

EMERGENCY MEDICAL SERVICES AUTHORITY (EMSA) STRATEGY for DATA COLLECTION, EVALUATION, and QUALITY

**Emergency Medical Services Authority
And the Executive Data Advisory Group¹**

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BACKGROUND AND HISTORY

EMSA and LEMSAs are currently experiencing an unprecedented convergence of opportunity and demand involving the collection and meaningful use of Emergency Medical Services (EMS) and specialty care data. Drivers include health care reform, patient outcome focused performance improvement, current and new legislation, grant and funding requirements, community expectations for efficient EMS system design, and changes in the national policy and practice of collecting EMS data. Development of a cohesive statewide EMS data collection and meaningful use strategy is urgently needed in order to position EMS in California to optimize opportunities and meet the increasing demand. This includes development of a comprehensive and integrated statewide approach to how we collect, analyze, report and utilize data.

Currently the national healthcare system is undergoing a major change driven by the need for greater economy, quality of care, and population health—all demonstrated by data. EMS will be swept along in these changes and the resulting model for healthcare. Until recently, EMS has been largely excluded from the healthcare data revolution, but there is an emerging realization that EMS plays a key role in many critical and costly medical interventions such as trauma, stroke, STEMI, and overall emergency care. Additionally, as part of the Office of the National Coordinator for Health Information Technology strategy, there is an increased emphasis on interoperability and explicit calls on EMS to be fully integrated into the healthcare information technology infrastructure. In the future, EMS will not be simply a fee-for-service transportation service; rather, EMS will be a fully integrated component in the broader challenge of community healthcare as well as the chain of emergency care.

Data played a pivotal role in the early development of EMS in the United States. In 1966 The National Academies of Science published *Accidental Death and Disability: The Neglected Disease of Modern Society*, which would become known as “The White Paper” presented compelling data that was widely utilized by the National Transportation and Safety Administration (NHTSA) and early EMS leaders to successfully argue for organized EMS systems. The resulting shift to a systems based approach supported by an effective governance structure led to great improvements in EMS delivery and patient care throughout the country. By all accounts this was a major

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turning point for EMS and healthcare in the United States that began with the collection, analysis and reporting of death and disability data.

Historically, EMS data collection efforts in California have been decentralized with the LEMSAs collecting, analyzing and reporting data based on local system needs. At the State level, without reliable and consistent data, EMSA has relied on the review and approval of EMS plans from local EMS agencies that provide descriptive system design and program information, current status, and planning goals, but limited system performance metrics.

Some LEMSAs have established sophisticated data collection systems; however, there is a lack of uniformity in data collection systems, varied analytic methodologies and limited success in the data reporting. This dynamic has resulted in data output variation that hamper EMSA and some LEMSA's ability to meet their statutory mandate and key function to assess and validate the effectiveness of EMS systems in delivering care (Health and Safety Code 1797.102). This is demonstrated by the challenges faced by Core Measures reporting. Although the project is a national model for state EMS performance measurement, the completeness, comparability, and validity of the results are irregular due to the wide disparity of data systems, collection, and reporting.

As part of an EMS vision process in 2000, an EMS system stakeholder group recommended that a single data collection system be implemented statewide. However, the rapid growth of health information technology and the lack of accepted national EMS data standards made this recommendation unrealistic. The goals developed by that stakeholder group included:

1. Achieve statutory mandates at the local and State level;
2. Understand the effectiveness of EMS systems;
3. Improve the quantity and quality of pre-hospital EMS and trauma data submitted; and
4. Improve clinical care and engage in continuous quality improvement (CQI or QI) activities.

These goals are just as cogent today, but there is new opportunity to achieve them through development of a cohesive statewide EMS data collection and meaningful use strategy.

Statutory Authority and Responsibility

The legislative intent and goal described in the EMS Act is to have a coordinated EMS system in the state of California. The EMS Act mandates collection of data to evaluate the effectiveness of the current system, detect practices in patient care and trends in patient movement, and adjust EMS systems accordingly. LEMSAs and EMSA rely upon data and information to adequately assess and coordinate local EMS systems.

The local EMS agency shall plan, implement, and evaluate an emergency medical services system...(1797.204). Evaluation is one of the responsibilities specifically

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assigned to the medical director: *Every local EMS agency shall have a ... medical director ... to provide medical control and to assure medical accountability throughout the planning, implementation and evaluation of the EMS system. (1797.202)*

Among the duties conferred on EMSA by statute (H&S code 1797.102) is to "...assess each EMS area or the system's service area for the purpose of determining the need for additional emergency medical services, coordination of emergency medical services, and the effectiveness of emergency medical services". The statute states "shall assess", indicating it is a mandatory duty and further instructs that it be performed "utilizing regional and local information".

H&S Code 1797.103 assigns additional duties to EMSA beyond assessing each EMS area. EMSA "...shall develop planning and implementation guidelines for emergency medical services systems which address the following components:

...
(f) Data collection and evaluation.

....
In addition, EMSA is given the responsibility "for the coordination and integration of all state activities concerning emergency medical services". (Section 1797.1)

EMSA, LEMSAs, and local EMS providers are all required by regulation to actively participate in a QI program. Additionally, local EMS agencies have a requirement to collect data in order to develop their local EMS plans.

Taken together, the statutes and regulations create a repeated mandate for system evaluation at the local and state levels, and the expectation that EMS providers and LEMSAs collect and submit data to EMSA to achieve the required objectives. The requirement for an evaluation of the system at the state level requires complete and reliable data from the all parts of the EMS system to provide a balanced and complete picture and to understand the diversity inherent in any statewide program in California.

CEMSIS and NEMSIS

Currently, the California EMS Information System (CEMSIS) is based on the version 2.2 application from the National Emergency Medical Services Information System (NEMSIS) and collects EMS data from 20/33 (60%) Local Emergency Medical Service Agencies (LEMSA), representing only about one-third of EMS transports of patients who activate the 911 system. As of 2015, approximately 70% of EMS providers document patient encounters in an electronic health record (ePCR), which is necessary for competent data.

The current EMS system is being replaced by NEMSIS version 3.4.4 which is expected to improve the available data for EMS. NEMSIS Version 3 will yield better information on patient care since it is compatible with Health Level 7 (HL7) and based on International Classification of Disease (ICD) 10. EMS data reported through a NEMSIS 3.X compliant system will be the only data accepted as of January 1, 2017, but is

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already the standard for EMS data nationwide and the tool for data and quality evaluation by EMS providers and the Centers for Medicare and Medicaid Services (CMS).

Other data sources and initiatives

Several other sources of data are currently or soon will be integrated with the pre-hospital data.

- Currently, 73 of the 78 designated Trauma Centers report data either to the LEMSA or directly to EMSA. Trauma center registrars record patient care information on pre-defined trauma patients from the time of the hospital admission to discharge.
- On behalf of local EMS agencies, EMSA will collect and aggregate data on cardiac resuscitation (CARES) within CEMSIS; much of the data is found within the EMS record.
- EMSA is partnering with CDPH on a grant from CDC to create a statewide stroke registry, which will link hospital and outcome data with the EMS data. The data will be housed with CEMSIS data and linked to prehospital data for use in performance improvement initiatives.

Performance improvement measures

In an effort to meet performance improvement goals, EMSA requests EMS Core Measures (quality measures of specific system and clinical indicators of care) reported annually from local EMS agencies on 17 clinical measures. While these are the only statewide patient care data available, they are reported as aggregate data, reflect only a small portion of the available data, and reflect non-standardized data sets in each LEMSA.

As an indication of the importance of using data for performance improvement, a national initiative is underway to develop EMS performance measures using NEMSIS 3 data (COMPASS initiative).

IMPETUS FOR CHANGE

Recent Legislation requiring EMS data collection and coordination

Several bills pertaining to EMS data were signed into law in 2015 that presume or require a leadership role by EMSA to establish data standards consistent with the statutory role to coordinate and integrate all state activities concerning emergency medical services as part of the two tiered regulatory structure.

AB 1129 (Burke) Emergency medical services: data and information system.
(Chaptered-9/30/2015)

This bill requires an emergency medical care provider, when collecting and submitting data to a local EMS agency, to use an electronic health record system that exports data in a format that is compliant with the most current version of CEMSIS and NEMSIS. The EMS provider must use an electronic health record system that can be integrated with the local EMS agency's data system.

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This bill will assure the collection of electronic data at the provider level and transfer it to the local EMS agency. It will require EMSA to provide consistent definitions for NEMSIS compliance and establish standards for data collection to ensure reasonable data quality and the ability to aggregate the data at the local level. This will facilitate transmission to state and national EMS information systems and the use of data at these levels.

AB 503 (Rodriguez) Emergency medical services. (Chaptered-9/30/2015)

This bill authorizes a health facility to release patient-identifiable medical information to a defined EMS provider, a local EMS agency, and the authority for quality assessment and improvement purposes. Hospital outcome data is an essential component for quality improvement, and this bill is intended to relieve one barrier to reporting outcomes to EMS agencies, which was lack of explicit permission in the California privacy act. The bill also authorizes the Authority to develop minimum standards for the implementation of this data collection.

AB 1223 (O'Donnell) Emergency medical services: ambulance transportation. (Chaptered-9/30/2015)

This bill authorizes a local EMS agency to adopt policies and procedures relating to ambulance patient offload time. The bill requires the authority to develop a statewide standard methodology for the calculation and reporting by a local EMS agency of ambulance patient offload time, although reporting by LEMSAs is voluntary.

SB 19 (Wolk) Physician Orders for Life Sustaining Treatment (POLST) information: electronic registry pilot. (Chapted-10/5/2015)

The bill requires the Emergency Medical Services Authority to establish a pilot project to operate an electronic registry system for the purpose of collecting and making available POLST information received from a physician or physician's designee. This project is dependent on use of electronic patient records by EMS personnel (as required in AB 1129), and transition to a NEMSIS 3 platform, to link those records to electronic medical records within health systems to send, receive, find, and use POLST information.

Health Information Exchange (HIE)

In addition to patient care data collection and aggregation, EMSA is engaged in increasing the use and value of data through the electronic movement of health information and data exchange. EMSA has received a grant from the Office of the National Coordinator to pilot HIE through two-way exchange of data between hospitals and EMS providers in the field. EMSA will also design a system to widely share patient data during a disaster between EMS personnel, other field care providers, and hospitals (Patient Unified Lookup System for Emergencies + EMS). The ePOLST registry and community paramedicine both require quality electronic data from EMS providers to exchange with other parts of the health care system.

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Additional factors driving data development

- Increased emphasis on data and performance measures at the national level, including development of performance measure to justify ambulance transport reimbursement;
- Interest from the Office of Traffic Safety and the Statewide Highway Safety Program to increase funding to advance California data collection and to create linkages with EMS data programs;
- Potential for one-time Federal grant funding for local assistance grants to implement NEMSIS 3 standards and NEMSIS reporting;
- Strong request from local EMS agencies for greater EMSA leadership in standardizing data requirements to improve data quality;
- EMSA's desire to increase our capability and capacity to meet our statutory requirements to evaluate EMS system effectiveness.

Barriers and Challenges

Despite the requirements for data, significant challenges must be addressed. These are noted, but not elaborated here.

➤ *Data Submission*

At the present time, many of the most populous LEMSAs do not provide data to the state for various reasons. Some provide only aggregate data and not patient level data that are needed for any analysis. Hospitals do not universally consent to share data, allegedly out of inappropriate privacy or legal concerns that either HIPAA or the California Medical Information Act prohibits data sharing. (AB 503 was written to alleviate that concern.)

Some providers are still using paper records, and many fire agencies use a program that is primarily for fire data and secondarily for EMS (RMS software), so is not capable of submitting data in a compatible format. But, AB 1129 now requires providers to transition to NEMSIS compliant electronic patient care reports. Until regulations are in place to define CEMSIS and NEMSIS standards, there will be a lack of compliant systems and vendors.

➤ *Funding*

There are no current State General Funds allocated specifically to prehospital EMS or trauma data collection and evaluation. EMSA relies solely on year-to-year federal funding that is insufficient to address the needs in this overall data strategy. Year-to-year funding discourages EMSA from implementing a long term strategy for prehospital and trauma data.

➤ *Capability and Capacity to Evaluate Data and Information*

EMSA is currently caught in a difficult situation where the local EMS agencies do not see value from EMSA and are hesitant to submit data, because they do not know what EMSA will do with it. We have developed a boilerplate data use agreement that is available for LEMSAs who require or desire it; to date, none have used it. In

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order to demonstrate the value of data collection, it is critical that meaningful analytic results are returned to the local EMS agency and EMS providers. But poor data quality submitted to CEMESIS limit results of analyses. To the extent possible, any analytic results should be readily available, timely, easy to access, and pre-packaged for rapid consumption. The use of dashboards and other information tools would facilitate this and would demonstrate value from the data. This would allow them to benchmark their activities in reference to other California agencies. Currently, EMSA does only basic analysis of trauma data (our best clinical data) and develops and publishes a report on the EMS Core Measures based on the aggregate results provided by the local EMS agencies. EMSA is using available funding to improve analytic capability. Both analytic capability and data quality need to be addressed simultaneously to be successful.

➤ *Long Term EMSA Data and Information Technology Strategy*

Currently, the mechanism in place to allow for the aggregation of local data is through the Inland Counties EMS Agency (ICEMA). This is funded as a local pilot project using Office of Traffic Safety funding. Because it is structured as a local data collection effort, EMSA must address the potential implications of pre-hospital EMS and trauma evaluation in the near future and decide our strategy to sustain data collection. Any ongoing State solution related to EMS data will require a review by California Office of Technology. The entire 4-stage process of IT development requires significant sustained resources.

GOALS AND RECOMMENDATIONS

EMSA has made data development a priority over the past 5 years. Concurrent efforts are required to meet statutory mandates, satisfy stakeholders, and position EMSA to meet its mandate to evaluate quality of care and system effectiveness. EMSA recently formed the Executive Data Advisory Group consisting of three local EMS agency administrators and an equal number of medical directors to help determine a cooperative strategy for improving EMS data and its application. This group informed and supports these recommendations.

Overarching Goals and Value Proposition

There are real benefits to improving the completeness and quality of data collected for pre-hospital, trauma and specialty emergency care when used for analysis of patient care and system performance. These benefits are consistent with the Triple Aim of improving patient satisfaction, improving population health, and lowering the cost of health care.

1. Improved data collection is critical to California's ability to provide meaningful data describing patient care outcomes and EMS systems.
2. Improved data collection is central to achieving the need of both LEMSAs and EMSA to assess the status and quality of their EMS system and the care that it provides.
3. State-level individual patient/run data are necessary to benchmark and compare values from local agencies and providers and to evaluate the need for additional

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emergency medical services, coordination of emergency medical services, and the effectiveness of emergency medical services.

4. Quality improvement processes will help to achieve better clinical care for patients and improved population health.
5. Improved data collection and integration with HIEs will link EMS more fully to the full healthcare service spectrum.
6. Sharing critical patient information between EMS personnel in the field and the hospital through health information exchange (HIE) will allow better and more accurate care and transport to appropriate destinations with improved patient outcomes.
7. Standardization of data collection and definitions will ensure reasonable data quality.

Additional benefits include:

- Better service by EMSA to Local EMS agencies through data analysis and return of information to LEMSAs and EMS providers for comparison purposes, including the potential of a dashboard with real-time information;
- Creating a favorable infrastructure to implement Health Information Exchange (HIE) to link EMS more fully to the full healthcare service spectrum. In turn, this would improve transitions of care with hospitals, obtain patient outcomes for quality improvement, and evaluate system effectiveness.
- Improvement of existing electronic patient care reporting processes at the LEMSA and EMS provider level;
- Efficiencies to program operations at the EMS provider level through analysis of system data;
- The ability to describe and analyze the EMS systems across the state;
- A regional view of EMS systems and better coordination between local areas in support of improved patient care;
- Inclusion of all California data to NEMSIS so that we can evaluate California within the national context

RECOMMENDATIONS

1. Continue to rely on the Executive Data Advisory Group as a key source of consultation and expert advice, and as liaisons with EMSAAC and EMDAC.
2. Implement the other provision of AB 1129 that requires NEMSIS 3 compliant systems for all EMS providers².
 - a. Note: The preference of the data group was to use a single ePCR for for all EMS providers and for aggregation and analysis of data. However, AB 1129 expressly prohibited LEMSAs from mandating a particular ePCR for all providers.

² See EMSA Memo dated January 5, 2016, Subject: "New State EMS Data System Requirements". "AB 1129, effective January 1, 2016.

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3. Continue to implement NEMSIS 3 and Health Information Exchange at the local level, including EMSA guidance to ensure CEMSIS and NEMSIS standards are maintained;
 - a. Improve data consistency with NEMSIS 3 implementation through limiting data choice in several key fields, including primary and secondary impression, cause of injury, location type. Vendors will be required to implement these recommendations that will be drafted and approved by medical directors and the data advisory group.
 - b. Per AB1129, all EMS providers must use an ePCR that is NEMSIS 3.4 compliant, a standard that is achieved only through testing by NEMSIS and cannot be achieved through data mapping from NEMSIS 2.X programs;
 - c. LEMSAs must use a data platform that is also NEMSIS 3 compliant in order to aggregate and subsequently transmit data to CEMSIS
 - d. LEMSAs should consider linking Computer Automated Dispatch (CAD) systems for populating NEMSIS 3 compliant dispatch and call taking data into ePCR platforms. CAD input is accommodated by NEMSIS 3.X using digital push into ePCR.
4. Work toward our federal challenge goal of receiving 100% of data from 100% of EMS providers in California.
5. Link EMS records to electronic medical records within health systems to obtain patient outcome data.
6. Improve data quality through modification to selected values of certain data elements within NEMSIS 3, such as Primary Impression and Cause of Injury.
7. EMSA will work with federal partners to maximize funds in order to support data submission and aggregation through implementation of AB 1129 and NEMSIS 3. Funds obtained will be used primarily for local assistance.
8. Regulations: There are multiple issues that require further definition through regulations. This will be done through a stakeholder task force to revise existing quality improvement regulations.
 - a. Recently chaptered legislation (AB 503 and AB 1129) obligate EMSA to define CEMSIS and NEMSIS standards to assure statewide consistency. These regulations will address methods to improve quality and narrow variation in systems through clarification of data standards.
 - b. Develop statewide consistency for technical data specification to define and limit data elements and subsequent values for each element. (For example, standardize appropriate choices for Primary Provider Impression).
 - c. Implement NEMSIS 3.4
 - d. The Executive Data Advisory Group recommends a regulatory mandate for submission of all patient level data to CEMSIS; however, the approach endorsed will be to develop support for the current statutory mandates and utilize other incentives, including funding, if available.

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9. Develop analytic capability and capacity within EMSA and expand the Annual Statewide and local agency reports, including efforts to develop regional data.
10. Address concerns over data security, confidentiality, and sharing, including through data use agreements. (These were developed, reviewed by OHII legal counsel and are currently available.)
11. Performance improvement: In addition to improving consistency and completeness of data to use for quality improvement at the local and state level, continue EMS Core Measure reporting to provide state level measures. As national measures become available, these specifications can be incorporated into the state reporting.
12. Examine a long term EMS Data strategy, considering the policy options listed above.

CONCLUSION

EMSA and LEMSAs have an unprecedented opportunity to collaboratively improve the quality and completeness of EMS data. This is driven by both long-standing and recent statutory mandates, funding opportunities, federal data changes and expectations, and health system changes that require consistent data to measure system effectiveness and clinical quality of care at all levels of our EMS system. Moreover, we now have an opportunity to better integrate specialty care data and link to electronic health records to facilitate outcome data. EMSA, EMSAAC and EMDAC are working together to determine the best strategy and use of available resources to accomplish these goals. Development of a cohesive statewide EMS data collection and meaningful use strategy is urgently needed in order to successfully meet the increasing demand for EMS services and to position EMS in California to optimize opportunities within the healthcare system.