



EMS Innovations in Santa Cruz County

DAVID GHILARDUCCI MD, FACEP, FAEMS

EMS Innovations

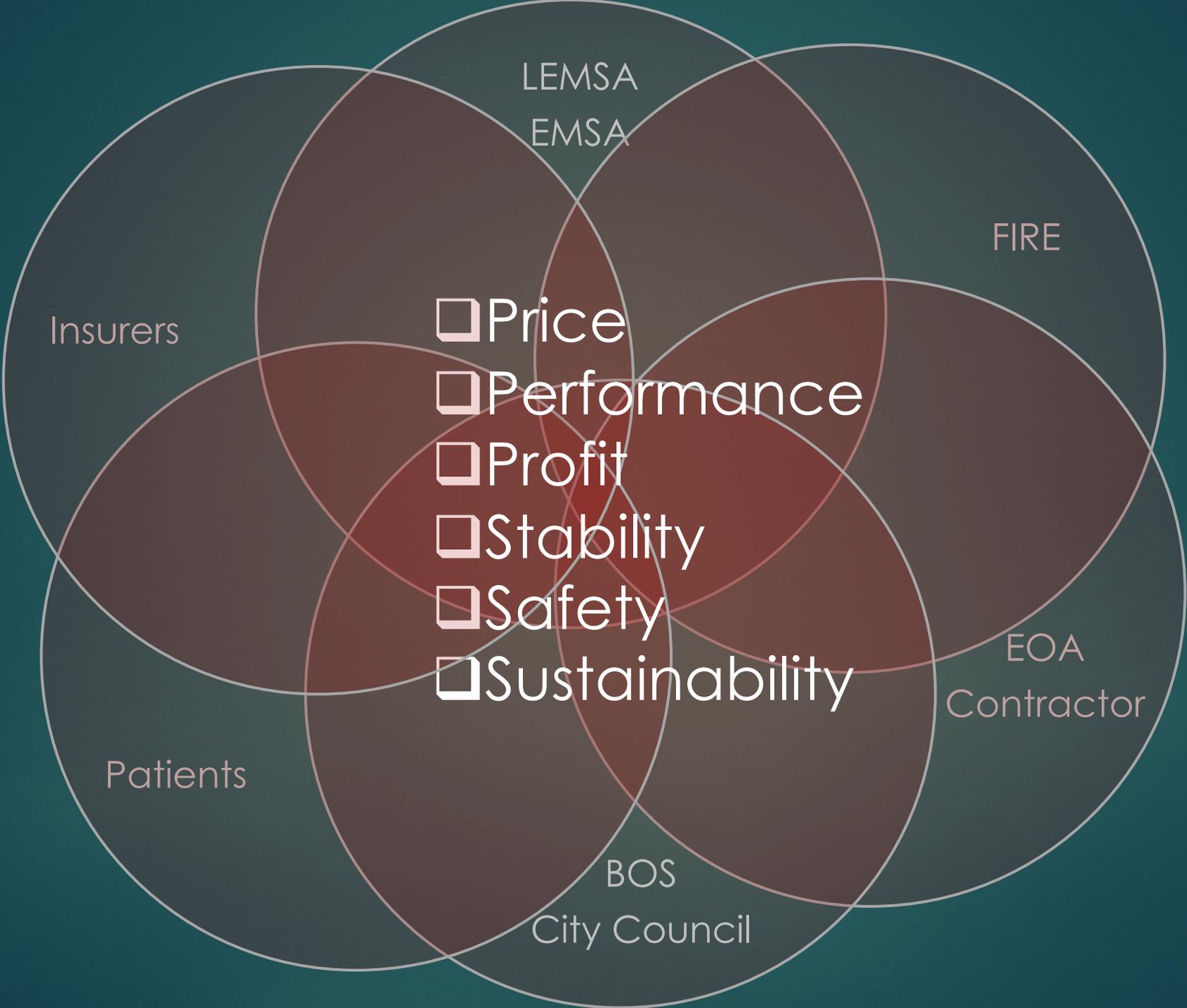
- ▶ Part 1
 - ▶ Patient Centered Quality in an EMS System
- ▶ Part 2
 - ▶ Reducing waste using MPDS

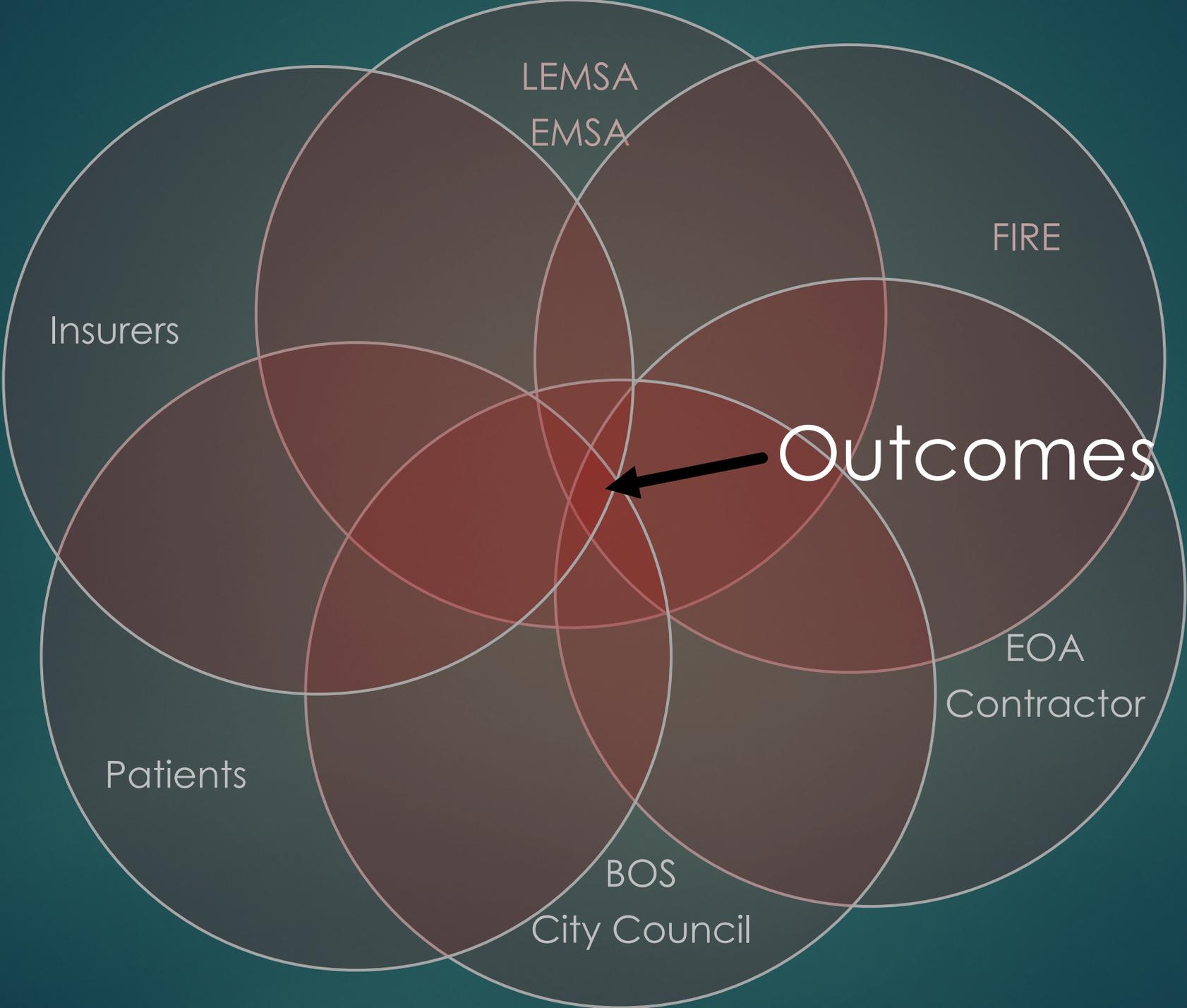
Part 1

WHAT MATTERS MOST IN EMS



What matters most depends on
who you are asking





Health Care Should be:

1. Safe: avoiding injuries to patients (and providers)
2. Effective: based on scientific evidence
3. Patient-centered: respectful of and responsive to individual patient preferences, needs, and values
4. Timely: reducing waits and sometimes harmful delays
5. Efficient: avoiding waste, including waste of equipment, supplies, ideas, and energy.
6. Equitable: care that does not vary in quality due to gender, ethnicity, geographic location, and socioeconomic status.

A Patient Centered Metric for Stroke

The speed to thrombolytics is the strongest predictor of good outcomes

Stroke Centers

- Door to Needle time

EMS Systems

- 911- Needle time
 - Early 911 activation
 - Rapid dispatch
 - Early EMS identification
 - Rapid Transport
 - Pre-notification
 - Direct transport to CT scanner
 - Hospital performance

**EMERGENCY
MEDICAL SERVICES
AT THE CROSSROADS**



INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

Quality Defined

“the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge”

Institute of Medicine. *Emergency Medical Services at a Crossroads*. Washington, DC, USA: The National Academies Press; 2006.



Our focus should be on Outcomes

But sometimes outcomes are hard to measure

3 Types EMS Quality Measures

- ▶ Outcomes
 - ▶ OHCA survival, patient satisfaction, pain scores
- ▶ Structure
 - ▶ Response times, deployment, credentials, staffing
- ▶ Process
 - ▶ Protocols, Med administration, Destination

EOA Contracts:

- ▶ Shifting Emphasis to the Patient

Response times

- ▶ Traditional method of measuring EMS performance
 - ▶ Easy to measure
 - ▶ Provides an clearly understandable benchmark
 - ▶ Establishes a benchmark for “level of effort”

Do ALS
response
times
improve
patient
outcome?

Stopping the “ALS clock” only matters when ALS interventions are immediately needed.

Otherwise this is wasted energy and resources

Applying a uniform response time standard for all calls for service may even be harmful, by misallocating resources to where they are not immediately needed.

Response Times and Cardiac Arrest

- ▶ The classic rationale for the 8 minute ALS clock
- ▶ Irreversible Brain damage occurs within the first 5-8 minutes
 - ▶ Even the fastest ALS responders cannot intervene within that time
- ▶ Most survivors have these things in common
 - ▶ Witnessed arrest
 - ▶ CPR within 4 minutes
 - ▶ Early defibrillation within 8 minutes
- ▶ ALS interventions are important later
 - ▶ Reversible causes of PEA, STEMI recognition, specialty center transport

Other EMS patients

- ▶ Denver: 9559 EMS patients
 - ▶ *No benefit for < 8 minute response time*
 - ▶ Pons PT, Haukoos JS, Bludworth W, et al. Paramedic response time: Does it affect patient survival? *Acad Emerg Med.* 2005;12(7):594–600.
- ▶ Charlotte NC: 746 Priority 1 EMS patients
 - ▶ No benefit for <11 min response time
 - ▶ Blackwell TH, Kline JA, Willis JJ, et al. Lack of association between prehospital response times and patient outcomes. *Prehosp Emerg Care.* 2009; 13(4):444–450.
- ▶ Ontario Canada: 9273 OCHA patients
 - ▶ Only defib within 5 minutes makes much difference
 - ▶ De Maio V, Stiell I, Wells G, et al. Optimal defibrillation response intervals for maximum out-of-hospital cardiac arrest survival rates. *Ann of Emerg Med.* 2003;42(2):242–250.
- ▶ Denver: 3576 Trauma Patients
 - ▶ Exceeding 8 minute response time has no effect on survival
 - ▶ Pons P, Markovchick V. Eight minutes or less: Does the ambulance response time guideline impact trauma patient outcome? *J Emerg Med.* 2002;23(1):43–48.

**EMERGENCY
MEDICAL SERVICES
AT THE CROSSROADS**



INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

IOM Recommendation

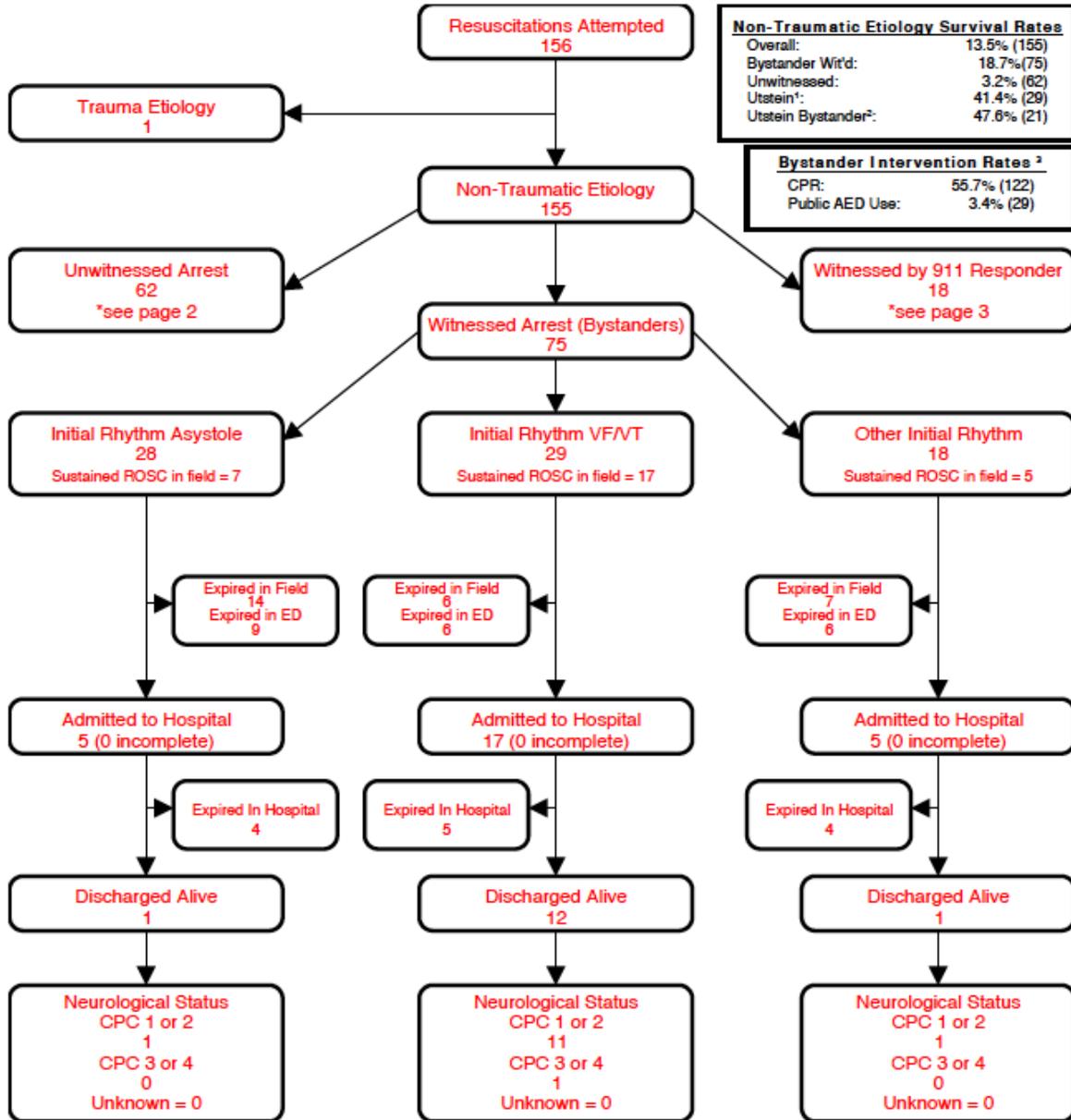
EMS must develop “evidence based performance indicators that can be nationally standardized so that statewide and national comparisons can be made”

Institute of Medicine. *Emergency Medical Services at a Crossroads*. Washington, DC, USA: The National Academies Press; 2006.

Utstein Survival Report

AMR Santa Cruz

Service Date: 01/01/17 - 12/31/17



Non-Traumatic Etiology Survival Rates	
Overall:	13.5% (155)
Bystander Wit'd:	18.7% (75)
Unwitnessed:	3.2% (62)
Utstein ¹ :	41.4% (29)
Utstein Bystander ² :	47.8% (21)

Bystander Intervention Rates ²	
CPR:	55.7% (122)
Public AED Use:	3.4% (29)

CARES: Cardiac Arrest Registry to Enhance Survival

Santa Cruz County Transport Report Card

Criterion	Goal	Weighted Value	Score
Cardiac Arrest			
End-tidal CO2 monitored	90.0%	3.0%	
Complete documentation (see System QI P&P)	90.0%	3.0%	
Respiratory Distress			
Mental Status assessed/documented	90.0%	3.0%	
bronchodilator administration for wheezing	85.0%	3.0%	
Airway Management			
End-tidal CO2 performed on any successful ET intubation	90.0%	3.0%	
Other confirmation techniques (e.g., visualize chords, chest rise, auscultation)	90.0%	3.0%	
Complete documentation (see System QI P&P)	90.0%	3.0%	
STEMI			
ASA administration	90.0%	3.0%	
SpO2 recorded	95.0%	3.0%	
12 LEAD EKG acquired within 5 minutes	80.0%	3.0%	
Scene time less than 15 minutes	80.0%	3.0%	
Transport to STEMI center rate (with notification)	95.0%	3.0%	
Complete documentation (see System QI P&P)	90.0%	3.0%	
Stroke			
Time last seen normal	90.0%	3.0%	
Use of a prehospital BEFAST stroke scale	90.0%	3.0%	
Scene time less than 15 minutes	80.0%	3.0%	
Complete documentation (see System QI P&P)	90.0%	3.0%	
Trauma			
PAM scale recorded	90.0%	3.0%	
Scene time less than 15 minutes	50.0%	3.0%	
Trauma center destination	90.0%	3.0%	
Complete documentation (see System QI P&P)	90.0%	3.0%	
Safety			
Employee injuries per 10,000 hours worked	1.00	2.0%	
Employee turnover rate	25.0%	8.0%	
Protocol compliance rate per chart review (high acuity, AMA/RAS, & random)	90.0%	10.0%	
Patient Satisfaction (use standardized questions to allow inter-agency comparison)			
Communication by medics (patient and family)	97.2%	3.0%	
Care shown by the ambulance crew	94.4%	2.0%	
Skill and professionalism of our ambulance crew	93.8%	2.0%	
Cleanliness of ambulance	94.1%	2.0%	
Ride of the ambulance	92.3%	2.0%	
ePCR Submission Compliance			
At time of patient drop off (over 90 days)	90.0%	2.0%	
High acuity (ROSC, STEMI, Stroke, Trauma) cases at time of drop off	95.0%	2.0%	
Completed within 24 hours	100.0%	2.0%	
Total Standards		100.0%	

Transport Report Card

- ▶ Criteria
 - ▶ Measurable
 - ▶ Improvable
 - ▶ Reflect Value to the patient

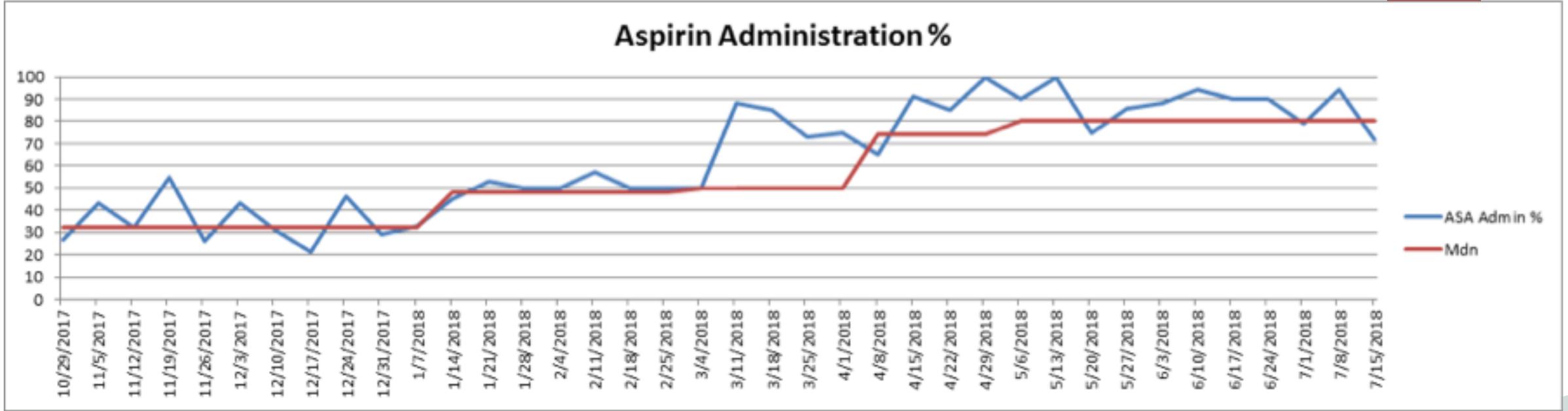
Green: Meet/Exceed Goal	Criteria
Orange: 0-20% Below Goal	1) Measurable
Red: >20% Below Goal	2) Must be improvable
	3) Reflect value to the patient

First Responder Report Card

- ▶ Designed to measure interventions that should occur before immediately after patient contact

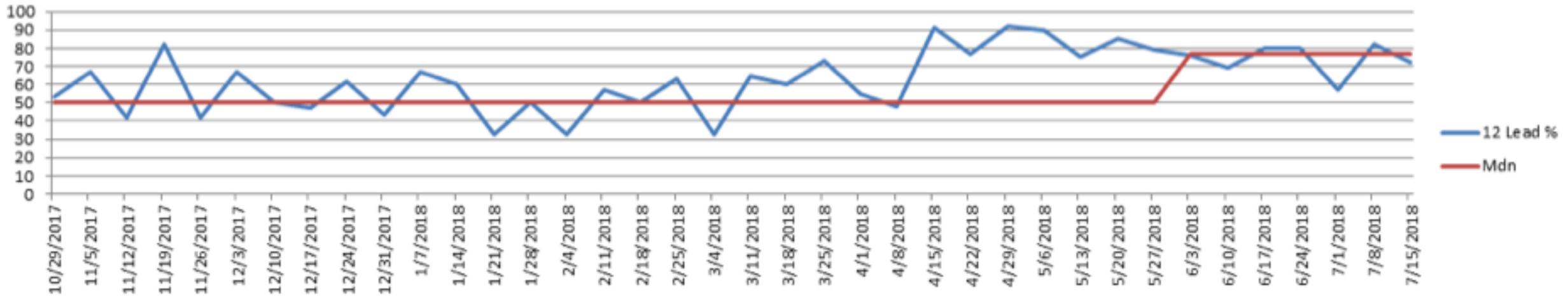
Santa Cruz County First Responder Report Card

Criterion	Goal	Weighted Value	Score
Cardiac Arrest			
End-tidal CO2 monitored	90.0%	4.0%	
Complete documentation (see System QI P&P)	90.0%	4.0%	
Respiratory Distress			
Mental Status assessed/documented	90.0%	4.0%	
bronchodilator administration for wheezing within 10 minutes	85.0%	4.0%	
Airway Management			
End-tidal CO2 performed on any successful ET intubation	90.0%	4.0%	
Other confirmation techniques (e.g., visualize chords, chest rise, auscultation)	90.0%	4.0%	
Complete documentation (see System QI P&P)	90.0%	4.0%	
STEMI			
ASA administration within 5 minutes	90.0%	4.0%	
SpO2 recorded	95.0%	4.0%	
12 LEAD EKG acquired within 5 minutes	80.0%	4.0%	
Complete documentation (see System QI P&P)	90.0%	4.0%	
Stroke			
Time last seen normal	90.0%	4.0%	
Use of a prehospital BEFAST stroke scale	90.0%	4.0%	
Complete documentation (see System QI P&P)	90.0%	4.0%	
Trauma			
PAM scale recorded	90.0%	4.0%	
Complete documentation (see System QI P&P)	90.0%	4.0%	
Safety			
Protocol compliance rate per chart review (high acuity, AMA/RAS, & random)	90.0%	10.0%	
Patient Satisfaction (use standardized questions to allow inter-agency comparison)			
Degree to which the firefighters took your problem seriously	94.0%	4.0%	
How well the firefighters explained things in a way you could understand	95.4%	4.0%	
Skill of the firefighters	94.1%	4.0%	
Extent to which the firefighters cared for you as a person	94.1%	4.0%	
Professionalism of the firefighters	94.1%	4.0%	
ePCR Submission Compliance			
Transfer of Care (TOC) critical ePCR elements completed within 10 minutes of patient departure from scene	90.0%	3.0%	
Full ePCR completed within 24 hours	100.0%	3.0%	
Total Standards		100.0%	



ASA Administration

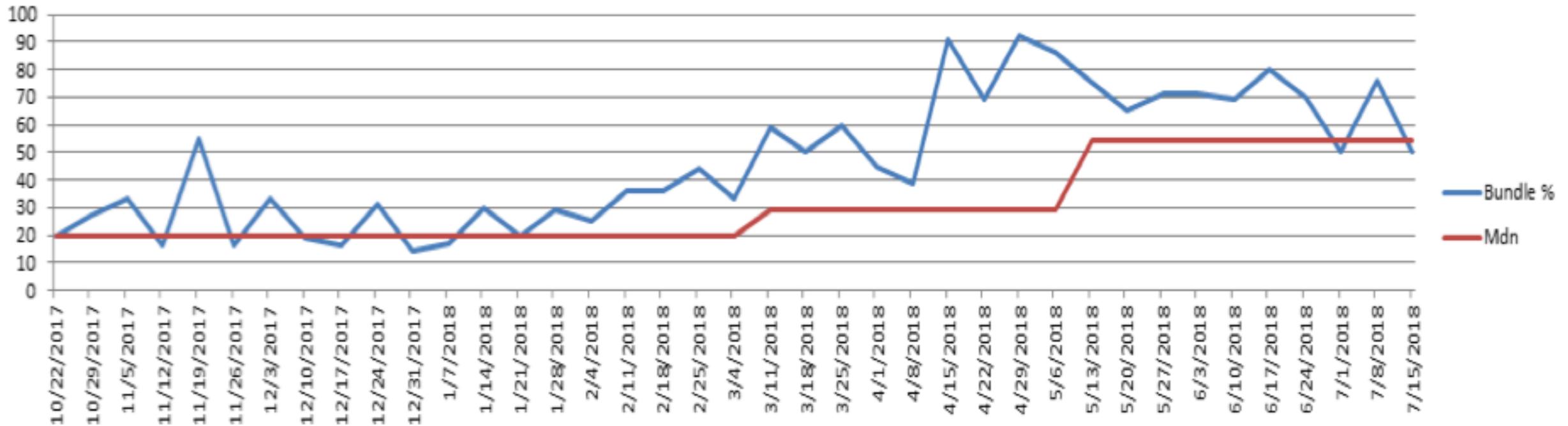
12 Lead %



12 Leads

Cardiac Bundle

ASA + 12 Lead Bundle %





Part 2

REDUCING WASTE

Identifying waste in the System

1

EMS systems become busier every year

2

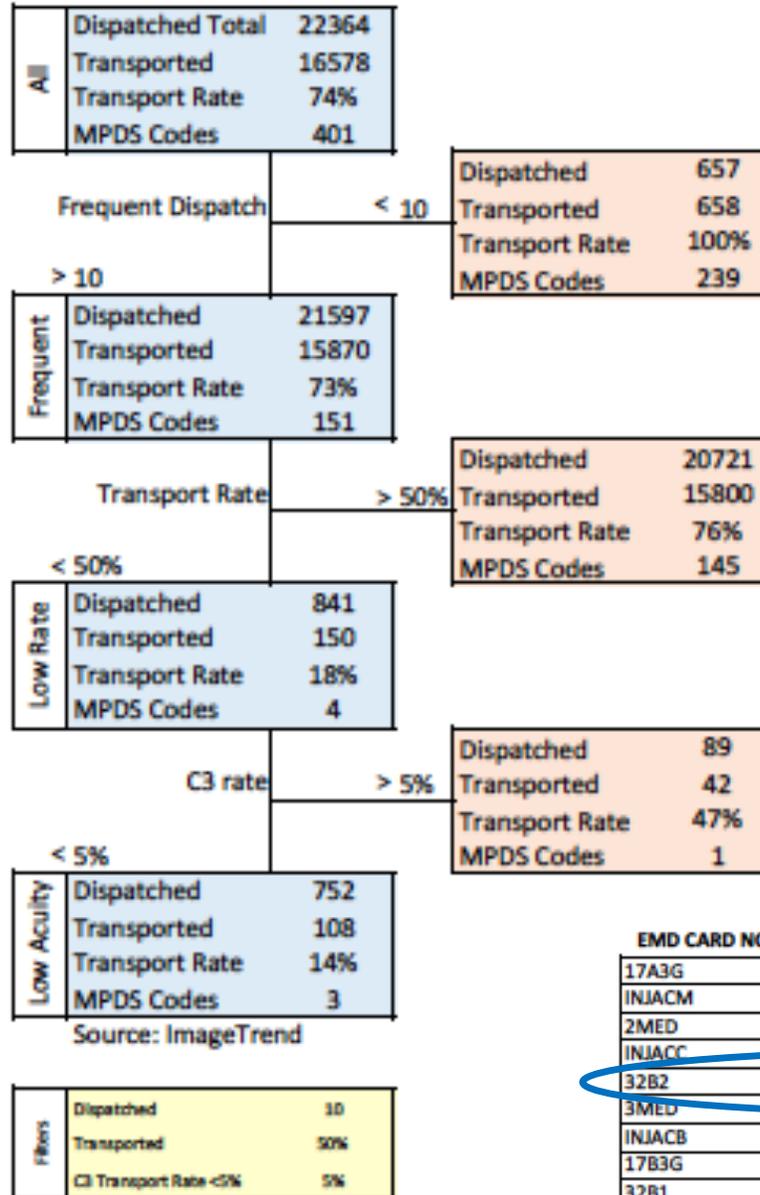
Resource demands are not matched by new revenue

Resource Utilization

- ▶ As system levels became critically low more often we found that we couldn't send everything to everything anymore

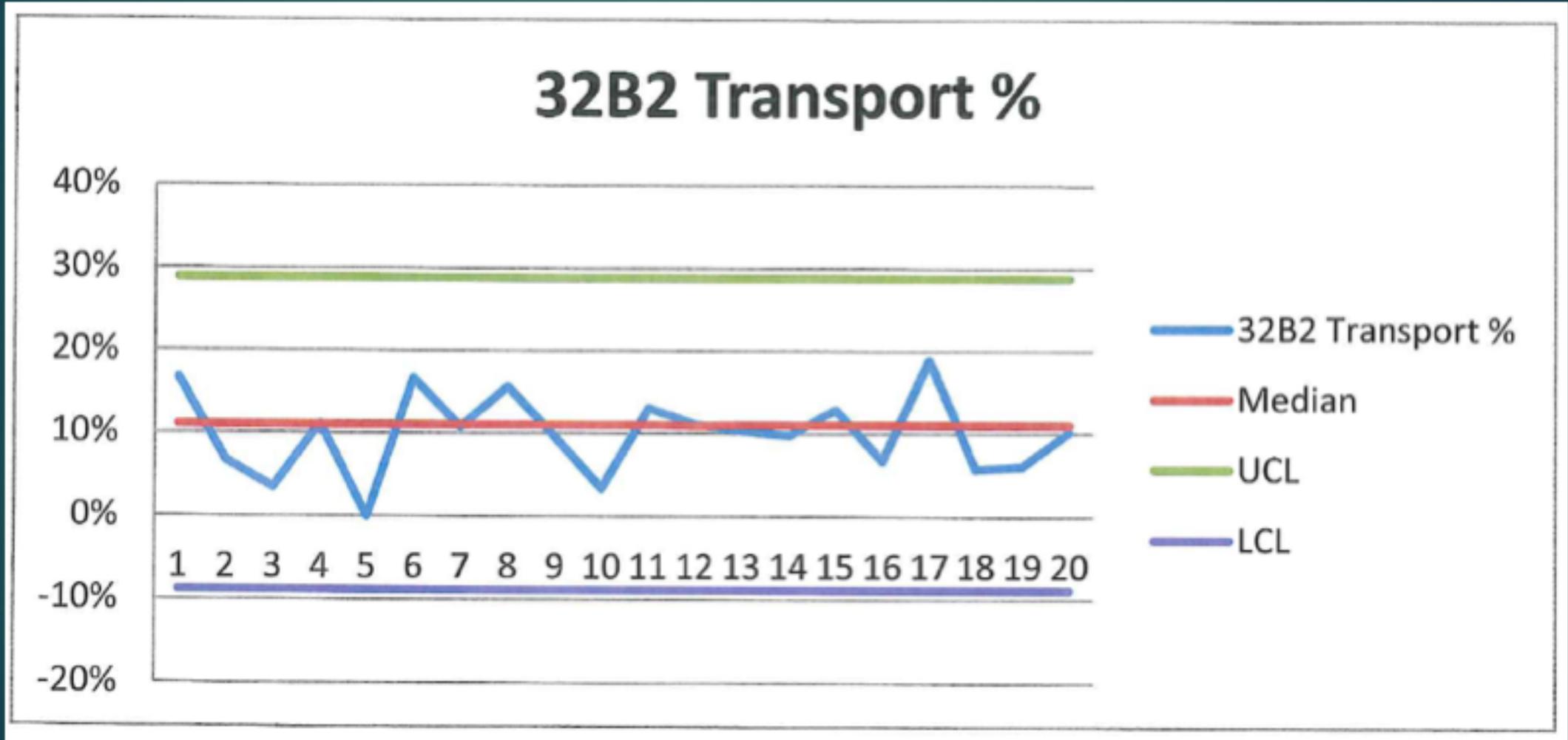
Santa Cruz County MDPS 2016

Using EMD to Determine what is needed on the Scene



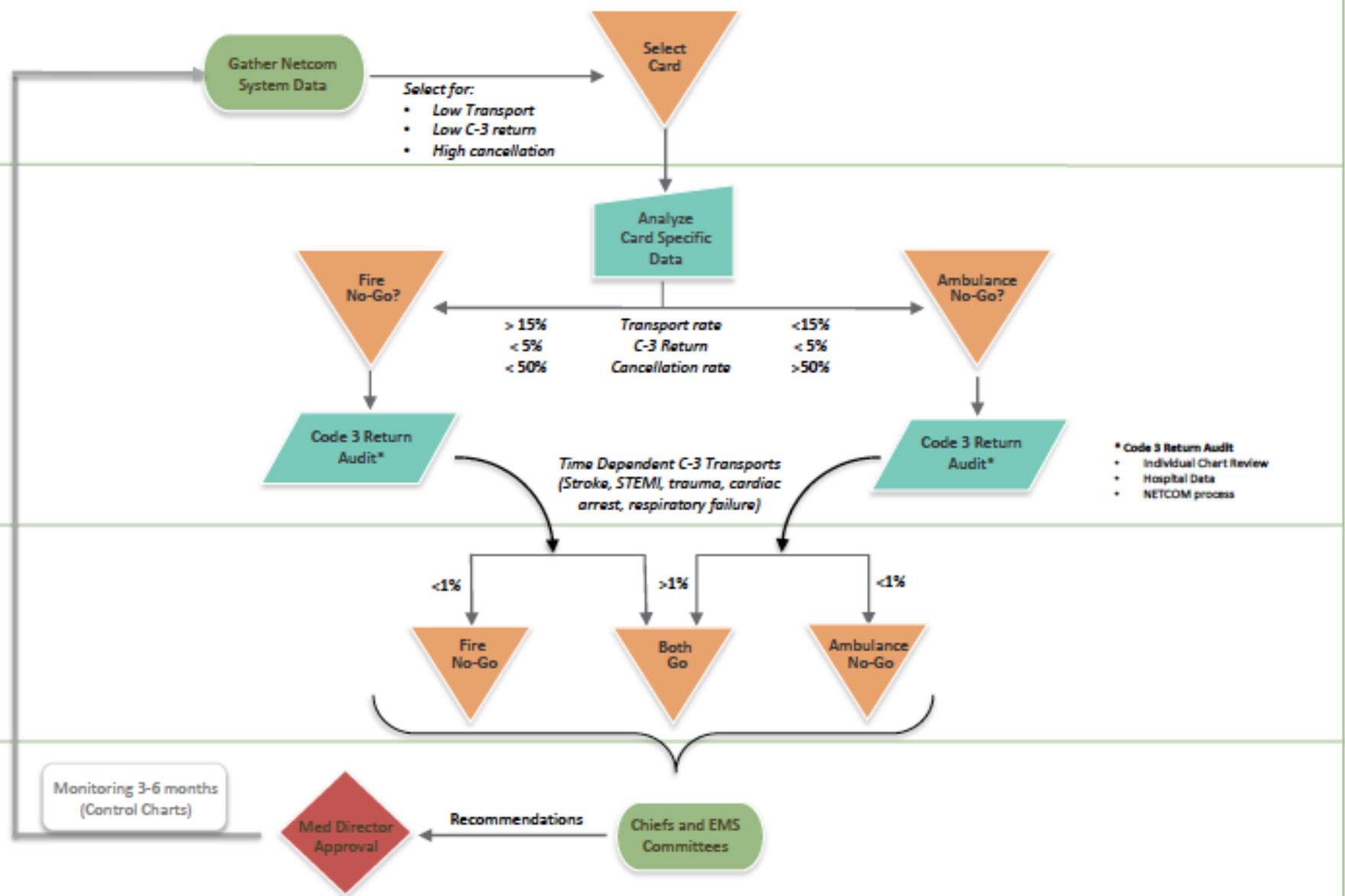
EMD CARD NO	TOTAL	TRANSPORTED	% TRAN	% CODE 3
17A3G	209	11	5%	0%
INJACM	54	3	6%	2%
2MED	1009	59	6%	0%
INJACC	1175	71	6%	2%
32B2	451	35	8%	0%
3MED	4703	373	8%	1%
INJACB	129	12	9%	1%
17B3G	593	115	19%	2%
32B1	237	49	21%	2%
26B1	73	20	27%	3%

32-B-2: Medical alarm (alert) notifications (no patient information)



EMD Card Review Process

Card Selection
Case Audit
Dispatch Recommendation
Approval



Law initiated calls

- ▶ Send Protocol

SEND™ Protocol
Secondary Emergency Notification of Dispatch™

The EMS service relies on you to provide the following information:

- 1. Chief complaint and incident type?**
 - a. Is there more than one person injured?
- 2. Approximate age?**
- 3. Conscious: Yes / No... or alert?**
- 4. Breathing: Yes / No... or difficulty?**

Medical Priority Consultants™

- 5. Illness case (*age 35 or over*):**
Is there chest pain?
- 6. Accident or injury case:**
Is there severe bleeding (spurting)?
- 7. Response mode:**
Do you need a lights-and-siren response?

©1997, Medical Priority Consultants, Inc., Salt Lake City, Utah, USA