Region IX / NWC EMSS 2014 SOP Changes, rationales, & references

Objectives:

After completing the class, reviewing the SOP document, and independent study of the post-test bank, each participant will do the following with a degree of accuracy that meets or exceeds the standards established for their scope of practice:

Cognitive:

1. Identify the major changes in each section of the new SOPs and explain their rationales.

Psychomotor:

2. Safely adapt EMS practice to implement the changes when caring for patients or providing OLMC no later than June 1, 2014.

Affective

3. Accept and defend the need to modify System protocols to national evidence based practice standards as they are published.

Notes:

Region IX 2014 SOP Changes, rationales, & references

SOP section	CHANGES, RATIONALE, CITATIONS
Introduction	• Listed full name of the organizations that provide national standards or guidelines to provide clarity for those that may not be familiar with the initials only. • Added that only decisional adults can provide consent or refusals as a point of law. • Defined that minors are < 18 years of age as a point of law and added treatment authorization under the Emergency Doctrine to align with System policy. • Added clause, and in accordance with System policy, to Lights and Sirens to allow Systems to flesh out their practice more fully within their individuals policy manuals. • Added POLST to the DNR/Advanced Directive policies as a point of law. Illinois will be changing the DNR form again in the near future to remove the words DNR and only refer to it as a POLST-compliant form.
General assessment May need to rely more on AVPU scoring as the initial evaluation of mental status.	Sets the stage for EMS being allowed to append records to the hospital electronic patient record system as integrated health systems develop. **GLASGOW COMA SCALE SCORES (GCS) ARE OFTEN INACCURATE** Bryan Bledsoe, Univ of Nevada Despite standardization, there appears to be significant variation in GCS scoring by various emergency health-care professionals. Such discrepancies can complicate emergency care. Results: A total of 217 emergency health-care professionals took part in the study. There were 2,084 total GCS observations with complete data sets for analysis. Overall GCS scoring accuracy was 33.1% (95% CI: 30.2-36.0). **Conclusions: Only one-third of GCS scores were accurate** in this mixed emergency health-care provider cohort. Strategies should be developed to promote improved accuracy of GCS scoring or development of a simpler tool should be considered.
Initial Medical Care (IMC) O2 needs to be titrated based on SpO2; COPD parameters included Hyperoxia contraindications listed	• Deleted statement re: spine motion restriction; not needed for medical pts; reflects the changing practice to consider need to spine motion restriction selectively • Not new learning, but new to the SOPs. Lists SpO_2 target of 92% for those with COPD to align with best practice models and prevent over-correction w/ too much oxygen. **See abstract at end of this document**. Lists those patients for whom hyperoxia is harmful: Uncomplicated Acute MI; post-cardiac arrest; acute exacerbations COPD; stroke; newborn resuscitation. Give O_2 to these pts only if evidence of hypoxia and titrate to dose that relieves hypoxemia without causing hyperoxia (SpO_2 >94%) Iscor, S. et al. (2011) Supplementary oxygen for nonhypoxemic patients: O(2) much of a good thing? Crit Care, 15(3), 305
Lidocaine flush dosing for IO	• **Added Lidocaine** 2% 1 mg/kg (max 50 mg) **IO before NS flush** in an IO line of a **conscious or responsive pt** to prevent pain. Not a new practice; new to SOP.
	• Added option of elevating head of stretcher 10-30° in pts w/ AMS to help prevent aspiration.
MAP added throughout	• **Pain mgt:** SBP ≥ 90 (MAP ≥ 65): Consider all pts as candidates for pain mgt regardless of transport interval. Blood pressures throughout the document have added the target mean arterial pressures **a**s a point of assessment that are more meaningful to **evaluating tissue perfusion** than the systolic and diastolic pressures alone. A full description of how to calculate the MAP if a non-invasive BP monitor is not used; and the normal ranges are found in the SHOCK SOP (p. 36).
Fentanyl dose clarified	• This has been an area of misunderstanding and questions since the last SOPs were issued. Fentanyl should always be dosed based on patient size, age, &/or state of health with a max divided dose of 1 mcg/kg followed by 0.5 mcg/kg if needed to equal a **total dose of 1.5 mcg/kg by SOP** and subsequent divided doses **of 0.5 mcg/kg prn up to 3 mcg/kg** (max 300 mcg) based on OLMC order.
Removed reference to transporting to an ED	• Transport in the future may be to places/healthcare facilities other than a hospital. Where appropriate, references to transporting only to a hospital have been removed in anticipation of evolving Mobile Integrated Healthcare practice. Deleted requirement for a physician to certify need to transport to further location. No longer in state law, rules, or IDPH policy statements. Verification may be done by ECRN or physician.

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Emergency Drug Alternatives Ketamine dose chart **Norepinephrine (levophed) added as an alternative to dopamine**	The ongoing drug shortage makes it prudent to pre-identify drugs that are approved for EMS scope of practice and can be rapidly exchanged when the primary drug is not available. This entire page is new; listing the indications and dosing **for KETAMINE, MORPHINE, and NOREPINEPHRINE (levophed).** A ketamine **dosing chart for PEDs patients** has been created listing doses at 1 mg/kg. Given that the standard dose for sedation is 2 mg/kg and the IVP dose for pain is 0.5 mg/kg, and the IM dose for pain is 1 mg/kg the values on the chart must be doubled, halved or given as calculated depending on the indication for the drug and the route given. **REVIEW THESE DOSES and updated drug profile CAREFULLY** De Backer, D., Biston, P., Devriendt, J., Madl, C., Chochrad, D., Aldecoa, C., Brasseur, A., Defrance, P., Gottignies, P., and Vincent, J.L. (2010). Comparison of dopamine and norepinephrine in the treatment of shock. NEJM, 362(9), 779-789. **REVIEW the DRUG PROFILE, drip preparation, and dosing carefully**
Radio report	Signs and Symptoms added as a point of patient history – clean up
Withholding or Withdrawing Resuscitative Efforts	Advance Directive Section all new – written in compliance with State DNR/POLST form issued in March and taught in May of 2013. Brings SOP into compliance with law and System policy. No new content for System members to learn.
Termination of Resuscitation	Minor changes that bring the SOP into ALS guidelines from AHA.
Geriatric patients changed to ELDERLY	Title change to reflect conventional reference to those 65 and older. • Adds CPAP as possible O2 delivery device • Lists common conditions to anticipate • Emphasizes need to ask about medication compliance and anticoagulant use • Allows for selective spine immob; inform ED if elderly pt left w/ them on a board • Refers to System policy re: refusals: All elderly pts must be called in from scene
Extremely Obese patients	• Defines bariatrics • Auscultate lung sounds over back first for better sounds & early warning of crackles • Use right size BP cuff; ask about recent gastric surgery • A&P changes aligned with Region IX trauma guidelines – see mark up edition
Airway obstruction	No change
Drug Assisted Intubation (DAI)	• $SpO_2 \leq 90$; $EtCO_2 \geq 60$ added as possible indicators for DAI • Recommendation to use bougie placed as higher priority for even 1st attempt if difficult airway anticipated • **All references to giving midazolam now begin with caveat if SBP ≥ 90/ MAP ≥65** since in the presence of hypotension a significant further drop in BP may occur. If pt is hypotensive – go directly to etomidate for sedation prior to DAI. "Midazolam is the most rapidly acting benzodiazepine, making it the benzo of choice for rapid sequence intubation (RSI). The induction dose is 0.1 to 0.3 mg/kg IV push, with a time to effect of ~30 to 60 seconds, and a duration of action of 15 to 30 minutes. The routine induction dose for RSI is 0.2 mg/kg [our SOP says 5 mg as we are following it with etomidate]. At this dose, midazolam causes moderate hypotension, with an average drop in MAP in healthy patients of 10% to 25%. This tendency to induce hypotension limits its usefulness in the setting of hypovolemia or shock. If it must be used in hypotensive patients, we suggest a dose of 0.1 mg/kg which will somewhat delay the speed of onset and the depth of sedation achieved, but should not severely compromise intubating conditions. For patients in shock, we suggest etomidate or ketamine because of their superior hemodynamic profiles." (www.uptodate.com) **All midazolam IVP timing has been changed to slow IVP**. This will reduce the likelihood of hypotension. Dosing increments for anxiety and mild sedation changed from every 30 to 60 second to every 2 minutes, as it takes that long for small doses to show an effect and the goal is to provide a minimal dose titrated to desired effect. Additional references: Choi, Y.F., Wong, T.W., Lau, CC. (2004). Midazolam is more likely to cause hypotension than etomidate in emergency department rapid sequence intubation. Emerg Med J;21:700–702. doi: 10.1136/emj.2002.004143

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	• Removed the caveat about *if not adequately sedated*…Etomidate should be given in all patients needing DAI unless contraindicated. • Added option to go directly to an alternate advanced airway if DAI unsuccessful or ETI attempts not advised. We thought this option to be understood, but it was requested as a clarification in SOPs by System members. This is highly supported by best practice models of EMS airway management: Bledsoe, B.E., Braude, D., Eckstein, M., Gandy, W.E., Tan, D.K., Wang, H., & Wayne, M. (Posted Feb 22, 2012). Rethinking ETI. EMS Airway Clinic; Best Practices in Airway Management & Education. Reprinted from JEMS, 35(7) with the permission of Elsevier Inc. *Dr. Bledsoe:* What will prehospital airway management look like in five years? Certainly, the increasing use of ketamine as an analgesic/sedative agent will change the face of things—especially trauma. *Dr. Eckstein:* I agree. I think the routine use of ketamine to control the multitrauma patient will eventually replace RSI.. *Dr. Wang:* I think there will be a decreased emphasis on ETI and a strong shift toward primary alternate airway use. *Dr. Braude:* Bryan, let me tell you what it won't look like—a metal laryngoscope handle and blade. There will be far more use of extraglottic airways and video laryngoscopy with little in between. *Mr. Gandy:* With the advent of devices, such as the GlideScope Ranger and the AirTraq, and further development of adjuncts to intubation and alternative (supraglottic) airways, medics will have an improved arsenal of tools for airway management. However, if services don't provide those tools together with training and education in their use, prehospital ETI will continue to fall under scrutiny and criticism. Airway management is the most important part of any critical patient's care, yet only a fraction of the time in most training programs is devoted to it. We must either make a commitment to adequate training or find another model for airway management than ETI. *Dr. Tan:* I think there will be more utilization of video laryngoscopy to enhance the success rates of prehospital RSI. We'll also see an increased usage of supraglottic airways—especially in cardiac arrest.
Patients w/ Tracheostomy	No change
Allergic reaction Anaphylaxis:	**Anaphylaxis**: If No IV/IO AND while vascular access is being established: **EPI (1:1,000) IM in vastus lateralus muscle of the leg.** Dose was reduced from 1 mg to 0.5 mg IM that can be repeated X 1 in 5-10 min. This brings our SOP in line with other evidence based protocol ranges (0.3 to 0.5 mg IM) and encourages early administration of Epi as soon as anaphylaxis is suspected. Once vascular access is established, Epi should be given in increments IVP/IO per usual protocol.
Asthma/COPD	**Allows for PEEP to be titrated down from 10 cm to 5 cm if the BP starts to drop** after CPAP application. Avoids an automatic discontinuing of CPAP therapy. Pts with asthma tend to have air trapping in the chest. If CPAP over-pressurizes the chest, rather than allowing better exhalation, venous return to the heart could be reduced, thus dropping the BP. Titrate PEEP values to maintain MAP ≥ 65.
Acute Coronary Syndromes (ACS) Updated language taken from **Mission Lifeline recommendations** for Criteria for STEMI Systems of Care	Change requested by the Trauma Committee: **Do not give ASA to patients c/o chest pain following trauma.** Their pain is unlikely to be due to ischemia from a developing clot in their coronary artery that ASA would impact, and it could alter their platelets in a way that could impair their ability to clot. There is an increased emphasis on **acquiring a clean 12 lead** with no artifact and **transmitting the tracings** to the hospitals so we can reduce EMS to balloon (E2B) time. We anticipate that the current guideline target of 90 minutes may be reducing to 60 minutes as the AHA protocols evolve. Throughout the document you will see Fentanyl: Standard dosing to save words on the page. The standard dosing is written out fully under IMC and in the drug appendix. It may be repeated on individual pages if space was available.

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Bradycardia with a Pulse	We are trying one more time to clarify the order of care for these patients: • Atropine (if not contraindicated) • Dopamine if atropine is contraindicated • Pacing, only if one or both of the above are contraindicated, ineffective, or no IV Side by side table has been redesigned to a traditional top-down approach.
Narrow QRS Complex Tachycardia	Small addition to check monitor-specific recommendations for joule settings for cardioversion. An individual manufacturer may have different numbers than those on our tables. Know your equipment - and use per manufacturer's recommendations.
Wide Complex Tachycardia with a pulse	Should the full dose of amiodarone should be given to a stable pt once the rhythm converts? YES. It should still be pushed slowly to ensure that a therapeutic blood level is achieved and the patient does not go back into VT from persistent ventricular irritability. That note was included in the previous SOP under the peds section, and has now been added to the adult page. Joule settings for cardioversion affirmed with Zoll and PhysioControl.
V-Fib / Pulseless VT Additional reasons why we should not intubate right away when the patient is in cardiac arrest: **Epi and vasopressin** **Quality CPR elements clarified** **Emphasize continues on quality CPR and adds the use of a CPR feedback device**	As technology-dependent patients become more frequent, we needed to make reference to the **Lifevests** (external defibrillator pads in them) that some pts are wearing (which need the batteries disconnected), while we stress that the **Ventricular Assist Device** batteries are NOT to be removed. "Disconnect Lifevest batteries; remove vest if present; DO NOT disconnect VAD batteries – See p. 22". There is a whole new protocol for VADs. Wang, H.E., Szydlo, D., Stouffer, J.A., Lin, S., Carlson, J.N., Vaillancourt, C., Sears, G., Verbeek, R.P., Fowler, R., Idris, A.H., Koenig, K., Christenson, J., Minokadeh, A., Brandt, J., Rea, R. (The ROC Investigators). (2012). Endotracheal intubation versus supraglottic airway insertion in out-of-hospital cardiac arrest. Resuscitation, 83, 1061–1066 Order of use optional. Either may be given first, but practically, the epi is preloaded and can be given while the vasopressin is being drawn up. No new learning – we've taught this for a long time. It's just found its way to the SOP page. Bobrow, B.J., Vadeboncoeur, T.F., Silver, A.F., Tobin, J.M., Crawford, S.A., Mason, T.K., Schirmer, J., Smith, G.A., & Spaite, D.W. (2013). **The influence of scenario-based training and real-time audiovisual feedback on out-of-hospital cardiopulmonary resuscitation quality and survival from out-of-hospital cardiac arrest**. Annals *of* Emergency Medicine **Study objective**: We assess whether an initiative to optimize out-of-hospital provider cardiopulmonary resuscitation (CPR) quality is associated with improved CPR quality and increased survival from out-of-hospital cardiac arrest. **Methods**: This was a before-after study of consecutive adult out-of-hospital cardiac arrest. Data were obtained from out-of-hospital forms and defibrillators. Phase 1 included 18 months with real-time audiovisual feedback disabled (October 2008 to March 2010). Phase 2 included 16 months (May 2010 to September 2011) after scenario-based training of 373 professional rescuers and real-time audiovisual feedback enabled. The effect of interventions on survival to hospital discharge was assessed with multivariable logistic regression. Multiple imputation of missing data was used to analyze the effect of interventions on CPR quality. **Results**: Analysis included 484 out-of-hospital cardiac arrest patients (phase 1 232; phase 2 252). Median age was 68 years (interquartile range 56-79); 66.5% were men. CPR quality measures improved significantly from phase 1 to phase 2: Mean chest compression rate decreased from 128 to 106 chest compressions per minute (difference _23 chest compressions; 95% confidence interval [CI] _26 to _19 chest compressions); mean chest compression depth increased from 1.78 to 2.15 inches (difference 0.38 inches; 95% CI 0.28 to 0.47 inches); median chest compression fraction increased from 66.2% to 83.7% (difference 17.6%; 95% CI 15.0% to 20.1%); median preshock pause decreased from 26.9 to 15.5 seconds (difference _11.4 seconds; 95% CI _15.7 to _7.2 seconds), and mean

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	ventilation rate decreased from 11.7 to 9.5/minute (difference _2.2/minute; 95% CI _3.9 to _0.5/minute). All-rhythms survival increased from phase 1 to phase 2 (20/231, 8.7% versus 35/252, 13.9%; difference 5.2%; 95% CI _0.4% to 10.8%), with an adjusted odds ratio of 2.72 (95% CI 1.15 to 6.41), controlling for initial rhythm, witnessed arrest, age, minimally interrupted cardiac resuscitation protocol compliance, and provision of therapeutic hypothermia. Witnessed arrests/shockable rhythms survival was 26.3% (15/57) for phase 1 and 55.6% (20/36) for phase 2 (difference 29.2%; 95% CI 9.4% to 49.1%). **Conclusion:** Implementation of resuscitation training combined with real-time audiovisual feedback was independently associated with improved CPR quality, an increase in survival, and favorable functional outcomes after out-of-hospital cardiac arrest. Meaney, P.A., Bobrow, B.J., Mancini, M.E., Christenson, J., de Caen, A. R., Bhanji, F., Abella, B.S., Kleinman, M.E., Edelson, D. P., Berg, R.A., Aufderheide, T. P., Menon, V., and Leary, M. (June 25, 2013). **CPR quality: Improving cardiac resuscitation outcomes both inside and outside the hospital : A consensus statement from the AHA.** Downloaded from http://circ.ahajournals.org/ by guest on June 25, 2013. **Final Recommendations** 1. High-quality CPR should be recognized as the foundation on which all other resuscitative efforts are built. Target CPR performance metrics include a. CCF >80% b. Compression rate of 100 to 120/min c. Compression depth of ≥50 mm in adults with no residual leaning (At least one third the anterior-posterior dimension of the chest in infants and children) d. Avoid excessive ventilation (Only minimal chest rise and a rate of <12 breaths/min) 2. At every cardiac arrest attended by professional rescuers a. Use at least 1 modality of monitoring the team's CPR performance b. Depending on available resources, use at least 1 modality of monitoring the patient's physiological response to resuscitative efforts c. Continually adjust resuscitative efforts based on the patient's physiological response 3. Resuscitation teams should coordinate efforts to optimize CPR during cardiac arrest by a. Starting compressions rapidly and optimizing CPR performance early b. Making sure that a team leader oversees the effort and delegates effectively to ensure rapid and optimal CPR performance c. Maintaining optimal CPR delivery while integrating advanced care and transport 4. Systems of care (EMS system, hospital, and other professional rescuer programs) should a. Determine a coordinated code team response with specific role responsibilities to ensure that high-quality CPR is delivered during the entire event b. Capture CPR performance data in every cardiac arrest and use an ongoing CPR CQI program to optimize future resuscitative efforts c. Implement strategies for continuous improvement in CPR quality and incorporate education, maintenance of competency, and review of arrest characteristics that include available CPR quality metrics 5. A national system for standardized reporting of CPR quality metrics should be developed: a. CPR quality metrics should be included and collected in national registries and databases for reviewing, reporting, and conducting research on resuscitation b. The AHA, appropriate government agencies, and device manufacturers should develop industry standards for interoperable raw data downloads and reporting from electronic data collected during resuscitation for both quality improvement and research CCF, chest compression fraction; CQI, continuous quality improvement Information sourced from *NEJM Journal Watch:* **CPR: Push Hard, Push Fast, Push Deep** ***Chest compressions deeper than 2 inches were associated with improved survival and neurological outcomes.*** Starting in 2010, AHA guidelines increased the recommended chest compression depth to at least 51 mm (2 inches). Using real-time audiovisual feedback, researchers prospectively analyzed chest compression depth and outcomes in 593 consecutive adults with out-of-hospital cardiac arrest of presumed cardiac etiology in two emergency medical services systems in Arizona from 2008 to 2011.

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	Twenty-three percent of patients had return of spontaneous circulation, 11% survived to hospital discharge, and 8% had favorable neurological outcomes (defined as Cerebral Performance Category Scores of 1 or 2) at hospital discharge. Survivors were more likely to have witnessed arrests, initial shockable rhythms, or hypothermia treatment. Mean compression depth was <38 mm in 16% of patients, 38 to 51 mm in 36%, and ≥51 mm in 47%. There was an independent association between deeper chest compression and improved survival (mean depth, 53.6 mm in survivors vs. 48.8 mm in non-survivors) and functional outcomes. In addition, each 5-mm increase in mean compression depth increased the odds of both survival and favorable functional outcomes (adjusted odds ratios, 1.29 and 1.30). **COMMENT** This study shows only an association and not causation. Nevertheless, it highlights chest compression depth as another quality indicator for cardiopulmonary resuscitation. Until more data become available on optimal compression depth, be sure to push to a depth of at least 2 inches, in addition to minimizing any interruption in chest compressions and maintaining an adequate compression rate. *Kristi L. Koenig, MD, FACEP, FIFEM reviewing* *Vadeboncoeur T et al. (2013 Oct 12.)* Chest compression depth and survival in out-of-hospital cardiac arrest. *Resuscitation*. [PubMed® abstract] --- Also see: ***Change in Scenery: Re-Thinking On-Site Management of Cardiac Arrest?*** Paul R. Hinchey, MD, MBA, FACEP, Medical Director, Austin-Travis County EMS, National Association of EMTs. Presentation available at: www.gatherineofeagles.us/2014 ---
Post-cardiac arrest care	**Post-cardiac arrest (ROSC) care has been subject to controversy lately.** **Key objectives/recommendations for post-arrest care:** • Optimize CV and hemodynamic function to maintain vital organ perfusion • Core body temperature control; higher temps than originally targeted may be OK • Access appropriate hospitals specializing in coronary care - EMS should transport pts with ROSC to hospitals that can appropriately manage their care • Identify acute coronary syndrome • Optimize mechanical ventilation – avoid hyperoxia, hyperventilation and maintain normal glucose levels • Assess prognosis and assist survivors Vasoactive medications should usually be titrated to achieve a MAP goal of 65 to 75 mm Hg, employing the lowest dose possible to achieve this hemodynamic goal. There has been a recent exception to this rule, **utilizing mean arterial blood pressure in the range of 80 to 100 mm Hg in out-of-hospital**, post-cardiac arrest patients in a model of early goal-directed hemodynamic optimization combined with therapeutic hypothermia, yielded improved results in this one small study of cardiac arrest patients. (Resuscitation 2009;80[4]:418.) For this reason, Post-ROSC care is the only time the SOPs specify a higher MAP than 65 as the goal. --- Nielsen, N. et al. (2013) Targeted temperature management at 33°C versus 36° C after cardiac arrest. New Engl J Med, 369:2197-2206 • Compared 32 -33 to 35 -36 TH • No unwitnessed asystole patients • 24% intravascular; 76% surface cooled • 28 hours of cooling • Rewarmed at 0.5 /hour **The future of deep TH is unclear** • Preventing Hyperthermia appears crucial • Future studies will determine optimal TH temp • 35 – 36 looks like the new 32 – 34

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Therapeutic hypothermia benefits?	*Kim, F. et al. (2013). Effect of prehospital induction of mild hypothermia on survival and neurological status among adults with cardiac arrest. A randomized clinical trial. JAMA* **Does Prehospital TH have benefits?** • 1.359 patients; Randomized trial • King County Washington Medic 1 • 583 with VF; 776 without VF • Almost all patients cooled on hospital arrival • EMS cooling: up to 2L of 4 C LR • Mean core temp decreased by 1.20 C to ED • EMS patients took 1 hr less to get to 34 • Study evaluated mortality and neuro status • EMS pts: 7-10mg pavulon + 1-2mg valium • No improvement in neuro status in any group • EMS TH group had more re-arrests (26% vs 21%; p = 0.008) • EMS TH group had more pulmonary edema (41% vs 30%; p < 0.001) • No difference in pressor use (9%) In our area, the early initiation of cooling by EMS has resulted in continued cooling upon arrival. Our initiation of TH at the hospitals may not be as rapidly aggressive as that in King County Washington. We will be watching this literature carefully. **Also see: The 5 most important research articles Eagles 2014 by Corey M. Slovis, MD,** Vanderbilt University Medical Center, Metro Nashville Fire Department, Nashville International Airport, Nashville, TN
Asystole / PEA **Should we work them longer?**	**Wake County (No Carolina) EMS approach to cardiac arrest** (See: Wake EMS and SAS: Public Private partnership to improve cardiac arrest care. Eagles presentations 2014.) • Community-wide approach to improving resuscitation outcomes • Natural experiment with prospective data collection and observation • Continuous compressions, controlled ventilations, working codes “on-scene”, and induction of hypothermia *Points 1 & 3 sound like us…however, they look carefully at their data* **Multiple factors are known to impact cardiac arrest survival** • Age • Initial Cardiac Rhythm • Witnessed status **Other factors seem to impact survival** • Presence of continuous compressions • Controlled ventilations • Presence of induced hypothermia (Post ROSC evolving to pre-ROSC) Wake County partnered with SAS to study and report on their data: **90 percent of neurologically intact survivors had ROSC at 40 minutes of resuscitation** 29 of 42 survivors with resuscitation beyond 40 minutes had NIS (69%, (CI 54-81%) • Presence of continuous compressions • Controlled ventilations • Presence of induced hypothermia **CARES Registry Termination of resuscitation (TOR)** **BLS Rule** / **ALS Rule** Not witnessed by EMS / Not witnessed by EMS Non-shockable rhythm / Non-shockable rhythm **No ROSC** / **No ROSC** Not by-stander witnessed No bystander CPR Wake County data **implications for EMS:** Prolonged resuscitative efforts with continuous compressions, controlled ventilations, and hypothermia can reliably produce neurologically intact survivors **well beyond 25 minutes of resuscitation**

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Heart failure/pulmonary edema	Hospitals desire a recently acquired 12L on all patients in pulmonary edema to r/o ischemia or AMI as a cause. Box added for **anticoagulants** as a reference for the many new drug names
LVADs	New protocol listed for **left ventricular assist device (LVAD)**. This is consistent with the procedure that has been taught before in CE and is in our **Procedure Manual**
Acute abdominal/flank pain	Removed prohibition against giving fentanyl if pt has S&S of peritonitis Added several of the most serious GI complaints to consider if pt has abdominal distress
Dialysis/Chronic Renal Failure Emergencies	No change
Altered mental status	No substantial change
Alcohol intoxication/ withdrawal	▪ References alternate advanced airway in addition to ETI ▪ Adds "amount" of last alcohol ingestion to history ▪ Adds cerebellar assessment for ataxia to determine degree of impairment ▪ Treatment of seizures placed as a higher priority than obtaining a glucose level ▪ Opens the future door to not only transporting these patients to a hospital. May be needed in a Mobile Integrated Healthcare model.
Diabetic / glucose emergencies	Incorporates D10%W dosing introduced to the System last May
Drug OD/Poisoning	Page reorganized to modify sections based on the classes of drugs mentioned in the EMS education standards and contemporary practice. Examples of drugs expanded. New categories • Beta blocker • Cyclic antidepressans: A note is added that these do **NOT** include serotonin reuptate inhibitors (SSRIs) like Paxil, Prozac, Luvox, Zoloft • Depressants • Dextromethorphan • Hallucinogens: Note added to decrease environmental stimuli • Inhalents • Narcotics changed to Opiates • Organophosphates • Stimulants
Carbon monoxide / cyanide poisoning	No change
Cold emergencies	CPR section clarified to align with other cardiac arrest protocols
Near drowning name change to Drowning and Submersion Incidents	No major changes to protocol; just name to reflect contemporary reference
Heat emergencies	Provision to use cold saline to cool a pt with heat stroke Reflects new literature that discovered more effective cooling if a cold pack was placed on the palms of the hands or cheeks. *A randomized controlled trial of a novel application of chemic cold packs for treatment of exercise-induced hyperthermia* John Lissoway, Grant Lipman, Dennis Grahn, Vinh Cao, Michael Shaheen, Samson Phan, Eric Weiss, Craig Heller, Stanford Univ
Hypertension/ hypertensive crisis	Adds recommendation to do a quick stroke screen on these patients as severe HTN can result in a stroke or be a S&S that accompanies a stroke
Psychological emergencies	No change other than midazolam dosing
Seizures	Reminder that benzodiazepine administration takes precedence over bG determination in pts who are actively seizing

SOP section	CHANGES, RATIONALE, CITATIONS
	WHEN SHOULD YOU TEST FOR AND TREAT HYPOGLYCEMIA IN PREHOSPITAL SEIZURE PATIENTS? Daniel Beskind, Suzanne Rhodes, Uwe Stolz, Bret Birrer, Thomas Mayfield, Scott Bourn, Kurt Denninghoff, Univ of Arizona, American Medical Response Multivariable regression showed that obtaining a blood glucose measurement prior to benzodiazepine administration compared to no glucose measurement or glucose measurement after benzodiazepine administration was independently associated with a 2.9-minute (CI: 2.0, 3.8) and 9.3-minute (CI: 8.3, 10.4) delay to benzodiazepine administration by EMS, respectively, controlling for age, history of diabetes, and route of benzodiazepine administration. **Conclusions:** Hypoglycemia occurs infrequently in pts treated by EMS for seizure. Glucose measurement before benzodiazepine administration was associated with a significant delay in time to benzodiazepine administration. These data suggest that **benzodiazepine administration should take precedence over blood glucose determination in pts who are actively seizing.**
Stroke/Brain Attack	• Note added to get contact information from reliable historian so ED can contact them • Reminder to avoid hyperoxia • Same note regarding treating seizure over bG determination • Transport intent at the present time: Patients presenting with stroke within 4.5 hours of symptom onset shall be transported to the nearest Comprehensive or Primary stroke center. Illinois does not yet have a law that references Comprehensive Stroke Centers nor Rules that recommend transport patterns to them although some hospitals have that designation outside of an IDPH certification (ABMC) and national literature clearly references them.
Shock **Emphasis on early fluids, measurement of lactate levels (if available), and vasopressors for septic shock**	To date, early goal-directed therapy (EGDT) for severe sepsis and septic shock has produced the best evidence for a MAP goal during shock resuscitation. Setting a target MAP of 65 mm Hg as one of the hemodynamic resuscitation goals, EGDT investigators demonstrated improved mortality for patients with septic shock. (*Ann Emerg Med* 2006;48[1]:28.) Green, J.P. (Feb 25, 2012). ***Rapid risk stratification of septic adults in non-intensive care unit settings*.** Emergency Medicine Cyberounds; Alberg Einstein College of Medicine. Jones, A. E. & Puskarich, M.A., (2012). ***The surviving sepsis campaign guidelines*** *2012:* Update for emergency physicians. Annals of Emerg Med. http://dx.doi.org/10.1016/j.annemergmed.2013.08.004 --- **AN EMS SEPSIS ALERT PROTOCOL REDUCES TIME TO ANTIBIOTICS IN PATIENTS PRESENTING TO THE ED WITH SEVERE SEPSIS OR SEPTIC SHOCK** Timothy Shiuh, Thomas Sweeney, Rebecca Rupp, Brian King, Seema Sonnad, Christiana Health Care System **Criteria for ESA protocol** group were 1) Presence of 2 or more systemic inflammatory response syndrome (SIRS) criteria (HR > 90, RR > 20, T > 38 or <36) plus paramedic clinical suspicion for infection, 2) prehospital venous lactate measurement = 4 mmol/dL, and 3) hospital notification of an ESA. Dichotomized analysis of mortality with respect to the primary goal of achieving antibiotic administration within 60 minutes showed that 49% vs. 14% of pts met this target in the ESA and pre-ESA groups, respectively ($p < 0.001$). **Mortality in pts receiving antibiotics <60 minutes was 20.5% vs. 41% if = 60 minutes ($p = 0.023$)**. **Conclusions**: An EMS Sepsis Alert reduces time of arrival to appropriate antibiotics in pts with severe sepsis/septic shock. The proportion of pts in the ESA group that received antibiotics within 60 minutes of arrival was 3-fold that of the pre-ESA group. **EMS systems can have a significant impact on the care of pts with sepsis and meeting critical benchmarks** ---

SOP section	CHANGES, RATIONALE, CITATIONS

Severe Sepsis Strategy Significantly Reduces Mortality. *Medscape*. Oct 16, 2013.

Early Sepsis Prophylaxis Study: Reported at the American College of Emergency Physicians 2013 Scientific Assembly by Dr. D'Amore. He reported that his team evaluated all-cause in-hospital mortality using registry data from a healthcare system that include 11 acute care facilities, 3 tertiary centers, and 700,000 emergency department visits per year.

They assessed the impact of goal compliance in 5787 adults who either presented to the ED with severe sepsis or septic shock or developed these conditions during hospitalization. Their sepsis bundle consists of 4 clinical goals:

- blood cultures before antibiotics
- lactate before 90 min
- intravenous (IV) antibiotics before 180 min
- 30 cc/kg of IV fluids before 180 min

One of the 4 (fluids) can be done and/or started by EMS.

In-hospital all-cause mortality was significantly lower when the goals were used than when they were not (22.6% vs 26.5%; *P* = .0005).

The strategy was fully implemented in January 2012. Mean in-hospital mortality for this patient population dropped from 30% in the first quarter of 2012 to 23% in the fourth quarter of 2012.

The concept of early aggressive fluids in septic shock is supported by:

Salvucci, A. (2011). ***IV fluid for severe sepsis patients.*** (April 2011). EMS World. Accessed on line April 11, 2011 http://www.emsworld.com/magazine/ems And,

Lee, S. & Becker, L. (2013). ***Early fluid resuscitation reduces sepsis mortality*.** Society of Critical Care Medicine (SCCM) 42nd Critical Care Congress: Abstract 26. Presented January 20, 2013.

These investigators adjusted for factors such as age, admission weight, total fluid administration in the first 6 hours after sepsis onset, Apache III score at admission, and Charlson score. They found that the receipt of more total fluid in the first 3 hours after sepsis onset was associated with a decrease in hospital mortality (odds ratio, 0.34; 95% confidence interval, 0.15 - 0.75; *P* = .008). **We hope that this will help guide physicians to emphasize early aggressive fluid resuscitation in sepsis and that every hour of hypoperfusion counts.**

Glatter, R. (Posted 3/10/11). **What is the best treatment for septic shock**? Accessed on line: Medscape Emergency Medicine. Conclusions recommended by this article:

1. Septic shock is associated with a high mortality and vasopressors are an important intervention in managing associated hypotension. A large prospective, multicenter, randomized, double-blind study in 2010 published in *The New England Journal of Medicine* found no significant difference in the mortality rate at 28 days between dopamine and norepinephrine in the treatment of shock.[1]
2. Overall, dysrhythmias were more common with dopamine. Patients with cardiogenic shock demonstrated a significantly higher mortality rate with dopamine than with norepinephrine. Dopamine-induced elevations in heart rate are associated with an increased incidence of ischemic events.
3. Data reviewed here challenge historical beliefs and clinical practice that norepinephrine is associated with increased mortality and that dopamine is superior to norepinephrine in maintaining cardiac output.[1,17]
4. In the absence of any contraindications, or previous adverse reactions, norepinephrine should be considered first-line for patients presenting with septic shock after appropriate fluid resuscitation is initiated, in light of increased risk for dysrhythmias and morbidity/mortality associated with dopamine use.
5. If, after a reasonable dose of norepinephrine the patient remains hypotensive with MAP< 65-70, then add fixed dose vasopressin (0.03 units/min and IV hydrocortisone [50 mg q 6 hr]).[4]

SOP section	CHANGES, RATIONALE, CITATIONS
	Similar trends in the literature support our use of norepinephrine (Levophed) as an alternative to dopamine if inventories are depleted due to a drug shortage. Persichini, R., Silva, S., Tenoul, J.L., Jozwiak, M., Chemla, D., Richard, C., & Monnet, X. (2012). Effects of norepinephrine on mean systemic pressure and venous return in human septic shock. Crit Care Med, 40(12), 3146-3153. DeBlieux, P. & Winters, M. (2011). Vasoactive agents for managing shock. Emergency Medicine News. Accessed on line January 2011 - Volume 33 - Issue 1 - doi: 10.1097/01.EEM.0000393505.71508.17 Unfortunately production of the **Lactate Pro monitor has been discontinued.** Per the manufacturer, Arkray Inc, certain internal components are no longer available due to changes in manufacturing technology and a retrofit of those components would void the existing FDA certification as a clinical laboratory product. For those veterinarians, physicians, EMTs, and other professionals fortunate enough to have acquired their analyzer prior to its demise, they will continue to produce test strips for the Lactate Pro for at least another 4-5 years. ~3 years ago, Arkray began developing a replacement analyzer which was released in Japan in April 2012 as the Lactate Pro 2. When they began the design of this analyzer they did not have the medical market in mind opting instead to focus on the sports training segment. Unfortunately, this new analyzer proved unsuitable for medical use due to certain performance shortcomings, i.e., accurate readings can only be obtained as long as the hematocrit and SpO2 of the patient are both within normal range. Any analyzer designated for medical use must be self-correcting as is the case with the current Lactate Pro. As a result, the Lactate Pro 2 will not be released for sale in USA or Canada since FDA certification will still be required even for devices designated for sports use only. The Lactate Pro is still the only handheld lactate analyzer that is FDA approved and CLIA-waived for clinical medical use. Its successor, the Lactate Pro 2, is not approved by the FDA or CLIA-waived, **so we have no practical way to measure lactate levels at the present time**. http://www.vetlab.com/Lactate%20Pro.htm
Initial Trauma Care **Change priorities to C-A-B-C-D-E in severe hemorrhage** Supports the concept of balanced resuscitation for hypovolemic shock	The early recognition of major blood loss and the institution of effective resuscitation are essential to avoid unnecessary trauma deaths. **Hemorrhage control steps clarified**. Review page carefully **May use upside down KED to stabilize a pelvic fracture.** Taught for years, new to SOPs ***Balanced resuscitation*** is the administration of controlled volumes of fluid, sufficient to maintain organ perfusion, without disrupting clot and worsening extravasation. This approach is recommended in the current Advanced Trauma Life Support program. Management of massive hemorrhage should focus on early recognition of blood loss, rapid **control of the source of bleeding** and **restoration of circulating blood volume**. Overly aggressive **volume resuscitation can cause serious problems**, including exacerbation of bleeding due to clot disruption, hemodilution, thrombocytopenia and coagulopathy, as well as later complications such as peripheral edema, compartment syndrome, acute lung injury and immunomodulation leading to multiple organ failure. **IV crystalloid volume limited to 1 L**. Hypovolemic pts will need rapid transport for infusions of RBCs, plasma (clotting factors) and other factors at the trauma center. It is essential to take and record frequent vital signs, even though they may not reflect the extent of blood loss. The mechanism of injury and data from the scene should be taken into account. Resuscitation to normal VS should not be targeted until exsanguinating bleeding has been controlled. Haut, E.R., Kalish, B.T., Cotton, B.A., Efron, D.T., Haider, A.H., Stevens, K.A., Kieninger, A.B., Cornwell, E.E., Chang, D.C. (2011). **Prehospital Intravenous Fluid Administration is Associated with Higher Mortality in Trauma Patients: A National Trauma Data Bank Analysis.** Posted: 03/07/2011; Annals of Surgery. 2011; 253(2):371-377. © 2011 Lippincott Williams & Wilkins

SOP section	CHANGES, RATIONALE, CITATIONS
	This study demonstrated that the harm associated with prehospital IV placement is significant for victims of trauma. In no subset of trauma patients is there any survival advantage for prehospital IV placement and/or IV fluid administration. The association is especially marked in patients with penetrating mechanism, hypotension, severe head injury, and patients undergoing immediate surgery. The routine use of IV placement and fluid administration for all trauma patients should be discouraged. If transport is required before a secondary assessment can be performed, repeat primary assessments enroute and do secondary assessment as able. Additional trauma references: Mahambrey, T., Pendry, K., Nee, A., Bonney, S., Nee, P.A. (2013). Critical care in emergency department Massive haemorrhage in trauma. Emerg Med J. 30(1):9-14. Kragh, JF Jr., Littrel, ML, Jones, JA., Walters, TJ, Baer DG, Wade, CE & Holcomb, JB (2011) Battle casualty survival with emergency tourniquet use to stop limb bleeding. *J Emerg Med*, 41(6); 590-597. American College of Surgeons, Committee on Trauma. (2012). Advanced trauma life support. 9th edition. Chicago: American College of Surgeons. BMJ Publishing Group (2013). Best practice: disseminated intravascular clotting. Retrieved at http://bestpractice.bmj.com/best-practice/monograph/184/diagnosis/step-by-step.html on July 22, 2013 at 2330. Food and Drug Administration (2013). FDA safety communication: boxed warming on increased mortality and severe renal injury and additional warning on risk of bleeding, for use of hydroxyethylene starch solutions in some settings. Retrieved from: www.fda.gov. Galvagno, S & Mackenzie, C. (2013). New and future resuscitation fluids for trauma patients using hemoglobin and hypertonic saline. *Anesthesiol Clin,* 31 (1); 1-19. Howerton, D., McAnallen, D., Reend, H., & Goodloe, J. (2013). The role of tranexamic acid in EMS and preoperative trauma management. *JEMS*. Retrieved on line from www.jems.com Kashuk JL. (2011). What's new in emergencies, trauma and shock ? Optimizing initial resuscitation strategies in a patient with shock. J Emerg Trauma Shock [serial online] 2011 [cited 2012 Jan 7];4:441-2. Available from: http://www.onlinejets.org/text.asp?2011/4/4/441/86624 Kasotakis, G., Sideris, A., Yang, Y., Demoya, M., Alam, H., King, D., Tomkins, R., & Velmahos, G. (2013). Aggressive early crystalloid resuscitation adversely affects outcomes in adult blunt trauma patients: an analysis of the Glue Grant database. *J Trauma and Acute Care Surg*. 74 (5), 1215-1222. Sharma, P., Benford, Karalan, J., Keneally, R. (2012). Effects of volume and composition of the resuscitation fluids in the treatment of hemorrhagic shock. *J Emerg Trauma Shock*, (4), 309-315. Spahn, D., Bouillon, B., Cerny, V., Coats, T., Duranteau, J., Fernandez-Mondejar, E., Filipescu, D., Hunt, B., Komadina, R., Nardi, g., Neugebauer, E., Ozier, Y., Riddez, L., Schultz, A., Vincent, J & Rossaint, R. (2013). Management of bleeding and coagulopathy following major trauma: an updated European guideline. *Critical Care,* 17, 1-45. Polderman, KH (2012). Hypothermia and coagulation. *Critical Care* 2012**,** 16(Suppl 2):A20. Retireved at http://ccforum.com/content/16/S2/A20 July 9, 2013 8:08pm.
Trauma Triage & Transport Criteria	Changes consistent with CDC document published January 2012 – review mark-up version for specific additions
Traumatic arrest	Changes align treatment to ITC protocol (fluid volume limited to 1 L); drowning changed to submersion. No substantive changes.
Post-Taser care	No changes to SOP, but science is evolving with respect to use of these devices. “ECD manufacturers should undertake an educational campaign to make all ECD users aware of the VF risk. Educational material should stress avoiding chest shots if possible and should warn against repeated or long trigger pulls. However, it is clear that a single 5-

SOP section	CHANGES, RATIONALE, CITATIONS
	second shock can induce VF. A user should be judicious with ECD deployment and treat it with the same level of respect as a firearm, suspect cardiac arrest in any individual who becomes unresponsive after a shock, quickly call for medical support, and be prepared to resuscitate, including using an automated external defibrillator if needed. A national database should be mandated." Zipes, D.P. **TASER electronic control devices can cause cardiac arrest in humans.** *Circulation.* 2014;129:101-111 doi: 10.1161/CIRCULATIONAHA.113.005504 http://circ.ahajournals.org/content/129/1/101
Burns **Calcium gluconate gel for hydrofluoric acid burns**	Indications for vascular access and volumes of fluid to infuse based on American Burn Association recommendations: % TBSA burned**:** Adults > 20%; Children >15%; hypovolemic shock; need for IV meds Initial NS IVF: 0-5 yrs: 125 mL/hr 5-14 yrs: 250 mL/hr ≥15 yrs: 500 mL/hr **Caveat on obese pts added**: Trunk may constitute up to 50% of TBSA, while each leg may account for 20%. Head & arms account for smaller % of TBSA than Rule 9s. **Thermal**: Cool externally for **10** minutes, not 1 to achieve tissue cooling and prevent deepening of the burn. **COOL** partial thickness burns <10% BSA or full thickness burns < 2% BSA. The first objective in burn wound care is to dissipate the heat. The subcutaneous temperature continues to rise for a while even after the heat source has been removed. Thereafter, it takes about 3 minutes for the tissues to return to body temperature. Immediate active cooling of burn wounds with cool water or saline (lavage, soaks, compress or immersion) is effective. **Continuous cooling for the first 10 minutes** dissipates heat, reduces pain, delays onset and minimizes the extent of burn edema by decreasing the histamine release from the skin mast cells (Shrivastava & Goel, 2010). Shrivastava, P. and Goel, A. (Sept. 2010). Prehospital care in burn injury. Indian J Plast Surg.; 43(Suppl): S15-S22. Kearns, R.D. (2013). Thermal burn care: A review of best practices. [On-Line] www.EMSWorld.com accessed Jan.1, 2013. **Inhalation:** No change **Electrical:** Added caveat to also treat tonic clonic seizures per SOP and to perform selective spine immobilization as needed. **Chemical: Added the application of calcium gluconate 2.5% gel for hydrofluoric acid burns.** Review Drug Appendix p.84 for full explanation of Calcium gluconate application, action, indications, & precautions. Flush area w/ water. Apply gel directly from tube and massage into burned area. Apply frequently (q. 15 min) until pain relieved. Hand burns: apply liberal amount of gel to area, have pt put on a vinyl glove and wiggle fingers, opening and closing hand. Change gel & glove every 5 min by removing glove, wiping off gel, then reapplying as before. Recommended Medical Treatment for **Hydrofluoric Acid** Exposure ehs.unc.edu/ih/lab/docs/hfaexposure.pdf. This monograph gives a thorough explanation of these burns and the multiple options for treating them. Please go on line to pull up and read for a fuller understanding of these painful and devastating injuries.
Chest trauma	Added caveat that a pt wit **flail chest** should not have evidence of a pneumothorax to be a candidate for CPAP. This has been taught for a long time, now added to SOP. Added section on **blunt cardiovascular injury** consistent with Region IX trauma protocols. Review that section of the page.
Eye trauma	No changes
Head trauma They don't all need spine motion restriction (*gasp!*)	▪ Consider need for and apply selective spine motion restriction if indicated ▪ SBP may need to be higher than 110.

SOP section	CHANGES, RATIONALE, CITATIONS
	SYSTOLIC BP IN MAJOR TRAUMATIC BRAIN INJURY: WHAT IS THE OPTIMUM PRESSURE FOR SURVIVAL? Uwe Stolz, Bentley Bobrow, Daniel Spaite, Joshua Gaither, Vatsal Chikani, Duane Sherrill, Michael Sotelo, Bruce Barnhart, Chad Viscusi, Kurt Denninghoff, Univ of Arizona In a statewide, multisystem analysis of major TBI pts, a SBP between 145 and 150 mmHg was associated with the lowest mortality. The general consensus in the EMS literature and the TBI Guidelines state that SBP is only a significant clinical issue when it is very low (e.g., <90 mmHg) or very high; this may not be true. Further study is needed to identify the potential therapeutic implications of these findings. **EVIDENCE-BASED PREHOSPITAL BLOOD PRESSURE TREATMENT THRESHOLD IN MAJOR TRAUMATIC BRAIN INJURY: "NORMOTENSION" MAY BE TOO LOW** Daniel Spaite, Uwe Stolz, Bentley Bobrow, David Adelson, Chad Viscusi, Terry Mullins, Will Humble, Kurt Denninghoff, Vatsal Chikani, Duane Sherrill, Michael Sotelo, Bruce Barnhart, Joshua Gaither, Univ of Arizona Conclusion: They found a linear relationship between SBP and severity-adjusted risk of mortality across an exceptionally wide range. Thus, for the injured brain, "functional hypotension" may not be as low as current guidelines suggest. The fact that the adjusted odds of death increases as much for an SBP of 110 mmHg versus 100 as it does for 100 versus 90 suggests that the optimal resuscitation target may be much higher than 90 mmHg. Specific trials comparing various treatment thresholds are needed.
Spine trauma	**Read through this page carefully – significant new language** **NAEMSP Position Statement re Spine Motion Restriction** **Current science:** There is no demonstrated benefit of maintaining rigid spinal immobilization with a long backboard during EMS transport of a trauma patient. Use of a long board, short board or KED is NOT a benign procedure. A backboard can induce pain, patient agitation, and respiratory compromise. Further, the backboard can decrease tissue perfusion at pressure points, leading to the development of pressure sores. Use of backboards for spinal immobilization during transport should be judicious, so that the potential benefits outweigh the risks. A long backboard or similar device may be useful to facilitate spinal precautions during patient extrication. Patient time on long backboards should be minimized. **Securing a trauma patient to an EMS stretcher without a long backboard whether or not a cervical collar is being used is acceptable for maintaining spinal precaution during transport**. (NAEMSP, 2013) --- **Penetrating trauma:** In September, 2011, the paramedics, trauma surgeons and emergency physicians of the Executive Committee of Prehospital Trauma Life Support (PHTLS) produced the following recommendations which will be included in al future PHTLS programs. ▪ There are no data to support routine spinal immobilization in patient with penetrating trauma to the neck or torso. ▪ There are no data to support the routine spinal immobilization in patients with isolated penetrating trauma to the cranium. ▪ Spinal immobilization should never be done at the expense of physical examination or correction of life-threatening conditions in patients with penetrating trauma. ▪ Spinal immobilization may be performed when a focal neurological deficit is noted although there is little evidence of benefit even in these cases Stuke LE, Pons PT, Guy JS, Chapleau WP, Butler FK, McSwain NE. Prehospital spine immobilization for penetrating trauma—review and recommendations from the Prehospital Trauma Life Support Executive Committee. *J Trauma,* 2011; 71: 763–9; discussion 769–70. Sochor M, Althoff S, Bose D, et al. (2012). Glass intact assures safe cervical spine protocol. *J Emerg Med.* 2012 Dec 20.

SOP section	CHANGES, RATIONALE, CITATIONS
Musculoskeletal trauma	Treatment for suspected hyperkalemia standardized across all sections (renal & musculoskeletal protocols). New section added: Suspension injuries. Requested by one of the Resource Hospitals in Region IX. The major risk with these patients is orthostatic intolerance (shock) while suspended and reflow syndrome with hyperkalemia once rescued. Review carefully. **Keys for Rescue & EMS Treatment** A patient who is experiencing pre-syncopal symptoms or who is unconscious while suspended in a harness should be rescued as soon as safely possible. • If you cannot immediately release a conscious patient from a suspended position, instruct them to elevate their legs and contract their leg muscles periodically. • Watch for signs and symptoms of pre-syncope: light-headedness, nausea, sensations of flushing, tingling or numbness of the arms or legs, anxiety, visual disturbance or a feeling they're about to faint. • After rescue, do NOT allow the patient to lie flat (unless CPR is required). • Do NOT allow the patient to stand up. Risk of syncope and rapid weakness should be anticipated. • For a semi-conscious or unconscious person who has already been placed in a horizontal position, follow standard first aid guidelines. Do not raise an unconscious or pre-syncopal patient back to a sitting or standing position. • Maintain a patent airway and follow standard procedures for ABCs. • Administer only minimal fluid via IV administration in the absence of blood loss. (After 20Ï40 minutes following the rescue and fluid administration, the rate of infusion can be increased to facilitate dieresis, as renal failure is a common complication.) • Hypoglycemia should be corrected with an IV bolus of 25 g of 10% dextrose-in-water. • Monitor the ECG for electrical abnormalities, such as hyperkalemia (peaked T waves, prolonged QT intervals, widened QRS complexes). • Monitor the blood pressure and the onset of crush syndrome. • Consider additional drugs (IV bicarbonate or albuterol). • Transport in a sitting position for at least 30 minutes post-release from the vertical motionless position. Bill Raynovich; B., Al Rwaili, F.T., & Bishop, P. (2009). **Dangerous suspension: Understanding suspension syndrome & prehospital treatment for those at risk.** Published on *jems.com* (http://www.jems.com)
Multiple patient management	SOP changed to reflect procedural changes taught last Sept and October. Review page carefully.
Haz-mat incidents	No change.
Chemical agents	Mark 1 and DuoDote kit dosing updated to be in compliance with Illinois State-wide protocol.
Widespread disease outbreak	CDC contact information added
Abuse/neglect: Domestic, sexual, elder	Department of Aging phone number added.
Trauma in pregnancy	No major changes
Childbirth	Transport a laboring mother only to a hospital with OB services
Newborn & post-partum care	Leave a premature infant horizontal; do not place in a head-down position to avoid risk of intracranial bleeding Always safely secure infant for transport.
Delivery complications	Anticipate hemorrhage with inverted uterus
Newborn resuscitation	"Infants in the first or second day of life may be asymptomatic or may have life-threatening central nervous system (CNS) and cardiopulmonary disturbances.

SOP section	CHANGES, RATIONALE, CITATIONS
Added hypoglycemia values for newborns Assess heel stick glucose level if S&S hypoglycemia or resuscitation fails to improve infant status	**If hypoxic: Increase O_2 in 5 L increments** every 30 sec to reach targeted SpO_2 levels. Avoid hyperoxia in newborns. They are often well resuscitated with room air rather than oxygen. Neonatal hypoglycemia, defined as a plasma glucose level of less than 30 mg/dL (1.65 mmol/L) in the first 24 hours of life and less than 45 mg/dL (2.5 mmol/L) thereafter, is the most common metabolic problem in newborns. Major long-term sequelae include neurologic damage resulting in mental retardation, recurrent seizure activity, developmental delay, and personality disorders. Some evidence suggests that severe hypoglycemia may impair cardiovascular function. Symptoms can include the following: • Hypotonia • Lethargy, apathy • Poor feeding • Jitteriness, seizures • Congestive heart failure • Cyanosis • Apnea • Hypothermia Clinical manifestations associated with activation of the autonomic nervous system include the following: • Anxiety, tremulousness • Diaphoresis • Tachycardia • Pallor • Hunger, nausea, and vomiting" Cranmer, H. (Oct. 7, 2013). Neonatal hypoglycemia. Accessed on line: http://emedicine.medscape.com/article/802334-overview
Obstetrical complications	Maintain a quiet environment and monitor fetal heart tones if possible in patients with pre-eclampsia
Pediatric patients **Peds initial medical care**	No major changes
Peds IMC: Breathing	No change
Peds IMC: Circulation	No change
Peds Secondary Assessment **Pain management** **Refusals**	Section added for treatment of febrile child – same as child with febrile seizures Same clarification on 1.5 mcg/kg dose limit by SOP as per adult protocols **Refusal of service**: All refusals involving children/minors must have OLMC contact from the scene even if parent /guardian consents to release.
Children with special needs	No major changes
Peds Airway Adjuncts	**Children < 8 years of age shall have airways secured using BLS adjuncts & interventions.** This is consistent with the draft National Pegasus Airway management algorithm for children. **Possible indications for intubation**: **CHILDREN 8-12 years per OLMC only; ADOLESCENTS > 12 yrs/SOP** We will keep peds laryngoscopes and Magill forceps on the ambulances and ALS MedEngines to use as "Choking kits". May consider use of a King Airway is child taller than 4 feet
Pediatric foreign body airway obstruction	No change
Peds Respiratory Arrest	No change
Sudden Infant Death Syndrome	No change

SOP section	CHANGES, RATIONALE, CITATIONS
Peds Allergic Reaction **Anaphylaxis**	Minimum blood pressure thresholds listed as consistent with Peds VS table SBP > 70 + 2 X age or ≥ 90 if 10 -12 yrs **Added: Epipen dosing**: Pts ≥ 30 kg (66 lbs): 0.3 mg Pts 15 to 30 kg (33 lbs – 66 lbs): 0.15 mg Early administration of IM Epi added to mirror adult protocol
Peds Asthma	Reminder added to put gauze moistened in cold water or cold pack over IV site to relieve burning from magnesium sulfate
Croup / Epiglottitis	No change
Peds Bradycardia	Same comments about BP
Peds Narrow QRS Complex Tachycardia	Same comments about BP
Peds V-Tach w/ Pulse	Same comments about BP
Peds V-Fib & asystole	Same changes re: CPR and post ROSC care as adult protocols
Peds Altered Mental Status	Added shunts as a possible cause under “S”
Peds Diabetic/Glucose Emergencies	Use heel stick to obtain glucose in infants < 12 months D10% dosing added to SOP
Peds Drug Overdose/ Poisoning	Same changes as adult protocols
Peds CO / Cyanide Poisoning	No change
Peds Seizures	No change
Peds Initial Trauma Care	Same change as adult protocols – Call in all refusals
Peds Trauma Management of specific injuries	No change
Child Abuse or Neglect	No change
Drug Appendix	Major updates – review additions:Calcium gluconate gel, ketamine, norepinephrine
Pediatric drug calculations **Approved drug routes**	Updated
Burn center referral criteria **Fentanyl dosing table** **Fahrenheit to Celsius conversion table**	Local burn centers added
12 L criteria	No change
Approved abbreviations	Selectively updated
Body mass index table	No change
Differentials for SOB	CPAP information added
Peds dextrose doses **Capnography table**	Added
Quality CPR criteria **Peds defib chart**	No change
Invalid Assist Checklist	Added from policy manual based on System request
Hospital contact info	No change
Pain scales	Updated Wong-Baker faces scale

Effect of high flow oxygen on mortality in chronic obstructive pulmonary disease patients in prehospital setting: randomised controlled trial. BMJ. 2010; 341:c5462 (ISSN: 1468-5833)

Austin MA; Wills KE; Blizzard L; Walters EH; Wood-Baker R, Menzies Research Institute, University of Tasmania, Hobart, Tasmania, 7001 Australia. maaustin@utas.edu.au

OBJECTIVES: To compare standard high flow oxygen treatment with titrated oxygen treatment for patients with an acute exacerbation of chronic obstructive pulmonary disease in the prehospital setting.

DESIGN: Cluster randomised controlled parallel group trial.

SETTING: Ambulance service in Hobart, Tasmania, Australia. PARTICIPANTS: 405 patients with a presumed acute exacerbation of chronic obstructive pulmonary disease who were treated by paramedics, transported, and admitted to the Royal Hobart Hospital during the trial period; 214 had a diagnosis of chronic obstructive pulmonary disease confirmed by lung function tests in the previous five years.

INTERVENTIONS: High flow oxygen treatment compared with titrated oxygen treatment in the prehospital (ambulance/paramedic) setting.

MAIN OUTCOME MEASURE: Prehospital or in-hospital mortality.

RESULTS: In an intention to treat analysis, the risk of death was significantly lower in the titrated oxygen arm compared with the high flow oxygen arm for all patients (high flow oxygen n=226; titrated oxygen n=179) and for the subgroup of patients with confirmed chronic obstructive pulmonary disease (high flow n=117; titrated n=97). Overall mortality was 9% (21 deaths) in the high flow oxygen arm compared with 4% (7 deaths) in the titrated oxygen arm; mortality in the subgroup with confirmed chronic obstructive pulmonary disease was 9% (11 deaths) in the high flow arm compared with 2% (2 deaths) in the titrated oxygen arm. Titrated oxygen treatment reduced mortality compared with high flow oxygen by 58% for all patients (relative risk 0.42, 95% confidence interval 0.20 to 0.89; P=0.02) and by 78% for the patients with confirmed chronic obstructive pulmonary disease (0.22, 0.05 to 0.91; P=0.04). Patients with chronic obstructive pulmonary disease who received titrated oxygen according to the protocol were significantly less likely to have respiratory acidosis (mean difference in pH 0.12 (SE 0.05); P=0.01; n=28) or hypercapnia (mean difference in arterial carbon dioxide pressure -33.6 (16.3) mm Hg; P=0.02; n=29) than were patients who received high flow oxygen.

CONCLUSIONS: Titrated oxygen treatment significantly reduced mortality, hypercapnia, and respiratory acidosis compared with high flow oxygen in acute exacerbations of chronic obstructive pulmonary disease. These results provide strong evidence to recommend the routine use of titrated oxygen treatment in patients with breathlessness and a history or clinical likelihood of chronic obstructive pulmonary disease in the prehospital setting. TRIAL REGISTRATION: Australian New Zealand Clinical Trials Register ACTRN12609000236291.

Additional REFERENCES – See attached

ASK DR. O

Please list any questions that you have about the new SOPs that have not been answered to your satisfaction in class, the handouts, or the protocols.

Answer:

If you would like us to respond to you personally, please list your contact information:

Name (PRINT):_____

Contact e-mail: _____