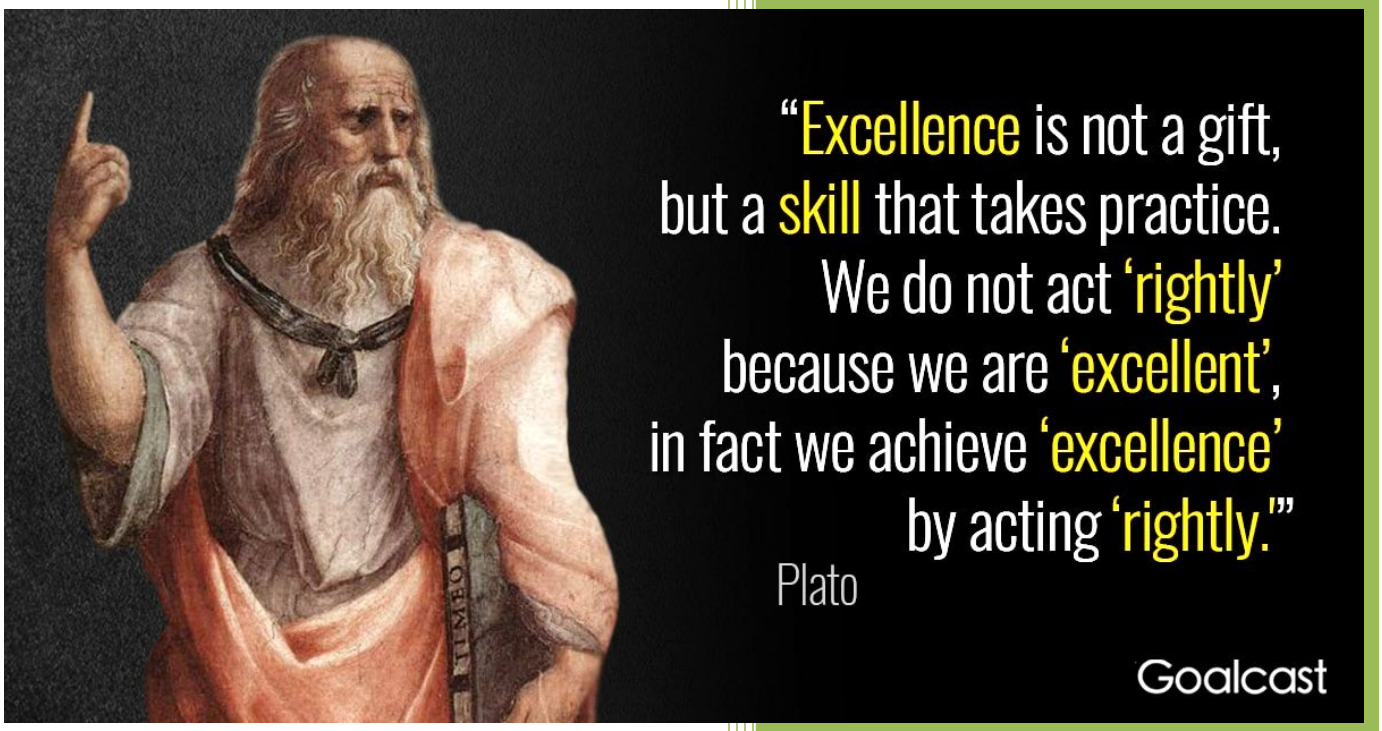
2022

V. 8-22-22

SOP Changes and Rationales



Objectives:

After completing the class, reading this document and the new SOPs, each participant will do the following with a degree of excellence that meets or exceeds the standards established for their scope of practice without critical error:

***Cognitive*:** Identify the major changes in each section of the new SOPs and explain their rationales.

***Psychomotor*:** Safely and competently adapt EMS practice to implement the changes when caring for patients or providing OLMC.

***Affective*:** Value and defend the need for evidence-based (EB) practice and person-centered care based on national, state, and local standards.

Goal: EMS practitioners are well-informed about the 2022 EB updates and transform their knowledge into modified or enhanced clinical practice.

This document explains the changes, why they are necessary, and provides strategic resources to support them.

Questions and comments welcome. Direct to:

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Region IX 2022 EMS SOP Changes, rationales, & references

SOP section	CHANGES, RATIONALE, CITATIONS
General editorial comments	**Focus on continuous collaborative learning | learn, share and innovate together**
Table of contents	Colors match the title boxes on each section of the SOPs – more appealing and easier to rapidly see divisions.
Introduction	These SOPs/SMOs reflect best practice; evidence-based guidelines as known at the time of writing. **Definition of Scientific Evidence:** "Information from peer-reviewed journals, methodologically-sound clinical trials, nationally or internationally recognized clinical practice guidelines, or other consensus-based documents that receive broad acceptance from the medical and/or scientific communities. Where evidence does not exist in these forms, there must still be a plausible basis in theory or prevailing and consensus-based, peer-acknowledged practice to justify any proposed treatment" (Federation of State Medical Boards, Policy on Professional Expectations Regarding Medical Misinformation and Disinformation, 2022). **NEW National Guidelines/Resources since last SOP edition:** - **EMS Agenda 2050**: https://www.ems.gov/projects/ems-agenda-2050.html - **EMS Scope of Practice Model** (2019; Rev. 3/21) https://www.ems.gov/pdf/National_EMS_Scope_of_Practice_Model_2019_Change_Notices_1_and%20_2_August_2021.pdf - NASEMSO National **Model EMS Clinical Guidelines** Version 3 (2022) https://nasemso.org/projects/model-ems-clinical-guidelines/ - National **EMS Education Standards** (2021) https://www.ems.gov/pdf/EMS_Education_Standards_2021_v22.pdf - **National EMS Pain Guidelines** (NASEMSO, 2022) (See links below) - **AHA ECC Guidelines (2020) October 20, 2020,** Circulation, 142(16_suppl_2) - https://www.facs.org/quality-programs/trauma/systems/field-triage-guidelines/ (2022) - See: https://www.ncsl.org/research/health/ems-legislative-database.aspx | https://www.911.gov/ | https://www.samhsa.gov/find-help/988 - Others are noted in the specific sections relative to content areas **Involuntary consent** also applies to those under a Court Order for Detention and Examination ("Writ") in a Mental Health Emergency. See: https://www.cookcountycourt.org/Portals/0/RMM.Writ%20Process%20modified%205-25-17.pdf Definitions under the **Adult Protected Services Act** noted here to support changes to Decisional Capacity and risk assessment protocols. National EMS Quality Alliance Safety 01 and Safety 02 reports focus on the **judicious use of lights and sirens** during a response to the scene and during patient transport. These measures have the strongest evidence of any within the EMS Compass Measure Set. There are strong guidelines and published studies that support the limited use of lights and sirens to protect the public, EMS providers and patients from potential danger, as a consequence of lights and sirens use. See https://www.nemsqa.org/wp-content/uploads/2022/02/NEMSQA-Safety-01_2021-updated-2.17.22.pdf and https://www.nemsqa.org/wp-content/uploads/2022/02/NEMSQA-Safety-02_2021-updated-2.17.22.pdf Alternative destinations to transport updated based on modified IDPH EMS Rules.
EMS Scopes of Practice	Aligns with the **2019 National EMS Scope of Practice Document** (Rev. 2021). Also includes expanded scope skills approved by Illinois EMS MDs and authorized by IDPH. No changes for us needed at the ALS level. Most under the EMRs and EMTs. See link above.
General patient assessment / IMC	**Updated focus on assessing for hypoxic or hypercarbic respiratory failure.** StatPearls: https://www.ncbi.nlm.nih.gov/books/NBK526127/ Respiratory failure is a clinical condition that happens when the respiratory system fails to maintain its main function, which is gas exchange, in which PaO2 is lower than 60 mmHg (SpO_2 <90%) and/or $PaCO_2$ is higher than 50 mmHg. **Respiratory failure** is classified according to ABG abnormalities into **type 1 and type 2**. **Type 1 (hypoxemic):** PaO_2 < 60 mmHg (SpO_2 < 90%) with normal or subnormal $PaCO_2$. Gas exchange is impaired at the level of the alveolar-capillary membrane. Ex: carcinogenic or non-cardiogenic pulmonary edema, severe pneumonia, atelectasis, ARDS.

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	Type 2 (Hypercapnia / hypercarbia): $PaCO_2$ > 45 mmHg. Generally, the human body adapts quickly and eliminates CO_2 from the body as excesses are produced. Unless there is a significant loss of pulmonary ventilation, even metabolic processes that produce excess CO_2 will not induce hypercapnia. The presence of hypercapnia indicates a failure to eliminate CO_2 from the pulmonary system, likely due to hypoventilation secondary to decreased respiratory rate or decreased tidal volume. Respiratory failure is classified according to its onset, course, and duration into acute, chronic, and acute on top of chronic respiratory failure. **Etiology:** May be due to **pulmonary or extra-pulmonary causes** which include: ▪ **CNS causes** due to depression of the neural drive to breath as in cases of opioid, sedative or CNS depressant toxicity. ▪ **Disorders of the peripheral nervous system**: Respiratory muscle and chest wall weakness or paralysis. ▪ **Upper and lower airways obstruction:** due to various causes as in cases of exacerbation of chronic obstructive pulmonary diseases and acute severe bronchial asthma | increased dead space (pulmonary embolus) ▪ **Abnormities of the alveoli that result in type 1 (hypoxemic) respiratory failure** as in cases of pulmonary edema and severe pneumonia. **Complications from respiratory failure** may result from blood gases disturbances or from the therapeutic approach itself. Many of the SOP are related to finding and fixing (or attempting to correct) respiratory failure to mitigate or prevent these complications. Examples: ▪ **Lung**: pulmonary embolism can cause acute Rt. Heart failure; irreversible scarring of the lungs; pneumothorax; and dependence on a ventilator. ▪ **Cardiac**: AMI; heart failure; arrhythmias, cardiac arrest. ▪ **Neuro**: Prolonged brain hypoxia can lead to irreversible brain damage and brain death. ▪ **Renal**: Acute renal failure may occur due to hypoperfusion and/or nephrotoxic drugs. ▪ **GI**: Stress ulcer, ileus, and hemorrhage ▪ **Infectious:** Sepsis is the most common cause of death in pts with acute respiratory failure **Mortality** is often due to multiorgan failure. **SpO_2 targets:** *American Association for Respiratory Care (AARC)* Piraino, T., Madden, M., Roberts, K.J., Lamberti, J., Ginier, E., Strickland, S.L. (2022). AARC clinical practice guideline: management of adult patients with oxygen in the acute care setting. Respir Care, 67(1), 115-128. [69 references] **Recommendations**: SpO_2 range of 94%–98% for most patients requiring supplemental O_2, 88%–92% for patients with COPD who require supplemental O_2, and a range of 88%-95% for pts with ARDS who require O_2. **CPAP**: Expanded considerations for use | Updated appendix section Hensel, M., Strunden, M.S., Tank, S., et al. (2019). Prehospital non-invasive ventilation in acute respiratory failure is justified even if the distance to hospital is short. Am J Emerg Med 37(4), 651-656.] https://pubmed.ncbi.nlm.nih.gov/30068489/ IDPH EMS Rules require an **SOP on nausea & vomiting**: Highlighted this section of the IMC protocol to show compliance.
Pain management	Several options were added to align with **National EMS Pain Guidelines** published in March 2022: The articles are available at EBGs for Pain Management: Recommendations and EBGs for Pain Management: Literature and Methods Emphasis placed on **carefully estimating weight** and monitoring pts after drug administration. Weight estimation guidelines added in the appendix; p. 106. Chewable PO acetaminophen added as an option for mild to moderate pain IV acetaminophen has come off patent, is now very affordable, and is an excellent alternative to an opioid or ketamine for severe pain. While adults can receive their dose as a gravity hang direct infusion at 60 gtts/min over 15 minutes, it is proposed that an IV pump is used to deliver a peds drip to prevent risk of OD and liver damage. Added content on **non-pharmacologic Rx of pain** in children to slide deck plus content on select PICO questions from the Ntl pain mgt guideline roll-out. The national controversy over using ketamine needs perspective:

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	Fernandez, A.R., Bourn, S.S., Crowe, R.P., Bronsky, E.S. et al. (2021). Out-of-hospital ketamine: Indications for use, patient outcomes, and associated mortality. Annals of Emergency Medicine, 78(1), 123-131. Results: Indications for out-of-hospital ketamine administrations in our 11,291 patients were trauma/pain (49%; n=5,575), altered mental status/behavioral indications (34%; n=3,795), cardiovascular/pulmonary indications (13%; n=1,454), seizure (2%; n=248), and other (2%; n=219). The highest median dose was for altered mental status/behavioral indications at 3.7 mg/kg (interquartile range, 2.2 to 4.4 mg/kg). Over 99% of patients (n=11,274) were transported to a hospital. Following ketamine administration, hypoxia and hypercapnia were documented in 8.4% (n=897) and 17.2% (n=1,311) of patients, respectively. Eight on-scene and 120 in-hospital deaths were reviewed. Ketamine could not be excluded as a contributing factor in 2 on-scene deaths, representing 0.02% (95% confidence interval 0.00% to 0.07%) of those who received out-of-hospital ketamine. Among those with inhospital data, ketamine could not be excluded as a contributing factor in 6 deaths (0.3%; 95% confidence interval 0.1% to 0.7%). **Conclusion**: In this large sample, out-of-hospital ketamine was administered for a variety of indications. **Patient mortality was rare.** Ketamine could not be ruled out as a contributing factor in 8 deaths, representing 0.07% of those who received ketamine. **Ketamine is safe and effective when used (dosed) appropriately and risk is mitigated with appropriate monitoring**. Pain dose given an optional dose range. Sedation dose capped at 300 mg per SOP with option for additional amounts per OLMC.
Emergency Drug Alternatives	Dextrose 50% and 25% added back as options to the Glucose Emergency SOP and Drug Appendix due to shortage of D10%.
INOPRESSORS	All norepinephrine references added IO to route options and clarified dosing. Note: Large IV bags drip more reliably than small if not connected to an IV pump. Drip concentration more dilute than hospital standards to make dosing easier to do the math (2 mL/min for all adults). Use regular drip tubing and count drops based on tubing calibration or use Sapphire pump (preferred approach). Dopamine removed as an optional drug.
OLMC / Handoff report	EMS may only transfer care to one who is qualified and credentialed to receive the patient from us. If an ED is giving LPNs pt assignments, and EMS will be transferring responsibility for the pt to the LPN, they may receive the handoff report if allowed by that facility. **Our policies are based on the position paper** published by ACEP, ENA, NAEMSP, & NASEMSO (2014). Transfer of patient care between EMS providers and receiving facilities. PEC, 18(2), 305. https://www.tandfonline.com/doi/full/10.3109/10903127.2014.883001#:~:text=The%20American%20College,period%20of%20time . **See content of paper at end of this document**.
Withholding or Withdrawing Care | POLST | POA	Reduced from two pages to one. A new state law modified the POLST process and IDPH forwarded information and a slide deck on May 12, 2022 that each System will use in an educational outreach based on local preferences. The SOP was modified to highlight the important new instructions. New options ask surrogate decision makers to use two approaches to deciding care decisions: **Substituted Judgment Standard:** What would the pt choose in this situation if known). This may differ from what the surrogate wants. If not known, surrogates are asked to use the **Best Interest Standard**: What would bring the most net benefit to the pt by weighing benefits and risks of treatment options? Ask the surrogate, "Knowing your loved one, what do you think would be the most important for them right now?" The termination of resuscitation (TOR) guidelines were removed from this page as they were redundant and listed inconsistently in two places | updated to the 2020 AHA guidelines, and only noted in the cardiac arrest SOP.
Elderly patients	Added comments on preserving pt autonomy, allowing use of aids such as glasses and hearing aids; need to prevent/Rx hypothermia; and clarified indications for SMR after all falls. Newgard, C.D., Lin, A., Caughey, A.B. (2022). Falls in older adults requiring emergency services: mortality, use of healthcare resources, and prognostication to one year. Western Journal of Emergency Medicine, 23(3), 375-:385. Accessed online: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9183773/pdf/wjem-23-375.pdf

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Extremely Obese pts	No substantial changes. Sleep apnea now called sleep disordered breathing.
Adult Foreign Body Airway Obstruction	Change to title to differentiate from peds protocol; reformatted for esthetics; no change in practice
Advanced Airways/DAI	General comments on weight estimation | Focus on PreOx: oxygen wash in and nitrogen wash out; deleted NRM & added CPAP per current literature | Sedative selection prioritized | # ETI attempts and tube passes clarified | Post sedation and analgesia options clarified. Blind insertion airway device (BIAD) term introduced.
Allergic reaction Anaphylaxis Must show a protocol on bites and envenomations (highlighted here in table of contents)	**CPAP** added to anaphylaxis to decrease breath stacking, decrease intrathoracic pressure; improve preload; oxygenate the patient and avoid the need for ETI. Lowest MAP adjusted to 60 for CPAP indication. Finn, J.C. et al. (2022). Prehospital continuous positive airway pressure (CPAP) for acute respiratory distress: a randomised controlled trial. Emerg Med J, 39(1), 37–44. doi:10.1136/emermed-2020-210256 Antevy, P., Piehl, M., Spiro D., Dunlap, Z. (March 17, 2022). Anaphylaxis Emergency At Medical Clinic. Reel Emergency webinar. Campbell, R.L. and Kelso, J.M. (2022). Anaphylaxis: Acute diagnosis. Accessed online: Anaphylaxis: Acute diagnosis - UpToDate **Cardiac arrest**: Could not find literature support for unlimited massive IVF volumes nor high doses IVP epinephrine q. 2 min. In former SOPs. Changed to align w/ current guidelines.
Asthma/COPD	No change
Tracheostomy/ Laryngectomy	No change; See National Model EMS Guidelines pp. 203-207.
Acute Respiratory Conditions	Minor changes to reference COVID-19; easily seen in document. Pulmonary embolism S&S: https://www.annemergmed.com/action/showPdf?pii=S0196-0644%2817%2931806-1 Added thrombectomy to definitive Rx at hospital and reason for short scene time: https://www.jem-journal.com/article/S0736-4679%2819%2931136-9/fulltext
Acute Coronary Syndromes (ACS) / STEMI	**Variables that affect the immediate prognosis in acute myocardial infarction** 1. Size of the ischemic myocardium at risk. 2. The percent of the ischemic myocardium at risk that has already undergone irreversible necrosis. 3. The "severity" of ischemia (the expected rate of progression of myocardial necrosis). 4. Presence of old myocardial infarction or fibrosis (myocardial reserves). 5. Presence of "ischemia at a distance" due to existence of stenotic lesions in other coronary arteries. https://pmj.bmj.com/content/79/935/490 Given that EMS cannot know factors 2-5, we must assume that time is muscle for all STEMI patients and time-sensitive transport to a STEMI center is a top priority after attending to early patient assessment and care interventions. No change in practice; just reinforcement. Top of protocol language reordered based on suggestion from an ALGH EMSS paramedic seeking clarity.
Bradycardia with a Pulse	**Atropine** dose changed to 1 mg increments in compliance with 2020 AHA guidelines. **Ketamine** added as sedative option during pacing.
Narrow QRS Complex Tachycardia	Removed reference to low BP as a contraindication to sedation prior to cardioversion in a responsive patient. Midazolam dose changed; ketamine added as optional sedating drug.
Wide Complex Tachycardia w a pulse	Same changes re: low BP and ketamine as above. • Notation added to confirm reliable QRS wave synchronization on monitor – if not present, switch to a different lead. • Aligned with 2020 AHA guidelines that ALL polymorphic VT should be defibrillated, not cardioverted with synchronization. **Reference**: Feb 2 Gathering of Eagles recording - fast forward to ~ 50:00. They are discussing untoward events in cardioversion.

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	(1) Classic VT w/ pulse – cardioversion planned – 12 L shows sync markers not landing consistently, and they converted the patient to VF. Lesson learned – don't assume you are synched – look at your monitor. If the lead you are using is not giving reliable sync, switch to a different lead! (2) Great example of why providers should NOT rely on the monitor for HR and or accurate rhythm determination. Pt w/ hyperkalemia, actual HR 80s, but the monitor counted the huge T waves and displayed HR 160. Pt was hypotensive but the 12 L is very obviously NOT that fast and the large T waves are unmistakable. Crew cardioverted her… (3) Same patient – The huge T waves create a very different 12 L waveform in V1 and V2 – they look like ugly STE but that is not demonstrated anywhere else. https://www.hmpgloballearningnetwork.com/site/emsworld/videos/gathering-eagles-meeting-february-2-2022-shocking-asystole-omicron-variants
Cardiac Arrest Management (adults and peds)	**Aligned entire SOP to 2020 AHA guidelines. https://cpr.heart.org/-/media/cpr-files/cpr-guidelines-files/highlights/hghlghts_2020_ecc_guidelines_english.pdf** • Added note that **pregnant pts need left lateral displacement of uterus**. Removed contraindications of pregnancy if using a piston driven mechanical CPR device. • **Very clear: All patients in cardiac arrest receive early oxygen. Modified but retained option for ApOx** in pts with EMS witnessed arrest and/or found in shockable rhythms as we treat in a bundled care process. Time frame reduced for O_2 without ventilations [ApOx] from 6 to 3 minutes (need 3 min of preox prior to advanced airway in all pts). These patients should be in the electrical phase of the arrest and the goal is to OPTIMIZE the effectiveness of CPR during this time and emphasize the need for early defibrillation. PPV can stop forward movement of blood flow to the heart from over pressurizing the chest and negating the pulmonary pump effects of inspiration linked to negative intrathoracic pressure. It has been proven in multiple studies that EMS frequently OVERVENTILATES (volume and rate). • IO: 10-1-20: Teleflex received 510(k) clearance from the FDA to expand the indications for use of the Arrow® EZ-IO® Intraosseous Vascular Access System. See end of document for current approvals. Distal femur site approved in pts up to 21. There is ongoing research relative to using the **distal femur site in adults**: It is away from the chest and has high flow rates. The study below found that distal femur IO was feasible and associated with similar measured performance parameters as other IO sites in adult OHCA for both advanced and BLS personnel. Will follow trends and determine if this is something we should adopt in the future. Rayas, E.G., Winckler, C., Bolleter, S., Stringfellow, M., et al. (2022). Distal femur versus humeral or tibial IO, access in adult out of hospital cardiac resuscitation, Resuscitation, 170:11-16. Epub 2021 Nov 5. PMID: 34748766; DOI: 10.1016/j.resuscitation.2021.10.041 • **Defib all shockable rhythms immediately:** Deleted reference to delayed defibrillation as feedback was consistent that ETCO2 levels were difficult to obtain in apneic patients. Removed option to start peds defib J at 4 (was too confusing to explain the options based on previous literature). Adopted AHA language exactly as stated. **Removed dual sequential defibrillation** option based on AHA guidelines. • Clarified ALS intervention sequencing • Limit ETI attempts to 2 (one attempt at passing the tube). See: DAI SOP Murphy, D. L., Bulger, N. E., Harrington, B. M., et al. (2021). Fewer tracheal intubation attempts are associated with improved neurologically intact survival following out-of-hospital cardiac arrest. Resuscitation, 167, 289-296. Number of intubation attempts in airway mgt survival (ems1.com) • Modified repeat dosing of peds amiodarone based on 2020 AHA guidelines • Clarified Hs & Ts: **Sodium bicarbonate**- no evidence of benefit. Potentially some evidence of harm in undifferentiated cardiac arrest. Special circumstance – TCA OD or sodium channel blockers. See: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8042972/pdf/12245_2021_Article_344.pdf

SOP section	CHANGES, RATIONALE, CITATIONS
	Alshahrani, M.S. and Aldandan, H.W. (2021). Use of sodium bicarbonate in out-of hospital cardiac arrest: a systematic review and meta-analysis. International Journal of Emergency Medicine, 14:21 https://doi.org/10.1186/s12245-021-00344-x **Naloxone in cardiac arrest:** No evidence of benefit in cardiac arrest. Dezfulian, C. et al. (2021). Opioid-associated out-of-hospital cardiac arrest: distinctive clinical features and implications for health care and public responses: A scientific statement from the American Heart Association. Circulation, 143, (16), e836-e870. https://doi.org/10.1161/CIR.0000000000000958 • ROSC care targets aligned with AHA • Removed reference to TTM for EMS. This remains a hospital option. • Direct listing of TOR rules from AHA
HF/ pulmonary edema / Cardiogenic shock	Heidenreich, P.A. et al. (2022). 2022 AHA/ACC/HFSA guideline for the management of heart failure. J Am Coll. of Cardiology in press. Replaces the 2013 Guideline and 2017 Focused Update. Intended to provide patient-centric recommendations for clinicians to prevent, diagnose, and manage patients with heart failure. **Added comorbidities** to consider in pts w/ HF; caution to assess for congestion; and **three new classes of drugs** to references at the page bottom. No change in EMS care. **HCN Channel blocker**: Hyperpolarization-activated cyclic nucleotide-gated (HCN) channels play important roles in the control of heart rate and neuronal excitability. These channels are located on the SA node and in different regions of the nervous system. Ivabradine (Corlanor; Amgen) is indicated to reduce the risk for hospitalization for worsening heart failure in patients with stable, symptomatic chronic heart failure with LVEF ≤35%, who are in sinus rhythm with a resting HR of ≥70 beats per minute (bpm) and are taking maximally tolerated doses of beta-blockers or have a contraindication to beta-blockers. **Mineralocorticoid Receptor Antagonists (MRAs)**: Aldosterone receptor antagonists block the reabsorption of sodium, which encourages water loss. Consequently, this leads to a decrease in blood pressure and a reduction in fluid around the heart. These drugs may be used in the treatment of HTN or heart failure. They also have a weak diuretic action. Examples: spironolactone (Aldactone); eplerenone (Inspra); finerenone (Kerendia) **Sodium-glucose cotransporter-2 (SGLT2) inhibitors ("gliflozins"):** Inhibit sodium glucose cotransporter 2 in the proximal renal tubule, leading to increased glucose excretion. While effective drugs for the treatment of type 2 diabetes, they have been shown to reduce all-cause mortality, cardiovascular mortality and HF hospitalizations in pts with HF with and without diabetes. Gliflozins are increasingly used to treat CHF and renal failure. Examples: canagliflozin (Invokana); dapagliflozin (Farxiga); empagliflozin (Jardiance)
VADs	No change other than to remove reference to "left": LVAD to VAD.
Acute abdominal/ flank pain	No change
Dialysis/Chronic Renal Failure Emergencies	S&S of severe hyperkalemia updated Prehospital Identification and Management of Hyperkalemia - JEMS: EMS, Emergency Medical Services - Training, Paramedic, EMT News Treatment and prevention of hyperkalemia in adults - UpToDate
Alcohol intoxication/ withdrawal	Added step to ask about alcohol use disorder (AUD) in PMH IVF max cap at 1 L added plus assessment additions for decisional capacity and S&S of depression and anxiety **Notes added at bottom** amended to refer to Decisional Capacity assessment re pt's ability to consent or dissent to care; medications commonly prescribed for alcohol use disorder (AUD), alcohol-related psychosis, depression, and anxiety. Alcohol-related psychosis manifests as prominent hallucinations (usually visual) and delusions. For pts with alcohol-use disorder, psychosis can occur during acute intoxication or withdrawal, with or without delirium tremens. Characteristics that may differentiate alcohol-induced psychosis from schizophrenia: later onset of psychosis, higher levels of depressive and anxiety symptoms, fewer negative and

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	disorganized symptoms, better insight and judgment toward psychotic symptoms, and less functional impairment. https://www.samhsa.gov/medication-assisted-treatment/medications-counseling-related-conditions Pharmacotherapies for Adults With Alcohol Use Disorders: A S... : Journal of Addiction Medicine (lww.com)
Altered mental status/Syncope & Pre-syncope	VOWELs and TIPS updated slightly to include additional causes of AMS. References to narcotics and opiates changed to opioids in compliance with current naming regimens (see explanation below).
Drug OD/Poisoning	All areas of the SOPs have had **terminology and abbreviations changed to reflect current practice.** For example: "**Narcotic drugs**" – Originally referred to any substance that dulled the senses and relieved pain. Some people use the term to refer to all illegal drugs but technically, it refers only to opioids. **Opioid is now the preferred term** to avoid confusion. https://www.cdc.gov/opioids/basics/terms.html#nav-group-f64ac "Opiates" vs. "opioids" Although these terms are often used interchangeably they are different: **Opiates** refer to natural opioids such as heroin, morphine and codeine. **Opioids** refer to all natural, semisynthetic, and synthetic opioids. **Natural opioid analgesics:** morphine and codeine; **Semi-synthetic opioid analgesics**: oxycodone, hydrocodone, hydromorphone, oxymorphone **Methadone**, a synthetic opioid that can be prescribed for pain reduction or for use in MAT for opioid use disorder (OUD). For MAT, methadone is used under direct supervision of a healthcare provider; **Synthetic opioid analgesics** other than methadone: tramadol and fentanyl. **Emphasis has been placed on the uptick in opioid ODs**: IDPH has forwarded Siren Alerts – we need to reinforce this education: **Fentanyl** is a synthetic opioid that's taken thousands of Americans lives. The FDA-approved prescription drug was originally developed in 1959. It was introduced to the public in the 1960s as a pain-relieving IV anesthetic, according to the Department of Justice's Drug Enforcement Administration (DEA). "[Fentanyl] is approximately 100 times more potent than morphine and 50 times more potent than heroin as an analgesic," the DEA reports. Regulated pharmaceutical companies manufacture fentanyl as lozenges, tablets, mouth or nose sprays, patches and injections. However, illegal drug makers produce fentanyl as a powder, candy, eye drop liquid and nasal spray, according to the National Institute on Drug Abuse (NIDA). https://www.foxnews.com/lifestyle/what-is-fentanyl-more-know-dangerous-drug **Medication-assisted treatment (MAT)** – Treatment for opioid use disorder combining the use of medications (methadone, buprenorphine, or naltrexone) with counseling and behavioral therapies. Need to **obtain as part of the patient's PMH**. **High-risk and potentially harmful behaviors** for which on-scene naloxone is indicated: high-volume use of opioids; taking opioids in combination with alcohol, benzodiazepines, or other respiratory depressants; using illicit opioids where contents of substance cannot be confirmed or fentanyl test strips are not used. All opioids are reversed by naloxone and may trigger opioid withdrawal depending on dose. **SIGNS OF OPIOID WITHDRAWAL:** S&S of opioid withdrawal in a person physically dependent on opioids may include body aches, diarrhea, tachycardia, fever, runny nose, sneezing, piloerection (gooseflesh), sweating, yawning, nausea or vomiting, nervousness, restlessness or irritability, shivering or trembling, abdominal cramps, weakness, tearing, insomnia, opioid craving, dilated pupils, and increased BP. Practical questions remain relative to "Refusal of transport" calls following opioid OD and naloxone resuscitation in light of recent literature and the St. Paul's Early Discharge Rule for Emergency Departments. For an excellent analysis of this situation see: The Post-naloxone patient: Optimizing opioid overdose refusals originally published in an NAEMP Blog (6-29-22) and reprinted with permission in EMS1 Daily newsletter (7-4-22). See: https://www.ems1.com/naloxone/articles/the-post-naloxone-patient-optimizing-opioid-overdose-refusals-qkFuzWaLtbqcAjxe/ ,

SOP section	CHANGES, RATIONALE, CITATIONS
	CHANGES: • Format modified to better highlight the **standard dosing for naloxone** (modified timing of **repeat doses to q. 2 min and max of 4 mg per EMS), midazolam, and ketamine (max dose lowered to 300 mg).** Ketamine dosing chart recalculated to include all dose increments (see appendix). Naloxone onset of action is 2 minutes. Providing repeat doses more frequently than that did not give the medication time to work and may have led to higher than indicated dosing. • Drug name spelling corrected in some instances • Updated listing of organophosphate substances and ways to suspect this poisoning.
Carbon monoxide / cyanide exposure	• Updated indications for hyperbaric oxygenation (HBO) per current ALGH policy • Updated phone number for Milwaukee HBO chamber • Cyanide poisoning: No change
Environmental: Cold emergencies	TRIPLE ZERO CANNOT BE CONFIRMED until rewarmed unless obviously dead (rigor mortis or non-survivable injury) per AHA specialty resuscitation guidelines.
Environmental: Submersion | DROWNING | SCUBA **High Altitude**	Strong request from System member to modify title to include reference to drowning so field personnel could rapidly search for the correct protocol by name. Slight modifications to care based on 2020 AHA recommendations. Example; do not attempt compressions while still in the water. **S&S Decompression illness** added: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5351842/ IDPH requires an SOP on Altitude Illness: Added **High Altitude Travel and Altitude Illness:** with a link to the CDC See https://wwwnc.cdc.gov/travel/yellowbook/2020/noninfectious-health-risks/high-altitude-travel-and-altitude-illness
Heat-related emerg.	No change
Glucose / Diabetes emergencies	• There is an acute shortage **of dextrose 50% prefilled syringes**. Both manufacturers have had this item on backorder or very limited allocation for over 4 months. The reported date to begin refilling the manufacturing pipeline is February 2023. There may be small quantities in distributor warehouses in the U.S. • There is a continued shortage **of dextrose 10% IV fluids**. These have been on manufacturer allocation for over a year. All smaller volume bags (500 mL or 250 mL, regardless of product) have been very limited. Dextrose 10% solutions have very limited production, and manufacturers indicate no capacity to increase. • There is very limited production and shipment of dextrose 5% solutions. • **Glucagon for IM injection is on backorde**r. IM glucagon has historically been used as a rescue drug for hypoglycemic pts with no vascular access. It is very expensive, clinically less useful, and more difficult to administer. Major brands have not shipped in 6 months, and remains on backorder. Many EMS agencies no longer have this medication in the protocols. See 6 ways to manage the EMS drug shortage of dextrose and glucagon (ems1.com) • Ntl EMS leaders recommend that Systems manage their SMOs/SOPs by allowing several drugs for common problems that EMS encounters (e.g., pain mgt, low blood sugar, cardiac arrest, heart irregularities, vomiting and seizures). We have done that. **Our response to the dextrose shortage** • Protect limited inventories of IV dextrose by giving **oral carbohydrate sources** to those who can safety swallow. **ADA recommends a 15:15 rule**. Consume 15 g of glucose. Wait 15 min and retest bG. If still low, repeat 15 g glucose. Oral options added for easy reference. • D50W and D25W added back as approved alternates if D10% is unavailable.
Hypertension/ hypertensive crisis	https://emedicine.medscape.com/article/1952052-overview#showall – Excellent article on hypertensive emergencies as background information. Added methamphetamine as a drug class that could cause extreme HTN
Psych/Behavioral Health Emergencies (BHE)	**Aligned with decisional capacity worksheet** **Definitions added** from Adult Protective Services Act for those unable to care for themselves:

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SUBSTANTIALLY NEW Decisional capacity & risk assessments Use of verbal de-escalation; sedation and monitoring; restraints Suicide screen (no change)	**Self-neglect:** (i-5) Means a condition that is the result of an eligible adult's inability, due to physical or mental impairments, or both, or a diminished capacity, to perform essential self-care tasks that substantially threaten his or her own health, including: providing essential food, clothing, shelter, and health care; and obtaining goods and services necessary to maintain physical health, mental health, emotional well-being, and general safety. The term includes compulsive hoarding, which is characterized by the acquisition and retention of large quantities of items and materials that produce an extensively cluttered living space, which significantly impairs the performance of essential self-care tasks or otherwise substantially threatens life or safety. (320 ILCS 20/) Adult Protective Services Act. Columbia Suicide Severity Rating Scale **Imminent risk for a person being unable to care for themselves:** (f) "Emergency" means a situation in which an eligible adult is living in conditions presenting a risk of death or physical, mental, or sexual injury and the provider agency has reason to believe the eligible adult is unable to consent to services that would alleviate that risk. (320 ILCS 20/) Adult Protective Services Act. **Possible medical causes of increased risk for suicidal behavior to note**: individuals taking anti-seizure medications (levetiracetam) both in depressed and nondepressed individuals. **Medications with considerable association with depression and/or mania** include: Antidepressants, corticosteroids, interferon-alpha, and opiates. **DSM-5 criteria for substance/medication-induced mental disorders:** • The disorder is a clinically significant symptomatic presentation of a relevant mental disorder. • Evidence from the Hx, physical exam, or lab findings supports both of the following: The disorder developed during or within 1 month of a substance intoxication or withdrawal or taking a medication; and the involved substance /medication is capable of producing the mental disorder. • The disorder is not better explained by an independent mental disorder (i.e., one that is not substance- or medication-induced). • The disorder does not occur exclusively during the course of a delirium. • The disorder causes clinically significant distress or impairment in social, occupational, or other important areas of functioning. **Deleted any references to "Chemical restraint"** – now called sedation and monitoring **Content added on steps to de-escalate; sedate & monitor; and restrain per guidelines.** EMS scene safety: de-escalating mental health/substance abuse crises (ems1.com) **The nature of suicide attempts:** "The CDC defines a suicide attempt as, "a non-fatal, self-directed, potentially injurious behavior with intent to die as a result of the behavior." Making a suicide attempt is a very traumatic event. Protective factors have failed, risk factors are strong, intent to die is severe, lethal means are on hand and a plan is underway. When a patient survives a suicide attempt, many of these prerequisites remain. Only intent to die may subside. Suicide risk stays very high. Protective factors do not rebound. Suicide plans may remain in the patient's thoughts and the means to die may still be available. Coming to the brink of ending one's life weakens resistance to do so again." This is one of the best recent articles on suicide and what we need to know about its nature, prevention, and postvention in EMS. Highly recommended reading. Salvatore, T. (2022). Beyond BLS: suicidality and postvention: What EMS needs to know about treating suicide attempts. EMS1. Accessed online: https://www.ems1.com/suicide/articles/beyond-bls-suicidality-and-postvention-wIQmfbsqG8wlBaRd/ **Supporting information:** See Jan, Feb, March 2022 NWC EMSS CE materials **Safe Call Now** is a CONFIDENTIAL, comprehensive, 24-hour crisis referral service for all public safety employees, all emergency services personnel and their family members nationwide. They provide education, support, healthy alternatives and resources to save lives and put families back together. https://www.safecallnowusa.org/ Garner, D.G., DeLuca, M.B., Crowe, R.P., et al. (2022). Emergency medical services professional behaviors with violent encounters: A prospective study using standardized

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	simulated scenarios. Journal of the Am Coll of Em Physicians Open. Apr;3(2):e12727. DOI: 10.1002/emp2.12727. PMID: 35475121; PMCID: PMC9023872. https://onlinelibrary.wiley.com/doi/epdf/10.1002/emp2.12727 Klein, L.R. & Cole, J.B. (2021). Ketamine: Focusing on the facts and forgetting the fiction. Ann Emerg Med, 78(1), 132-139. PMID 34167728 DOI: 10.1016/j.annemergmed.2021.03.039 Kupas, D.F., Wydro, G.C., Tan, D.K. et al. (2021). NAEMSP 2021 Joint position statement on clinical care and restraint of agitated or combative patients by EMS practitioners. PEC, 25(5), 721-723. DOI: 10.1080/10903127.2021.1917736 (Excellent resource) https://www.tandfonline.com/doi/epub/10.1080/10903127.2021.1917736?needAccess=true Organizations endorsing joint statement: NASEMSO, National EMS Management Association (NEMSMA), NAEMT, and the American Paramedic Association (APA) UpToDate: https://www.uptodate.com/contents/assessment-and-emergency-management-of-the-acutely-agitated-or-violent-adult?search=Taser&source=search_result&selectedTitle=2~3&usage_type=default&display_rank=2 Suicide prevention resources American Hospital Association – See: https://www.aha.org/suicideprevention?utm_source=newsletter&utm_medium=email&utm_campaign=aha-today&mkt_tok=NzEwLVpMTC02NTEAAAGETvZlVxNHCeNQpoPW2KafZvw_Wujr3tU6mEam7RdbGiyJ5bnyZ-aH8p8cmNB2YUIbu8oW-qPwEMpdWy-_oelVeIVRliw20wqanwu-Bj2X1hb9 National Academies of Sciences, Engineering, and Medicine. (2022). Strategies and interventions to reduce suicide: Proceedings of a workshop. Washington D.C: The National Academies Press. https://doi.org/10.17226/26471. Day, S.W., Sharp, J., Jackson, G.L. et al. (2022). Management of aggressive patient situations. Am Nurs Journal, 17(4). Beebe, C. (2018). Ligature-risk requirements. Patient safety. Accessed online: www.HFMmagazine.com Medscape articles: Substance-Induced Mood Disorder https://emedicine.medscape.com/article/286885-overview ; Alcohol-Induced Psychosis, https://emedicine.medscape.com/article/289848-overview ; and Amphetamine Toxicity https://emedicine.medscape.com/article/812518-treatment
Stroke | TIA	Separated TIME last known well /normal pt baseline and time of discovery of stroke S&S and option to extend scene time option to 15 minutes per Am Heart Assoc. Mission Lifeline Stroke Prehospital Care Measures (Jan 2021) registry entries required of hospitals | added bG to stroke screen checklist Emphasize appropriate execution of Regional Stroke Systems of care already in place. Added Image Trend checkbox for seizure at onset of S&S in compliance with stroke SOP. **Added consideration of Large Vessel Occlusion (LVO)** in the assessment and destination decision tree for patients with suspected strokes. **LVO:** Thrombosis or embolism of the middle cerebral arteries, internal carotid or basilar arteries. In addition to BEFAST screen, EMS must assess and identify 3 cortical signs to suspect LVO. **These are not new assessments** – but have been highlighted in green for easy identification on the Stroke Worksheet. **Cortical signs: https://www.pulsara.com/blog/how-to-assess-for-large-vessel-occlusion-lvo-stroke** 1. **GAZE DEVIATION**: Gaze will deviate toward the side of the occlusion, usually away from the visibly affected side or hemiplegia. 2. **APHASIA:** Difficulty in understanding spoken or written words. Four subcategories: expressive aphasia, receptive aphasia, anomic aphasia, and global aphasia. ▪ **Expressive aphasia,** also known as Broca's aphasia, involves the partial loss of the ability to produce language, whether spoken, manual, or written. Patients with expressive aphasia might have trouble speaking fluently and may take a great deal of effort when they speak, though their comprehension is usually unaffected. ▪ **Receptive aphasia**, also known as Wernicke's aphasia, impairs the ability to grasp the meaning of spoken words and sentences. Individuals with receptive aphasia are able to speak in long, fluent sentences, but the words they use together often don't make sense to listeners.

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	▪ **Anomic aphasia** is a milder type of aphasia, in which the individual has a persistent inability to retrieve the words they're looking for (particularly nouns and verbs). They can speak fluently with correct grammar but may substitute in vague words or attempt to describe the word they're trying to find. ▪ **Global aphasia** is the most severe form of aphasia and is caused by widespread damage to the language areas of our brain. Global aphasia inhibits both the ability to produce language and the ability to comprehend it. Patients with global aphasia aren't able to produce recognizable words, can't read or write, and may not be able to understand spoken language; however, their cognitive capabilities unrelated to language can be fully preserved. 3. **Agnosia:** Pt is unable to recognize and identify objects, persons, or sounds using one or more of their senses despite otherwise normally functioning senses. The deficit cannot be explained by memory, attention, language problems, or unfamiliarity with the stimuli. Usually, one of the sensory modalities is affected. Ex: a pt may not be able to identify a cup by sight, although they may be able to tell its color and identify it by touch by its shape and texture. It is not the same as anomia. Anomia is a naming disorder in which patients cannot name an object despite using their other sensory modalities like touch and smell. https://www.ncbi.nlm.nih.gov/books/NBK493156/ . These are **severe strokes and mechanical thrombectomy is the accepted standard of care**. It's critical to take pts to an interventional-capable facility as quickly as possible if LVO is suspected. Challenge: In general, the sensitivity, specificity and positive predictive value of all the LVO scales (CPSS, RACE, LAMS or VAN) has been suboptimal. **What this means for EMS**. Destination decision is a critical component of EMS mgt of stroke and has increased in complexity with the availability of endovascular therapy for LVOs. Optimizing pt outcomes requires a balance between over- and under-triage to specialty centers capable of providing endovascular therapy. In this retrospective analysis of EMS pts, a CPSS > 2 performed similarly to more complex LVO scales for large vessel occlusion prediction. While we await assessment of additional prehospital stroke scales, it may be more worthwhile to focus on incorporating CPSS > 2 into destination decisions and QI efforts than training EMS clinicians on new stroke scales. Crowe, R.P., Myers, J.B., Fernandez, A.R.et al. (2020). The Cincinnati prehospital stroke scale compared to stroke severity tools for large vessel occlusion stroke prediction. Prehospital Emergency Care, 1-9. Analysis by Maia Dorsett, MD, PhD, FAEMS, FACEP. Cincinnati prehospital stroke scale vs. other LVO stroke scales (ems1.com) Recommendations for Regional Stroke Destination Plans in Rural, Suburban, and Urban Communities From the Prehospital Stroke System of Care Consensus Conference: A Consensus Statement From the American Academy of Neurology, American Heart Association/American Stroke Association, American Society of Neuroradiology, National Association of EMS Physicians, National Association of State EMS Officials, Society of NeuroInterventional Surgery, and Society of Vascular and Interventional Neurology: Endorsed by the Neurocritical Care Society | Stroke (ahajournals.org) AHA/ASA. (2022) 2022 Guideline for the Management of Patients With Spontaneous Intracerebral Hemorrhage: A Guideline From the American Heart Association/American Stroke Association. Stroke. 2022; 53:00–00. DOI: 10.1161/STR.0000000000000407 Roaldsen, M.B., Lindekleiv, H., Mathiesen, E.B. (2021). Intravenous thrombolytic treatment and endovascular thrombectomy for ischaemic wake-up stroke. Cochrane Database Syst Rev, 12:CD010995.
Seizures	No change
Sepsis and Septic Shock	**Max IVF challenges** for EMS reduced from **30 to 20 mL/kg** (IVF challenge amounts) EMS is generally unable to make a definitive diagnosis of sepsis or septic shock and there is a risk to some patients if they are fluid overloaded too quickly. It is unlikely that EMS would achieve the 30 mL/kg volume prior to hospital arrival in many parts of Region IX due to shorter transport times. Additionally, there is great risk that EDs start the 30 mL/kg of the sepsis bundle with their first IV bag at the hospital, failing to take into account any IVF given by EMS. The ED should account for EMS IV fluids when they calculate the 3-hour fluid targets.

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	The **Surviving Sepsis guidelines** recommend using **balanced crystalloid instead of NS** for resuscitation. Much of EMS only has NS, so they should not be providing the greater volume of the early IVF resuscitation targets in septic patients. Guidelines recommend starting **vasopressors peripherally** to restore MAP rather than delaying initiation until central venous access is secured. Prompt initiation of vasopressors is an integral component of septic shock mgt. Vasopressors have been traditionally administered via central lines due to concerns of extravasation and local tissue injury and ischemia. However, placement of these lines requires specialized expertise and is time consuming, potentially leading to delays in administration. A recent systematic review showed that **peripheral administration of vasopressors is generally safe, particularly if infused distally to the antecubital fossa and for short periods of time** (< 6 hr). Peripheral administration of vasopressors is associated with shorter time to administration and faster time to achieving a MAP > 65 mm Hg. **Guideline:** "**Use norepinephrine as the first line vasopressor**. Target MAP of 65. Consider switching to epinephrine if cardiac dysfunction with persistent hypoperfusion is present despite adequate volume status and blood pressure." Surviving Sepsis Campaign (2021). Executive summary: International guidelines for the management of sepsis and septic shock 2021. J Crit Care Med, 49(11), 1974-1982.
Shock / Hypovolemic	No change
Initial Trauma Care	**Secondary assessment:** Reminder to use **correct size BP cuff** to optimize accurate readings; defined hemodynamic instability from previous SOPs **Assess tourniquets applied by non-EMS personnel** (police, firefighter, bystander, and pt). A high proportion of tourniquets were placed **without indication** (72/146, 49%); however, the proportion placed without a proper indication across all applier groups was not statistically different (p = 0.99). Rates of **inappropriately applied** tourniquets ranged from 21 to 46% across all groups. Mokhtari, A.K., Mikdad, S., Luckhurst, C. et al. (2022). Prehospital extremity tourniquet placements—performance evaluation of non-EMS placement of a lifesaving device. Eur J Trauma Emerg Surg. https://doi.org/10.1007/s00068-022-01973-4 See NASEMSO Model EMS Guidelines pp. 208 and the EMS World Supplement [Combating the Hidden Dangers of Shock in Trauma, June 2022]] for introduction of **MARCH assessment algorithm** to prioritize assessment and treatment in the Primary Survey. Added to Abbreviations in Appendix.
Trauma Triage & Transport Criteria Substantially changed based on new national guidelines	**Citation:** National Guideline for the Field Triage of Injured Patients: Recommendations of the National Expert Panel on Field Triage, 2021. Journal of Trauma and Acute Care Surgery (2022). DOI: 10.1097/TA.0000000000003627 See also: https://www.jems.com/patient-care/revised-field-triage-guideline-published/ **Summary of Changes** **Guideline format**: Consolidation into two categories based on the risk of severe injury requiring trauma center resources **Rationale**: The previous versions of the algorithm have focused on a stepwise approach starting with evaluation of the physiologic criteria followed by anatomic criteria, MOI criteria, and then special considerations. The end-user feedback was clear that the anatomic and MOI criteria are often first used to make the decision to transport to a trauma center before any physiologic criteria are assessed. In the prehospital setting, this approach makes sense. Providers are seeing the scene and assessing the MOI before the patient. Evidence suggests triage decisions are based on initial impressions of the scene and pt. This order of tasks is in contrast to the hospital where more weight is placed on the VS. Thus, based on feedback, the guideline was redesigned to consolidate the steps into the highest risk criteria (red box) any of which should prompt an immediate decision to transport to the highest-level trauma center available and the moderate risk criteria (yellow box) which, if none of the highest risk criteria are met, should still prompt transport to a trauma center but it need not be the highest level. The anatomic and mechanism criteria are presented first in these sections to match how the guideline is used in the field. **Rationale**: Previous versions of the Field Triage Guidelines (FTG) used a positive predictive value (PPV) ≥ 20% to add new criteria. There were no statistical criteria for removing triage measures (the lack of evidence/data was a primary reason for removing criteria). The main

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	limitation of PPV is the dependence on the prevalence of disease being studied, so PPV is not comparable across studies and can be artificially inflated by a study sample with high prevalence of disease (e.g., % of patients with ISS ≥ 16). For the 2021 Expert Panel, we worked with several experts in predictive analytics and guideline development to generate the current measures, which parallel metrics commonly presented in systematic reviews. **Likelihood ratios and area under the receiver operating characteristic curve** (AUROC) are favored measures frequently used in systematic reviews of predictive utility because they combine sensitivity and specificity (measures not influenced by the prevalence of disease) and provide a balanced metric. Because some systematic reviews only include sensitivity and specificity (based on limitations in the evidence base), we also list these measures above, although likelihood ratios and AUROCs are favored. **Anatomic Criteria (Injury Patterns)** The overall structural design of the preexisting algorithm was revised so that Injury Patterns (previously referred to as anatomic criteria) are now evaluated first and are ordered with a head-to-toe approach. The eight criteria previously included in this section were validated and retained although wording for some was clarified. Following stakeholder organization feedback, "new onset motor or sensory loss" was **changed to, "suspected spinal injury with new motor or sensory loss**." **Rationale**: In 2013, Lerner et al. evaluated the performance of the anatomic criteria outlined in the 2011 algorithm and validated the fact that all were a reasonable predictor of need for trauma center care. All injuries identified by EMS providers, with the exception of pelvic fractures, were found to have positive likelihood ratios greater than 2, indicating that they are good predictors of need for trauma center care. When pelvic fractures were identified at time of discharge from the hospital, the positive likelihood ratio increased to 6.2 thus suggesting that this criteria should also be retained with a focus on training to improve identification of these injuries in the field. **Addition of "active bleeding requiring a tourniquet or wound packing with continuous pressure"** **Rationale**: There is a growing body of literature to suggest that patients with external bleeding requiring a tourniquet will benefit from trauma center care. Studies reviewed demonstrated that: - 43% - 81% of pts where a tourniquet was applied were found to have significant vascular injury. - 82% of pts with tourniquets placed in the field had an absolute or relative indication for tourniquet placement and went on to require surgery. [Either vascular or soft tissue injury] - 89% of prehospital tourniquets were indicated. Pts with indicated tourniquet placement had a higher ISS and AIS of the extremity - Pts with tourniquets transported to a Level 1 TC center may have survival benefit in the civilian population. - Pts with tourniquets had significantly higher incidences of shock and vascular injury and higher rates of hospital admission, emergent hemorrhage control surgery, emergent blood transfusions and significantly higher volumes of fluid resuscitation. **Physiologic Criteria:** • Changed Heading of this Section to **Mental Status & Vital Signs** • **Replaced GCS ≤ 13** with **"Unable to follow commands (Motor GCS < 6)"** **Rationale**: A recent systematic review comparing total GCS to motor GCS indicated little clinical difference in predictive utility. In addition, there has been ongoing feedback from EMS to simplify this criterion. Motor GCS is felt to be easier to teach/train and use compared to total GCS. No other measures of mentation (e.g., Simplified Motor Score) were superior to mGCS. There were 18 head-to-head studies included in the systematic review, primarily comparing tGCS to mGCS. AUROCs were high for both measures (0.8-0.9), with differences in AUROC small (0.03-0.05 for non-mortality measures, 0.015 for mortality) and favoring total GCS. These differences are likely to be smaller when dichotomizing the measures by a single cut-point, as is used in the triage algorithm. Replacing this criterion recognizes the goal of making it easier for EMS to make a rapid assessment of mental status in the field and for training EMS. • **Retain SBP < 90** **Rationale:** The predictive utility of this criterion is supported by the systematic review of circulatory predictors for triage (49 studies). While a higher cut-point would raise sensitivity, it would also reduce specificity. This cut-point was also felt to be deeply rooted in medical culture

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	and training as a measure of hypotension, shock, and the potential for serious injury. This criterion applies to adults. • **Retain SBP >110 for older adults (Age >65 years)** **Rationale**: The predictive utility of this criterion is supported by the systematic review of circulatory predictors. The higher cut-point raises sensitivity and slightly lowers specificity, which was felt to be a reasonable trade-off for older adults, who have the highest rate of under-triage. • **New Criteria: heart rate > SBP (shock index) for adults and older adults** **Rationale**: The systematic review of circulatory predictors identified 29 studies evaluating shock index (HR/SBP), most of which used a value of 1.0 (HR > SBP). The pooled AUROC was 0.72, compared to 0.67 for SBP. There were 5 head-to-head studies between SI vs SBP, which favored SI, although the quality of the evidence was low. SI integrates the potential value of heart rate, when used in combination with SBP, and may identify patients with SBP > 90 mmHg who have serious injuries. Studies of SI included in the systematic review were performed in adults (all ages) and therefore felt applicable to older adults as well. While there are 5 studies using an age-adjusted SI for children, the calculation is cumbersome, differs by age, and felt non-feasible for field use. Therefore, **this criterion only applies to adults and older adults**. • **New Criteria: SBP < 70mmHg + 2 x age (Age 0-9)** **Rationale:** This criterion is specific to children and currently used in PALS and ATLS for identifying hypotension in children. There are two studies showing ED age-adjusted hypotension as an independent predictor of in-hospital mortality (Sathya et al. JAMA Surg, 2015; Newgard et al. JAMA Ped, 2021). While SBP is often not obtained by EMS in young children, inclusion of this criterion aligns the FTG with other international training courses on pediatric resuscitation and is viewed as a pediatric-specific training opportunity for EMS. • **Retain RR < 10 or > 29** **Rationale**: In the systematic review of respiratory measures for triage, RR was the most commonly studied criterion (25 studies), with RR < 10 or > 29 being the most commonly studied cut-point. The pooled AUROC was 0.70. While there were less studies specific to children and older adults, the available studies suggested similar performance in these groups. • **Retain need for ventilatory support but wording change to "Respiratory distress or need for respiratory support"** based on stakeholder feedback **Rationale**: In the systematic review of respiratory measures, airway management or need for ventilatory support (variously defined) was evaluated in 7 studies, including one in children and one in older adults. There was insufficient data to pool measures across studies, but comparison of predictive utility across studies was similar to that of the respiratory rate criterion. • **Replace RR < 20 in infant aged < 1 year with respiratory distress.** **Rationale**: There are no triage data supporting a specific RR in children to identify pts with serious injury, so the RR < 20 in infants was removed. Although there are no data specific to using "respiratory distress" for field triage, the panel felt that this measure would allow **pediatric-specific training for exam findings indicating respiratory difficulty and potentially serious injury (e.g., grunting, retractions, increased work of breathing),** which may be easier to implement and use in practice. This measure also increases alignment of FTG criteria with PALS and ATLS training. While the focus of this measure is children, it also applies to adults and older adults, serving as a precursor exam finding before the need for ventilatory support is present. • **New criterion Room-air pulse oximetry < 90%** **Rationale:** In the systematic review of respiratory measures, out-of-hospital oxygen saturation was evaluated in 5 studies, with most using a cut-point of < 90% (one study used < 95%). AUROC values ranged from 0.59 to 0.76. While the volume of literature is less for oxygen saturation than for respiratory rate, the number of studies is similar to that of ventilatory support, with similar predictive value. Pulse oximetry is also widely available on portable monitors and largely implemented to EMS systems throughout the US. The studies were conducted among adults of all ages and thus felt applicable to adults and older adults. While there are no triage studies evaluating the predictive utility of oxygen saturation in children, this criterion is consistent with PALS teaching and indirectly supported by one study showing the benefit of correcting prehospital hypoxia among children with severe traumatic brain injury (Gaither et al. Annals Emerg Med, 2021). Therefore, this criterion applies to patients of all ages, including children.

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	Mechanism of Injury • **Addition of Need for extrication for entrapped patient to intrusion criteria** **Rationale**: Previous versions of the algorithm included prolonged extrication (> 20 min) as a criterion in this section. This was removed in 2011 as it was felt that time was difficult to estimate, and the intrusion measurements should encompass these patients. Four new studies were reviewed suggesting any extrication time was a significant predictor of severe injury or trauma center need with LR ranging from 2.2 to 6.5 in adults and LR 6.55 in children. LR remained above 2 for even 5 min of extrication. Stakeholder raised concern that any extrication could be interpreted as the need to pry a door open to get the patient out, but the patient is not actually trapped in the vehicle which is what increases the risk of injury. As a result, this criteria was qualified as need for extrication for entrapped patient. Adding this criteria meets the goal of **making it easier for EMS to make a rapid assessment in the field.** • **Retain Vehicle telemetry data consistent with severe injury** **Rationale:** While the widespread implementation of AACN has not yet been realized, several studies were reviewed which have evaluated predictive algorithms based on data available from these systems with LR ranging from 4.7 to 22. Thus, this criteria was retained with a focus to encourage the further development of these automated systems which may outperform several of the traditional crash criteria. • **New Criteria: Child (Age 0-9) unrestrained or in unsecured child safety seat** Rationale: A large prospective study evaluating the value of the mechanism of injury criteria for triage of children demonstrated a 77% undertriage rate and 6% overtriage rate. As a result, the literature was reviewed for potential criteria specific to children. A NHTSA report from 2019 indicated that 44% of children who died in MVCs were unrestrained and being unrestrained or improperly restrained was associated with a significant increase in the risk of both death and severe injury. Four studies were reviewed from 2002-2015 which provided further support for this new criteria. The age ranges in these studies were variable, with the greatest impact seen in younger children. Age 0-9 years was selected to be consistent with the pediatric specific physiologic criteria to facilitate EMS training. • **Change Fall criteria to > 10 feet (all ages)** **Rationale:** New data were reviewed that demonstrated that Fall > 10 feet had a LR 2.6 for trauma center need in adults and LR 5.9 for children. • **Change Motorcycle crash criteria to: Rider separated from transport vehicle with significant impact (e.g. Motorcycle, ATV, Horse, etc.)** **Rationale**: There is insufficient data to remove this criteria but the panel felt that broadening this language would make it more relevant to children who may be involved in other events that offer similar risk such as ATV crashes and Equestrian events. This helps address the concern raised regarding the usefulness of these criteria for children. **Special Populations (Previous Step 4)** The information contained in Step 4 of the prior algorithm focused on special populations and additional considerations which should contribute to the judgment of the EMS providers. Data were reviewed for each of the special population criteria and incorporated into the guideline as appropriate. Recognizing the importance of provider judgment in unusual circumstances, this section is now titled EMS Judgment. These criteria provide a framework of additional risk factors that EMS providers should consider in their triage decisions and if concerned, transport the patient to a trauma center. **Older Adults: Relocation of blood pressure criteria** **Rationale**: Relative hypotension is essential to recognize in an older population. For this reason, it was removed from step four and relocated to the physiology section of the algorithm noting specific age variation. See supporting evidence referenced above. **Children**: **Should be triaged preferentially to pediatric capable trauma centers** **Rationale**: The expert group agrees that if given the option between a Pediatric Trauma Center and Adult Trauma center, children should be preferentially taken to a pediatric center. Given the variability in access to pediatric trauma centers, It was felt that this would be determined by local protocol based on proximity, this is now added to the footnotes and described in the text.

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	• **Add Suspicion of Child Abuse to EMS judgment considerations** **Rationale:** The mechanism of injury reported by caregivers may be inaccurate in the setting of child abuse. Blunt assault in children had a LR 4.6 for trauma center need in one study and in another study children under age 12 who were victims of child abuse had an odds ratio of 6 for trauma center need when compared to children injured in motor vehicle collisions. Trauma centers are required to have protocols in place to support a comprehensive evaluation of these children for occult or prior injuries. **Anticoagulant Use** • **Moved Anticoagulant use to EMS high-risk judgment factors** **Rationale**: Anticoagulant use was explored to determine if it should be moved from the special populations section to a strict criterion. However, the evidence did not support this move. Two studies (N= 3,414) studies reported that use of anticoagulants and antiplatelets were predictive of the composite outcome of in-hospital mortality, neurosurgery, or death due to trauma; these same two studies also reported association with ICH in the comorbidity section above. However, sensitivity (median 9.1%, range 0% to 78%) and positive likelihood ratios (median 0.96, range 0 to 2.18) were low and indicated minimal additive value to the triage algorithm. Evidence is clear, that if the patient has an injury, then the bleeding from the injury will be worse if the patient is on anticoagulation. For this reason, anticoagulation use was kept as an EMS judgment factor. **Lower-Level Falls in Older adults and Children** • **Low level falls in young children (age ≤5 years) or older adults (age ≥65) with significant head impact.** **Rationale**: Several studies were reviewed that suggested that the most significant injury from lower-level falls in small children and older adults is traumatic brain injury and so this new criteria replaces falls 2-3 times the height of the child previously in the MOI criteria and the caution regarding the risk of severe injury in ground level falls in older adults which was previously in Step 4. This criteria was moved from mechanism to EMS judgment based on stakeholder feedback and the recognition that EMS providers must judge significant head impact. **Special High-Resource Healthcare Needs** • **Added Special high-resource healthcare needs to EMS high-risk judgment factors** **Rationale**: While there is little evidence, the overall expert option was that patients with injury who also have special healthcare needs (e.g., tracheostomies, gastrostomy tubes, VADs) would be best serviced in a trauma center with more resources. **EMS Judgment** • **Format Change** **Rationale**: In the previous algorithm the special considerations section (Step 4) gave no strict criteria but rather several considerations. The panel reviewed these and felt that these factors represented high-risk factors that contributed to EMS judgment and hence the format change. The previous language which read “When in doubt, take to a trauma center” was changed to “If concerned, take to a trauma center” based on stakeholder feedback. **Transport Destination** Transport destination was moved to the bottom of each section to make it clear that any one of the criteria above should trigger that transport decision. The primary wording of the destination criteria has not changed but has been qualified with the statement, “within the geographic constraints of the regional trauma system”. This recognizes that there is a wide variety in trauma system structure and resources across the US and implementation of this guideline will require local evaluation of transport distances, available modes of transport, and trauma center resources. This is discussed in the supporting manuscript. **Footnotes** to destination criteria in RED section: Patients in extremis may require an intermediate stop at a closer hospital for procedures not available within the EMS systems such as complex airway patients. Pediatric patients should be preferentially triaged to pediatric capable trauma centers. **Additional Footnotes YELLOW SECTION** *Examples of special high resource healthcare needs include patients with tracheostomies, home ventilators, cardiac assist devices, etc.

SOP section	CHANGES, RATIONALE, CITATIONS
	** Patients with combined burns and trauma should be preferentially transported to a trauma center with burn care capability but if not available then a trauma center takes precedence over a burn center. ***EMS Judgment criteria should be considered in the context of the resources available in the regional trauma system. May consult medical control for further direction.
Cardiac arrest due to Trauma	• Cleaned up a couple of Hs & Ts to consider as reversible causes of cardiac arrest • Added: Pause CPR for pleural decompression: Safety consideration • Added: In MPIs, care for those w/ VS first until adequate responders arrive to resuscitate pts in traumatic arrest (AHA, 2020)
Conducted electrical weapon: Post-Taser care	**UpToDate 2022**: A systematic review of the clinical studies of electrical weapons found no evidence that they cause "dangerous laboratory abnormalities, physiologic changes, or immediate or delayed cardiac ischemia or arrhythmias" when exposure lasts ≤15 seconds. The authors of two systematic reviews conclude that prolonged observation and diagnostic testing are not necessary in pts who are asymptomatic and alert following such an exposure. Concurrent intoxication with cocaine, methamphetamine, phencyclidine (PCP) or other stimulants is common among those subdued by law enforcement with electrical weapons and **may increase the risk of cardiac arrhythmia**, as may preexisting cardiovascular disease. People **can be injured if they fall after being "stunned,"** and such patients should be carefully examined. Significant injuries reported in association with electrical weapons are rare, but may include **cutaneous burns, lacerations, rhabdomyolysis, testicular torsion, ocular injury, and miscarriage. Management of cutaneous injuries is supportive and is similar to the treatment of other types of electrical injuries**. https://www.uptodate.com/contents/environmental-and-weapon-related-electrical-injuries?search=Taser%20dart%20care&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1 El Sayed, M., El Tawil, C., Tamim, H., Mailhac, A., Mann, N.C. (2019). Emergency medical services experience with barb removal after taser use by law enforcement: A descriptive national study. Prehosp Disaster Med; 34(1), 38-45. doi: 10.1017/S1049023X18001176. Epub 2018 Dec 28. https://pubmed.ncbi.nlm.nih.gov/30591087/ At present, EMS activations with documented TASER barb removal are rare. Routine care by EMS is expected, and life-threatening emergencies are not common. All EMS providers should be familiar with local policies and procedures related to TASER use and barb removal
Burns **Adults & peds**	**Burn shock** during the initial 24 to 48 hours following major burns is characterized by myocardial depression and increased capillary permeability resulting in large fluid shifts and depletion of intravascular volume. Rapid, aggressive fluid resuscitation to reconstitute intravascular volume and thereby maintain end-organ perfusion is crucial. Delays in appropriate fluid resuscitation are associated with increased mortality. **Overestimation of burn size will overestimate IV fluid requirements**. Only partial and full thickness burns are included for the calculation of IV fluids. Over-resuscitation can be problematic and has been associated with multiple morbidities, including acute respiratory distress syndrome, pneumonia, multiorgan failure, and abdominal, extremity, and orbital compartment syndromes. A survey of burn centers reported that initial fluid resuscitation exceeded recommended amounts in 58% of patients. This reinforces the importance of calculating fluid resuscitation needs carefully (OLMC activity) and of continually adjusting resuscitation efforts according to the physiologic response. Tran, D.P., Arnold, D.H., Thompson, C.M., et al. (2022). Evaluating discrepancies in percent total body surface area burn assessments between prehospital providers and burn center physicians. J Burn Care Res, 43(1):225-231. doi: 10.1093/jbcr/irab131. PMID: 34289051. **ABA recommends starting IVF for all nonsuperficial burns >15%-20% TBSA at 2 mL/kg/% TBSA and switching to LR ASAP**. Large volumes of NS can result in hyperchloremic acidosis. **Fluid requirement is calculated from the time of injury rather than the time of starting fluids**. Ex: if fluid resuscitation is delayed by 2 hr, then fluid calculated for the first 8 h should be infused in the next 6 h. Volume infused should always be titrated and adjusted per the pt response. Use the minimum amount of fluid required to maintain organ perfusion and continuously titrate to avoid under- and overperfusion.

SOP section	CHANGES, RATIONALE, CITATIONS
	IDPH Rules require that EMS Systems have an SOP on **Blast Injuries**. Created from National Model Guidelines, TNS outline, and included in Burn protocols as many blast pts have co-morbidities with burns or inhalation injuries. ABA. (2018). Advanced Burn Life Support Course Provider Manual. http://ameriburn.org/wp-content/uploads/2019/08/2018-abls-providermanual.pdf Gupta, A.K., Asirvatham, E., Reddy, K.A., Lamba, S. (2021). Fluid resuscitation in adult burns. Curr Med Issues [serial online] [cited 2022 Apr 25];19:103-9. Available from: https://www.cmijournal.org/text.asp?2021/19/2/103/313809 Rice, P.L. & Orgill, D.P. (2021). Emergency care of moderate and severe thermal burns in adults. UpToDate, Accessed online: https://www.uptodate.com/contents/emergency-care-of-moderate-and-severe-thermal-burns-in-adults/print Schaefer; T.J., & Tannan, S.C. (2021). Thermal burns. StatPearls [Internet]. Accessed online: https://www.ncbi.nlm.nih.gov/books/NBK430773/ **International Burn Care Guidelines recommend cooling** a burn injury with clean, cool, water for 20 minutes. This requires many gallons of water which is not practical for EMS. Preferred alternative is a **Hydrogel dressing**. Added as an option; particularly attractive are the face and hand dressings. Special pricing available for kits through Boundtree. Shu, W., Wang, Y. and Zhang, X. (2021). Functional hydrogel dressings for treatment of burn wounds. Frontiers in Bioengineering and Biotechnology. Accessed online: https://www.frontiersin.org/article/10.3389/fbioe.2021.788461 DOI=10.3389/fbioe.2021.788461 ISSN=2296-4185 **Inhalation burns**: Pts at risk: Hx of closed space entrapment; syncope; carbonaceous sputum; arterial PaO_2 <60 mmHg (SpO_2 < 90%); metabolic acidosis; carboxyhemoglobin levels >15%; bronchospasm/wheezing; facial burns. Pts who do not require ETI should receive O_2 by NRM to displace CO. For those at risk of O_2-induced hypercapnia (PMH COPD or obstructive sleep apnea), a low threshold to Rx with **CPAP** or mechanical ventilation is prudent. https://www.uptodate.com/contents/inhalation-injury-from-heat-smoke-or-chemical-irritants **Existing burn center referral criteria** were developed in 2014. Innovations in burn care have occurred since then. Frequent errors in the estimation of TBSA or extent of burn and burn depth resulted in over and under-triage to burn centers when old criteria were used. A multidisciplinary panel of experts was convened to use an eDelphi consensus process to facilitate a revision. Referral criteria were simplified. ACS did not address burn mgt in their 2022 guideline update so references to their older document were removed. Bettencourt, A.P., Romanowski, K.S., Joe, V., Jeng, J., et al. (2020). Updating the burn center referral criteria: Results from the 2018 eDelphi consensus study. J of Burn Care & Research, 41(5), 1052–1062 | https://doi.org/10.1093/jbcr/iraa038
Torso/Chest trauma	Providers must maintain a high level of clinical suspicion for patients who have an initially elevated **shock index (SI) (HR/SBP - Normal <0.7)**. EMS SI was the greatest predictor of injury and the need for resources. Note SI added to National Trauma Triage criteria with VS. Bardes, J.M., Price, B.S., Adjeroh, D.A. e al. (2022). Emergency medical services shock index is the most accurate predictor of patient outcomes after blunt torso trauma. J Trauma Acute Care Surg, 92(3):499-503 | doi: 10.1097/TA.0000000000003483. Added option for approved commercial device for pleural decompression
Eye trauma	No change
Facial trauma	No change
Head trauma/ Traumatic Brain Injury (TBI)	Added detail to neuro exam under point 2. These elements are not well remembered by EMS personnel and prompts are helpful for accurate assessment and documentation. New study affirms need for higher MAP in patients with TBI. Optimal adjusted mortality was associated with a surprisingly high SBP range (130 to 180 mmHg). Findings highlight how sensitive the injured brain is to compromised perfusion at SBP levels thta have previously been considered adequate or even normal. Spaite, D. W., Hu, C., Bobrow, B. J., Barnhart, B., et al. (2022). Optimal out-of-hospital blood pressure in major traumatic brain injury: A challenge to the current understanding of

SOP section	CHANGES, RATIONALE, CITATIONS
	hypotension. *Annals of emergency medicine*, S0196-0644(22)00101-9. Advance online publication. https://doi.org/10.1016/j.annemergmed.2022.01 **Concussion** section reorganized and clarified to insert the specific SCAT-5 assessment tool including the **MADDOCKS questions** See SPORT CONCUSSION ASSESSMENT TOOL 5th Edition developed by the CONCUSSION IN SPORT GROUP for use by Medical Professionals only https://bjsm.bmj.com/content/51/11/851
Musculoskeletal trauma	No substantial change to SOP, but new literature as background. **Severe crush injury** results from direct tissue trauma and sequelae of ischemia-reperfusion injury. Once compressive forces are released, muscle injury and swelling can occur, with possible muscle necrosis and neurologic dysfunction in the affected areas. Systemic manifestations resulting from crush injury (crush syndrome), can result in organ dysfunction or death. **Splinting considerations traction splints & pelvic fractures: (Q&A from CE)** https://www.ncbi.nlm.nih.gov/books/NBK507842/ https://www.emswebinfo.com/uploads/4/7/7/5/47750425/tractionsplintsb.pdf While injuries to surrounding nerves are rare in diaphyseal femur fractures, the femur does have a robust blood supply, which can lead to large amounts of blood loss. The large compartments of the thigh can hold up to 3 liters of hemorrhaged blood. A patient with a femur fracture can be expected to lose about 1 to 1.5 L of blood or up to 30% of the normal body's blood volume. Therefore, EMS personnel must keep a close eye on the hemodynamic status of patients with a suspected femur fracture. **Clinical diagnosis** of femur Fx is usually obvious from mechanism, pain, swelling, and deformity/shortening of the thigh. Extreme pain may mask secondary injuries. Since most femur fractures occur with high energy trauma, pelvic ring, hip, groin, perineum, and buttock evaluations are crucial. Up to 40% of the femur fx are associated with an ipsilateral knee injury. **Traction splints** are a useful emergency tool to align the femur fx better, increase arterial blood flow, decrease pain and spasm, and reduce the risk of further injury from fractured bone fragments. Commonly used types: Thomas, Hare, Sager, Kendrick, CT-6, Donway, and Slishman traction splints. **General indications for traction splints:** A suspected isolated (closed) fracture of the **midshaft** femur **Contraindications** ▪ Any immediate life-threat and/or significant multi-system trauma: If the patient is unstable, do not waste time trying to apply traction splint. Splint the injured leg against the uninjured leg to expedite transport. ▪ Pelvic or hip fracture; hip dislocation ▪ Obviously open femur fracture ▪ Any other injury on the affected limb: Knee, tib/fib, ankle or foot ▪ Partial amputation or avulsion with bone separation ▪ Hare splint is not effective with proximal femur shaft fracture because the ischial pad may rest directly under the fracture. **Crush injuries**: Rescuers and health care professionals must recognize crush injury to avoid missing a narrow window of time in which to provide intensive fluid resuscitation, which may limit acute kidney injury. See UpToDate: https://www.uptodate.com/contents/severe-crush-injury-in-adults Suspension Trauma -- Occupational Health & Safety (ohsonline.com)
Spine trauma	**Content and format updated to align with the 2022 ACS QTP guidelines.** **Respiratory insufficiency or failure** often accompanies SCI because of respiratory muscle weakness resulting in hypoxemia that worsens the spinal cord ischemia. Consider need for NIPSV (CPAP) to support ventilations. **Evolving thoughts on ways to safely remove persons from vehicles**. Major transition away from using a KED as it causes more spine movement to apply. Research in healthy volunteers has shown the least movement when conscious pts without severe injury who are able to follow commands self-extricate onto the cot. Injured pts should have SMR and rapid extrication.

SOP section	CHANGES, RATIONALE, CITATIONS
	Although theoretically possible to distinguish between **hypovolemic and neurogenic shock**, clinically this **distinction is not so clear.** Acute trauma pts sustaining a high cervical SCI may suffer from both conditions. The Consortium for Spinal Cord Medicine suggests ruling out other causes of shock before assuming a diagnosis of neurogenic shock. Initially restore vascular volume and if symptoms of neurogenic shock persist, give vasopressors such as norepi, with both alpha- and beta-agonist properties (preferred over pure alpha agonists). **Abnormal temperature control** is seen with cervical and high thoracic injuries largely due to reduced sensory input to thermoregulating centers and the loss of SNS control of temperature and sweat regulation below the level of injury. Pts present with poikilothermia resulting in fluctuating temperature, hypothermia or hyperthermia. **References** ACS. (2022) Trauma Quality Program (TQP) Spine Injury Best Practices Guidelines. https://www.facs.org/-/media/files/quality-programs/trauma/tqip/spine_injury_guidelines.ashx Azar, F.M. (2022). Fractures, dislocations, and fracture-dislocations of the spine. Vol. 2 Campbell's Operative Orthopaedics (14th ed). Elsevier ISBN: 9780323672177 Fischer, P.E., Perina, D.G., Delbridge, T.R. et al. (2018). Spinal motion restriction in the trauma patient - A joint position statement. PEC, 22(6), 659-661. Epub 2018 Aug 9. PMID: 30091939 NAEMSP. (2018). EMS spinal precautions and the use of the long backboard – A joint position statement of the NAEMSP and the ACS Committee on Trauma. https://naemsp.org/home/news/spinalmotion-restriction-in-the-trauma-patient- Nutbeam, T., Fenwick, R., May, B. et al. (2022). Assessing spinal movement during four extrication methods: a biomechanical study using healthy volunteers. Scand J Trauma Resusc Emerg Med, 30(7). Open access, available at: https://doi.org/10.1186/s13049-022-00996-5 Padmaja, D. and. R. Mitra, R. (2017). Neurotrauma. In Essentials of Neuroanesthesia; Prabhakar, H. Ed.). Elsevier. Hardcover ISBN: 9780128052990 | eBook ISBN: 9780128054307 https://www.sciencedirect.com/topics/neuroscience/neurogenic-shock#:~:text=Specific%20treatment%20of%20neurogenic%20shock,effect%20(i.e.%2C%20bradycardia).
Multiple patient incidents (MPIs)	Addition of SALT approach to triage and treatment. Duckworth, R. (2021). How to use SALT to triage MCI patients. Clarified treatment to rapidly provide at time of triage. EMS1 How to triage mass casualty victims with SALT method (ems1.com) **Updates to JumpSTART mass casualty triage** training based on educational materials provided to EMS Systems by Evelyn Lyons from Illinois EMSC on 6-27-22. ▪ JumpSTART education recommended for all EMS, ED, and pediatric staff who may need to assist during a mass casualty event. ▪ JumpSTART refresher training recommended every other year. Refresher trainings can consist of full JumpSTART© training, a refresher course defined by the organization, or a relevant online module. Education verification to be submitted to EMSC. See memo for attachments.
Haz-mat incidents	No change
Chemical agents	No change
CHEMPACK Requests	No change (little reformatting)
Active Assailant response	Added information about care of injured Law enforcement animals per new IDPH EMS rules. **NWC EMSS: For Rx of injured police dog** – *see Policy A3: ALS to EMR Services/Scopes of Practice* ***Veterinary Specialty Center with HBO, imaging, and ICU** is currently located at 1515 Busch Pkwy, Buffalo Grove, IL 60089 | Hours: 24 | Phone: (847) 459-7535* **Moving in mid-August** - *New address*: 2051 Waukegan Road, Bannockburn, Illinois 60015 *is in SOP. Contact Jerry Jensen at ext. 3030 or jjensen@vetspecialty.com . He heads education and is the manager of the ICU.* Wylie, R. (2022). Rapid response: 5 ways to be prepared for an MCI in your community Focusing on swift triage, being good at the basics and having a plan for exfiltrating the

SOP section	CHANGES, RATIONALE, CITATIONS
	wounded are essential steps to immediate lifesaving measures. EMS1. Accessed online: https://www.ems1.com/ems-products/bleeding-control/articles/rapid-response-5-ways-to-be-prepared-for-an-mci-in-your-community-fofc97Xs5TNAaC1M/ Goolsby, C., Schuler, K., Krohmer, J., Gerstner, D., Weber., Slattery, D., Kuhls, D., Kirsch, T. (2022). Mass shootings in America: Consensus recommendations for healthcare response. Journal of the American College of Surgeons: July 18, 2022 (ahead of print).
Widespread disease outbreak	No change
Adult Abuse | Neglect | Maltreatment | Trafficking	Substantial changes – See all the underlined language in protocols based on updates to State Law and national guidelines.
Trauma in pregnancy	Notes added on preferred pain medications in pregnant women.
Childbirth (uncomplicated)	No change
Delivery complications	No change
Newborn resuscitation	Aziz, K., Lee, H.C., Escobedo, M.B., Hoover, A.V. et al. (2020). J. Part 5: **neonatal resuscitation: 2020 AHA Guidelines** for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 42(suppl. 2):S524–S550. doi: 10.1161/CIR.0000000000000902 Also see Am Acad of Pediatrics Neonatal Resuscitation Program: https://www.aap.org/en/learning/neonatal-resuscitation-program/?_ga=2.24465266.956165532.1650110460-32617723.1650110460 - Placing a healthy newborn who does not require resuscitation **skin to skin with mom** after birth can be effective in temperature control and bG stability. Perform all resuscitation procedures with temperature-controlling interventions in place. The use of wraps (with a cap) and increased environmental temp can be effective in preventing hypothermia. - The immediate care of newly born babies involves an **initial assessment of gestation, breathing, and tone**. Babies who are breathing well and/or crying are cared for skin-to-skin with their mothers and should not need interventions such as routine tactile stimulation or suctioning, even if the amniotic fluid is meconium stained. Avoiding unnecessary suctioning helps prevent the risk of induced bradycardia as a result of suctioning of the airway. - Assess the newborn's **HR to determine the effectiveness of spontaneous respiratory effort**, the need for, and the response to interventions. - Alternative compression-to-ventilation ratios to 3:1, plus asynchronous PPV (inflations not coordinated with chest compressions), are routinely used outside the newborn period, but the **preferred method in the newly born is 3:1 in synchrony**. - When providing chest compressions to a newborn, the **2 thumb–encircling hands** technique may have benefit over the 2-finger technique with respect to BP generation and provider fatigue. The 2 thumb–encircling hands technique can be performed from the side or from above the head of the newborn. - **Shock**: A newly born infant in shock from blood loss may respond poorly to initial resuscitative efforts of ventilation, chest compressions, and/or epinephrine. **S&S suggestive of blood loss** include a pale appearance, weak pulses, and persistent bradycardia (HR <60). Blood may be lost from the placenta into the mom's circulation, from the cord, or from the infant. IV boluses of 10 mL/kg over 5 to 10 minutes may be reasonable and may be repeated if there is an inadequate response. - **Hypoglycemia** is common in infants who have received advanced resuscitation and is associated with poorer outcomes. Monitor for hypoglycemia (heel stick) and Rx per SOP.
OB complications	No change
Pediatric patients Peds initial medical care	Antevy, P. (2020) Two issues with the new PALS guidelines. EMS World. www.emsworld.com/article/1225297/two-issues-new-pals-guidelines Illinois EMS for Children Pediatric Prehospital Protocols (2021).

SOP section	CHANGES, RATIONALE, CITATIONS
	https://www.luriechildrens.org/en/emergency-medical-services-for-children/resourcesguidelines/guidelines-tools-and-other-resources/practice-guidelinestools/ Korioth, T. (2020). Updates to neonatal, pediatric resuscitation guidelines based on new evidence. AAP News. Topjian, A.A., Raymond, T.T., Atkins, D., Melissa Chan, M. et al. On behalf of the Pediatric Basic and Advanced Life Support Collaborators. (2021). Part 4: Pediatric basic and advanced life support 2020 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. Pediatrics, 147 (Supplement 1): e2020038505D. https://doi.org/10.1542/peds.2020-038505D Also see **Circulation**, 142(suppl 2) S469-S523. DOI: 10.1161/CIR.0000000000000901 https://www.ahajournals.org/doi/10.1161/CIR.0000000000000901 Commonly used intravenous agents for pediatric procedural sedation. https://www.uptodate.com/ Rappaport, L.D., Markowitz, G., Hulac, S., & Roosevelt, G. (2022). Medication errors in pediatric patients after implementation of a field guide with volume-based dosing. PEC, DOI: 10.1080/10903127.2022.2025962. https://doi.10.1080/10903127.2022.2025962 **Peds midazolam max dose clarified.** **Peds VS chart updated**
Children with special needs	No change
Peds Airway Adjuncts	The midazolam max dose was clarified.
Pediatric foreign body airway obstruction	Content updated to AHA 2020 guidelines. Color formatting to enhance readability.
Peds Respiratory Arrest	New algorithms for health care providers address opioid-associated emergency for adolescents. Naloxone can reverse respiratory arrest due to opioid overdose, but there is no evidence that it benefits patients in cardiac arrest. Naloxone dosing clarified.
SIDS	No change
Brief resolved unexplained events (BRUE)	No change
Peds Allergic Reaction Anaphylaxis	Same changes as adult SOP; IV epinephrine dose clarified. Albuterol and diphenhydramine made optional based on contemporary literature showing no benefit in anaphylaxis.
Peds Asthma	No change
Croup / Epiglottitis Respiratory syncytial virus / bronchiolitis	No change
Peds Bradycardia	Midazolam max dose clarified
Peds Narrow QRS Complex Tachycardia	Same changes as adult SOP; clarified peds J settings for cardioversion
Peds V-Tach w/ Pulse	Same changes as adult SOP; clarified max midazolam dosing and rhythms to be cardioverted vs. defibrillated
Peds AMS	Same changes as adult SOP; clarified naloxone dosing
Peds Drug Overdose/ Poisoning	Same changes as adult SOP; standard dosing clarified for naloxone, midazolam and ketamine
Peds Glucose/ Diabetic Emergencies	Same changes as adult SOP; added oral carbohydrate options; Source UpToDate https://www.uptodate.com/contents/image?imageKey=PEDS%2F83485 Added option of D25W if D10% unavailable
Peds Seizures	No change

SOP section	CHANGES, RATIONALE, CITATIONS
Peds SEPSIS and Septic shock	Reduced our dose from 1 to 0.1 mcg/kg/min IVPB/IO (max 1-2 mcg/kg/min up to 8 mcg/min) titrated to SBP >70 + (2 X age in yrs) based on current literature. See dosing chart in Appendix. Norepinephrine pediatric drug information (2022). Lexicomp Online; UpToDate. See www.uptodate.com/contents/norepinephrine-noradrenaline-pediatric-drug-information High-Dose Vasopressor Therapy for Pediatric Septic Shock: When Is Too Much? da Silva, P.S.L. and Fonseca, M.C.M. (2020). High-dose vasopressor therapy for pediatric septic shock: When is too much? J Pediatr Intensive Care, 9(3), 172-180.
Peds ITC	Peds lidocaine dose added for IO in responsive pt ; IVF challenge volumes clarified
Peds Trauma Management of specific injuries	Conclusion: Implementation of the pediatric out-of-hospital traumatic brain injury guidelines was not associated with improved survival when the entire spectrum of severity was analyzed as a whole (moderate, severe, and critical). However, both adjusted survival to hospital admission and discharge improved in children with severe traumatic brain injury, indicating a potential severity-based interventional opportunity for guideline effectiveness. These findings support the widespread implementation of the out-of-hospital pediatric traumatic brain injury guidelines. Gaither, J.B., Spaite, D.W., Bobrow, B.J., Keim, S.M. (2021). Effect of implementing the out-of-hospital traumatic brain injury treatment guidelines: The excellence in prehospital injury care for children student (EPIC4Kids). Annals of Em Med, 77(2), 139-153. https://doi.org/10.1016/j.annemergmed.2020.09.435 Verity, S. Clinical pathway for the management of a pediatric patient with hypothermia. EB Medicine. Accessed online: www.ebm@ebmdicine.net https://www.ebmedicine.net/topics/toxicology-environmental/pediatric-hypothermia
Child Abuse or Neglect	Substantial revisions – see underlined text Definition of "Abused child" means a child whose parent or immediate family member, or any person responsible for the child's welfare, or any individual residing in the same home as the child, or a paramour of the child's parent: (a) inflicts, causes to be inflicted, or allows to be inflicted upon such child physical injury, by other than accidental means, which causes death, disfigurement, impairment of physical or emotional health, or loss or impairment of any bodily function; (b) creates a substantial risk of physical injury to such child by other than accidental means which would be likely to cause death, disfigurement, impairment of physical or emotional health, or loss or impairment of any bodily function; (c) commits or allows to be committed any sex offense against such child, as such sex offenses are defined in the Criminal Code of 2012 or in the Wrongs to Children Act, and extending those definitions of sex offenses to include children under 18 years of age; (d) commits or allows to be committed an act or acts of torture upon such child; (e) inflicts excessive corporal punishment or, in the case of a person working for an agency who is prohibited from using corporal punishment, inflicts corporal punishment upon a child or adult resident with whom the person is working in his or her professional capacity; (f) commits or allows to be committed the offense of female genital mutilation, as defined in Section 12-34 of the Criminal Code of 2012, against the child; g) causes to be sold, transferred, distributed, or given to such child under 18 years of age, a controlled substance as defined in Section 102 of the Illinois Controlled Substances Act in violation of Article IV of the Illinois Controlled Substances Act or in violation of the Methamphetamine Control and Community Protection Act, except for controlled substances that are prescribed in accordance with Article III of the Illinois Controlled Substances Act and are dispensed to such child in a manner that substantially complies with the prescription; or (h) commits or allows to be committed the offense of involuntary servitude, involuntary sexual servitude of a minor, or trafficking in persons as defined in Section 10-9 of the Criminal Code of 2012 against the child.
APPENDIX	
CPR guidelines	Updated to AHA 2020 guidelines.
Drug Appendix	Dose charts added for PO and IV **acetaminophen; diphenhydramine** Added guidelines for IV access; distal femur IO option for peds; steps in Medication Administration Cross-Check procedure

SOP section	CHANGES, RATIONALE, CITATIONS
	Added options for estimating body weight in children, adolescent and adults EMS reliably estimates adult wt within 20% of actual and they are accurate within 10% only ½ the time. Pts generally estimate their own wt accurately. www.researchgate.net/publication/246282753_Can_emergency_personnel_accurately_estimate_adult_patient_weights **Measuring weight accurately may be impossible**, especially for critically ill or injured pts in emergency conditions. Medical personnel often depend on crude estimations like using 70 kg for males and 60 kg for females in critical situations with potentially lethal consequences. – **Overestimation** increases the calculated dose of weight-based drugs/IVF with narrow margins of safety and may result in potentially life-threatening side-effects – **Underestimation** may result in suboptimal (subtherapeutic) dosing EMS needs a reasonably accurate way to estimate weight using validated methods that are quick and easy to recall and use. **Conversion reminder:** 2.2 lbs roughly converts to 1 kg, and a kilogram equals ~2.2 lbs. Our recommendations: ▪ Ask all conscious patients who can communicate reliably about their last known weight ▪ **Adolescents** (>12 yrs) & **adults:** Mid-upper arm circumference measurement (**MUAC**) **MUAC: Weight in kg = 4 X MAC (in cm) − 50** Use LEFT upper arm. Measure at the mid-point between the tip of the shoulder and the elbow. Use left arm because triceps and biceps muscle development may be asymmetric, being greater in the dominant than the non-dominant arm (assumed to be the left). ▪ **Children:** - Ask parents or caregivers (most accurate) - Use Broselow tape or other approved length-based tape or Pedi Wheel - Age-based formula (ABF) defined by the child's age at their last birthday (APLS) o Children aged 1–5 years: weight in kg = (2 X age) + 8 o Children aged 6–12 years: weight in kg = (3 X age) + 7 Note: Age-based formulae and length-based methods without habitus adjustment tend to predict ideal (not actual) body weight. Cattermole, G.N., Graham, C.A., Rainer, T.H. (2017). Mid-arm circumference can be used to estimate weight of adult and adolescent patients. Emerg Med J; 34:231–6. https://pubmed.ncbi.nlm.nih.gov/27993936/ https://assetcloud.roccommerce.net/files/_armstrong/2/8/4/broselow-age-chart.pdf
Peds dose calculations	Original tables substantially changed to put most peds dosing within 2 tables for ready reference.
Ketamine dosing table	Revised to include all dosing increments: Pain column in draft calculated at 0.3 mg/kg – although option to use 0.25 mg/kg in Region SOP. Wil require the dose table recalculation by those Systems wishing to use a lesser dose | Sedation at 2 mg/kg and 4 mg/kg. Bold line added between the two main sections for easier reading. With max dose per SOP capped at 300 mg, last column on right is shaded red as a reminder that those doses should get OLMC approval in advance.
Norepinephrine charts	Adult dosing charts significantly edited to include pediatric dosing based on weight.
12 L changes in STEMI reference	Removed table calculating QT intervals as that is done by the cardiac monitors. Request came from field personnel to add all the likely 12 L ECG changes based on the location of a STEMI. Added. Makes a nice pull out reference now. **STEMI ECG definitions** – Accessed on line 3-26-22 from F.O.A.M. ED (www.ebmedicine.net/ebmblog/rapid-reference/stemi-ecg/?__s=qphagsrs6iri1frqgmfj) "Acute myocardial infarction (AMI) historically is defined as a clinical syndrome that meets a certain set of criteria, usually a combination of symptoms, ECG changes, and cardiac

SOP section	CHANGES, RATIONALE, CITATIONS
	biomarkers in the proper clinical context." Added a summary of **ECG criteria used to diagnose ST-elevation myocardial infarction (STEMI)** as defined by the Fourth Universal Definition of Myocardial Infarction. **References** 1. Thygesen, K., Alpert, J.S., Jaffe, A.S. et al. (2018). Fourth universal definition of myocardial infarction. Circulation, 138(20): e618-e651. PubMed 2. Frank, M., Sanders, C., Berry, B.P. (2021). Evaluation and management of ST-segment elevation myocardial infarction in the emergency department. Emerg Med Pract; 23(1), 1-28. Article, PubMed. 3. O'Gara, P.T., Kushner, F.G., Ascheim, D.D., et al. (2013). ACCF/AHA guideline for the management of ST-elevation myocardial infarction: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Circulation, 127(4): e362-e425. Article 4. Sgarbossa, E.B., Pinski, S.L., Barbagelata, A. et al. (1996). Electrocardiographic diagnosis of evolving acute myocardial infarction in the presence of left bundle-branch block. GUSTO-1 (Global utilization of streptokinase and tissue plasminogen activator for occluded coronary arteries) Investigators. N Engl J Med, 334(8), 481-487. PubMed 5. Smith, S.W., Dodd, K.W., Henry, T.D., Dvorak, D.M., Pearce, L.A. (2012). Diagnosis of ST-elevation myocardial infarction in the presence of left bundle branch block with the ST-elevation to S-wave ratio in a modified Sgarbossa rule. Ann Emerg Med, 60(6), 766-776. PubMed 6. Sandoval, Y., Thygesen, K., Jaffe, A.S. (2020). The universal definition of myocardial infarction: Present and future. Circulation, 141(18), 1434-1436. doi: 10.1161/CIRCULATIONAHA.120.045708. Epub 2020 May 4. PubMed
Approved abbreviations	Newly added ones are highlighted in bright yellow based on national changes or omissions from last document.
Differentials for SOB & CPAP	Updated section on the indications, absolute and relative contraindications for CPAP. StatPearls [Internet] (2021) https://www.ncbi.nlm.nih.gov/books/NBK470429/ and StatPearls [Internet] (2022) https://www.ncbi.nlm.nih.gov/books/NBK526127 for quick reference on respiratory failure differentiation
Biologic, nuclear, incendiary, chemical agents	No change
Hospital OLMC contact info	Should be modified for each System in Region IX based on the hospitals their personnel call most frequently.
Hospital Designations for Specialty Transports	Updated to known designations
Pain scales	Pain scales typically assess patients with all types of pain but may not be fully accurate in those with severe chronic or breakthrough pain (cancer or severe inflammatory reaction-related), those who are non-verbal, or do not perceive pain in usual ways. Patients with autism spectrum disorder may have a heightened or reduced sensitivity to pain or experience it in unusual ways. They may not be able to express their distress due to communication and social difficulties. Most scales try to assess pain severity or intensity and are modified for adults, children, the elderly, those with dementia, or those who have language fluency challenges. In patients with chronic pain, determine their baseline and where they rate the pain now in comparison. Options: Verbal Rating Scales (VRS); Visual Analogue Scales (VAS), and Numerical Rating Scales (NTS). The Wong-Baker Faces scale and Faces Pain Scale-Revised (FPS-R) and observational-behavioral scales are also helpful tools. Malviya, S., Vopel-Lewis, T., Burke, C., Merkel, S., Tait, A.R. (2006). The revised FLACC observational pain tool: improved reliability and validity for pain assessment in children with cognitive impairment. Pediatric Anesthesia, 16(3), 258-265. SOP updated to add the additions. Our FLACC scale was updated to the 2006 revisions. Slide shows updates in red font.

Handoff report position paper:

ACEP, ENA, NAEMSP, NAEMT, and NASEMSO believe that clearly defined processes for the contemporaneous face-to-face communication of key information from EMS providers to healthcare providers in an ED are critical to improving patient safety, reducing medico-legal risk, and integrating EMS with the health-care system. It is critical that patient information is exchanged verbally during the transfer of care, but verbal information alone may lead to inaccurate and incomplete documentation of information and inadequate availability of information to subsequent treating providers (in both the ED and inpatient units) who are not present at the time of verbal communication.

The following principles are important to ensuring safe patient hand-off from EMS to healthcare providers at receiving facilities:

- In addition to a verbal report from EMS providers, the minimum key information required for patient care must be provided in **written or electronic form at the time of transfer of patient care.** This provides physicians and other healthcare providers who deliver subsequent care for the patient to receive this information more accurately and avoid potential errors inherent with second-hand information. The minimum key information reported at the time of hand-off must include information that is required for optimal care of the patient –examples include **vital signs, treatment interventions, and the time of symptom onset for time-sensitive illnesses.**

- All members of the healthcare team, including EMS providers, nurses, and physicians, must communicate with mutual respect for each other and respect the verbal and written communication from EMS as an important part of the patient's history. During the transfer of patient care, the receiving healthcare providers should have an opportunity to ask questions to clarify the information that is exchanged.

- Health-care facilities should attempt to receive pt care transfer reports in a timely manner, facilitating the return of EMS units to service.

- EMS transfer-of-care documentation should be treated as part of the healthcare record and must be professional, accurate, and consistent with information included in the final complete electronic or written EMS patient care report. Hospital systems should preserve written transfer-of-care documentation in the patient's permanent medical record.

- Copies of all results of medical tests performed by EMS providers (e.g., 12-L ECGs, results of blood chemistry testing, and any medical imaging) must be available to the receiving facility with the EMS transfer-of-care documentation.

- In addition to the information exchanged contemporaneously at the time of transfer of pt care, the complete EMS patient care report must be available to the receiving facility within a clinically relevant period of time.

Illinois note: IDPH emergency rules (12/27/21) allow for a temporary transfer of care paper report approved by the EMS MD to be left at the hospital before EMS departs and requires the complete EMS PRC to be filed within two hours.