

EMS System Key Performance Indicators / Clinical Measures

Clinical Group/ Key Performance Indicators (KPIs)	Definition of Measure • Process vs. Outcome Measure • Descriptions of numerator and denominator	Relation of Measure to Quality of EMS System	Established KPI (Used by whom?)	Performance Measure/ Goal?	Notes
1. Critical Trauma Patient Management					
1.1 Percent of Step 1 and Step 2 trauma patients with an EMS scene time of less than 10 minutes. (arrival-to-departure of ambulance)	<ul style="list-style-type: none"> • Process measure // Available in WEMSIS • Numerator includes all Step 1 and 2 Trauma Triage Criteria patients (excluding entrapped patients or staging issues) with an EMS scene time of less than 10 minutes. • Denominator includes all Step 1 and Step 2 Trauma Criteria patients, but excludes entrapped patients where tools were used, or time staging for scene safety 	Minimizing scene time can reduce patient morbidity and mortality.	<ul style="list-style-type: none"> • Am College of Surgeons Committee on Trauma • CA Core Measure 	Goal: more than or equal to 90 percent	1. KPI limited to Step 1 and 2 Trauma patients for cleaner analysis, since they tend to have higher acuity. Step 3 and 4 patients end up with long scene times for many reasons.
1.2 Percent of Step 1 and Step 2 trauma patients transported to a designated trauma center.	<ul style="list-style-type: none"> • Process measure // Available in WEMSIS • Numerator includes number of all Step 1 or 2 trauma patients transported by EMS to a designated trauma center. • Denominator includes all Step 1 or 2 Trauma Triage criteria patients who are transported by EMS. 	Transport of Step 1 and 2 trauma patients to a designated trauma center can reduce mortality.	<ul style="list-style-type: none"> • NHTSA • WA Trauma Triage • CA Core Measure 	Goal: more than or equal to 90 percent	1. WEMSIS can determine that a patient went to <u>a</u> trauma receiving center—not necessarily the <u>correct</u> one. 2. Individual MPDs may have to review to confirm that patients are transported to the <u>appropriate</u> receiving center.

ADDITIONAL NOTES:

#1: After careful examination of peer-reviewed articles, there is little evidence documenting impact of prehospital ALS procedures on critical trauma patient outcomes. Only the two KPIs listed above have widespread acceptance in the literature.

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2. Heart Failure Patient Management					
2.1 Percent of suspected heart failure patients who received CPAP or had the CPAP protocol documented.	<ul style="list-style-type: none"> • Process measure // Available in WEMSIS? • Numerator includes number of patients with suspected CHF who received CPAP or had the CPAP protocol documented. • Denominator includes number of patients with suspected congestive heart failure. • Assumes that CPAP is available in system. 	CPAP can improve patient outcomes and decreases number of required patient ET intubations (NNT=6).	<ul style="list-style-type: none"> • Metro Med Directors 	Goal: more than or equal to 90 percent	1. Not all EMS systems utilize CPAP. 2. Most BLS-equipped units do not carry CPAP units—which will have to be included in exclusionary criteria.
2.2 Percent of suspected heart failure patients who received nitroglycerine (NTG) or had NTG protocol documented.	<ul style="list-style-type: none"> • Process measure // Available in WEMSIS? • Numerator includes number of patients who received NTG or had documentation of 	NTG can improve CHF patient outcomes	<ul style="list-style-type: none"> • Metro Med Directors 	Goal: more than or equal to 90 percent	1. In BLS systems, units may not be able to give NTG.

NTG protocol documented.
 • Denominator includes number of patients with suspected congestive heart failure.

ADDITIONAL NOTES:
 #1: This KPI measures only presumed CHF (primary or secondary impression) patients who receive CPAP and nitroglycerine, based on Metro Medical Directors who thought this treatment improved CHF patient outcomes. One potential issue is that many ePCRs allow providers to select a generic "respiratory distress" category for patient impression or a more specific "CHF" category. This will make data collection and evidence through WEMISIS more complicated.
 #2: Additional comments by reviewers challenging outcome benefit of both CPAP and NTG for heart failure patients.

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3. Asthma Patient Management					
3.1 Percent of bronchospasm patients with respiratory distress, indicative of wheezing or known history of asthma or reactive airways disease, who received a beta-agonist or had the beta-agonist administration protocol documented by the first EMS crew able to provide such treatment.	<ul style="list-style-type: none"> • Process measure // Available in WEMISIS • Numerator includes number of patients with provider impression of bronchospasm and respiratory distress with documentation of beta-agonist protocol administration by EMS. • Denominator includes all patients with a provider impression of bronchospasm and respiratory distress. 	Treatment of bronchospasm patients with beta-agonist improves patient outcomes.	<ul style="list-style-type: none"> • Metro Med Directors • CA Core Measure 	Goal: more than or equal to 90 percent	1. Metro Medical Directors included this as a clinical measure in the 2007 report with one KPI—use of a beta-agonist. No other treatment. Only one KPI.

ADDITIONAL NOTES:
 #1: This KPI measures patients with bronchospasms and respiratory distress. Will have to examine how well WEMISIS can narrow down and identify this patient population. Many ePCRs allow providers to select a generic "respiratory" distress vs. asthma, COPD, etc. as presumed diagnosis.

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4. Seizure Patient Management					
4.1 Percent of still seizing (upon EMS arrival) and post-seizure patients who received a blood glucose (BG) check.	<ul style="list-style-type: none"> • Process measure // Available in WEMISIS • Numerator includes all patients with provider impression of seizure or post-seizure (postictal) who receive a blood glucose (BG) check. • Denominator includes all patients with provider impression of on-going seizure activity or post-seizure status. 	Hypoglycemia is a common, easily treated cause of seizure activity, which can cause patient harm if untreated	<ul style="list-style-type: none"> • Metro Med Directors 	Goal: more than or equal to 90 percent	1. After discussion with various adult/pedi physicians, BG check important for seizing and postictal patients.
4.2 Percent of still-seizing (upon EMS	<ul style="list-style-type: none"> • Process measure // Available in WEMISIS 	Administration of a benzo-	<ul style="list-style-type: none"> • Metro Med Directors 	Goal: more than or	1. Variability in drugs used; so the KPI is <i>whether it</i>

arrival) or recurrent seizure patients treated with benzodiazepines by EMS.	<ul style="list-style-type: none"> Numerator includes number of patients with provider impression of on-going (or repeat) seizure activity with documentation of administration of benzodiazepine administration by EMS protocol. Denominator includes all patients still seizing upon EMS arrival and patients with recurrent seizures. 	diazepine can diminish convulsions and seizure activity with low risk of significant complications.		equal to 90 percent	was given—not whether the seizure was terminated (since that could be causal or coincidental).
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Clinical Group/ Key Performance Indicators (KPIs)	Definition of Measure <ul style="list-style-type: none"> Process vs. Outcome Measure Descriptions of numerator and denominator 	Relation of Measure to Quality of EMS System	Established KPI (Used by whom?)	Performance Measure/ Goal?	Notes
5. Acute Coronary Syndrome/Chest Pain Patient Management					
5.1 Percent of patients more than or equal to 35 years old with suspected cardiac chest pain, discomfort or other ACS symptoms who received aspirin (ASA) from EMS or had the aspirin protocol documented.	<ul style="list-style-type: none"> Process measure // Available in WEMESIS Numerator includes patients who took own non-enteric ASA prior to arrival (PTA) of EMS, ASA given by EMS; and includes patients with contraindications to ASA noted (i.e. allergies) Denominator includes patients with suspected ACS/ cardiac chest pain or discomfort. 	Early ASA administration reduces patient morbidity and mortality rates.	<ul style="list-style-type: none"> NHTSA AHA Metro Med Directors CA Core Measures WA ECS TAC* 	Goal: more than or equal to 90 percent	<ol style="list-style-type: none"> Numerator includes all patients with suspected ACS, including those with other ACS symptoms—i.e., SOB, weakness. If ASA given at any point prior to arrival at the hospital, or taken by patient PTA of EMS, the performance goal is met (similar to JCAHO requirements).
5.2 Percent of patients more than or equal to 35 years old with suspected cardiac chest pain/discomfort or other ACS symptoms with 12-Lead ECG acquired by EMS.	<ul style="list-style-type: none"> Process measure // Available in WEMESIS Numerator includes number of suspected ACS pts who receive a 12-lead ECG by EMS Denominator includes all suspected ACS patients with and without acquisition of 12-lead ECG. 	12-Lead ECG acquisition and notification of receiving hospital allows cardiac care team to be assembled.	<ul style="list-style-type: none"> NHTSA AHA AHA Mission Lifeline 	Goal: more than or equal to 90 percent	1. KPI 5.2 measures whether or not a 12-lead ECG is acquired, while 5.3 measures timeliness of the acquisition (i.e. within 10 minutes of 12-lead equipped unit arriving on scene.
5.3 Percent of patients more than or equal to 35 years old with suspected cardiac chest pain/discomfort or other ACS symptoms who received a 12- Lead ECG less than 10 minutes from time of arrival on scene by first 12-lead ECG-equipped EMS unit.	<ul style="list-style-type: none"> Process measure // Available in WEMESIS Numerator includes suspected ACS patients who receive 12-lead ECG less than 10 minutes of 1st 12-lead ECG-equipped EMS unit arrival on scene. Denominator includes all suspected ACS patients with and without acquisition of 12-lead ECG. 	Earlier 12-Lead ECG acquisition and notification of receiving hospital allows cardiac care team to be assembled.	<ul style="list-style-type: none"> NHTSA AHA AHA Mission Lifeline 	Goal: more than or equal to 90 percent	<ol style="list-style-type: none"> ED notification of potential STEMI or ACS not captured under WEMESIS2. Time to acquire 12-Lead ECG serves as proxy. Documentation of serial 12-Leads will be reviewed as a potential KPI in the future.

<p>5.4 Percent of patients more than or equal to 35 years old with suspected cardiac chest pain/discomfort, or other ACS symptoms with an EMS scene time (arrival- to- departure of ambulance) less than 20 minutes.</p>	<ul style="list-style-type: none"> • Process measure // Available in WEMSIS • Numerator includes number of ACS patients with an EMS scene time (ambulance arrival until departure from scene) less than 20 minutes. • Denominator includes all patients with suspected chest pain, discomfort or ACS. 	<p>Delays in patient transport increase E2B (EMS-to- balloon) and D2B (door to balloon) time, potentially increasing patient morbidity and mortality.</p>	<ul style="list-style-type: none"> • AHA • WA ECS TAC 	<p>Goal: more than or equal to 90 percent</p>	<ol style="list-style-type: none"> 1. Research indicates 90 percent goal for scene time of less than 15 minutes is unrealistic, but a 90 percent goal at less than 20 minutes <i>is</i> realistic. 2. Optional Measure: MPDs can choose to measure EMS scene-time only for STEMI patients, or set different system time goals for STEMI patients vs. other ACS patients.
<p>5.5 Percent of suspected STEMI patients in which a Code STEMI alert is activated prior to hospital arrival.</p>	<ul style="list-style-type: none"> • Process measure // Available in WEMSIS • Numerator is number of patients identified by EMS with STEMI with a Code STEMI alert activated prior to hospital arrival. • Denominator is total number of patients identified by EMS as having STEMI. 	<p>Early EMS notification of hospitals of a Code STEMI alert reduces patient D2B treatment time, thereby reducing morbidity and mortality.</p>	<ul style="list-style-type: none"> • AHA • CA Core Measures 	<p>Goal: more than or equal to 90 percent</p>	<ol style="list-style-type: none"> 1. Tracking this measure is crucial to Cath Lab center tracking of their performance.
<p>5.6 Percent of patients identified as STEMI by EMS who are taken to a designated cardiac receiving center.</p>	<ul style="list-style-type: none"> • Process measure // Available in WEMSIS* • Numerator includes number of patients identified as STEMI by EMS taken to designated cardiac receiving centers. • Denominator includes number of all patients identified as STEMI. 	<p>Transport to appropriate facility reduces time to treatment, decreasing patient morbidity/mortality.</p>	<ul style="list-style-type: none"> • NHTSA • WA ECS TAC 	<p>Goal: more than or equal to 90 percent</p>	<ol style="list-style-type: none"> 1. *WEMSIS can determine that a patient went to <u>a</u> cardiac receiving center—not necessarily the <u>correct</u> one. 2. Individual MPDs may have to review to confirm that patients are transported to the appropriate receiving center.

ADDITIONAL NOTES:

#1: Since use of the KPIs is voluntary, MPDs can always choose to “narrow the focus” of individual KPIs to meet their EMS system-specific needs, or to reduce the COI workload requirements.

#2: Workgroup decided to measure time to acquire 12 Lead ECGs for ALL chest pain/discomfort/ACS patients (AHA standard) vs. STEMI patients only. We don’t know who is a “time-sensitive STEMI” patient until a 12 Lead ECG is acquired.

#3: Discussion over whether scene-time clock should start with 1st EMS unit on scene (i.e. fire engine, aid unit or ambulance). Literature review determined that use of ambulance times is dominant in clinical articles and KPI measurements.

#4: Original KPI measured “scene time” **only** for STEMI patients which is a common KPI reported in medical journal articles. Reports suggest that 10-15 percent of patients develop ST elevation after 1st 12 lead ECG acquired and arrival at the hospital. Additionally, undertriage of STEMI patients is relatively common. After discussion, decision was made to measure scene time on all suspected ACS patients. EMS systems can choose to study subset of scene times for STEMI patients.

#5: Future KPI should include use of ACC standard measuring true E2B (EMS-to-balloon) system performance; time from FMC (first medical contact) to balloon. Not available in WEMSIS. Suggest utilizing in EMS KPIs VERS. 2.

Clinical Group/ Key Performance Indicators (KPIs)	Definition of Measure	Relation of Measure to Quality of EMS System	Established KPI (Used by whom?)	Performance Measure/ Goal?	Notes
<p>6. Stroke/TIA Patient Management</p>					
<p>6.1 Percent of suspected CVA/TIA patients who have a FAST exam (i.e. neuro screening) completed and documented <u>or</u> documentation of why an exam could not be completed.</p>	<ul style="list-style-type: none"> • Process measure // Available in WEMSIS* • Numerator includes suspected stroke/TIA patients (primary or secondary impression) with FAST exam performed and results documented, or documentation why FAST exam not possible. (i.e. unresponsive patient) • Denominator includes all patients with primary or secondary impression of CVA/ 	<p>Early identification of potential TIA/CVA patients by EMS ensures that patients are transported to stroke receiving centers which receive notification.</p>	<ul style="list-style-type: none"> • AHA • WA ECS TAC • CA Core Measures 	<p>Goal: more than or equal to 90 percent</p>	<ol style="list-style-type: none"> 1. *WEMSIS can identify suspected CVA/ TIA patients and patients with a FAST exam. Unclear if WEMSIS-3 can identify patients who were ineligible for a FAST exam due to GCS. 2. Final review by neurologists required to confirm utility and value of this measure.

	TIA.				
6.2 Percent of suspected CVA/TIA patients receiving a blood glucose (BG) check.	<ul style="list-style-type: none"> • Process measure // Available in WEMISIS • Numerator includes number of suspected CVA/TIA patients who received a BG check. • Denominator includes all patients with suspected CVA/TIA. 	Hypoglycemia can mimic signs and symptoms of a CVA/TIA, resulting in unneeded diversion to a stroke center and additional stroke team activations.	<ul style="list-style-type: none"> • NHTSA • CA Core Measures 	Goal: more than or equal to 90 percent	<ol style="list-style-type: none"> 1. The BG check will be required for all suspected CVA/TIA patients for whom a FAST (neuro) exam was performed. 2. Some BLS providers/BLS EMS systems may not have capability to measure BG.
6.3 Percent of patients with suspected CVA/TIA, with an EMS scene time (arrival-to-departure of ambulance) less than 20 minutes.	<ul style="list-style-type: none"> • Process measure // Available in WEMISIS • Numerator is percent of suspected CVA/TIA patients with an EMS scene time less than 20 mins. • Denominator is all patients with suspected CVA/TIA. 	Delays in patient transport decrease opportunity for treatment with tPA or other interventions, increasing potential morbidity/mortality.	<ul style="list-style-type: none"> • WA ECS TAC • CA Core Measure • AHA Stroke Assoc. 	Goal: more than or equal to 90 percent	<ol style="list-style-type: none"> 1. Lots of variables. 90 percent percentile goal of less than 15 minutes is unrealistic. Recent study reports mean of 13 minutes and a median of 14 minutes
6.4 Percent of suspected CVA/TIA patients with Time Last Normal less than 6 hours to hospital arrival, in which a Code Stroke alert is activated prior to hospital arrival.	<ul style="list-style-type: none"> • Process measure // Available in WEMISIS • Numerator is number of suspected CVA/TIA patients with Time Last Normal less than 6 hours with a Code Stroke alert activated prior to hospital arrival. • Denominator is number of suspected CVA/TIA patients with Time Last Normal less than 6 hours. 	Early stroke alert notification of hospitals by EMS reduces time for assessment and treatment of CVA patients reducing morbidity and mortality.	<ul style="list-style-type: none"> • AHA • CA Core Measures 	Goal: more than or equal to 90 percent	<ol style="list-style-type: none"> 1. The specified maximum hours for Time Last Normal interval for EMS to perform a stroke alert can be altered, depending upon protocols, by local MPD or EMS region.
6.5 Percent of patients with suspected CV/TIA taken to a designated stroke center.	<ul style="list-style-type: none"> • Process measure // Available in WEMISIS* • Numerator includes number of suspected CVA/TIA patients taken to a designated stroke center. • Denominator includes number of all suspected CVA/TIA patients. 	Transport to a stroke center reduces time to treatment, decreasing patient morbidity and mortality.	<ul style="list-style-type: none"> • AHA • WA ECS TAC • CA Core Measure 	Goal: 100 percent	<ol style="list-style-type: none"> 1. *WEMISIS can determine that a patient went to <u>a</u> stroke receiving center—not necessarily the <u>correct</u> one. 2. Individual MPDs may have to review to confirm that patients are transported to the appropriate receiving center.
6.6 Percent of suspected CVA/TIA patients who have a FAST exam score who have a LAMS Stroke Scale Assessment completed and documented or documentation of why an assessment could not be completed	<ul style="list-style-type: none"> • Process measure // Available in WEMISIS* • Numerator includes number of transported patients creating a provider impression of CVA/TIA who's FAST exam was positive, who received a LAMS Stroke Scale Assessment from EMS and documented or documentation of why an assessment could not be completed • Denominator includes number of transported patients creating a provider impression of CVA/TIA and who's FAST exam score was positive 	Identification of Stroke Severity aids in appropriate patient triage, decreasing patient morbidity and mortality	<ul style="list-style-type: none"> • WA ECS TAC 	Goal: 100 percent	<ol style="list-style-type: none"> 1. Measure used for ongoing evaluation of WA Prehospital Stroke Triage Destination Procedure.

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ADDITIONAL NOTES:
 #1: Performing a FAST exam (and identifying patients with possible CVA) helps ensure that patients go to a stroke center. We are unable to measure time to hospital notification. CA Core Measure has KPI for STROKE ALERT—but it is not supported in current NEMIS data base. Time to “Code Neuro” (or “Code Stroke”) notification may be available in WEMIS Version 3.
 #2: We want to assess percent of time EMS personnel utilize FAST to assess potential CVA/TIA patients—however determining which patients are ineligible for a FAST exam (i.e. GCS of 6) may be a challenge for WEMIS.
 #3: It would be useful to identify accuracy of FAST exam in identifying possible TIA/CVA pts, however this information requiring outcome data would not be available through WEMIS. EMS systems at the local and regional level could choose to analyze accuracy of FAST exam in identifying CVA /TIA patients.

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7. Cardiac Arrest Patient Management					
7.1 Percent of non-traumatic cardiac arrest patients who received bystander CPR.	<ul style="list-style-type: none"> • Process measure // Available in WEMIS • Numerator includes all non-traumatic cardiac arrest patients, who receive bystander CPR—including dispatch-assisted CPR. • Denominator includes all non-traumatic cardiac arrest patients with attempted resuscitation. 	Bystander CPR (including dispatch-assisted CPR) improves patient survival rates.	<ul style="list-style-type: none"> • WACARES/Utstein • AHA • CA Core Measure 	Goal: more than or equal to 50 percent	<ol style="list-style-type: none"> 1. Optional Measure: MPDs and EMS systems can choose to measure percent of patients receiving dispatch-assisted (telecommunicator) CPR instructions. 2. This optional KPI would measure the impact of dispatch-assisted CPR programs.
7.2 Percent of patients (in cardiac arrest before EMS arrival) in an initially “shockable” rhythm, who received first defibrillation in less than 8 minutes, from time the 911 call was received at Fire/EMS dispatch	<ul style="list-style-type: none"> • Process measure // Available in WEMIS • Numerator includes all patients, with non-traumatic cardiac arrest before EMS arrival, who received a first defibrillation in less than 8 minutes, from time the 911 call was received at Fire/EMS dispatch. • Denominator includes all patients with non-traumatic cardiac arrest before EMS arrival, in an initially shockable rhythm (i.e. VF, pulseless VT). 	Survival drops for each minute of delay until defibrillation.	<ul style="list-style-type: none"> • AHA 	Goal: more than or equal to 90 percent	<ol style="list-style-type: none"> 1. Use of any AED, including public-access units, fire/EMS, etc. less than 8 mins. meets goal. 2. Concern raised by MPDs in rural counties over discrepancy in times between urban/suburban vs. rural counties. Does there need to be adjusted standards? 3. AED unit data needs to be input into WEMIS, with time synched with dispatch, if this measure is utilized

<p>7.3 Percent of patients (in cardiac arrest before EMS arrival) with a witnessed collapse and found in an initially “shockable” rhythm, with survival to discharge from the acute care hospital.</p>	<ul style="list-style-type: none"> • Outcome measure // Data NOT in WEMSIS • Numerator includes all patients, with cardiac arrest before EMS arrival, of suspected cardiac etiology, in an initially shockable rhythm who are discharged alive from an acute care hospital to home or a rehab/SNF. • Denominator includes all patients (with cardiac arrest PTA of EMS and of suspected cardiac etiology) with an initially shockable rhythm. • Follows Utstein Template Model. 	<p>Measure of patient outcome provides an evaluation of EMS system performance.</p>	<ul style="list-style-type: none"> • WACARES/Utstein • AHA 	<p>Goal: more than or equal to 50 percent</p>	<ol style="list-style-type: none"> 1. Witnessed VF survival is more than 50 percent in several EMS systems. However, 30 percent to 40 percent survival rates might be a good, attainable number for many systems to start. 2. Outcome data can be obtained through WACARES—not WEMSIS.
<p>7.4 Percent of overall cardiac arrest patients with survival to discharge from hospital.</p>	<ul style="list-style-type: none"> • Outcome measure // Data NOT in WEMSIS • Numerator includes all non-traumatic patients in cardiac arrest, discharged alive from a hospital to home, or a rehab/ SNF. • Denominator includes all patients in cardiac arrest, of suspected cardiac etiology, with attempted resuscitation by providers. 	<p>Measure of patient outcome provides an evaluation of EMS system performance.</p>	<ul style="list-style-type: none"> • WACARES/Utstein • AHA • CA Core Measure 	<p>Goal: more than or equal to 10 percent</p>	<ol style="list-style-type: none"> 1. Cardiac arrest survival rates vary widely by EMS system—with some variation due to protocols on which patients even receive resuscitation efforts. 2. Outcome data can be obtained through WACARES—not WEMSIS.

ADDITIONAL NOTES:

#1: The WACARES and Utstein templates provide a recognized system for gathering and analyzing cardiac arrest data. Recommendations have been made to use WACARES elements as *the* KPI bundle for CPR patients. WACARES will be valuable as a data source—particularly for outcome data. Workgroup members continuing to consult with King County Medic One and WACARES staff on cardiac arrest KPIs.

#2: Response time was discarded as a KPI. Unclear if it was needed since KPI#3 measures time from dispatch to first defibrillation, although this only reports out on the @25 percent-30 percent of patients found initially in shockable rhythm.

#3: “ROSC on ED arrival” has been deleted as a KPI. Focus is on patient discharge. “ROSC”—“we had a pulse” has been found, anecdotally to highly subjective, not sure of its validity.

#4: The use of patient first contact with 911 (the Public Safety Access Point—law enforcement dispatch) is recommended in many references. However, PSAPs are often uncooperative in releasing info, and this info is not available as a data point in many ePCR programs, or in WEMSIS (?)

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8. Advanced Airway Management					
<p>8.1 Percent of patients intubated with “first pass” success.</p>	<ul style="list-style-type: none"> • Process measure // Available in WEMSIS • Numerator includes number of patients successfully intubated with ET tube on first attempt. See definition of “attempt” in notes section. • Denominator includes number of patients intubated successfully, regardless of number of attempts. 	<p>ET intubation can provide airway protection, but additional attempts can increase rate of patient hypoxia, airway trauma and other complications.</p>	<ul style="list-style-type: none"> • ? 	<p>Goal: more than or equal to 80 percent</p>	<ol style="list-style-type: none"> 1. Many studies document importance of “1st Pass” success to prevent patient hypoxia, and list success rates in systems. No established standard of expected rate. 2. An attempt is defined as “any attempt to insert an ET tube or boogie past the teeth”.

<p>8.2 Overall percent of patients who are successfully intubated with an ET tube.</p>	<ul style="list-style-type: none"> • Process measure // Available in WEMISIS • Numerator includes number of patients who were successfully intubated with an ET tube, regardless of number of attempts. • Denominator includes total number of patients who received ET intubation attempts, whether successful or not. 	<p>Measure of skills proficiency of EMS providers. Note: ETI provides optimal airway protection, however missed attempts can worsen patient outcome.</p>	<ul style="list-style-type: none"> • CA Core Measure 	<p>Goal: more than or equal to 90 percent</p>	<p>1. Some systems define this KPI with limits on the number of ET attempts permitted—often 3 or 4 max attempts. If additional attempts are utilized, no “credit” is given even if the ET tube is placed due to increased risk to the patient.</p>
<p>8.3 Overall percent of patients with successful placement of a supraglottic (SGA) airway.</p>	<ul style="list-style-type: none"> • Process measure // Available in WEMISIS • Numerator includes number of patients with successful placement of a SGA, regardless of number of attempts. • Denominator includes total number of patients with attempts to place a SGA. 	<p>Measure of skills proficiency of EMS providers. In most clinical studies, use of SGAs provide equivalent (or better) patient outcomes.</p>	<ul style="list-style-type: none"> • ? 	<p>Goal: more than or equal to 90 percent</p>	<p>1. “Successful placement” can be defined as confirmation with auscultation of lungs, ETCO₂, bulb-syringe devices, etc., permitting effective ventilation of patients.</p>
<p>8.4 Overall percentage of patients who are successfully intubated or who have a supraglottic airway (SGA) successfully placed.</p>	<ul style="list-style-type: none"> • Process measure // Available in WEMISIS • Numerator includes number of patients successfully intubated OR who had a supraglottic airway successfully placed. • Denominator includes total number of patients who received ET intubation attempts and/or SGA airway placement attempts. 	<p>Measures total system performance in managing airways with ET tubes as well as SGA devices.</p>	<ul style="list-style-type: none"> • ? 	<p>Goal: more than or equal to 90 percent</p>	<p>1. Decreases emphasis on ET intubation—emphasis is on airway management, even if other devices are utilized.</p>
<p>8.5 Percent of patients and patients with SGAs with documentation of continuous wave-form ETCO₂.</p>	<ul style="list-style-type: none"> • Process measure // Available in WEMISIS • Numerator includes number of patients with an ET tube or with a supraglottic airway placed who also had documentation of continuous wave-form ETCO₂. • Denominator includes total number of patients with ET tube or SGA placed. 	<p>Misplaced ET tubes and SGA airways can increase patient mortality and morbidity. Wave-form ETCO₂ is recognized as the “gold standard” for confirming ET tube placement.</p>	<ul style="list-style-type: none"> • CA Core Measure 	<p>Goal: more than or equal to 90 percent</p>	<p>1. Wave-form ETCO₂ can be utilized on ET tubes as well as most SGAs. 2. Some EMS systems (particularly BLS systems) may not have wave-form capnography available, in which case use of capnometry and litmus-color devices should be utilized.</p>

ADDITIONAL NOTES:
 #1: Large number of EMS clinical performance studies in advanced airway management—but with widely variable results. Challenge is trying to find KPIs defining “quality patient care” and data points that can be retrieved through WEMISIS.
 #2: KPI Workgroup believes that continuous wave-form ETCO₂ is a better indicator for correct ET placement than “Unrecognized Esophageal ET placement”—which could have highly variable reporting results depending upon local system feedback by ED physicians and medical examiners.



General Notes on WA State EMS System Key Performance Indicators:

Proposals for several KPI “bundles” were brought to the KPI Workgroup by TACs, MPDs and other providers. The KPI Workgroup evaluated the KPI suggestions below, but ultimately decided to defer inclusion of any of the specific KPIs until there are revisions to the current list of eight topics. The Workgroup believes that even eight KPI topics is a substantial number. If all eight KPIs were utilized by a particular EMS system, up to 25 percent of all EMS patient contacts in that system would be reviewed for clinical performance.

Deferred KPI Bundles:

1. **Pediatric Patient Care**—while there are no specific KPI bundles dedicated to EMS pediatric patient care, several of the KPI groups can be utilized (with age criteria) to examine pediatric patient care management:
 - a. Pediatric cardiac arrest.
 - b. Pediatric critical trauma patient management-- percent of patients going to the correct Peds Trauma Facility—INCLUDED (use age to separate out Step 1 and Step 2 pediatric patient transports)
 - c. Pediatric asthma patient management— percent of Asthma patients receiving bronchodilator—INCLUDED (use age to separate out pedi results from KPI above).
 - d. Pediatric seizure patient management— percent of patients who receive BG check and, if ongoing seizure, treated with benzodiazepine.
 - e. Pediatric advanced airway management.
2. **Older Patient Fall Management**—considered by Workgroup, but deferred until next KPI version. More analysis needed to determine what KPIs would be relevant.
3. **Pain Management**—deferred by Workgroup. Clinical controversies ongoing regarding ongoing over and under-treatment for pain management.
4. **Treatment of Allergic Reaction Patients with Epi**—under discussion—could include pediatric patients.

Definitions:

<p><i>ACS—Acute Coronary Syndrome—cardiac-related list of signs and symptoms, such as chest pain, respiratory distress, nausea, etc.</i></p> <p><i>Ambulance—a private, 3rd service, or fire-based BLS or ALS transport unit</i></p> <p><i>BG—blood glucose level</i></p> <p><i>CA Core Measure—system of EMS performance measures implemented by CA State EMS in 2013</i></p> <p><i>CPAP—Continuous Positive Air Pressure</i></p> <p><i>E2B—EMS to Balloon Time for STEMI patients</i></p> <p><i>ETI—endotracheal intubation</i></p> <p><i>NHTSA—Nat’l Hwy Traffic Safety Admin—EMS Performance Measures Project completed in cooperation with National Association of EMS State Officials</i></p> <p><i>PSAP—public safety answering point. Law enforcement dispatch center, typically answers 911 call, then transfers if fire/EMS to a fire dispatch center. Can lead to dispatch delays and it is difficult to obtain data</i></p>	<p><i>PTA—prior to arrival (of EMS)</i></p> <p><i>Patients—patients</i></p> <p><i>ROSC—Return of Spontaneous Circulation</i></p> <p><i>STEMI—ST elevation Myocardial Infarction—particular type of heart attack—definitive treatment available in cardiac catheterization labs</i></p> <p><i>Utstein—internationally recognized system for benchmarking cardiac arrest survival</i></p> <p><i>WACARES—WA Cardiac Arrest Registry for Enhanced Survival. Grant funded through CDC focusing on CPR patient survival. Many EMS systems from around U.S. reporting data</i></p> <p><i>WEMSIS—Washington EMS Information System</i></p>
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from some PSAPs

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