Pre-Hospital Emergency Medical Services

Quality Management Approach

Mendocino, Napa, & Sonoma Counties

Revised June 30, 2009

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The Healthcare Quality Challenge

In 2006, the Institute of Medicine report – *EMS at the Crossroads* – described the state of EMS performance monitoring and accountability in the following firm language: "Accountability has failed to take hold in EMS systems because responsibility is dispersed across many different components of the system; thus it is difficult for policy makers to determine when a system breakdown occurs, much less where it is located or how it can be adequately addressed" (IOM, 2006). The committee advocated for three steps in its recommendation:

1) Develop performance indicators,

2) Measure system performance, and

3) Publicly disseminate performance information.

In 1996, the *EMS Agenda for the Future* indicated in the Information Systems section, "that the lack of organized information systems that produce data which are valid, reliable, and accurate is a significant barrier to coordinating EMS system evaluation, including outcomes analysis" (NHTSA, 1996).

With the paucity of data available in EMS at the national and local level, it's difficult to assess the potential challenges facing quality of care in the EMS setting. Looking at what is known in the in-hospital environment may be the most reasonable benchmark.

In 2000, the Institute of Medicine released a report titled -*To Err Is Human: Building a Safer Health System (IOM, 2000)* – which focused on the need to improve patient safety in the health care system through the reduction of medical errors. The report cited studies estimating that of the 33.6 million annual admissions, 44,000 patients die each year from medical errors. This puts medical errors as the 8th leading cause of death and a greater killer than motor vehicle accidents (43,458 deaths), breast cancer (42,297 deaths), or AIDS (16,516). The subset of medication errors (7,000 deaths) is a bigger killer than on-the-job deaths (6,000) and preventable drug events cost $2 billion annually nationwide.

The quality of care provided in and out of the hospital is in need of improvement. All indications from within the EMS industry point to nation-wide inadequacy in measuring and improving performance and, if in-hospital estimates are comparable to the ambulance, it's reasonable to assume that EMS is putting patients at risk and there continues to be a failure to act.

The Quality Improvement Plan described in the pages to follow is how Coastal Valleys EMS is making a coordinated effort to act. It transparently reflects that many of the challenges seen nation-wide are present in our own community and that the journey ahead of us is still a steep climb if we wish to reach our goal of providing care that achieves measureable results. It is, however, our plan and a road map for striving to meet the recommendations of those that have studied improving the quality of care in EMS.

Who We Are

Coastal Valleys EMS Agency

The Coastal Valleys EMS Agency (CVEMSA) is a multi-county regional entity designated as the Local Emergency Medical Services Agency (LEMSA) for Sonoma, Napa, and Mendocino Counties. The EMS Agency provides the administrative and regulatory oversight responsibilities for the local EMS systems within each of these counties.

The primary function of the EMS Agency is to plan, implement, and evaluate the local EMS system and the various components contained within it. This includes:

- Licensing/permitting of ambulance provider companies and hospitals,
- Coordination and monitoring of air and ground ambulances,
- Certification/accreditation of pre-hospital care personnel,
- Policy development and implementation,
- Medical control,
- Quality improvement, and
- Disaster medical response preparedness.

CVEMSA Staff

The EMS Agency is staffed by Nine (9) full-time positions with specific focus areas to meet the mission of coordinating system-wide EMS oversight and quality management. The following is a description of each role and associated responsibilities:

- *Regional EMS Manager* - responsible for the overall leadership and management of the Agency.

- *EMS Medical Director* – an emergency physician contracted by the CVEMSA to provide system-wide medical oversight including off-line medical control and clinical consultation.

- *EMS Coordinators* – staff responsible for the operational components of the County portion of the EMS system. Coordinator focus areas include: Maintaining relationships with the local EMS stakeholders and providing a local point of contact for system participants, oversight and review of the ambulance providers, coordination of inter-agency communication within the county EMS provider community, special projects, region wide disaster medical preparedness and communications-dispatch oversight.

- *The Advanced Life Support (ALS) Coordinator* - responsible for the Quality Improvement (QI)/data system, training, AED program, medical control oversight, certification functions within the system and special projects.

- *Trauma Coordinator* - oversees the Level II trauma center in Sonoma County and manages the development of the regional trauma system, which also includes a

Level III trauma center in Napa County as well as working on the QI team as the primary contact for hospital stakeholders.

- *Agency Clerical staff* - provides support services for each regional office including certification processing. Certification services for field personnel are centralized in the Sonoma office.

EMS Stakeholders

CVEMSA provides oversight for dozens of fire departments, ambulance providers, and hospitals that serve citizens and visitors to the tri-county area. The following table shows the distribution of stakeholders in the Coastal Valleys System.

	Mendocino County	Napa County	Sonoma County	Costal Valleys EMS Agency
Fire Departments (Paid, Volunteer, Combination)	24	3	9	**36**
Ambulance	8	4*	11	**23**
Hospitals	3	2	7	**12**

<u>Note</u>: One fire service provider that provides primary care and contracts for transportation with another ALS Provider.

The Quality Improvement Charge

The goal of improving the quality of the service provided to patients and customers who may encounter the EMS system is a noble one. But, how does a system ensure it is focused on the right areas and making the changes that will result in improving care and service and reducing the patient risk? Turning the goal into actionable focus areas can pose a paralyzing challenge to many EMS systems.

In 2001, the Institute of Medicine released a report aimed at guiding healthcare to improve the quality and safety of healthcare. *Crossing the Quality Chasm: A New Health System for the 21st Century* (IOM, 2001) included six quality aims for improvement. These six aims have been modified for EMS and are:

- *Safe* – That an EMS system should avoid injuries to patients from the care that is intended to help them.
- *Effective* – The right care should be provided to all who could benefit and that care should be based on evidence that it will have a clinical benefit. Inversely, EMS should refrain from providing services to those not likely to benefit.
- *Patient-centered* - Care should be provided in a manner that is respectful of and responsive to individual patient preferences, needs, and values and ensure that patient values guide all clinical decisions.
- *Timely* – The EMS system should reduce delays in access and clinical intervention for both those who receive and those who give care.
- *Efficient* – Waste should be incongruent with quality and it should be avoided, including waste of equipment, supplies, ideas, and energy.
- *Equitable* – Everyone has a right to quality care and providing care should not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status.

CVEMSA and its stakeholders recognize that these six aims are not only applicable to the in-hospital environment, but should guide pre-hospital improvement efforts. Every process and practice should be held up to these six aims to ensure that they are aligned with, not just one, but all of the focus areas that can ensure quality care and service.

The Guiding Framework

In the State of California, the California Council for Excellence is the entity charged with assessing and awarding the state's highest benchmark for organizations achieving systemic process improvement. The assessment criteria are modeled after the Malcolm Baldrige National Quality Award. Only two EMS systems – Tulsa/Oklahoma City, OK (2002) and Pinellas County, FL (2009) – have ever been awarded their state quality award and no EMS agency has ever been recognized with the national award.

The Baldrige criteria are the framework advocated by the National Highway Traffic Safety Administration (1997) in the *Leadership Guide to Quality Improvement in Emergency Medical Services Systems*. While specific in scope, the criteria are focused broadly enough to be applicable to diverse industries including healthcare. CVEMSA's QIP applies the criteria as a framework for assessing and planning for systemic quality improvement in the Coastal Valley EMS systems.

The following are the seven (7) criteria:

Leadership – EMS systems require leadership in two forms: 1) Senior leadership and 2) governance and social responsibility. Senior leadership involves administrators in lead roles, including the CVEMSA regional EMS manager, physician medical director, fire chiefs, EMS provider agency managers, and hospital administrators who help guide and direct day-to-day activities and put into action plans for the future. Ethical, objective, and transparent governance with a focus on the communities served support senior leaders and provide the context and boundaries of the system's aim.

Strategic Planning – Communities and the EMS systems that serve them are not static. Patient populations and their needs change, funding sources shift, workforce considerations alter, and the standard of care evolves. EMS systems that fail to be proactive and strategically plan for the future are left to respond to the market changes and the result may not be ideal or progress may be slow.

Customer Focus – EMS serves customers. Unfortunately, the norm for the industry is to assume that EMS system leaders and frontline caregivers know what customers need and want and how they perceive the quality of the care and service provided. Very few actually ask the communities and patients they serve for their input or opinion. Customer focus involves designing and managing processes from the patient's perspective and continually engaging the customers through focus groups and targeted and random surveys. The perspective and voice of the customer is central to quality service. Reacting only when a customer calls to complain is not customer focused.

Measurement, Analysis, and Knowledge – Effective measurement provides a clear picture of demand and whether core processes are in control and have reasonable common cause variability. In addition, measurement should enable the ability to

know when the results of a process have changed for the positive or the negative. In addition, data must be measured over time. Useful data enables real-time monitoring of the system, predictions for the future, and the ability to observe process improvement results.

Workforce Focus – The workforce is essential to providing quality service and great customer care. Recent reports including the Institute of Medicine (2005) *EMS at the Crossroads* and the *EMS Workforce for the 21st Century: National EMS Workforce Assessment* conducted by Center for Health Professions at the University of California San Francisco for the National Highway Traffic Safety Administration (2008) however portray that the EMS industry does not adequately focus on and manage workforce issues. Safety risk, attrition, training, and engagement are all persistent problems. Continuity of the quality of service requires a committed, engaged, and stable workforce. Monitoring attrition rates, regularly soliciting input from caregivers, and creating career challenge are required to maintain a quality workforce.

Process Management – Every activity is a process. From the call taking of incoming 9-1-1 calls, the dispatch of an ambulance, the assessment and treatment of a stroke patient, to the transfer of care at a hospital. Production of quality service requires thoughtful planning and management of core processes, using real-time data to monitor performance, and continually testing improvement changes to enhance maintain or enhance performance. Effective management involves collaboratively mapping processes and establishing procedures with those closest to the process and then developing and monitoring data to assure it is performing optimally. If an opportunity exists for improvement, small tests of change are implemented and the process is refined as appropriate.

Results – The Institute of Medicine (2005) report describes the difficulty EMS systems have in showing the value and result of our efforts. National definitions and benchmarks are not established, data capture is not uniform, and the data that is tracked is often limited (e.g., sudden cardiac arrest). EMS systems however need to be focused on the results of our efforts. Measuring and achieving desired results support the value of advanced level pre-hospital care and help the EMS system recognize if system operations and frontline care is producing the outcomes that are desired and expected. Results orientation should not be a slogan. It requires developing a scorecard of guiding operational and clinical measures, tracking data in a format that enables analysis (e.g., run chart), and EMS leaders looking at the data with a focus on inquiry and improvement versus justification.

Our Approach

Looking Back, Looking Around, and Looking Forward

Quality management in EMS is frequently termed "quality improvement" but traditionally it is focused on inspection for individual protocol compliance, internal review of individual complaints or issues, and attention is placed on individual caregivers and not systems in process. When data is tracked, it is limited, and often captures information like skill success.

To effectively address specific events, monitor current performance, and actually improve the quality of future performance requires a three-pronged approach to quality management: 1) quality assurance, 2) key performance measurement, and 3) process improvement. The following describes these three foci and how CVEMSA aspires to develop total quality management across the system.

Quality Assurance – Targeted and Event Focus

The commonly performed quality activity in the EMS system is quality assurance. Quality assurance occurs in two forms:

Targeted – Reviewing a sampling of patient care reporting related to a specific call type, time, period, or provider. Targeted reviews can be in used as part of employee performance evaluations, as supporting data for educational sessions, and as an opportunity to study the specifics of a specific call type (e.g., STEMI).

Event Focused – Reviews of an individual call may be the result of an internal request or an external customer service event. Upon receipt of an inquiry, each individual organization has the responsibility to review and respond to the inquiry in a timely manner. The following is a description of the framework of review expected of all entities in the CVEMSA jurisdiction.

- Accessibility – Each entity is required to have a published number for a customer to access a representative 24-hours a day either directly or through a paging system. The representative should be able to call the customer within one hour to receive the inquiry.
- Review – Every inquiry will be reviewed by the responsible entity. Review includes inspection of the computer aided dispatch record and the patient care report and speaking with the attending providers. It is strongly encouraged that the customer/patient be interviewed in person.
- Reporting – Each inquiry will be documented by the entity in a centralized, electronic tracking tool. Themes should be captured in a report monthly, quarterly, and annually.
- Timeliness – Reviewing event inquires is important and the majority of events will be reviewed and completed in 5-10 business days.

Inquiries received by CVEMSA will be referred to the entity in question for review and the results of the review will be reported back upon completion.

Key Performance Indicator Tracking & Monitoring

Measuring and tracking activity and performance in an EMS system is critically important. Universal measures and industry standards do not exist. Also, processes may be slightly different, making benchmarking a challenge. CVEMS is conscious of the challenges, but also expects that all entities are tracking data related to their service areas and activity.

The State of California defines three levels of data under the CEMSIS Data Standards: level I, II, and III. Data set standards are aligned with those of the National EMS Information System data set (NEMSIS). The goal is to be level III compliant, but there is recognition that this requires electronic patient care reporting to achieve.

CVEMSA entities vary in their capacity and technology to collect data. Many providers continue to use hardcopy, paper patient care reports that require administrative input of data and others have evolved to electronic formats. There are multiple vendor platforms in use in the system and it is not possible to request or mandate a single solution that would be cost effective and appropriate for all of the provider entities. All entities are level 1 compliant.

CVEMS currently requests data from all entities in the system on a quarterly base. The following is the existing data set of measures.

2009 Key Performance Data Set
Total ambulance response vehicles
Total patients transported
Total patients not transported (AMA/RAS, treated and released dry runs)
Total patient care reports generated
Total trauma patients
Total trauma patients meeting trauma triage criteria
Total cardiac patients
Total medical patients
Total pediatric patients
Total number of CQI cases
Total number of advanced airways attempted
Total number of advanced airways successful
Total number of KING AIRWAYS
Total number of field 12 lead EKG's performed
Total number of filed diagnosed STEMI
Total number of patients transported to a STEMI Receiving Center
Total number of patients treated for pain
Total number of patients receiving greater than 15mg MS
Total number of patients who received greater than 2 mg of Versed
Total number of patients treated with sedation
Total number of patients treated with ZOFRAN
Total number of patients treated with CPAP
Total number of patients receiving intraosseous infusion
Total number of patients who received needle cricothyrotomy or thoracostomy
Total number of patients who received external cardiac pacing
Total number of patients who received cardioversion
Total number of Disaster/MCI Responses (response with 5 or more victims)

The existing data set is limited in that it is only captured four times per year, it is reported in a simple spreadsheet, and it tells the quantity of activities, but it does not provide information on the quality of those activities. In addition, it may not provide information across the spectrum of the majority of the patient population.

The goal for enhancing performance measurement in 2010-2011 is to transition the measures to a defined and more balanced scorecard. This will involve several steps.

1. Using 9-1-1 medical priority dispatch data or patient care reporting data, the system will identify how calls types are distributed. This enables identification of categories of measures that help understand performance for the majority of the patient population (e.g., cardiac, respiratory, trauma).
2. Adopt measures from the identified categories from the EMS Performance Measure Project coordinated by the National Association of State EMS Officials (NASEMSO) and in partnership with the National Association of EMS Physicians (NAEMSP). These measures are well defined, using a consensus-based model, and act as a benchmark for industry standard benchmarking.

Measurement Examples

Cardiac
   Sudden cardiac arrest survival (%)[Utstein]
   Chest pain patients pain free at ED arrival (%)
   9-1-1 to ED total call time less than x Min (%)
Respiratory
   Respiratory emergency patients not intubated (%)
   Respiratory emergency patients with return of O2 saturation to normal ranges (%)
   Respiratory emergency patients with successful airway management (5)
Trauma
   9-1-1 to trauma center arrival less than x min (%)
   Fractures patients pain free at ED arrival (%)
   Other Call Types
Targeted Measures on a Rolling Basis

3. Future data should be tracked monthly and be reported in a run chart to enable system leaders to interpret if the measure is in control, if variation exists, and be able to note that system changes have resulted in the desired improvement. See figure below.
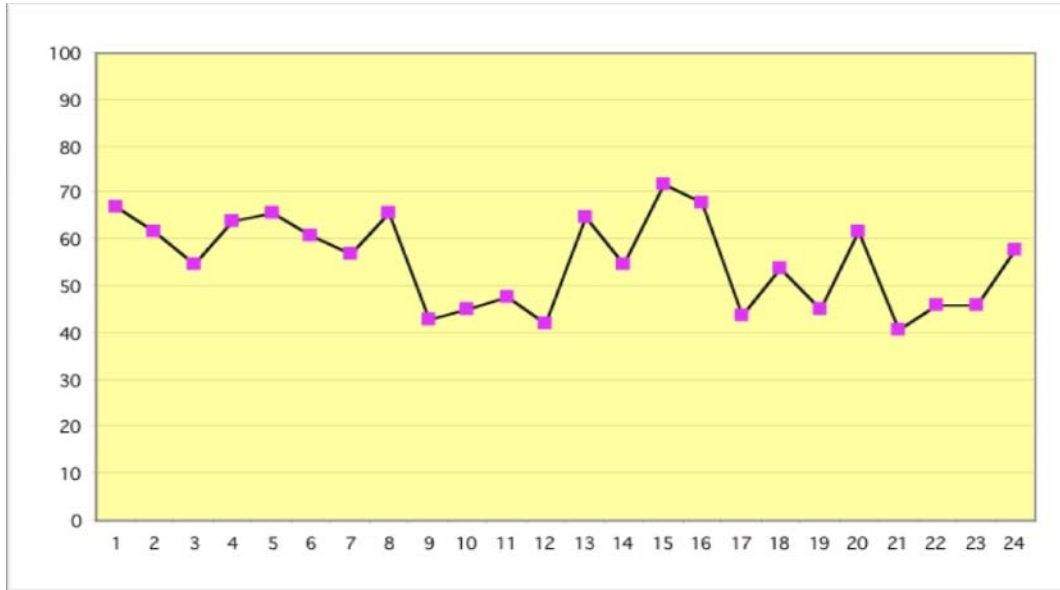
Figure: Run Chart Example

The data provided by system providers and collated by CVEMSA will be reported back to the system. Quarterly, provider organizations will meet with CVEMSA as a system quality council to review the data in detail and discuss opportunities to test improvements. Between face-to-face meetings, the participants will meet monthly via a conference/web meeting. Opportunities for improvement testing will be delegated to focused teams who will work on projects using the Model For Improvement to identify and test changes and then spread the changes to the system (see Process Improvement).

Process Improvement

Successful change and improvement requires thoughtful planning and methodical approaches that are inclusive to stakeholders, involve action and learning, and where the resulting improvements and skills have the opportunity to spread beyond the inaugural project. The following describes the process for improvement projects.

Forming the Team – Developing the right team is essential. Team membership should be diverse and represent stakeholders connected to the process to be improved.

Setting Aims – What are we trying to accomplish? Aims should identify the population to be affected, be measureable, and time specific.

Establishing Measures – How will we know a change is an improvement? Quantitative measures are used to determine if a change results in an actual improvement.

Selecting Changes – What changes can we make that will result in improvement? Teams propose changes believed to result in the desired improvements.

Testing Changes – Using an action learning method, teams use Plan-Do-Study-Act (PDSA) cycles to test the changes and learn as they act.

Implementation of Changes – Following small scale testing and refinement resulting from team learning, the changes may be implemented on a larger scale (e.g., an entire region).

Spreading Changes – Post successful implementation, changes may be spread to other areas of the organization or network.

This process for improvement relies on your local experts methodically testing changes, studying results, modifying changes as appropriate based on data, and identifying process improvements. It is a simple and effective method for teams to make substantive changes that improve processes and enhance care.
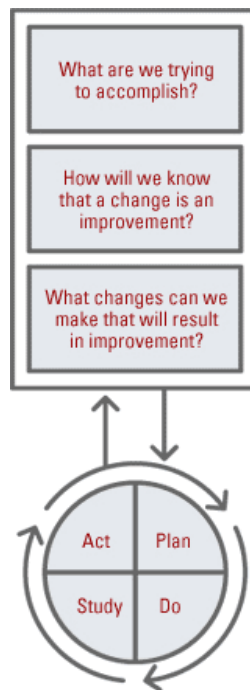

Figure – Model for Improvement

Next Actions

The Quality Management plan described in the preceding pages reflects activities in progress and projects and activities to come in 2009/2010. The following are six (6) next actions steps for CVEMSA and its stakeholders and descriptions of each.

1. EMS System Inclusion in QIP Planning
2. Creating Awareness of Principles and Assessing Competencies
3. Identifying and Supporting Key Sponsors and Champions
4. Developing County and Regional Quality Groups
5. Quality Management Policy and Procedures
6. Regional Data System

The following is a brief description of each of the six next actions.

EMS System Inclusion in QIP Planning

The QIP plan is a framework for quality management in the region. It is based on national standards from within the EMS environment and the greater healthcare arena. The plan specifically focuses on frameworks, guidelines, and objectives to achieve the intended aim, but is designed to enable independent entities and stakeholders the flexibility to create their own processes to achieve the aims.

At a regional level, the plan will require stakeholders to be participants in the implementation and continued activities. System stakeholders will be invited to participate and support the process by sharing input, attending meetings, and supporting and enabling activities in their organizations and communities. The results of the effort will be the direct product of the stakeholders who participate and take ownership in the regional QIP development.

Creating Awareness of Principles and Assessing Competencies

The framework and outcomes described in the QIP may be new to many of the stakeholders or be similar to current activities that may need to be aligned. The implementation of the plan - region-wide - will require time and planning.

The first step in the process involves introducing stakeholder organizations to the plan, the aims, and outcomes. CVEMSA will schedule and conduct live or web based meetings to introduce the plan to stakeholders. An electronic copy will also be distributed. Questions and comments will be encouraged and a "frequent asked questions" (FAQ) document will be drafted and distributed to support stakeholders in understanding the QIP. Individual entities will be supported and requested to use the QIP as individual entities develop their own QIPs.

Enabling stakeholder discussion and input is essential to the QIP plans success and the ability of independent entities to collaborate as a system to manage and deliver quality pre-hospital clinical care and transportation.

In addition to providing information and answering questions, CVEMSA must provide experiential learning to build process improvement skills among leadership stakeholders and their management staff. Development sessions may be held in-person or online and will focus on a case-based, pragmatic learning model to help introduce the core concepts and build the essential skills. The development process will enable gauging current awareness of quality management and provide an opportunity for CVEMSA to identify and work with organizations that may benefit from additional advising.

Identifying and Supporting Key Sponsors and Champions

Quality management in EMS fails in two core areas: a lack of champions or sponsors and responsibility delegated to a low tier quality coordinator. Identifying respected and capable sponsors is critical to inaugural efforts to develop measures and implement process improvement. CVEMSA and EMS leaders within the system must identify key people and organizations to be the beta sites for implementation and testing of the QIP plan's core framework. From the lessons learned and successes, these sponsors can help CVEMSA and the system see the value of the efforts and spread the methods and results across the system.

Developing County and Regional Quality Groups

Much of the day-to-day quality assurance and process improvement activities will be conducted and lead at the local level by individual service providers. As a system, representatives of each provider will also have the opportunity to participate with colleagues at both the county and regional level. The following is a description of the three levels of quality management participation in the region.

> *Individual Provider Organization* – Leaders of fire departments, ambulance services, and hospitals will conduct event and targeted quality assurance and test process improvements within their organizations. This may be an independent initiative or part of a collaborative of other entities in the county or region.

> *County Quality Group* – Representatives of provider organizations will meet with colleagues from each organization within the county to discuss countywide data, develop improvement projects, and collaborate with regional initiatives.

> *Regional Quality Group* – Delegates from the three County Quality Groups will meet at the regional level. Regional data will be discussed and system-wide process improvement initiatives will be developed and facilitated.

Currently, the three layers just described are not formally in place in the region. Several quality related working groups exist throughout the region and have been working independently to influence quality in their local community or county. CVEMSA will work with existing groups and additional stakeholders to coordinate establishing and supporting the development of each layer with the aim of initial activities occurring within three to six months.

Quality Management Policy and Procedures

This Quality Plan acts as the foundation for the development of regional policies and procedures related to quality assurance and process improvement activities. CVEMSA will work with stakeholder organizations through the Regional Quality Group to develop formal policies for all provider organizations by the end of 2009. Policies and procedures will continue to focus on frameworks and outcomes to support autonomous management activities that achieve the desired results, but do not proscribe the method. Any policies and procedures will be distributed to all stakeholders for review and comment before a final draft is implemented. Final policies and procedures will be publicly accessible on the CVEMSA website.

Regional Data System

Earlier in the plan, the recommended EMS data sets for the State of California and Nationally were discussed. All entities in the system strive to be level III compliant and some with more advanced data capturing are at levels II and I. Collecting meaningful data is a formidable challenge. Defining data elements, capturing the data, and reporting it back are just a few the core obstacles. In addition, data should not just be captured to have it, but to be used.

CVEMSA will invite a workgroup of system stakeholders to review existing data elements and recommend a core set of data to be captured by each organization and compiled by CVEMSA regionally. A key consideration of any data element is to understand why it is needed and what it will be used for so that all collected data has a purpose.

In addition, CVEMSA has engaged an emergency services industry consulting firm to assess the current data capturing capabilities of the regional providers and make recommendations for future actions. A summary report will provide the assessment and recommendations. The focus will be on solutions that do not limit any one provider and are accessible by all.

Next Action Summary

The list of next actions just described represents a great deal of work and progress for the CVEMSA's efforts to develop system-wide quality management that meets state expectations and strives to improve service to our customers. Additional actions will be identified as the activities are pursued and implemented. CVEMSA will work diligently with stakeholders to set clear goals, support efforts, communicate timelines, and encourage participation to achieve this aim.

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