




Integrating EMS-C into EMS-A

Joelle Donofrio-Odimann, DO FAAP, FACEP, FAEMS
Associate Medical Director, City of San Diego, SDFD
EMS Medical Director, Rady Children's Hospital
Associate Professor, UCSD



UC San Diego

SCHOOL of MEDICINE

1

Overview

- Kids in EMS – why we should care
- What is EMSC?
- Pediatrics and EMS medical direction
- Getting EMSC into your EMSA
- Pediatric SMEs
- Examples
- Joelle's Tips

2



Kids in EMS

3



4

Small people and Small % of EMS runs

- Only 13% of EMS runs
- Differing anatomy and physiology with different patterns of illness and injury
- Specialized centers and regionalization of care
- Specialized equipment
- Emotional component
- Legal component – both law suits and legal liability issues (minors, family, capacity)

shutterstock.com • 704923213

5


Pediatric Skill Retention (Youngquist 2008)

- 212 paramedics voluntary retraining exercise
- Pediatric airway skills decay quickly
 - **66% (139/211) passed BVM testing**
 - **42% (88/212) passed ETI testing**
- Skill drops significantly within 6 months and is unaffected by the number of pediatric runs/shift
- Only 10% participation (245/2520 invited)
 - Will paramedics seek out education in areas they feel deficient in?

shutterstock.com • 1803448390

6

Simulation –based Assessment of Paramedic Pediatric Resuscitation Skills (Lammers 2009)



- 212 trained and practicing paramedics from 5 agencies in Michigan (91% of available paramedics in the region)
- 3 clinical assessment modules:
 - Infant CPR
 - 6-month-old with hypotension and seizures from dehydration, hypoglycemia and sepsis
 - 7-year-old asthmatic child with respiratory arrest

7

Cardiac Arrest in Infant

- Basic life support issues
- Basic airway mgmt. issues
- IO access issues
- Medication administration issues

TABLE 2. Most Common or Significant Performance Deficiencies in the Arrest Clinical Assessment Module

Steps (n = 72)	Not Completed	95% CI
Use of basic life support assessment skills		
Check for spontaneous respirations	18%	(12.8%, 23.1%)
Begin bag-mask ventilations within 60 seconds	18%	(12.8%, 23.1%)
Auscultate lungs during bag-mask ventilations	74%	(66.2%, 80.0%)
Check pulse	10%	(6.3%, 14.5%)
Perform chest compressions within 60 seconds	3%	(2.2%, 4.2%)
Begin chest compressions within 60 seconds	51%	(44.2%, 57.8%)
Basic airway management		
Select correct size OP airway	71%	(64.6%, 76.9%)
Prepare suction	96%	(93.0%, 98.5%)
Insert OP airway	86%	(80.5%, 92.8%)
Insert OP airway correctly	81%	(74.3%, 87.4%)
Intravenous access		
Prep IO site	33%	(27.1%, 39.8%)
Insert in correct location	14%	(9.1%, 18.3%)
Aspirate or flush	39%	(32.6%, 45.7%)
Attach IV line to IO needle	18%	(12.8%, 23.1%)
Medication dosing (first round of drugs)	50%	(42.8%, 56.3%)
Use bromine tape to obtain correct weight	69%	(N/A)
Give correct volume of epinephrine (either concentration)	69%	(N/A)
Advanced airway management		
Select correct endotracheal tube size	58%	(51.4%, 64.7%)

8

Asthma

- Basic airway management issues
- Medication dosing issues
- Advanced airway issues

TABLE 3. Most Common or Significant Performance Deficiencies in the Asthma Clinical Assessment Module

Steps (n = 55)	Not Completed	95% CI
Basic airway management		
Select correct size of OP airway	65%	(56.2%, 73.1%)
Insert OP airway correctly (if used)	48%	(44.2%, 52.7%)
Deliver high-flow oxygen during bag-mask ventilation	23%	(17.0%, 28.3%)
Use two-person bag-mask ventilation	93%	(88.5%, 96.4%)
Medication dosing		
Apply oxygen within 60 seconds	29%	(22.1%, 35.4%)
Give correct dose of albuterol	23%	(17.0%, 28.3%)
Use bromine tape to obtain correct weight	51%	(44.7%, 56.1%)
Select correct concentration of epinephrine	57%	(50.4%, 63.7%)
Give correct, weight-based volume of epinephrine	75%	(66.7%, 81.3%)
Advanced airway management		
Prepare suction	91%	(87.2%, 94.9%)
Select correct ET tube	47%	(40.0%, 53.4%)
Perform ET intubation	21%	(15.3%, 26.2%)
Insert ET tube to proper depth (if intubated)	49%	(41.9%, 55.3%)
Confirm ET tube placement (other than auscultate)	84%	(75.0%, 88.9%)
Auscultate gastric area to confirm ET tube placement	53%	(46.1%, 59.6%)
Secure ET tube placement	45%	(38.6%, 52.0%)
Secure ET tube (before decision to transport)	45%	(38.6%, 52.0%)

9

Root Causes of Errors in a Simulated Prehospital Pediatric Emergency (Lammers 2012)

- 45 crews in 5 geographically diverse regions participated in a simulated simulation of infant with AMS/seizures/respiratory arrest using **THEIR OWN equipment and drugs**
- Delays in O2 administration
- 54% failed using OPA
- Most crews struggled to locate essential pediatric equipment
- 3 crews found broken or inoperable BVMs leading to delayed ventilation
- Some mistrusted IO device, others used it incorrectly
- Only 51% measured glucose and some found there was no glucometer in the pediatric bags
- Medication error rates: diazepam 47%, midazolam 60%

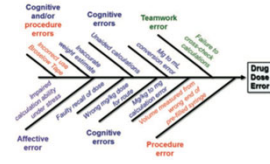
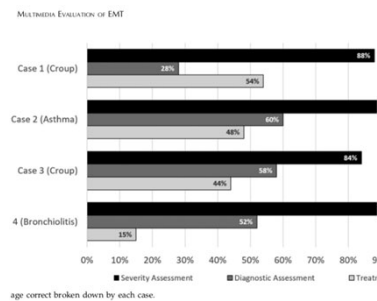


Figure 2. Drug administration errors. Fishbone diagram showing how a variety of factors, individually or combined, can result in a bad outcome.

10

Multi-media evaluation of EMT-paramedic assessment and management of pediatric respiratory distress (Schroter 2020)

- 419 completed all 4 cases
 - 92% correct severity of respiratory distress
 - 50% made correct diagnosis
 - 38% correct intervention
- Increased age, years of experience, self reported comfort with kids, volume of peds patients, or having children of their own NOT associated with assessment performance




11

Assess, educate, train, measure, repeat are needed in pediatric prehospital care




12

Systems of care & regionalization



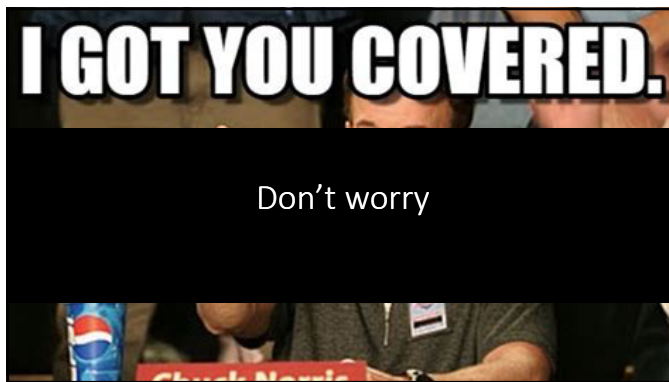
- Who needs to go where, when, and how...
 - EMS plays a critical role



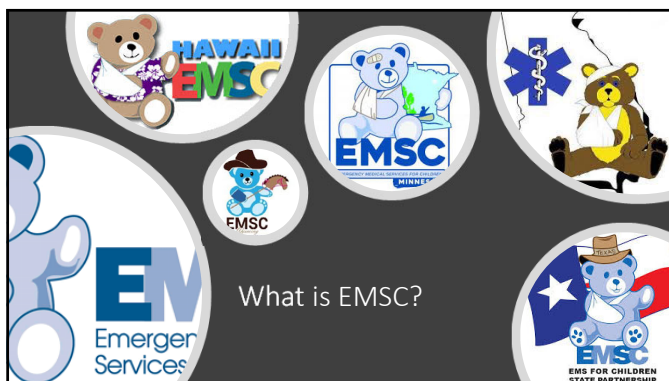
13

I GOT YOU COVERED.

Don't worry




14




What is EMSC?

15


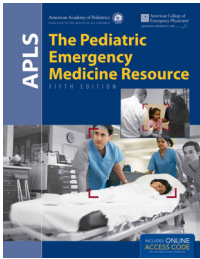
EMSC ... some basics



- Mission: reduce child and youth mortality and morbidity resulting from severe illness and trauma
- Only federal program that focuses on improving the quality of emergency care for children
- Aims to enhance existing EMS systems with a peds focus



16



What are some things EMSC has brought to us – 1980s


17


What are some things EMSC has brought to us – 1990s

Welcome to
The National Emergency Medical Services
for Children Data Analysis Resource Center


*A national resource center helping state
and territory EMSC managers and
EMS offices develop capabilities to
collect, analyze, and utilize EMS data.*

*EMSC - Emergency Medical Services for Children





Emergency Medical Services for Children
Targeted Issues Program



18

PECARN head trauma rule

Rule

The PECARN head trauma rule is a clinical decision rule that helps emergency department (ED) physicians decide whether a child with a head injury needs a CT scan. The rule is based on research that shows that children who do not meet the rule's criteria do not need a CT scan and can be safely discharged from the ED.

Read more on [this page](#) or [this page](#)

RAISING THE BAR ON TRAUMA CARE



EMS FOR CHILDREN PERFORMANCE MEASURES

What are some things EMSC has brought to us – 2000's




19

EMSC IIC
Emergency Medical Services for Children
Innovation and Improvement Center

Health Resources and Services Administration,
Emergency Medical Services for Children
State Partnership: Regionalization of Care Programs - 2008 Award/Announcement

TELEHOSPITAL PARTNERSHIPS
Telehealth: Expanding Access to Pediatric Clinical Expertise

What are some things EMSC has brought to us – 2010's




20

2017 EMSC performance measures

- https://www.nedarc.org/performanceMeasures/documents/EMS%20Perf%20Measures%20Manual%20Web_0217.pdf

EMS 01: Submission of NEMSIS Compliance Reports to NEMSIS

The purpose of this measure is to ensure that all EMS agencies submit NEMSIS compliance reports to NEMSIS by the deadline.

EMS 02: Pediatric Emergency Care Coordinator (PECC)

The purpose of this measure is to ensure that all EMS agencies have a designated individual who coordinates pediatric emergency care.

EMS 03: Use of Pediatric Specific Equipment

The purpose of this measure is to ensure that all EMS agencies use pediatric specific equipment in the field.

EMS 04: Hospital Recognition for Pediatric Emergencies

The purpose of this measure is to ensure that all hospitals have a designated individual who coordinates pediatric emergency care.

EMS 05: Hospital Recognition for Pediatric Trauma

The purpose of this measure is to ensure that all hospitals have a designated individual who coordinates pediatric emergency care.

EMS 06: Hospital Recognition for Pediatric Trauma

The purpose of this measure is to ensure that all hospitals have a designated individual who coordinates pediatric emergency care.

EMS 07: Inter-Facility Transfer Agreements

The purpose of this measure is to ensure that all hospitals have a designated individual who coordinates pediatric emergency care.

EMS 08: Performance of EMS


The purpose of this measure is to ensure that all EMS agencies have a designated individual who coordinates pediatric emergency care.

EMS 09: Integration of EMS Priorities into State or Regional

The purpose of this measure is to ensure that all EMS agencies have a designated individual who coordinates pediatric emergency care.

21

- Dexamethasone in bronchiolitis
- TBI
- THAPCA
- DKA fluid hydration
- Over 150 publications



How is PECARN organized?


The PECARN network consists of:

- a Data Coordinating Center
- seven Research Node Centers (RNCs)


Six of the Research Nodes contain three Hospital Emergency Department Affiliates (HEDAs) and one EMS Affiliate. The EMS Research Node contains three EMS Affiliates. PECARN sites represent academic, community, urban, general, and children's hospitals. The PECARN network Emergency Departments serve approximately 1.3 million acutely ill and injured children every year and the 9 EMS affiliates account for more than 113,000 pediatric runs annually.

22

First, they came for your EDs
Then, in 2020 they came for your EMS systems



National
PRP
Pediatric Readiness Project
Ensuring Emergency Care for All Children



National
PRP
Prehospital Pediatric Readiness Project
Ensuring Emergency Care for All Children

23



Pediatrics and EMS Medical Direction


24

I am the Lorax Med Director, I speak for the trees Children

- If you have knowledge gaps – get SMEs
 - If you look or know where to look, you won't see the issues
- Planning for peds in EMS system
 - Gap analysis
 - EMSC
 - Online/offline medical direction
 - QI, QI, QI
- PECC &/or EMS peds advisory committee

Physician Oversight of Pediatric Care in Emergency Medical Services

To cite this article (2017) Physician Oversight of Pediatric Care in Emergency Medical Services, Prehospital Emergency Care, 21:1, 88-98, DOI: 10.1080/10903127.2016.1229626
To link to this article: <https://doi.org/10.1080/10903127.2016.1229626>



25


How to put EMSC in your EMSA

TECHNICAL REPORT

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN

Pediatric Readiness in Emergency Medical Services Systems

Jane Rosencranz, MD, MPH, FAAP, Brian Moore, MD, MPH, FAAP, Manish I. Shah, MD, MS, FAAP, Sylvia Orvaschel-Ansah, MD, MPH, FAAP, Tami Gross, MD, MPH, FAAP, Kathleen Brown, MD, FAAP, Marianne Gausche-Hill, MD, FACEP, FAAP, FAEMS, Katherine Benish, MD, FACEP, FAAP, FAEMS, Kathleen Adalgisa, MD, MPH, FAAP, Tara Paquette, MD, MPH, FAAP, John Lyng, MD, FAEMS, FACEP, NRP, Lara Rappaport, MD, MPH, FAAP, Sally Stone, RN, BSN, CEN, FAEN, Cynthia Wright-Johnson, MSN, RNC, Julie C. Leonard, MD, MPH, FAAP, and American Academy of Pediatrics Committee on Pediatric Emergency Medicine, Section on Emergency Medicine EMS Committee and Section on Surgery, American College of Emergency Physicians, Emergency Medical Services Committee, Emergency Nurses Association Pediatric Committee, National Association of Emergency Medical Services Physicians Standards and Clinical Practice Committee, National Association of Emergency Medical Technicians Emergency Pediatric Care Committee



Prehospital Emergency Care

Pediatric Readiness in Emergency Medical Services Systems

26

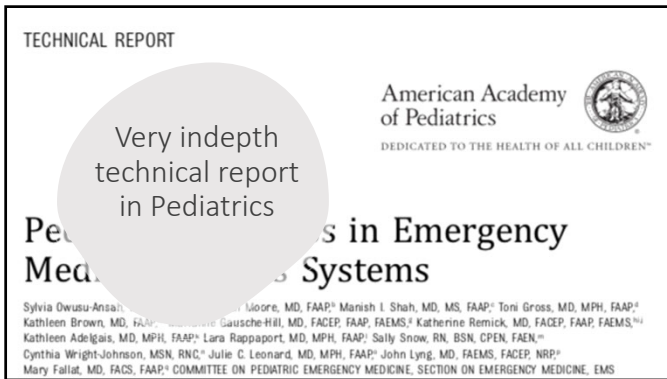
Position Statement in PEC

PEDIATRIC READINESS IN EMERGENCY MEDICAL SERVICES SYSTEMS

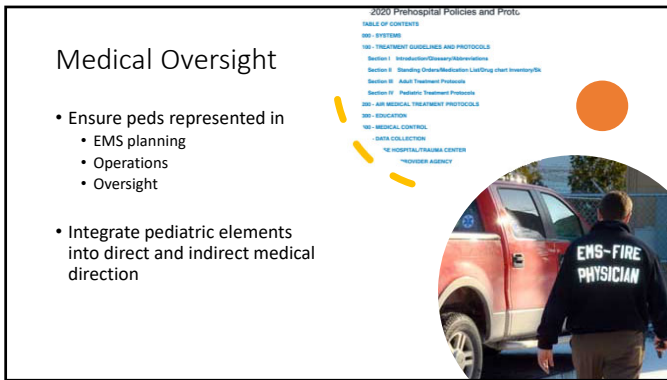
Brian Moore, MD, FAAP, Manish I. Shah, MD, MS, FAAP, Sylvia Orvaschel-Ansah, MD, MPH, FAAP, Tami Gross, MD, MPH, FAAP, Kathleen Brown, MD, FAAP, Marianne Gausche-Hill, MD, FACEP, FAAP, FAEMS, Katherine Benish, MD, FACEP, FAAP, FAEMS, Kathleen Adalgisa, MD, MPH, FAAP, John Lyng, MD, FAEMS, FACEP, NRP, Lara Rappaport, MD, MPH, FAAP, Sally Stone, RN, BSN, CEN, FAEN, Cynthia Wright-Johnson, MSN, RNC, Julie C. Leonard, MD, MPH, FAAP, and American Academy of Pediatrics Committee on Pediatric Emergency Medicine, Section on Emergency Medicine EMS Committee and Section on Surgery, American College of Emergency Physicians, Emergency Medical Services Committee, Emergency Nurses Association Pediatric Committee, National Association of Emergency Medical Services Physicians Standards and Clinical Practice Committee, National Association of Emergency Medical Technicians Emergency Pediatric Care Committee

- 2020 PEC publication with some allstar national Peds EMS leaders
- AAP, ACEP, ENA, NAEMSP, NAEMT Policy Statement and technical report

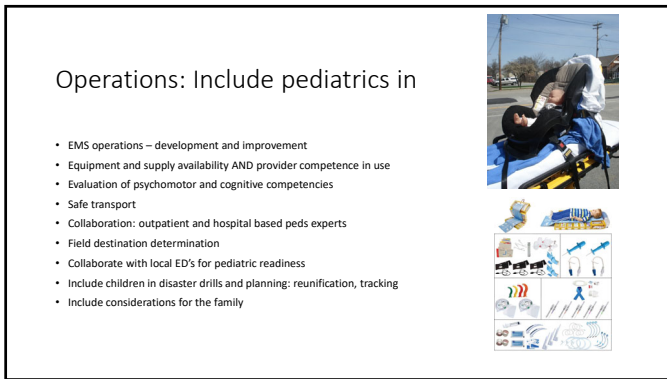
27



28



29



30

Education

- Provide periodic peds education
- Ensure assessment and recognition of:
 - resp distress and failure
 - cardiac failure
 - Shock
- Ensure competency in neonatal and pediatric resuscitation competency
- Psychomotor skill competency and practice
 - Airway management: focus on basic
 - IV/IO placement and access
- Provide tools for assessment of
 - Pain assessment and treatment, wt assessment (document in Kg)



31

Research, Data Management, and QI

- Implement practices to reduce medication errors (HUGE)
- Include pediatric specific measures in QI/QA
- Submit NEMSIS compliant data to the statewide database
- Work with local hospitals to track peds centered outcomes (ex CARES/OHCA)

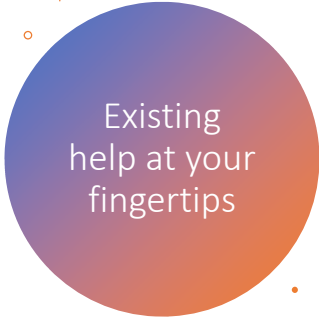


32

How do I get
me some
pediatric
expertise?

LET ME TELL YOU
WITH SOME KNOWLEDGE

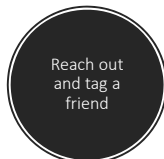
33




Existing help at your fingertips

- **EMSC Innovation and Improvement Center:**
<https://emscimprovement.center>
 - Pediatric prehospital, hospital, trauma, and disaster focused
 - QI collaboratives
 - Prehospital Education toolkit:
<https://emscimprovement.center/education-and-resources/toolkits/pediatric-prehospital-education-toolbox/>
 - Go through a whole list of available courses
 - Prehospital PECC Community of practice:
<https://emscimprovement.center/collaborative/peccs/>
- **Courses**
 - PEPP, PALS, EMSC course, APLS, Handtevy, etc.
- **Connect with your state and local EMSC**
 - Performance measures
 - SME

34




Reach out and tag a friend



35

Share the love

- **Get yourself a PECC**
 - Have them assist
 - Have them assist with protocol updates, equipment, sims, competency, etc.
- **Do you have a Pediatric Advisory Committee?**
 - If not, consider creating one



36


Examples of EMSC in the EMSA

California, Los Angeles, San Diego, SDFD



37

CA EMSC

- Large number of SMEs available
- Provides pediatric liaison for the EMS Medical Director Association of California (EMDAC)
- Technical Advising Committee who reports to the State EMS medical director
- Connects with pediatric representatives in each of the 33 Local EMS Authorities
 - ED Pediatric Readiness
 - Measurement of EMSC performance measures
- Provide guidelines and educational tools



CALIFORNIA EMERGENCY MEDICAL SERVICES AUTHORITY

38

California Code of Regulations


Title 22. Social Security

Division 9. Prehospital Emergency Medical Services

Chapter 14. Emergency Medical Services for Children

- 20 years in the making, went live 2019
- Allows our local EMS authorities (LEMSAs) to implement regional pediatric systems of care
- Goal is to improve the system of care
- Modeled after Trauma regulations

39



Pediatric Trauma Center (PTC): A licensed acute care hospital that is designated by the EMS Agency to receive critically injured pediatric patients via the 9-1-1 system based on guidelines outlined in this policy. These centers provide tertiary-level pediatric care and serve as referral centers for critically injured pediatric patients.

Pediatric Medical Center (PMC): A licensed acute care hospital that is designated by the EMS Agency to receive critically ill pediatric patients via the 9-1-1 system based on guidelines outlined in this policy. These centers also provide referral services for critically ill pediatric patients.

Emergency Department Approved for Pediatrics (EDAP): A licensed basic or comprehensive emergency department that is designated by the Emergency Medical Services (EMS) Agency to receive pediatric patients via the 9-1-1 system.

40

San Diego

- LEMSA and EMSC pediatric liaison
- Children's hospital has physician and nurse liaisons at LEMSA wide meetings
 - Protocol review
 - Case review
 - EMS system collaboration
- Children's hospital has education outreach through trauma and transport teams
- Children's hospital assigned EMS medical director, trauma RN, and medical RN to liaison all EMS issues
- Children's hospital involved with health information exchange and pilot EMS data project for close loop communication with involved EMS agencies




41



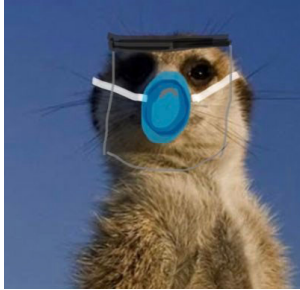
San Diego Fire-Rescue

- Our education coordinator RN Paramedic is also our PECC
- QI
- Research involving pediatrics
- Close collaboration with the Children's Hospital

42

Joelle's tips

- If you don't look, you won't see
- Think of your most commons and check to see if they are covered
- Ask for help
- **Think of this as a system of care** – prehospital assessment, treatment, and getting the patient to the correct place is crucial to improve outcomes



43

But seriously,
QI your
agency

- **Where are you and where do you want to go?**
 - OHCA?
 - Pediatric airway?
 - Pediatric respiratory distress?
 - EMS compass measures: B-agonist for asthmatics
 - Vital signs complete?
 - Correct medication dosing?

44

Thank you

jdonoofrio@health.ucsd.edu

(916) 217-1200
@PEMEMS

45

46

Resource Library

- EMSC Resuscitation Improvement Center: <http://www.resuscitationimprovementcenter.org/>
- National Model Guidelines: <http://www.nationalmodelguidelines.org/>
- National EMS Consensus Of opinion: <http://www.nemsc.org/>
- Physician Evaluation of Pediatric Care in Emergency Medical Services. *Prehospital Emergency Care*. 2001; 6(4): 404-410. doi: 10.1080/10837170108839376
- Rege RA, Nelson, S.J., et al. Pediatric Resuscitation in Emergency Medical Services Systems. *Prehospital Emergency Care*. 2003; 7(3): 375-376. doi: 10.1080/10837170308839376
- Dawes RA, Nelson, K., & Walsh, M. et al. Pediatric Resuscitation in Emergency Medical Services Systems. *Prehospital Emergency Care*. 2003; 7(3): 375-376. doi: 10.1080/10837170308839376
- California EMS Regulations:
- National EMS Data Analysis Resource Center: <http://www.nemsc.org/>
- Pediatric Emergency Care Applied Research Network: <http://www.pedern.org/>
- EMSC Performance Measures: <http://www.emscperformance.org/>



Additional References

- Youngquist ST, Henderson DP, Gausche-Hill M, Goodrich SM, Poore PD, Lewis RI. Paramedic Self-Efficacy and Skill Retention in Pediatric Airway Management. *Academic Emergency Medicine*. 2008;15(12):1295-1303. doi:10.1011/j.1553-2712.2008.00262.x.
- Lammers LR, Byrwa MJ, Fales WD, Hale RA. Simulation-based assessment of paramedic pediatric resuscitation skills. *Prehospital Emergency Care*. 2009;13(2):345-356. doi:10.1080/10903120802706161.
- Lammers R, Byrwa M, Fales W, Root Causes of Errors in a Simulated Prehospital Pediatric Emergency. *Academic Emergency Medicine*. 2012;19(1):37-44. doi:10.1111/1553-2712.2011.01552.x.
- Schroter S, Thomas D, Nimmer M, et al. Multimedia Evaluation of EMT-Paramedic Assessment and Management of Pediatric Respiratory Distress. *Prehosp Emerg Care*. 2020;84(1):1-11. doi:10.1080/10903127.2020.1871211.
- <https://emsa.ca.gov/emt-for-children/>

47