TREKK: Translating Emergency Knowledge for Kids

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No conflicts of interest

TREKK is grateful for our support from:

Government of Canada Networks of Centres of Excellence
Gouvernement du Canada Réseaux de centres d'excellence

University of Manitoba

the Children's Hospital Research Institute of Manitoba

Research Manitoba

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Goal

- To debunk the adage that:
  "Kids are just small adults"
- Demonstrate the clinical tools available to emergency providers through TREKK
- Understand the rigor that goes into the resources available on trekk.ca website

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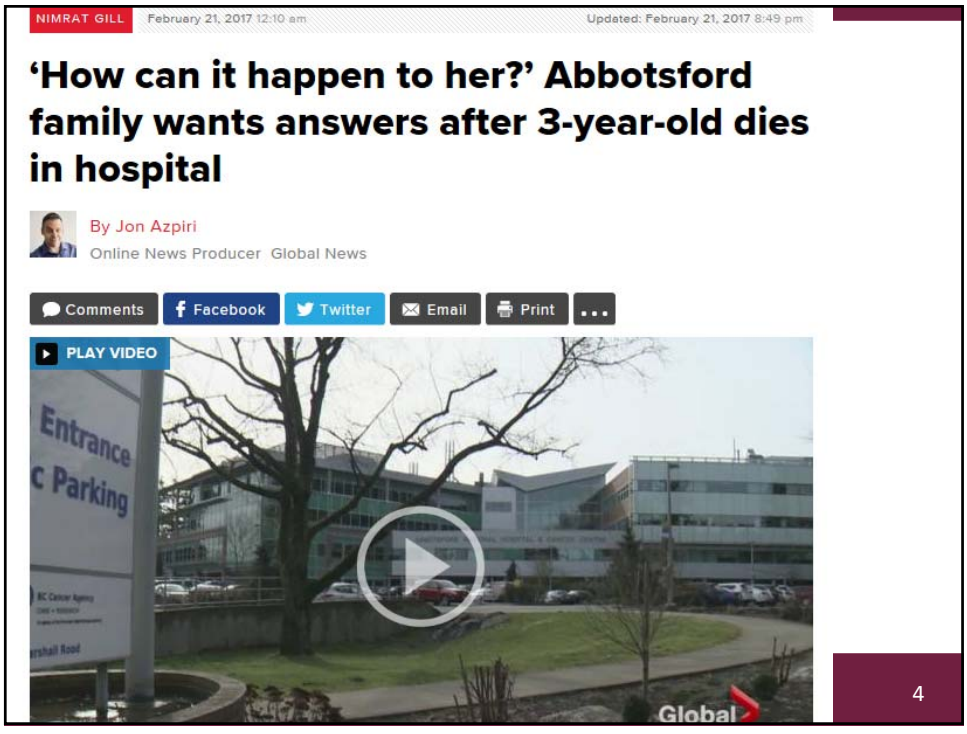

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Pediatric specific life saving skills are often the #1 discomfort for general emergency department physicians

- Specific medical condition or procedures (RSI, Chest tube placement, IO, defib, cardioversion)
- Weight based dosing
- Age appropriate vital signs

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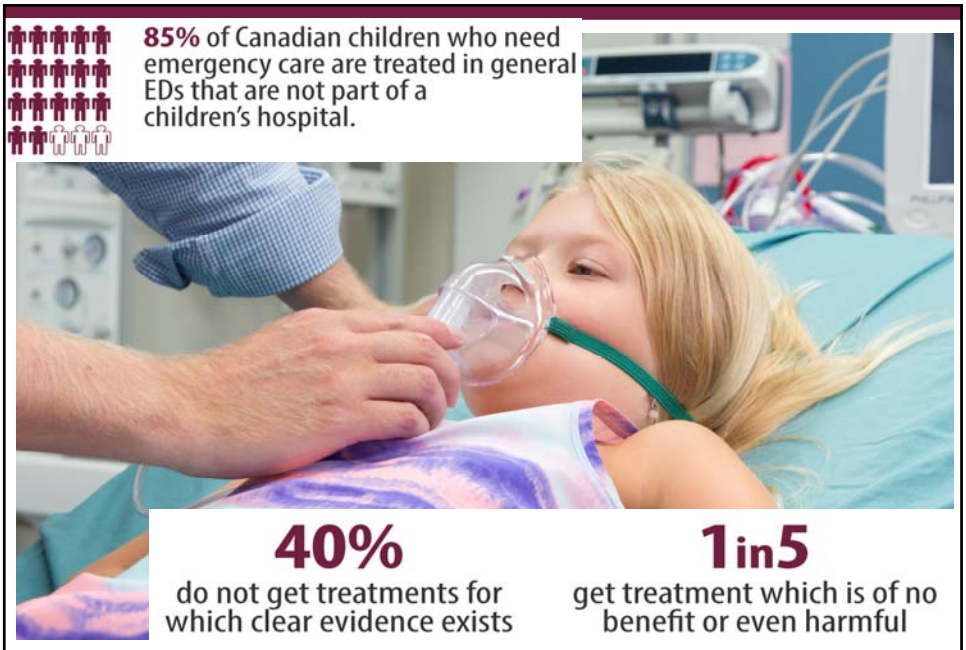

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It takes 17 years for research to reach practice.

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TREKK wants to narrow this research →bedside gap

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TREKK PROVIDES

Instant access to the most current, vetted evidence related to children's emergency care for emergency department practitioners.

Innovative, evidence-based tools (podcasts, videos, interactive storybook) that appeal to a wide variety of audiences and learning styles.

Educational programs and resources for healthcare professionals and families.

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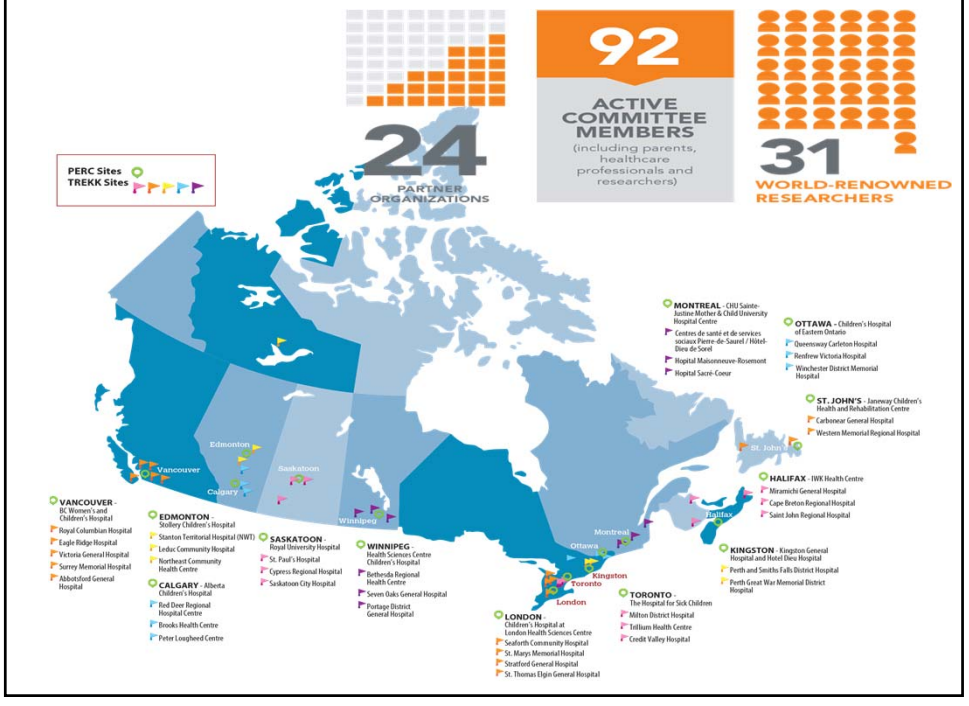

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Case

- 8 month old boy, previously healthy
- Went to bed normally
- Woke up with barky cough and distress
- Arrives by EHS
  - Sitting on fathers lap coughing constantly
  - Stridor at rest
  - Well perfused
  - RR 36, sats 97%, increased work of breathing
  - HR 170, BP 80/40, cap refill 2 seconds
  - Awake and alert

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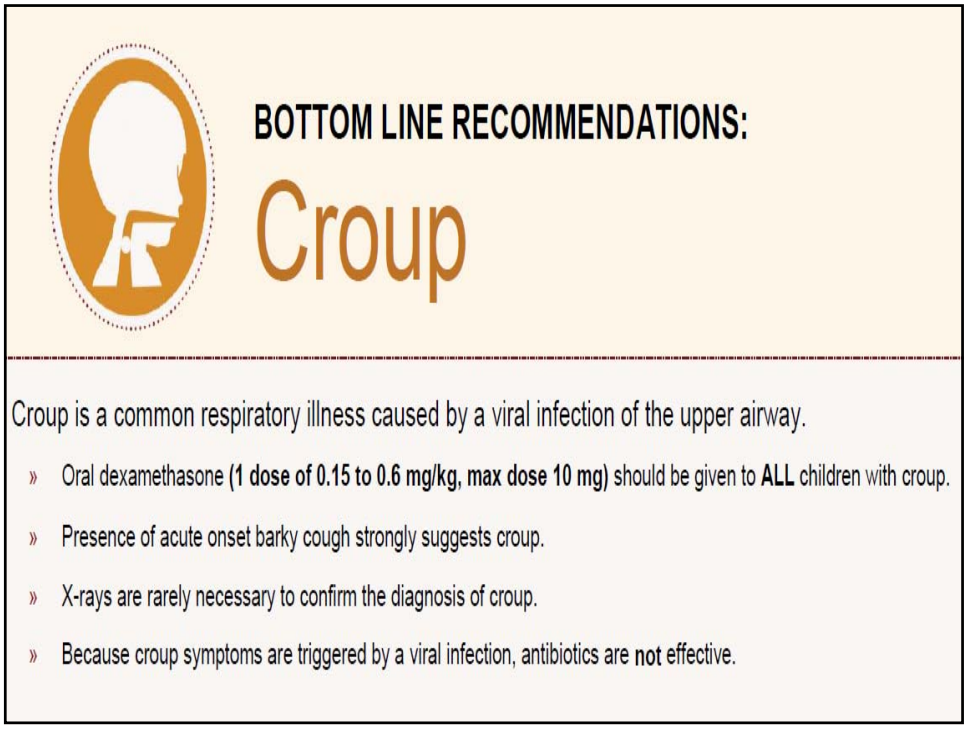
BOTTOM LINE RECOMMENDATIONS:
Croup
Croup is a common respiratory illness caused by a viral infection of the upper airway.
» Oral dexamethasone (1 dose of 0.15 to 0.6 mg/kg, max dose 10 mg) should be given to ALL children with croup.
» Presence of acute onset barky cough strongly suggests croup.
» X-rays are rarely necessary to confirm the diagnosis of croup.
» Because croup symptoms are triggered by a viral infection, antibiotics are not effective.

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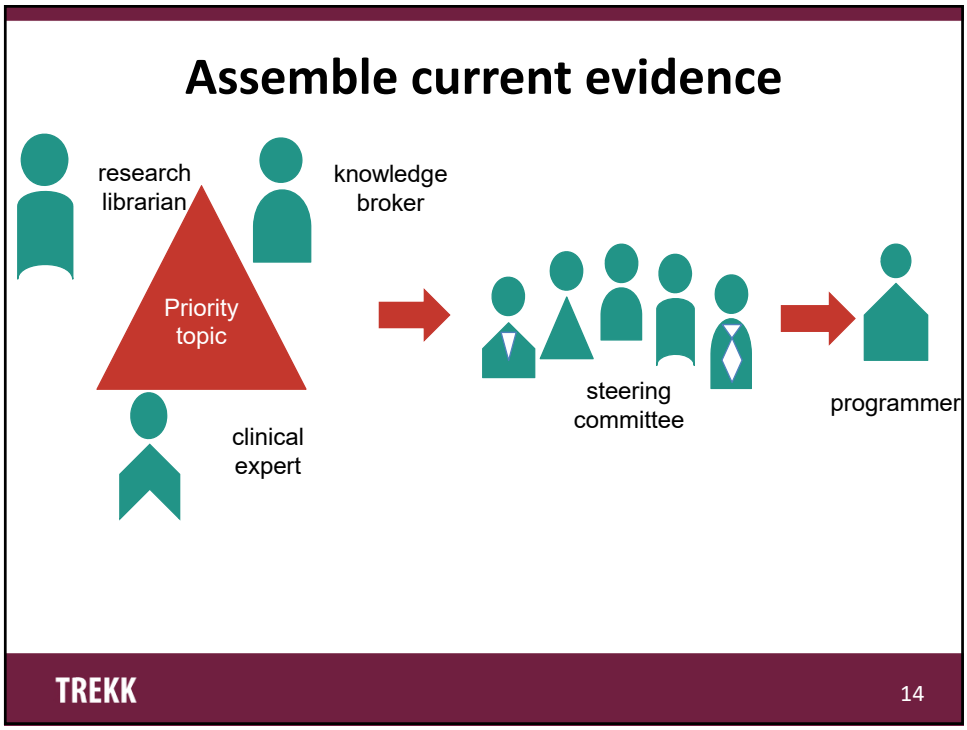
Assemble current evidence
research librarian
knowledge broker
Priority topic
clinical expert
steering committee
programmer
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Ongoing engagement with end-users

synthesis
exchange
dissemination
application

Steering Committee
Content Advisor
KM Advisory
PERC Reps
TREKK Reps
Parent Advisory

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KM Processes

Partnerships:

EMERGENCY MEDICINE CASES
The Audio Program Where the Experts Keep You in the Know

canadiem

CAEP | Canadian Association of Emergency Physicians
ACMU | Association canadienne des médecins d'urgence

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PARENT TOOLS

- Croup
- Gastro
- Procedural Pain
- Acute Otitis Media
- Fever
- Concussion
- Fracture

2016/2017 PARENT TOOLS

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- https://www.youtube.com/watch?v=Y2zQHpghexY&feature=youtu.be

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Recently updated topics

- DKA
- Gastroenteritis
- Sepsis

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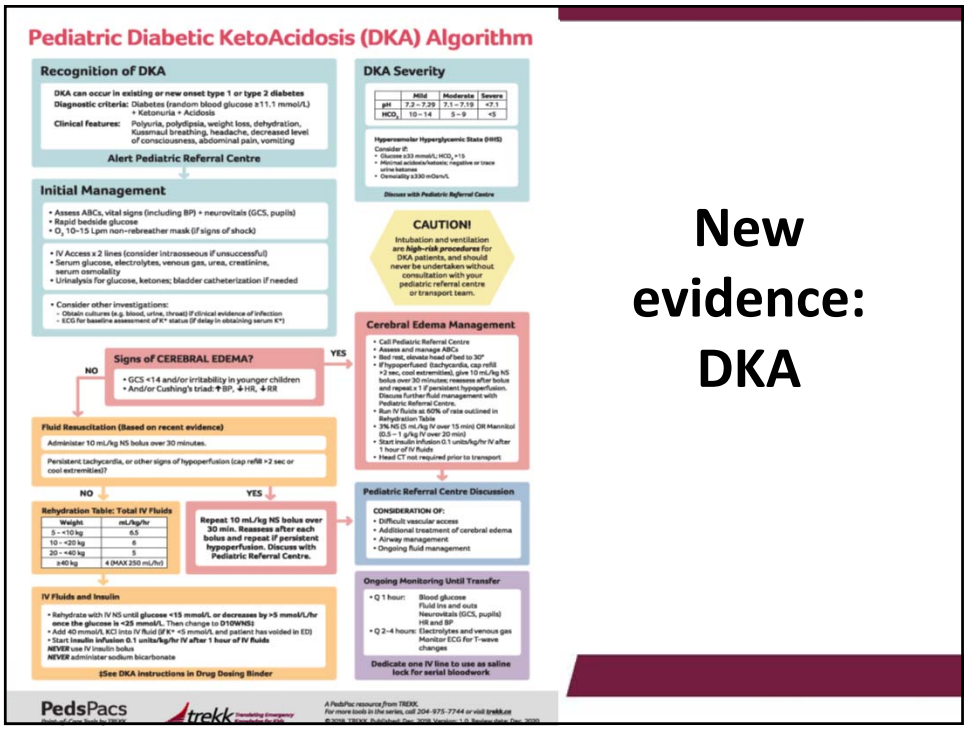

New evidence: DKA

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Fluid bolus for all patients in DKA (exception: cerebral edema)

- All patients are assessed for signs and symptoms of cerebral edema. If absent, ALL PATIENTS receive NS 10 cc/kg bolus over 30 minutes.
- If patient still has tachycardia, CR > 2seconds or cool extremities, a second bolus of 10 cc/kg NS is administered.

Kupperman, NEJM, June 2018

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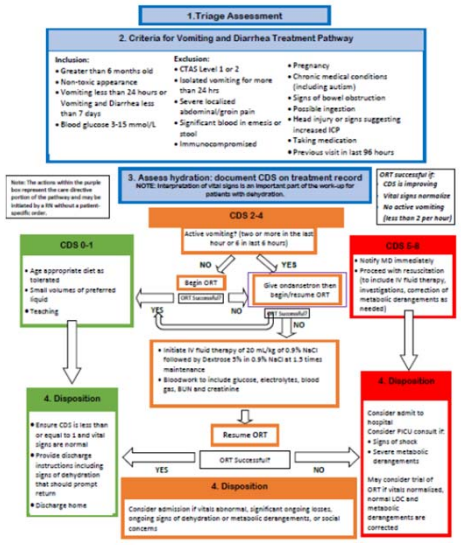

New evidence: Gastroenteritis

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It's as easy as 1-2-3 (ounces)

Age	Sip volume per 10 min
6 months-5 years	30
5-10 years	60
> 10 years	90

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Oral rehydration fluid choice

- ½ strength apple juice vs. apple flavored oral electrolyte solution
- 6 months to 60 months
- 647 kids, Single randomized, ondansetron used
- Treatment failure = any one of
  - IV therapy, Hospitalization, Unscheduled medical visit, Protracted symptoms, Crossover, 3% dehydration or more

Freedman, JAMA, 2016

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Ondansetron

- Used if oral rehydration fails
- Reduction in IV rehydration (NNT 5), hospitalization (NNT 17), ED length of stay
- No difference in return visits
- Increase in diarrhea frequency:
  - Single dose: 1.4 vs 0.5 stools
  - Multi-dose: 4.7 vs 1.4 stools

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Multi-dose ondansetron is not recommended!

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Thea's Story

- 7 months old
- Chicken pox x 3 days
- Today
  - Crying constantly
  - Fever
  - Area of redness around one of the spots
- Taken to after hours clinic
  - Prescribed antibiotics and sent home
  - *"The doctor did not even take her out of the stroller to examine her"*

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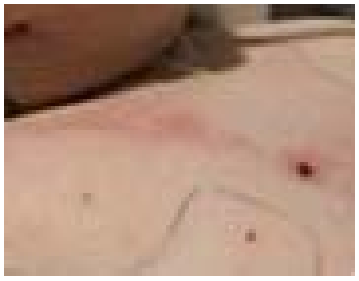
On arrival in triage:

- T 39.4, HR 168, RR 44, BP 70/35, Sat 94%
- Difficult to arouse
- Mottled, cap refill 5 sec
- Area of erythema on chest



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KM Processes

PedsPacs
Point-of-Care Tools by TREKK

Partnerships:

EMERGENCY MEDICINE CASES
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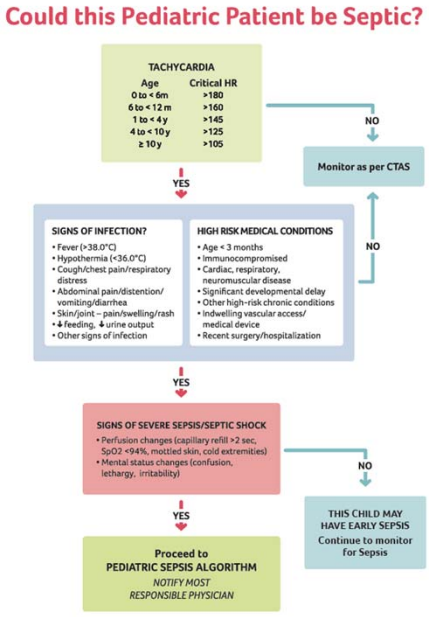
Sepsis
Triage Poster



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Could this patient be septic?

- Do they have a critical heart rate?
- If yes, are there signs of infection or a high risk medical condition?
- Are there signs of severe sepsis or shock?
  - Perfusion changes (CR>2 seconds, Sats <94%, mottled skin, cold extremities)
  - Mental status changes (confusion, lethargy, irritability)

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Diagnosis: Septic Shock

Sepsis Protocol

- Fluid Resuscitation
- Antibiotics
- Pressors

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High Risk Patient groups

- Pediatric patients with sepsis are likely to have an underlying co-morbidity (40 %)
  - Neuromuscular
  - Cardiac
  - Respiratory
  - Oncology
- Patients who have undergone recent surgery at high risk for sepsis too (27%)

Trends in the Epidemiology of Pediatric Severe Sepsis. Watson et al. Ped Crit Care Med 2013

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Sources of sepsis

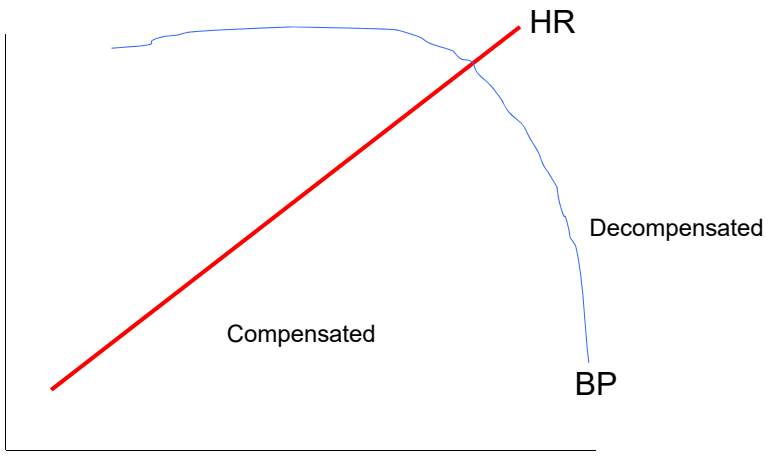
- Most common source of sepsis in kids= Respiratory (40%)
- Blood culture POSITIVE in only 26%

Weiss, Fitzgerald, Pappachan, et al.: Global Epidemiology of Pediatric Severe Sepsis: The Sepsis Prevalence, Outcomes, and Therapies Study. Am J Respir Crit Care Med Vol 191, Iss 10, pp 1147–1157, May 15, 2015

The Third International Consensus Definitions For Sepsis and Septic Shock (JAMA, 2016)

- **Sepsis: Life-threatening organ dysfunction caused by dysregulated host response to infection**
- **Septic shock: a subset of sepsis in which underlying circulatory and cellular metabolism abnormalities are profound enough to substantially increase mortality**

Shock in Kids



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Pediatric Heart Rate Guidelines

Age	Low	Normal	High
0 to <3 mo	<95	110 - 160	>180
3 to <6 mo	<105	120 - 160	>180
6 to <12 mo	<100	110 - 150	>160
1 to <4 y	<75	85 - 140	>145
4 to <10 y	<60	70 - 115	>125
≥10 y	<45	60 - 100	>105

Used with permission from the Canadian Triage and Acuity Scale National Working Group

CTAS·ÉCTG PedsPacs Point-of-Care Tools by TREKK trekk Translating Emergency Knowledge for Kids

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Hypotension

- Decompensated shock
- Late and often sudden finding

Pediatric Definition of Hypotension*

*Defined as < 5th percentile for age

Age	Systolic BP (mmHg)
Term neonate (0–28 days)	< 60
Infants (1 to 12 mo)	< 70
Children (1–10 years)	< 70 + (age in years x 2)
Children (>10 years)	< 90

Source: American Heart Association Inc.

PedsPacs Point-of-Care Tools by TREKK

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A PedsPac resource from TREKK.
For more tools in the series, call 204-975-7744 or visit trekk.ca

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Intervention

- Giving Fluid Fast
- Pressors for hemodynamic support
- Antibiotics WITHIN the first 60 minutes

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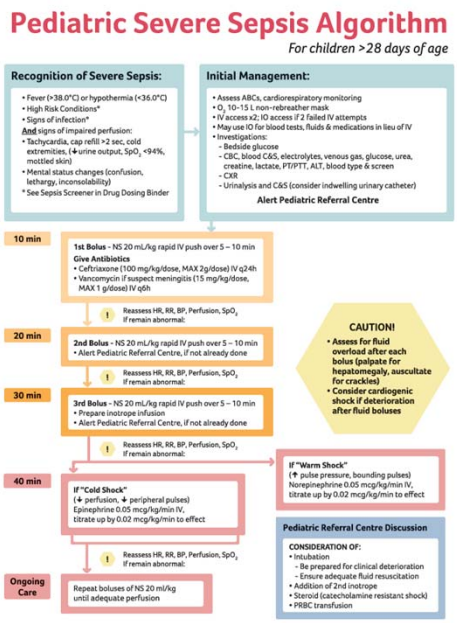
Sepsis Algorithm



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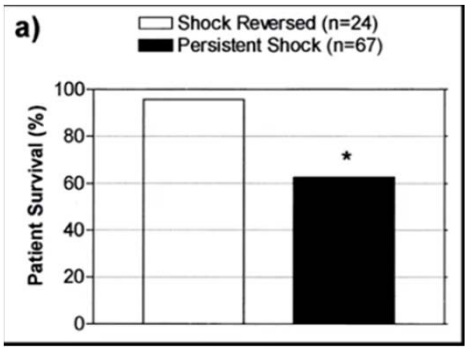
Patient Survival Related to EARLY Shock Reversal



When resuscitation practice was consistent with ACCM-PALS guidelines, a lower mortality was observed (8% vs 38%).

YY Han, et. al. Early *reversal* of pediatric-neonatal septic *shock* by community physicians is associated with improved outcome. Pediatrics. 2003 Oct;112(4):793-9.

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Giving Fluid Fast

- Babies/Toddlers < 20 kg
  - PUSH/PULL method
- Kids > 20 kg with IV 22 gauge or larger
  - Rapid infuser/Level 1 infuser
  - PUSH/PULL

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When the fluids don't work to correct the perfusion, move to inotropes!

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Can you give Epinephrine and Dopamine in a peripheral line?

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Review

- Fluid 20 cc/kg NS x 3
- Pressors
- Antibiotics

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Antibiotics

- Empiric antibiotics should be given within first hour
  - Blood cultures should be obtained before starting antibiotics but **should not cause delay** in antibiotics
  - Do not delay antibiotics while awaiting the LP
  - Ceftriaxone 100 mg/kg IV/IM q 24h
  - +/- Vancomycin 60 mg/kg/**24h** IV **divided** q6h

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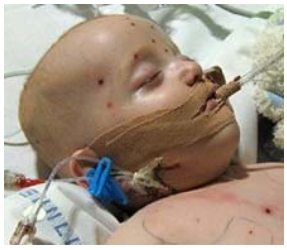
Thea's Story

- Received NS 20 ml/kg x 3, no improvement
- Dopamine started, no improvement
- Epinephrine started
- Intubated
- Admitted to ICU x 7 days
- Group A Strep Sepsis



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Free time outside a shift?

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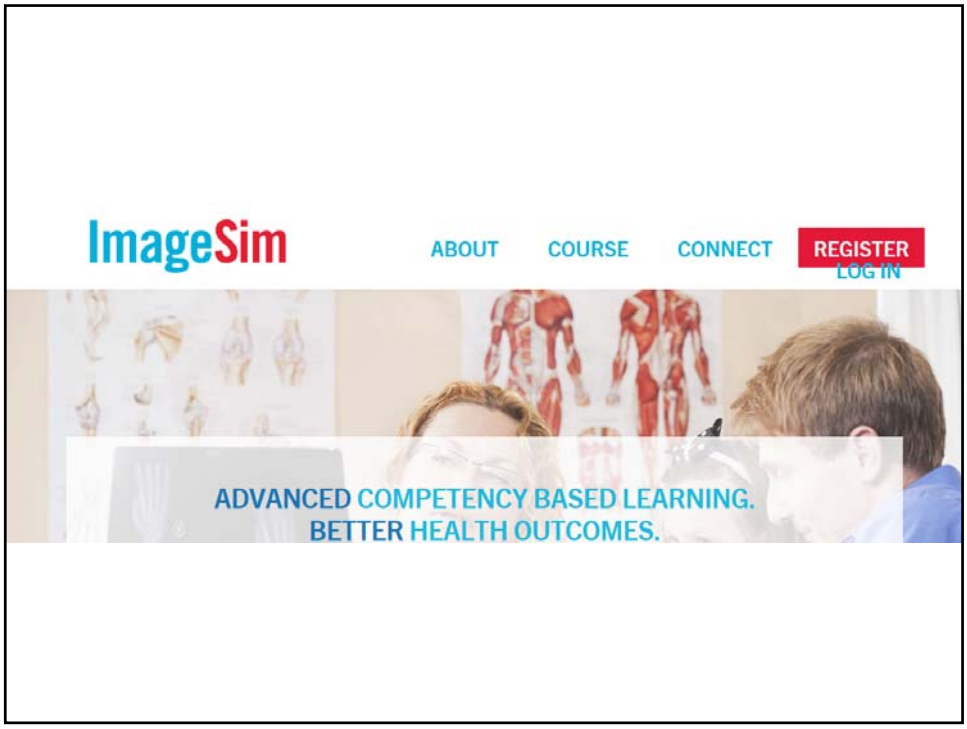
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ADVANCED COMPETENCY BASED LEARNING.
BETTER HEALTH OUTOMES.

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7 year old male fell off slide onto right arm. Pain and swelling of right elbow.
Select View
AP View
AP View
Lateral View
R
A fracture and/or dislocation is...
Definitely Absent
Probably Absent
Probably Present
Definitely Present
Submit
Toggle Markup
Toggle Dot
Bookmark Case
Leave Comment
There is a significant transverse fracture of the lateral epicondyle that extends into the articular surface. This is associated with joint effusion and marked soft tissue swelling. Distraction of the fracture fragment is seen with minimal posterior displacement. The radius and ulna are normal.
To zoom in, Right Click on the Image and select "Zoom In"
Working on D0178 - case 4 of 334 cases
Next Case

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Thank you

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