Indiana Pediatric Emergency Care & Preparedness in Rural Communities Workshop

Co-Hosted by Region V for Kids, Riley Children's Hospital for Children,
Indiana Emergency Medical Services for Children & Indiana Rural Health Association

June 27, 2023

Acknowledgement and Disclosure

- This Pediatric Center for Disaster Excellence, Region V for Kids, is supported by the Administration for Strategic Preparedness and Response, formerly the Assistant Secretary for Preparedness and Response (ASPR) for as part of an award (U3REP190615-01-01) totaling $2.85 M with zero percent financed with non-governmental sources. The content presented here and throughout the presentation is that of the authors and does not necessarily represent the official views of, nor an endorsement by ASPR or the U.S. Government.

Workshop Agenda

9:00-9:05	Welcome & Introductions
9:05-9:20	Intro to Region V for Kids w/ Indiana focus - Dr. Roxanna Lefort
9:20-9:40	Emergency Medical Services for Children Program - Margo Knefelkamp
9:40-10:00	Pediatric Trauma Presentation – Dr. Matthew Landman
10:00-10:10	Break w/ Question & Answer Session
10:10-10:20	Children & Youth w/ Special Health Care Needs - Dr. Kara Kowalczyk
10:20-10:50	Facilitated Child Life & Respiratory Therapy Case - Dr. Kara Kowalczyk, Meredith Vlach & Colleen Gatton
10:50-11:00	Closing Remarks w/ Mentimeter Survey

Region V For Kids

Pediatric Disaster Preparedness

Roxanna Lefort, MD MPH
Assistant Professor of Clinical Pediatric Emergency Medicine
Riley Hospital for Children ED Disaster Planning Physician Lead
Region V for Kids – Indiana Lead Principal Investigator

Region V For Kids

Pediatric Disaster Centers of Excellence

Who are we?
Why do we exist?
What are we doing?

Region V For Kids

-Address gaps within the care of children across the disaster cycle (mitigation, preparedness, response, recovery)

-Develop best practices around pediatric disaster preparedness and response for our region

Region V For Kids

3 ASPR funded Pediatric Disaster Centers of Excellence

1) Region V for Kids-FEMA Region V – IL, IN, MI, WI, OH, MN
2) WRAP-EM – Western Regional Alliance for Pediatric Emergency Management – AZ, CA, NV, OR, WA, UT
3) Gulf 7 – Pediatric Disaster Network (G7) - AL, FL, GA, LA, MS, TX

Region V For Kids

IU Health/Riley Hospital for Children (Indianapolis, IN)

Rainbow Babies (Cleveland, OH)

Cincinnati Children's (Cincinnati, OH)

CS Mott Children's Hospital (Ann Arbor, MI)

Nationwide Children's Hospital (Columbus, OH)

Children's Hospital of Michigan (Detroit, MI)

Lurie Children's Hospital (Chicago, IL)

Children's Hospital of Minnesota (Minneapolis, MN)

Helen DeVos Children's Hospital (Grand Rapids, MI)

Children's Hospital of Wisconsin (Milwaukee, WI)

Region V For Kids

The Regional Approach to Pediatric Disasters

Workgroups:

- PMOCC
- EMS
- Reunification
- Trauma
- IT/Telehealth
- Legal
- Surge
- Behavioral Health
- Education
- Supply Chain
- Metrics
- HVA
- Facility Recognition

Region V For Kids

We have resources and we want to share!

Where can you find us?

https://emscimprovement.center/domains/preparedness/asprcoe/eglpcdr/

Region V For Kids

https://emscimprovement.center/domains/preparedness/asprcoe/eg

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EIIC
EMSC Innovation and Improvement Center

Pediatric Readiness | Focus Areas | EMSC Program | Engage with EMSC | Resources | Partners

Home / Focus Areas / Disaster Preparedness / Pediatric Disaster Care Centers of Excellence (ASPR) / Region V for Kids (formerly EGLPCDR)

Region V for Kids (formerly EGLPCDR)

- Region V for Kids (formerly EGLPCDR)
- Summary of Activities
- Children and Youth with Special Healthcare Needs
- CONOPS: Leveling the Playing Field

The **mission** of Region V for Kids (formerly EGLPCDR) is to build on existing foundations in pediatric clinical care and emergency response by enhancing coordination mechanisms and incorporating relevant capabilities at the local, state and regional levels.

The consortium is led by **Rainbow Babies and Children's Hospital** in Cleveland, Ohio, and comprised of nine other children's hospitals within the states of Ohio, Michigan, Illinois, Indiana, Minnesota and Wisconsin.

The 10 hospitals include:

- University Hospitals Rainbow Babies and Children's Hospital

Region V For Kids

https://media.emscimprovement.center/documents/3.29.2023_Final_All_

1 of 4 — + Automatic Zoom

REGION V FOR KIDS PEDIATRIC CONSORTIUM FOR DISASTER RESPONSE MAY 2021

Children and Disaster Hazard Awareness

This publication was made possible by Award Number (U3REP190615-01-01) from the Office of the Assistant Secretary for Preparedness and Response (ASPR). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of ASPR or the Department of Health and Human Services.

Blizzard Snow

- **Awareness:** Children are at greater risk of injury and death due to severe weather events. Young children are at a high risk of hypothermia. Pediatric admissions to hospitals associated with frostbite, hypothermia, and carbon monoxide poisoning should be anticipated.
- **Preparedness:** Warn community on carbon monoxide risks when using generators and alternate heating sources. Plan for workforce delays due to disrupted childcare, transportation. Assure re-warming equipment suitable for young children is in place.
- **Response:** Families with children who are dependent on medical devices are known to seek assistance from 911 and hospitals during a severe weather power outage.
- **Mitigation:** Children rely on their families, childcare providers, and schools to prepare and gather supplies prior to freezing winter storms. Health care facilities need to assure backup power and water is available and know where warming centers are in their communities.

Region V For Kids

https://media.emscimprovement.center/documents/3.29.2023_Final_All_

1 of 4 — Automatic Zoom

Active Shooter

- **Awareness:** 15% of all active shooter events have occurred in schools (pre-K to 12) since 2000. In 2020 there were 113 shooting incidents and 44% of shooters were students. Shootings in communities frequently occur within proximity to schools.
- **Preparedness:** Active shooter drills in schools were associated with a 42% increase in anxiety & stress and 39% in depression. The American Academy of Pediatrics recommends that drills be conducted in a manner that does not traumatize children.
- **Response:** PsySTART Triage assists providers in allocating mental health resources to children and adults after the event. Limiting children's media exposure when an incident occurs reduces anxiety. Practice age-appropriate community messaging to reassure children.
- **Mitigation:** Stop-the-bleed training is for everyone, including middle and high school students. Hospitals need to ensure there is a practiced plan for family reunification and unaccompanied children.

Chemical Exposure

- **Awareness:** Children have a greater risk of respiratory failure and acute toxicity. Children breathe more air per body weight and have a higher body surface area that increases the absorption of toxins. Agents of the highest concern include nerve, blistering, asphyxiants, and disabling agents.
- **Preparedness:** Childcare, schools, and families should practice their plans for sheltering in place. Prehospital providers and hospitals should include children or child simulators during decontamination drills.
- **Response:** Anticipate the decontamination of children may be needed within a short period of time. Consider dry decontamination depending on the substance. Do not separate a young child from a parent. Prevent hypothermia using warmed water for decontamination. Prepare for pediatric medical countermeasure administration.

Region V For Kids

https://media.emscimprovement.center/documents/3.29.2023_Final_All_

2 of 4 Automatic Zoom

Tornado

- **Awareness:** Most tornados occur during April and May while children are in school. Injuries and deaths to children are associated with trauma due to fractures and brain injuries due to flying/falling debris. 50% of tornado-related injuries occur during rescue, cleanup, and post-tornado activities. Children experience anxiety and fear during these events.
- **Preparedness:** Children rely on school personnel to shelter in place during a tornado. Mass casualty events involving children may occur. Facilities should prepare accordingly.
- **Response:** First medical response will rely on community responders. Facilities should expect surges of self-transported children with their families after a tornado. Secondary surges of children should be anticipated with and without parents.
- **Mitigation:** Tornados are short notice events. Children, families, and communities need to know how to rapidly seek shelter and deal with power and housing failures.

Flood

- **Awareness:** 37% of fatalities associated with flooding in the US occurred in children < 19 in 2020. Young children and those with autistic disorders may be drawn to water and are at high risk for drowning. Children may go towards a threat due to their curiosity.
- **Preparedness:** Childcare, schools, and families should have plans for flood emergencies that include sufficient food, water, and medication. Flooding is typically a noticed event and families should monitor local communications for evacuation warnings.
- **Response:** Avoid separating children during evacuation. Keep children away from rising water. Prepare to follow boil water notices. Do not let children participate in flood cleanup due to contaminated water and mold.
- **Mitigation:** Prepare children and their families that flooding disrupts power, housing, transportation and increases the risk of infectious disease. Families should know not to drive through floodwaters. Six inches of water can knock you down and two feet or water

Region V For Kids

3 Main Steps to Conquering the Fear of Pediatric Disasters

1. Be prepared to care for the single sick/injured child

Be Prepared for Sick Kids

-Attending this conference!

-EMS/Hospital - Peds Ready, Pediatric Champion

-Clinical Practice – Meds/Supplies (Pedi STAT, Handtevy, Broselow)

Region V For Kids

3 Main Steps to Conquering the Fear of Pediatric Disasters

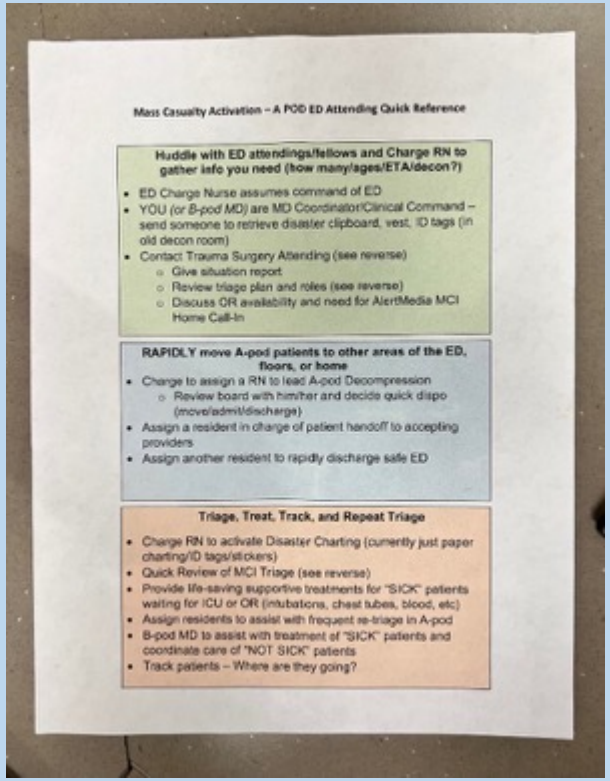
1. Be prepared to care for the single sick/injured child
2. Be prepared for any surge/disaster involving adults

Be Prepared for Disasters

Make sure your Emergency Management team and clinicians work together

Plan and practice for a surge of trauma patients, medical patients, decon, etc. (QuickDrills)

Job Action Sheets


Mass Casualty Activation – A POD ED Attending Quick Reference

Huddle with ED attendings/fellows and Charge RN to gather info you need (how many/ages/ETA/decon?)

- ED Charge Nurse assumes command of ED
- YOU *(or B-pod MD)* are MD Coordinator/Clinical Command – send someone to retrieve disaster clipboard, vest, ID tags (in old decon room)
- Contact Trauma Surgery Attending (see reverse)
  - Give situation report
  - Review triage plan and roles (see reverse)
  - Discuss OR availability and need for AlertMedia MCI Home Call-In

RAPIDLY move A-pod patients to other areas of the ED, floors, or home

- Charge to assign a RN to lead A-pod Decompression
  - Review board with him/her and decide quick dispo (move/admit/discharge)
- Assign a resident in charge of patient handoff to accepting providers
- Assign another resident to rapidly discharge safe ED

Triage, Treat, Track, and Repeat Triage

- Charge RN to activate Disaster Charting (currently just paper charting/ID tags/stickers)
- Quick Review of MCI Triage (see reverse)
- Provide life-saving supportive treatments for "SICK" patients waiting for ICU or OR (intubations, chest tubes, blood, etc)
- Assign residents to assist with frequent re-triage in A-pod
- B-pod MD to assist with treatment of "SICK" patients and coordinate care of "NOT SICK" patients
- Track patients – Where are they going?

Region V For Kids

3 Main Steps to Conquering the Fear of Pediatric Disasters

1. Be prepared to care for the single sick/injured child
2. Be prepared for any surge/disaster involving adults
3. Know how to get pediatric help (phone a friend)

Know how to get help

Phone numbers easily accessible for transfers

Consider back-up options

Where do you transfer your peds patients?

-trauma, complex care, cardiac, crit care

Where are beds available, how do you find those beds, and how can this process be simplified?

Consider your District Healthcare Coalitions – Pediatric Annex

Region V For Kids

THANK YOU

https://emscimprovement.center/domains/preparedness/asprcoe/eglpcdr/

rlefort@iu.edu

Workgroups:

- PMOCC
- EMS
- Reunification
- Trauma
- IT/Telehealth
- Legal
- Surge
- Behavioral Health
- Education
- Supply Chain
- Metrics
- HVA
- Facility Recognition

NPRP, Indiana Pediatric Facility Recognition, & PPRP

Margo Knefelkamp, MBA
Program Manager
Indiana Emergency Medical Services for Children

EMSC

Federal Program to ***reduce pediatric morbidity and mortality as a result of serious injury and illness***.

Consider…

- 83% of children are seen in community hospitals
- 69% of hospitals see < 15 kids/day
- The FEWER kids you see, the MORE READY you need to be!

OBJECTIVES

- National Pediatric Readiness Project
- Indiana Pediatric Facility Recognition Program
- National Prehospital Pediatric Readiness Project

The National Pediatric Readiness Project (NPRP) is a multi-phase quality improvement initiative to ensure that all U.S. emergency departments have the essential guidelines and resources in place to provide effective emergency care to children.

THE PROJECT IS SUPPORTED BY THE AMERICAN COLLEGE OF EMERGENCY PHYSICIANS, THE EMERGENCY NURSES ASSOCIATION, THE AMERICAN ACADEMY OF PEDIATRICS, AND THE FEDERAL EMERGENCY MEDICAL SERVICES (EMS) FOR CHILDREN PROGRAM

Indiana – Emergency Medical Services for Children

EMSC Emergency Medical Services for Children

National Pediatric Readiness Project
Ensuring Emergency Care for All Children

We're Gaining Weight!

3 out of 4 Hospital Emergency Departments Nationwide
Weigh and Record Children in Kilograms

National Pediatric Readiness Project
Ensuring Emergency Care for All Children

EMSC Emergency Medical Services for Children

The NPRP is funded in part by the HRSA EMSC Program

Indiana 2021 National Pediatric Readiness State Summary

2021 Pediatric Readiness Response Rate

Numerator: **132**
Denominator: **134**
Response Rate: **99%**

2013-14 Pediatric Readiness Response Rate

Numerator: **106**
Denominator: **121**
Response Rate: **88%**

2021 Average State Score	2021 Median State Score
67	66
State AVERAGE Hospital Score out of 100 (n=130)	State MEDIAN Hospital Score out of 100 (n=130)

NOTE: There are 2 records in this dataset that did not have answers to all the scored questions and are not included in the scores shown above.

The overall 2021 National Pediatric Readiness scores (based on the 2018 Joint Policy Guidelines) are not directly comparable with the 2013-14 state scores (based on the 2009 Joint Policy Guidelines). These were two unique assessments based on two different published sets of guidelines. Questions were added/removed and point values changed based on the new guidelines. Although the overall scores are not comparable, several individual questions remained the same and these components can be compared over time.

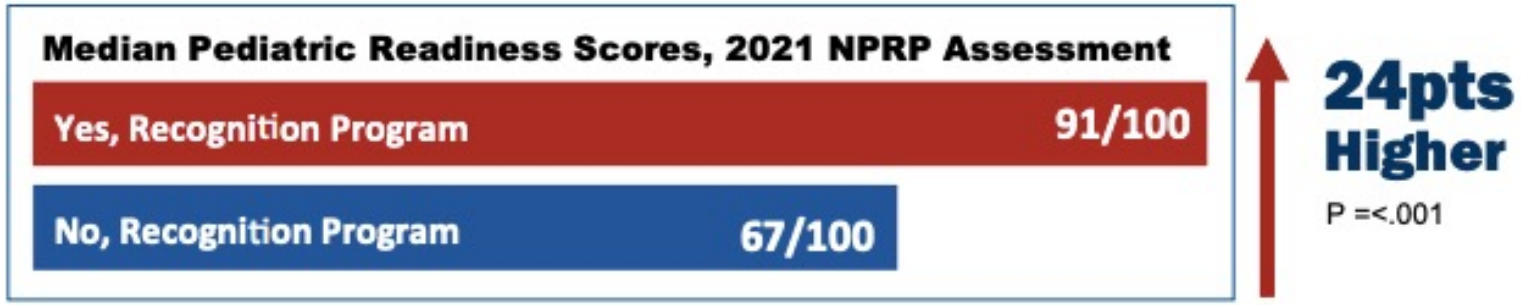
NPRP Complete, what next?

- Self Assessment available at pedsready.org
- iEMSC Virtual review of NPRP
- Request Indiana Pediatric Facility Recognition Program Application

EMSC Emergency Medical Services for Children

National Pediatric Readiness Project
Ensuring Emergency Care for All Children

Emergency Departments that Participate in a Pediatric Readiness Recognition Program Score Significantly Higher on the National Pediatric Readiness Project (NPRP) Assessment*



Why is participation important?

Hospitals with high ED readiness scores demonstrate **a 4-fold lower rate of mortality for children** with critical illness than those with lower readiness scores; thus, improving pediatric readiness improves outcomes for children and their families.

EVERYDAY READINESS

Be ready next time a child comes through your ED's doors.

Indiana – Emergency Medical Services for Children

Indiana's Facility Recognition Work Group

- IDOH
- IRHA
- IHA
- ACEP
- AAP
- Indianapolis Patient Safety Coalition

- ENA
- Pediatric Intensivists
- Pediatric Hospitalists
- Pediatric EM

National working group partnerships;
18 month iterative process

Facility Recognition Indiana

- 2-Tiered Process*
  - Pediatric Ready
    - Minimal preparedness to treat, stabilize, and transfer as needed
  - Pediatric Advanced
    - Pediatric Ready with additional resources to care for children

* Development of 3rd Tier under consideration

Facility Recognition Indiana

- Organized in 7 Domains
- VOLUNTARY
- Reverification every 3

Domain 1: Administration and Coordination
Domain 2: Health Provider Standards
Domain 3: Quality Improvement
Domain 4: Patient Safety
Domain 5: Polices, Procedures, and Protocols
Domain 6: Support Services
Domain 7: Equipment

Site Verification Process

1. Hospital expresses interest, receives online application
2. Hospital completes and submits application
3. Application is reviewed by 2 team members
4. Written feedback, including gaps provided within 90 days of submission. If meets criteria, scheduled for site visit.
5. ½ day site visit
6. Formal written feedback within 60 days
7. Hospital given 90 days to address any deficiencies

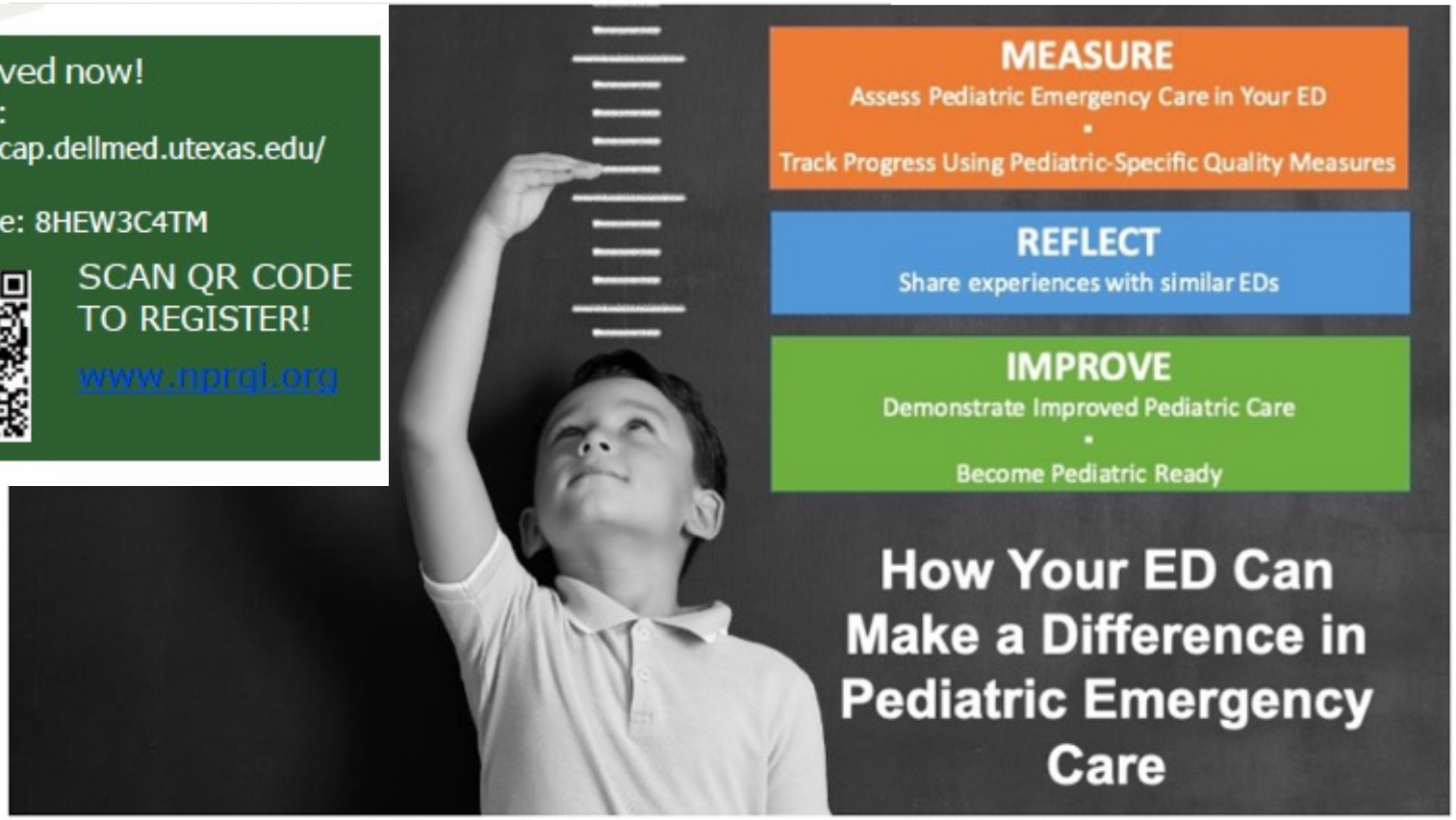
NPRQI

Enrollment Now Open!

National PRQI
Pediatric Readiness Quality Initiative
Measure • Reflect • Improve

Get involved now!
Register at:
https://redcap.dellmed.utexas.edu/surveys/
Access code: 8HEW3C4TM

SCAN QR CODE TO REGISTER!
www.nprqi.org



Indiana – Emergency Medical Services for Children

National PRP

Prehospital Pediatric Readiness Project

Ensuring Emergency Care for All Children

Pediatric Readiness in Emergency Medical Services Systems: POLICY STATEMENT

Review the January 2020 Joint Policy Statement (AAP, ACEP, ENA, NAEMSP, NAEMT) and AAP Technical Report, which provide recommendations on pediatric readiness in EMS systems.

PREPARE YOUR EMS AGENCY

ESSENTIAL RESOURCES
Assess and improve your readiness with the EMS Agency Checklist and Toolkit

PEDIATRIC CHAMPION
Participate in the Pediatric Emergency Care Coordinator (PECC) Workforce Development Collaborative

PEDIATRIC PROTOCOLS
Ensure integration of best evidence into clinical protocols using Model EMS Clinical Guidelines, available at NASEMSO.org

PREHOSPITAL

Pediatric Readiness

Ensure High-Quality Care for Children

Use the EMS Agency Checklist to assess your agency's level of readiness. The Toolkit provides you resources to help fill in gaps as identified in the checklist.

EMSCimprovement.center/domains/prehospital-care

Less than 10% of EMS calls are for **pediatric patients.***

43.6% of EMS agencies see (on average) **fewer than 1 pediatric patient** a month.**

Pediatric patients often provoke discomfort and anxiety among EMS personnel.*

* Hewes, Hilary A., et al. "Ready for children: assessing pediatric care coordination and psychomotor skills evaluation in the prehospital setting." Prehospital Emergency Care 23.4 (2019): 510-518.

** National Emergency Medical Services for Children Data Analysis Center National Emergency Medical Services for Children Data Analysis Center, "EMS for Children Survey," April 2020.

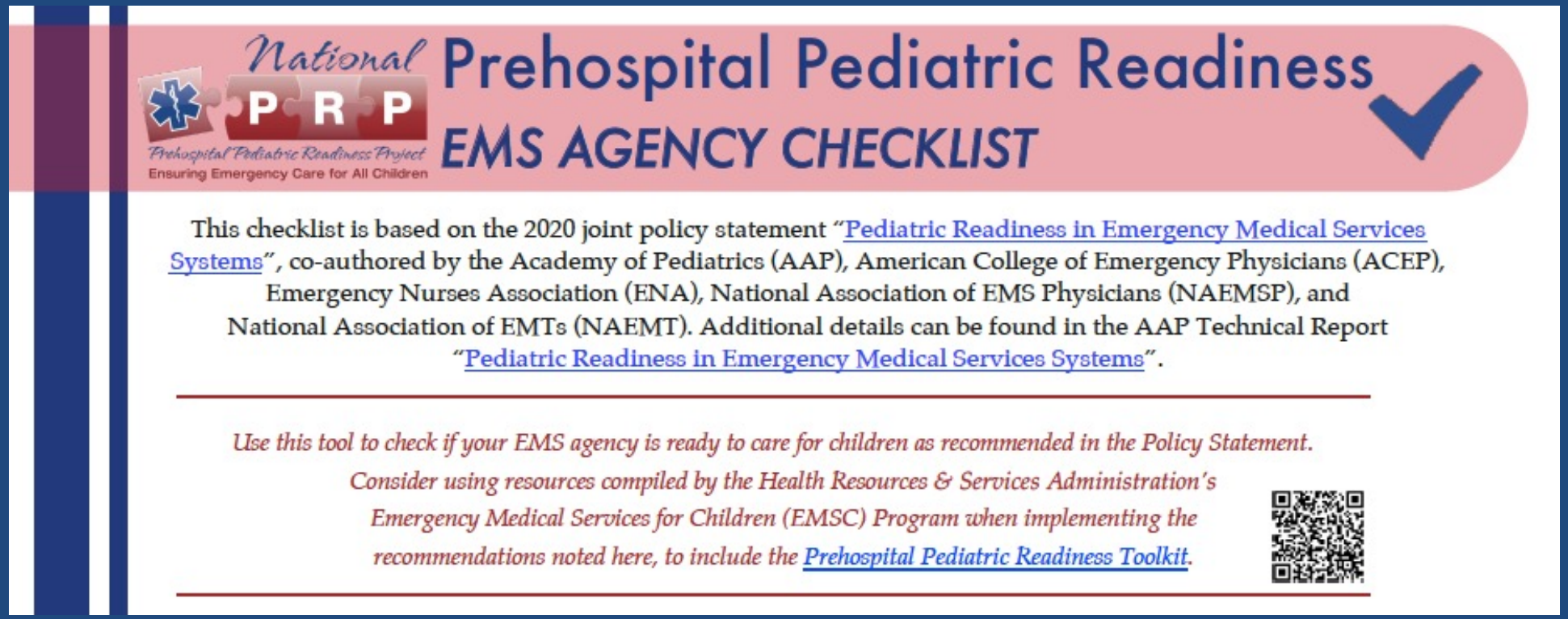
Created in collaboration with the EMSC Innovation & Improvement Center (EIIC) and the National EMSC Data Analysis Resource Center (NEDARC).

This resource is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) as part of an award totaling $3,000,000 with 0% financed with non-governmental sources. The contents are those of the authors and do not necessarily represent

Emergency Medical Services for Children

Children

PREHOSPITAL PEDIATRIC READINESS (PPRP)



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

Prehospital Pediatric Readiness
EMS AGENCY CHECKLIST

This checklist is based on the 2020 joint policy statement "Pediatric Readiness in Emergency Medical Services Systems", co-authored by the Academy of Pediatrics (AAP), American College of Emergency Physicians (ACEP), Emergency Nurses Association (ENA), National Association of EMS Physicians (NAEMSP), and National Association of EMTs (NAEMT). Additional details can be found in the AAP Technical Report "Pediatric Readiness in Emergency Medical Services Systems".

Use this tool to check if your EMS agency is ready to care for children as recommended in the Policy Statement. Consider using resources compiled by the Health Resources & Services Administration's Emergency Medical Services for Children (EMSC) Program when implementing the recommendations noted here, to include the Prehospital Pediatric Readiness Toolkit.

Emergency Medical Services for Children

Indiana – Emergency Medical Services for Children

Education Opportunities

- *PECC Quarterly Newsletter*
- *ED PECC Network*
- *Prehospital PECC Network*
- *MIDWEST EMSC PECC Symposium*
- *Prehospital PECC Roles and Responsibilities Document*

PEAK

Pediatric Education and Advocacy Kits

PEAK: Status Epilepticus

PEAK: Suicide

PEAK: Pain

PEAK: Agitation

https://emscimprovement.center/

Indiana – Emergency Medical Services for Children

Questions?

Contact Indiana EMSC Program Manager,
Margo Knefelkamp,
Margo.Knefelkamp@indianapolisems.org

pedsready.org

Pediatric Emergency Care & Preparedness in Rural Communities – Indiana
June 27, 2023

Pediatric Trauma Care & Preparedness in Rural Communities

Matthew P. Landman, MD, MPH, FACS, FAAP

Associate Professor of Surgery

Indiana University School of Medicine

Trauma Medical Director, Riley Hospital for Children

Vice-Chair Indiana Committee on Trauma, American College of Surgeons

AMERICAN COLLEGE OF SURGEONS
Verified Trauma Center

Riley Children's Health
Indiana University Health

BEST CHILDREN'S HOSPITALS
U.S.News & WORLD REPORT
RANKED IN 10 SPECIALTIES
2022-23

No financial disclosures

Indiana COT Vice-Chair

ACS VRC Reviewer

Member, Indiana State Trauma Care Committee

Statements are my own and not those of the ACS/COT/VRC or ISTCC

AMERICAN COLLEGE OF SURGEONS
Verified Trauma Center

https://geology.com/cities-map/iowa.shtml


HOULE

#1 Challenge for a Pediatric TMD in any lecture

Not just lecturing on some variation of the topic:

"Children are not just little adults"

5 Leading Causes of Death, United States
2020, All Races, Both Sexes

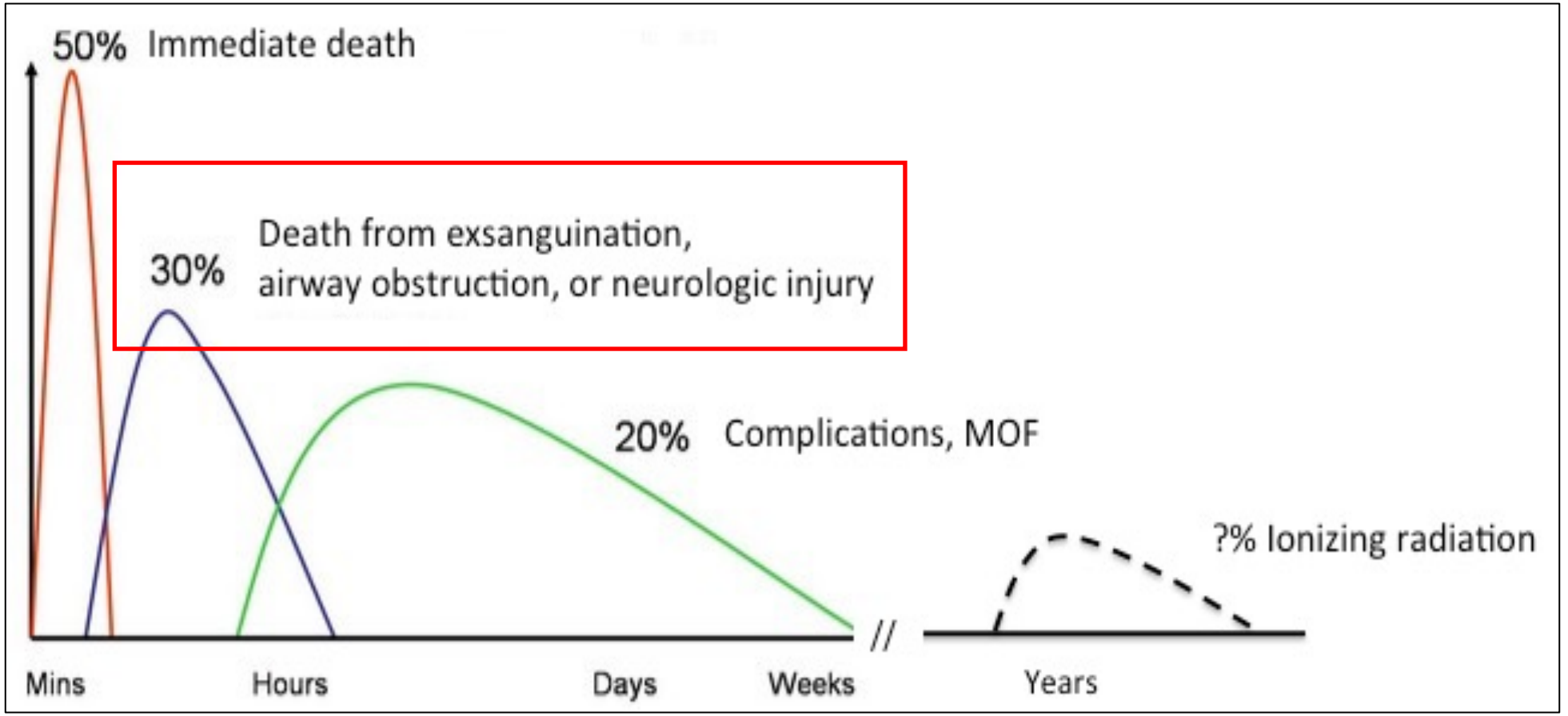
	Age Groups										
Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Al
1	Congenital Anomalies 4,043	Unintentional Injury 1,153	Unintentional Injury 685	Unintentional Injury 881	Unintentional Injury 15,117	Unintentional Injury 31,315	Unintentional Injury 31,057	Malignant Neoplasms 34,589	Malignant Neoplasms 110,243	Heart Disease 556,665	D 6
2	Short Gestation 3,141	Congenital Anomalies 382	Malignant Neoplasms 382	Suicide 581	Homicide 6,466	Suicide 8,454	Heart Disease 12,177	Heart Disease 34,169	Heart Disease 88,551	Malignant Neoplasms 440,753	M Ne 6
3	SIDS 1,389	Homicide 311	Congenital Anomalies 171	Malignant Neoplasms 410	Suicide 6,062	Homicide 7,125	Malignant Neoplasms 10,730	Unintentional Injury 27,819	COVID-19 42,090	COVID-19 282,836	C 3
4	Unintentional Injury 1,194	Malignant Neoplasms 307	Homicide 169	Homicide 285	Malignant Neoplasms 1,306	Heart Disease 3,984	Suicide 7,314	COVID-19 16,964	Unintentional Injury 28,915	Cerebro-vascular 137,392	Uni 2
5	Maternal Pregnancy Comp. 1,116	Heart Disease 112	Heart Disease 56	Congenital Anomalies 150	Heart Disease 870	Malignant Neoplasms 3,573	COVID-19 6,079	Liver Disease 9,503	Chronic Low. Respiratory Disease 18,816	Alzheimer's Disease 132,741	C v 1

ed By: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention

urce: National Center for Health Statistics (NCHS), National Vital Statistics System

https://wisqars.cdc.gov

Pediatric trauma mortality distribution



Bensard. “Pediatric Trauma”. Trauma 9th ed

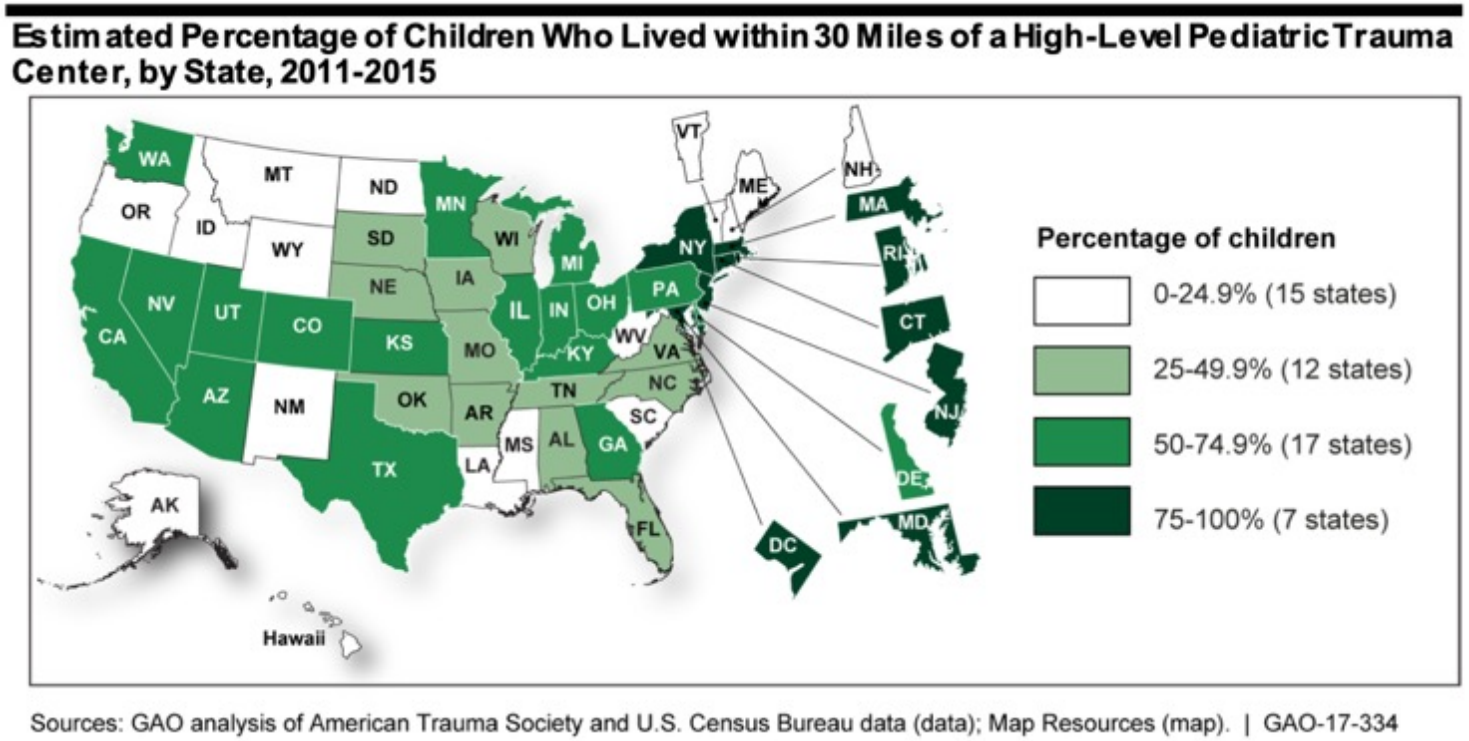
INJURY

The #1 killer of children in the US

https://www.cdc.gov/vitalsigns/childinjury/infographic.html

Pediatric Preparedness

- Children arrive at adult hospitals
  - >80% of pediatric ED visits are at general EDs
- EMS transport of critically injured children rare
  - >80% EMS agencies see <8 children/month
  - ~13% of all transports
- ED pediatric readiness directly correlated with mortality



Sources: GAO analysis of American Trauma Society and U.S. Census Bureau data (data); Map Resources (map). | GAO-17-334

https://www.ruralhealthinfo.org/toolkits/emergency-preparedness/4/mass-casualty-incidents

JAMA Pediatrics | Original Investigation

Evaluation of Emergency Department Pediatric Readiness and Outcomes Among US Trauma Centers

Craig D. Newgard, MD, MPH; Amber Lin, MS; Lenora M. Olson, PhD; Jennifer N. B. Cook, GCPH; Marianne Gausche-Hill, MD; Nathan Kuppermann, MD, MPH; Jeremy D. Goldhaber-Fiebert, PhD; Susan Malveau, MS; McKenna Smith, BS; Mengtao Dai, MS; Avery B. Nathens, MD, PhD; Nina E. Glass, MD; Peter C. Jenkins, MD, MSc; K. John McConnell, PhD; Katherine E. Remick, MD; Hilary Hewes, MD; N. Clay Mann, PhD, MS; for the Pediatric Readiness Study Group

- 832 trauma centers (levels 1 to 5, adult and pediatric) in 50 states and the District of Columbia
- Pediatric Readiness Score (wPRS) from the 2013 NPRP assessment.
- 372,004 children included – over 5 years
- Initial care at highest quartile of wPRS associated with 42% lower odds of death

- If 25%, 50%, 75%, and 100% of children cared for in lower-readiness quartile EDs were treated in an ED in the highest quartile of readiness
  - 25% 31 additional lives saved
  - 50% 63 additional lives saved
  - 75 % 94 additional lives saved
  - 100% 126 additional lives saved

INDIANA UNIVERSITY
SCHOOL OF MEDICINE

JAMA Pediatr. 2021;175(9):947-956

Pediatric Readiness in the Emergency Department

This checklist is based on the American Academy of Pediatrics (AAP), American College of Emergency Physicians (ACEP), and Emergency Nurses Association (ENA) 2018 joint policy statement "Pediatric Readiness in the Emergency Department," which can be found online at: https://pediatrics.aappublications.org/content/pediatrics/142/5/e20182459.full.pdf.

Use this tool to check if your hospital emergency department (ED) has the most critical components listed in the joint policy statement.

Administration and Coordination of the ED for the Care of Children

☐ Physician Coordinator for Pediatric Emergency Care (PECC)*

- Board certified/eligible in EM or PEM (preferred but not required for resource limited hospitals)
- The Physician PECC is not board certified in EM or PEM but meets the qualifications for credentialing by the hospital as an emergency clinician specialist with special training and experience in the evaluation and management of the critically ill child.

☐ Nurse Coordinator for Pediatric Emergency Care (PECC)*

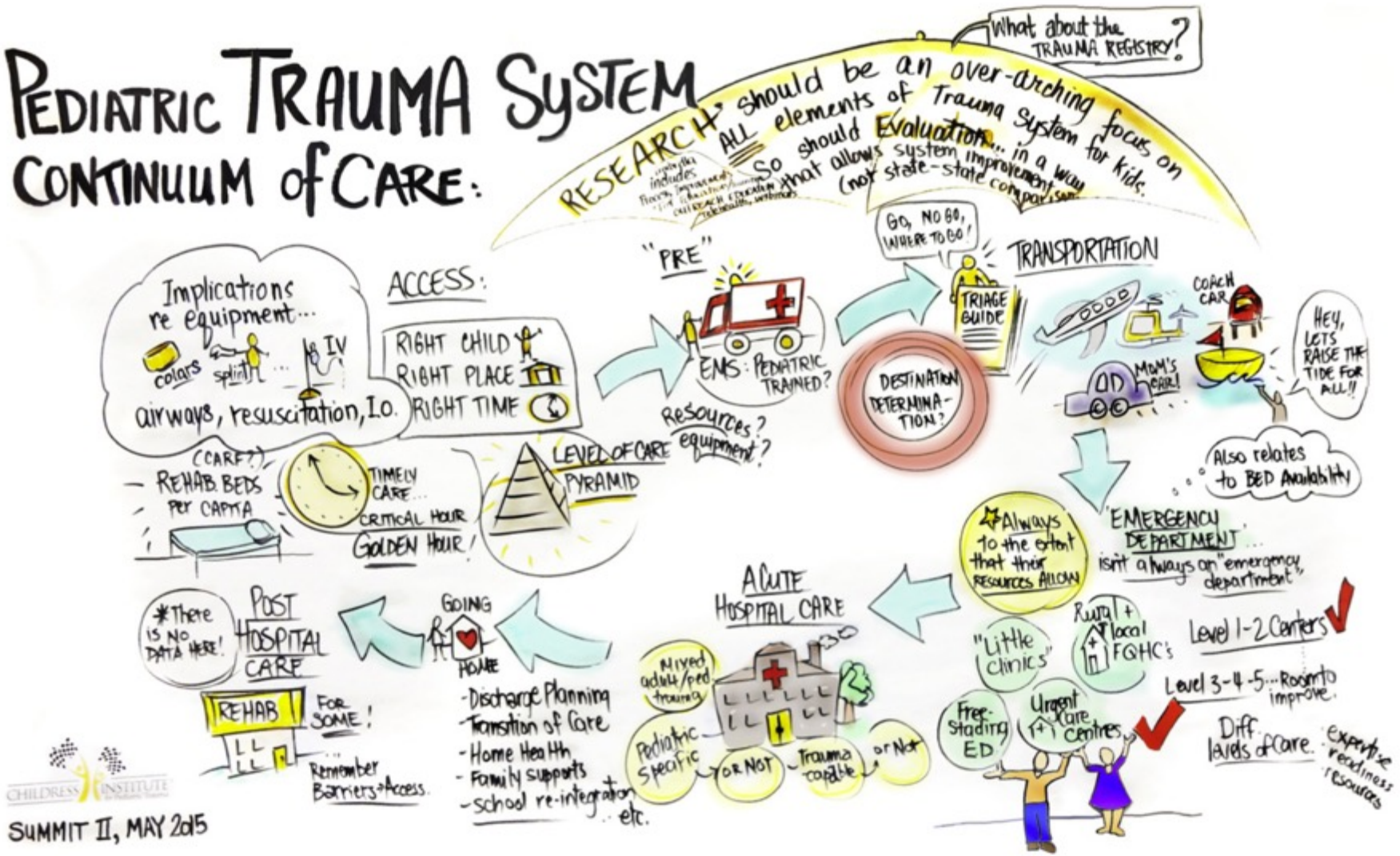
- CPEN/CEN (*preferred*)
- Other credentials (e.g., CPN, CCRN)

ED Policies, Procedures, and Protocols

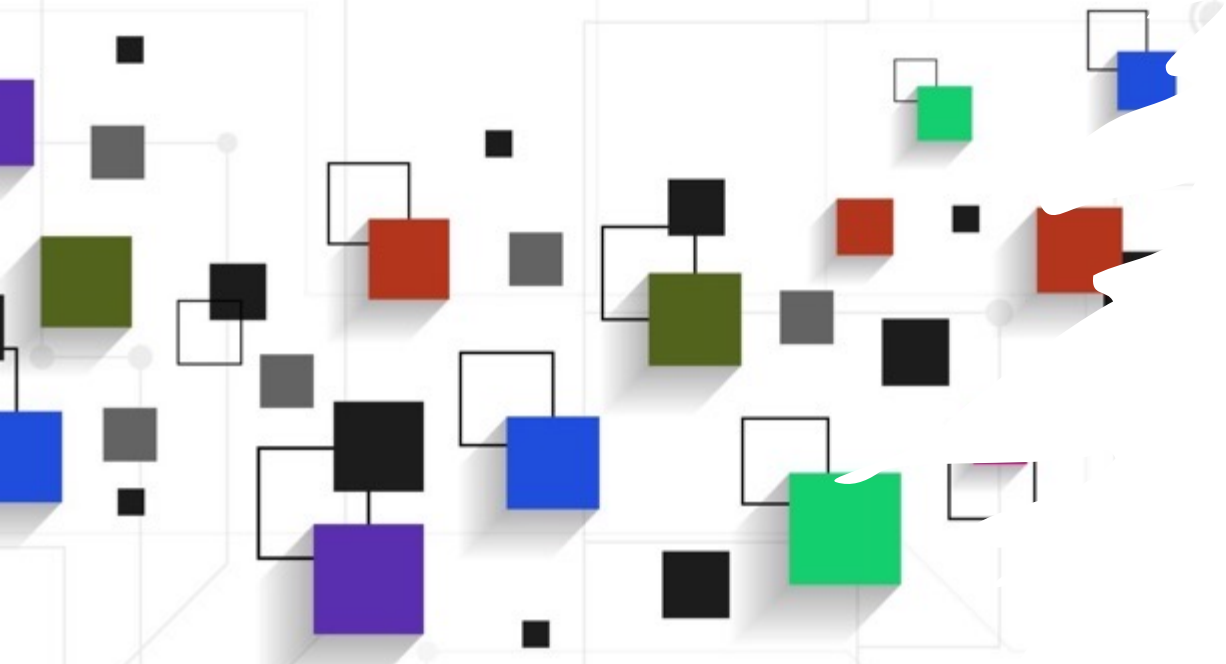
Policies, procedures, and protocols for the emergency care of children. *These policies may be integrated into overall ED policies as long as pediatric-specific issues are addressed.*

- ☐ Illness and injury triage
- ☐ Pediatric patient assessment and reassessment
- ☐ Identification and notification of the responsible provider of abnormal pediatric vital signs
- ☐ Immunization assessment and management of the under-immunized patient
- ☐ Sedation and analgesia, for procedures including medical imaging
- ☐ Consent, including when parent or legal guardian is not immediately available

https://media.emscimprovement.center/documents/NPRP_Checklist_Final_Apr2021_LEqqleE.pdf



Fallat. Journal of Pediatric Surgery 52 (2017) 3–15



Pediatric Trauma Preparedness

- Multi-step approach, starts at individual EMS agencies & hospitals
  - Training
  - Equipment
  - **Triage & Treatment**
  - Partnerships

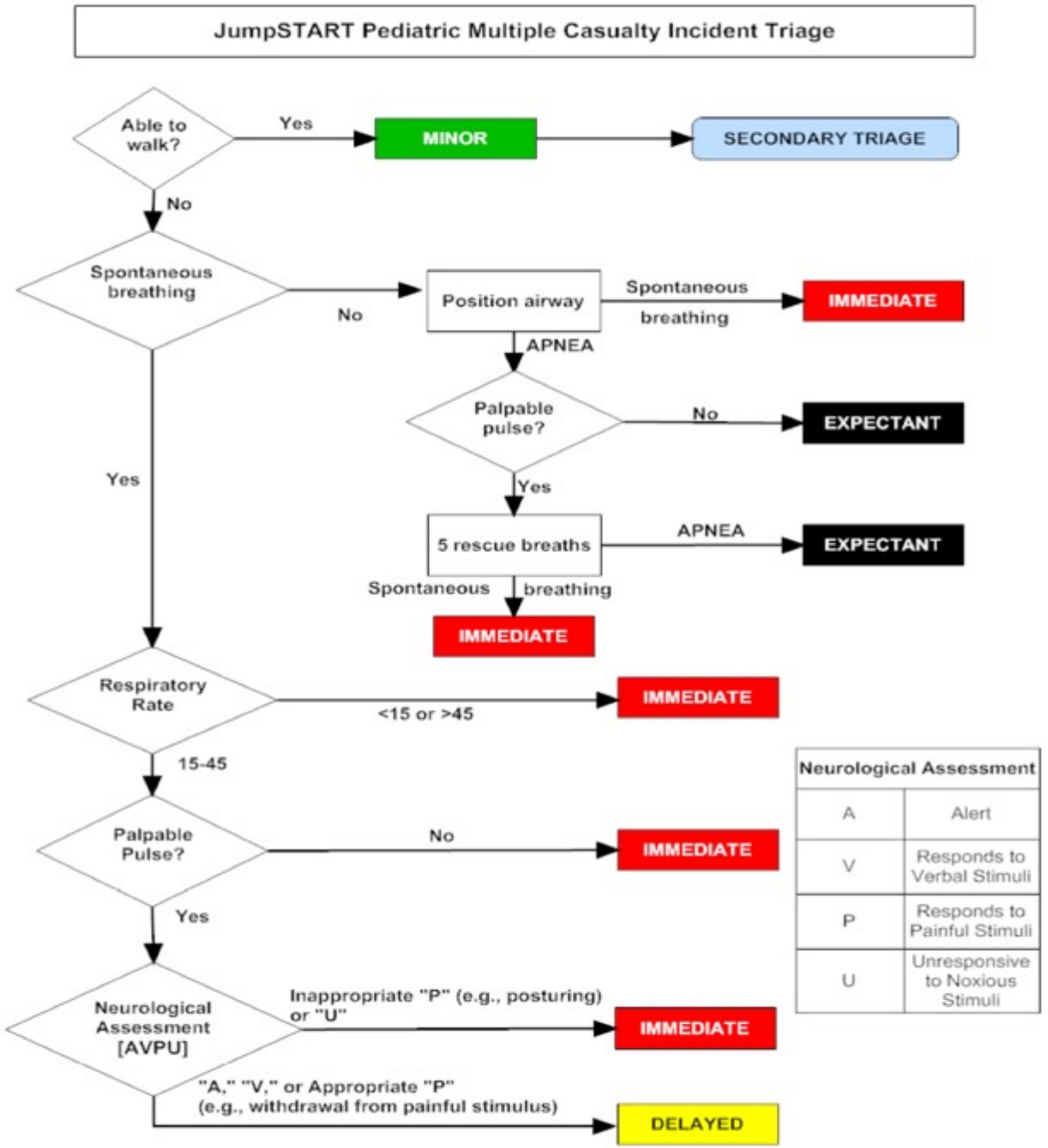
The ability to care for a single pediatric trauma patient is the first step to caring for a surge of pediatric trauma patients!

https://media.cdn.lexipol.com/article-images/GettyImages-1340858524.jpg?w=1600&format=jpg&quality=87&crop=179%2C0%2C2121%2C1194

Pediatric Trauma Triage

- Triage
  - Sorting patients by level of acuity
  - Over/under triage
    - Many adult triage systems may over triage pediatric trauma patients
  - Predicated on understanding patient's illness acuity at that moment
  - Multiple pediatric triage systems
    - Have your system, drill it

P	T	Description	Colour
1	1	Immediate	Red
2	2	Urgent	Yellow
3	3	Delayed	Green
1 hold	4	Expectant	Blue
Dead	Dead	Dead	White/Black



Romig LE. Pediatric triage, a system to JumpSTART your triage of young patients at MCIs. JEMS. 2002 Jul;27(7):52-8, 60-3

Pediatric Trauma Pearls

Airway

Access

Resuscitation

Temperature

Trauma Evaluation - ATLS

- Primary Survey (ABCDEs)
  - Adjuncts to primary survey and resuscitation
- Control of hemorrhage

ATLS®
ADVANCED TRAUMA LIFE SUPPORT

Primary Survey – Remember the Basics

A: Airway

Inability to establish and maintain a patent airway is the most common cause of cardiorespiratory arrest

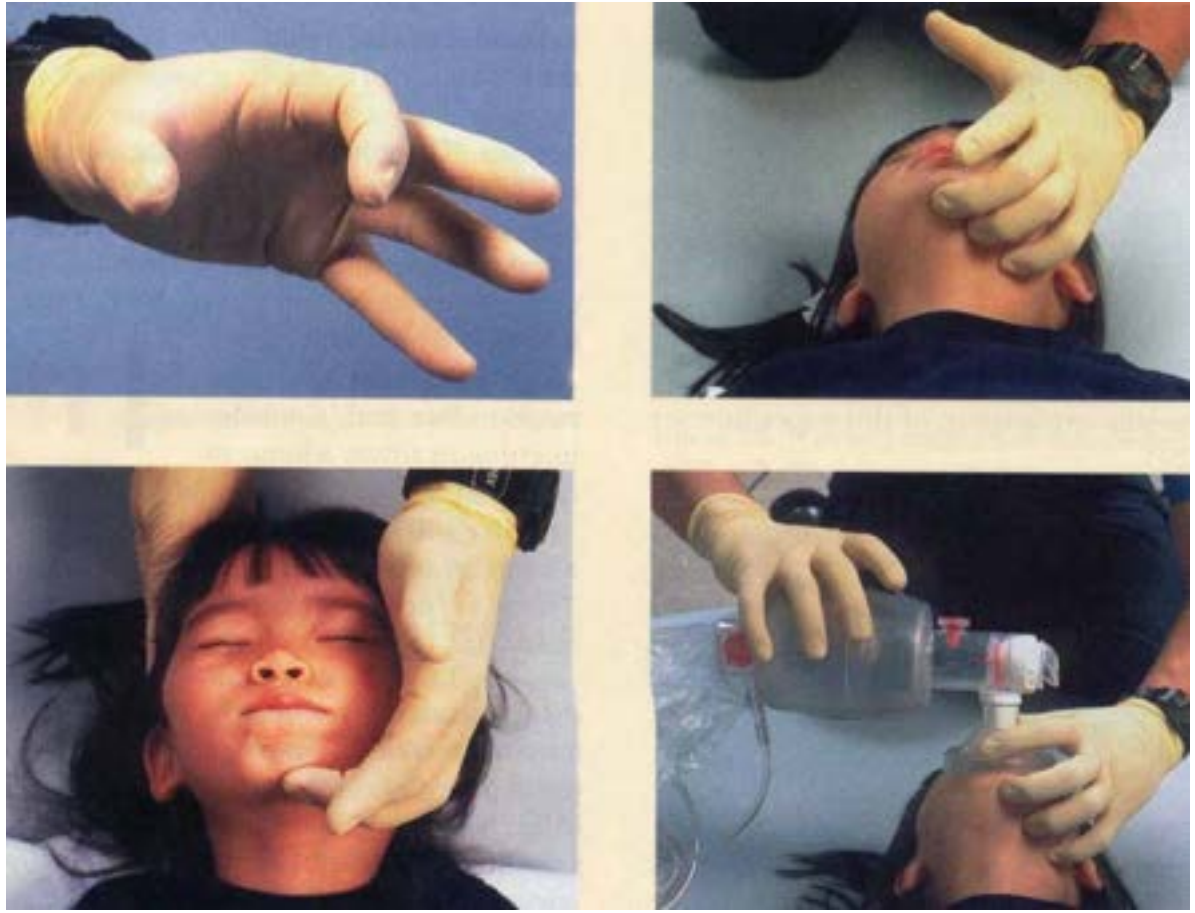
B: Breathing

C: Circulation

Assessment of circulation and obtaining hemorrhage control

Initial Trauma Assessment: ABCDE

- Airway
  - –obstruction
    - soft tissue
    - blood
    - vomit
    - loss of reflexes
  - –immobilize c-spine



Children = increased lymphoid tissue, floppy tongue, and subglottic narrowing predispose to obstruction

Airway - ETT

- Broselow tape
- Diameter of child's little finger
- 4 + age/4 = size of tube (mm)
- Capnography standard, auscultation
    - Right mainstem intubation common

Broselow®-Luten Zones

It is *always preferable* to measure the patient using a Broselow® Pediatric Emergency Reference Tape to determine the color zone.

For situations in which the child cannot be measured, patient age may be used to select the zone.

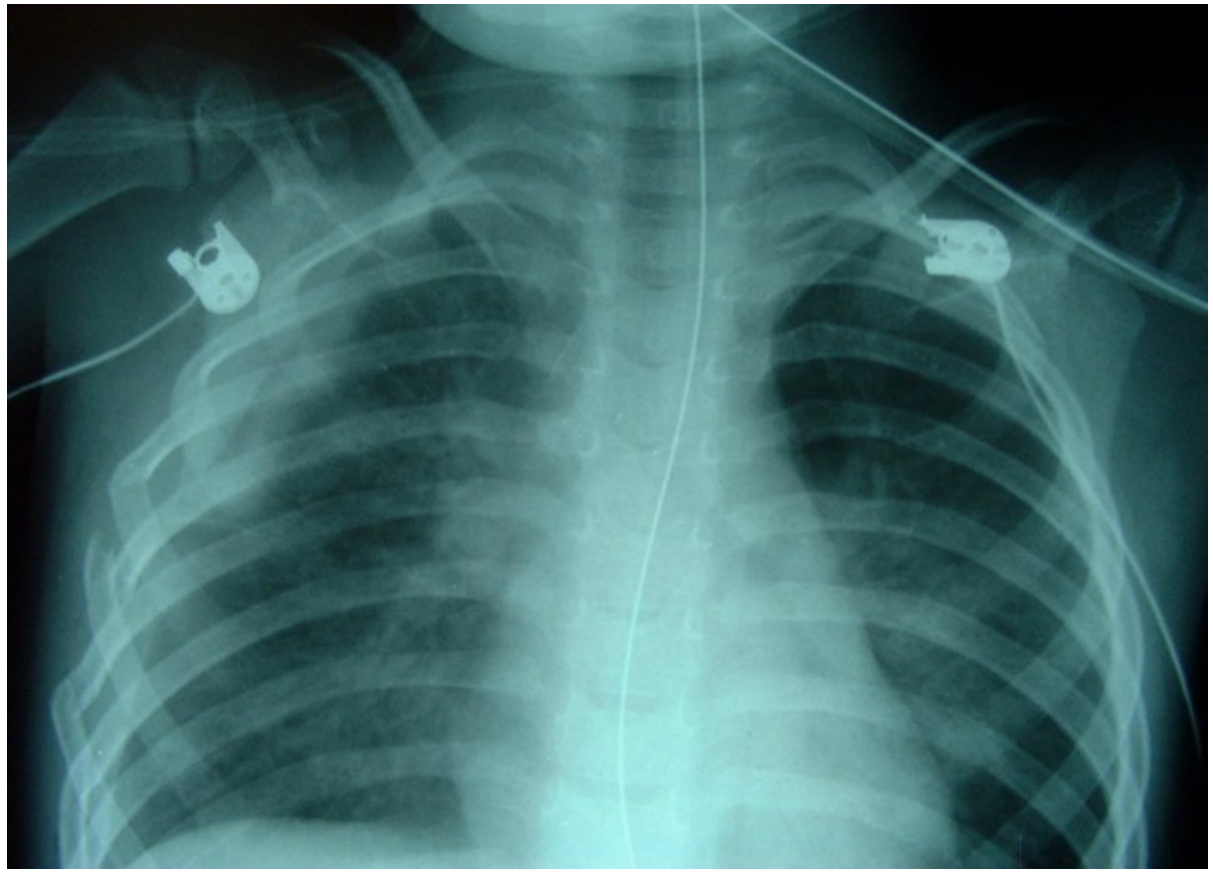
Zone	Patient weight	Age
3 kg, 4 kg, and 5 kg zones	3 kg, 4 kg, and 5 kg	< 3 mos
Pink	6–7 kg	3–5 mos
Red	8–9 kg	6–11 mos
Purple	10–11 kg	12–24 mos
Yellow	12–14 kg	2 yrs
White	15–18 kg	3–4 yrs
Blue	19–23 kg	5–6 yrs
Orange	24–29 kg	7–9 yrs
Green	30–36 kg	10–11 yrs

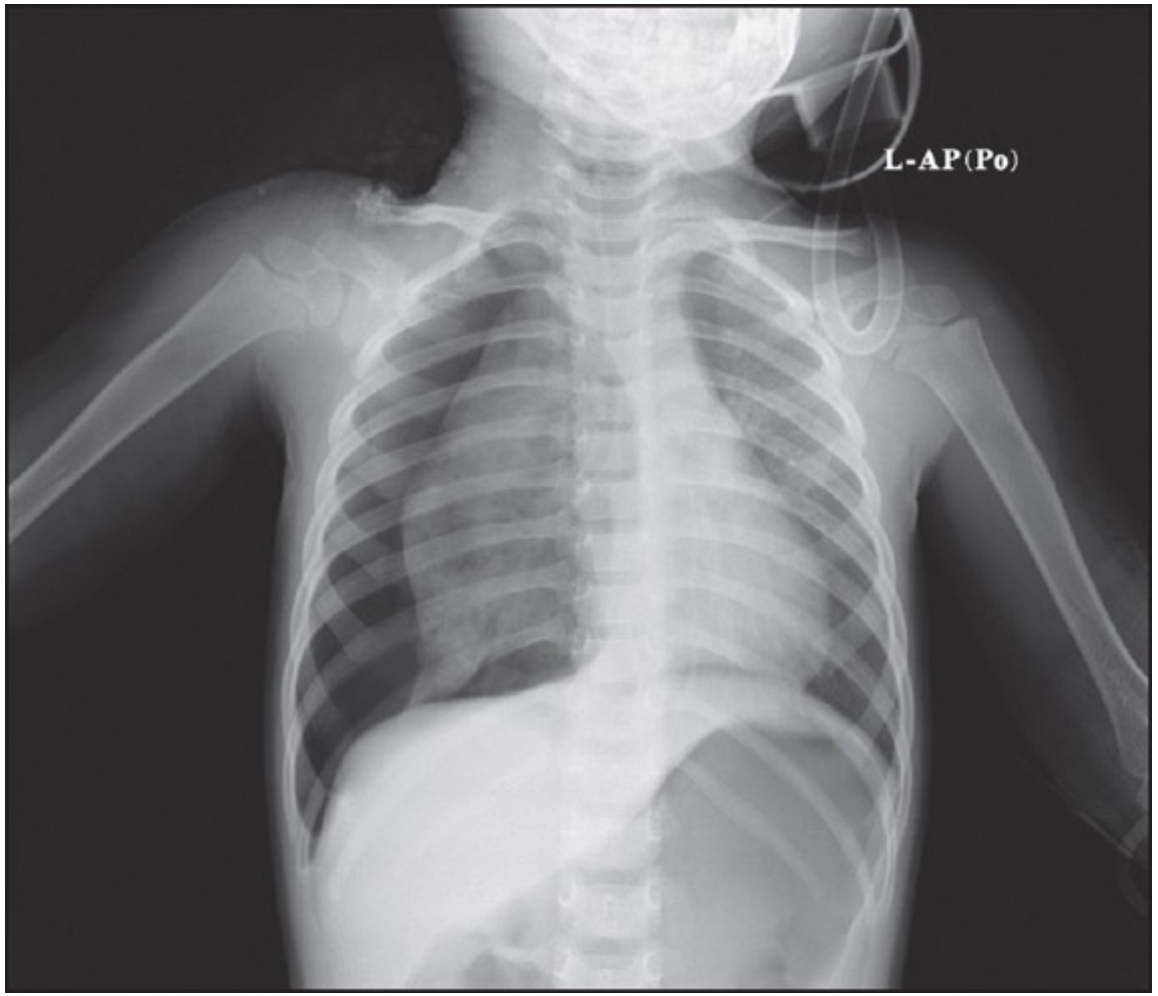
https://images.jems.com/wp-content/uploads/2019/04/1904DeBoer-Figure2.png

Initial Trauma Assessment: ABCDE

- Breathing
  - –look, listen, feel
    - -loss of CNS drive
      - head injury
    - -restriction
      - rib fractures
    - -chest injury
      - pulmonary contusion
      - pneumothorax

Initial Trauma Assessment: ABCDE





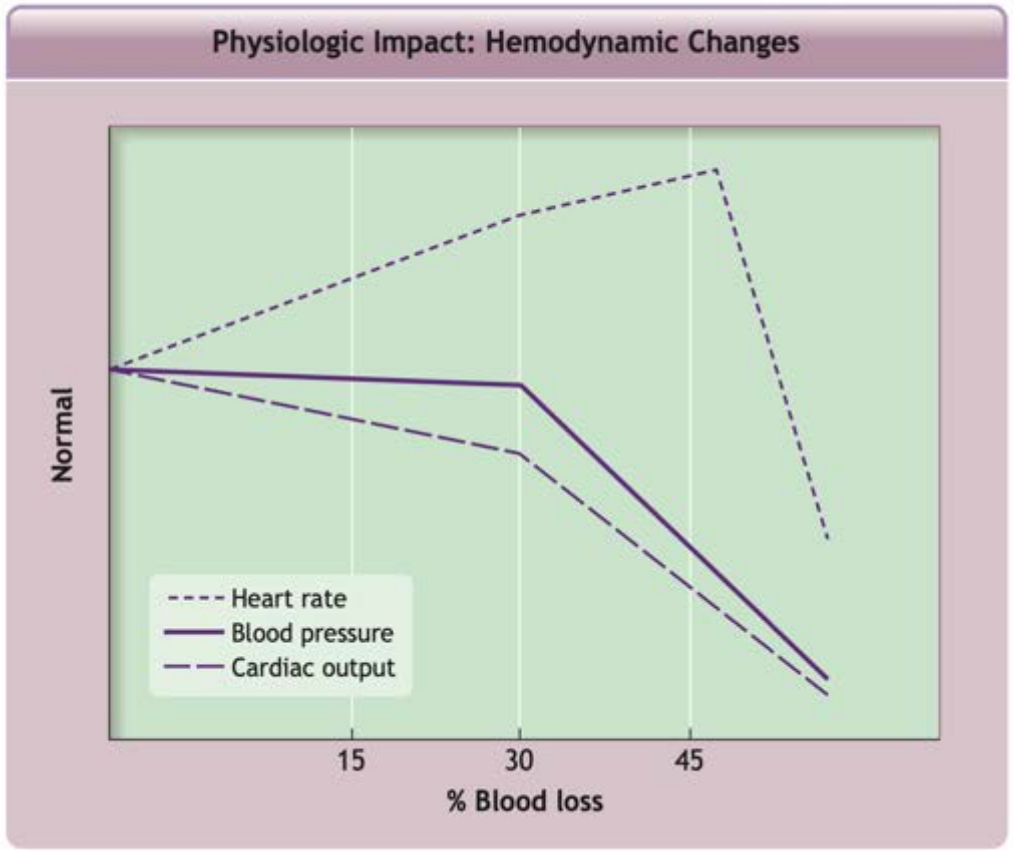
Children = significant injury can occur in absence of visible trauma

Circulation - Pediatric Trauma Hemorrhage

- Tachycardia may be only sign
- Other signs
  - Poor skin perfusion, delayed cap refill
  - Lethargy, altered mental status
  - Dry mucous membranes
  - Cyanosis
  - Hypothermia

- Total blood volume ~80 mL/kg
- Classic teaching – 45% blood volume loss before profound hypotension

Circulation - Pediatric Hemorrhage Physiology



■ FIGURE 10-5 Physiological impact of hemodynamic changes on pediatric patients.

Heart rate levels off after 35 - 45% blood volume loss

Compensatory mechanisms fail

Tachycardia → Bradycardia

Hypotension

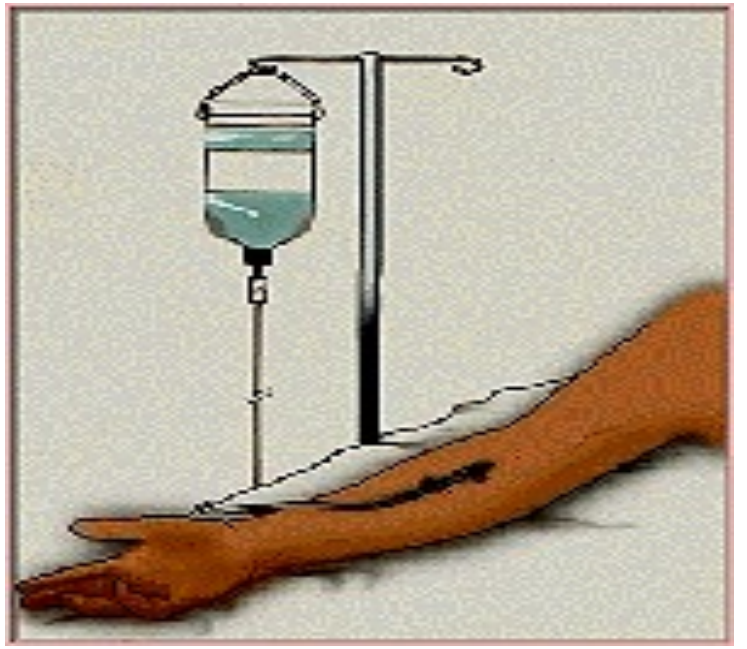
Irreversible shock

Trauma ACoSCo. ATLS, advanced trauma life support student course manual. 9th ed.. Chicago, IL: American College of Surgeons; 2013.

Circulation: Resuscitation

- Initial volume bolus 20 mL/kg
  - May be repeated
  - Isotonic IV fluid – LR vs. NS

- Blood transfusion
  - Indicated in children who do not respond to initial crystalloid resuscitation
  - 10 mL/kg
  - Consider massive transfusion protocol



**Changing paradigm!

Damage control resuscitation

- Treatment/prevention of lethal triad
  - Acidosis
  - Hypothermia
  - Coagulopathy
- Hemorrhage control!
  - Direct pressure, tourniquet, OR

- Principles:
  - Judicious crystalloid use
  - Early use of warmed blood products (MTP)
  - ~~Permissive hypotension**~~
  - Hemostatic agents

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Excessive Crystalloid Resuscitation

- Dilutional coagulopathy
- Increased pressure – “soft” clot disruption
- Hypothermia
- Immune modulation
- Proinflammatory effect

https://www.npr.org/sections/health-shots/2018/03/31/597666140/why-did-sterile-salt-water-become-the-iv-fluid-of-choice

Pediatric Crystalloid Data Summarized….

- No great data, retrospective/database
  - >60 mL/kg/day – likely impacts outcomes
- Bridge the gap between injury and access to definitive hemorrhage control/blood products
- Importance of knowing prehospital volume resuscitation when handing off patient

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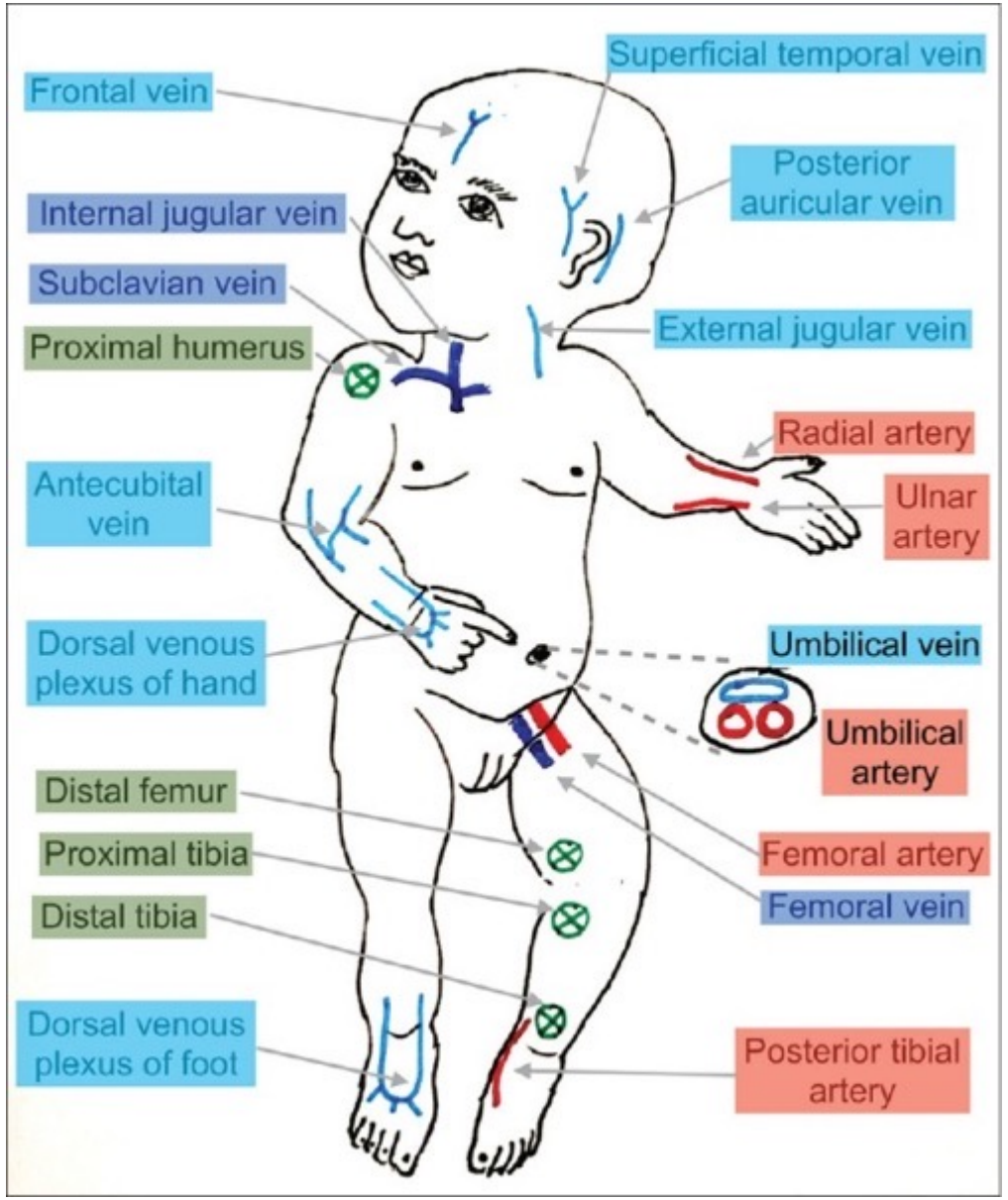
Circulation: venous access

Two attempts at large bore peripheral IVs

↓

Move to IO access quickly if hemodynamic instability exists



Indian J Anaesth. 2019 Sep; 63(9): 737–745.

Circulation: Intraosseous access

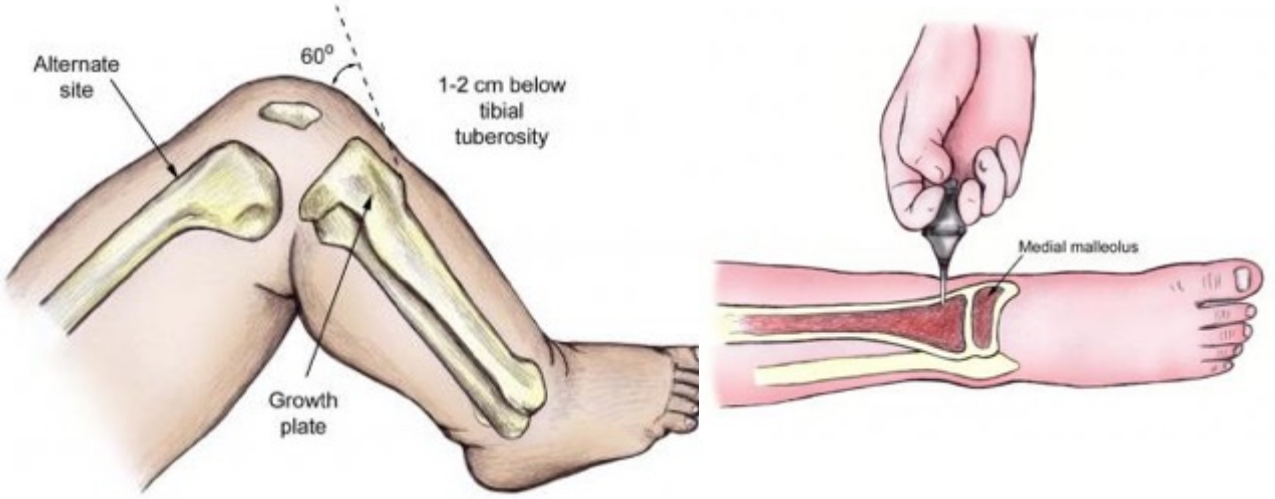
No specific age cut off

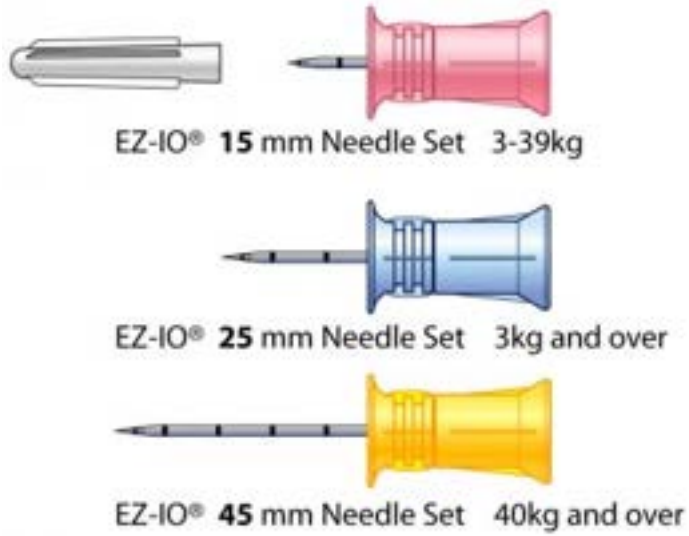
Contraindications:

- Ipsilateral fracture of the extremity
- Previous placement/attempt in extremity
- OI/osteopetrosis
- Obvious overlying infection

Site:

- Proximal tibia, distal tibia, distal femur
- Adult size children: sternum, proximal humerus, iliac bone





http://img.medscapestatic.com/pi/meds/ckb/03/25403tn.jpg

https://cleavonmd.com/wp-content/uploads/2020/07/256718tn.jpg

Trauma and blood transfusion

- Selective component transfusion
- Massive transfusion protocol
  - 1:1:1 ratio
  - What is a massive transfusion?
    - 40 ml/kg in a child

      (Neff et al, *J Trauma Acute Care Surg*, 2014)
- Whole blood resuscitation

Pre-Hospital Hypocapnia, Hypoxia and Hypothermia Impacts Mortality in Pediatric Traumatic Brain Injury

- Ackerman et al. Riley Hospital for Children
  - –TBI patients aged 18 years or younger
  - –PICU admission at Riley Hospital for Children 2010-2017
- **Any documented occurrence of hypoxia, hypothermia, or hypocarbia in the pre-hospital setting was associated with increased mortality**

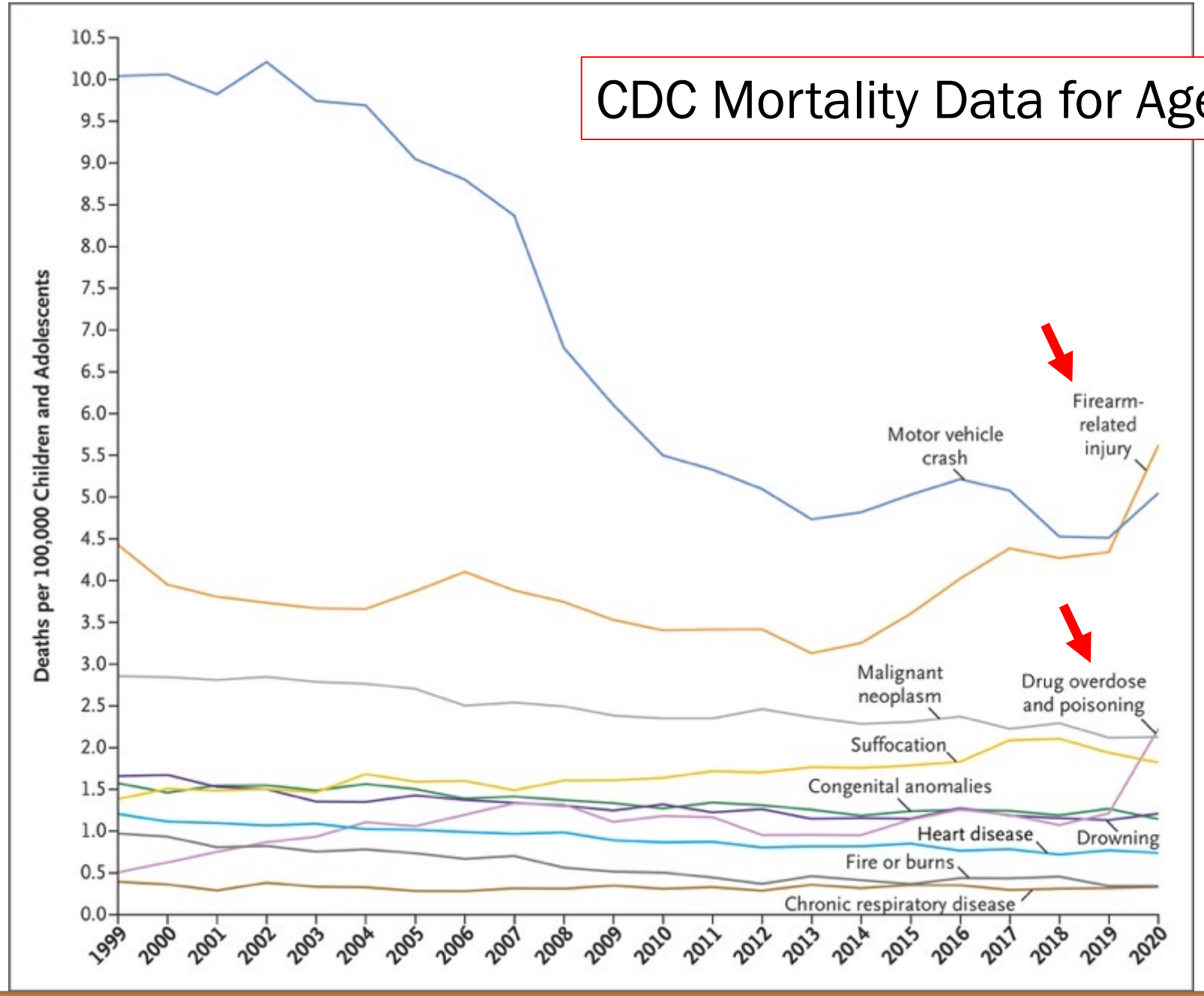
Hypocapnia *(PaCO2 <35 mmHg)*

Hypercapnia *(PaCO2 >45 mmHg)*

Hypoxemia *(O2 sat <92%)*

Hypothermia *(Temp < 36 degrees Celsius)*

CDC Mortality Data for Ages 1 – 19



N Engl J Med
2022;386:1955-1956

Chest tube insertion

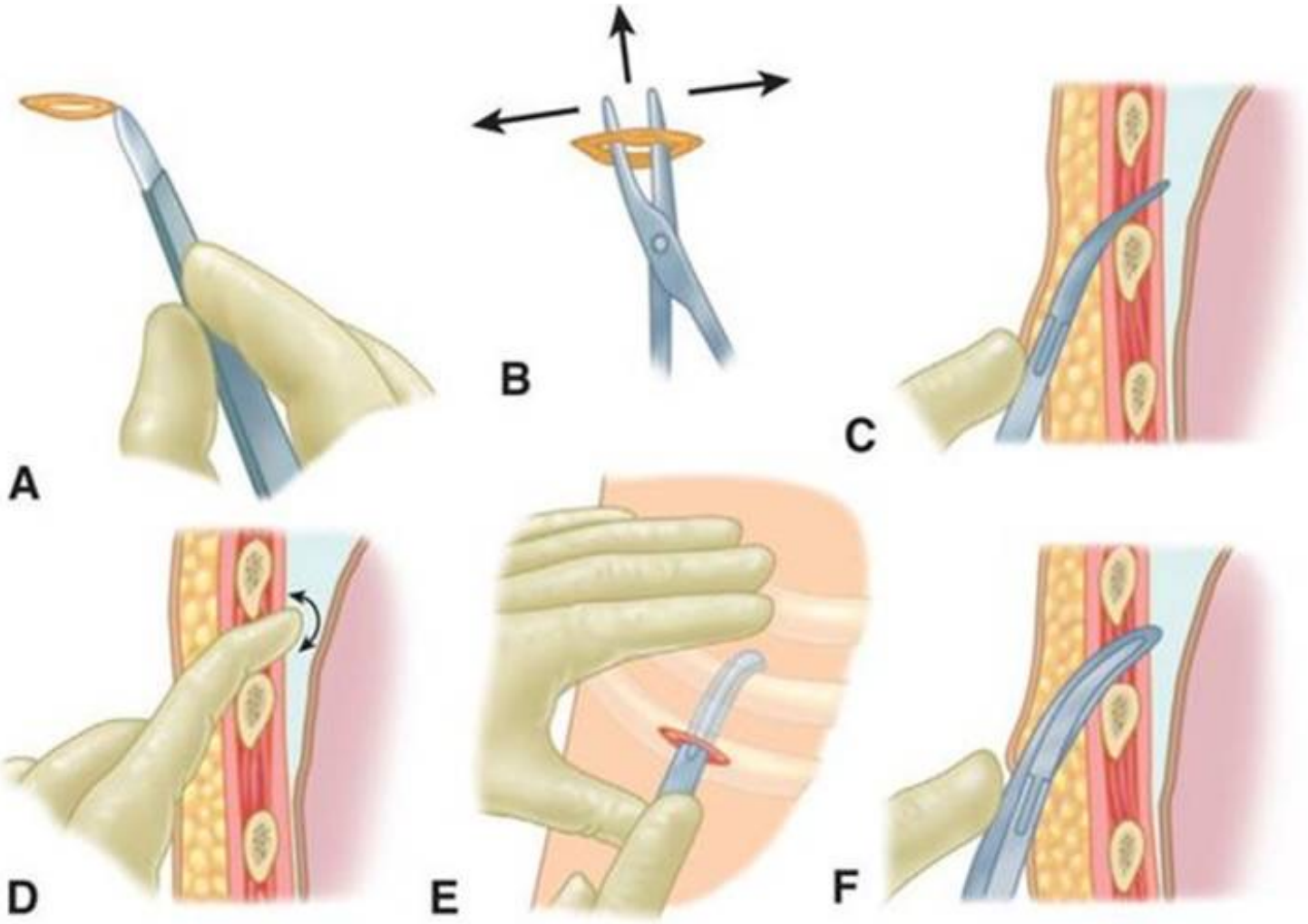


Table 3. Chest tube sizes by patient weight

Weight, kg	Chest Tube Size, Fr
3–5	10–12
6–9	12–16
10–11	16–20
12–14	20–22
15–18	22–24
19–22	24–28
23–30	
>32	

Bliss & Silen. *Crit Care Med*, 2002
https://doctorlib.info/pediatric/schafermeyers-pediatric-emergency-medicine/schafermeyers-pediatric-emergency-medicine.files/image171.jpg

From: **Adult Tourniquet for Use in School-Age Emergencies**

Pediatrics. 2019;143(6). doi:10.1542/peds.2018-3447

STOP THE BLEED

https://www.stopthebleed.org

Figure Legend:

The CAT as configured for carrying (wrapping for shipment removed). Two colors are produced for the civilian versions: orange for clinical application and blue for training. The military version is black.

Thank you!

landman@iu.edu

rileychildrens.org

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Disaster Preparedness for Children and Youth with Special Health Care Needs

Kara Kowalczyk, MD

Assistant Professor of Clinical Emergency Medicine and Pediatrics

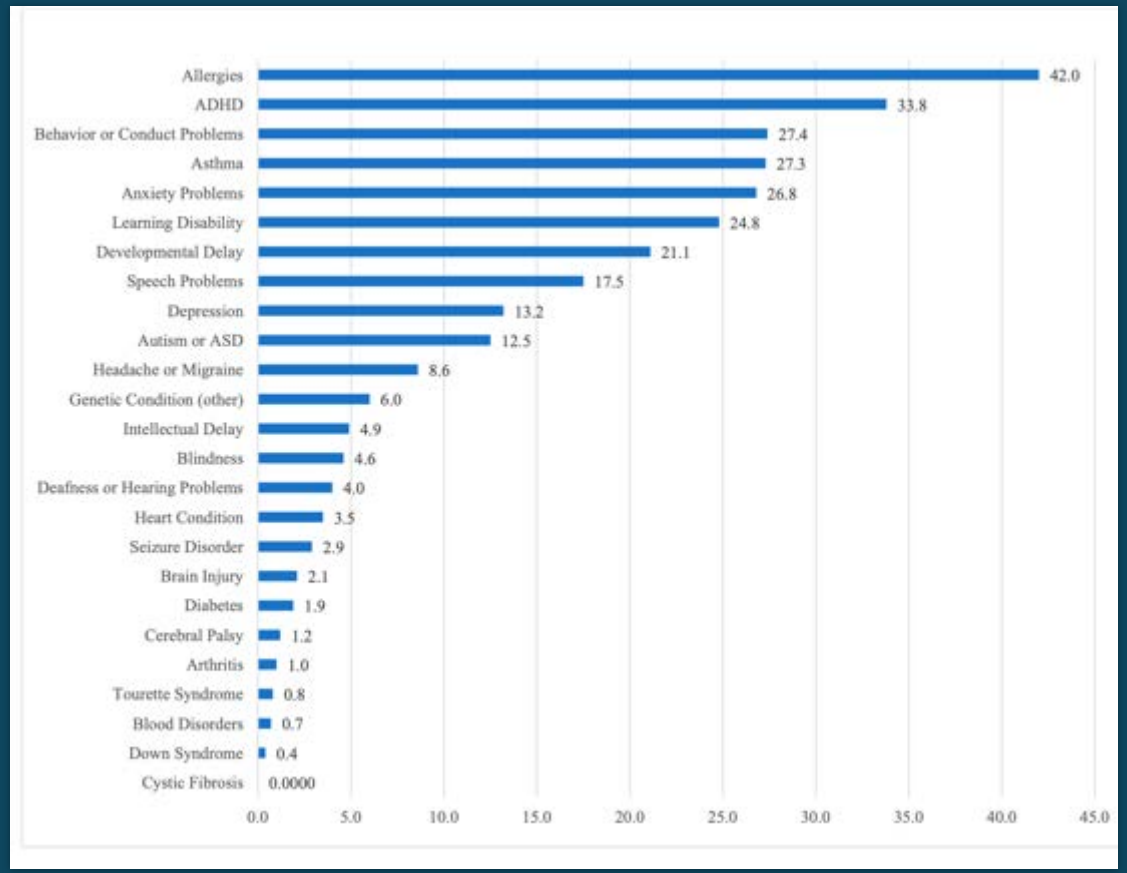
Indiana University School of Medicine

Who are Children and Youth with Special Health Care Needs (CYSHCN)

Those who have a chronic physical, developmental, behavioral or emotional condition and require health or related services of a type or amount beyond that required by children generally

14 million total

7.3 million number of CYSHCN with health conditions that consistently and often affect their daily activities a great deal


Allergies 42.0
ADHD 33.8
Behavior or Conduct Problems 27.4
Asthma 27.3
Anxiety Problems 26.8
Learning Disability 24.8
Developmental Delay 21.1
Speech Problems 17.5
Depression 13.2
Autism or ASD 12.5
Headache or Migraine 8.6
Genetic Condition (other) 6.0
Intellectual Delay 4.9
Blindness 4.6
Deafness or Hearing Problems 4.0
Heart Condition 3.5
Seizure Disorder 2.9
Brain Injury 2.1
Diabetes 1.9
Cerebral Palsy 1.2
Arthritis 1.0
Tourette Syndrome 0.8
Blood Disorders 0.7
Down Syndrome 0.4
Cystic Fibrosis 0.0000
0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0

- More like to live in poverty 23.9% versus 19.4%

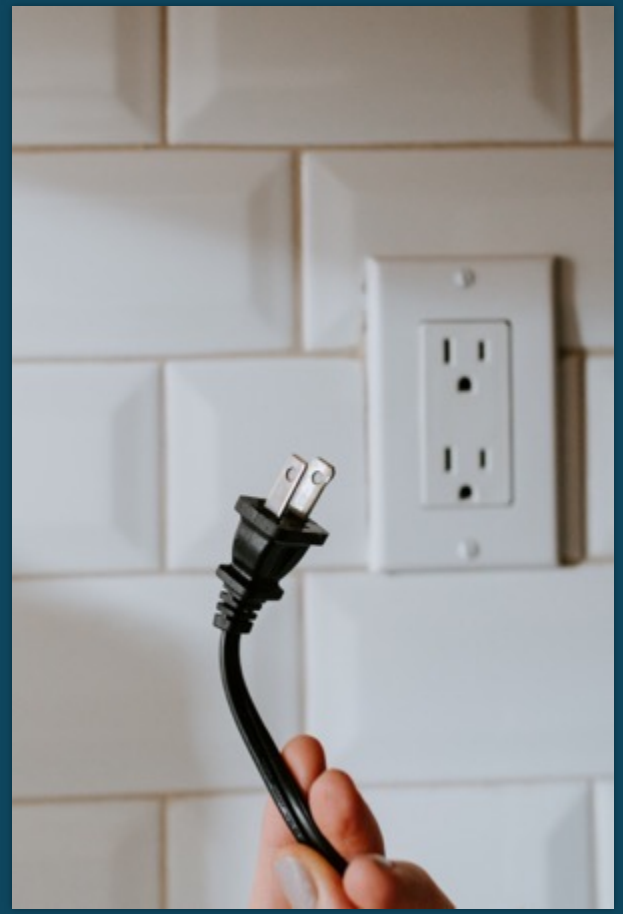
During disaster scenarios these often chronically stressed families will have an even more difficult time accessing what they need

Disaster Considerations for Families

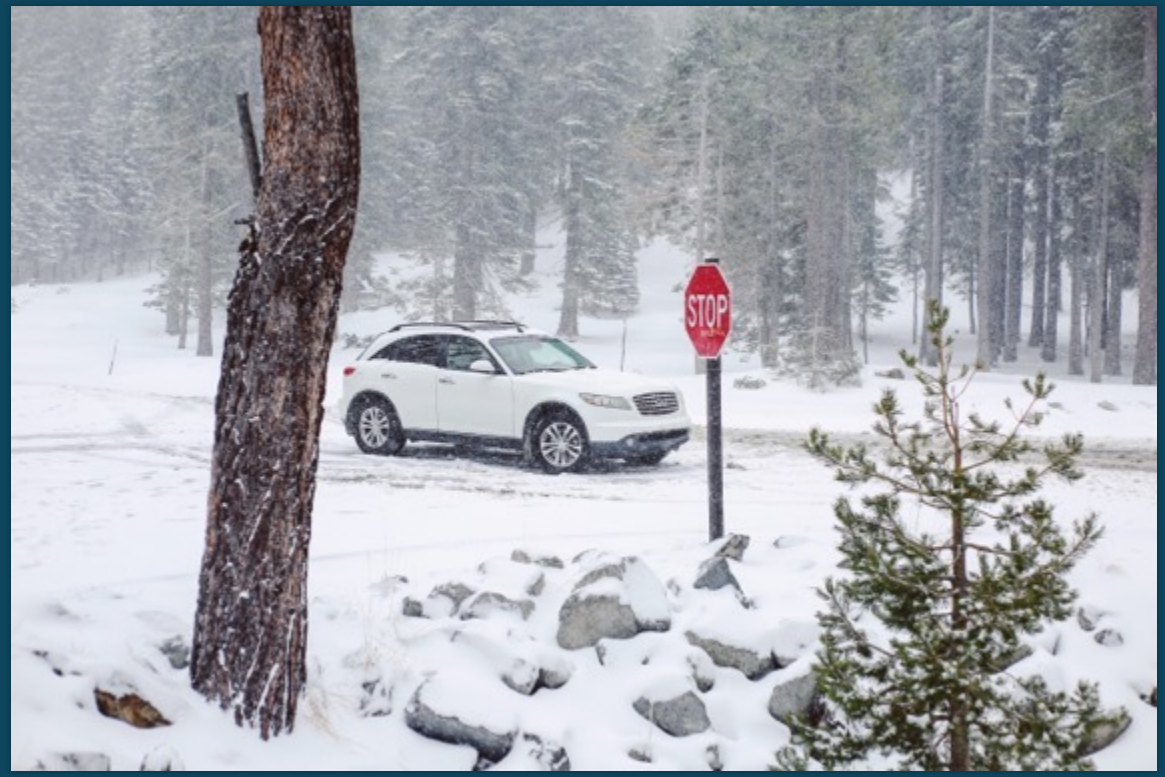
Medications

Supplies

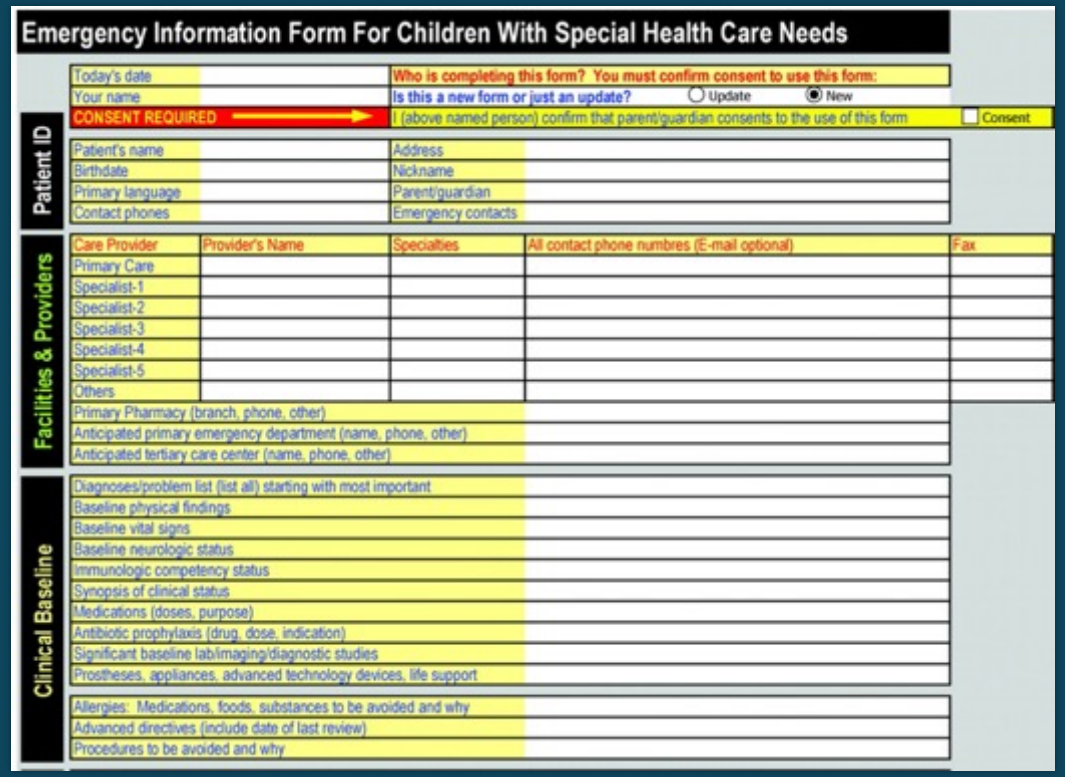
Power Supply



Transportation



Emergency Information Form



Emergency Information Form For Children With Special Health Care Needs

	Today's date	Who is completing this form? You must confirm consent to use this form:	
	Your name	Is this a new form or just an update? ○ Update ◉ New	
	CONSENT REQUIRED →	I (above named person) confirm that parent/guardian consents to the use of this form	☐ Consent
Patient ID	Patient's name	Address	
	Birthdate	Nickname	
	Primary language	Parent/guardian	
	Contact phones	Emergency contacts	

Facilities & Providers	Care Provider	Provider's Name	Specialties	All contact phone numbres (E-mail optional)	Fax
	Primary Care				
	Specialist-1				
	Specialist-2				
	Specialist-3				
	Specialist-4				
	Specialist-5				
	Others				
	Primary Pharmacy (branch, phone, other)				
	Anticipated primary emergency department (name, phone, other)				
	Anticipated tertiary care center (name, phone, other)				

Clinical Baseline	
	Diagnoses/problem list (list all) starting with most important
	Baseline physical findings
	Baseline vital signs
	Baseline neurologic status
	Immunologic competency status
	Synopsis of clinical status
	Medications (doses, purpose)
	Antibiotic prophylaxis (drug, dose, indication)
	Significant baseline lab/imaging/diagnostic studies
	Prostheses, appliances, advanced technology devices, life support
	Allergies: Medications, foods, substances to be avoided and why
	Advanced directives (include date of last review)
	Procedures to be avoided and why

Hospital Considerations of CYSHCN in Disasters

March 2022 Checklist of Essential Pediatric Domains and Considerations for Every Hospital's Disaster Policies

Domain 9: CYSHCN

Foundation Level

- Identify content experts and partners skilled in caring for CYSHCN in their community

Foundation Level

- Anticipate and incorporate the needs of CYSHCN in your community and plan for their initial care in a disaster

Foundation

- Identify equipment, supply, and medication needs
- Establish protocols with local EMS agencies to ensure CYSHCN are transported with all their medication and equipment
- Coordinate with local DME companies to develop a process for securing essential equipment during a disaster

Consideration for taking care of CYSHCN

- Make parents part of the team
- Preparation is key
- Take opportunities to familiarize yourself

Cases with Child Life and Respiratory Therapy Experts

Kara Kowalczyk, MD

Colleen Gatton, RRT

Jackie Moeller, MS, CCLS

Meredith Vlach, MPH, CCLS

Case

You are working a typical dayshift in your emergency department when you get a call regarding an MCI at a local elementary school with daycare less than 1 mile away. A car ran into the school and caused a partial building collapse.

There are two critical "RED" patients that are being flown to the children's hospital, however you are anticipated to receive **3 yellow patients**.

Patient 1

- 5 yo male sustain lacerations and abrasions during the explosion thought to be from glass. He was non ambulatory at the scene, so he was tagged YELLOW. He will require stiches for a 1cm linear forehead laceration and 2 cm leg laceration. His Mom is a teacher at the school and was able to accompany him to the hospital. He is very scared about getting a shot.

Patient 1

5 yo with multiple lacerations to repair

- What are non-pharmacologic ways to help make this child comfortable?
- How can we use Mom in the situation?
- Are there any medications to help us?

TYPES OF COMFORT HOLDS

Comfort holds help children feel safe during a procedure, while also helping their body stay still and calm. Parents, caregivers, and staff may carry out comfort holds when appropriate.

Back to Chest

Chest to Chest

Sideways Lap Sit

Patient 2

- 6 yo female medically complex child with a trach and vent. She inhaled lots of dust during the building collapse and is working hard to breath. She is typically on room air but her O2 sats are currently 85%

Patient 3

- 6 yo male presents with obvious deformity LUE. Patient is crying in pain. You need to place an IV for sedation medication.

- Extremity deformity needing an IV for sedation
  - How to best treat pain before IV
  - How would you explain and IV to this child?
  - How can we make this procedure more comfortable?

EMERGENCY DEPARTMENT

CHILD FRIENDLY LANGUAGE

- **Blood Pressure Cuff** – A soft band that wraps around your arm or leg and gives a tight squeeze
- **Cervical Collar (C-Collar)** – A tight and soft necklace to keep your head and neck safe
- **EKG Leads** – Stickers that go on your chest and belly
- **IV** – A small plastic straw to help give your body medicine
- **Medication** – Medicine to help your body feel better Paramedic – The person taking care of you in the ambulance
- **Poke** – used to replace the needle
- **Pulse Oximeter** – A sticker (or clip) that measures your breathing
- **Tourniquet** – A tight rubber band that squeezes your arm to help see the veins/blue lines
- **Vein** – The blue lines that carry blood throughout your body

EMERGENCY DEPARTMENT

PAIN MANAGEMENT INTERVENTIONS

Pharmacological Interventions	Non-Pharmacological Interventions
LMX/EMLA	Comfort Positioning
LET	Deep Breathing
Sweet Ease/oral sucrose	Counting
Pain Ease Spray	Alternative Focus
	Guided Imagery
	Buzzy Bee

* This is not a comprehensive list, but most used techniques in the ED*

Age	Developmental Characteristics	Hospital Stressors	How to Help
Toddlers (1-2 years)	• Strives for independence • Sensory motor learning through exploration • Short attention span	• Unfamiliar environment • Altered routines • Fear of separation and pain • Stranger anxiety • Loss of autonomy	• Offer choices when appropriate • Comfort positioning with parent as comforter, never restrainer • Begin exam with something familiar • Allow child to "help" with care • Allow time to rest between procedures • Give one direction at a time
Pre-School (3-5 years)	• Egocentric • Difficulty distinguishing between reality and fantasy (magical thinking) • Limited concept of time • Learn best by doing • Need for caregiver under stress	• View illness and treatment as punishment • Fear of abandonment/separation • Misconceptions and inability to distinguish fantasy from reality • Fear of pain	• Give them a "job" during exam • Give choices and control • Use simple, concrete language • Reinforce exam is not punishment, explain reasoning for things, talk before touch • Medical Play • Anticipate and clarify misconceptions
School- Age (6-12 years)	• Able to think logically • Self-esteem evolving • Establishing same-sex peer groups	• Separation related to disruption in daily living (school and peers) • Modesty concerns • Fear of body injury and never being well again • Enforced dependence	• Explain reason and purpose for things • Check for misunderstandings • Reinforce their body is "normal" or "intact" • Teach about equipment and function by introducing medical terms • Provide opportunities for success
Adolescents (13-18 years)	• Rapidly changing body image • Need for privacy • Body image relates to self-esteem • Socializing and peer group important • Risk-taking behavior	• Invasion of privacy • Lack of confidentiality • Concern for body image and physical changes • Dependency • Separation from peers	• Communicate honestly • Include patient in decision making • Support independence • Respect privacy • Allow choices, let them decide who accompanies to exam room • Allow them to ask questions

Thank you for attending!

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https://emscimprovement.center/domains/preparedness/asprcoe/eglpcdr/