



What to Take Back to Your EMS Providers from Recent EMS Research

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Nodal PI, CHaMP Node of PECARN

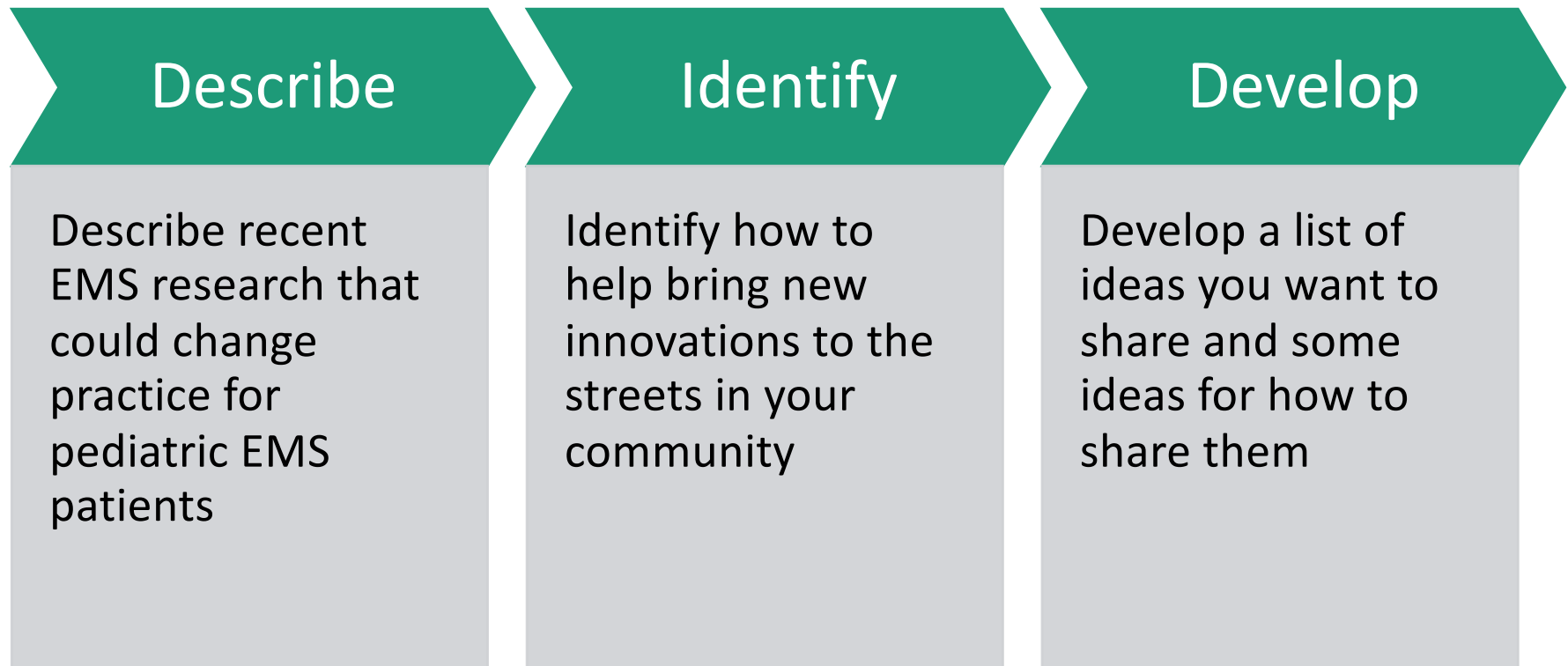
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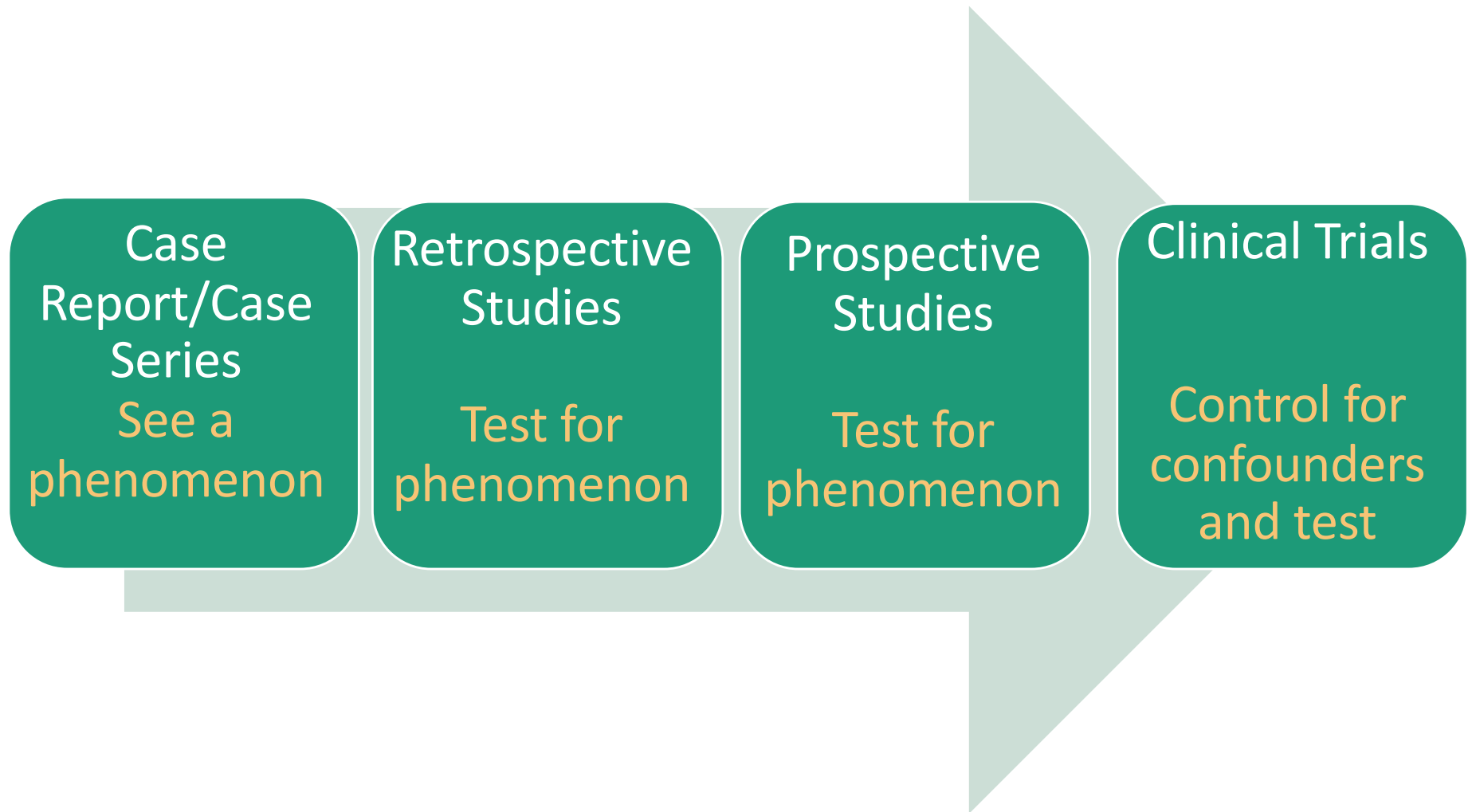
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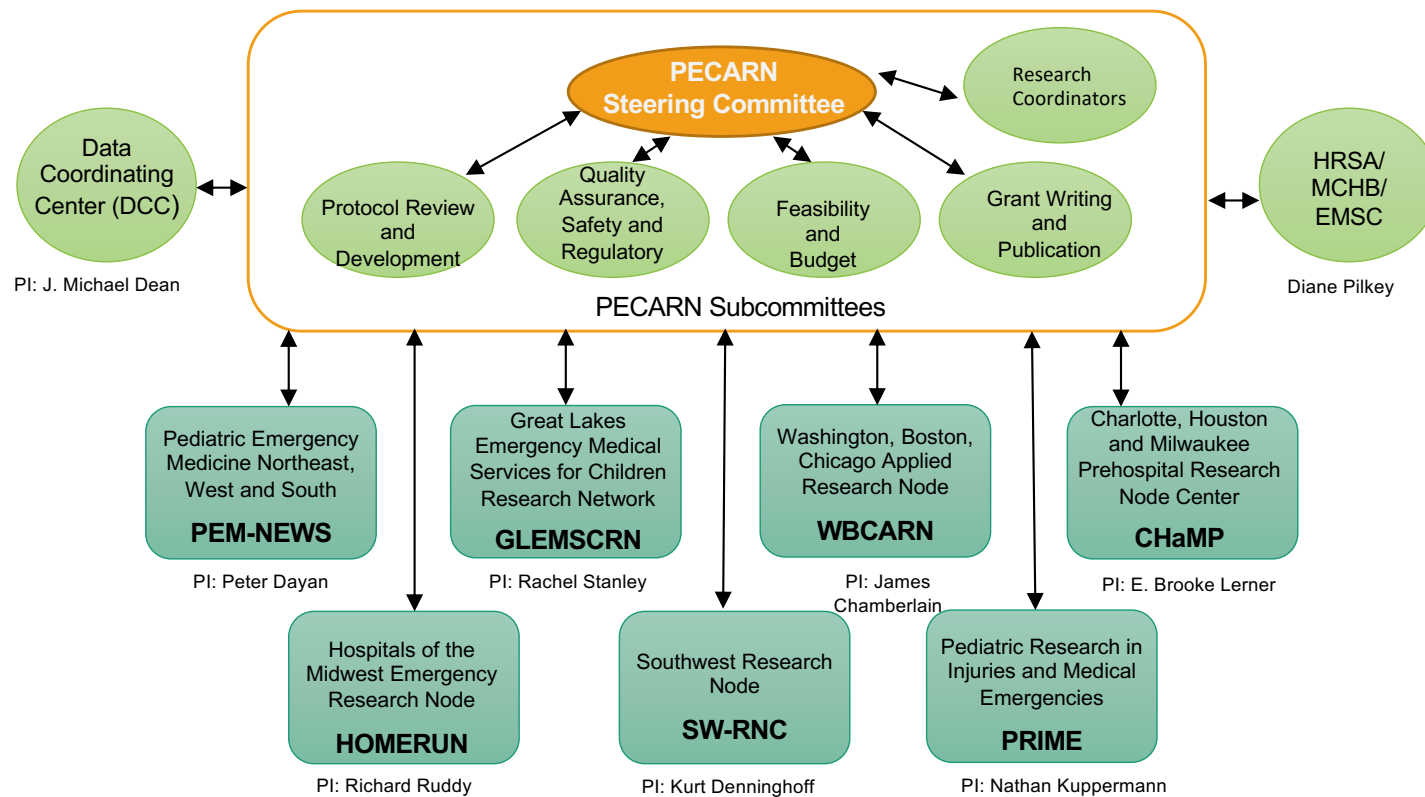
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- This information or content and conclusions are those of the author and should not be construed as the official position or policy of, nor should any endorsements be inferred by HRSA, HHS or the U.S. Government.

Objectives



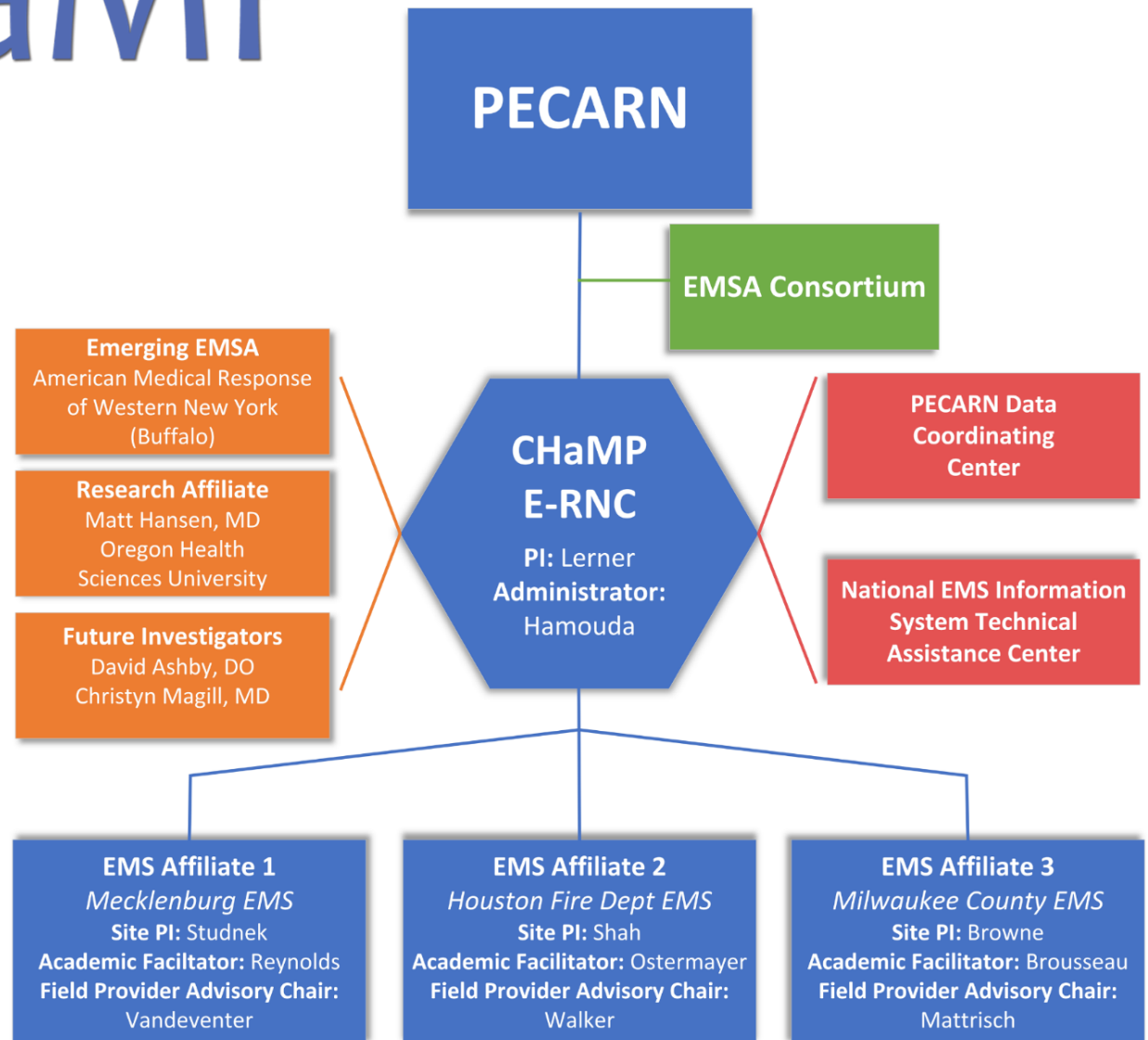
Evolution of Research

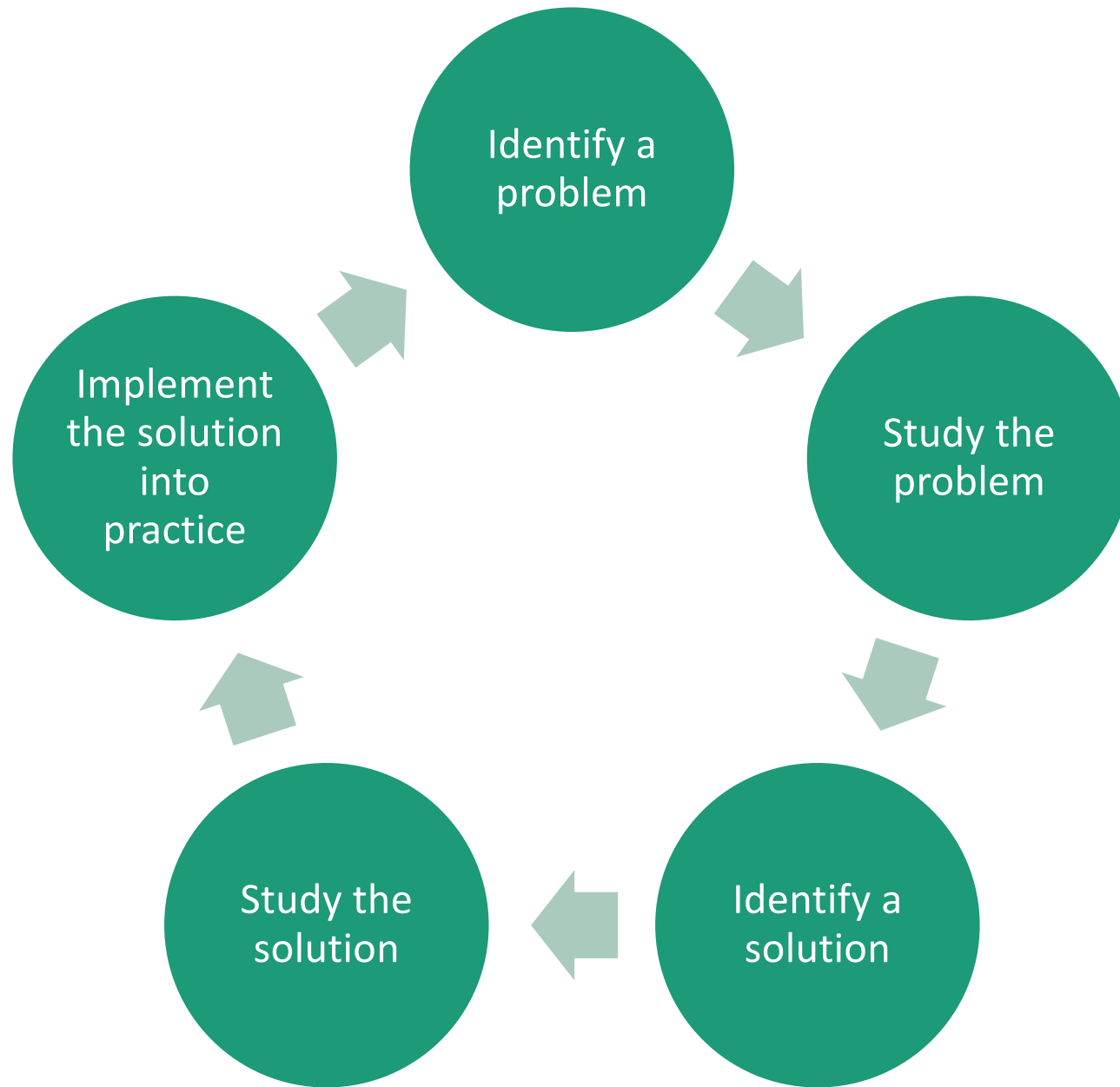


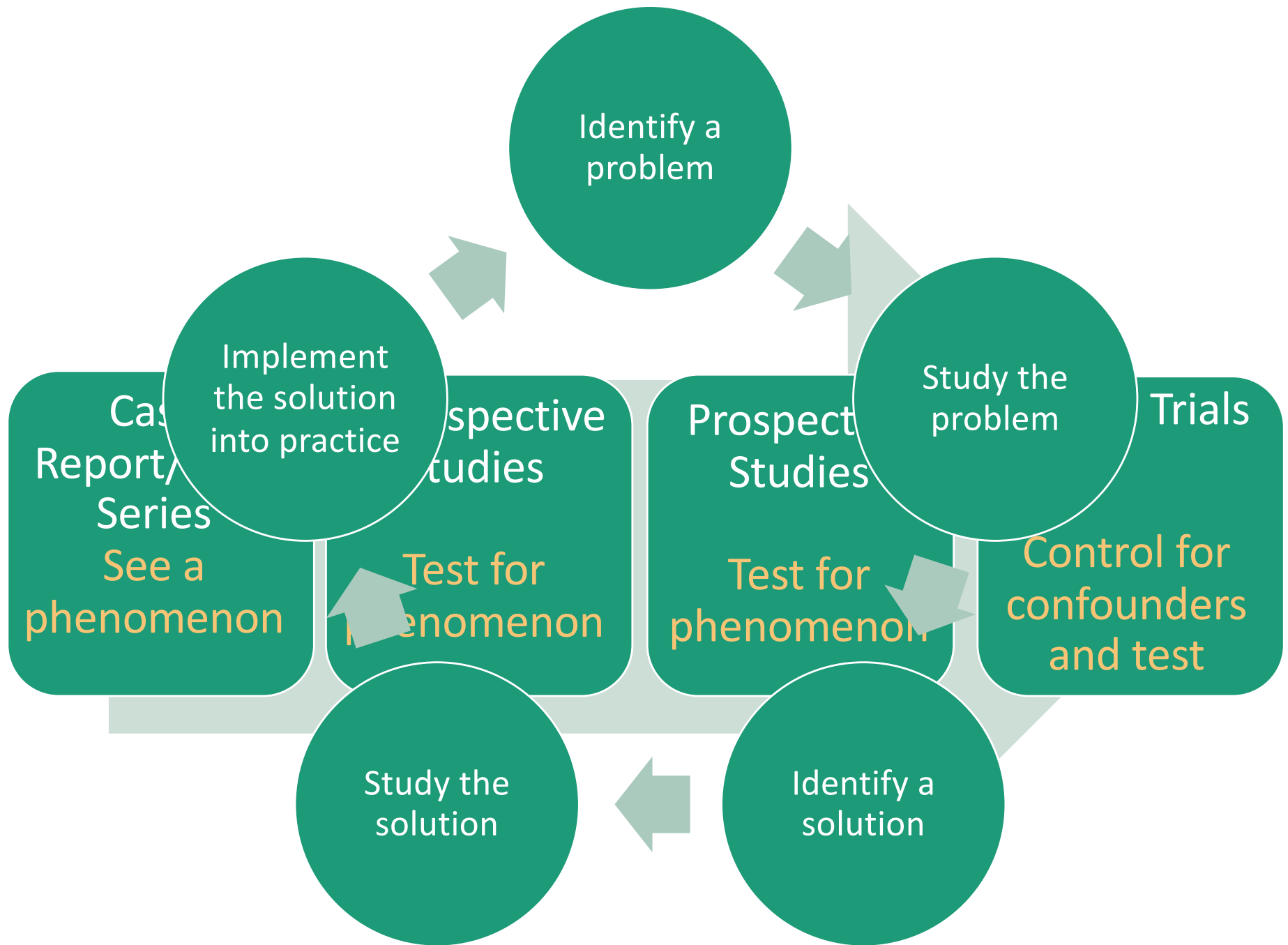


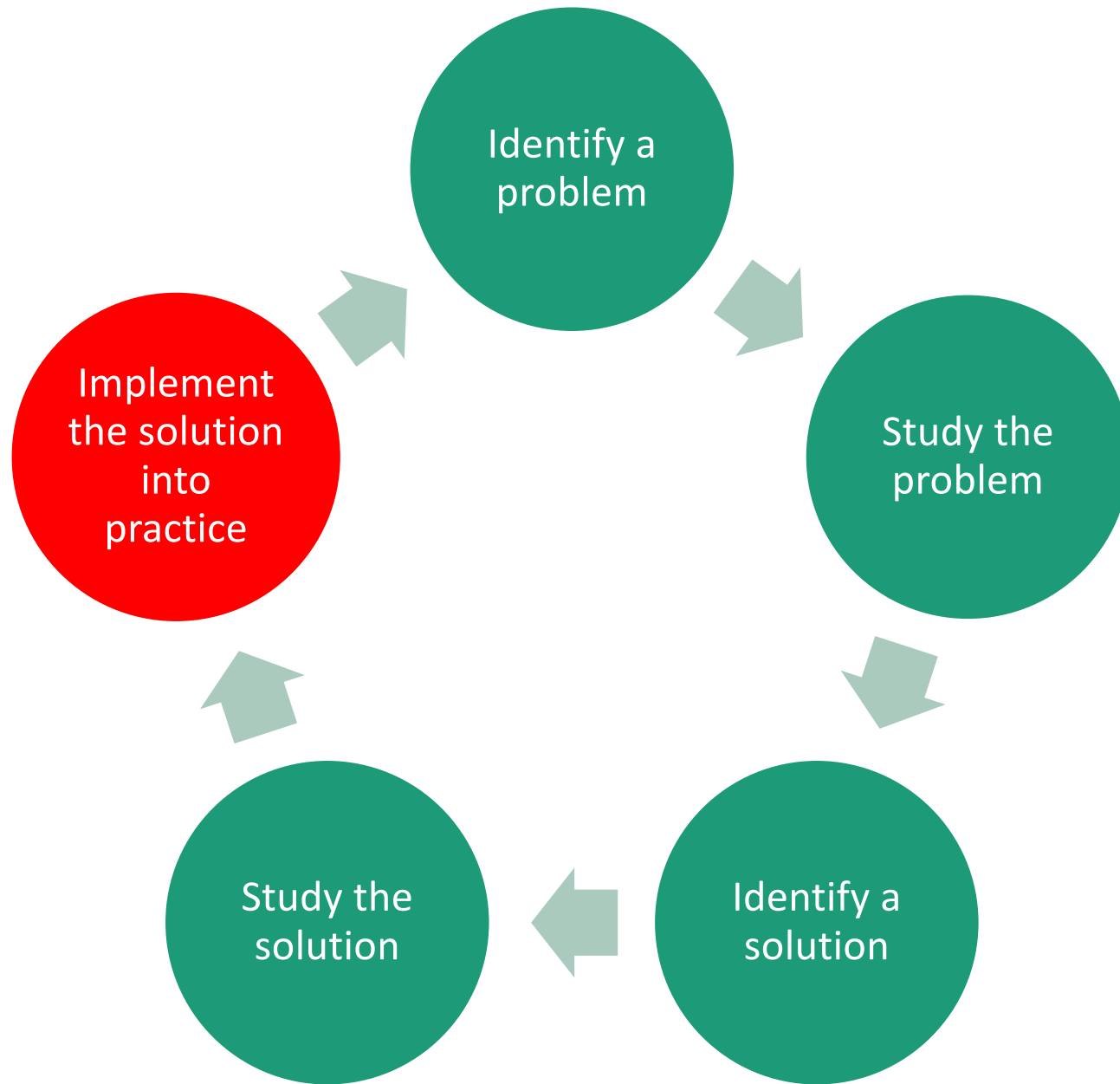


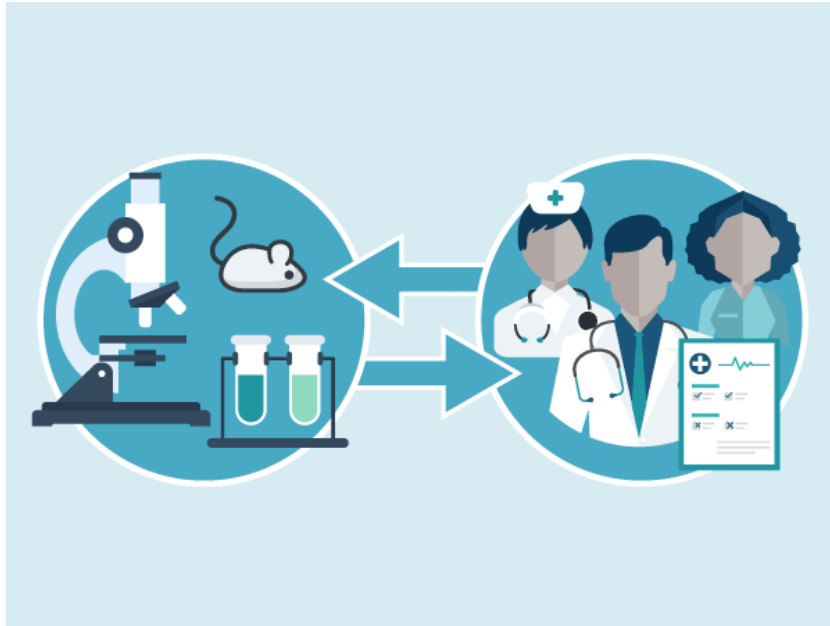
CHaMP











“There is no exact timeline for moving something from bench to bedside, and, although it typically takes anywhere from 10 to 15 years, it can be highly variable.”

Moving
from
Bench to
Bedside

In EMS?



2005 AHA guideline implementation

Netherlands 1.5 years

US ROC EMS agencies average of 416 days

Holland 1.5 years



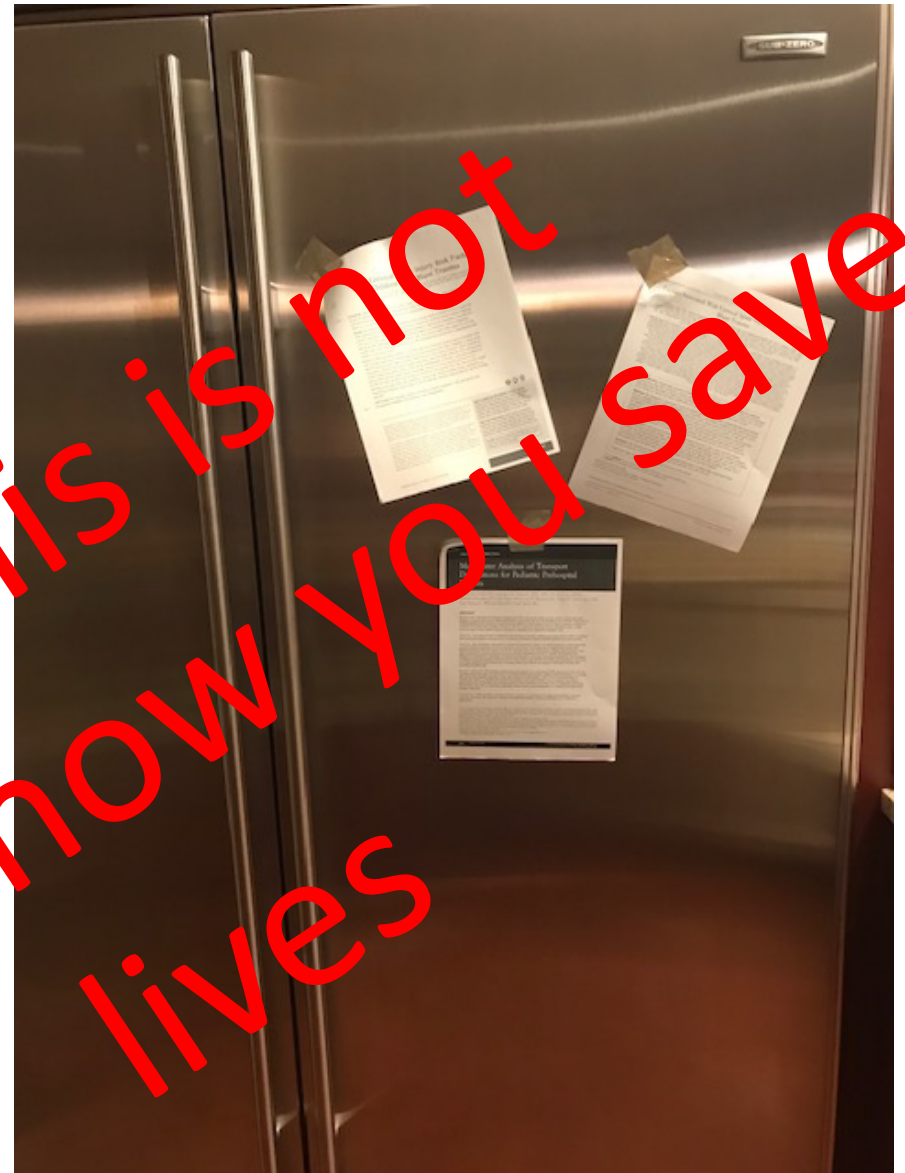
Trauma Triage Guidelines

In 2011, 7 states had implement the 2006 field triage guidelines

My Youth



Today



Researchers
need to
actively work
to bring
research
findings to
those who
implement
them

Policy makers

Leadership

Providers

Recent Pediatric Research

- C-Spine
- Seizure
- Prehospital Pain management
- Destination decision making

C-Spine

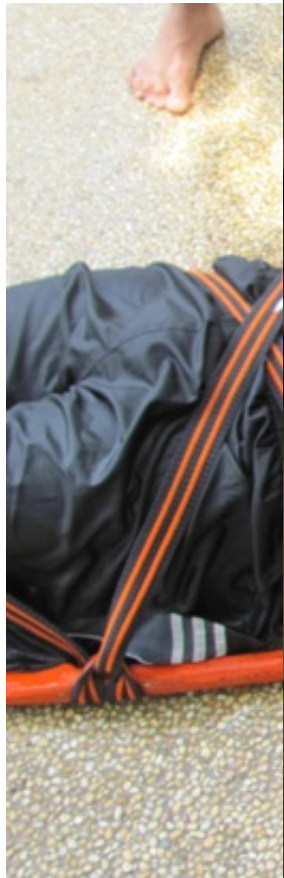
The problem:

- Cervical Spine Injuries have life-long consequences
- Poor management can result in worsening patient outcomes
- Diagnosing and managing injuries has risk

The need:

- Protect children who have a cervical spine injury without over treating those who don't

EMS in the 90's



Everybody gets boarded and collared after an injury

2000 C-Spine Revolution

- NEXUS less than 8 years old
 - 2.5% of 34,069 included
 - 1.5% of 818 with injury
- Canadian C-spine rule adults only

The New England Journal of Medicine

VALIDITY OF A SET OF CLINICAL CRITERIA TO RULE OUT INJURY TO THE CERVICAL SPINE IN PATIENTS WITH BLUNT TRAUMA

JEROME R. HOFFMAN, M.D., WILLIAM R. MOWER, M.D., PH.D., ALLAN B. WOLFSON, M.D., KNOX H. TODD, M.D., M.P.H., AND MICHAEL I. ZUCKER, M.D., FOR THE NATIONAL EMERGENCY X-RADIOGRAPHY UTILIZATION STUDY GROUP*

ABSTRACT

Background Because clinicians I cult cervical-spine injuries, they obta graphs for nearly all patients who pi trauma. Previous research suggests ical criteria (decision instrument) can who have an extremely low probabi who consequently have no need for

Methods We conducted a prospect al study of such a decision instrum across the United States. The decisic quired patients to meet five criteri classified as having a low probabl midline cervical tenderness, no foca icit, normal alertness, no intoxicat ful, distracting injury. We examined of the decision instrument in 34,069 derwent radiography of the cervical trauma.

ORIGINAL CONTRIBUTION

The Canadian C-Spine Rule for Radiography in Alert and Stable Trauma Patients

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MORE THAN 1 MILLION patients with blunt trauma and potential cervical spine (C-spine) injury are treated each year in US emergency departments (EDs).^{1,2} Among those patients presenting with intact neurological status (arriving either walking or by ambulance), the incidence of acute fracture or spinal injury is less than 1%.^{3,4} Due to concerns about potentially disabling spinal injuries, most clinicians make liberal use of C-spine radiography.^{5,6} Nevertheless, such practice is inefficient—more than 98% of C-spine radiographs are negative for fracture.

See also p 1893 and Patient Page.

Context High levels of variation and inefficiency exist in current clinical practice regarding use of cervical spine (C-spine) radiography in alert and stable trauma patients. **Objective** To derive a clinical decision rule that is highly sensitive for detecting acute C-spine injury and will allow emergency department (ED) physicians to be more selective in use of radiography in alert and stable trauma patients. **Design** Prospective cohort study conducted from October 1996 to April 1999, in which physicians evaluated patients for 20 standardized clinical findings prior to radiography. In some cases, a second physician performed independent interobserver assessments. **Setting** Ten EDs in large Canadian community and university hospitals. **Patients** Convenience sample of 8924 adults (mean age, 37 years) who presented to the ED with blunt trauma to the head/neck, stable vital signs, and a Glasgow Coma Scale score of 15. **Main Outcome Measure** Clinically important C-spine injury, evaluated by plain radiography, computed tomography, and a structured follow-up telephone interview. The clinical decision rule was derived using the κ coefficient, logistic regression analysis, and χ^2 recursive partitioning techniques. **Results** Among the study sample, 151 (1.7%) had important C-spine injury. The resultant model and final Canadian C-Spine Rule comprises 3 main questions: (1) is there any high-risk factor present that mandates radiography (ie, age ≥ 65 years, dangerous mechanism, or paresthesias in extremities)? (2) is there any low-risk factor present that allows safe assessment of range of motion (ie, simple rear-end motor vehicle collision, sitting position in ED, ambulatory at any time since injury, delayed onset of neck pain, or absence of midline C-spine tenderness)? and (3) is the patient able to actively rotate neck 45° to the left and right? By cross-validation, this rule had 100% sensitivity (95% confidence interval [CI], 98%–100%) and 42.5% specificity (95% CI, 40%–44%) for identifying 151 clinically important C-spine injuries. The potential radiography ordering rate would be 58.2%. **Conclusion** We have derived the Canadian C-Spine Rule, a highly sensitive decision rule for use of C-spine radiography in alert and stable trauma patients. If prospectively validated in other cohorts, this rule has the potential to significantly reduce practice variation and inefficiency in ED use of C-spine radiography. JAMA. 2001;286:1841–1848.

Furthermore, there is considerable practice variation among well-trained emergency physicians, with radiography rates ranging as much as 6-fold.¹¹ Cervical spine radiography is an example of a "little ticket" item, a low-cost procedure that significantly adds to health care costs due to its high volumes of use.^{10,19}

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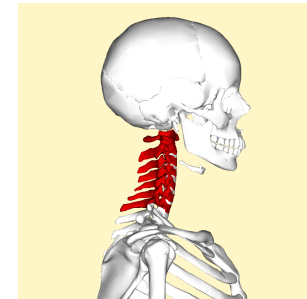
Study cervical spine injury in children

- Factors Associated with cervical spine injury in Children after blunt trauma
 - Annals of EM 2011
- Cervical Spine Injury Risk Factors in Children with Blunt Trauma
 - Pediatrics 2019

Studies continue

2018 Joint Position Statement

- Spinal Motion Restriction in Injured Children
 - Age alone should not be a factor in decision making for prehospital spinal care, both for the young child and the child who can reliably provide a history
 - Young children pose communication barriers, but this should not mandate SMR purely based on age
 - Based on the best available evidence from [PECARN studies](#), a cervical collar should be applied if the patient has:
 - Complains of neck pain
 - Torticollis (head turned sideways)
 - Neurologic deficit
 - Altered mental status
 - Involvement in a MVC, high impact diving injury, or substantial torso injury

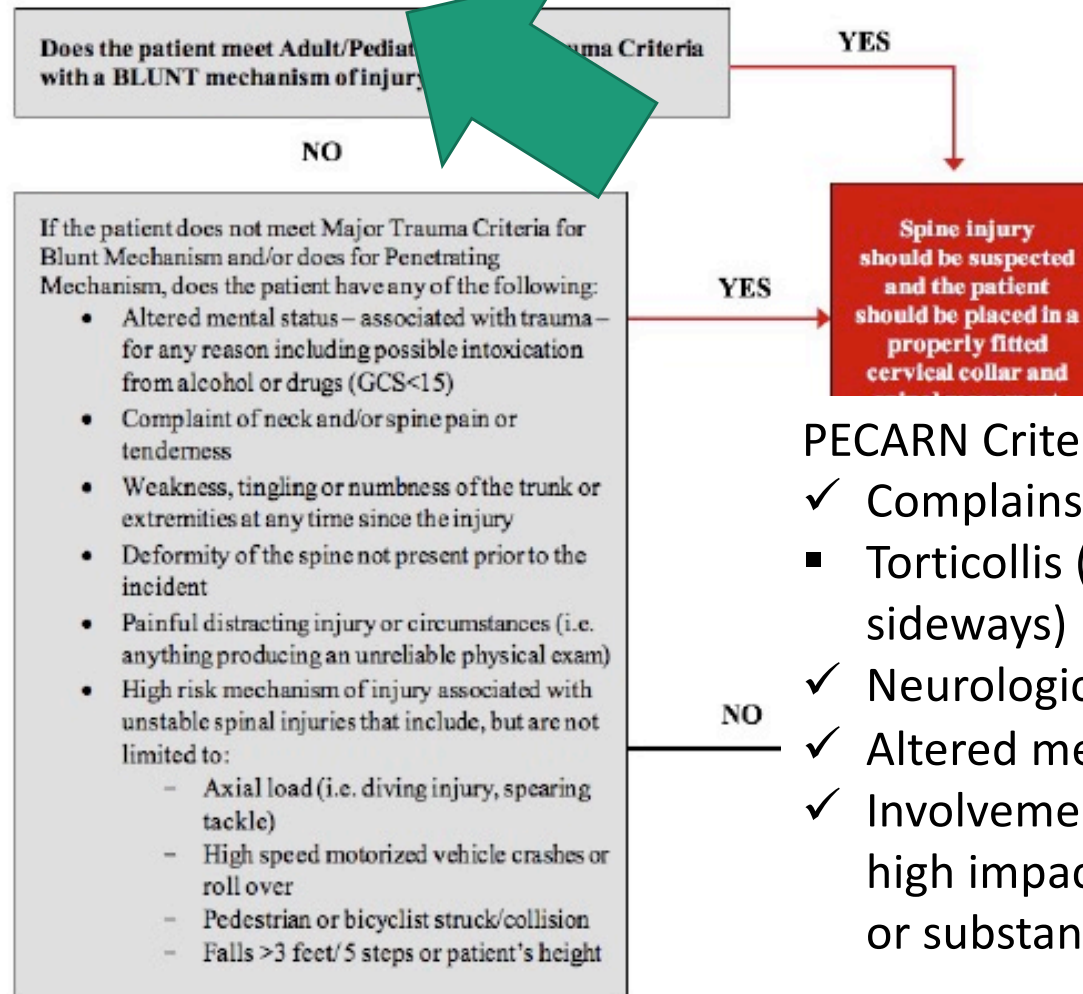


What does this
mean for your
community?

- Check the protocols

Suspected Spinal Injuries

Applies to adult and pediatric patients



KEY POINTS/CONSIDERATIONS

- Spinal movement can be minimized by application of a properly fitting rigid cervical collar and securing the patient to the EMS stretcher
- The head of the stretcher should not be elevated by more than 30 degrees
- When spinal motion restriction has been initiated and a higher level of care arrives, patients may be reassessed for spinal injury (per this protocol)
- When possible, the highest level of care on scene will determine if spinal motion restriction is to be used or discontinued (collar removed, etc.)

What does this
mean for your
community?

- ✓ Check the protocols
 - Are the protocols being followed?
 - How can you check?
 - Where would you look?

Look at the Numbers

Age (years)	0-10	11-17	18-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90
C-Spine Stabilization, Manual	546	1,307	965	2,745	2,210	2,013				

Not always easy “Better may be the enemy of good enough”

PECARN Criteria:

- Complains of neck pain
- Torticollis (head turned sideways)
- Neurologic deficit
- Altered mental status
- Involvement in a MVC, high impact diving injury, or substantial torso injury

What does this
mean for your
community?

- ✓ Check the protocols
- ✓ Are the protocols being followed?
 - How can you share this information/drive change
 - Newsletters
 - Lectures
 -

New Idea

- Recent UNC Targeted Issues Grant
 - Pediatric Performance Measures: Improving EMS Care for Time-Critical Illness and Injury (*Principal Investigator: Jane Brice, MD, MPH*)
 - *Using personalized benchmarking to drive change*
 - *Using social media to interact with providers*
 - *Looking forward to hearing the outcome*



Seizure

- Evidence-Based Guidelines published in 2014
- All active seizure peds patients
 - Check capillary blood glucose
 - If needed treat with IV dextrose or IM glucagon
 - Use buccal, IM, or intranasal benzodiazepines as first-line therapy for status epilepticus

What's happening in the field?

- Shah found:

	PediSTEPPs trained paramedics	Non-trained paramedics
Did not check blood glucose	28%	34%
Did not give midazolam	27%	34%

- 1/3 of patients still seizing on ED arrival
 - Likely due to under-dosing of medication -50% wrong dose and $\frac{3}{4}$ were under-dosed
 - Time to benzodiazepine administration was long 14 minutes on average

Why don't providers follow guidelines?

Qualitative study of paramedic adherence to protocols:

- Prehospital Emergency Care 2018
 - **Enablers:**
 - Training
 - Point of care references
 - Availability of multiple routes for treatment
 - **Barriers:**
 - Misconceptions on different treatment methods
 - Misconceptions on protocol for seizure management
 - Misconceptions about medication dosing and side effects
 - Language barriers/difficulty communicating with patients or their parents

Up next

- Quantitative study
- NIH application to improve seizure care
 - Age based dosing



Pain Management

Evidence-Based Guidelines published in 2014

- All patients considered for analgesia, regardless of transport interval
- Opioid medications should be considered for moderate to severe pain
- Reassess pain at frequent intervals using a standardized age-appropriate pain scale
- Re-dose if pain persists

What's happening in the field?

Current state of pediatric pain management

- 2 publications Prehospital Emergency Care 2016
- No significant change in pain severity assessment and documented opioid administration even after implementation of best-practice protocols
 - Opioid administration: 5% pre and 5% post
 - Pain scale documentation 18% pre and 18% post

Up next

- Taking the question to EMS providers
- After treatment ask for barriers and enablers of pain management
- Goal: develop an intervention and test its effectiveness



Destination Decision Making

- All EDs should be pediatric capable
 - Pediatric Readiness found not all are
 - Even those that are ready don't have some specialized resources
- EMS plays a role in destination decision making
 - Transport to an ED that is not capable of providing needed care can lead to treatment delays
 - Secondary transport can increase cost and risks

Where does EMS transport pediatric patients?

Current state of pediatric destination decisions

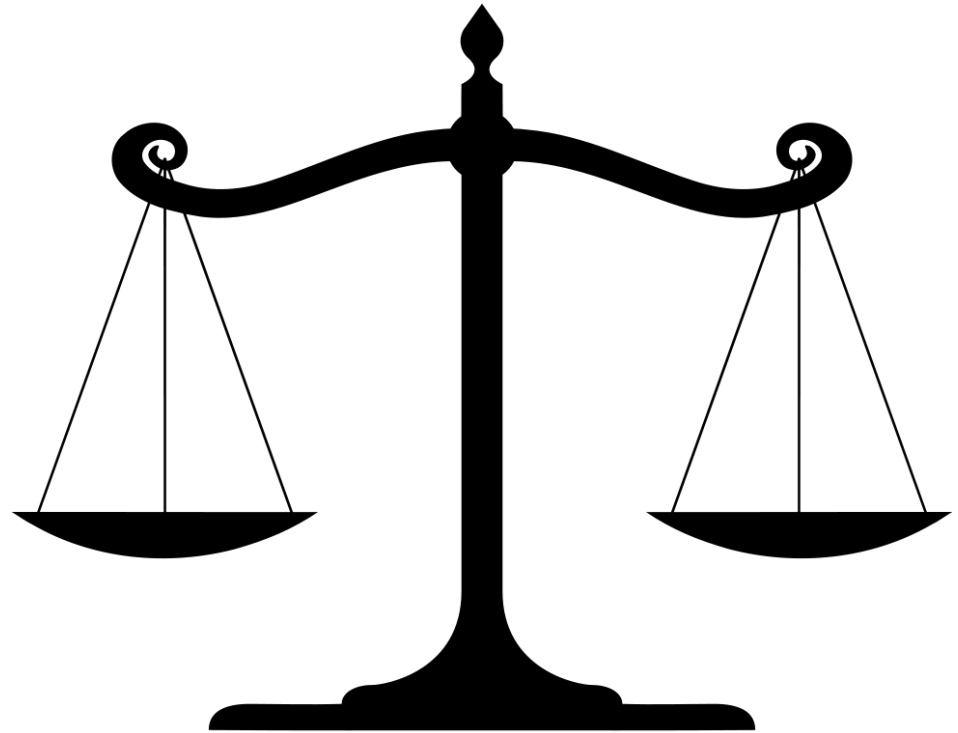
- 41,345 pediatric patients transported by EMS in 3 cities
 - 55% went to highest level pediatric hospital
 - 60% of those with potentially severe illness
 - 74% of those with potentially severe trauma
- Protocols would have all potentially severe traumas go to pediatric hospital
- Limited protocols for medical patients

Up next

- Can we create a triage guideline for children

What the heck?

- None of these stories have endings
- Need to balance never changing with constant change
- Culture needs to embrace change



Researchers need to bring research to users but
users need to find science too



Read

Prehospital Emergency Care

Prehospital and Disaster
Medicine

Create a pubmed search for
EMS and pediatric

Search for Blogs



Follow pod casts

NAEMSP pod cast

Search 10 best EMS pod casts



Follow social media

EMS agencies, organizations,
researchers, other



Follow review efforts

Let panels do the work for you

AHA guidelines

COMPAS

ACS-COT

others

No one likes change, but change is good, create a culture that values change

Conclusion

New findings should change practice

- Research should be used to improve care in your community

Changing practice is slow and hard

- All of us need to work together to speed up translation

Actively search for new findings

- Bring new findings back to your community

Questions?

For More Information on CHaMP

- Website: www.mcw.edu/champ



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