CONTRA COSTA
HEALTH SERVICES

Contra Costa Health Services
Emergency Medical Services

Executive Report

EMS Quality Improvement Program (EQIP)
Annual Report
January – December
2007

Contra Costa County Emergency Medical Services
Quality Improvement Report Jan 2007-Dec 2007

Advisory Body
Contra Costa County Quality Improvement Committee

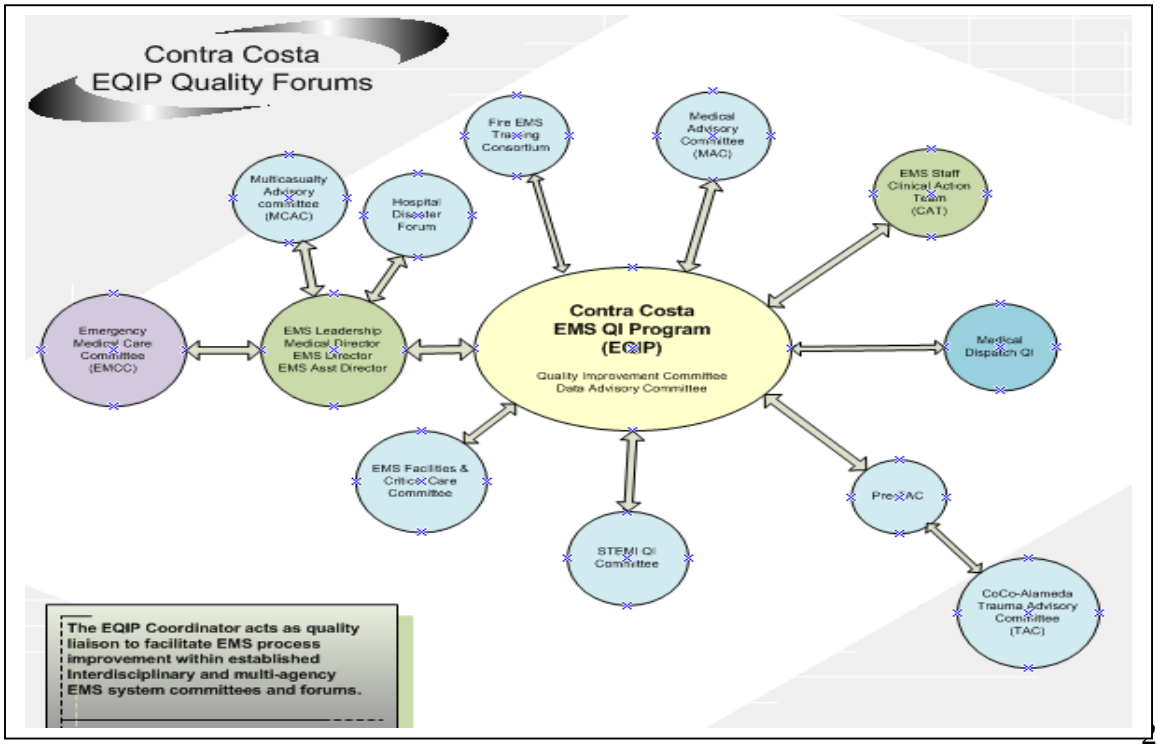
Mission
Contra Costa EMS Quality Improvement's mission is to ensure that quality emergency medical services are available for all people in Contra Costa County and that the medical care is consistent with best practices and evidence based medicine.

Membership
Participation includes EMS Medical Director, QI Coordinator and EMS Staff assigned to clinical programs and representatives of BLS provider and first responder programs, Fire Districts with ALS and BLS programs: Medical Dispatch centers; Private ALS provider and Base Hospital and Trauma Center, Receiving Hospitals and Air Ambulance Providers. Currently Hospital, Private ALS and Dispatch QI participation is facilitated by appropriate EMS Staff who acts as QI liaison.

Medical Director Oversight: Joe Barger MD, EMS Medical Director

Chair: Patricia Frost PNP, EMS QI Coordinator

EMS Clinical Program Coordinators: Pam Dodson RN, Public Safety, Dispatch, Fire First Responder Programs, Judy Smith RN, Trauma Coordinator, Bruce Kenagy, EMT-P, Contract Compliance and Data Management



Contra Costa County Emergency Medical Services
Quality Improvement Report Jan 2007-Dec 2007
Executive Summary

Accomplishments

- After an initial assessment of the Local EMS System QI resources and processes, goals and objectives were established to build a comprehensive Quality Improvement Program for Contra Costa County over the next 2-3 years.
- Six out of the eight 2007 QI Program goals were met with the remaining 2 goals substantially met.
- QI stakeholder participation increased from 3 agencies to 10 during 2007.
- Contra Costa County QI Plan revised and complete as of December 2007.
- Monthly QI meetings and activities re-established with active stakeholder participation
- Facility and Medical Advisory Committees QI partnership established June 2007
- Regular EMS system QI biannual reporting established July 2007
- Core Data Indicator report building in progress
- Data advisory subcommittee established to facilitate and support EMS system data management.
- Best Practice Patient Safety Reporting program (EMS Event Reporting) built and implementation begun
- Fire EMS Training Consortium Quality Partnership in effect facilitating Best Practice curriculum development incorporating field simulation training resources (METI man and pediatric ECS).
- Electronic Newsletter EMS Best Practices 6 issues published.
- Patient Safety Reporting system being utilized to determine and address root causes.
- Participation in State EMS-C pediatric indicator validation study May 2007
- EPCR data being utilized to support decision making on protocol and treatment guideline update and revision.
- Charcoal administration removed from county protocols based on patient safety and poor clinical efficacy for field administration July 2007.
- EPCR data being utilized to evaluate effectiveness of EMS field treatment and identify training issues.
- First Fire EMS Training Consortium Field provider needs assessment conducted Many 2007 and data used for curriculum planning.
- Paramedic patient safety reporting and field practice survey conducted and report compiled Dec 2007.
- EMS Virtual Advisor program established to improve input from EMS field personnel.
- 22 EMS QI data related QI studies conducted as of December 2007 assessing skills, patient satisfaction, medication utilization, treatment protocol compliance and patient safety.

2007 EMS Provider Agency Stakeholder QI Participation

Agency	QI Plan	QI Representative	QI Meeting Attendance
Contra Costa EMS	**Y**	**Y**	**10**
AMR	**Y-OP**	**Y**	**10**
MOFPD	**OP-IP**	**Y**	**7**
SRVFPD	**OP-IP**	**Y**	**7**
CCCFPD	**Y-OP**	**Y**	**6**
El Cerrito Fire	**IP-OP**	**Y-ES**	**8**
Pinole Fire	**IP-OP**	**Y-ES**	**7**
Rodeo-Hercules Fire	**IP-OP**	**Y-ES**	**8**
East Contra Costa Fire	**IP-OP**	**Y**	**5**
Richmond Fire	**?**	**N-ES**	**4**
Crockett Fire	**?**	**N-ES**	**4**
CALSTAR	**Y-OP**	**Y**	**1**
REACH	**Y-OP**	**Y**	**1**
JMMC Base & Trauma	**Y-IP**	**Y**	**6**
Contra Costa Fire Dispatch	**Y-EMD**	**?**	**0**
Richmond Dispatch	**Y-EMD**	**?**	**0**
SRVF Dispatch	**Y-EMD**	**?**	**0**
Dispatch to be incorporated into QI program in 2008			

Legend:
Y = Yes
N = No
OP = Own plan
IP = In Progress
? = Unknown
EMD = Emergency Medical Dispatch QI Participant
ES = EMS staff assigned to facilitate QI participation

Long Term Objective (2-3 year implementation effective Jan 2007): Develop and implement a comprehensive Quality Improvement Program for Contra Costa County Emergency Medical Services.

2007 Quality Improvement Goals- A Productive year of Accomplishments: Based on an assessment of EMS system resources and processes conducted between Dec 2006 to Feb 2007, eight EMS QI goals were identified for 2007. Six of the eight goals were accomplished with the two remaining having been substantially met.

2007 EQIP Goal	Progress as of December 2007	Outcome
Update QI policies and programs assuring compliance with EMSA regulations and guidelines.	▪ EQIP Policy and Procedures approved and Agency QI Program Plan ready to be submitted to the State. ▪ In Jan 2007 only 1 agency was in compliance with Title 22 requirement for a written QI plan. 8 agencies have submitted drafts or completed QI plans with another 3 agencies with plans in progress. ▪ Ongoing process in place.	 Goal substantially met.
Develop providers, agencies and hospitals as Quality partners in the LEMSA QI program	▪ QI meetings previously not held since May 2005. Monthly QI meetings held since Feb 2007. ▪ QI committee stakeholder participation increased from 3 to 10 agencies from Feb 2007 to Dec 2007. ▪ 18/20 stakeholder QI Site Assessment visits completed as of 1/9/08. CCCFPD, Kaiser Antioch and REACH visits pending. ▪ Formal QI liaison relationship and biannual QI reports established through Facilities and Critical Care Committee and MAC as of 9/2007. ▪ Expanded QI meeting format to facilitate stakeholder QI coordinator development and EMS system QI.	 Goal Met
Create appropriate tracking mechanisms to capture agency QI activities	▪ Database QI activity tracking mechanism and project management tool developed for agencies as of 7/17/07. Implemented 12/2007. ▪ Stakeholders oriented and data tools distributed 12/2007.	 Goal Met
Re-design current system of unusual occurrence reporting and data management.	▪ EMS Patient Safety reporting system not captured from 2/15/05 thru 12/28/06 re-established 12/28/06. 40 events captured with 60% associated with communication related issues. See addendum for detailed report. ▪ Best Practice Patient Safety Program redesign Stakeholders oriented and all EMS providers trained for implementation 12/2007. ▪ EMS Event Reporting QI database designed and distributed for implementation 12/07.	 Goal Met
Explore technology solutions to improve processes and efficiencies within the county EMS QI program.	▪ Zoll consultant hired and identifying infrastructure support issues and facilitating problem resolution. ▪ Data Advisory Committee formed and meeting monthly with Zoll and MEDS active stakeholder participation as of 11/2007 ▪ Tracking systems for policy and procedure development and approval implemented July 2007 ▪ Clinical Action Team (Internal EMS) work group established and meeting regularly to improve internal EMS efficiencies. ▪ Core indicator development ongoing. Ongoing processes to support in place	 Goal Met

Improve opportunities for direct pre-hospital provider feedback on QI issues through electronic newsletters and e-communications	▪ 6 issues EMS Best Practices Electronic Bi-monthly newsletter established with provider focus as of 2/2007 establishing mechanism to communicate system QI issues to providers and give feedback in timely fashion on patient safety and clinical performance. ▪ Distribution expanded to ED Nursing and Medical Staff and Fire Chiefs ▪ EMS Virtual Advisors concept developed 11/2007. 19 advisors recruited goal out of a goal of 50. ▪ Ongoing processes to support in place	 Goal Met
Create a collaborative environment to share tools, resources and strategies to improve patient care outcomes with quality partners and stakeholders.	▪ Using QI Committee and other venues such as the Fire-EMS Training consortium to communicate and share skills, information and tools collaboratively. ▪ Fire-EMS Consortium has cooperatively developed and implemented standardized best practice education and training programs on COPD, Pediatric Airway, MCI, 2007 EMS Update and Jan 2008 Advances in Effective Airway Management. ▪ Highly productive collaborative model working with excellent results. ▪ Fire-EMS Consortium now self directed as of 6/2007. Ongoing processes to support in place	 Goal Met
Establish key indicator reports for patient care and patient safety.	▪ Zoll implementation has been challenging, indicator reports unable to be developed. Technical, software, interface and training issues affecting ability to proceed. Limited reporting began in December 2007 with Data Advisory and Zoll Fire EMS consultant. ▪ Code cracked to match First responder and Transport records thru First Watch ▪ Quality indicators were identified in 3/2007 and plans established for core report development in Business Objects and eventually Zoll. 5 out of 15 indicator reports completed or 9 in development effective 12/07. ▪ Cardiac Arrest Registry to Enhance Survival (CARES) CDC program participation exploration in progress. Ongoing processes to support in place	 Goal partially met

Quality Improvement EMS System Recommendations

Continued support and resources need to be facilitated by the EMS Agency in the following areas:

1. Explore technology solutions and continue solution-focused support to achieve full ZOLL ePCR implementation.
2. Support utilization of clinical and communication best practices models to improve efficiencies in the EMS system.
3. Support data analysis and core indicator development compliant with CEMSIS..
4. Incorporate clear realistic QI expectations during contract review process.
5. Encourage provider agency leadership to support FTE for QI and Training activities to assure effective & competent workforce.
6. Promote a culture of safety for patients and providers throughout the EMS system
7. Engage agency leadership in supporting EMS QI as an important risk management strategy.
8. Explore regional solutions for specialty populations & limited resources such as Trauma, Pediatrics, Burns and Air Transport.
9. Explore partnerships with county and regional injury and risk prevention efforts ie: Senior Falls, Stroke, Heart Safe Community, CPR Anytime, Public Access Defibrillation, Disaster preparedness, Violence, Domestic, Elder and Child Abuse.

2008 EMS Quality Improvement Goals

Overall Goal (beginning 2nd year of 3 year plan) : Establish a comprehensive county-wide quality improvement program focused on best practices and improved patient outcome.

Priorities	Criteria
Compliance with Title 22 requirement for QI Plans	All agencies have plans in place and system to review and update
Patient Safety Goal: Improve Field Handoff Communication	Standards and training developed in Field handoff communication
Fully Implement EMS Event Reporting and QI Activity Tracking	Quarterly reporting implemented and operational
Comprehensive QI stakeholder participation	Dispatch Integration into EMS QI Program Air Transport and Facility Participation
Facilitate County wide QI data Integration	Data Warehouse Exploration. ZOLL implementation support CEMSIS- recently approved. CARES- Cardiac Arrest Registry to Enhance Survival. Zoll and MEDS data set updates. Improvements in ePCR completion and delivery
EMS Patient Care Improvement Opportunities	Improved pain assessment and protocol compliance. Behavioral Emergencies and Restraint standards and training developed. STEMI program implementation. Improved End Tidal CO2 monitoring
EMS Education and Training Opportunities	Standard building: Documentation, ETT confirmation and handoff, Best Practice Handoff (SBAR) with Fire EMS Consortium Collaboration
EMS-Children Plan update	Hospital surveys completed and plan updated
Improve patient safety and EMS quality information exchange	Biannual reporting on patient care and EMS system topics Explore technology solutions to improve QI communication with field providers and stakeholders.

Table A: EMS QI Program Core Indicator Report Development "Our EMS System Vital Signs" Progress as of January 2008 NS = Not started IP = In-progress C = Complete NA = Not applicable			
Indicator Name	**ZOLL Crystal Reports (CR)**	**MEDS Business Objects (BO)**	**Comments**
Utsteins Report	NS	IP	Data base built. Data entry started. No reports defined. CARES implementation being considered.
Cardiac Arrest	NS	IP	Reports defined. Map of report process required. CARES implementation being considered.
Pediatric Report	NS	IP	Reports defined. Map of report process required.
Documentation	IP	C/IP	Reports being generated on related issues with final report elements in development. MEDS EPCR printing compliance report complete
Trauma and Trauma Triage Destination Report	C	C	*Uses trauma registry in tandem with BO. No CR component at present.
Patient Safety and EMS Event Reporting	C	C	Non-ePCR system data collection program.
Airway Management	NS	IP	Preliminary parameters defined.
Chest Pain/STEMI	NS	IP	Reports defined. Map of report process required.
Pain Evaluation and Treatment	NS	IP	Reports defined. Map of report process required.
Shortness of Breath Report	NS	IP	Preliminary parameters defined.
Destination Decision Report	NS	IP	Preliminary parameters defined.
AMA/Patient refusal Report	NS	NS	Preliminary parameters defined.
General Activity Report (dispatch related)	C	C	Non-ePCR system data collection program. Medical Priority Dispatch System (MPDS) used.
Customer Satisfaction	Some IP Others NS	C	Agency-based survey system Non ePCR system data collection program.
Infrequent Skills	NS	C	Improved report developed breaks out patient ages.

Addendums

Contra Costa County EMS 2007 State EMSA Summary
Contra Costa County Paramedic EMS Patient Safety Survey Summary
Patient Satisfaction
Pediatric Studies
Infrequent Skills
Trauma Advance Airway
Pain Assessment and Management
Field Medication Utilization: Furosemide (Lasix)
Field Medication Utilization: Dopamine
EMS Event (Patient Safety) Reporting
Prehospital Patient Care Records at Receiving Facilities
2007 Fire EMS Training Consortium Needs Assessment: Summary of Findings
Acknowledgements

CCCEMS 2007 State EMSA Summary

QI Issue Indicators Monitored	Date identified	Key Findings/priority Issues Identified	Improvement Action Plan	Outcome/Followup
ePCR ED/hospital delivery	Jan 2007	Timely delivery of completed ePCR to ED/hospital. Zoll Fax server problems identified Compliance issues identified with. Implementation of new Zoll ePCR system. Hospitals vary in ePCR intake creating barriers to effective delivery and not value first responder ePCR. Fire work practices creating barriers to ePCR completion. Long term solution would be to PUSH ePCR into electronic hospital record system.	AMR completion compliance reports in place and being monitored. Zoll ePCR completion reports developed 12/07. Developing Core indicator report in Data Advisory Group. Zoll Fax server issues being addressed with Zoll consultant. QI liaison to Facilities meeting addressing EMS/Hospital delivery issues. Monitoring and feedback to agencies involved to improve delivery. Continued need to monitor and address.. Reports submitted quarterly to QI for AMR and monthly updates thru data advisory regarding Zoll. Compliance and Servers monitored. Ongoing education and training of providers.	AMR MEDS printing improved from 62% to 85% for an average increase of 17% with implementation of training and infrastructure improvements. Continuing to expand use of printer fax option. Upgrade of MEDS fax servers pending. New printers place in facilities in Sept 2007. Corrective action and education to employees based on audits ongoing Routers replaced Oct 2007. Zoll completion rates 36-86% with improved statistics in agencies with strong QI involvement. Ongoing complex problem-solving required
Prehospital-ED Handoff Communication	July 2007	Incomplete communication at handoff resulting in lack of adequate information to ED providers. Impacts pt care in hospital. Best Practice communication models available. Plan to establish standards in development	QI Committee reviewed TeamSTEPPS communication curriculum to adapt to EMS system Fall 2007. Content applicable but must be effectively adapted for EMS.	Field medic survey to be conducted in 2008 Hand off communication models to be adapted to EMS in 2008

Prehospital-ED Pre-arrival Communication	June 2007	Incomplete communication prior to arrival resulting in lack of readiness to receive pt in ED. Impacts in pt care in hospital. Best Practice communication models available. Plan to establish standards in development	QI Committee reviewed TeamSTEPPS communication curriculum to adapt to EMS system Fall 2007. Content applicable but must be effectively adapted for EMS. Communication topics to be featured in EMS Best Practice newsletter. Determine root causes and identify effective strategies to address issues.	Survey of hospitals and field to be conducted in 2008 to determine root causes. Field Audit and Base Call review to be re-established in 2008
Prehospital-ED Base Contact Communication	April 2007	Ineffective communication during base contact for destination or trauma triage contributing to less optimal destination and trauma decisions. Impacts pt care in hospital. Best Practice communication models available. Plan to establish standards in development	QI Committee reviewed TeamSTEPPS communication curriculum to adapt to EMS system Fall 2007. Content applicable but must be effectively adapted for EMS. Communication topics to be featured in EMS Best Practice newsletter. Determine root causes and identify effective strategies to address issues.	QI to assess MICN training program
Destination Decision Making	June 2007	Ineffective communication during base contact for destination or trauma triage contributing to less optimal destination and trauma decisions. Impacts in pt care in hospital. Best Practice communication models available.	Determine root causes and identify effective strategies to address issues. QI and EMS to establish standards in development, review policies and training to improve care.	Field Care Audit and Base Call review to be re-established in 2008.
Patient Safety Reporting	Jan 2007	Unclear EMS patient safety reporting processes. Numerous factors impacting effective reporting processes. Redesign in progress. All stakeholders will have opportunity to participate while facilitating system wide monitoring.	Policy and process re-designed and new patient safety reporting data management system. All providers and agencies trained on new system Fall 2007.	QI data management roll out with agencies to be fully implemented by 2008. Quarterly reporting and blinded aggregate data analysis planned.
Prehospital-ED Relations	May 2007	Ineffective communication between providers affecting relations between ED and prehospital. Goal to promote culture shift from one of blame to one of team oriented process improvement	Efforts to improve communication through site visits, best practices Determine root causes and identify effective strategies to address issues. EMS provider communication training needs to be developed.	Communication survey to medics in 2008 and Field Audit and Base Call review planned. Ongoing issue. Improved communication and processes required.

Increased Prehospital-ED off-load times	Jan 2007	Numerous factors impacting increased off load times. ED's working with internal hospital QI to improve offload issues. Consensus that No diversion policy is appropriate. Need to create mechanism to monitor off load times.	Increased EMS and Facility feedback mechanisms required to effectively address. Hospital ED working to determine root causes and identify effective strategies to address issues. Significant patient flow improvements have occurred due to elimination of destination per hospital ED directors.	Regular monitoring of off load times is needed and Core Indicator report to be developed thru data advisory committee. Will be ongoing issue.
Zoll ePCR Implementation	Jan 2007	Complex implementation of new ePCR for Fire providers affected by multiple internal and external resource, education, IT interface issues. Consultant identified to assist in problem resolution. Multiple user, IT and receiving facility issues.	Fire EMS consultant hired to determine root causes and identify effective strategies to address issues in November 2007. Data advisory committee developed to support consultant and prioritize problem solving.	Consultant in place and actively pursing improvements in collaboration with QI data advisory subcommittee.
Adult Airway Mangement	July 2007	Intubation success 33-80% in adults. Rescue airway Combitube found to be less effective than desired but overall success with rescue airway 100% in appropriate patients. Best practice supports emphasis on BLS airway.	Changed to King airway to improve patient safety and medic success. New update including King competency training. New Airway module to improve intubation success based on Levitan best practice approach developed in Dec 2007. CPAP adopted for improved management of patients with respiratory distress.	Levitan training. CPAP, King tube implementation in progress. Will continue to monitor effectiveness with quarterly infrequent skills and airway management case reports.
Pain Assessment and Control	Quarter I 2007	Are we managing pain effectively in our patients. 100% compliance pain would be assessed and managed with NTG or MS. Poor compliance with assessment of pain in all patient populations. Pain only documented in 4% of pedi pains and 7% of chest pain patients requiring MS for control	Pain assessed 50% of time with adult chest pain patients and 91% of patients assessed with having pain had improvement after treatment with O2, NTG or MS. Assessment and management of pain with patients under chest pain treatment protocol. Other primary impressions associated with pain demonstrated 16-40% compliance with pain assessement. Pain protocol for pediatrics developed and implemented July 2007.	Pain assessment and treatment prioritized for 2008 QI topic. Training and standards to be improved in this area. Core pain indicator report to be built and monitored.

Provider Agency QI Plan and QI activity tracking	Jan 2007	Only one agency compliant with QI Plan. Other agencies had not reviewed old plans in several years or did not have one in place. County plan not up to date.	EQIP plan updated completed Dec 2007 awaiting admin approval. Templates made available to agencies to facilitate completion. Tools shared for QI program implementation.	As of Dec 2007 all agencies have QI plan development in process or completed. Quarterly reporting beginning in March 2007
12 lead reliability	January 2007	Issues with 12 lead use in the field and problem solving in preparation for implementation of STEMI program. 12 lead did not increase scene time 49% <15 min and 76% <20min compared to scene time for all chest pain pts of 16min. 51% chest pain got 12 lead.	System in place for review of 12 lead and to give appropriate medic feedback with transport provider AMR. System issues addressed in EMS Best practices. Expectation that 100% of chest pain patients get 12 lead.	Directed feedback improved performance in the first half of the year. 12 lead reliability improved but requires ongoing monitoring. 2nd Quarter 2008 12 lead review planned prior to implementation of STEMI program in July 2008.
Helicopter activation	Nov 2007	High volume of helicopter activations with questionable benefit to patients.	Determine root causes and identify effective strategies to address issues.	Helicopter ad hoc task force to be developed. Input to refine policy and process.
Medication Safety: Charcoal	May 2007	Case review of Ingestion guideline and ALOC determined limited efficacy and patient safety administration issues.	Treatment guideline reviewed in context of current literature in consultation with California Poison control experts. Efficacy of charcoal very limited.	Case review indicated that 10% refused with 40% patients showed deterioration and 86% no change. Removed Charcoal from treatment guidelines effective 7/2007
Medication Safety: Carpujet Versed and MS labeling	June 2007	Manufacturer labeling on carpujects for Versed and MS very similar with reports of near miss medication errors in the field.	Alert to provider agencies to put controls in place using color coding implemented. Double check process for carpujets strongly recommended. Manufacturer notified.	Controls appear to be working with no other near miss or medication errors reported. Continue to monitor.
Patient Safety and reporting practices	July 2007	Current patient safety work practices and reporting practices are unknown in the county. Patient safety practices surveyed among medics county wide with anonymous survey to assess baseline patient safety practices and reporting habits	Plan to study data and address in training, policy development and reassess in 1 year after implementation of new reporting program for county to assess if there were changes. Need to re-educate identified.	14% did not use broselow or medication charts by self report. 30% failed to report a safety event. 30% would report if anonymous reporting an option. Plan to work on changing patient safety reporting culture.

Needle Cricothyrotomy	July 2007	Procedure rarely used in our county with poor efficacy. 3 times in last 4+ years from AMR data. Cost of training for procedure essentially not utilized unable to justify.	EMS reassessed need for high risk low frequency procedure in medic scope.	Removed from Local EMS Paramedic Scope 1/2008
Pediatric Airway Management	May 2007	Intubation 0-50 % success in peds. 23 ETT attempts for 16 patietns from Dec 2005 to May 2007 with 1.4 ETT attempts per patient. Cases reviews found evidence of patient deterioration due to ETT when BLS airway effective.	Literature review and best practice Pediatric airway management Fire-EMS training module developed and all providers trained in June 2007 emphasizing BLS airway and preparing for removal of pedi intubation from scope.	Plans to remove Pediatric intubation from County medic scope in July 2008
Infrequent Skills Assessment	Jan 2007	IV success 78-95% in adults and 62-90% in peds. Intubation 0-50 % success in peds and 33-80% in adults. Needle Thorascostomy 100% in adults. IO 100% in all age groups. EJ success was 66-68% success.	Reporting redesigned to capture success by age range in May 2007 to analyze competency by population. Ongoing training in progress and competency check off for infrequent skills may need revision.	New reporting model provides data helpful in addressing age differences in supporting provider competency. Will assess over next year how expanded use of EZIO impacts vascular access decision making in the field.
Trauma Advanced Airway	June 2007	Retrospective study from 7/1/05 to 6/30/07. Success rate of intubation in perfusing rhythm 33.3%. In pre-arrest 50%. In arrest 59.3% with overall success in 49.5% Outcomes showed those who required advanced airway 94.4% died due to their injuries while patients with perfusing rhythms who had failed advanced airway had a 50% survival rate. Overall trauma airway	Review of current practice. BLS emphasis required in training as that improves outcomes and advanced airway requirement indicator of poor outcome in trauma. Data shared at TAC and MAC. RSI key to success in conscious perfusing patients in terms of ETT success but does not improve outcome.	Continued emphasis on BLS airway management and rapid trauma transport. Review of protocols for air transport RSI resources in select populations.
Use of Dopamine in the field	Sept 2007	Retrospective review of dopamine use in the field from 1/1/05 to 9/15/07. Indications cardiac arrest 49% and non arrest hypotension 51%. Very small numbers 57 cases.	Minimal or no change in BP in 57% of cases. BP increased by > 10 mm systolic in 39% patients. Most common use in cardiogenic shock 46%.	Review appropriateness of dopamine use in the field when limited efficacy in 2008.

Pediatric Morphine Admistration	Aug 2007	Poor documentation and assessment statistic on pediatric pain from participation in State indicator validation study prompted retrospective review of pediatric MS administration. Jan 2005 to Aug 2007 167 patients out of 6400 pediatric transports in 32 months.	Only 2.6% received morphine. 65% 11-14 yrs, 30% 5-10 yrs and 1-4 yrs 5%. 86% for blunt injury 7% Burn, 2% Abdominal pain, 3% penetrating injury, 2% non traumatic body pain. MS makes up 45% of all pareneral medication use in pediatric patients.	Training and documentation compliance issues raised by study. Pediatric Pain Protocol established in Dec 2007 with plan to address standards and training in pain assessment and management in 2008.
Pediatric Parenteral Medication utilization	Aug 2007	Retrospective review of pediatric medication administration between Jan 2005 to Aug 2007 167 patients out of 6400 pediatric transports in 32 months.	For all ages MS used 45% of the time. Midazolam 22%, Epinephrine 11%, Diphenhydramine 9%. Adenosine 1%, tropine 2%,Dextrose 3%, Epi SQ 4%, Glucagon 1%, Nalozone 2% and Sodium Bicarbonate 0%. Training implications for medication utilization considered. Review of medication utilization when compared to adults identified.	Goal is to simplify medication decision making in the field to promote patient safety. Plan to look at D10 for treatment of hypoglycemia in pediatrics.

Contra Costa County Emergency Medical Services
Paramedic EMS Patient Safety Survey Summary

Background: Patient safety events are medication, treatment, equipment related, problems or mistakes, that lead to adverse patient care outcomes. According the National Institute of Medicine over 1 million patients are injured and 100,000 die annually as a result of patient safety events in our health care system.[1] Patient safety events in EMS are likely to be similar to other health care settings and have the same root causes.[2] Recent studies note that EMS providers reporting practices strongly influence the ability of local EMS systems to effectively reduce patient safety events. [3] Contra Costa County EMS system serves over 1,024,000 people. The county is a diverse mix of urban, suburban, rural, and industrial areas and is one of the fastest growing counties in California. In 2006 EMS responded to 72,849 calls transporting over 54,000 patients.

Materials and Methods: In September 2007 a voluntary anonymous patient safety survey was distributed to evaluate safety practices of Contra Costa County paramedics in the field. The 10 question survey was modeled after the 2006 San Diego County EMS survey of paramedic Self-Reported Medication Errors.[2]The survey was then modified to address key concerns in our county EMS system and was not limited to medication safety related events.

Results: 119 surveys were returned. It is unknown how many were distributed however the county has approximately 440 working paramedics in our system. Surveys were distributed by all provider agencies and included both Fire and Transport medics. Assuming all paramedics attended mandatory training the survey had a minimum return rate of 27%. A summary of the results follow and the complete report is available through the EMS QI Coordinator.

1. How long have you been a paramedic?		
	Response percent	
Less than 3 years	**12.4%**	
3-5 years	**28.3%**	
6-10 years	**19.5%**	
> 10 years	**39.8%**	
2. Are the following safeguards effective in preventing patient care mistakes?		
	Yes	**No**
The Broselow	**92.3% (108)**	**7.6% (9)**
Double-checking medications with a partner	**88% (103)**	**11.1% (13)**
Adult or pediatric drug charts requiring no calculation	**94% (110)**	**6%% (7)**

[1] Kohn LT, et. al., "To err is human: building a safer health care system. A report of the committee on Quality of Health Care in America, Institute of Medicine. Washington, DC: National Academy Press: 2000
[2] Vilke,GM, et.al., "Paramedic Self-Reported Medication Errors" Prehospital Emergency Care 2007:11:80-84
[3] Criss, E.A., "Research Review" JEMS, May, 2006:46

3. Do you routinely use the county EMS pediatric drug chart or Broselow tape to obtain drug dosages when treating a child?	
	Response percent
Yes	**85.5%**
No	**14.5%**

4. Does the layout of your drug/equipment bag ever cause patient safety problems?	
	Response percent
Yes	**13 %**
No	**86.9%**

5. Have you reported a patient safety event in the last 3 years involving:		
	Yes	**No**
Equipment	**3.4% (4)**	**96.6% (114)**
Medication	**3.4% (4)**	**96.6% (114)**

6. How many times, in the last 3 years have you been directly or indirectly involved in a patient safety event?	
	Response Total
	19

7. Have you ever given medication(s) prepared by another medic without checking it?	
	Response percent
Yes	**11.5%**
No	**88.5%**

8. Have you ever NOT reported a patient safety event?	
	Response percent
Yes	**30.6%**
No	**69.4%**

9.Would you report events more often if it could be done anonymously?	
	Response percent
Yes	**29.7%**
No	**70.3%**

10. What are your comments and concerns about patient safety reporting

	Comment Text
1.	stricker QI for medics. Many new medics have ethical issues and are not being held accountable. they are getting by and slipping throught the cracks. major concern and should be addressed at a county level. example falsifying pcrs, not performing appropirate level of care and lying to cover up.
2.	If I don't like whats going on with a pt. I speak at that time and make the change. I don't need to "rat" out a peer, I speak to their face post pt transfer
3.	anonymous reporting would not matter
4.	blue bag too heavy and stuffed.Alot of stuff not used on scene. Weight burdensome.Pt safety concerns with fire medics when new fire medic and seasoned medic disagree. Too much concern for fire to get ALS contact right away.
5.	stations should have washers and dryers and extra empty equipment bags. Intubation bags or jumpbags need to be washed. No way to do this.Smell like vomit.
6.	updated Broselows needed-some meds (versed) are not onew we carry. Double checking might e uselful on scene but can't be done during transports and EMT's on 1:1 ALS units donts know much about ALS meds
7.	should be anonymous. Pedi bags should be setup color coded to broselow tapes
8.	observed 3 other medic errors
9.	Being on an engine my exposure to complex prehospital care is limited
10.	It used to be unclear what needed to be reported

Survey Highlights

- Survey participation was reflective of the 2007 workforce demographics in our EMS system with 40.7% of less experienced medics (<6 years experience) and 59.3% of more experienced medics (>6 years experience) participating.

- Safeguards utilizing standardized drug charts for pediatric and adult patients, length based color-coded safety systems and cross checking practices were perceived to improve patient safety 88-94% of the time.

- Medics reported they did not consistently utilize the above resources in the high-risk low-frequency population of pediatrics 14.5% of the time.

- Medics reported that the layout of drugs and equipment raised safety concerns more often for themselves as EMS providers than their patients. 13% of medics reporting difficulties associated with the weight of the equipment.

- Paramedics surveyed reported that only 3.4% had reported a patient safety event in the last 3 years. This was the case for both medication and equipment.

- 30.6% of medics responded that they had **not reported** a patient safety event although earlier in the survey they reported patient safety events 3.4% in the last 3 years.

- 11.5% of Medics reported they had handed off a medication to another medic to administer without cross-checking.

- 29% of medics reported that anonymous patient safety reporting would affect whether they reported. Anonymous reporting systems are known to be effective as a mechanism to improve patient safety reporting in EMS systems.

EMS System Implications: Barriers continue to exist and need to be considered as we educate EMS providers regarding patient safety reporting responsibilities. Patient safety events that fail to be reported provide the EMS system no opportunity for quality improvement review and intervention and are missed opportunities to improve the system. Fear of reprisals and the stigma associated with reporting when others are involved is significant.

Quality improvement coordinators, supervisors and Fire-EMS leadership must continue to work together closely to build effective orientation and training programs; prompt, timely and meaningful feedback work practices; and effective remediation. Root cause analysis of common patient safety issues needs to be encouraged and effective controls put in place to improve overall EMS system performance in the area of patient safety.

Understanding EMS patient safety practices and reporting trends are essential to our efforts to promote a culture of safety within our local EMS system. Clear patient safety reporting programs are known to be essential to effective EMS patient safety management.[4] Contra Costa County has implemented a Best Practice Patient Safety Event reporting program known as EMS Event Reporting. This survey was conducted prior to implementation of this program. The intention is to repeat this survey in approximately one year to assess if the program has made any difference in the reporting practices of EMS providers.

[4] Criss, E.A., "Research Review" JEMS, May, 2006:46

Patient Satisfaction

AMR Contra Costa County

Customer Satisfaction Survey Results

January - May 2007

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I had the trust and confidence in the paramedic ambulance crew's professional skills.	419	168	15	4	11
The paramedic ambulance crew explained the care / treatment in a way you could understand.	362	185	41	8	14
The paramedic ambulance crew took steps to ensure comfort and minimize pain.	409	165	26	8	11
Overall, the service received from the paramedic ambulance company was excellent.	436	146	17	8	12
Total Percentage	**93%**		**4%**	**1%**	**2%**

Based on 2465 individual responses. Overall return rate of 5.2%

AMR Contra Costa County

Customer Satisfaction Survey Results

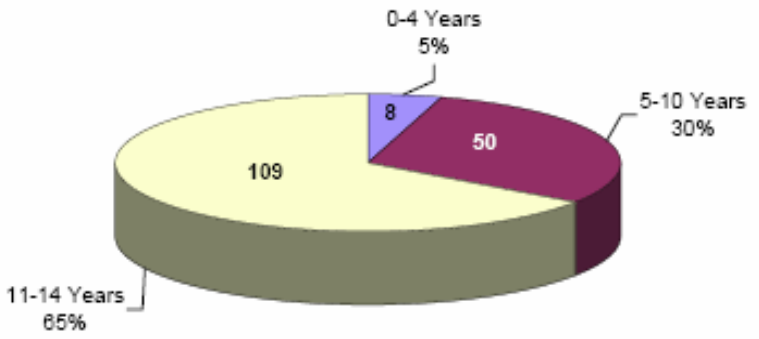
June - September 2007

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I had the trust and confidence in the paramedic ambulance crew's professional skills.	355	252	24	28	50
The paramedic ambulance crew explained the care / treatment in a way you could understand.	305	157	23	10	9
The paramedic ambulance crew took steps to ensure comfort and minimize pain.	354	119	16	6	7
Overall, the service received from the paramedic ambulance company was excellent.	367	108	12	9	9
Total Percentage	**91%**		**3%**	**2%**	**3%**

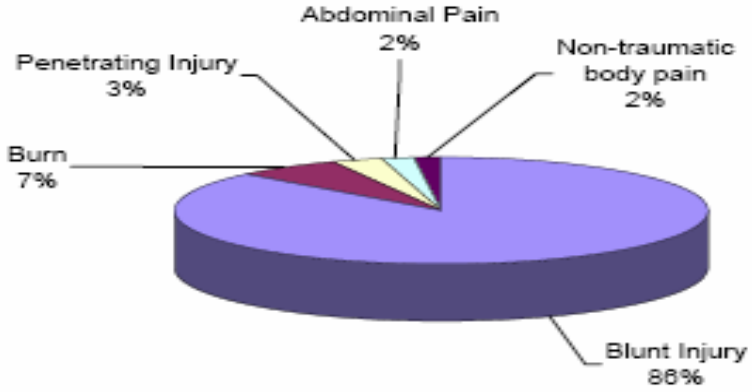
Based on 2220 individual responses. Overall return rate of 4.2%

Pediatric Studies

PEDIATRIC PATIENTS RECEIVING MORPHINE
By Age Group - January 2005 to August 2007



PEDIATRIC PATIENTS RECEIVING MORPHINE
Paramedic Impression - All Age Groups



PEDIATRIC PATIENTS - PARENTERAL MEDICATIONS

	<1 Yr		1-4 Yrs		5-10 Yrs		11-14 Yrs		All Ages	
Adenosine	0	0%	0	0%	1	1%	1	1%	2	1%
Atropine	3	8%	3	4%	1	1%	1	1%	8	2%
Dextrose	0	0%	2	2%	5	4%	3	2%	10	3%
Diphenhydramine	3	8%	15	18%	8	7%	9	6%	35	9%
Epinephrine IV/ETT	18	50%	17	21%	4	4%	2	1%	41	11%
Epinephrine SQ/IM	1	3%	4	5%	4	4%	6	4%	15	4%
Glucagon	0	0%	4	5%	1	1%	0	0%	5	1%
Midazolam	8	22%	31	38%	35	31%	7	5%	81	22%
Morphine	2	6%	6	7%	50	45%	109	76%	167	45%
Naloxone	0	0%	0	0%	3	3%	5	3%	8	2%
Sodium Bicarbonate	1	3%	0	0%	0	0%	0	0%	1	0%
TOTAL	36	100%	82	100%	112	100%	143	100%	373	100%

REASONS FOR PARENTERAL MEDS

	<1 Yr	1-4 Yrs	5-10 Yrs	11-14 Yrs
Allergic Reaction	11%	22%	10%	8%
ALOC	0%	0%	3%	3%
Cardiac Arrest	61%	24%	4%	2%
Dysrhythmia	0%	0%	1%	1%
Hypoglycemia	0%	7%	5%	2%
Pain	6%	7%	45%	77%
Respiratory	0%	1%	2%	2%
Seizure	22%	38%	31%	5%

Infrequent Skills

Key Performance Indicators Data 1/1/07 through 4/30/07				
	Successful	Unsuccessful	Total Patients	Successful %
Vascular Access	7,178	1,541	8,719	82.33%
Intubation	92	39	131	70.23%
Combitube	26	3	29	89.66%
Thoracostomy	5	0	4	100%
Jugular IV	25	16	41	65.79%
Intraosseous	4	0	4	100%
Pacing	8	2	10	80%
Cardioversion	3	0	3	100%

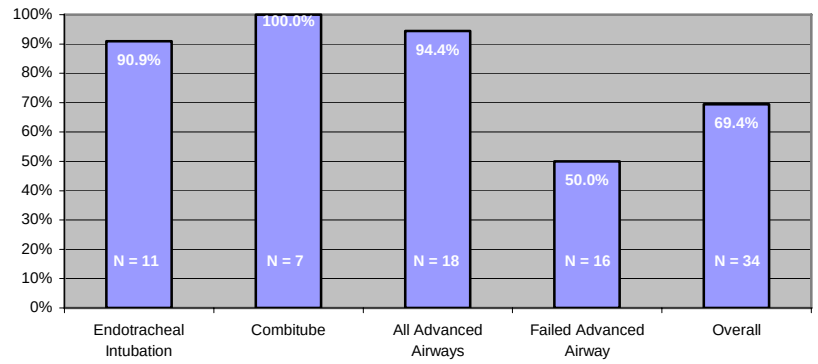
Infrequent Skills by Age Range 10/1/2007 12:00:00 AM And 12/31/2007 12:00:00 AM

Age	Success	< 3 Yrs.	3-14 Yrs.	15-17 Yrs.	18-24 Yrs.	25-44 Yrs.	45-64 Yrs.	65 Yrs.>
IV Apps	80.59%	77.78%	90.00%	89.93%	91.44%	83.01%	76.56%	80.05%
Patient Count	6,820	9	80	149	397	1,195	1,924	3,057
Intubation	65.22%	0.00%	50.00%		80.00%	37.50%	66.67%	69.57%
Patient Count	92	1	2	0	5	8	30	46
Combitube	85.71%					100.00%	100.00%	60.00%
Patient Count	14	0	0	0	0	8	7	5
Cricothyrotomy								
Patient Count	0	0	0	0	0	0	0	0
Needle Thor	100.00%				100.00%	100.00%	100.00%	
Patient Count	5	0	0	0	1	1	1	0
Jugular	68.18%					75.00%	66.67%	66.67%
Patient Count	22	0	0	0	0	4	12	6
Intraoseous	100.00%	100.00%	200.00%		100.00%	100.00%	100.00%	83.33%
Patient Count	14	1	1	0	1	2	2	6
King Tube								
Patient Count		Future Reporting Criteria						

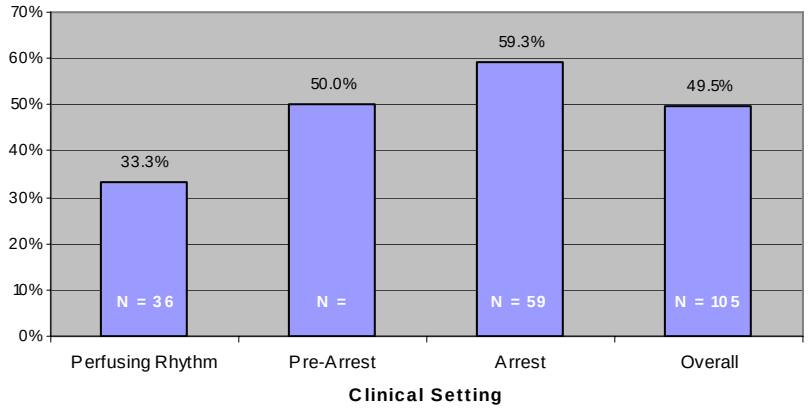
= No Data Present

Trauma Advanced Airway

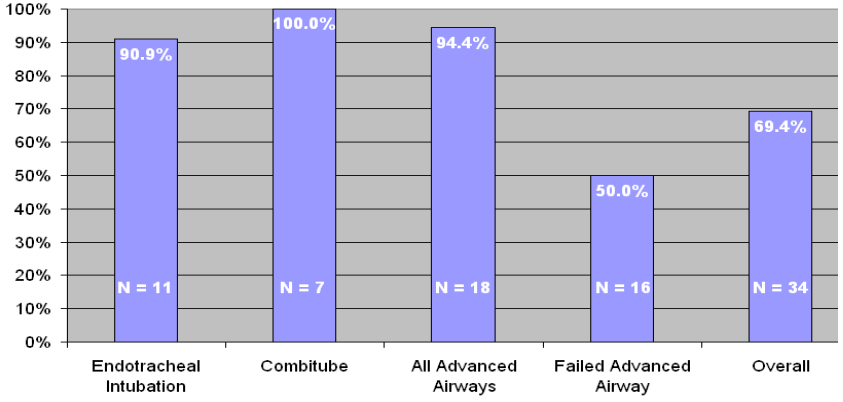
Mortality - Trauma Patients with Perfusing Rhythms
By Final Paramedic Airway Technique



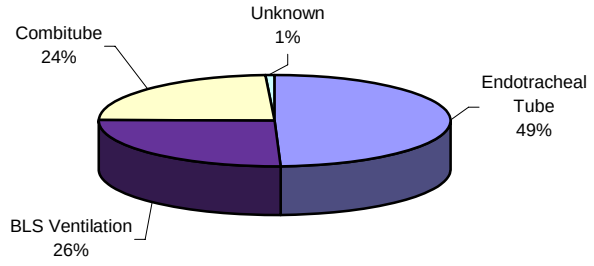
Endotracheal Intubation Success - Trauma Airways



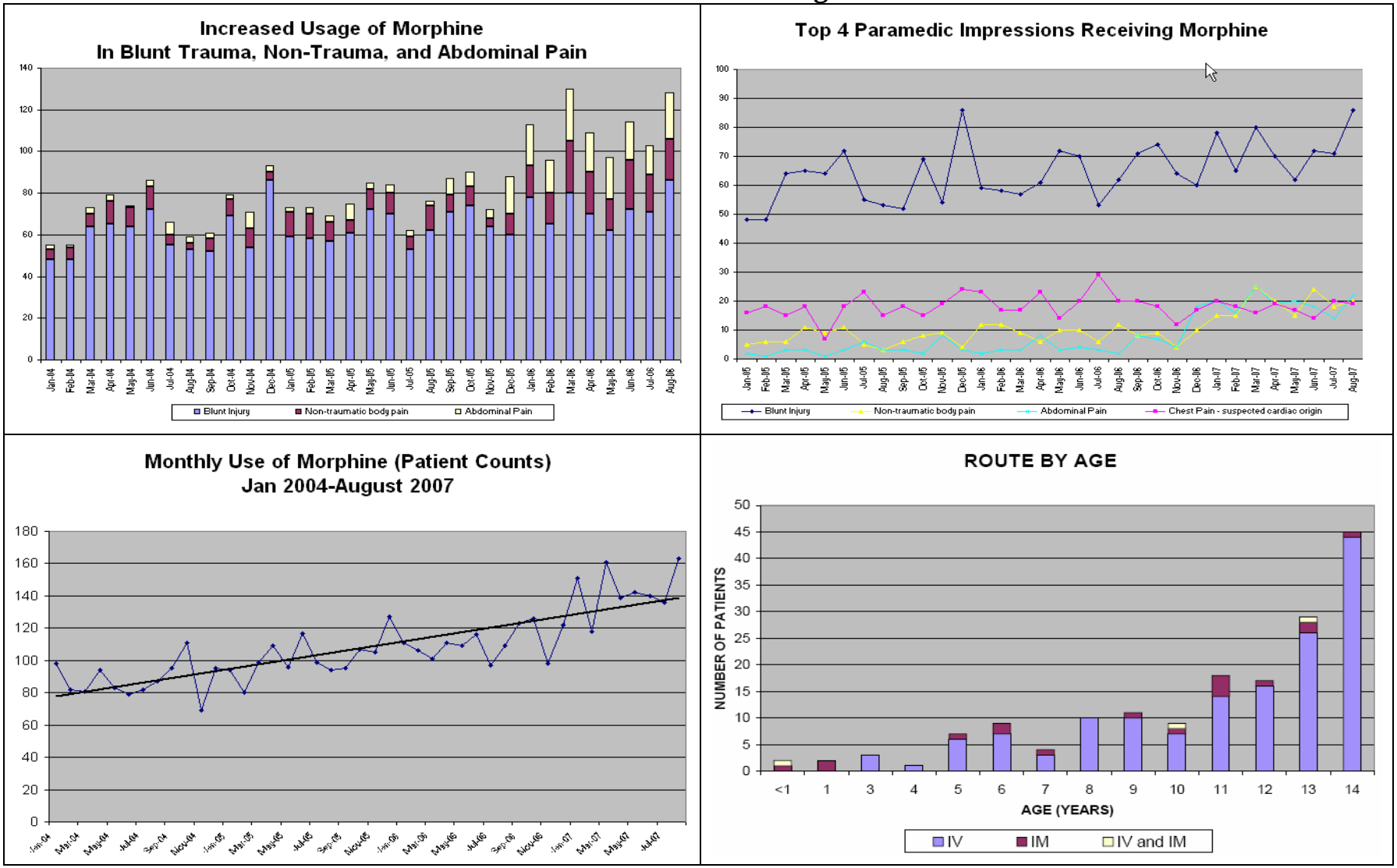
Mortality - Trauma Patients with Perfusing Rhythms
By Final Paramedic Airway Technique



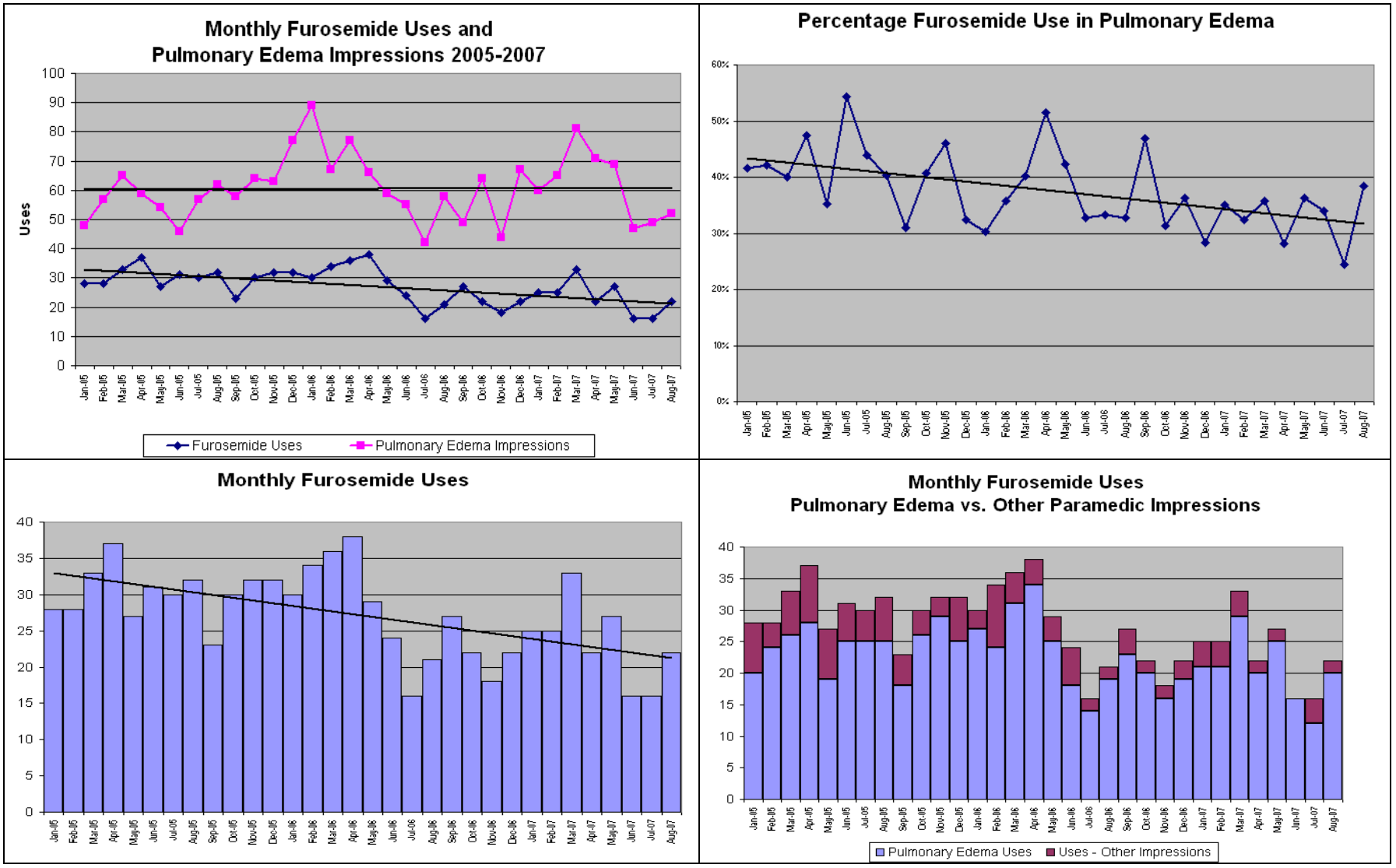
Definitive Paramedic Airway Management
Trauma Patients - All Settings (N = 105)



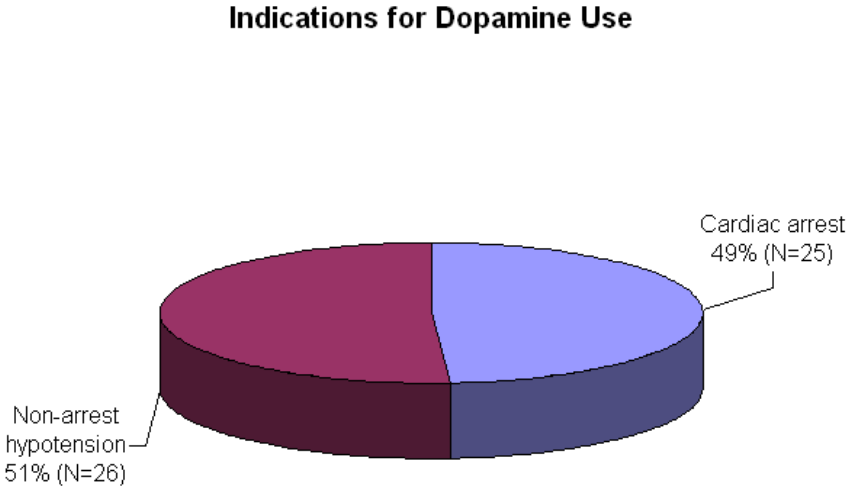
Pain Assessment and Management

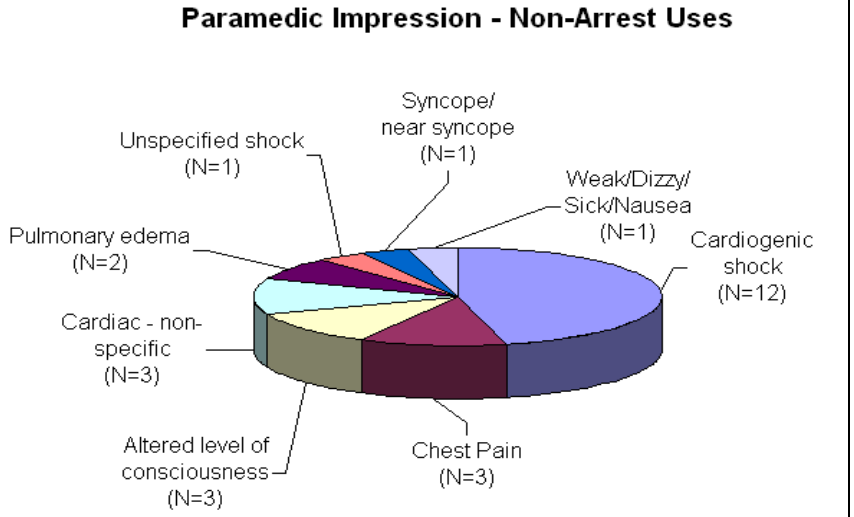


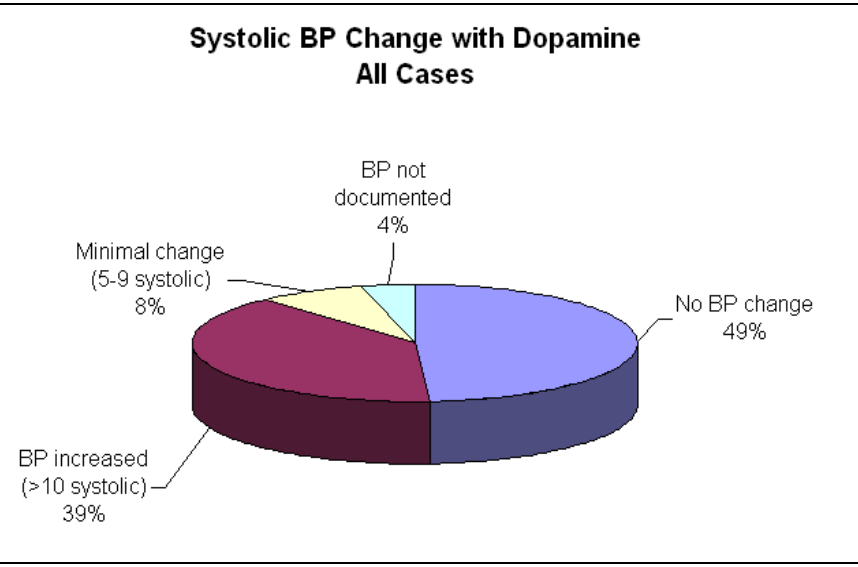
Field Medication Utilization: Furosemide

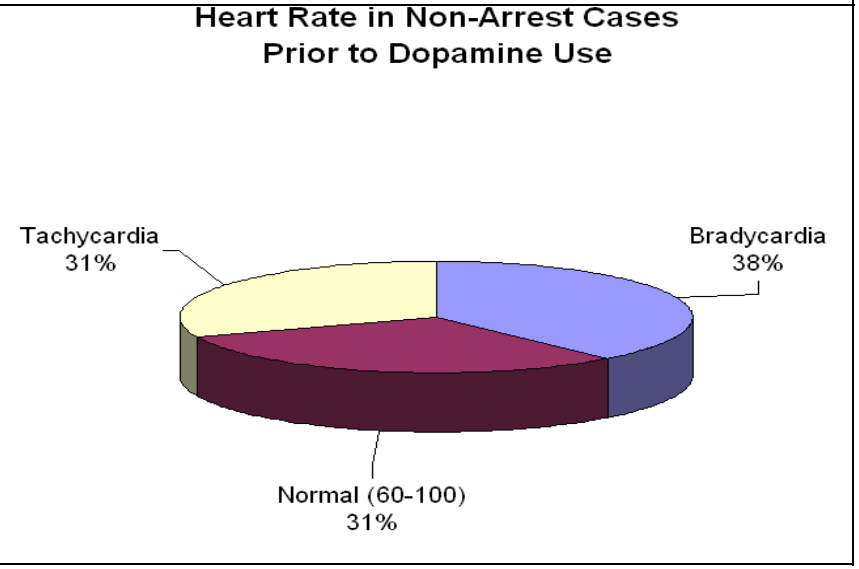


Field Medication Utilization: Dopamine









EMS Event (Patient Safety) Reporting

January 2007-December 2007

Reporting Agency	Cases	Percent
ED	9	22.5 %
MD	5	12.5 %
Fire	8	20 %
Ambulance	11	27.5 %
Patient	2	5 %
Other	5	12.5 %
Total	40	100 %

- 60% of EMS events had communication as a key characteristic with 100% of these events affecting patient care.
- National statistics demonstrate communication as a key factor in 65% to 85% of sentinel events
- More than 50% of communication related EMS events occurred during "handoffs" or transfer of patient care to other providers.
- In 2006 there were over 102,000 patient care handoffs in our EMS system, a 20% increase from 2005.
- Standardized communication practices have been shown to substantially improve patient safety during handoff.

Event Characteristics	Cases	Percent
Communication	24	60%
Medication	7	17.5%
Destination	13	32.5%
Patient Care	36	90%
Billing	1	2,5%
Documentation-ePCR	14	35%
Response Time	12	30%
Event Disposition		
Met Safety Code 1798.200 Criteria	0	0
State Referral Made	0	0
Event forwarded for Provider Agency Action by EMS	37	92%
Cases closed by EMS	40	100%
Cases closed by EMS but monitored for similar events	33	92.5%
Average Time for EMS to review and close case	9.8 days	

PREHOSPITAL PATIENT CARE RECORDS AT RECEIVING FACILITIES
Printing Report for June 1, 2007 through November 30, 2007

A. CURRENT PROCESSES
(No changes)

- Crew responsibilities
  1) Accurate and detailed completion of PCR.
  2) Printing the PCR and leaving it at the facility.
  3) If leaving the facility prior to completion of the report, the crew must print an Interim Report and leave it at the facility.
     - ♦ Must complete and fax/print PCR as soon as possible and leave it at the facility.
     - ♦ JMMC Concord and Walnut Creek Campuses have PCRs faxed to the business offices.
  4) Advising AMR Supervisor if unable to do any of the above.
- AMR Supervisor responsibilities
  1) Assure that crew completes and prints PCR.
     - ♦ Troubleshooting printer/router/laptop when needed.
     - ♦ Retrieving the PCR from the Viewer or directly from the MEDS server and provide to the receiving facility.
- AMR Administrative Supervisor
  1) Audit PCR printing compliance
     - ♦ Run Print Stamp reports for JMMC Concord and Walnut Creek Campuses*[1]
     - ♦ Research areas of non-compliance then take necessary action:
       - o Education of crews on the necessity of printing and help with troubleshooting of printing problems;
       - o Use available options for ease of printing including the Fax Option which was implemented in January 2007;
       - o Recognize and report to IT sudden changes in compliance such as failures of routers and printers.
     - ♦ Run Fax Option report for compliance and send any missing PCRs to hospitals.
- AMR MEDS Programmers
  - o Ongoing improvement and additions to increase ease and compliance of delivery of PCRs;
  - o Monitoring servers, PDF generators, replicating tools for MEDS and correcting any errors.

B. IMPROVEMENTS- IMPLEMENTED AND/OR PENDING (June 2007 – Current)

- Fax Option
  1) Automatically faxes transmitted PCR; recent facilities added:
     - ♦ Marin General Hospital
     - ♦ Ralph K. Davies
- Routers
  1) Recently replaced and updated routers were recalled and replaced by manufacturer; replacement completed October 2007

- Printers
  1) Installation of new printers completed September 2007
  2) Kaiser Antioch – Printer installed (November 2007)
- Increase audit process of print stamp reports (Current)
  1) Identify employees with compliance issues which will include individual education and corrective action for ongoing printing compliance issues.
  2) Took corrective action and individual education to employees based on audits. Initial process was completed by September 2007.

C. Results

- Completed improvements; including new printers and routers; along with the focused individual employee education/corrective actions were all in place by the end of September. As such, the table below reflects printing percentages before the improvements and immediately after. It shows an average increase of 17%.

PRINTING AT HOSPITALS

Facility	Total Calls	Printed Calls	% of Calls Printed 4/1/07 – 9/30/2007	% of Calls Printed 10/01/07 – 11/30/2007
CCRMC	3586	2697	68.53%	85.60%
DHSP	3839	2534	62.25%	81.32%
JMMC	3706	2720	68.97%	81.18%
KANT	221	151		68.33%
KRCH	2110	1349	56.87%	77.34%
KWC	2677	2003	68.65%	86.20%
MDMC	4741	3382	65.06%	84.77%
SDMC	5165	3215	57.23%	72.93%

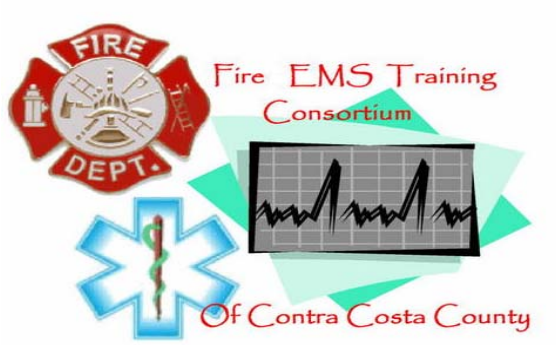
FAXING OPTION

Facility	Total Calls	Faxed Calls	% of Calls Faxed
Alta Bates	332	325	97.89%
Alta Bates-Summit	117	117	100.00%
CHO	148	147	99.32%
JMMC	3551	3548	99.92%
KOAK	62	62	100.00%
KVAL	154	153	99.35%
Marin General Hospital	5	5	100.00%
Ralph K. Davies*[2]	No Transports		
StFrancisBurn	No Transports		
StFrancisED	No Transports		
MDMC	4572	4559	99.72%

*[1]-At this time, unable to track Interim Report printing.
*[2]-Fax Option started 11/2007

D. <u>RECOMMENDED SYSTEM IMPROVEMENTS</u>

- Increase hospitals/ED use of Fax Option – We are still working to increase this option to all hospitals. However, there is an upgrade needed at the Modesto server to increase the amount of phone lines committed to faxing. There is not an estimated time of implementation at this time.



2007 Contra Costa County Fire EMS Training Consortium Needs Assessment Summary of Findings

A county-wide EMS provider education and training needs assessment was conducted by EMS and the Fire EMS Training Consortium. The purpose of the survey was to determine:

- Current system learning needs of our EMS providers
- Gain information of their preferred learning styles and preferences
- Assess their learning experience with human simulator training
- Determine what skills and procedures they most often use in their work

- **Participation: 8 Agencies**
  - 3 ALS Transport; 4 ALS First Responder; 1 BLS First Responder
  - 221 participants/1040 countywide (21%)
  - 154 EMT/600 countywide (27%)
  - 65 Medics/440 countywide (15%)
- **Learning Methods Preferred**
  - Hands on, real life, instructor contact
- **Meti (patient simulator) Experience**
  - Good 75%; Fair (21%); Poor (6%)
- **Understand reason for protocol changes when made (60%)**
- **Change Field Practice Immediately when updates occur (68%)**
- **BLS Skills Field Experience over last year (includes EMT assist data)**
  - Used Daily-Monthly
    - Adult CPR 41/93 (44%)
    - Adult BVM 41/93 (44%)
    - Pain assessment 70/93 (75%)
    - Spinal immobilization 66/93 (71%)
  - Used Rare-Never
    - AED 60/93 (65%)
- **ALS Skills Field Experience over last year (includes EMT assist data)**
  - Used Daily-Monthly
    - Adult IV 62/93 (67%)
    - IV Meds 48/93 (52%)
    - 12 Lead 35/93 (38%)
    - Defibrillation 29/93 (31%)
  - Used Rare or Never
    - Adult Intubation 53/93 (55%)
    - Cardioversion 63/93 (68%)
    - Cricothyotomy 63/93 (68%)
    - Pleural Decompression 59/93
    - ETDLA 62/93 (67%)
    - Cardiac pacint 64/93

- **Pediatric ALS Skills Experience (included EMT assist data)**
  - Used Monthly
    - All skills used 9.6% or substantially less
  - Rare-Never
    - Pedi intubation 73/93 (75%)
    - Infant/Pedi IV 77/93 (83%)
    - IO 70/93 (75%)
    - BVM 60/93 (65%)
    - CPR 72/93 (75%)
- **Most important factors in improving patient care**
  - Education and training
  - Everyone working together
  - Decreased time to ED door
  - Improving communication between ED and medics
  - A positive and professional attitude
  - Feedback and review
  - Staying current with practice
  - Education, desire and resources
  - Your attitude
  - Strong differential diagnosis skills
  - More regular training
  - Scenario practice less common emergencies
  - Experience
  - Knowledge, experience and compassion

- **2007 Top 10 Leaning Needs**
  - Respiratory (67%)
  - Adult Trauma (65%)
  - 12 Lead (60%)
  - Rhythm Interpretation (59%)
  - Pharmacology (59%)
  - Advanced difficult airway (57%)
  - Pedi IO/IV (59%)
  - Triage (52%)
  - Cardiac (40%)
  - Pediatric Emergencies (38%)

Actions implemented as a result of this survey

Pediatric Advanced Airway Training Module Developed (3rd quarter 2007)
BLS Airway Training re-emphasized
Expanded Meti Simulator instructor training opportunities developed
Triage included in new MCI training module (2nd quarter 2007)
Levitan Best Practice Advanced Airway training resources obtained
Pediatric Simulator funded and obtained Fall 2007
Results being used as part of provider agency education and training planning

Acknowledgements

This report reflects the dedication and extraordinary work of many who actively participate in Contra Costa County Emergency Medical Services Quality Improvement Program. The work, data and accomplishments summarized in this biannual report are based on contributions from numerous individuals and are a product of the collective QI committee.

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Sam Bradley, ECC Fire
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Lauren Kovaleff EMS
Art Lathrop EMS
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1/15/08