)
  – H_O states that the mean or variance of the samples are equal, and H_A states they are not
- Second, determine the test to be performed (see below) using the type of data (discrete vs. continuous) and its distribution (normal vs. non-normal)
- Third, when conducting the test with a confidence of 95 percent, we look for the results of the "p-value" to be less than 0.05 (statistically significant) or greater than 0.05 (not statistically significant)
  – p-value < 0.05, we reject H_O and conclude there is a statistical difference between the values
  – p-value > 0.05, we fail to reject H_O

Which Statistical Test to Use

		X	
		Discrete	**Continuous**
Y	**Discrete**	Chi Square Test	Binary Logistic Regression
	Continuous	Test Equal Variances ANOVA 1-Sample T-test 2-Sample T-test	Simple Linear and Multiple Regression

I — IMPROVE

Objectives

- Identify, evaluate, prioritize, select and pilot the proposed improvement solutions
- Measure the outcomes of the new solution and make adjustments
- Develop a plan that will assist the organization in adapting to the changes introduced by your project
- Implement the new process and make it part of the way we achieve our strategic plan

Key Questions

- Has your team created a list of performance improvement ideas? What is the criteria for prioritizing the ideas? (i.e., Cost and benefit? Timing? Ease of implementation? Productivity improvement? Increased patient satisfaction?)
- How will the improvements affect other areas of the health care system/departments?
- Can you rollout the improvement to one unit/department first to prove that the change will have the anticipated benefit?
- How will the organization receive the process improvements? How can you reduce the resistance to change?
- Can your project sponsor help communicate the importance of the improvement?
- Have you employed control mechanisms and forcing functions and error proofed the new process improvement? How are you going to make the new process part of the normal routine?

Deliverables

❒ Change Implementation Plans
❒ Validation of Improvement Results
❒ Process Maps and Documentation (e.g. New Roles and Responsibilities)
❒ Plan for Pilot — Implementation, Resources and Milestones
❒ Operating Tolerances
❒ Return on Investment (value)

Change Management

❒ Stakeholder Analysis for the Improvement

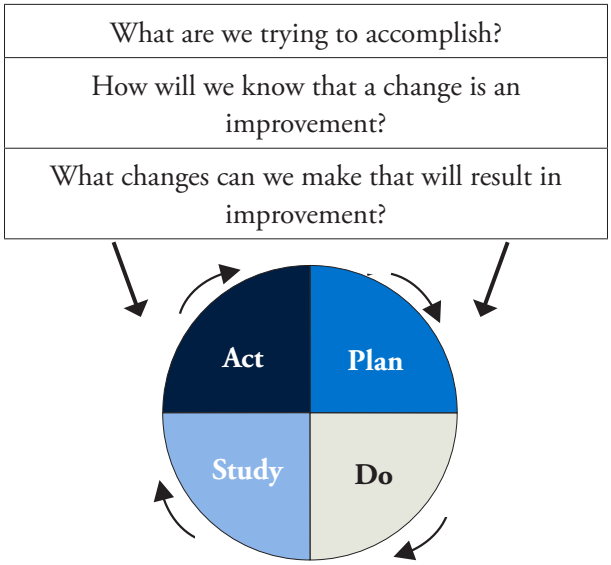
Tools

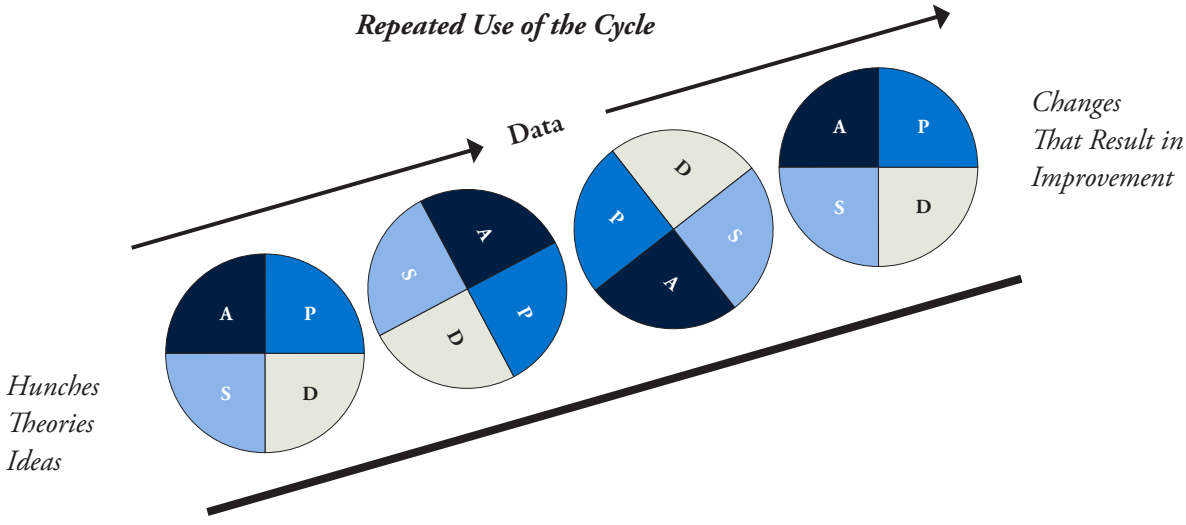
❒ Graphical Analysis — Pareto Chart, etc.
❒ Main Effects Analysis
❒ Criteria Matrix
❒ Lean Value Stream Map *(see page 18)*
❒ 5-S *(see page 19)*
❒ Waste Reduction (MUDA)
❒ PDSA Cycles

PDSA

A series of progressive cycles of experimentation based on the Plan, Do, Study, Act cycle of process improvement help answer the questions. Students of continuous quality improvement will recognize the ongoing, repetitive nature of this cycle to drive from hunches, theories, and good ideas to change that result in real improvement in the process of care. Data and measurement form the foundation for the cycles; the ongoing collection of, and reflection on, information informs and drives the action elements of the cycle. A series of cycles, as illustrated below, builds a ramp to change. At each meeting, a work team can ask practical questions that form the basis for the model:

- What is the smallest number (patients, health plan members, encounters, surveys, and so on) that will test an idea?
- What can a small group of people or one individual accomplish by next Tuesday?





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C — CONTROL

Objectives

- Guarantee performance through monitoring and corrective action — stabilized process
- Educate stakeholders and change standard operating procedures
- Close the project and fully transition to the Process Owner

Key Questions

- How can the improvement benefits be sustained over time? What policies, procedures and management practices need to be implemented?
- How will you know if the benefits are not being sustained?
- What additional tools and/or training will be necessary with the new process?
- How can we guarantee that patient expectations will continue to be met?
- Have you communicated the project's success and lessons learned to your team, management and organization?

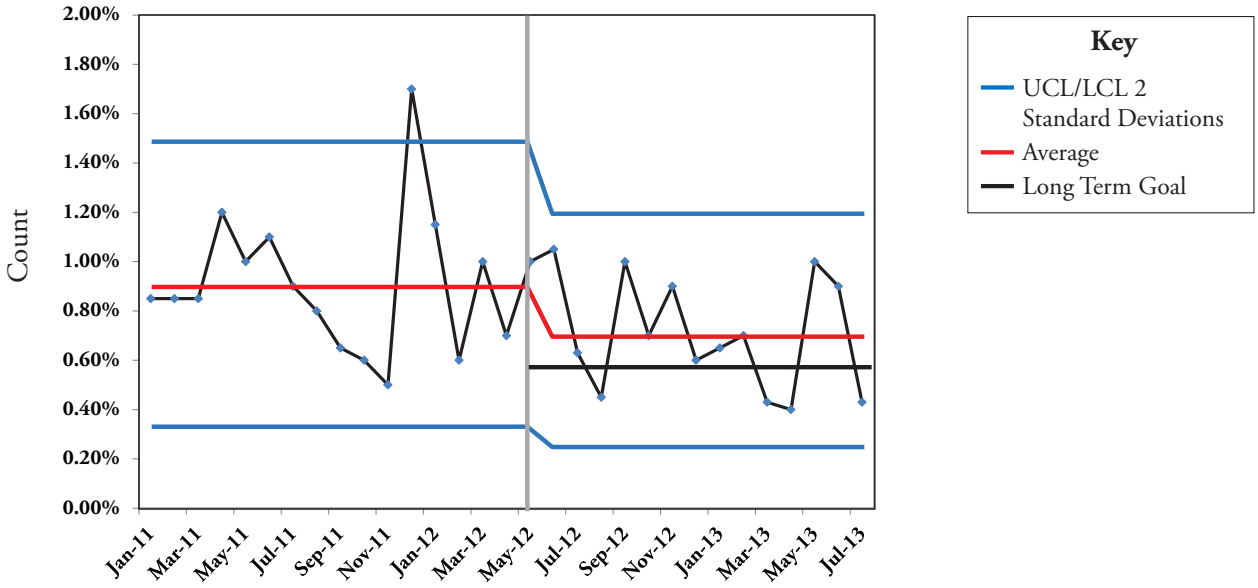
Deliverables

- ❒ Finalized Process Maps
- ❒ Policies and Procedures
- ❒ Patient or Employees Impact Analysis
- ❒ Financial Benefit Analysis
- ❒ Continuous Training
- ❒ Success Stories

Tools

- ❒ Control Plan (focusing on the items, the measurement method, timing and accountability)
- ❒ Graphical Analysis — Control Chart indicating upper and lower specification or control limits (UCL and LCL)

Control Chart with Control Limits



2 Metrics

I. INTRODUCTION

The California Ambulance Patient Offload Delay Collaborative and the metrics workgroup agreed that using objective, measureable metrics allows for collection of meaningful data for trending and analysis of performance improvement changes over time.

This document was developed by the metrics workgroup and is designed to establish common language, definitions and metrics pertaining to ambulance patient offload. It is intended for use by local emergency medical services (EMS) systems and other stakeholders in their efforts to define, measure and control ambulance patient offload delay (APOD).

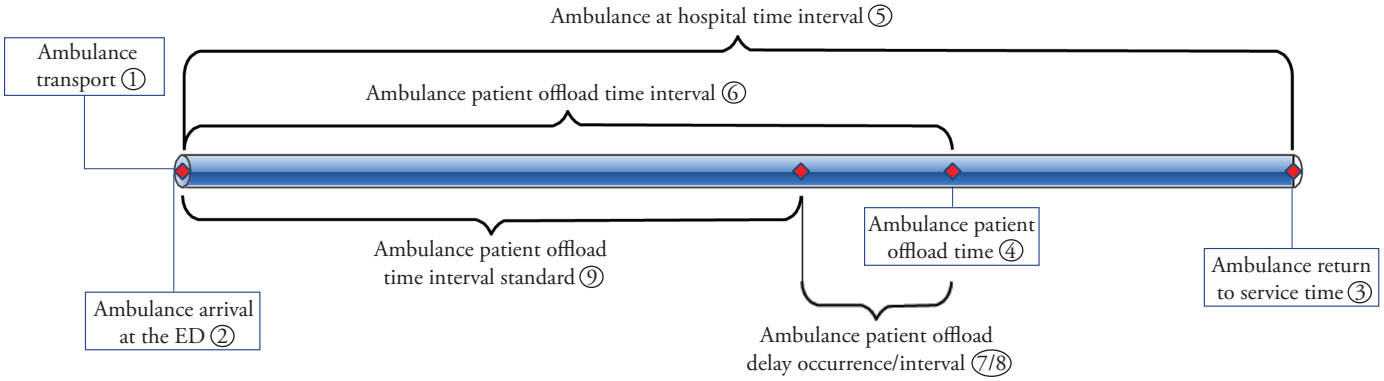
II. METRIC DEFINITIONS

APOD	Ambulance patient offload delay.
AVL/GPS data	Automatic vehicle location/global positioning system.
Atomic clock	The most accurate time and frequency standards known used as primary standards for GPS.
Baseline metric	An agreed-to description of a point in time, which serves as a basis for defining change.
Computer Aided Dispatch (CAD)	A method of dispatching taxicabs, couriers, and emergency services assisted by computer. It can either be used to send messages to the dispatchee via a mobile data terminal (MDT) and/or used to store and retrieve data (i.e. radio logs, field interviews, client information, schedules, etc.). A dispatcher may announce the call details to field units over a two-way radio.
Control metric	Used to compare to other variables in an experimental group.
Continuous variable metric	One metric compared continuously over time.
Dual variable metric	Two metrics used in comparison.
ePCR	Electronic patient care record.

Fractile	Measurement of percentage of time interval associated with completed transfer of care (e.g. 90 percent of patients with transfer of care within 20 minutes).
ICEMA	Inland Counties Emergency Medical Agency.
LEMSA	Local emergency medical services agency.
Metric	A measurement used to gauge a quantifiable component of performance.
Mobile data computer	A computerized device used in public transit vehicles and emergency vehicles to communicate with a central dispatch office.
Single variable metric	Single metric that varies over time.
Time stamp metrics	Moments in time on the Ambulance Patient Offload Delay Timeline and Definitions that should be captured in order to understand time intervals. A time stamp metric is a single number variable that must be known if it either begins or ends measurement of a time interval metric. (i.e., Stations by Individual Hospital = EMS Transport to ED Bed Ratio).
Twenty-four hour clock	The convention of time keeping in which the day runs from midnight to midnight and is divided into 24 hours, indicated by the hours passed since midnight, from 0 to 23.

III. HOW TO MEASURE AMBULANCE PATIENT OFFLOAD DELAY

Ambulance patient offload time is a component of the total ambulance transport time beginning from the pre-hospital EMS system by emergency ambulance to an approved EMS receiving hospital and back to the pre-hospital setting. This process is illustrated in the picture below with corresponding terms numbered to match listed items.



A. Baseline and Control Metrics for Ambulance Transports

The numbered definitions below are aligned with the corresponding numbers on the illustration above. Each are separated into the metric definition, a) metric development, b) metric collection method, c) metric reporting options, and d) considerations or key points.

1. **Ambulance transport** — the transport of a patient from the pre-hospital EMS system by emergency ambulance to an approved EMS receiving hospital.

    a. Metric development — a single variable metric that identifies the number of occurrences in which a patient is transported to a hospital within an EMS system or a dual variable metric used with a control-like population.

    b. Metric collection method — most available methods for collection are integrated software solutions and CAD that are synchronized to the atomic clock.

    c. Metric reporting options, determined at the local level, include but are not limited to:

    - Annual EMS System Transports
    - Annual EMS System Transports/1000 Population
    - Annual EMS Transports by Individual Hospital
    - Monthly EMS Transports by Individual Hospital
    - Annual EMS System Transports/Annual System ED Visits = Annual System percent of ED Visits by EMS

- Annual EMS Transports by Individual Hospital/ Annual ED Visits by Individual Hospital = Annual percent of ED visits by EMS by Individual Hospital
- Annual EMS Transports by Individual Hospital/ Number of ED Beds or Treatment

d. Considerations/Key Points — transports are a standard known metric in most systems. Local definitions for ambulance transport types can be customized based upon local preference. (e.g. non-emergency ambulance transports, ALS, BLS, CCT, emergency ambulance transports, 9-1-1 ambulance transports, etc.)

2. **Ambulance arrival at the ED** — the time ambulance stops (actual wheel stop) at the location outside the hospital ED where the patient is unloaded from the ambulance.

   a. Metric development — single variable metric that captures time of arrival on a 24 hour clock.

   b. Metric collection method — most available methods for collection are integrated software solutions and CAD that are synchronized to the atomic clock. Some systems also have this time stamp available via AVL/GPS data.

   c. Metric reporting — not necessarily reported as a stand-alone metric, however, it is an important time stamp used in determining ambulance at hospital and ambulance patient offload time intervals.

   d. Considerations/Key Points — systems would need to train their personnel for uniform collection of this time. For example, personnel would need to be trained to notify dispatch centers or keystroke the Mobile Data Computer (MDC) when the ambulance actually comes to a stop.

3. **Ambulance return to service time** — the time the ambulance is response-ready after transporting a patient to a hospital ED.

   a. Metric development — single variable metric that captures time of arrival on a 24 hour clock.

   b. Metric collection method — most available methods for collection are integrated software solutions and CAD that are synchronized to the atomic clock.

   c. Metric reporting — not necessarily reported as a stand-alone metric, however, it is an important metric used in determining ambulance at hospital time interval.

   d. Considerations/Key Points — this time is usually captured by dispatch when the ambulance crew notifies the dispatch center they are response-ready at the conclusion of all tasks performed at the hospital (e.g. patient care report, ambulance clean up, equipment restock). This does not correlate to when the patient was actually removed from the ambulance gurney.

4. **Ambulance patient offload time**[1] — the time the patient is physically removed from the ambulance gurney to hospital equipment.

    a. Metric development — single variable metric that captures the time the patient was actually removed from the ambulance gurney.

    b. Metric collection method — most available methods for collection are integrated software solutions and CAD that are synchronized to the atomic clock. Some systems have developed data collection methods using commercially available software applications (e.g. FirstWatch).

    c. Metric reporting — not necessarily reported as a stand-alone metric, however, it is an important metric used in determining ambulance patient offload time intervals.

    d. Considerations/Key Points — Not all systems have trained their personnel to report this time so that it can be captured in the CAD or other data collection method. Some systems (e.g. ICEMA) have trained EMS personnel to get a signature on their electronic patient care record (ePCR) at this time. The ePCR then time stamps the signature for data collection and reporting.

B. Time Interval Metrics

These are time intervals within the "ambulance at hospital timeline" identified by utilizing the time stamps and the ambulance patient offload time interval standard.

5. **Ambulance at hospital time interval** — the period of time between ambulance arrival at the hospital ED and ambulance return to service time.

    a. Metric development — continuous variable metric that identifies the length of time in hours and minutes between ambulance arrival at the ED time and ambulance return to service time.

    b. Metric collection method — must be calculated by measuring the time interval between ambulance arrival at the ED time and ambulance return to service time.

    c. Metric reporting — reported in hours and minutes for every ambulance transport to a given hospital and/or within a given system. Reports can also identify averages or fractile percentages as metrics.

    d. Considerations/Key Points — ambulances may be response-ready but not necessarily leave the hospital. In some systems ambulances may actually "post" at strategically located hospitals. There needs to be clarity when differentiating between ambulance at hospital time interval and ambulance patient offload time interval. Some systems may be defining and measuring the two synonymously due to challenges with data collection capabilities. Efforts need to be made to differentiate between when patient offload delay is occurring due to the patient remaining on the gurney versus the additional time the ambulance personnel remain at the hospital for other tasks (e.g. cleaning of ambulance, restock, completing the ePCR).

1 Capturing this time stamp metric should be considered the "gold standard," however, not all EMS systems have the procedures, processes or technology to capture this timestamp metric.

6. **Ambulance patient offload time interval** (commonly referred to as ambulance wait time or walltime) — the period of time between ambulance arrival at the ED and ambulance patient offload time.

    a. Metric development — continuous variable metric that identifies the length of time in hours and minutes between ambulance arrival at the ED time and ambulance patient offload time.

    b. Metric collection method — most available methods for collection are integrated software solutions and CAD that are synchronized to the atomic clock. Some systems have developed other data collection methods using commercially available software applications (e.g. FirstWatch). Must be calculated by measuring the time interval between ambulance arrival at the ED time and ambulance patient offload time.

    c. Metric reporting — reported in hours and minutes for every ambulance transport to a given hospital and/or within a given system. Reports can also identify averages or fractile percentages as metrics.

    d. Considerations/Key Points — This is an important metric to measure. Some systems that do not capture the actual ambulance patient offload time (when the patient is actually removed from the gurney); instead they use ambulance return to service time and then "back out" or subtract a pre-established ambulance patient offload time interval standard, most commonly 15-30 minutes. The resulting time interval is then recorded as the ambulance patient offload delay time interval (wait time or walltime). Currently the consolidation of these times by hospital or system is commonly referred to as wait time or walltime hours.

7. **Ambulance patient offload delay (APOD) interval** (due to current variation in data collection methods, this is also known as ambulance wait time or walltime) — is the resulting period of time produced when the ambulance patient offload time interval exceeds the established ambulance patient offload time interval standard.

    a. Metric development — continuous variable metric for each occurrence that identifies the length of time in hours and minutes that an ambulance patient remains on the ambulance gurney beyond the ambulance patient offload time interval standard.

    b. Metric collection method — most available methods for collection are integrated software solutions and CAD that are synchronized to the atomic clock. Some systems have developed data collection methods using commercially available software applications (e.g. FirstWatch). Must be calculated by subtracting the ambulance patient offload time interval standard from the recorded ambulance patient offload time interval. Instances where the difference is less than or equal to zero do not qualify as occurrences of ambulance patient offload delay.

c. Metric reporting — reported in hours and minutes for every ambulance transport to a given hospital and/or within a given system. Reports can also identify averages or fractile percentages as metrics.

d. Considerations/Key Points — This is a critical metric to record and should be analyzed within the context of an established standard or performance expectation. This metric can be completely accurate only if the actual ambulance patient offload time is captured/known and factored into the calculation of ambulance patient offload time interval. This is commonly not the case due to limitations in data collection capabilities. Capturing this crucial time through new technologies and collaborative processes is the best approach and requires further discussion.

8. **Ambulance patient offload delay (APOD) occurrence** — the occurrence of an ambulance patient remaining on the ambulance gurney beyond the ambulance patient offload time interval standard.

   a. Metric development — single variable metric that captures the number of times a patient that is transported to a hospital remains on the ambulance gurney longer than the ambulance patient offload time interval standard.

   b. Metric collection method — varies based upon the data collection capabilities of a given system/provider/hospital. The most prevalent methods are integrated software solutions and the CAD.

   c. Metric reporting — reported as number of occurrences per provider, per hospital and/or system for a given time period.

   d. Considerations/Key Points — one of the most important metrics to know, understand and report. This establishes actual performance/compliance of a provider/hospital/system to the established standard. In day-to-day management of an EMS system, it is critical that the local emergency medical services agency (LEMSA) and system partners know the occurrences in as close to real time as possible. It is also worthwhile to establish a gradient that shows of the number of occurrences, how many occurrences were more than 30 min, more than 60 min, etc.

9. **Ambulance patient offload time interval standard** – is the established system performance standard for the period of time between ambulance arrival at the ED and ambulance patient offload time. By definition, when a patient remains on the ambulance gurney for longer than this time interval, APOD has occurred.

   a. Recommended Standard — 90 percent of all patients transported to the hospital shall be removed from the ambulance gurney within 15-30 minutes[2] of arrival at the ED.

   b. Use of the standard — this standard should be used to benchmark hospital and system fractile performance.

   c. Metric Reporting — Reported as LEMSA APOD interval standard.

2 15-30 minutes is the range of most common standards of those LEMSAs that have established system standards. Source – LEMSA Ambulance Patient Offload Delay Survey 2013.

d. Considerations/Key Points — performance improvement activities without an established standard upon which to benchmark system performance are ineffective. Every other aspect of EMS system performance has established standards or expectations. Discussions must address those instances where EMS system resources are low and hospital staff is needed to assist EMS personnel with the immediate transfer of patients to hospital equipment to expedite emergency ambulance availability.

C. Hospital Control Metrics

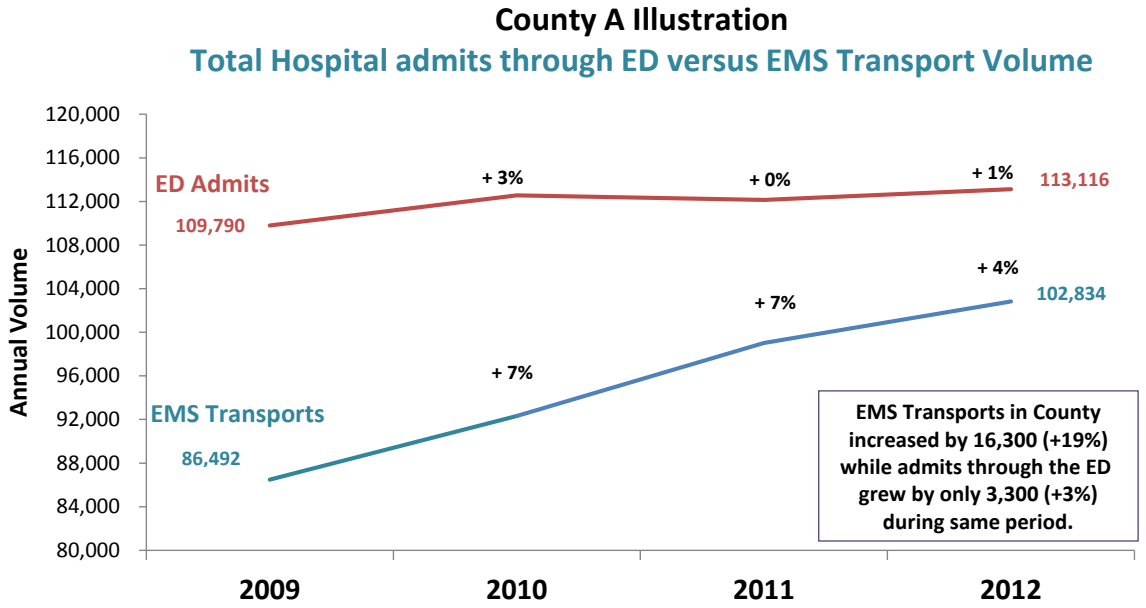
Relative to the delay in EMS patient offloading, these hospital metrics may provide baseline information for an apples-to-apples comparison on activity and capacity for EMS systems. Hospital Control metrics may include but are not limited to:

1. Annual System ED Visits
2. Annual System ED Visits /1000 Population
3. Number of System ED Beds or Treatment Stations
4. Number of System ED Beds or Treatment Stations/1000 Population
5. Number of System Licensed Hospital Beds
6. Number of System Licensed Hospital Beds/1000 Population
7. Number of ED Beds or Treatment Stations by Individual Hospital
8. Number of Licensed Beds by Hospital
9. Annual ED Visits by Individual Hospital
10. Monthly ED Visits by Individual Hospital

The following graphs show several corollary factors surrounding ambulance patient delay. Using and comparing various metrics, the graphs illustrate a deeper analysis of ambulance patient delay issues.

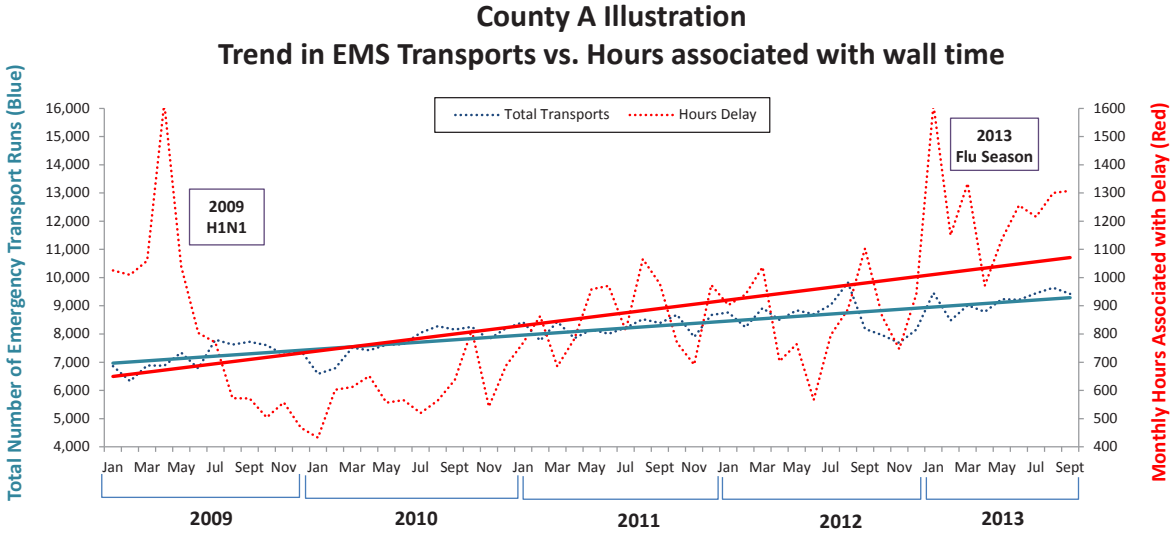
These charts depict County A's total EMS admits, EMS transports and hours associated with walltime. While walltime is a factor, ambulance delays have not escalated, in fact, when viewed as a ratio of overall transports, delays actually declined.

Fig. 1. Observed growth in EMS transports greater than growth in hospital admits through ED, County A example.



Source: Based on analysis of county published transport data and OSHPD.

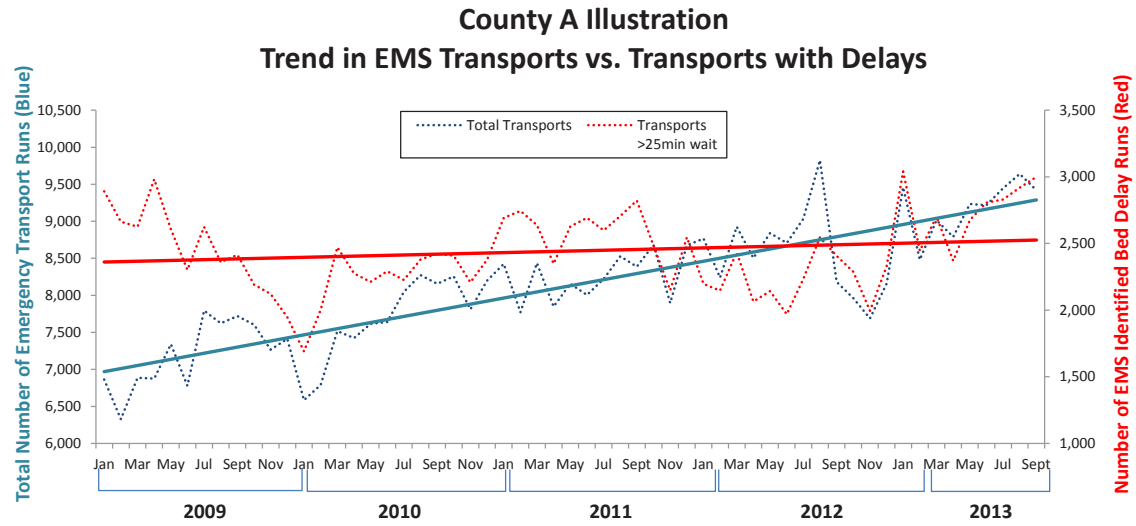
Fig. 2. Hours associated with ambulance walltime has grown, driven by both increased transport volumne and wait times, County A example.



While EMS transport have increased by 23% since 2009, the yearly hours associated with wall time delays has increased by 38%. This is driven by an increase in the average "delay time" from 20 minutes to 26 minutes (delays are measured as time over the initial 25 minute delay threshold).

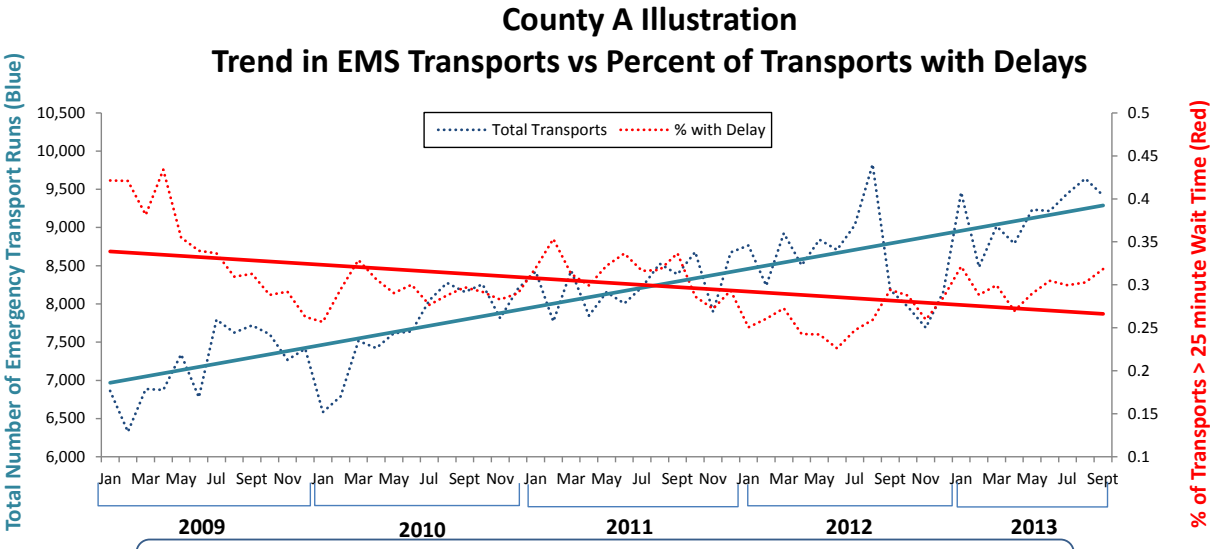
Source: Based on data in monthly reports published by county.

Fig. 3. As transports have increased, hospitals have managed to keep the number of ambulance delays from escalating.



Source: Based on data in monthly reports published by county.

Fig. 4. When delays are viewed as a ratio of overall transports, delays have actually improved.



Source: Based on data in monthly reports published by county.

IV. RECOMMENDATIONS

Local EMS systems and hospitals should evaluate ambulance patient offload times as a key indicator of efficient EMS system function. Local EMS systems that have identified negative system impacts due to Ambulance Patient Offload Delay (APOD) should utilize common language and metrics established by this document to define and measure APOD in the development of action plans to decrease or eliminate APOD.

Whenever possible, data collection systems that capture the metrics defined by this document should be developed as a collaborative effort between the LEMSA, ambulance provider(s) and hospitals(s). Local systems that have engaged these entities in sustained improvement activities have demonstrated improvement. Systems that demonstrate neutral or "not significant" EMS offload delays in the ambulance patient offload delay survey results had high collaboration among hospital and local EMS providers as well as successful process improvement activities *(see "Chapter 4 — Survey Findings and Strategies to Mitigate Offload Delays")*. This document can serve as a catalyst for unifying understanding, measurement and mitigation of APOD.

Local EMS systems should establish an ambulance patient offload time interval standard between 15-30 minutes that defines when APOD occurs. Key indicators for the efficient offload of ambulance patients include: fractal performance (facility and system) to the established APOD time interval standard, occurrence of "sentinel events" and aggregate APOD hours by facility and the system. During the development of ambulance patient offload definitions and metrics, the workgroup discussed the available data provided by LEMSAs. Some local EMS systems collect data as cumulated APOD hours by hospital and/or the system. In our discussions, this was not seen as a best practice or particularly useful metric if it stands alone.

Local EMS systems should define "sentinel events" related to APOD and establish reporting processes. Sentinel events could include but not be limited to:

1. Occurrence(s) of APOD.
2. Occurrence of APOD with the time interval exceeding one hour, two hours, three hours, etc.
3. Occurrence of APOD and patient decompensating or worsening condition.
4. Occurrence of APOD and an associated patient complaint.
5. Occurrence of APOD and associated delayed ambulance response(s).
6. Facility or system performance below established fractal (e.g. 90 percent) for compliance to the ambulance patient offload time interval standard.

3 Legal & Regulatory FAQs

This section answers frequently asked legal and regulatory questions regarding emergency medical services (EMS) patient transfer delays.

Question: Does a paramedic's scope of practice include the ability to legally care for patients brought by EMS after arrival in an emergency department?

Answer: California Health and Safety Code, Division 2.5, and the associated California Code of Regulations provision (Title 22, Division 9, Chapter 4, Article 2, Section 100146) define the paramedic scope of practice, which allows paramedics to practice "while in the emergency department of an acute care hospital until responsibility is assumed by the emergency or other medical staff of that hospital."[1] However, this provision does not provide for routine or extended continuation of care for patients transported by EMS personnel once the paramedic transfers responsibility to the hospital for the care of the patient. Care delivered to the patient while under the responsibility of EMS remains under the auspices of EMS. There are anecdotes of EMS personnel caring for patients for prolonged periods of time in an ED who call their medical control located outside of that hospital to receive an order to continue care. While waiting to transfer care, EMS personnel must continue the best possible care for the patient and may need to follow orders from their base station medical control, even if that physician is not on the hospital's medical staff; however, this may conflict with hospital staff privilege requirements and be a controversial issue for the receiving hospital. A patient's need for medication — such as additional pain medication — while waiting to transfer care suggests the need for more urgent transfer of responsibility for that care.

Question: When and where does EMTALA apply for patients brought to the ED by EMS?

Answer: EMTALA obligations are triggered when an individual presents to a dedicated emergency department seeking or in need of care for a medical condition, or when an individual presents on "hospital property" seeking or in need of care for an emergency medical condition. EMTALA is also triggered when an individual is being transported by a hospital-owned ambulance, or when a non-hospital owned ambulance arrives on hospital property. Many of these terms are further defined and clarified in regulation and the Centers for Medicare & Medicaid Services (CMS) State Operations Manual, Appendix V (the EMTALA

1 Health and Safety Code Section 1797.52. See also Health and Safety Code Section 1797.218.

Interpretive Guidelines),[2] including "emergency medical condition," "dedicated emergency department" and "hospital property."[3] EMTALA obligations of the hospital are not dependent upon or delayed by a report given by the EMS provider, but are triggered upon the person's arrival on hospital property as described above. Triage of the patient's condition must be provided "immediately upon arrival to ensure that an emergent intervention is not required and that the EMS provider staff can appropriately monitor the individual's condition."[4] The patient must receive a medical screening examination beyond initial triage, considering the emergency needs of the patients, the standard of care, and the capabilities of the hospital.

EMTALA does not specifically define the transfer of responsibility or the "formal acceptance" of a patient from EMS to ED staff.

If the hospital is accepting patients (i.e., "has capacity") and the individual has been brought to the emergency room, another area of hospital property, or is within an ambulance on hospital property and has requested to be examined, or (more commonly) EMS has requested that an examination take place on the patient's behalf, then the hospital's EMTALA obligations are triggered to triage and provide a medical screening examination by hospital designated physicians and staff.

Question: How are "triage" and "medical screening exam" defined?

Answer: **"Triage"** is the initial screening of the patient's presenting complaint, signs and symptoms, typically by a triage nurse, to determine the appropriate order for the patient to receive a medical screening exam. The triage nurse prioritizes when the patient will be seen by the physician or other qualified medical personnel for a medical screening exam. Triage is preliminary to the medical screening exam.

The **"medical screening exam"** (MSE) is the process required to evaluate the presenting condition of the patient to determine, within reasonable clinical confidence, if an emergency medical condition exists. The MSE process can be fairly simple and fast, or very complex and time-consuming requiring multiple tests and procedures; it really depends on the patient's condition. The CMS State Operations Manual, Appendix V (the EMTALA *Interpretive Guidelines*) and case law acknowledge that there is no prescribed process or timeframe for performing the MSE, because such a requirement could interfere with the hospital's ability to provide care to patients who need it the most urgently (e.g., if staff are responding to a trauma victim who needs all personnel).

2 The State Operations Manual is written by CMS for its surveyors, but is available to hospital personnel and the general public to understand what CMS expects its surveyors to do and how they should interpret CMS requirements.

3 42 C.F.R. Section 489.24(b)

4 Memorandum from CMS to State Survey Agency Directors, S&C-07-20, April 27, 2007

Question: Has CMS or California Department of Public Health (CDPH) addressed the issue of delays in EMS patient transfer?

Answer: CMS has addressed the issue of EMS to ED patient transfer delays in two memoranda to State Survey Agencies. The first, S&C-06-21 (July 2006), states that:

> CMS recognizes the enormous strain and crowding many hospital emergency departments face every day. However, this practice is not a solution. "Parking" patients in hospitals and refusing to release EMS equipment or personnel jeopardizes patient health and impacts the ability of the EMS personnel to provide emergency services to the rest of the community…
>
> This practice [delaying ambulance ED offload] may result in a violation of the Emergency Medical Treatment and Labor Act [sic] (EMTALA) and raises serious concerns for patient care and the provision of emergency services in a community. Additionally, this practice may also result in a violation of 42 CFR 482.55, the Conditions [sic] of Participation for Hospitals for Emergency Services…

A hospital that delays the medical screening examination or stabilizing treatment of a patient who arrives via transfer from another facility, by not allowing EMS to leave the patient, could also be in violation of EMTALA.

In response to requests for clarification, CMS provided additional guidance in CMS S&C-07-20 (April 2007), clarifying that S&C-06-21 does not mean that:

> a hospital will necessarily have violated EMTALA if it does not, in every instance, immediately assume from the EMS provider all responsibility for the individual, regardless of any other circumstances in the ED. For example, there may be situations when a hospital does not have the capacity or capability at the time of the individual's presentation to provide an immediate medical screening examination (MSE) and, if needed, stabilizing treatment or an appropriate transfer. So, if the EMS provider brought an individual to the dedicated ED at a time when ED staff was occupied dealing with multiple major trauma cases, it could under those circumstances be reasonable for the hospital to ask the EMS provider to stay with the individual until such time as there were ED staff available to provide care to that individual. However, even if a hospital cannot immediately provide an MSE, it must still triage the individual's condition immediately upon arrival to ensure that an emergent intervention is not required and that the EMS provider staff can appropriately monitor the individual's condition.

The CDPH Licensing and Certification Program also commented on EMS-ED patient "parking" in an All Facility Letter (AFL 07-04) issued on June 28, 2007:

> The CDPH realizes that there is crowding in many hospital emergency departments. There needs to be a different solution to this problem as "parking" patients in hospitals and refusing to release EMS equipment or personnel puts patients[sic] health at risk and jeopardizes the ability of the EMS staff to provide their important services to California's communities.

These communications clarify that it is not an acceptable practice to "park" patients as a routine response to ED overcrowding. A hospital cannot delay its EMTALA obligations with a delay in hand-off from EMS to a hospital gurney and staff. Rather, the appropriate response is dictated by the patient's condition and acceptable standards of care, along with the capacity and capability of the hospital. In other words, the clinically appropriate response will always be based on the circumstances at the time including the condition of the patient and whether the ED staff is occupied dealing with other more urgent or emergent cases.

Discussions with CMS regional staff its EMTALA Technical Lead further indicated the following:

1. There is some guidance in the CMS State Operations Manual, Appendix V (EMTALA *Interpretive Guidelines*). Appendix V states that:

   > Hospitals that deliberately delay moving an individual from an EMS stretcher to an emergency department bed do not thereby delay the point in time at which their EMTALA obligation begins. Furthermore, such a practice of "parking" patients arriving via EMS, refusing to release EMS equipment or personnel, jeopardizes patient health and adversely impacts the ability of the EMS personnel to provide emergency response services to the rest of the community. Hospitals that "park" patients may also find themselves in violation of 42 CFR 482.55, the Hospital Condition of Participation for Emergency Services, which requires that hospitals meet the emergency needs of patients in accordance with acceptable standards of practice.

2. CMS has not established a maximum acceptable time for transfer of responsibility from EMS to ED staff.
3. Any case brought to the attention of CMS will be considered on an individual basis, taking into account a full review of all relevant facts and circumstances including the other patients in, and demands on, the ED at the time, and the relative urgency of the patient brought in by EMS.
4. Anyone, including EMS personnel, can file an EMTALA complaint with the Centers for Medicare & Medicaid Services.
5. CMS states that there is no precedent that can be cited from CMS actions on prior complaints; CMS reviews each EMTALA complaint on a case-by-case basis.
6. EMTALA obligations do not supersede state nurse/patient ratio requirements.

Question: Does the California Health and Safety Code or Title 22 of the California Code of Regulations (also known as the California Administrative Code), address EMS patient transfer delays in the ED or provide flexibility to mitigate the problem?

Answer: Neither the Health and Safety Code nor Title 22 specifically addresses EMS patient transfer delays in the ED. Title 22 does, however, address emergency department beds and patient treatment areas specific to the emergency department service, including nurse-to-patient staffing ratios.

Program flexibility is addressed in Title 22, California Code of Regulations, Section 70129. While hospitals generally must maintain continuous compliance with licensing requirements, the law allows hospitals to use alternative ways to satisfy those requirements, if approved by CDPH. Some hospitals have received program flexibility approval to implement alternative systems and designs for appropriately handling emergency department patient flow and care units. Program flexibility is granted on a case-by-case basis, must be requested by the hospital, and approved by CDPH in writing. Section 70129 provides as follows:

> All hospitals shall maintain continuous compliance with the licensing requirements. These requirements do not prohibit the use of alternate concepts, methods, procedures, techniques, equipment, personnel qualifications or the conducting of pilot projects provided such exceptions are carried out with the provisions for safe and adequate care and with the prior written approval of the Department. Such approval shall provide for the terms and conditions under which the exception is granted. A written request plus supporting evidence shall be submitted by the applicant or licensee to the Department.

Some hospital actions may be limited or precluded under statute, regulation, or other rules, such as The Joint Commission accreditation standards.

Question: How have other states addressed the problem of EMS patient transfer delays?

Answer: Some examples of legislative and regulatory solutions are listed below.

1. Statutory limits for EMS transfer delays have been implemented by some jurisdictions.
2. The Nevada State Legislature passed Senate Bill 458 in late spring 2005 that created a standard of 30 minutes to transfer the care of patients from EMS to hospital staff.[5]
3. Massachusetts enacted a law effective Jan. 1, 2009, to prohibit ambulance diversion (except in the case of specified internal hospital

5 "SB 458: The Hospital Wait Bill," 8 News Now, Sept. 29, 2005; http://www.8newsnow.com/story/3918767/senate-bill-458-the-hospital-wait-bill

disasters) and monitor wait times. A March 2013 study found that no ED experienced an increase in ED length of stay or ambulance turnaround time despite an increase in volume for several EDs. There was an overall 2.2 minute decrease in ambulance turnaround time.[6] The legislation initially included fines if the time limit was exceeded, but these were dropped.

4. The British National Health Service Confederation adopted a report[7] urging "zero tolerance" for ambulance handover and turnaround delays. The Confederation recommended a national standard of 15 minutes for handover, with this standard allowing some "flex" rather than being an absolute 100% target. The NHS in London endorsed a financial penalty if a hospital did not meet a standard of 85% of handovers within 15 minutes and 95% of handovers within 30 minutes. The Confederation recommended that delays over one hour be regarded as unacceptable, and that financial penalties should be agreed to and consistently applied. The Confederation also noted that the London NHS considered any patient handover taking 60 minutes or more to be a serious incident that must be reported and investigated.

Question: Has The Joint Commission adopted standards regarding ED throughput?

Answer: Since EMS patient transfer delays are linked to ED overcrowding, which in turn is associated with boarding of admitted patients in the ED, The Joint Commission has instituted new measurement standards to focus attention and efforts on this problem of hospital and ED throughput. (Standard LD.04.03.11, EP 6)

> Boarding is the practice of holding patients in the emergency department or another temporary location after the decision to admit or transfer has been made. The hospital should set its goals with attention to patient acuity and best practice; it is recommended that boarding time frames not exceed 4 hours in the interest of patient safety and quality of care.[8]

The TJC position is aspirational, in light of the difficulties hospitals face regarding bed impaction, observation vs. inpatient status, and delays in transferring psychiatric patients.

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6 Burke, MD, Laura G., "The Effect of an Ambulance Diversion Ban on Emergency Department Length of Stay and Ambulance Turnaround Time," Annals of Emergency Medicine, March, 2013.

7 Zero tolerance: Making ambulance handover delays a thing of the past. NHS Confederation, May 2012. http://www.nhsconfed.org/resources/2012/12/zero-tolerance---making-ambulance-handover-delays-a-thing-of-the-past

8 R3 Report 1 Requirement, Rationale, Reference; The Joint Commission, Issue 4, December 19, 2012; http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&cad=rja&uact=8&ved=0CDcQFjAC&url=http%3A%2F%2Fwww.jointcommission.org%2Fassets%2F1%2F18%2FR3_Report_Issue_4.pdf&ei=6W6HU_eDGc7aoATA6oG4Ag&usg=AFQjCNHb7Fx8ZSFgnxneN_TvLE5eDwSmfw&bvm=bv.67720277,d.cGU

The National Health Service in Britain has also focused on throughput standards for ED patients as a solution to off-load delays, and recommended an ED throughput limit of 4 hours in 97% of patients. However, a British Broadcasting Corporation News report found that half of NHS EDs told the British Medical Association that pressure to meet the targets meant that patients were moved inappropriately.[9]

Question: Are there any contract-related issues regarding EMS patient transfer delays?

Answer: Local EMS agencies have contracts with many hospitals to receive ambulances, especially hospitals providing specialty systems of care such as trauma, stroke, or STEMI. These contracts have requirements for quality assurance and quality improvement through data collection, program management, and review of care. EMS patient transfer time expectations could be added to these contracts along with requirements for documentation, quality improvement and, potentially, fines for consistent outliers. Note that the contract must be possible to perform and use language such as "reasonable" or "best efforts" or "to the extent able." Contracts cannot use hard-stop language that cannot be met. Addressing transfer time expectations in a contract must be framed in terms of delivery goals that are subject to case-by-case review, consistent with the emergency needs of the patient, the standard of care, and the capabilities of the hospital.

Question: Are there any other potential legal issues regarding EMS patient transfer delays?

Answer: Health care providers may be exposed to liability from a professional negligence (medical malpractice) lawsuit if a transfer delay is excessive.

9 "Target 'putting A&E care at risk,'" British Broadcasting Corporation News, March 13, 2005; http://news.bbc.co.uk/2/hi/health/4339653.stm

4 Survey Findings and Strategies to Mitigate Offload Delays

I. OVERVIEW

The collaborative recommended that information be collected and best practices be identified and disseminated statewide to serve as a resource for hospital and local EMS system performance improvement activities.

The best practices workgroup of the collaborative, along with the Abaris Group, developed two survey instruments (one for hospitals and one for local EMS agencies (LEMSAs)). The collaborative was interested in understanding the scope and impacts of EMS ambulance patient offload delays and strategies LEMSAs and hospitals used to mitigate delays.

The surveys were distributed in October of 2013. Thirty-three LEMSAs and 381 hospitals received the survey. Thirty-three LEMSAs and 124 hospitals responded, for a response rate of 100 percent and 32.5 percent respectively. Some questions allowed only for a simple response of "yes" or "no," while others allowed the respondent to reply freely with narrative. The important survey findings are provided below.

II. OFFLOAD DELAY FACTORS

Many factors affect ambulance patient offload delay. Clearly, the problems are complex and multifaceted; they are similar to the determinants of ED crowding. Key factors to take into consideration are the number of ED visits, the type of visits, and the demographic variables of each region such as the number of uninsured residents, number of EMS beds/stations, and number of primary care physicians.

Figure 1 compares several relevant factors in representative counties, and provides a statewide average regarding the factors. Hospitals and LEMSAs that are addressing offload delays may wish to compare the factors in their counties against the chart. Because the use of emergency services is driven by many factors, problems that arise in connection with the use of emergency services do not lend themselves to a "one size fits all" solution. *(See Appendix B, "Comparison of California County Population ED Data," for information about many of these factors, broken down by county.)* For example, Imperial County has a higher number of Medi-Cal and uninsured ED visits compared to California's average, causing financial challenges. Yet they have a higher percentage of federally qualified health care's (FQHC) per 100,000 residents less than 150 percent federal poverty level (FPL), compared to California's overall average, that may provide this county more opportunities for patients to be seen in non-urgent settings versus visits in EDs. San Mateo County, on the other hand, has a higher percentage of

population greater than age 65, the state average, triggering challenges. Yet, they have a lower percentage of Medi-Cal and underinsured ED visits, possibly mitigating some financial challenges.

Fig. 1. Use of emergency services in counties is a multifaceted issue.

	County	ED Visits per 1,000 residents	% of ED Visits Medi-Cal or Uninsured	MD Licenses per 100,000 residents	FQHC per 100,000 residents < 150% FPL	EMS Stations per 100,000 residents	% of Population < 150% FPL	% of Population > age 65
High ED Rate	Imperial	**516**	57%	76	10	22	39%	11%
	Contra Costa	**398**	38%	287	3	25	18%	13%
	Kern	**381**	64%	129	9	19	38%	9%
	San Bernardino	370	50%	182	1	21	33%	10%
	Fresno	361	51%	199	6	20	42%	11%
Mid	Sacramento	359	50%	311	3	20	30%	12%
	Alameda	353	42%	305	11	22	21%	12%
	California Avg.	**333**	**45%**	**272**	**7**	**20**	**28%**	**12%**
	San Francisco	333	38%	747	9	20	23%	14%
	Riverside	323	45%	128	3	18	30%	12%
Lower ED Rate	Los Angeles	318	47%	285	6	18	31%	11%
	San Diego	293	40%	311	10	20	25%	12%
	San Mateo	**280**	28%	374	4	17	15%	14%
	Orange	**278**	31%	306	3	22	22%	12%
	Santa Clara	**261**	36%	405	7	15	18%	12%

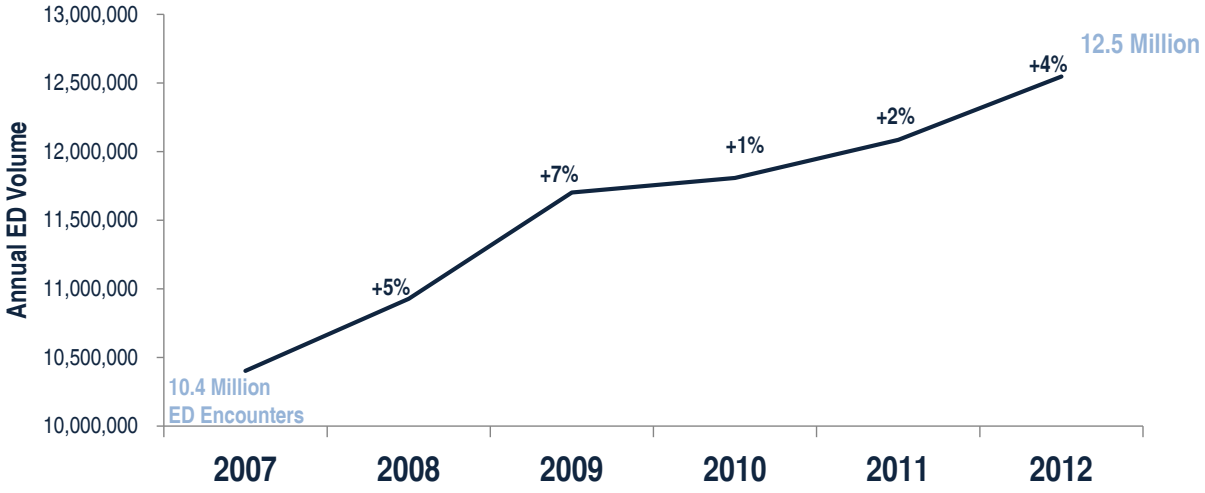
= Challenges driving ED volume

= Mitigating factors driving ED volume

Source: OSHPD, California Department of Finance and US Census Bureau. All Data represents 2012.

California's ED visits have increased by 20 percent between 2007 and 2012 *(see Fig. 2.)*.

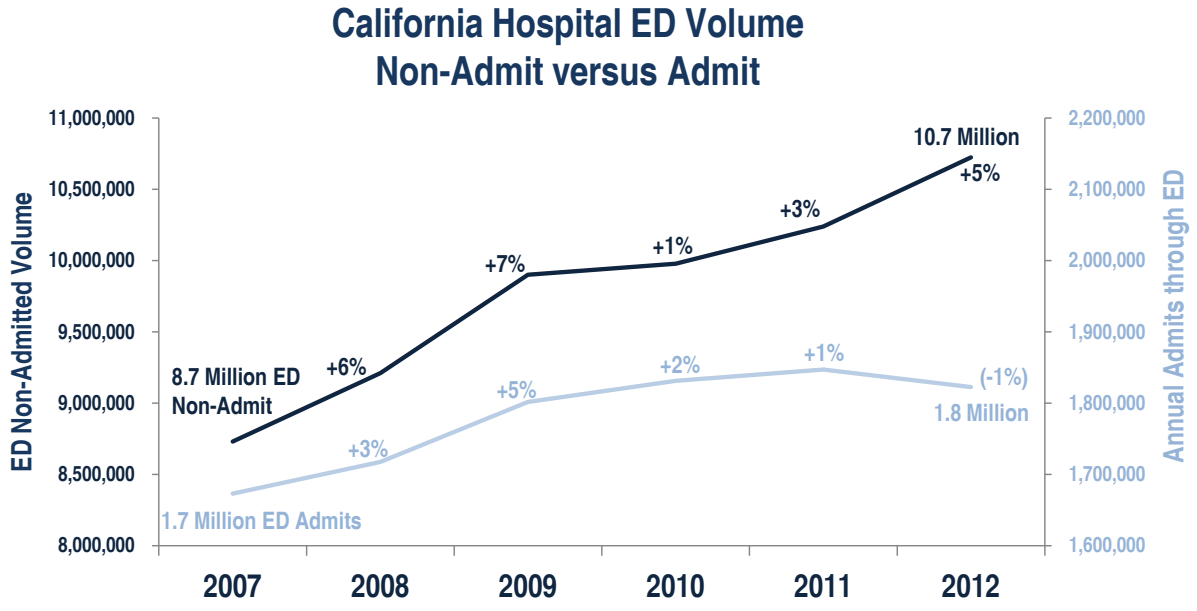
Fig. 2. California hospitals' ED volume.



Source: OSHPD EMS Utilization Trends

The greatest increase in volume has come from patients who visit the ED, but are not admitted. In addition to acute emergency care, California EDs are providing more primary care, observation, procedural, occupational health, employee health, and behavioral health services — as well as being the safety net for indigent patients. *(See Fig. 3.)*

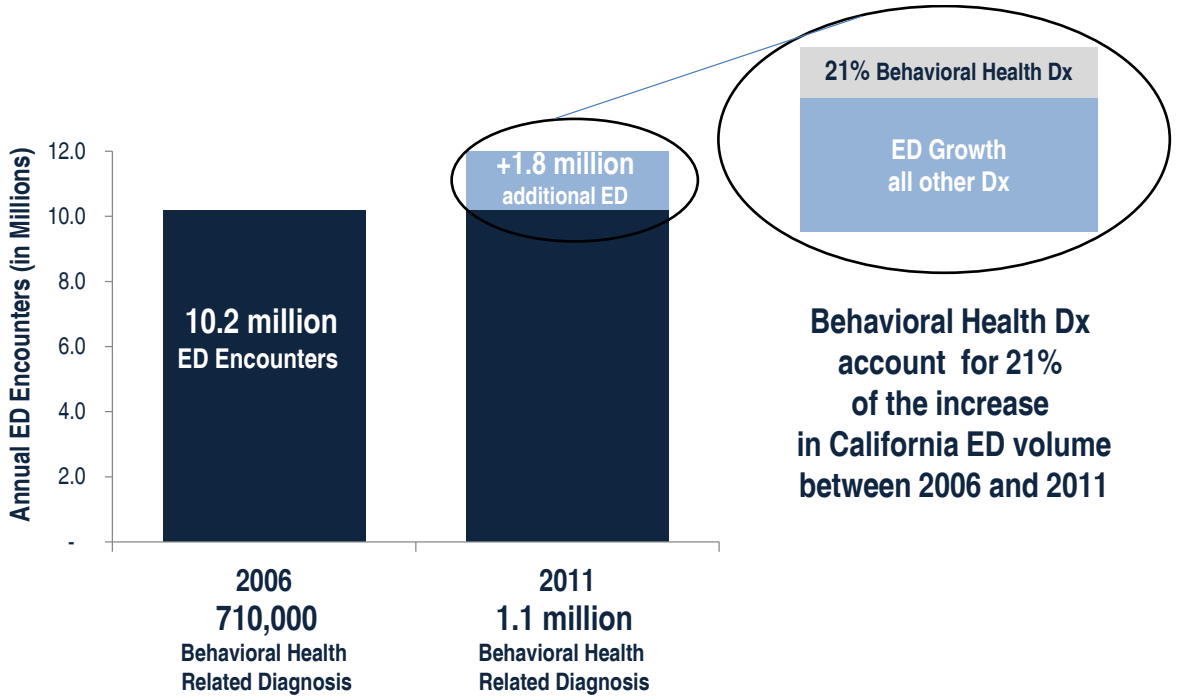
Fig. 3. Non-admit visits drive the volume increase and are growing at a rate greater than visits resulting in admissions.



Source: OSHPD EMS Utilization Trends

Patients with behavioral health diagnoses make up a significant component of ED volume growth. Figure 4 shows that patients with behavioral health diagnoses account for 21 percent of the increase in California ED volume between 2006 and 2011.

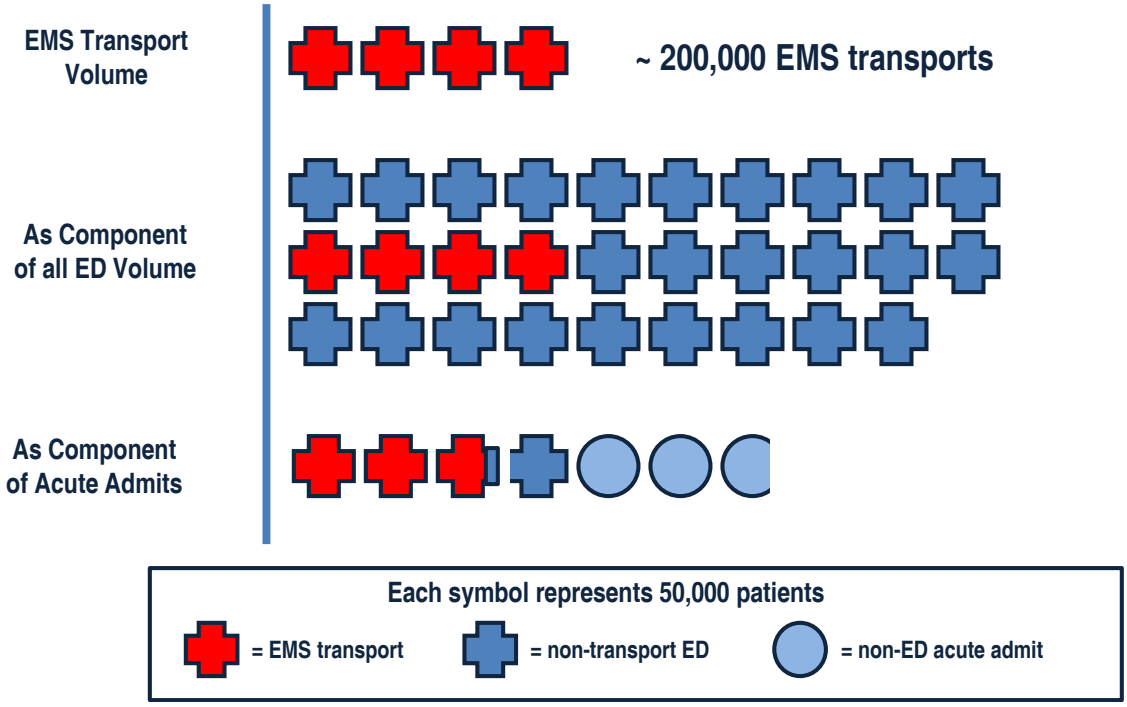
Fig. 4. Patients with behavioral health diagnoses were significant components of ED growth in California.



Source: Stratasan analysis of OSHPD ED encounters.

At first blush, it may seem that most patients enter the ED by ambulance. However, Figure 5 illustrates two contiguous counties in California and their respective EMS transports. This graph shows that only 15 percent of hospital ED volume is attributable to EMS transport, and 40 percent of acute admissions result from EMS transport.

Fig. 5. Volume from two contiguous counties in Southern California.

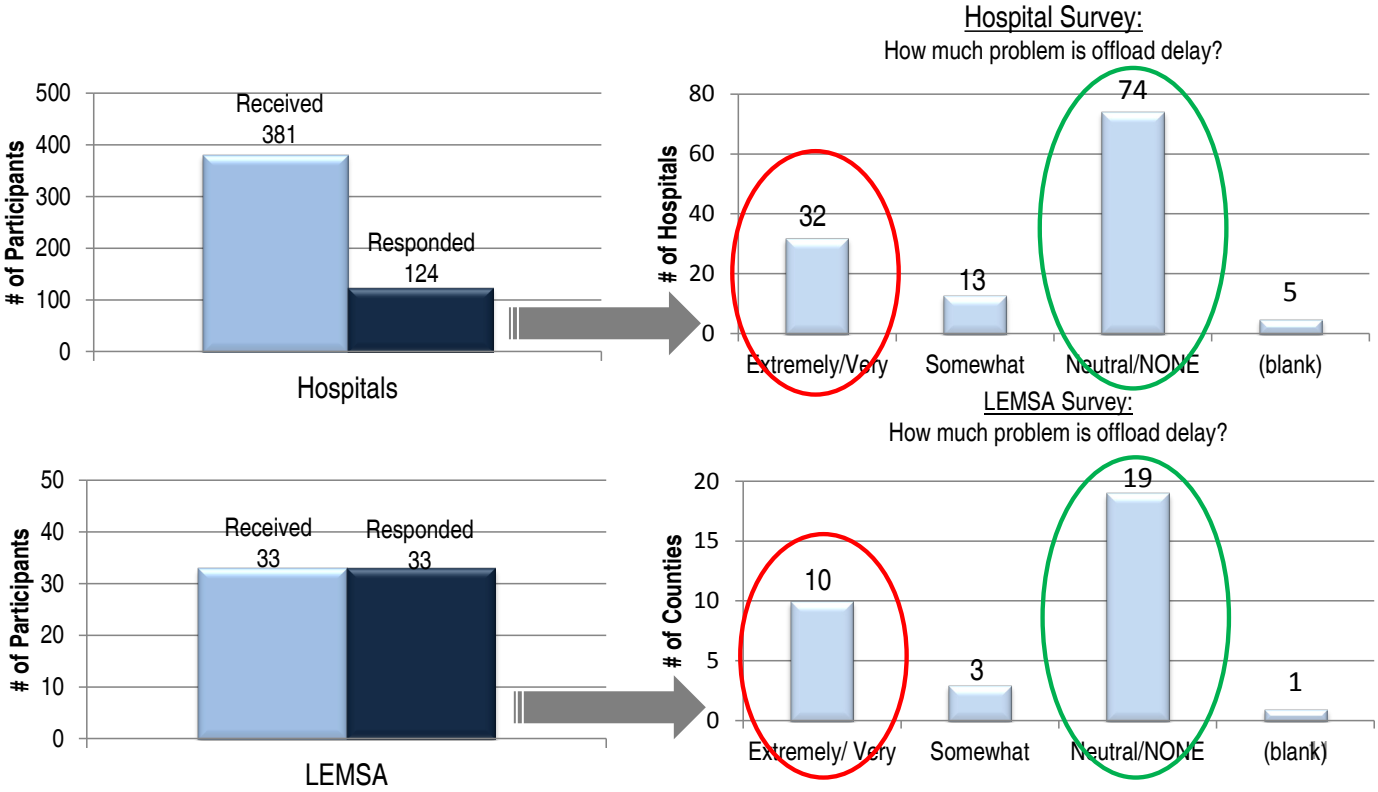


Source: Based on analysis of county published transport data and OSHPD encounter data for 2011.

III. WHO HAS SIGNIFICANT OFFLOAD DELAYS?

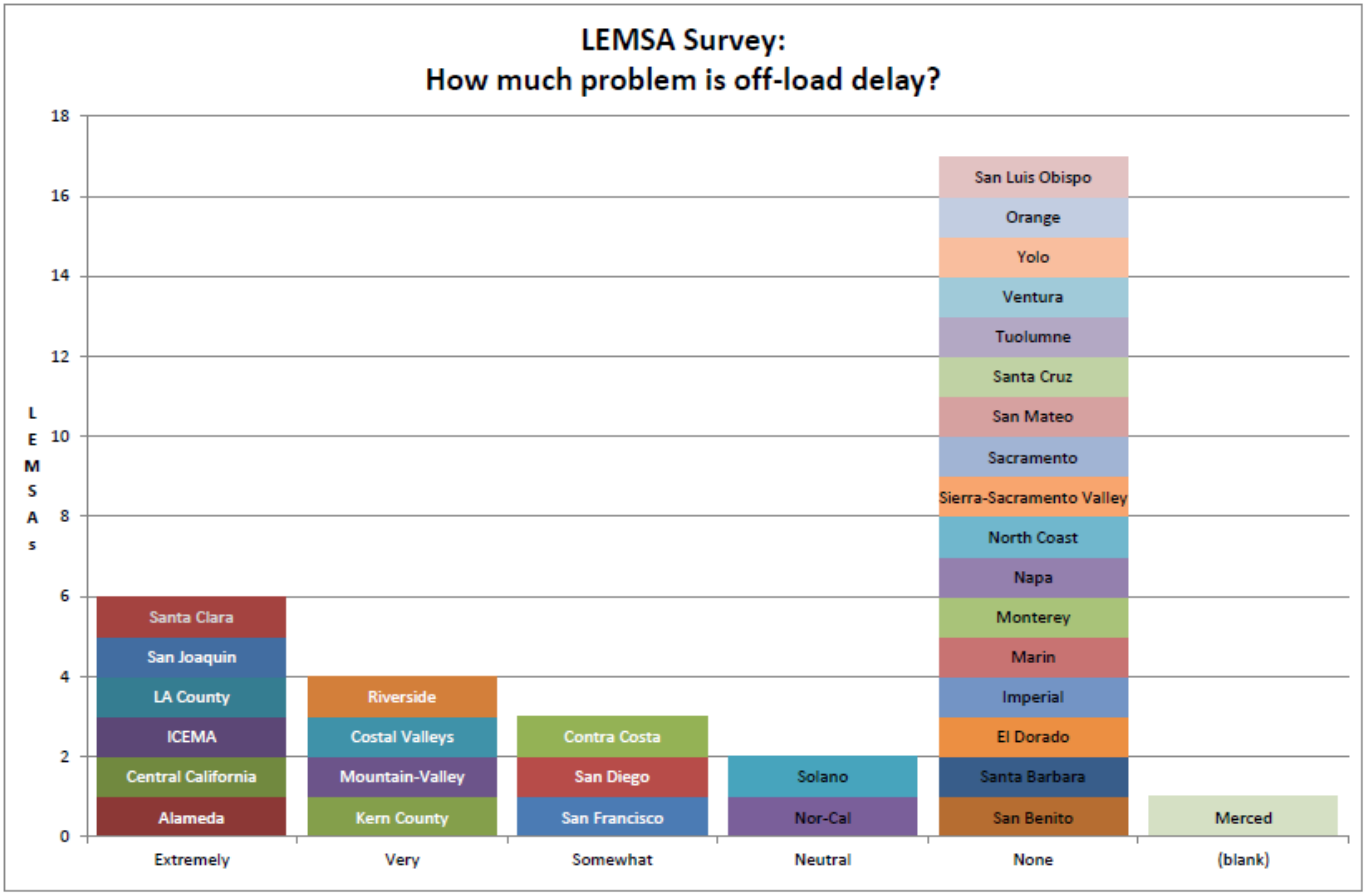
The survey sought to discover which areas of the state experience significant offload delays. One interesting survey finding is that a majority of LEMSAs and hospitals do not have significant offload delays. In addition, the survey results show a "barbell" pattern: Most respondents felt they had a very small or no problem at all, or they rated their offload problem as extreme/very significant. Few respondents were in the middle. Figure 6 shows that 60 percent of hospitals said they did not have a problem with offload delays, while 58 percent of LEMSAs said they did not have a problem with offload delays; however, the LEMSAs that reported a problem constitute 70 percent of the state population. Figure 7 provides a breakdown by county of the reported severity of offload delays.

Fig. 6. Survey responses on the severity of offload delays.



For the purposes of survey analysis, hospitals are broken into two groups: The 32 hospitals reporting "extremely" or "very" significant offload delays, and the 74 hospitals reporting "neutral" or "non" regarding offload delays. Similarly, for the purposes of survey analysis, LEMSAs are broken into two groups: The 13 LEMSAs reporting "extremely," "very," or "somewhat" significant offload delays, and the 19 LEMSAs reporting "neutral" or "none" regarding offload delays.

Fig. 7. LEMSA Survey: severity of offload delay by LEMSA.



The survey findings show that there is a strong consensus between LEMSAs and hospitals on who is experiencing ambulance patient offload delays and who is not.

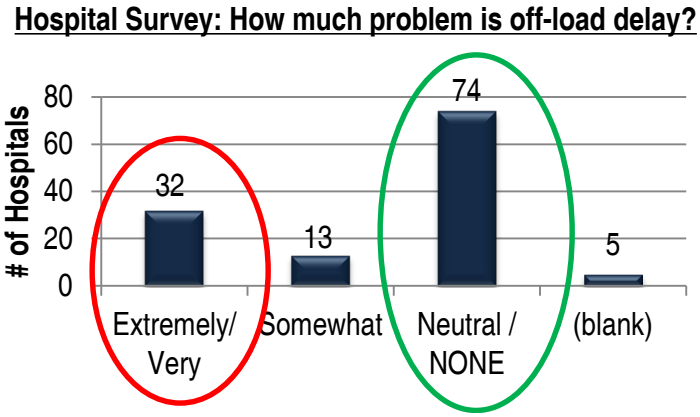
Figure 8 groups hospital respondents by their respective LEMSA region and shows whether offload delays were either "very or extremely significant" or "neutral or not significant." When comparing the hospital respondents to the LEMSA respondents in the bar chart at the bottom, there is strong consensus. Eight of the 10 LEMSA counties and their respective hospitals confirmed having an offload issue.

Coastal Valley and Mountain Valley Counties showed the only inconsistency; the hospitals reported offload delays as "not significant," while the LEMSAs reported they were "very significant."

Another interesting survey finding is that the three largest LEMSA regions are split between hospitals that have significant offload delays and those that do not.

1. Los Angeles (10 report issues, 15 do not)
2. Inland counties (ICEMA) (5 report issues, 3 do not)
3. Riverside (5 report issues, 2 do not)

Fig. 8. Hospital Survey: severity of offload delays by LEMSA.



Respondents by Region That Report "Very Significant" or "Extremely Significant" Impacts of Offload Delays	Count	Percent
Los Angeles	10	31.3%
ICEMA	5	15.6%
Riverside	5	15.6%
Alameda	2	6.3%
Kern	2	6.3%
Central California	1	3.1%
Contra Costa	1	3.1%
Merced	1	3.1%
Orange	1	3.1%
Sacramento	1	3.1%
San Joaquin	1	3.1%
Santa Clara	1	3.1%
Sierra-Sacramento Valley	1	3.1%
Coastal Valley	0	0.0%
Imperial	0	0.0%
Marin	0	0.0%
Monterey	0	0.0%
Mountain Valley	0	0.0%
North Coast	0	0.0%
Northern California	0	0.0%
San Diego	0	0.0%
San Francisco	0	0.0%
San Mateo	0	0.0%
Santa Barbara	0	0.0%
Solano	0	0.0%
Tuolumne	0	0.0%
Ventura	0	0.0%
Yolo	0	0.0%
Total	32	100.0%

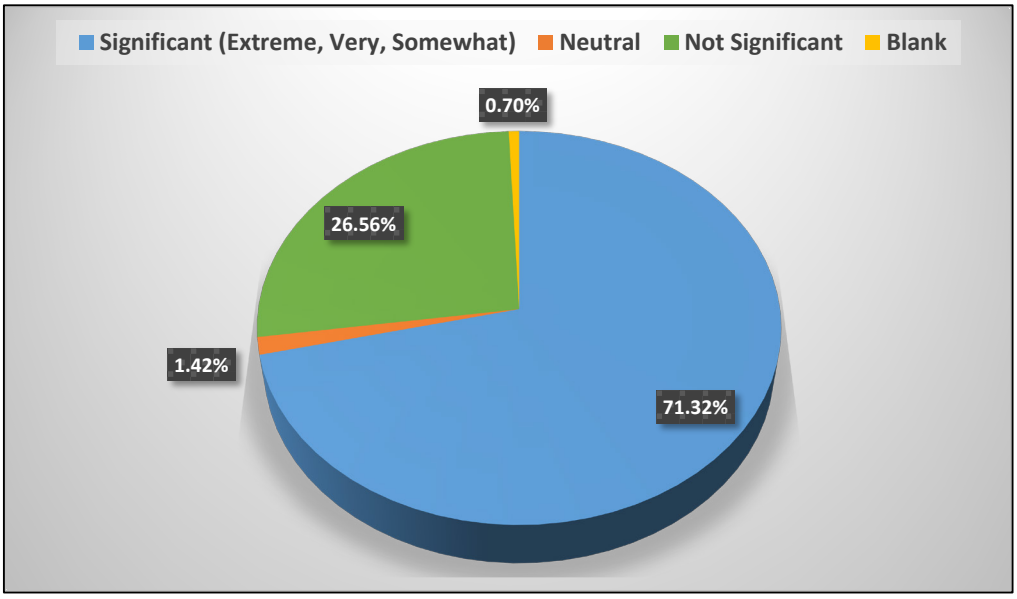
Respondents by LEMSA That Report "Neutral" or "Not Significant" Impact of Offload Delays	Count	Percent
Los Angeles	15	20.3%
San Diego	7	9.5%
Sierra-Sacramento Valley	6	8.1%
Orange	5	6.8%
Kern	4	5.4%
Coastal Valley	3	4.1%
ICEMA	3	4.1%
Santa Barbara	3	4.1%
Solano	3	4.1%
Ventura	3	4.1%
Contra Costa	2	2.7%
Monterey	2	2.7%
Mountain Valley	2	2.7%
Riverside	2	2.7%
San Mateo	2	2.7%
Yolo	2	2.7%
Alameda	1	1.4%
Central California	1	1.4%
Imperial	1	1.4%
North Coast	1	1.4%
Northern California	1	1.4%
Sacramento	1	1.4%
San Francisco	1	1.4%
San Joaquin	1	1.4%
Santa Clara	1	1.4%
Tuolumne	1	1.4%
Marin	0	0.0%
Merced	0	0.0%
Total	74	100.0%

The survey results show that population is a major factor driving offload delays. LEMSAs with "extremely significant" offload delays correlate strongly to large populations. The 6 LEMSAs with extremely significant offload delays have a total population of 17.5 million; the 17 LEMSAs that rate their offload delays as "not significant" have a total population of 9.8 million. Thus, the average population of a LEMSA with extremely significant delays is 2.9 million, while the average population of a LEMSA with insignificant delays is 574,500. *(See Fig. 9.)* Appendix B, "Comparison of California County Population ED Data," provides population numbers by county.

Fig. 9. Offload delay severity as percentage of population in LEMSA boundary.

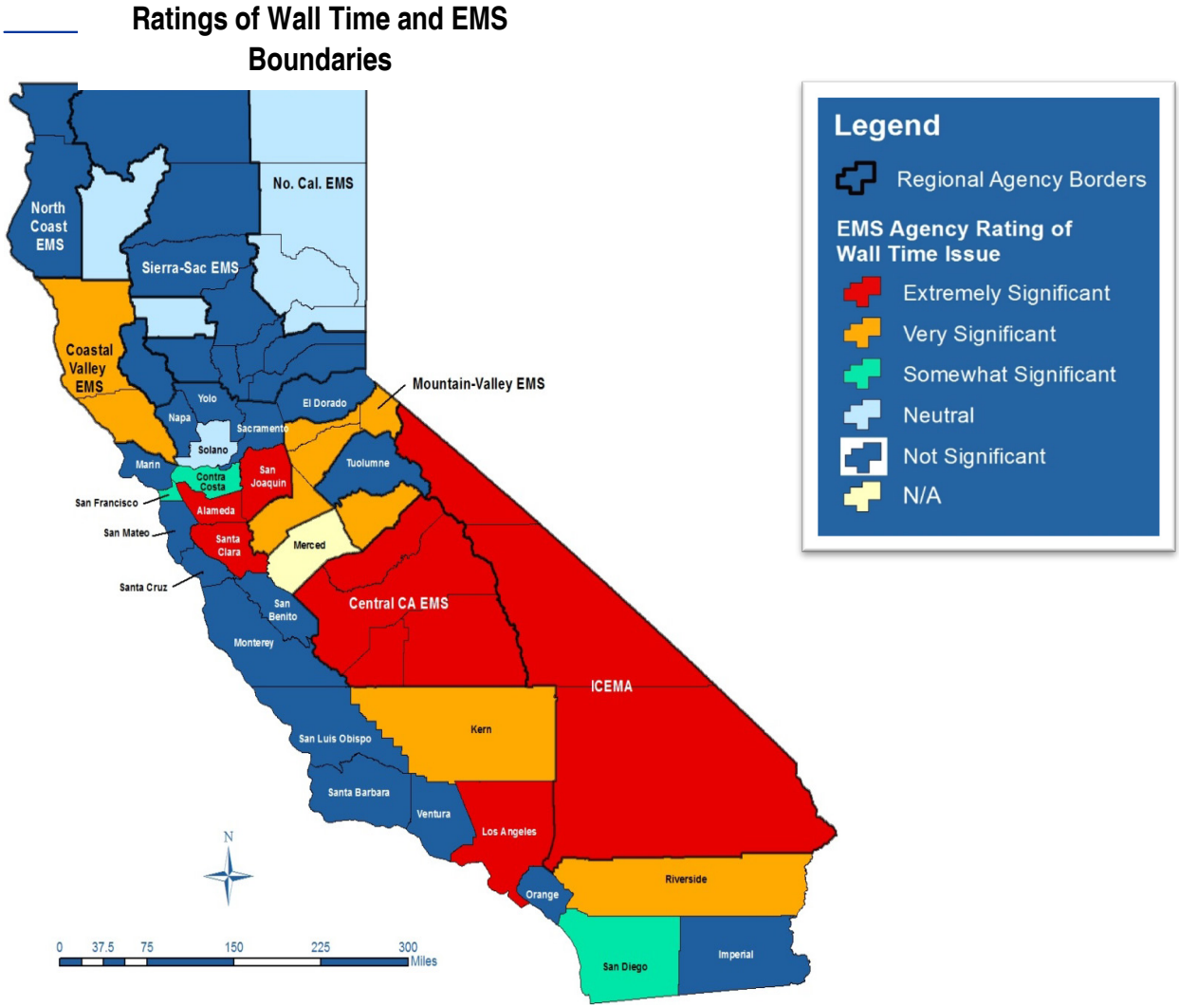
Offload Delay Severity as Percentage of CA Population (2010) in LEMSA Boundary

Response	Sum of Population	Response Count
Extremely significant	17,540,255	6
Very significant	3,734,661	4
Somewhat significant	4,949,573	3
Neutral	523,080	2
Not significant	9,766,713	17
Left Blank	255,793	1
Grand Total	**36,770,075**	**33**



According to LEMSA respondents, offload delay does not occur everywhere. There was consensus on the severity of delays, except for two LEMSAs that reported significant delays and the corresponding hospitals that reported none. *(See Fig. 10.)*

Fig. 10. Map of LEMSA rating of offload delay severity.



Figures 11, 12 and 13 show offload delay severity by county as rated by the hospital respondents. As can be seen, offload delays are greatest in the highly populated areas. As a whole, the southern portion of the state reports a more significant problem with patient offload delays than the northern portion of the state.

Fig. 11. Hospital rating of offload delay severity.

Fig. 12. Northern California hospital rating of offload delay severity.

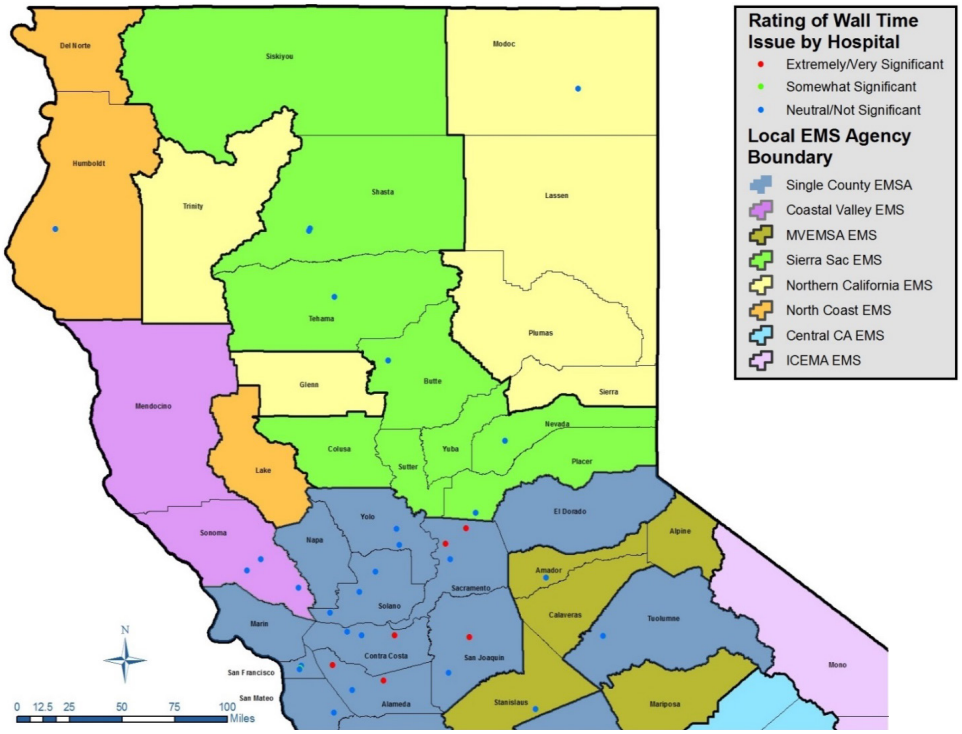
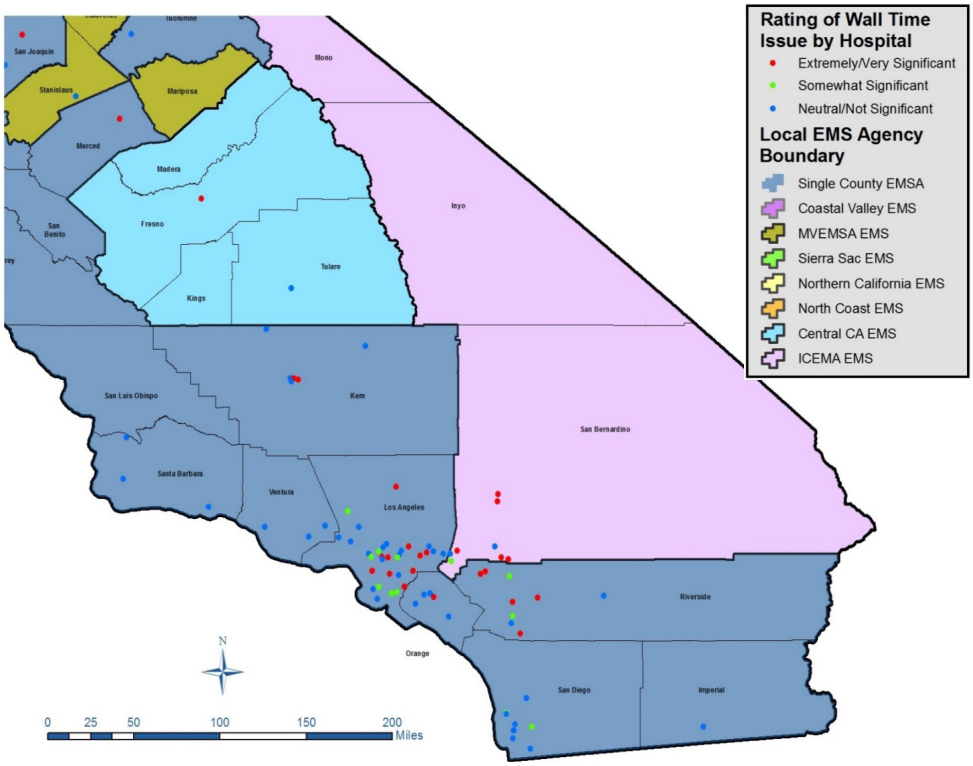


Fig. 13. Southern California hospital rating of offload delay severity.

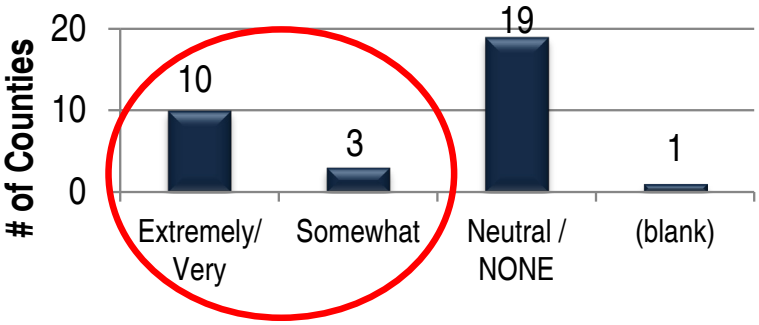


IV. LEMSA OFFLOAD DATA COLLECTION AND REPORTING

The survey requested that LEMSAs indicate how they collect and report data related to offload delays, including offload time interval data and their offload time interval standard.

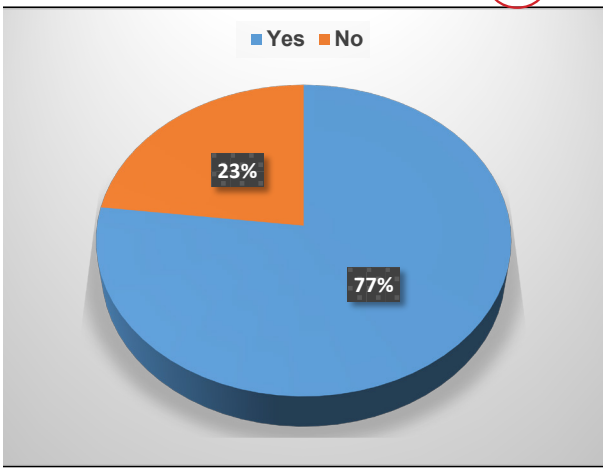
Of the 13 LEMSAs that reported a significant problem ("extremely," "very," "somewhat") with offload delays, a majority (77 percent) collect EMS offload time interval data. However, only a little over half (54 percent) report the data. *(See Fig. 14.)*

Fig. 14. LEMSA Survey: Severity of offload delay vs. data collection and reporting.



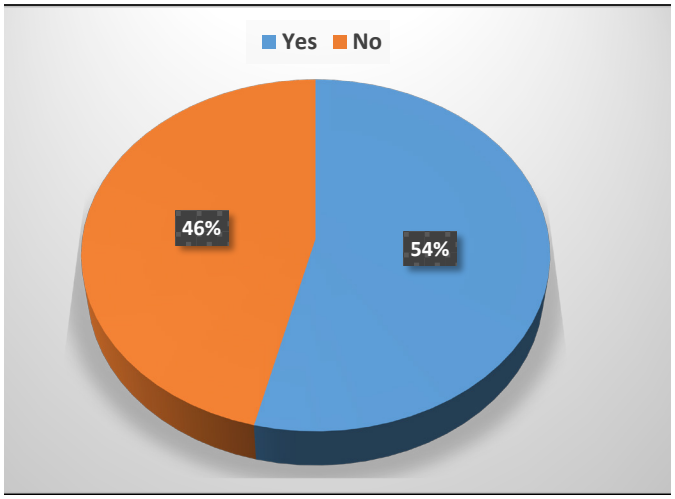
Collect offload time interval data?

If you reported a significant problem ("extremely," "very," "somewhat") from Question #9, do you collect EMS offload time interval data in your jurisdiction?	Count
Yes	10
No	3
Total	**13**



Report offload delay data?

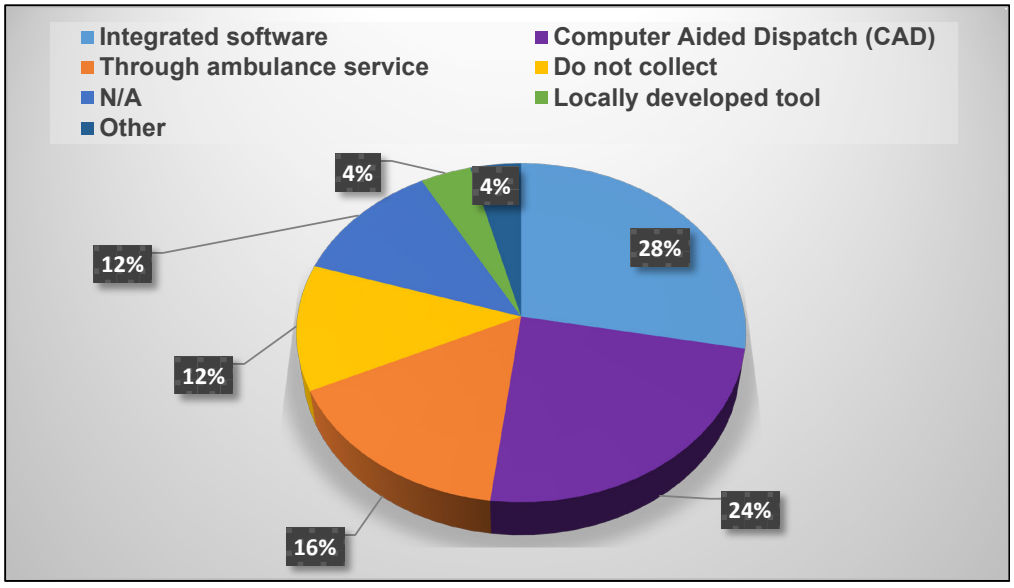
If you have a "somewhat" significant to "extremely" significant problem with offload delays (Questions #9), does your agency produce an EMS offload bed delay report (Question #7)?	Count
Yes	7
No	6
Total	**13**



LEMSAs use various data collection methods to measure offload time intervals. There appears to be no relationship between the data collection method used and the severity of offload delays *(see Fig. 15)*.

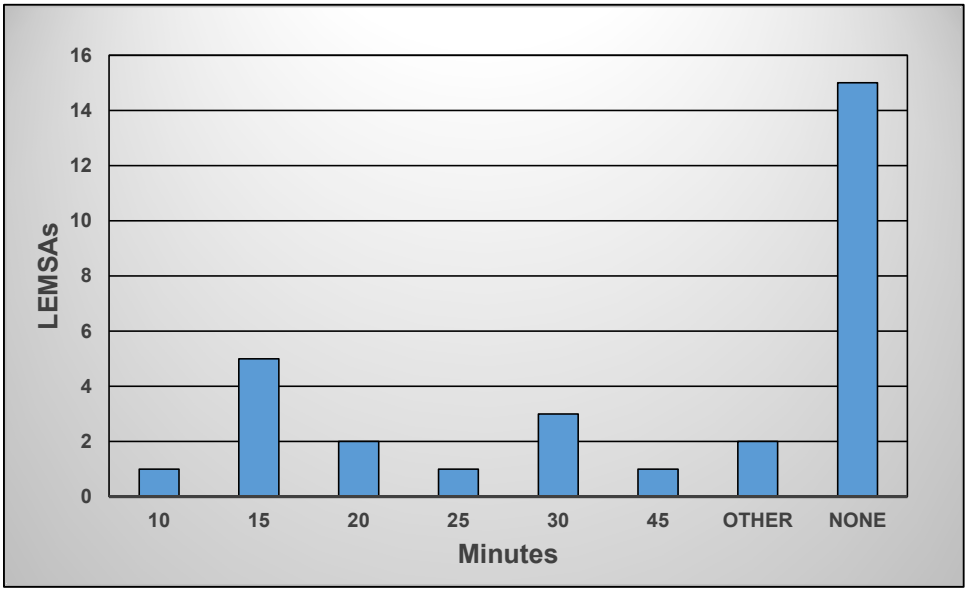
Fig. 15. LEMSA data collection methods.

How is offload time interval data collected?	Count
Integrated software	7
Computer Aided Dispatch (CAD)	6
Through ambulance service	4
Do not collect	3
N/A	3
Locally developed tool	1
Other	1
Total	25
Left Blank	8
Grand Total	**33**



The survey asked LEMSAs to report their offload time interval standard. Interestingly, half of respondents did not have a standard. Among those that did, the most frequently used standard was 15 minutes. The responses ranged between 10 minutes and 45 minutes. *(See Fig. 16.)*

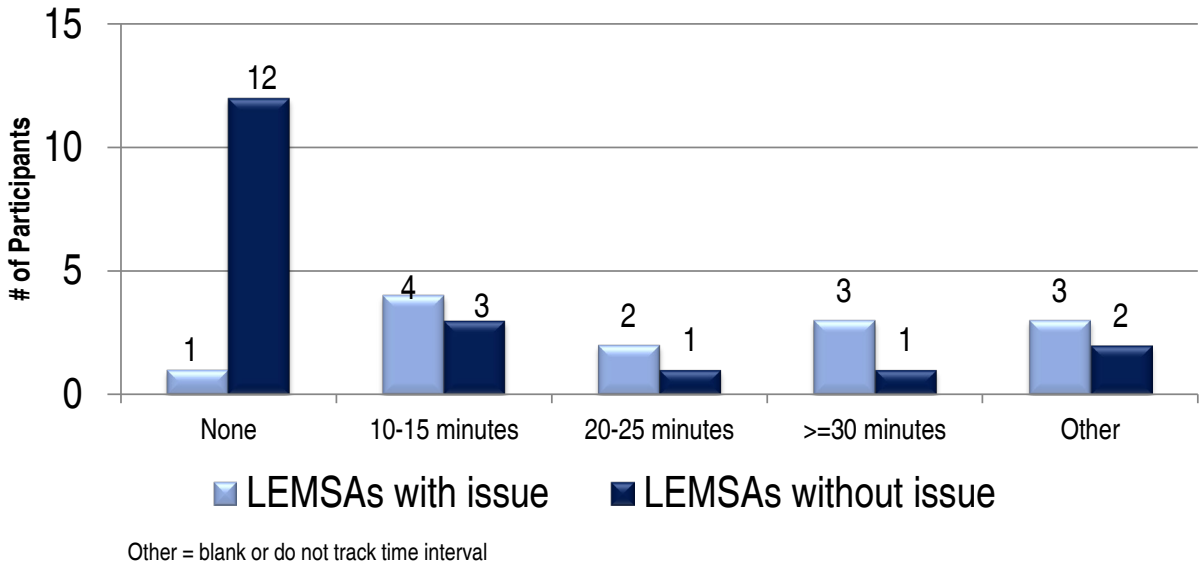
Fig. 16. Offload time interval standard.



What is your offload time interval standard?	Count	Percent of total
10 minutes	1	3%
15 minutes	5	17%
20 minutes	2	7%
25 minutes	1	3%
30 minutes	3	10%
45 minutes	1	3%
Other	2	7%
None	15	50%
Total	30	100%
Left Blank	3	-
Grand Total	**33**	-

Figure 17 breaks down the 13 LEMSAs with significant offload delays and the 19 LEMSAs without, showing that offload delays are significant for those with a standard, and insignificant for those without a standard.

Fig. 17. LEMSAs on offload time interval standards.

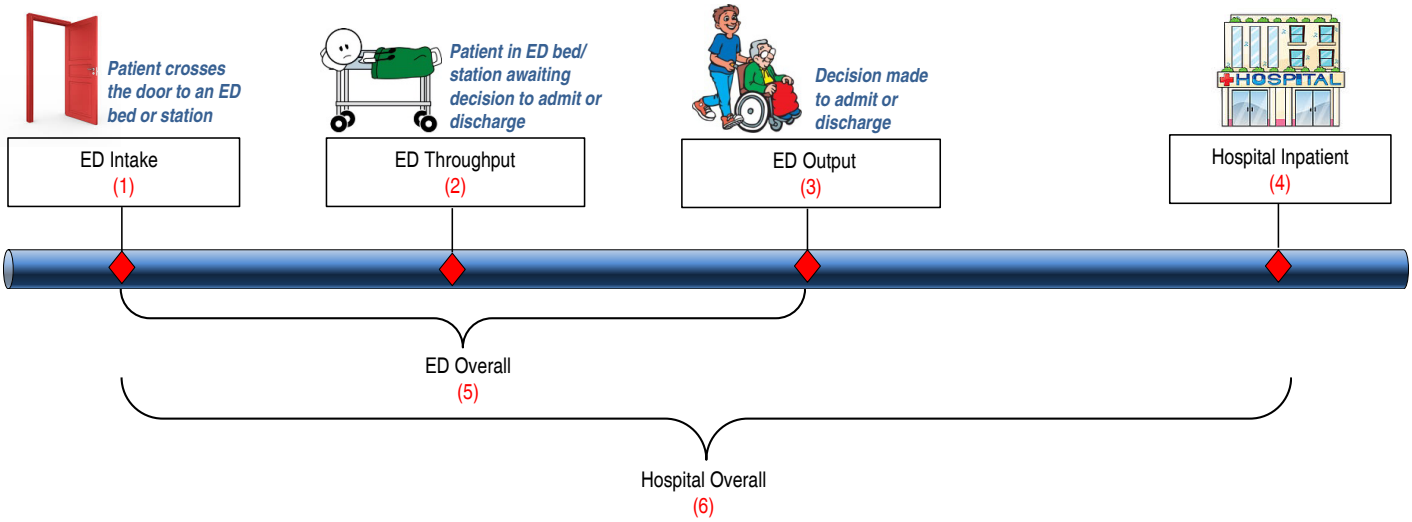


Other = blank or do not track time interval

V. HOSPITAL OFFLOAD DELAY MITIGATION STRATEGIES

To understand the survey responses regarding hospital offload delay mitigation strategies, it is important to have a common understanding of the language of hospital throughput activities. Figure 18 divides hospital throughput activities into distinct intervals based on the patient care activities occurring during each interval.

Fig. 18. ED Throughput Process Model



ED TERM	DEFINITION
ED intake	Patient arrives at the ED door to an ED bed or station
ED throughput	Patient in ED bed or station to decision to admit or discharge
ED output	Patient decision made for inpatient admission or ED discharge
ED throuput overall	Activities occurring throughout the entire ED from arrival to hospital ED to disposition from ED
Hospital inpatient	Activities occurring within the hospital inpatient area
Hospital overall	Activities occurring within the ED and the hospital inpatient area

The most frequent answers to survey questions about mitigation strategies are shown in the figures below. To help hospitals evaluate additional mitigation strategies, all responses are provided at the end of this chapter.

Figure 19 shows that the 74 hospitals without significant offload delays reported three factors for success:

1. Optimized ED intake process;
2. Successful hospital process improvement strategies; and
3. Hospital and LEMSA collaboration.

Fig. 19. Successful mitigation strategies.

For hospitals with Neutral + Not Significant EMS offload delays, what factors would you attribute to this? Check all that apply.	Count	Percent
Optimized ED intake process	37	23%
Successful hospital process improvement measures	34	21%
Hospital and local EMS agency collaborate and have ongoing patient improvement measures	23	14%
No historical problem on this subject	27	17%
Other (please specify)	30	19%
Physical plant redesign	9	6%
Total	**160**	**100%**
Hospital Count	**74**	**-**

In addition, the survey responses show that ED intake strategies had the highest frequency of implementation. Conversely, ED output strategies had the least frequency of implementation *(see Fig. 20)*.

Fig. 20. Mitigation strategy frequency.

Mitigation Strategy Implemented Topics	Count
ED Intake	460
ED Throughput	250
ED Output	105
ED Overall	317
Hospital Inpatient	240
Hospital Overall	**240**

Figure 21 shows the breakdown of strategies by severity of offload delay. There appears to be no correlation.

Fig. 21. Mitigation strategy frequency by severity of offload delay.

The **74 hospitals** that claimed the impact of EMS offload delay was either **neutral/not significant**

Mitigation Strategy Implemented Topics	Count
ED Intake	273
ED Throughput	146
ED Output	58
ED Overall	190
Hospital Inpatient	143
Hospital Overall	**136**

The **32 hospitals** that claimed the impact of EMS offload delay was either **extremely/very significant**

Mitigation Strategy Implemented Topics	Count
ED Intake	130
ED Throughput	67
ED Output	33
ED Overall	85
Hospital Inpatient	69
Hospital Overall	**69**

Figure 22 shows the four top strategies identified by the survey to address ED intake:

1. Bedside registration (98);
2. Orders from triage (92);
3. Accelerated intake processes (91); and
4. "Direct to bed" policy (89).

Fig. 22. ED intake strategy frequency.

ED Intake:	Implemented	Considering	Tried; Ineffective	Not Tried	Unknown	Total	Blank	Grand Total
Bedside registration	98	13	2	4	-	117	7	124
Orders from triage	92	10	3	7	1	113	11	124
Accelerated intake processes	91	8	2	11	2	114	10	124
"Direct to bed" policy	89	17	3	4	1	114	10	124
Mid-level or physician provider at triage	47	29	11	23	3	113	11	124
Greeter/patient liaison	43	16	6	41	1	107	17	124
Other (please specify)	-	-	-	-	-	-	-	7
Total	**460**	**93**	**27**	**90**	**8**	**-**	**-**	**-**

NOTE: *This question allowed participants to check all that applied, thus the total is greater than 124.*

Figure 23 shows the two top strategies to address ED throughput:

1. Effective ordering of lab and imaging (97); and
2. Innovative staffing utilization (89).

Of note, 64 hospitals have implemented a hospital code alert for ED overcrowding, while 23 have not tried it and 16 are considering it.

Fig. 23. ED througput strategy frequency.

ED Throughput:	Implemented	Considering	Tried; Ineffective	Not Tried	Unknown	Total	Blank	Grand Total
Effective ordering of lab and imaging	97	12	2	3	4	118	6	124
Innovating staffing utilization	89	17	2	7	4	119	5	124
Hospital Code Alert for ED overcrowding	64	16	9	23	3	115	9	124
Other (please specify)	-	-	-	-	-	-	-	17
Total	**250**	**45**	**13**	**33**	**11**	**-**	**-**	**-**

NOTE: *This question allowed participants to check all that applied, thus the total is greater than 124.*

Figure 24 shows that the majority of hospital respondents have not tried ED output strategies. Of those that have, most implemented "accelerated inpatient intake practices" (59).

Fig. 24. ED output strategy frequency.

ED Output:	Implemented	Considering	Tried; Ineffective	Not Tried	Unknown	Total	Blank	Grand Total
Accelerated inpatient intake practices	59	26	4	26	-	115	9	124
Discharge czar/accelerator	24	20	3	68	1	116	8	124
Use of Clinical Decision Unit (CDU)	19	13	3	70	9	114	10	124
Discharge instructions upon arrival	3	9	1	98	3	114	10	124
Other (please specify)	-	-	-	-	-	-	-	9
Total	**105**	**68**	**11**	**262**	**13**	**-**	**-**	**-**

The top strategy implemented in the ED overall category was management of ED throughput metrics (110). Notably, use of pharmacists in ED was implemented by 30 hospitals and is being considered by 17 hospitals, while 65 hospitals have not tried it. *(See Figure 25.)*

Fig. 25. ED overall strategy frequency.

ED Overall:	Implemented	Considering	Tried; Ineffective	Not Tried	Unknown	Total	Blank	Grand Total
Management of ED throughput metrics	110	3	1	4	1	119	5	124
ED management "rounding"	93	15	2	8	1	119	5	124
Charge ED physician-nurse concept (shift leaders)	84	14	1	15	4	118	6	124
Use pharmacist in ED	30	17	3	65	2	117	7	124
Other (please specify)	-	-	-	-	-	-	-	7
Total	**317**	**49**	**7**	**92**	**8**	**-**	**-**	**-**

NOTE: *This question allowed participants to check all that applied, thus the total is greater than 124.*

Interestingly, the top strategies in all areas of the ED that were implemented to mitigate offload delays were the same for hospitals that reported an issue and those that did not. *(See Figure 26.)*

Fig. 26. Mitigation strategies by severity of offload delay.

ED Intake Mitigation Strategy	32 Hospitals With Issue	%	74 Hospitals Without Issue	%
Bedside registration	26	81%	58	78%
Orders from triage	24	75%	57	77%
Accelerated intake processes	24	75%	53	72%
"Direct to bed" policy	23	72%	55	74%
Mid-level or physician provider at triage	18	56%	25	34%
Greeter / patient liaison	15	47%	25	34%

Four of the six intake strategies were implemented by approximately 80 percent of both sets of hospital groups.

ED Throughput Mitigation Strategy	32 Hospitals With Issue	%	74 Hospitals Without Issue	%
Effective ordering of lab and imaging	26	81%	56	76%
Innovating staffing utilization	25	78%	51	69%
Hospital Code Alert for ED overcrowding	16	50%	39	53%

Top 2 efforts to address delay via ED throuput were implemented by 81 percent of hospitals with an issue and 73 percent of hospitals without an issue.

ED Output Mitigation Strategy	32 Hospitals With Issue	%	74 Hospitals Without Issue	%
Accelerated inpatient intake practices	17	53%	34	46%
Discharge czar/accelerator	10	31%	11	15%
Use of Clinical Decision Unit (CDU)	5	16%	12	16%
Discharge instructions upon arrival	1	3%	1	1%

The top output strategy “accelerated inpatient intake practices” was implemented by 53 percent of hospitals with an issue and only 46 percent of hospitals without an issue.

ED Overall Mitigation Strategy	32 Hospitals With Issue	%	74 Hospitals Without Issue	%
Management of ED throughput metrics	28	88%	67	91%
ED management "rounding"	25	78%	56	76%
Charge ED physician-nurse concept (shift leaders)	22	69%	51	69%
Use pharmacist in ED	10	31%	16	22%

The top overall ED strategy “management of ED throughput metrics” was implemented by 88 percent of hospitals with an issue and 91 percent of hospitals without an issue, a clear priority for both.

Hospitals were about evenly split between implementing strategies for hospital inpatient bed availability (240) and hospitals that have not tried such implementation (272) *(see Figure 27)*.

Fig. 27. Inpatient bed availability stratgey frequency.

Hospital Inpatient Bed Availability	Implemented	Considering	Tried; Ineffective	Not Tried	Unknown	Total	Blank	Grand Total
Hospital program	69	10	4	16	17	116	8	124
Standardized discharge process	57	21	4	17	16	115	9	124
Rapid Admission Unit (RAU)	10	14	3	79	6	112	12	124
Bed turnover process	58	14	2	29	9	112	12	124
Universal telemetry (all hospital beds)	26	12	-	69	5	112	12	124
Standardized ICU step down bed management	20	14	2	62	14	112	12	124
Other (please specify)	-	-	-	-	-	-	-	6
Total	**240**	**85**	**15**	**272**	**67**	**-**	**-**	**-**

NOTE: *This question allowed participants to check all that applied, thus the total is greater than 124.*

Again, the top strategies for hospital inpatient bed availability and the hospital overall that were implemented were the same for hospitals that reported an issue and those that did not. *(See Figure 28.)*

Fig. 28. Mitigation strategies by severity of offload delays.

Hospital Inpatient Bed Availability

Hospital Inpatient Bed Availability		
Hospital program	17	44
Standardized discharge process	20	30
Bed turnover process	16	34
Rapid Admission Unit (RAU)	4	5
Standardized ICU step down bed management	7	11
Universal telemetry (all hospital beds)	5	19

To address inpatient bed availability, hospitals with an offload delay had top focus on a standardized discharge process while hospitals without an issue focused on the hospital program.

Hospital Overall

Hospital Overall	32 Hospitals With Issue	74 Hospitals Without Issue
Performance improvement system; for example, LEAN, Six Sigma, PDSA	23	54
Hospital throughput dashboards	27	53
Medical staff management of rounding practices and discharges	19	29

The top overall strategies ranked similar for all hospitals surveyed. Approximately 78% of hospitals with offload delays and 73% of hospitals without an issue implemented similar strategies.

While the top strategies for hospital inpatient bed availabilities were similar, the number of strategies identified was higher for those without delay issues.

Figure 29 shows that a significant number of the hospitals have implemented performance improvement strategies (90) and use of throughput dashboards (89).

Fig. 29. Hospital overall strategy frequency.

Hospital Overall:	Implemented	Considering	Tried; Ineffective	Not Tried	Unknown	Total	Blank	Grand Total
Performance improvement system; for example, LEAN, Six Sigma, PDSA	90	12	2	5	6	115	9	124
Hospital throughput dashboards	89	17	2	7	6	121	3	124
Medical staff management of rounding practices and discharges	61	20	4	23	9	117	7	124
Other (please specify)	-	-	-	-	-	-	-	9
Total	**240**	**49**	**8**	**35**	**21**	**-**	**-**	**-**

NOTE: *This question allowed participants to check all that applied, thus the total is greater than 124.*

VI. LEMSA OFFLOAD DELAY MITIGATION STRATEGIES

LEMSAs that reported implementing mitigation strategies primarily employed the following:

- **Efforts in collaboration:** There was significant collaboration between LEMSAs and hospitals
  - Charge nurses work with EMS crews
  - ED managers receive semi-annual reports
  - Community dialog with hospitals allows for throughput processes to be modified, resulting in zero diversion and fixing offload delay issues
- **Standardized data collection:** LEMSAs felt this aided in reporting. Examples of data collection include:
  - ED arrival time
  - Time available
  - Interval between arrival time to back in service
- **Implementation:**
  - Implementing a "no diversion" policy
  - Educating hospitals on concerns utilizing the memo from CMS *(see "Chapter 3 — Legal & Regulatory FAQs").*
  - Tracking offload times through EMS ALS supervisors
  - Hospitals efforts to decrease ED crowding through a formal QI process

Additional feedback on mitigation strategies implemented by LEMSAs is found in Fig. 30 and VIII. "Other Hospital Mitigation Strategies," page 79

Fig. 30. Detail from LEMSAs regarding mitigations comments.

LEMSA Agency	Comments
A	Our system hospitals have committed to have charge nurses work with EMS crews to find beds for EMS patients in the event of off-load delays. This information is provided to affected hospital Emergency Department Managers on semi-annual basis.
B	Standardized data collection by LEMSAs would aid in reporting. Currently we do not time stamp care in the ED. However, looking at time from "ED Arrival" to "time available" indicates this is currently not an issue in our EMS system.
C	We believe this is a non-remedying issue until the prescriptive requirement that all patients need to be delivered to ED's is resolved. Until regulations and reimbursements occur for delivering patients to an appropriate destination, i.e. clinics, primary care physicians or other healthcare entities, there is no true incentive for Hospitals to remedy the issue. What is the punitive action for an ED with an excessive off-load time? Does EMS stop transporting patients to that facility, it just over burdens the other down stream hospitals and self fulfills the offending Hospitals over crowding issues.
D	We measure time of arrival at hospital to back in service. Look at elective Sx scheduling resulting in backups in ED.
E	Our relatively low volumes mean relatively infrequent offload delays.
F	Within our county, the data that we collect is from the prehospital providers' documentation. We have done a couple of random queries and can show that about 90% of the time, the patient is off-loaded within about 30 minutes. Yes, there are outliers. As we do site visits with receiving centers, all understand the concerns and those that have "wall time" are working on flow projects to off-load the EMS providers.
G	All local hospital systems began maximizing throughput efficiencies to minimize 9-1-1 ambulance offload times several years ago (late 90s). The Agency contracted with a consultant to facilitate a community dialog on reducing diversions, which resulted in through-put processes being discussed, challenged and modified. We have zero diversion and 'offload' hasn't been an issue in several years.
H	We were very concerned about potential delays in off load when we implemented a no diversion policy. We educated hospitals on the concern using the EMTALA memo and were very attentive through the ALS supervisor to any delay in off load. We considered attempting to track off load times, however, there are so many confounders that impact the "time back in service", which was the only variable collected electronically, we decided to track it through the EMS ALS supervisors. We asked the transporting agency to notify the EMS on call of any delays. There were few notifications and they were rapidly corrected when identified. Since we did not identify a problem we abandoned the data collection project. I would estimate that since 2011 less than 20 complaints have been received by the EMS agency. It is my believe that the "no diversion" policy and the hospitals efforts to decrease ED crowding through a formal QI process has improved turnover time.
I	In speaking with our General Manager it was determined that there are offload delays experienced by our county's ambulances, but they are not occurring in this county, rather they are a problem in a nearby county.

NOTE: *LEMSA agency counties have been made anonymous*

VII. BRIEF SUMMARY OF CONCLUSIONS

In summary, 100 percent of LEMSAs and 32.5 percent of hospitals responded to the survey. 60 percent of hospitals and 58 percent of LEMSA respondents do not have significant offload delays. Except for two LEMSAs and their corresponding hospitals, there was full consensus regarding the severity, or lack thereof, of offload delays. LEMSAs with extremely significant offload delays correlate strongly to large populations and are clustered throughout the state.

The most consistent offload time interval standard was 15 minutes. Most LEMSAs use integrated software or computer assisted devices to collect offload delay information. 77 percent of LEMSAs collect offload delay information, but only a little over half (54 percent) report the data.

The 74 hospitals without offload delays reported three factors that attributed to their success:

1. Optimizing the ED intake process;
2. Successful hospital process improvement strategies; and
3. Hospital and LEMSA collaboration and ongoing process improvement strategies.

Many strategies in the ED throughput process were identified and rated based on frequency and effectiveness of use. ED intake strategies had the highest frequency of implementation and success. Bedside registration, orders from triage and accelerated intake processes were also likely to be implemented and successful. A majority of hospitals with and without offload delays have not focused on ED output strategies. All hospitals aligned on the prioritization of hospital process improvement in other areas of the ED. Management of ED throughput metrics was the highest priority for all hospitals in ED overall strategies.

A majority of LEMSAs are addressing offload delays but impact is scattered. One third of LEMSAs are unaware of the actions their local hospitals have taken in an effort to mitigate offload delays, reinforcing the need for collaboration and information-sharing between LEMSAs and hospitals.

VIII. OTHER HOSPITAL MITIGATION STRATEGIES

A. Other Responses

What Factors do you Attribute to No Offload Delay?

For hospitals with Neutral + Not Significant EMS offload delays, what factors would you attribute to this? Check all that apply.	Count	Percent of Total
Hospital administration awareness/Entire hospital involved/Inpatient bed control/ New processes/Float RN assigned to hall patients	11	37%
EMS arrivals get a bed immediately even if it means using wheelchairs, triage and hallway beds	7	23%
Working with providers	5	17%
Other: Impacts our psych ED/Pediatric specific/High wall time because of walk-ins, BLS & ALS patients	3	10%
Work with EMS agency	2	7%
Identified what other hospitals have done to reduce offload times	1	3%
Built a bigger ED	1	3%
Total	**30**	**100%**

ED Intake

ED Intake: Other Responses	Count	Percent of Total
EMS patients taken to room immediately	3	30%
Triage RN serves as greeter	2	20%
Bedside registration	1	10%
BLS goes to triage	1	10%
Eliminated triage process	1	10%
Zero allowance for diversion by EMS agency and hospital	1	10%
Other: EMS agency and hospital have a discrepancy with the data	1	10%
Total	**10**	**100%**

ED Throughput

ED Throughput: Other Responses	Count	Percent of Total
Collaborate with inpatient managers and staff	5	23%
Bed meetings twice a day	1	5%
Float staff	1	5%
Peak time staffing	1	5%
ED designated lab staff	1	5%
Radiology priority	1	5%
Use medical students and residents for admitting and discharge	1	5%
"Live Process"	1	5%
Push/Pull	1	5%
Super track area	1	5%
Use protocols for lab and rad	1	5%
Revising Hospital Code Alert	1	5%
Data analysis of saturation	1	5%
Implementing CALDOCS	1	5%
Using electronic alerts	1	5%
Using Lean	1	5%
Other Comments: some physicians wait until one set of test results come back before ordering others/Limited in-house participation	2	9%
Total	**22**	**100%**

ED Output and ED Overall

ED Output: Other Responses	Count	Percent of Total
Intake process is being revised/Process improvement project/Using Lean process	3	38%
Patient case manager in ED/RN navigators/Admission RN	1	13%
Use CDU protocol in ED (but do not have a formal CDU)	1	13%
Once a bed is identified, floor has 30 min to retrieve patient, if not, department manager is called	1	13%
Other: Hospitalists are a bottle neck/EMR has slowed us down	2	25%
Total	**8**	**100%**

ED Overall: Other Responses	Count	Percent of Total
Using pharmacy techs/Pharmacy on trauma team	3	43%
Used to use pharmacy, but eliminated due to downsizing	1	14%
Only one physician on duty per shift	1	14%
Use ED charge RN on duty	1	14%
Implemented team care approach to physician and RN collaboration	1	14%
Total	**7**	**100%**

Hospital Inpatient Bed Availability

Hospital Inpatient Bed Availability: Other Responses	Count	Percent of Total
Developing and implementing processes	3	38%
Bed meeting at 8:45A and 9P daily and can be called as needed	1	13%
Surge capacity policy that includes NEDOCS	1	13%
Staff meeting every 6 hours	1	13%
Use hospitalists	1	13%
Changing housekeeping staffing to match discharges	1	13%
Total	**8**	**100%**

Hospital Strategies Overall

Hospital Overall: Other Responses	Count	Percent of Total
Management staffing for admits and discharges/Medical staff/Hospitalists	3	25%
Whole hospital perspective	3	25%
Implemented an 11A discharge policy/Created a council to review physician rounding practices	2	17%
Optimized housekeeping staff	1	8%
Attempted Lean, but difficult with physical plant and lack of physician buy-in	1	8%
Created ED dashboard	1	8%
Other: Not hard wired for medical staff yet	1	8%
Total	**12**	**100%**

Other Strategies

Other Strategies	Count	Percent of Total
Regular patient flow meeting with staff, physicians, administration/ Bed huddle twice a day	8	14%
Tracking ED data/Inpatient data needed	6	10%
Working with physicians and staff to write timely admission and discharge orders	6	10%
Rapid assessment and discharge area/ED team committee to facilitate discharge	4	7%
Physicians at triage/RN at triage/Physician at lobby	4	7%
Staff and physician peak time staffing	3	5%
Vertical patients remain vertical	3	5%
Admit planning	2	3%
Patient tracking software alerts greater than 2 hours/CALDOCs to monitor saturation	2	3%
Redesign RME process/Using RME	2	3%
"Bed Ahead" where CRN identifies bed before the patient arrives	2	3%
ED RN makes one call to transfer patient	2	3%
Psych patients are a big issue in the ED	1	2%
ED tech meets incoming EMS	1	2%
Priority is given to EMS admits	1	2%
ED pharmacy tech	1	2%
Surge capacity flexibility	1	2%
Work with inpatient departments	1	2%
Floating staff	1	2%
Educate staff on length of stay impact	1	2%
Staff moderate care areas with 2 RNs and 1 PA	1	2%
23 hour admissions	1	2%
Bedside report for ICU patients	1	2%
Case manager and social worker in ED	1	2%
Revised EMR to ensure good documentation	1	2%
Arriving patients assigned a physician before bed placement, thereby creating ownership in the waiting room for the patient	1	2%
Total	**59**	**100%**

Other Comments

Other Comments	Count	Percent of Total
Have/willing to collaborate with others — hospitals and EMS agencies	5	22%
EMS agency data is inaccurate, it counts time while provider is not actively tending to the patient (chatting, using restroom, etc.)	3	13%
Not an issue	2	9%
There are no real tools to quantify offload delays	2	9%
Notice of pending arrivals aids with bed placement	1	4%
We have offload delays when surrounding facilities go on divert	1	4%
We've tried multiple process improvement strategies to reduce bed delay, but nothing has worked	1	4%
Must move admissions to the floor	1	4%
Charge RN prints out discharge instructions	1	4%
Space constraints lead to offload delays	1	4%
ED director is involved in expediting transfers, IV starts, etc.	1	4%
Continues to be an issue, especially at peak times 4-8P	1	4%
Use of direct to bed by a Quick Look RN has helped	1	4%
EMS should create a uniform and accurate method of measuring turn over care (This respondent objects to the term "delay," believes it should be simply offload times. "Delay" prejudices the project.)	1	4%
Other: Implementation of EMR resulted in an increase in diversion hours in June	1	4%
Total	**23**	**100%**

Appendixes

White Paper: EMS Patient Offload Delays in the ED

(Background Information for a Stakeholder Meeting)

EMS Patient Offload Delays in the ED:

Background Information for a Stakeholder Meeting

Co-sponsored by:

California Emergency Medical Services Authority (EMSA) and

California Hospital Association (CHA)

Tuesday, March 5, 2013

California Hospital Association

1215 K Street | Sacramento, CA 95814

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EMS Patient Offload Delays

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EMS Patient Offload Delays

Introduction

Emergency medical services system (EMS), hospitals, and their emergency departments (ED) are fundamental components of California's health care delivery network. Together they provide 24/7 access to emergency health services and the safety net for health care for the uninsured. Each year Californians average more than 11 million ED visits, resulting in more than 1.7 million admissions.[1] Thus the availability and effective functioning of the EMS system and EDs are of vital importance to all Californians.

These systems of emergency care operate in a rapidly changing health care environment with economic pressures, price competition, public scrutiny, regulations and cost-containment initiatives. At the same time, population growth and California's aging population are contributing to the rising demand for care that is increasingly complex, but with additional expectations of improved patient safety and quality of care.

The emergency medical system and hospital emergency departments operate as separate distinct entities, but are linked through policies, procedure, and regulations to provide effective patient care from the initial notification of an emergency and response in the field to the time the EMS provider drops off the patient at the emergency department and returns to the community, while the patient receives evaluation, care, and hospitalization, if needed. The efficiency and effectiveness of each component in the chain of treatment radically affects the others; therefore, all members of the system must work together to ensure an adequate response. Since each local EMS system and its hospital emergency departments are unique, collaborative problem solving must be used to find solutions to system problems. A recent (2009) study on ambulance diversion in California found that when hospitals and their local emergency medical services agency were focused and united in reducing diversion, employing a collaborative process and best practices helped achieve a reduction of ambulance diversion, improved patient flow and opened lines of communication among participants".[2]

This statewide collaborative between The Emergency Medical Services Authority, the California Hospital Association, and other stakeholders, is intended to address the problem of ambulance patient offload delays. This document is intended to provide background information on ambulance offload delays to facilitate discussion among the participant stakeholders.

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[1] OSHPD, Baseline Five-Year Trends for California's Hospital Emergency Departments, 9/19/2012- 2010 data

[2] California Healthcare Foundation, Reducing Ambulance Diversion in California, Strategies and Best Practices, issue brief 2009.

EMS Patient Offload Delays

Meeting Objectives

The objectives of this initiative are to:

1. Convene a collaborative group process;
2. Provide focus on the problem of ambulance offload delay and establish standards for data collection, reporting, and the development of consistent metrics;
3. Explore successful and promising approaches to resolving or improving the problem through processes that can be controlled locally; and
4. Propose how to disseminate and institute solutions between medical systems and jurisdictions with problematic delays.

Emergency Medical Services (EMS) Patient Offload Delay Description

EMS patient offload time is the interval between arrival of an ambulance patient at the ED until the EMS and ED personnel transfer the patient to an ED stretcher and the ED staff assume the responsibility for care for the patient.[3] It is also known as ambulance wall time, ambulance wait times, EMS patient parking, and capture of emergency medical services.

Sometimes, after arrival at the hospital emergency department, ambulance patients remain on the ambulance gurney with emergency medical service personnel in attendance for an extended period of time, preventing the ambulance crew(s) from returning to service in a timely fashion. This is commonly referred to as ambulance patient offload delay.

Cone et al. more technically describe the offload time as a turnaround interval composed of six fixed events (arrive at hospital, remove patients from ambulance, enter ED, transfer to an ED bed, EMS personnel leave ED, leave hospital) that follow the movement of the patient and EMS providers, as well as a number of variable events that do not occur in the same sequence with every run but may still be required to get the ambulance back into service (notification of unit status to dispatch, delivery of verbal and written reports to the ED staff, and completion of the ambulance call report.)[4] In this and all off load time models, the interval ends either when the crew signals "available" or when the ambulance leaves the hospital. It does not include instances when the crews may be stationed at the hospital or remain in the emergency department even after the unit is available for the next call.

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[3] Cooney DR, Millian MG, Carter A, Lawner BJ, Nable JV, Wallus HJ. Ambulance diversion and emergency department offload delay: resource document for the National Association of EMS Physicians position statement. Prehosp Emerg Care. 2011 Oct-Dec;15(4):555-61.

[4] Cone DC,Davidson SJ,Nguyen Q. A time and motion study of the emergency medical services turnaround interval. Am Emerg Med 1998,31,241-6.

EMS Patient Offload Delays

Scope of the Problem

This problem is not unique to California. Other states including New York, Massachusetts, Nevada, Pennsylvania and West Virginia[5] have documented and addressed this issue. Recent reports from Canada, United Kingdom and Australia indicates that this issue is international.[6]

Although widespread in California, the problem is not uniform or consistent. Specific medical centers or regions are disproportionately affected. Many health care systems and acute care emergency departments have never routinely had a problem or they have resolved it. In some jurisdictions or ambulance zones, the problem has not been measured and evidence is anecdotal. In a study involving 200 cities (including California cities), the national average wait time for handing off ambulance patients has doubled since 2006, from 20 minutes to over 45 minutes, resulting in a loss of nearly 5 million hours of EMS system productivity.[7] A study from Los Angeles (2004) revealed 21,240 incidents (one out of every eight transports) in a one-year period when EMS providers were out of service for more than 15 minutes waiting to transfer a patient to the ED staff. There were 8.4% of incidents were greater than one hour and the maximum wait time was 6.75 hours. Some urban areas in California report ambulance wait times to transfer care in the ED not uncommonly reaching 2-4 hours[8].

EMS Patient Offload Delay Data Collection Challenges

One of the first challenges for measuring and monitoring the problem of patient offload delays in the emergency department is to agree on a uniform definition and measurement. Various methods and metrics are currently in use. San Joaquin County incorporates the "capture of emergency medical services" for 30 minutes into their diversion avoidance policy. Kern County also uses a 30-minute standard for reporting. Santa Clara County has met with hospitals to implement a 15-minute transfer of care expectation. LA County is currently working with stakeholders to implement system standards and metrics. San Bernardino County works with the Hospital Association of Southern California (HASC) and has maintained a 25-minute transfer standard since 2005. Riverside County also has a 25-minute standard and has an active duty officer to monitor system status.

Because there will always be uncontrollable surges in patient arrivals and ambulance traffic to an emergency department, any standard time parameter should apply to a given proportion of

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[5] West Virginia Ambulance Authority Begins Cutting Ambulance Wait Time. Charleston Daily Mail. Wednesday, August 15, 2012.

[6] The Sunday Times, Perth Australia, June 9, 2012.

[7] Williams DM. "2005 JEMS 200 City Survey," J. Emer. Med. Serv. Vol. 31(2):44-100, 2006

[8] Eckstein M, Chan LS. The effect of emergency department crowding on paramedic ambulance availability. Ann Emerg Med; 43(1):100-105

ambulance runs to an ED; for example, 90% of patient care transfers from EMS to an emergency department should be accomplished within 30 minutes. While there is a clear agreed start time, when the ambulance arrives at the emergency department door, there are several different end times that could be measured.

Associated Factors

Ambulance offload delays are not an isolated issue, but are symptoms of the larger problem. Research and expert opinion connect Emergency Department crowding, ambulance diversion, patient offload delay, and emergency department patient boarding with obstructions in hospital throughput.[9,10,11] Many factors have been identified as contributing to decreased patient throughput, including decreased inpatient capacity, nurse patient ratios, hospital regulations limiting areas of care, and inability to rapidly turn over hospital beds. Additional issues affecting emergency department crowding are increasing patient complexity, lack of hospital beds, increased psychiatric holds due to fewer mental health community resources, delays in radiology, laboratory and ancillary services, shortage of specialists, lack of physical plant space, increased medical record documentation, and increasing difficulties in placement and arrangements for follow-up care. The final common endpoint is that emergency department beds are full, including admitted patients, and the ED cannot free gurneys and staff to accept new patients arriving by EMS. The fact that many ambulance patients do not have critical or even emergent conditions also does not provide incentive to rapidly clear existing patients from ED gurneys. The problem then may impact other hospitals, if the first overcrowded hospital initiates ambulance diversion (not allowed within all jurisdictions).

Impact on Patient Care

When pre-hospital providers wait with the patient on their stretcher unable to transfer the patient to a hospital gurney and to transfer care to the ED staff, it creates issues of patient safety. The paramedics or EMTs must continue to care for the patient they brought to the ED, rather than transferring to the higher level of care that is the standard within a hospital ED. Delay in ED patient transfer has not been well studied in relation to patient care outcomes, but the associated factors of diversion status and ED boarding both have been linked to increases in patient morbidity and mortality. The GAO report on ED crowding used ambulance diversion and patients leaving the ED without being seen as proxy measures—both of which result in

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[9] Eckstein M, Chan LS. *Op. Cit.*

[10] http://www.chcf.org/publications/2009/07/reducing-ambulance-diversion-in-california-strategies-and-best-practices

[11] United States Government Accountability Office. Hospital Emergency Departments: Crowding Continues to Occur, and Some Patients Wait Longer than Recommended Time Frames. GAO-09-347 April 2011.

treatment delays. Waiting for an open ED bed also leads to delays in medication administration and failure to meet standard of care for treatments such as antibiotics for sepsis, as the clock starts when the patient enters the ED.[12] Delays in patient throughput in the ED actually decreases hospital cost efficacy and increases subsequent hospital stays.[13] [14],[15]

The National Association of EMS Physicians (NAEMSP) position paper states:

> *Patient-level consequences have not been well studied. Despite this fact, one might hypothesize that offload delay leads to delay to definitive care, poor pain control, delayed time to antibiotics, increased morbidity, and possibly even mortality. Ultimately, there is a reasonable concern that ambulance offload delay will compromise patient safety*.[16]

The Emergency Nurses association had published a white paper that reviews data on the effects of holding patients in the ED. [17]

> *The widespread practice of holding or boarding patients in the emergency department is a major contributing factor to ED crowding and may lead to ambulance diversion or a delay in ambulance unloading, a delay in the provision of emergency care, and/or prolonged lengths of stay for ED patients being admitted to the inpatient hospital or transferred to another facility. Further, holding and crowding may result in reduced quality of care and increased risks to patient safety.*

Impact on EMS system

The ambulance unit and staff that are delayed in the ED are effectively out of service, decreasing advanced life support coverage in the community, which can increase response time for subsequent critical cases, including cardiac arrest and major trauma. ED delays of the EMS professionals back up the entire system: dispatch centers have increased task times, and EMS supervisors spend their time in the hospital attempting to make their units available. The compilation of these additional non-productive unit-hours are costly to the company and to the

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[12] Pines JM, et al., "The Association between Emergency Department Crowding and Hospital Performance on Antibiotic Timing for Pneumonia and Percutaneous Intervention for Myocardial Infarction," *Academic Emergency Medicine*, vol. 13 no. 8 (2006).

[13] U.S. GAO. *Op.Cit.*

[14] Emergency Nurses Association White Paper, 2006. Holding patients in the Emergency Department. https://www.ena.org/IENR/Documents/HoldingPatientsEDWhitePaper.pdf

[15] Rabin E, Kocher K, McClelland M. Solutions to emergency department boarding and crowding are underused and may need to be legislated. Health Affairs, 2012; 31(8):1757-1766.

[16] Cooney DR, et al, 2011. *Op. Cit.*

[17] Emergency Nurses Association White Paper. *Op. Cit.*

community, since readiness accounts for a large portion of the cost associated with ambulance coverage in a community, and ambulance contracts mandate maximal response times to critical calls. The cost to fully supply and staff an ambulance for 60 minutes is termed a 'unit hour'. This varies by type of system but averages $100/hour. By adding up the total hours that EMS personnel wait to hand over their patients, and then multiply by the cost of a unit hour, the result is a tremendous financial loss to the system.

In 2012, Riverside and San Bernardino Counties logged approximately 20,535 total delay hours accounting to $3 million in lost unit hours during that year (not counting potential lost revenue). Also in 2012, Sacramento Metro Fire Department accumulated 17,345 hours of delays in patient offload time at one hospital with an estimated system cost for this time of $2.6 million. When multiple ambulances are delayed, Sacramento Fire has to pull paramedic firefighters from other stations, meaning fire suppression units are unavailable to respond.

Regulatory Framework

California Health and Safety Code, Division 2.5, and the associated California Code of Regulations (Title 22, Chapter 4, Section 100145) defines the paramedic scope of practice, which does allow for paramedics to practice "while in the ED of an acute care hospital until responsibility is assumed by hospital staff"; however, this does not provide for routine or extended continuation of care for patients transported by EMS personnel once the hospital is responsible for the care of the patient.

EMTALA states that a hospital is responsible for the care of a patient when the patient or ambulance arrives on "hospital grounds". EMTALA requires initial assessment and triage of the patient without delay. Legal transfer of care to the hospital is not dependent upon or delayed by a report given by EMS provider. Moreover, EMTALA does not specifically define the transfer of responsibility or the 'formal acceptance' of the patient from EMS to ED staff.

State and federal regulatory agencies have issued statements regarding delays in patient transfer in the ED in relation to ambulance diversion, ED overcrowding, and ED patient boarding.

In June 2007, the California Department of Public Health Licensing and Certification issued an All Facility Letter (AFL 07-04) on EMS-ED patient parking:

> *The CDPH realized that there is crowding in many hospital emergency departments. There needs to be a different solution to this problem as "parking" patients in hospitals and refusing to release EMS equipment or personnel puts patients' health at risk and jeopardizes the ability of the EMS staff to provide their important services to California's communities.*

The Center for Medicare and Medicaid Services addressed the issue with S&C -06-21 (July 2006):

> *CMS recognizes the enormous strain and crowding many hospital emergency departments face every day. However, this practice is not a solution. "Parking" patients in hospitals and refusing to release EMS equipment or personnel jeopardizes patient health and impacts the ability of EMS personnel to provide emergency services to the rest of the community.*
>
> *This practice [delaying ambulance ED offload] may result in a violation of the Emergency Medical Treatment and Labor Act (EMTALA) and raises serious concerns for patient care and the provision of emergency services in a community. Additionally, this practice may also result in violation of the Conditions of Participation for Hospitals…. A hospital that delays the screening examination or stabilizing treatment of a patient who arrives via transfer from another facility by not allowing EMS to leave the patient could also be in violation of EMTALA.*

S&C-07-20 (April 2007) clarified that S&C 06-21 does not mean that

> *a hospital will necessarily have violated EMTALA if it does not, in every instance, immediately assume from the EMS provider all responsibility for the individual, regardless of any other circumstances in the ED…. In some circumstances it could be reasonable for the hospital to ask the EMS provider to stay with the individual until such time as there were ED staff available to provide care to that individual.*

If the provider cannot perform an immediate Medical Screening Exam, it must still triage the patient's condition immediately to ensure immediate intervention is not required.

Solutions and Best Practices

Identifying the bottleneck

Since ambulance diversion, ambulance wait time and ED boarding are all linked to hospital throughput, they all must be examined together and in context with EMS system performance requirements to meet community service needs. Effective mitigation strategies designed to reduce ambulance patient offload time must include methods to improve hospital throughput and the establishment of meaningful metrics for benchmarking.

A National Association of EMS Physicians (NAEMSP) position resource document states:

> *It is clear that EMS systems do not exist in a vacuum isolated from the rest of the health care system. In addition, it is also clear that the most efficient way to ensure that the EMS system is able to respond to the emergent needs of the public is to maximize*

> *hospital throughput strategies…. Ultimately, the solution to ED diversion, ambulance offload delays, and overall hospital throughput is a matter of all entities in a given health care system working together in an integrated manner for the overall good of the public health*. [18]

Definition and measurement

The NAEMSP recommends that "reliable data on prolonged delivery time, offload delay, and the impact on EMS systems can be used to leverage hospitals to improve ED throughput by reorganizing or committing additional resources. EMS and hospital system agreement on criteria for ED ambulance diversion is also important. Limiting offload delay may greatly impact the outcome for ill and traumatized patients and, therefore, benchmarks for offload delay should be adopted. Communication of system resource availability, as well as factors relating to offload delay, should also be integrated into every EMS system." [6]

Measures to address ED overcrowding and boarding

Strategies that optimize bed management reduce boarding by improving the efficiencies of hospital flow. Some examples include improved registration procedures, space reorganization, patient placement "zones", addition of observation and treatment-in-progress bed space areas, use of bed tracking technology, changing patient flow patterns, adding urgent care and flexible bed space. Staff has been reconfigured into teams inclusive of such new roles as patient flow coordinator, and many hospitals have added pharmacists to the care delivery team to more quickly address the increased complicated polychronic individual on multiple medications. Inpatient throughput also has a direct impact on an ED's ability to move admitted patients through the process. Increased staff has been added to focus on more effective and rapid discharge of inpatients. Many hospitals have added physician hospitalists, discharge care teams, discharge waiting areas and inpatient flow coordinators. Other hospital strategies to reduce ED boarding and crowding include moving boarders to inpatient halls, active bed management, elective surgical case smoothing, and a simplified admission protocol.[19] The GAO report reviewed data on suggested measures.[20] These strategies are often underused, sometimes due to lack of incentives or cost containment initiatives, in other cases, innovative strategies may be hampered or prohibited by regulations or building and fire codes.

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[18] Cooney DR, 2011. *Op. Cit.*

[19] Rabin E, 2012. *Op. Cit.*

[20] United States Government Accountability Office. Hospital Emergency Departments: Crowding Continues to Occur, and Some Patients Wait Longer than Recommended Time Frames. GAO-09-347 April 2011.

Standards for ED boarding and hospital throughput

The Joint Commission, Agency for Healthcare Research and Quality (AHRQ), and CMS have all recognized the problem of patient flow in the Emergency Department, its root cause of hospital throughput, and its association with patient safety. Subsequently, new standards and guidelines for hospital throughput are being developed. Eventually, this should affect the downstream problem of EMS patient transfer delays, but more urgent measures to address this problem are warranted.

1. Agency for Healthcare Research and Quality (AHRQ) – publishes many best practice documents for managing hospital throughput and patient flow. [21]
2. New CMS core measures (2014) address ED and hospital throughput.[22]
3. The Joint Commission accreditation standards for ED Patient Flow (LD.04.03.11) has nine elements of performance (EP). They have recommended that "boarding timeframes not exceed 4 hours in the interest of patient safety and quality of care." EP8 requires leaders to take action to improve patient flow when goals are not achieved. Leaders who must take action include the board, medical staff, along with the CEO and senior leadership." [23]

American College of Emergency Physicians (ACEP) Clinical Policy

Reducing the time that patients remain in the emergency department (ED) after an admission decision has been made can improve access to treatment and increase quality of care. ACEP agrees with the National Quality Forum deliberations noting the importance of examining the median time from admit decision time to time of departure from the ED for patients admitted to inpatient status:

The problem of boarding emergency department (ED) patients is multifactorial with causes that span the entire health care delivery system. Boarding is a major patient safety issue. [24]

Optimal utilization of the emergency department (ED) includes the timely evaluation, management, and stabilization of all patients. Boarding of admitted patients in the ED contributes to lower quality of care, reduced timeliness of care, and reduced patient

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[21] http://www.ahrq.gov/qual/ptflow/ptflowguide.pdf

[22] http://www.ahrq.gov\qual\ptflow\ptflowguide.pdf

[23] http://www.jointcommission.org/assets/1/18/Pre_Publication_EDO_HAP.pdf
http://www.jointcommission.org/issues/article.aspx?Article=lFlB9kMZVBP527NDSKyuwfkXuYbHq4T05UmK9Azy4nE%3D

[24] ACEP Clinical Policy. Boarding of Pediatric Patients in the Emergency Department Approved January 2012

satisfaction. ED crowding is a direct result of diminished bed and resource capacity created by boarding. [25]

A proxy for emergency department crowding includes the proportion and lengths of time patients remain in the emergency department after the decision to admit. Studies have shown that boarding patients in the emergency department can lead to greater hospital lengths of stay over prompt admissions. Reducing this time potentially improves access to care specific to the patient condition and increases the capability of facilities to provide additional treatment. [26]

Best Practice Examples

A common theme among best practice examples is a "top to bottom" hospital focus on mitigation strategies and information sharing that involve coordination between the ED, bed control (house supervisor), and hospital administration.

a. AHRQ Service Delivery Innovations Profile – St. Francis Medical Center, Lynwood, California. [27]
b. Valley Hospital Emergency Critical Care Center, Las Vegas, Nevada. [28]
c. AHRQ – Forbes Regional Campus of Western Pennsylvania Patient Flow Improvements. [29]
d. Pennsylvania Patient Safety Advisory – Managing Patient Access and Flow in the ED to Improve Patient Safety. [30]
e. Florida State EMS Administrator (Jan 22, 2009) lists 21 recommendations that mostly can be implemented by EMS agencies. [31]
f. Victoria, BC, has published guidelines to provide direction for hospital and ambulance staff on the process for reception and handover of patients arriving by ambulance in Victoria's metropolitan public hospital emergency departments.[32]

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[25] ACEP clinical policy. Boarding of Admitted and Intensive Care Patients in the Emergency Department Approved April 2011

[26] ACEP Clinical Policy Statement 2011. http://www.acep.org/Clinical---Practice-Management/Definition-of-Boarded-Patient/

[27] http://www.innovations.ahrq.gov/content.aspx?id=1757

[28] http://www.rwjf.org/en/research-publications/find-rwjf-research/2006/09/valley-hosptial-medical-center.html

[29] http://www.innovations.ahrq.gov/content.aspx?id=2491

[30] *Pennsylvania Patient Safety Advisory* 2010 Dec;7[4]:123-34. http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2010/dec7%284%29/documents/123.pdf

[31] http://www.doh.state.fl.us/demo/ems/EMSAC/ACPDFS/AccesstoCareBestPracticesPositionPaper.pdf

[32] http://www.health.vic.gov.au/emergency/presentation-guide%20.pdf

EMS Patient Offload Delays

In West Virginia, ambulance personnel now can offload non-emergency patients to the emergency department's waiting room, as long as they make contact with the ER's charge nurse.

Legislative solutions

Nevada State Legislature passed Senate Bill 458 in late spring 2005 that created a standard of 30 minutes to transfer the care of patients from EMS to hospital staff.

Massachusetts passed a law in 2009 to prohibit diversion and monitor wait times. Based on a review published by the AMA, no increase in wait times has been seen through 2010. The legislation initially included fines if the time limit was exceeded, but these were dropped.

In England, some EMS agencies charge hospitals for delays in transfer of patients over 15 minutes. Moreover, England has addressed ED overcrowding by requiring an ED throughput limit of 4 hours in 90% of patients.

Areas for Discussion

1. Develop standardized nomenclature, definitions, metrics and reporting for ambulance patient transfer (of care) in policies for local EMS agencies and EMS receiving hospitals.
2. Prioritize known practices that are most likely to impact delays in problem areas.
3. Assist local jurisdictions in developing measurable and sustainable goals to reduce the incidence of patient offload delays using short, intermediate and long-term strategies.
4. Contribute to State (EMSA) and Federal discussions/efforts to examine the core issues and develop solutions such as alternative patient destinations, community paramedic programs, patient case management and alternatives for care of mental health patients.

Comparison of California County Population ED Data

(2009 & 2012)

Comparison of California County ED Data - 2009 & 2012

	2009							2012							Percent Change in Population	Percent Change in ED visits	Change in ED treatment stations	Change in Admission rate	Change in ED visits/1,000	Change in ED visits/station
County	Population	ED visits	ED treatment stations	ED Admission rate	ED Visits/1,000	ED visits/station	Population	ED visits	ED treatment stations	ED Admission rate	ED Visits/1,000	ED visits/station								
Alameda	1,503,827	536,613	314	13.6%	356.8	1,709	1,539,357	540,394	336	13.3%	351.0	1,608			2.4%	0.7%	22	-0.34%	-6	-101
Alpine	1,180	-	-	0.0%	0.0	-	1,106	-	-	0.0%	0.0	-			-6.3%	-	0	0.00%	0	-
Amador	37,905	17,924	6	11.0%	472.9	2,987	36,471	19,001	8	15.9%	521.0	2,375			-3.8%	6.0%	2	4.93%	48	-612
Butte	219,267	84,839	53	19.0%	386.9	1,601	221,056	99,498	65	19.8%	450.1	1,531			0.8%	17.3%	12	0.84%	63	-70
Calaveras	45,562	10,398	8	11.6%	228.2	1,300	45,683	9,235	8	11.5%	202.2	1,154			0.3%	-11.2%	0	-0.02%	-26	-145
Colusa	21,270	5,795	4	11.8%	272.4	1,449	21,472	6,003	4	10.7%	279.6	1,501			0.9%	3.6%	0	-1.11%	7	52
Contra Costa	1,043,501	371,492	227	13.5%	356.0	1,637	1,069,607	424,431	267	11.8%	396.8	1,590			2.5%	14.3%	40	-1.64%	41	-47
Del Norte	28,559	24,811	11	9.6%	868.8	2,256	28,462	21,969	11	10.4%	771.9	1,997			-0.3%	-11.5%	0	0.82%	-97	-258
El Dorado	179,701	47,943	27	10.7%	266.8	1,776	182,845	45,094	24	11.0%	246.6	1,879			1.7%	-5.9%	-3	0.29%	-20	103
Fresno	923,895	301,613	184	16.0%	326.5	1,639	948,790	340,267	190	14.3%	358.6	1,791			2.7%	12.8%	6	-1.67%	32	152
Glenn	28,056	5,796	5	4.5%	206.6	1,159	28,136	5,634	5	0%	200.2	1,127			0.3%	-2.8%	0	-4.45%	-6	-32
Humboldt	133,786	55,167	25	9.7%	412.4	2,207	134,644	57,618	37	9.5%	427.9	1,557			0.7%	4.4%	12	-0.24%	16	649
Imperial	173,241	95,468	36	8.9%	551.1	2,652	178,204	92,457	40	8.2%	518.8	2,311			2.9%	-3.2%	4	-0.70%	-32	-340
Inyo	18,448	9,223	5	4.1%	499.9	1,845	18,904	9,539	9	3.0%	504.6	1,060			2.5%	3.4%	4	-1.12%	5	-785
Kern	831,134	275,914	139	14.2%	332.0	1,985	856,282	323,648	164	14.2%	378.2	1,975			3.0%	17.4%	25	-0.03%	46	-10
Kings	151,794	59,700	30	9.2%	393.3	1,990	150,718	68,739	32	8.8%	456.1	2,148			-0.7%	15.1%	2	-0.38%	63	158
Lake	64,396	34,375	19	5.4%	533.8	1,809	64,394	35,422	19	1.5%	550.1	1,864			0.0%	3.0%	0	-3.87%	16	55
Lassen	34,173	10,392	7	7.3%	298.9	1,485	33,378	12,906	7	3.4%	386.5	1,852			-4.0%	24.8%	0	-3.85%	90	368
Los Angeles	9,806,233	3,068,645	1,767	18.5%	313.0	1,737	9,945,031	3,148,089	1,764	16.7%	316.6	1,785			1.4%	2.6%	-3	-1.75%	4	48
Madera	150,151	99,003	50	8.3%	659.4	1,980	151,329	128,436	55	8.3%	848.7	2,335			0.8%	29.7%	5	-0.05%	189	355
Marin	251,230	76,041	42	14.5%	302.7	1,811	253,991	75,258	46	14.9%	296.3	1,636			1.1%	-1.0%	4	0.41%	-6	-174
Mariposa	18,281	4,972	4	4.5%	272.0	1,243	18,361	5,862	4	2.4%	319.3	1,466			0.4%	17.9%	0	-2.06%	47	223
Mendocino	87,589	44,847	27	8.3%	512.1	1,661	88,568	42,370	27	9.6%	478.4	1,569			1.1%	-5.5%	0	1.37%	-34	-92
Merced	254,123	83,196	30	8.7%	327.4	2,773	261,062	85,794	35	7.1%	328.6	2,451			2.7%	3.1%	5	-1.56%	1	322
Modoc	9,632	5,183	6	3.1%	538.1	864	9,431	4,356	6	3.5%	461.9	726			-2.1%	-16.0%	0	0.47%	-76	-138
Mono	14,075	8,670	11	5.5%	616.0	788	14,377	7,630	11	4.3%	530.7	694			2.1%	-12.0%	0	-1.22%	-85	-95
Monterey	413,590	158,296	73	11.8%	382.7	2,168	421,486	146,889	78	12.2%	348.5	1,883			1.9%	-7.2%	5	0.38%	-34	-285
Napa	135,664	22,552	33	23.2%	166.2	683	138,032	36,445	26	15.9%	264.0	1,402			1.7%	61.6%	-7	-7.26%	98	718
Nevada	98,432	45,252	25	11.7%	459.7	1,810	97,926	42,371	33	11.7%	432.7	1,284			-0.5%	-6.4%	8	0.00%	-27	-526
Orange	2,998,816	765,028	578	18.6%	255.1	1,324	3,074,546	849,201	663	17.3%	276.2	1,281			2.5%	11.0%	85	-1.29%	21	-43
Placer	344,088	164,409	121	13.9%	477.8	1,359	360,440	176,940	121	13.8%	490.9	1,462			4.8%	7.6%	0	-0.14%	13	104
Plumas	20,063	12,201	6	5.8%	608.1	2,034	19,558	10,423	7	32.7%	532.9	1,489			-2.5%	-14.6%	1	26.87%	-75	-545
Riverside	2,158,399	613,350	315	14.5%	284.2	1,947	2,249,773	721,628	394	13.3%	320.8	1,832			4.2%	17.7%	79	-1.17%	37	-116
Sacramento	1,411,403	448,634	248	14.5%	317.9	1,809	1,435,682	515,152	281	13.3%	358.8	1,833			1.7%	14.8%	33	-1.19%	41	24
San Benito	55,093	16,494	6	10.1%	299.2	2,747	56,822	15,998	18	9.2%	281.5	889			3.1%	-2.9%	12	-0.89%	-18	-1859
San Bernardino	2,022,319	777,779	368	14.3%	384.6	2,114	2,064,118	762,085	430	14.1%	369.2	1,772			2.1%	-2.0%	62	-0.22%	-15	-341
San Diego	3,077,633	807,953	505	17.5%	262.5	1,600	3,153,877	916,246	614	16.4%	290.5	1,492			2.5%	13.4%	109	-1.08%	28	-108
San Francisco	801,799	245,410	157	13.3%	306.1	1,563	822,291	271,879	160	18.1%	330.6	1,699			2.6%	10.8%	3	4.74%	25	136
San Joaquin	680,421	235,660	106	13.2%	331.6	2,129	698,073	241,625	125	11.4%	346.1	1,933			2.6%	7.1%	19	-1.82%	14	-196
San Luis Obispo	268,224	94,470	59	15.5%	352.2	1,601	270,869	91,218	60	10.9%	336.8	1,520			1.0%	-3.4%	1	-4.58%	-15	-81
San Mateo	716,264	193,154	116	13.9%	269.7	1,665	735,882	203,938	123	13.4%	277.1	1,658			2.7%	5.6%	7	-0.44%	7	-7
Santa Barbara	422,423	143,094	66	12.1%	338.7	2,168	426,105	149,216	78	11.5%	350.2	1,913			0.9%	4.3%	12	-0.66%	11	255
Santa Clara	1,774,890	405,459	253	15.4%	228.4	1,603	1,826,878	473,607	267	15.3%	259.2	1,774			2.9%	16.8%	14	-0.09%	31	171
Santa Cruz	261,912	73,642	40	14.3%	281.2	1,841	268,796	68,629	38	15.8%	255.3	1,806			2.6%	-6.8%	-2	1.43%	-26	-35
Shasta	176,881	95,483	57	12.2%	539.8	1,675	178,519	88,435	55	13.3%	495.4	1,608			0.9%	-7.4%	-2	1.09%	-44	-67
Sierra	3,243	-	-	0.0%	0.0	-	3,114	-	-	0%	0.0	-			-4.0%	-	0	0.00%	0	-
Siskiyou	44,950	20,529	15	9.1%	456.7	1,369	45,378	21,474	15	8.9%	473.2	1,432			1.0%	4.6%	0	-0.15%	17	63
Solano	412,488	144,901	107	11.2%	351.3	1,354	419,347	177,047	112	10.0%	422.2	1,581			1.7%	22.2%	5	-1.15%	71	227
Sonoma	480,586	141,029	83	12.9%	293.4	1,699	488,467	150,085	99	12.1%	307.2	1,516			1.6%	6.4%	16	-0.79%	14	-183
Stanislaus	512,052	253,017	144	13.0%	494.1	1,757	523,197	265,170	160	13.7%	506.8	1,657			2.2%	4.8%	16	0.65%	13	-100
Sutter	94,372	-	-	0.0%	0.0	-	96,687	-	-	0%	0.0	-			2.5%	-	0	0.00%	0	-
Tehama	63,122	32,827	15	5.1%	520.1	2,188	63,336	29,752	15	5.8%	469.7	1,983			0.3%	-9.4%	0	0.69%	-50	-205
Trinity	13,771	5,102	4	5.3%	370.5	1,276	13,432	4,325	4	7.0%	322.0	1,081			-2.5%	-15.2%	0	1.65%	-48	-194
Tulare	438,408	132,248	73	13.6%	301.7	1,812	452,473	153,380	68	14.7%	339.0	2,256			3.2%	16.0%	-5	1.10%	37	444
Tuolumne	55,258	22,457	14	14.2%	406.4	1,604	54,101	26,305	14	13.0%	486.2	1,879			-2.1%	17.1%	0	-1.20%	80	275
Ventura	818,546	207,188	112	15.8%	253.1	1,850	833,366	234,600	123	13.9%	281.5	1,907			1.8%	13.2%	11	-1.82%	28	57
Yolo	199,697	44,289	26	6.7%	221.8	1,703	205,025	43,618	25	9.7%	212.7	1,745			2.7%	-1.5%	-1	3.02%	-9	41
Yuba	71,796	51,999	24	10.7%	718.7	2,150	73,156	49,210	24	19.5%	672.7	2,050			1.9%	-4.6%	0	8.77%	-46	-100

Sources: OSHPD Annual Utilization Data, 2009 & 2012; State of California, Department of Finance, E-2, California County Population Estimates and Components of Change by Year — July 1, 2010–2013, December 2013; State of California, Department of Finance, California County Population Estimates and Components of Change by Year, July 1, 2000-2010. Sacramento, California, December 2011; The Abaris Group calculations, 2014.

EMS Utilization Trends (2008-2012)

Report Period: Calendar Years 2008 - 2012

EMS UTILIZATION TRENDS 2008-2012

(Excludes State Mental Hospitals and Non-Responders)

PIVOT SELECTIONS (Individual hospital information will appear only if one hospital is selected*)

Facility Name	(All)		
County	(All)	**Assembly District**	(All)
EMSA County / EMS	(All)	**Senate District**	(All)
Type of Control	(All)	**Congressional District**	(All)
Principal Service	(All)	**Los Angeles SPA**	(All)
Trauma Center Designation	(All)	**MSSA**	(All)
EMS Level	(All)	**OSHPD ID**	(All)
Hospital in Operation During Year	Yes		
Show Only Hospitals With EDs	(All)		

* Individual hospital information is based on 2012 data.

Emergency Medical Services (EMS)	2008		2009		2010		2011		2012	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
GAC Hospitals Without Licensed EMS	96	22.1%	91	21.3%	89	20.8%	91	21.2%	87	20.3%
EMS Level: Standby	39	9.0%	37	8.6%	38	8.9%	37	8.6%	37	8.6%
EMS Level: Basic	290	66.8%	291	68.0%	292	68.2%	293	68.1%	296	69.0%
EMS Level: Comprehensive	9	2.1%	9	2.1%	9	2.1%	9	2.1%	9	2.1%
Total GAC Hospitals	**434**	**100.0%**	**428**	**100.0%**	**428**	**100.0%**	**430**	**100.0%**	**429**	**100.0%**

Designated Trauma Centers	2008		2009		2010		2011		2012	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Trauma Center Level I	13	3.0%	13	3.0%	13	3.0%	13	3.0%	13	3.0%
Trauma Center Level II	30	6.9%	31	7.2%	33	7.7%	34	7.9%	34	7.9%
Trauma Center Level III	9	2.1%	9	2.1%	11	2.6%	13	3.0%	13	3.0%
Trauma Center Level IV	9	2.1%	9	2.1%	9	2.1%	9	2.1%	9	2.1%
Undesignated GAC Hospitals	373	85.9%	366	85.5%	362	84.6%	361	84.0%	360	83.9%
Total GAC Hospitals	**434**	**100.0%**	**428**	**100.0%**	**428**	**100.0%**	**430**	**100.0%**	**429**	**100.0%**
Number of Pediatric Trauma Centers:	10		10		10		14		14	

EMS Services Available	2008		2009		2010		2011		2012	
	24 Hour	On-Call	24 Hour	On-Call	24 Hour	On-Call	24 Hour	On-Call	24 Hour	On-Call
Anesthesiologist	163	178	155	183	145	194	149	196	150	197
Laboratory Services	323	34	323	32	326	31	327	36	330	31
Operating Room	156	182	146	192	139	200	135	208	131	214
Pharmacist	208	144	210	137	215	135	218	139	217	138
Physician	336	25	335	21	339	20	342	23	344	19
Psychiatric ER	72	149	72	165	76	159	78	164	69	178
Radiology Services	291	68	287	67	291	66	290	73	292	70

EMS Patient Treatment Stations	2008	2009	2010	2011	2012
Patient Treatment Stations	6,533	6,786	6,991	7,168	7,404
Treatment Stations per EMS Hospital	19	20	21	21	22
EMS Visits per Treatment Station	1,673	1,724	1,689	1,686	1,695

Source: OSHPD Annual Utilization Report of Hospitals, 2008 - 2012

EMS_UT2008_2012

EMS UTILIZATION TRENDS 2008-2012

(Excludes State Mental Hospitals and Non-Responders)

EMS Visit by Type	2008		2009		2010		2011		2012	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Minor (CPT 99281)	953,243	8.7%	946,644	8.1%	883,093	7.5%	913,920	7.6%	798,911	6.4%
Low / Moderate CPT 99282)	2,429,713	22.2%	2,363,585	20.2%	2,096,453	17.8%	2,042,422	16.9%	2,025,424	16.1%
Moderate (CPT 99283)	3,686,538	33.7%	4,123,887	35.2%	4,150,140	35.1%	4,203,742	34.8%	4,513,184	36.0%
Severe Without Life Threat (CPT 99284)	2,292,547	21.0%	2,634,888	22.5%	2,718,878	23.0%	2,804,817	23.2%	3,070,243	24.5%
Severe With Life Threat (CPT 99285)	1,452,503	13.3%	1,487,973	12.7%	1,853,107	15.7%	2,012,489	16.7%	2,041,336	16.3%
Admissions Not Specified by Type*	112,416	1.0%	144,539	1.2%	107,326	1.2%	108,426	0.9%	98,283	0.9%
Total EMS Visits	**10,926,960**	**99.0%**	**11,701,516**	**100.0%**	**11,808,997**	**100.3%**	**12,085,816**	**100.0%**	**12,547,381**	**100.1%**
Total EMS Visits per Day	29,937		29,855		32,059		32,353		33,112	

* Beginning in 2008, the form does not require hospitals to enter a total by type.

EMS Admissions	2008		2009		2010		2011		2012	
	Number	Percent of Total Visits	Number	Percent of Total Visits	Number	Percent of Total Visits	Number	Percent of Total Visits	Number	Percent of Total Visits
Minor (CPT 99281)	19,355	2.0%	21,899	2.3%	8,941	1.0%	19,807	2.2%	8,474	1.1%
Low / Moderate CPT 99282)	38,382	1.6%	29,019	1.2%	20,496	1.0%	44,850	2.2%	18,175	0.9%
Moderate (CPT 99283)	290,549	7.9%	185,326	4.5%	174,844	4.2%	198,216	4.7%	152,912	3.4%
Severe Without Life Threat (CPT 99284)	484,077	21.1%	569,121	21.6%	514,288	18.9%	459,209	16.4%	476,258	15.5%
Severe With Life Threat (CPT 99285)	772,513	53.2%	851,586	57.2%	1,005,309	54.2%	1,095,115	54.4%	1,076,102	52.7%
Admissions Not Specified by Type*	112,416	N/A	144,539	N/A	107,326	N/A	108,426	N/A	98,283	N/A
Total EMS Admissions	**1,604,876**	**14.7%**	**1,801,490**	**15.4%**	**1,831,204**	**15.5%**	**1,925,623**	**15.9%**	**1,830,204**	**14.6%**

* Beginning in 2008, the form allows hospitals to report total admissions only.

Non-EMS Visits	2008		2009		2010		2011		2012	
	Number	Percent of Total Visits	Number	Percent of Total Visits	Number	Percent of Total Visits	Number	Percent of Total Visits	Number	Percent of Total Visits
Non-emergency Visits	676,234	4.9%	874,540	5.9%	795,782	5.4%	776,938	5.1%	739,759	4.8%
Non-emergency Visits per Day	1,853		2,389		2,180		2,129		2,027	
Registered, Left Without Being Seen	510,283	3.7%	444,739	3.0%	300,574	2.0%	303,654	2.0%	314,507	2.0%
LWOBS per Day	1,398		1,215		823		832		862	
Total ED Visits	**13,718,353**		**14,822,285**		**14,736,557**		**15,092,031**		**15,431,851**	
Number of ED Visits per Day	37,585		40,498		40,374		41,348		42,279	
Number of ED Visits per Hour	1,566		1,687		1,682		1,723		1,762	

Source: OSHPD Annual Utilization Report of Hospitals, 2008 - 2012

Report Period: Calendar Years 2008 - 2012

EMS UTILIZATION TRENDS 2008-2012

(Excludes State Mental Hospitals and Non-Responders)

ED - Ambulance Diversion	2008	2009	2010	2011	2012
EDs That Diverted Amulances at Least Once During Year	203	174	171	157	157
Percent of Hospitals with ED That Diverted Ambulances at Least Once During Year	60.1%	51.6%	50.4%	46.3%	45.9%

Ambulance Diversion Hours	2008		2009		2010		2011		2012	
	Diversion Hours	Avg Hrs / Day	Diversion Hours	Avg Hrs / Day	Diversion Hours	Avg Hrs / Day	Diversion Hours	Avg Hrs / Day	Diversion Hours	Avg Hrs / Day
January	20,613	664.9	12,183	393.0	8,512	274.6	9,850	317.7	8,601	277.5
February	26,122	900.8	10,005	357.3	9,138	326.4	10,141	362.2	8,610	296.9
March	17,602	567.8	11,559	372.9	9,091	293.3	9,526	307.3	9,998	322.5
April	11,756	391.9	10,813	360.4	6,956	231.9	7,124	237.5	7,065	235.5
May	10,632	343.0	8,726	281.5	7,503	242.0	7,180	231.6	5,899	190.3
June	10,455	348.5	8,070	269.0	6,495	216.5	6,495	216.5	6,144	204.8
July	10,156	327.6	9,423	304.0	7,179	231.6	6,057	195.4	6,523	210.4
August	10,363	334.3	6,850	221.0	7,194	232.1	5,526	178.3	7,612	245.5
September	10,408	346.9	7,488	249.6	7,129	237.6	5,451	181.7	7,013	233.8
October	8,620	278.1	9,074	292.7	6,243	201.4	5,902	190.4	6,231	201.0
November	8,589	286.3	7,644	254.8	6,270	209.0	5,047	168.2	5,203	173.4
December	9,194	296.6	7,561	243.9	7,742	249.7	6,792	219.1	5,895	190.2
Total Hours	**154,510**	**423.3**	**109,396**	**299.7**	**89,452**	**244.4**	**85,091**	**232.5**	**84,794**	**231.7**

Source: OSHPD Annual Utilization Report of Hospitals, 2008 - 2012

EMS_UT2008_2012

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