Research and Evidence-Based Guidelines in EMS

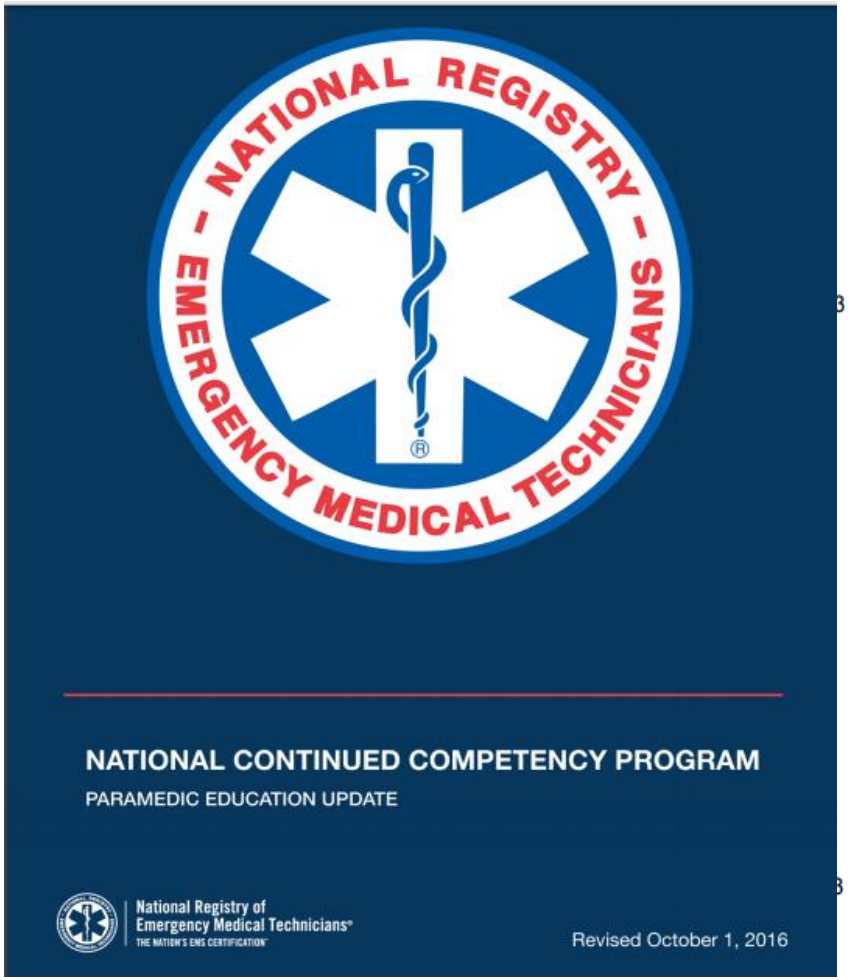
Prehospital Guidelines Consortium

Goals

Upon completion of this session, the participant will be able to:

- Describe evidence base medicine (EBM) or evidence based practice (EBP)
- Explain the value of research in EMS
- Explain the value and use of evidence-based guidelines (EBG)
- Describe the steps for creating an EBG
- Correctly incorporate EBGs into prehospital care

Knowledge of **research** and **evidence-based medicine** has become part of the National Registry's Core Competency Program



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Knowledge of **research** and **evidence-based medicine** has become part of the National Registry's Core Competency Program

- Neurological/Seizures Skills.....57
- Endocrine Emergencies- Diabetes.....58
- Endocrine Emergencies/ Diabetes Skills.....60
- Immunological Emergencies,
- Allergic Reaction & Anaphylaxis.....61
- Immunological Emergencies Skills.....62

Operations 63

- At Risk Population.....63
- At Risk Population Skills.....64
- Ambulance Safety.....65
- Ambulance Safety Skills.....67
- Field Triage- Disasters/MCIs.....68
- Field Triage Skills.....69
- Provider Hygiene, Safety, and Vaccinations.....70
- Hygiene Skills.....71
- Culture of Safety.....72
- Culture of Safety Skills.....73
- Pediatric Transport.....74
- Pediatric Transport Skills.....75
- Crew Resource Management.....76
- Crew Resource Management Skills.....78
- EMS Research.....79
- EMS Research Skills.....80
- Evidence Based Guidelines.....81
- Evidence Based Guideline Skills.....82

References 83

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National Registry of Emergency Medical Technicians®

PARAMEDICS
OPERATIONS
EVIDENCE BASED GUIDELINES
ADULT & PEDIATRIC PATIENTS: ½ HOUR

INSTRUCTOR PREPARATIONS

- [44]NASEMSO—*Statewide Implementation of an Evidence-Based Guideline*
- [45]NASEMSO—Statewide Implementation of an EBG: References
- [46]National Prehospital Evidence-based Guideline Model Process

LESSON OBJECTIVES

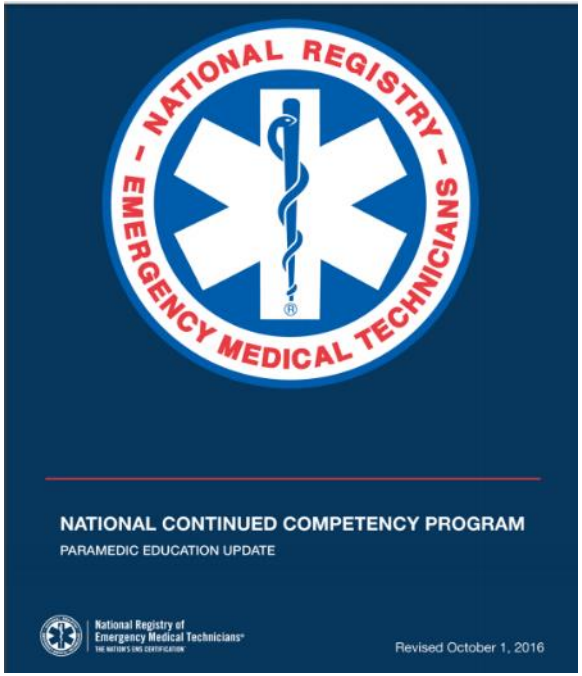
- Define evidenced based medicine and practice
- Identify resources available through NASEMSO to aid states and agencies in developing evidence based guidelines
- Explain the benefits of EBG to patients

LESSON CONTENT

I. Define evidenced based medicine and practice
   a. Statements developed through rigorous scientific inquiry that inform EMS systems, medical directors and EMS personnel on standards of care that have been vetted by research
   b. The National Prehospital Evidence-base Guideline Model Process has been approved by the Federal Interagency Committee on EMS and the National EMS Advisory Council
   c. The Process is cyclical in nature:
      i. System Inputs
      ii. EMS Evidence Accumulation & Evaluation
      iii. Establish Priorities for Guideline Development
      iv. EMS Protocol Development
      v. Dissemination of Guidelines/Protocols
      vi. Implementation
      vii. Evaluation of Effectiveness/Outcomes
      viii. EMS Evidence Accumulation
      ix. Repeat

II. Resources available to aide states and agencies in developing EBGs
   a. Resource: [44]NASEMSO—*Statewide Implementation of an Evidence-Based Guideline*
   b. NASEMSO was awarded a grant
      i. Focus on pediatric patients
         1. To implement an evidence-based guideline on pre-hospital pain management

III. Patients benefit from EBGs
   a. Ensures high quality patient management
      i. Standardized, consistent approach
      ii. Proven successful through expert practice and clinical evidence



PARAMEDIC EVIDENCE BASED GUIDELINES ACTIVITY	Successful	Unsuccessful
1. Create an outline or a synopsis of one or more of the following EMS Evidence Based Guidelines		
a. [47]An Evidence-based Guideline for Pediatric Prehospital Seizure Management Using Grade Methodology		
b. [48]An Evidence-based Guideline for Prehospital Analgesia in Trauma		
c. [49]An Evidence-based Guideline for the Air Medical Transportation of Prehospital Trauma Patients		
Documentation of successful completion of each skill must be maintained for each student in order to award full credit for this topic.		

Pages on evidence based guidelines from the NCCP guidelines

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What is evidence-based medicine?

Consider how many of our early practices have changed…

Compressions to ventilations ratio in CPR:

- 15:2
- 30:2
- Continuous

Tourniquets

- In favor → Out of favor → In favor

Military anti-shock trousers

Medications no longer used in cardiac arrest

- Atropine
- Bretyllium

What truths were these practices based on?

Has practice changed over the years?

Were there good things that changed?

How did these changes come about?

Usually someone asked…

“Why do we do it this way?”

“Is there a better way to do this?”

“What would happen if…?”

“How come…?”

“I saw this new product, should I…?

Then the group kept doing what they had been doing , or…..

They tried something new

Changed their practice

Shared their “findings”

Convinced others to change

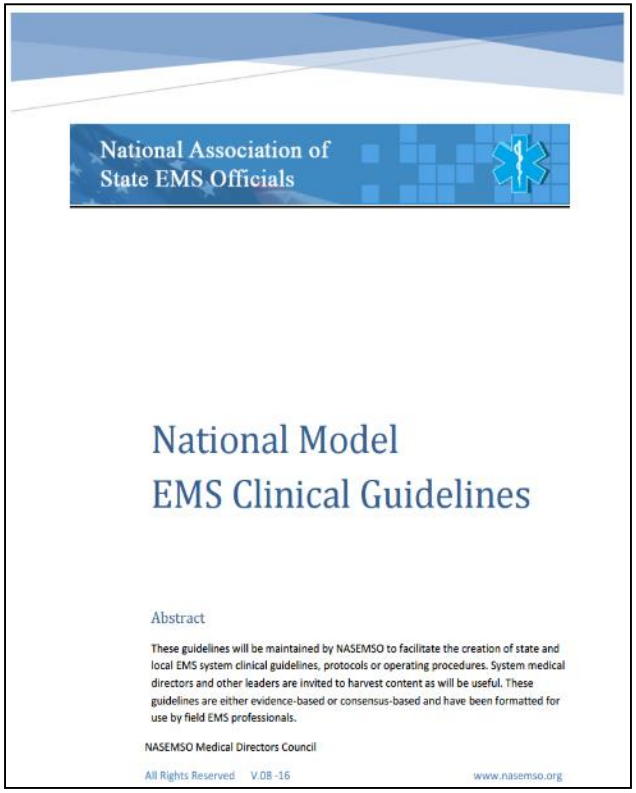
Some individuals have changed practice based on the success of a single study. Others changed their practice based on an aggregate of available evidence.

What is current EMS care is based on?

EMS protocols
- Developed locally, regionally, or statewide

EMS guidelines
- Evidence-based guidelines
- Expert or consensus-based guidelines

Position statements of national organizations
- Usually address individual topics, often related to potential controversy or differing opinion



NASEMSO's National Model EMS Clinical Guidelines
These are mostly expert consensus-based

Statewide EMS Protocols & Guidelines

Type of Protocols or Guidelines	No. States
Mandatory Statewide Protocols	21 (42%)
Optional Model Guidelines	17 (34%)
No Statewide Protocols/ Guidelines	12 (24%)

Kupas DF, et al. Characteristics of Statewide Protocols for Emergency Medical Services in the United States. Prehosp Emerg Care 2015;19:292-301.

Where did protocols or guidelines come from? Was there any “science” behind them?

Protocols and guidelines may be based on:

- Expert opinion
- Stakeholder consensus
- Review of research studies
- Evidence-based guidelines

Evidence-Based Guidelines for EMS

What is the issue?	How do EBGs help?
Wide variability in EMS care	Uniform recommendations leading to consistent prehospital care
Challenge of incorporating evidence into practice	Synthesize available evidence to advance quality of EMS
Lack of uniform measurements to assess the quality of prehospital care	Facilitate creation of standards for measuring quality of prehospital care

Only limited evidence-based guidelines exist for EMS

Evidence Based Guidelines…

…thoughtfully integrate best available **research findings**

…consider **clinical expertise** and **judgement**

…consider the **values and preferences** of patients and clinicians

…are NOT based solely on personal experience, anecdote, or “how we (always) do it”

Evidence-Based Guidelines aim to

Improve medical decisions and **quality** of care

Improve **clinical outcomes** for patients

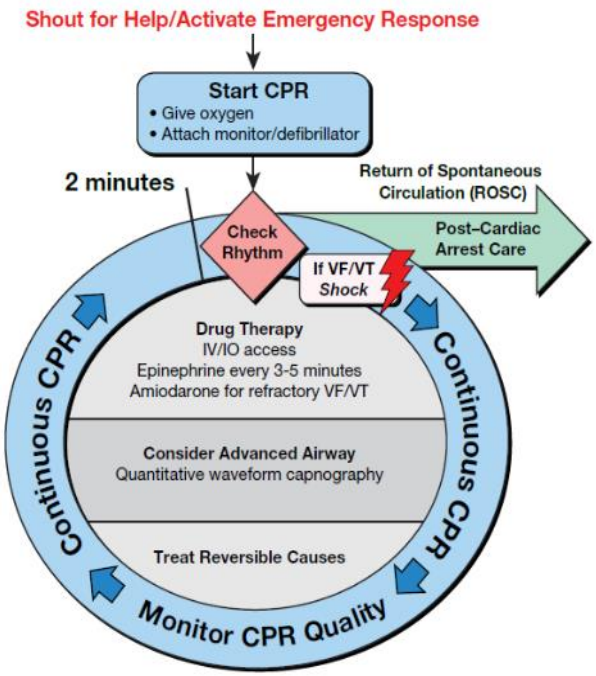
Improve **satisfaction** of clinicians as they deliver care to patients

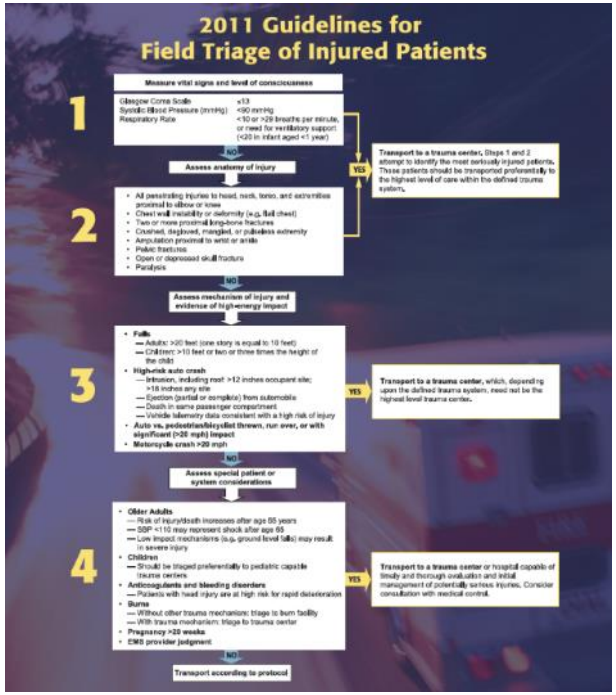
Provide consistency of care across clinicians and healthcare systems

Examples of Prehospital Evidence-Based Guidelines

American Heart Association®

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION





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Examples of Prehospital Evidence-Based Guidelines

An Evidence-Based Prehospital Guideline for External Hemorrhage Control: American College of Surgeons Committee on Trauma
Bulger EM et al. Prehosp Emerg Care 2014;18:163-173.

An Evidence-Based Guideline for Pediatric Prehospital Seizure Management Using GRADE Methodology
Shah M et. al. Prehosp Emerg Care 2014;18(Suppl 1):15-24.

An Evidence-Based Guideline for the Air Medical Transport of Prehospital Trauma Patients
Thomas SH et al. Prehosp Emerg Care 2014;18(Suppl1):35-44.

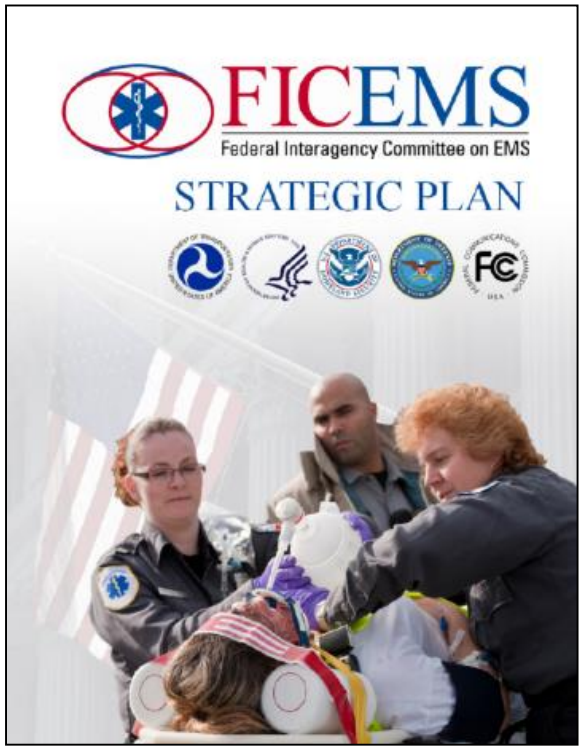
The Need for More Evidence-Based Medicine in EMS

NEMSAC Recommendations (2012)

1. Form relationships among stakeholders
2. Incorporate EBGs into EMS education
3. Develop strategies for defining outcomes, training EMS researchers, and creating funding sources
4. Create center(s) of excellence for EMS EBG development
5. Create a registry of current EBG efforts
6. Sustain the National EBG Model Process into Federal grant guidance language
7. Sponsor EBG scientific assemblies and workshops

National EMS Advisory Council: The Next Steps for Prehospital Care Evidence-Based Guidelines, 2012

FICEMS Strategic Plan (2013)



Goal 2: Data-driven and evidence-based EMS systems that promote improved patient care quality

- Objective 2. 1: Support the development, implementation, and evaluation of evidence-based guidelines (EBGs) according to the National Prehospital EBG Model Process
- Objective 2.3: Develop relationships with Federal and non-Federal stakeholders to support the development of scientific evidence for prehospital care

Federal Interagency Committee on EMS: Strategic Plan 2013

Research and EMS Care

Impact of Research on EMS Care

Resuscitation Outcomes Consortium

- Impact of CPR fraction
- 15:2 vs 30:2 for CPR
- Shock first vs CPR first
- Amiodarone, lidocaine, or placebo
- Hypertonic saline for traumatic shock and traumatic brain injury

Neurological Emergencies Treatment Trials (NETT)

- IV lorazepam vs IM midazolam for seizures

Impact of Research on EMS Care

nova scotia health authority

DALHOUSIE UNIVERSITY

EHS Emergency Health Services

Prehospital Evidence Based Practice

- Home
- Introduction
- PEP Database
- Methods
- FAQs
- What's New
- Presentations & Publications
- Appraisers
- Make a Suggestion
- Cochrane Corner
- Paramedic Evidence Based Practice Course
- Links of Interest
- Contact Us

- Disclaimer

Table of Contents

Acute Pain
- Analgesia

Advanced Airway Management
- Airway Confirmation
- Alternative Rescue Airway Management
- Intubation
- Medication for Airway Management

Airway Emergency
- Foreign Body Obstruction(Complete/Partial)
- Near Hanging

Allergic Reaction
- Anaphylaxis
- Mild Allergic Reaction

Altered Mental State-Dec. LOC
- Altered Mental Status (NYD)
- Hyperglycemia
- Hypoglycemia
- Seizure (Adult)

Burns
- Burns (fire/flame)
- Chemical Splash/Burn
- Electrocution/Electrical Burns
- Possible Airway Burns

Cardiac Arrest ^Top^
- General Cardiac Arrest Care
- PEA / Asystole
- Post-Cardiac Arrest Care
- Traumatic Arrest
- VF/VT-Pulseless (Shock Advised)

Cardiac Arrhythmia ^Top^
- Bradycardia
- Stable Narrow Complex Tachycardia
- Stable Wide Complex Tachycardia

https://emspep.cdha.nshealth.ca/TOC.aspx

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Impact of Research on EMS Care

<< Back

Spinal Injury

Last Reviewed: Jun 15, 2016

<< Back

Recommendation		RECOMMENDATION FOR INTERVENTION			
		SUPPORTIVE (Green)	NEUTRAL (Yellow)	AGAINST (Red)	NOT YET GRADED (White)
STRENGTH OF EVIDENCE FOR INTERVENTION	1 (strong evidence exists)	• In-line stabilization for intubation	• Steroid	• Cervical Collar • Long Spinal Immobilization Devices	• Hypertonic Saline
	2 (fair evidence exists)	• C-Spine Clearance • Scoop stretcher • Self Extrication		• Immobilization in Penetrating Trauma	
	3 (weak evidence exists)	• Leave Helmet in Place	• Spinal Precautions	• Short Extrication Devices (ex: KED)	

Interventions

Cervical Collar

Level	Direction	Primary Outcome	Reference
I	Opposes (Red)	ICP	Raphael J, Chotai R. Effects of the cervical collar on cere-brospinal fluid pressure. Anaesthesia 1994;49:437—9. Medline
II	Supportive (Green)	Cervical motion	Chandler DR, Nemejc C, Adkins RH, et al. Emergency cervical-spine immobilization. Ann Emerg Med 1992; 21(10):19-21 Medline
II	Supportive (Green)	Cervical motion	Podalsky S, Baraff LJ, Simon RR, Hoffman JR, Larmon B, Ablon W. Efficacy of cervical spine immobilization methods. J Trauma. 1983;23:461–5. Medline
II	Neutral (Yellow)	Measured (mm) cervical spine range of motion	Hostler D, Colburn D, Seitz SR. A comparison of three cervical immobilization devices. Prehosp Emerg Care. 2009;13(2):256-260. Medline
II	Opposes (Red)	Intracranial pressure	Davies G, Deakin C, Wilson A. The effect of a rigid collar onintracranial pressure. Injury 1996; 27:647-9.47. Medline
II	Opposes (Red)	ICP	Hunt K, Hallworth S, Smith M. The effects of rigid collarplacement on intracranial and cerebral perfusion pressures.Anaesthesia 2001;56:511—3.59 Medline
II	Opposes (Red)	ICP	Mobbs RJ, Stoodley MA, Fuller J. Effect of cervical hard col-lar on intracranial pressure after head injury. Aust N Z J Surg2002;72:389—91. Medline
III	Supportive (Green)	Cervical motion	Engsberg JR, Standeven JW, Shurtleff TL, Eggars JL, Shafer JS, Naunheim RS. Cervical spine motion during extrication. J Emerg Med 2013; 44:122–7. Medline
III	Supportive (Green)	Spinal movement	Kwan I, Bunn F. Effects of prehospital spinal immobilization: a systematic review of randomized trials on healthy subjects. Prehosp Disaster Med 2005 Jan-Feb;20(1):47-53. Medline
III	Neutral (Yellow)	Optimal type of immobilization, Ideal type of immobilization during AW management, morbidity of pts transported by EMS	Ahn H, Singh J, Nathens A, MacDonald RD, Travers A, Tallon J, et al. Pre-hospital care management of a potential spinal cord injured patient: a systematic review of the literature and evidence-based guidelines. J Neurotrauma 2011 Aug; 28(8):1341-61. Medline
III	Neutral (Yellow)	Ascending level of spinal injury in patients with acute spinal injury	Burney RE, Waggoner R, Maynard FM. Stabilization of spinal injury for early transfer. J Trauma 1989; 29:1497–9. Medline
III	Neutral (Yellow)	Optimal position for C-spine	De Lorenzo RA, Olson JE, Boska M, et al. Optimal positioning for cervical immobilization. Ann Emerg Med 1996; 28(3):301-8. Medline

https://emspep.cdha.nshealth.ca/LOE.aspx?VProtStr=Spinal%20Injury&VProtID=2

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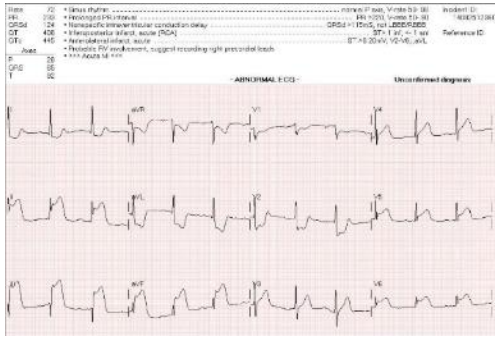
Impact of Research on EMS Care

Many other studies that have impacted our care:

Trauma triage

Bystander CPR & Resuscitation

Use of tourniquets



Prehospital activation of the cath lab

Performing Research

Scientific Method

- Ask a question
- Conduct literature review to seek answers
- Determine a hypothesis based on literature review
- Test the hypothesis
- Analyze the data to prove or disprove hypothesis
- Report findings, discuss limitations
- Refine hypothesis or adjust process and begin again

Quantitative Research

Uses the **scientific method**

Involves collecting **measurable data** with **statistical analysis**

Tests variables that may impact an outcome

May be:

- **Prospective** (e.g. randomized trials)
- **Retrospective** (i.e. using existing data)

Used to develop **evidence-based guidelines**

Qualitative Research

Often **observational**

Data are more descriptive instead of measurable

Best for generating questions and **explaining concepts** where there is no measurable data

e.g. Why do EMS providers choose to do things a certain way?

Types of research studies

Case Studies
I did something and it worked – or didn't

Case Series
I did something several times and it worked – or didn't

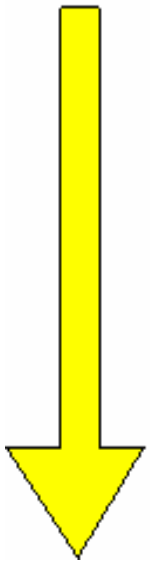
Cohort Studies
study cases with common characteristics to identify factors related to developing a disease or outcome

Case Control Studies
study cases with an outcome or intervention and compare to controls

Randomized Controlled Trials
study the random administration of an intervention or control

Types of research studies

Least certain



More Certain

Case Studies
I did something and it worked – or didn't

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study cases with common characteristics to identify factors related to developing a disease or outcome

Case Control Studies
study cases with an outcome or intervention and compare to controls

Randomized Controlled Trials
study the random administration of an intervention or control

Randomized Controlled Trials

The highest quality clinical study to test an intervention

Patients selected who meet specific criteria

Patients randomly assigned to either an intervention or a "control" group

Administer the intervention (and possibly a placebo)

Assess for difference in the outcome

Limitations of Randomized Controlled Trials

Sometimes we can't randomize to an intervention

Very costly

Time consuming

Requires large numbers of patients

May be unfeasible due to setting/environment

Requires more statistical analysis

Ethics in Research

History of unethical experimentation

- Nazi medical experimentation (1930s)
- Milgram experiments (1960s)
- Tuskegee syphilis study (1930-1972)

National Research Act (1974)

- Development of federal regulations for human subjects research
- Need for informed consent and IRBs

Belmont Report (1979) - Ethical standards for federal research

- Respect for persons
- Beneficence
- Justice

Ethics in EMS

Informed Consent

- Process of gaining permission from a subject for participation in research
- Difficult in the prehospital setting
- Waiver of informed consent possible for minimal risk studies

Exception From Informed Consent (EFIC)

- Allows interventional research without a waiver of consent
- Must be for a life threatening condition
- Consent must not feasible due to subject's medical condition
- Risk/benefit must be reasonable
- Requires community consultation and public disclosure

Challenges of EMS Research

Impediments to informed consent process

Randomization of interventions

Buy-in from EMS providers

Logistics

Continuity of medical records

Variability in documentation

Using Evidence-Based Guidelines

Evidence-Based Guidelines

Developed based on **systematic review** of all the available medical literature

Assist EMS systems, medical directors, and field personnel in making decisions about patient care

Address specific clinical questions

Ensure **high quality patient management**

What if we just read all of the published research and keep our practice current with the evidence?

Keeping track of all new evidence is almost impossible with the amount of literature being published!

A 2010 study indicated over 75 clinical trials and 11 systematic reviews were published *every day* in medicine

Even if one could read and digest each article in 10 minutes – that's over 14 hours a day*

* Bastian H, Glasziou P, Chalmers I (2010) Seventy-Five Trials and Eleven Systematic Reviews a Day: How Will We Ever Keep Up? PLoS Med 7(9): e1000326. doi:10.1371/journal.pmed.1000326. **Published:** September 21, 2010

Evidence-based guidelines help to:

1. **Decrease the amount of work that each individual must do** to be knowledgeable of all of the available medical evidence, including:
   - Prior guidelines
   - Systemic literature reviews
   - EBP summaries
   - Individual peer-reviewed research

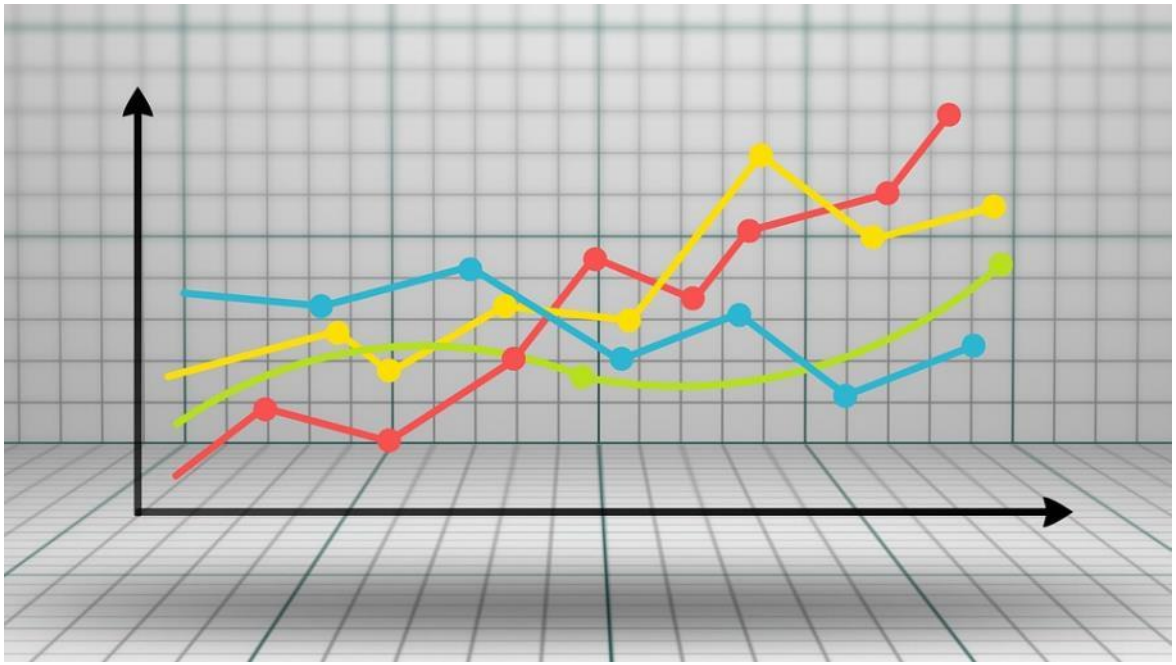
Evidence-based guidelines help to:

2. **Determine if something is worth incorporating into your practice**, based on:

- Critical look at currently available evidence
- Feasibility of implementation

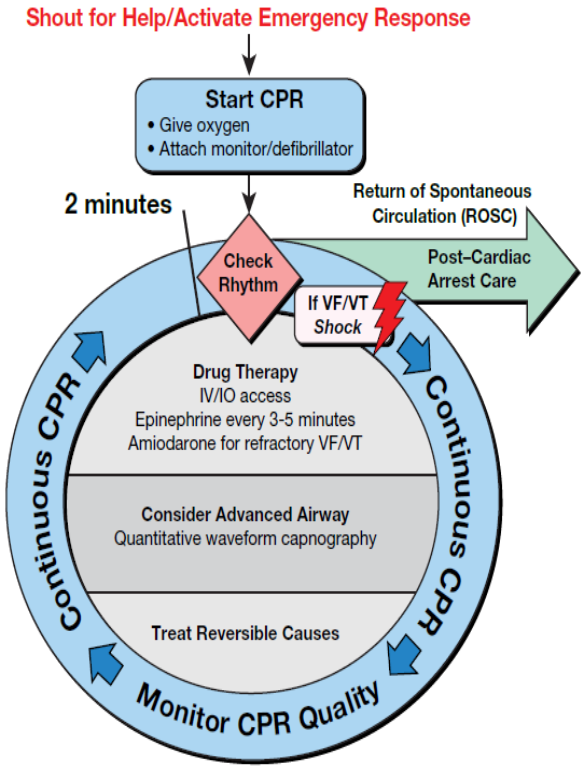
Evidence-based guidelines help to:

3. Review medical evidence to **answer questions that can directly improve patient outcomes**



Evidence-based guidelines help to:

4. Identify evidence-based **recommendations that help improve patient care**



Reprinted with permission
Web based Integrated 2010 & 2015 American Heart Association Guidelines for CPR & ECC Part 6: Adult ACLS

Evidence-Based Guidelines are useful

EBGs are promoted by:

- National organizations
- Insurers
- Accreditation bodies
- Others

How is an evidence-based guideline created and used?

From Evidence to Guidelines

Performing scientific studies

- Develop a research question
- Identify the patient population to study
- Carry out the study and data analysis
- Appropriately interpret the research findings

Synthesizing evidence from multiple studies

Developing recommendations

- Based on the best available scientific evidence
- Incorporating clinical judgement of experts
- Considering the values and preferences of the patients and clinicians

All of this takes a lot of resources, time, and effort

Multiple groups are engaged in creating evidence-based guidelines for EMS

Primary researchers in prehospital care

- Perform research that guidelines are based on

Evidence-based practice centers

- Synthesize the literature used by experts to create guidelines

Guideline development groups

- Often led by national organizations with broad stakeholder participation

Creating an evidence-based guideline begins with research that…

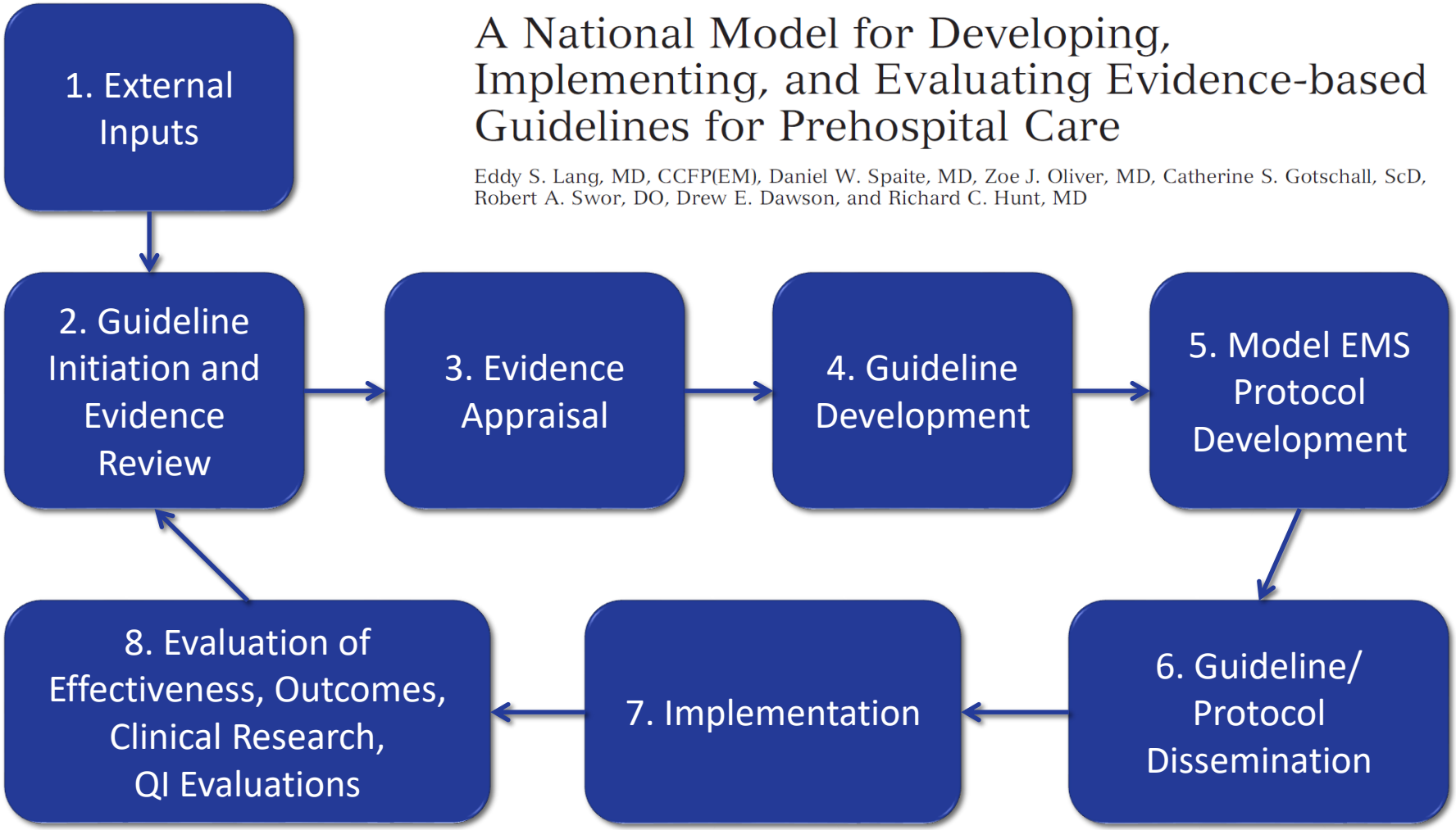
Must ask the right question(s)

Must involve the right population

Must analyze data accurately and without bias

Must allow conclusions that appropriately inform future practice

Creating an Evidence-Based Guideline



A National Model for Developing, Implementing, and Evaluating Evidence-based Guidelines for Prehospital Care

Eddy S. Lang, MD, CCFP(EM), Daniel W. Spaite, MD, Zoe J. Oliver, MD, Catherine S. Gotschall, ScD, Robert A. Swor, DO, Drew E. Dawson, and Richard C. Hunt, MD

Step 1: External Inputs

Identify what evidence already exists

- Existing prehospital guidelines
- Existing prehospital protocols
- Prehospital components of multidisciplinary guidelines

EMS scope of practice and educational standards

Input from EMS researchers and professionals

Step 2: Guideline Initiation and Evidence Review

Develop the question you are trying to answer

- Review of the existing literature will be guided by this question
- How you ask this question is of key importance

Examples of clinical questions:

- Should we use tourniquets to control hemorrhage?
- Should we administer aspirin to patients with chest pain?

Perform a review of the evidence based on your clinical questions

PICO questions focus your search

P	Patient or problem
I	Intervention or indication
C	Comparison or control
O	Outcome

Questions may be about:

Intervention or therapy

Diagnostic test or screening method

Prognosis

Risk factors

Clarifying the PICO Question

Patient
- Age, sex, conditions, numbers, etc.

Intervention/indication
- Clear description of what you are doing

Comparison or control
- What happens when you DO NOT do the action

Outcomes
- The impact you are trying to measure

Questions may address…

Interventions or therapies
- Best evaluated with randomized, controlled trials

Diagnostic tests
- Identify the ability of a tool to identify a disease

  e.g. Prehospital 12-lead

Risk factors for specific illness
- May identify the likelihood that a patient has serious illness

  e.g. trauma or stroke triage tools

Example PICO Questions

P

In prehospital patients age >35 years with chest pain,

I C

does administration of aspirin versus no aspirin

O

reduce mortality?

Example PICO Questions

P

In prehospital patients age >18 years with potential spinal injury,

I C

does placement of a cervical collar versus no cervical collar

O

reduce long term neurological deficits from spinal injuries

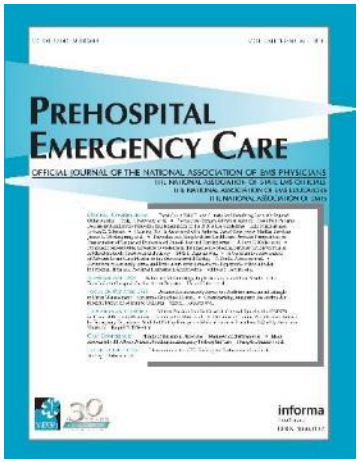
Performing a literature review

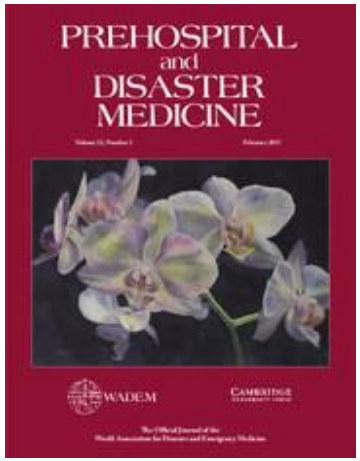
There are multiple resources for conducting a literature review

Existing research databases

Performing a literature review

Peer-reviewed literature





Trade publications

The Conscience of EMS JEMS JOURNAL OF EMERGENCY MEDICAL SERVICES ®

EMSWORLD®

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Step 3: Evaluating the Evidence

Must assess the quality of the evidence

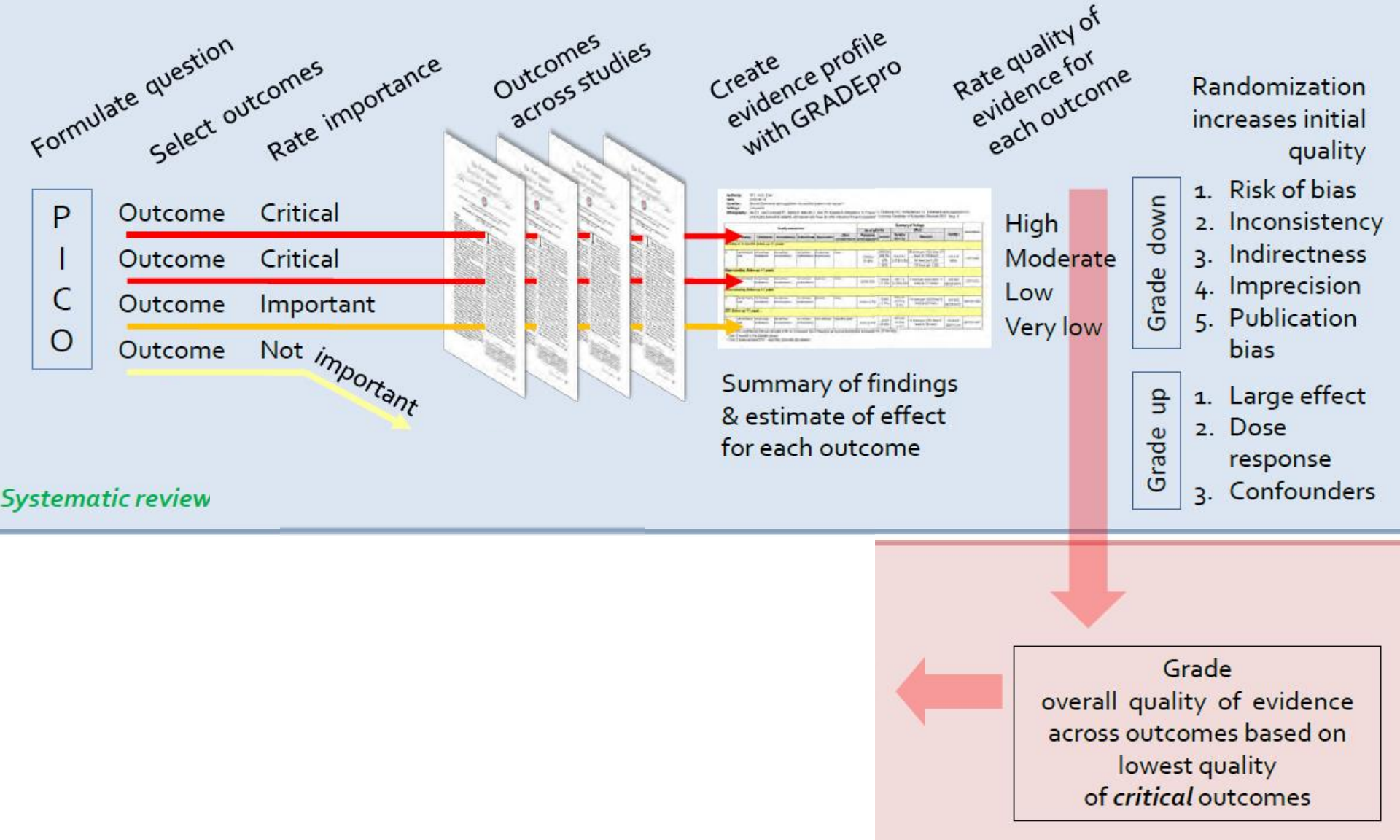
- Study design
- Risk of bias
- Does it address your population?
- Are the results consistent?

Using a systematic method of evidence appraisal is key

- E.g. the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) system

Summary OF GRADE Methodology

https://www.cdc.gov/vaccines/acip/recs/grade/downloads/guide-dev-grade.pdf



https://www.cdc.gov/vaccines/acip/recs/grade/downloads/guide-dev-grade.pdf

Formulate question

Select outcomes

Rate importance

Outcomes across studies

Create evidence profile with GRADEpro

Rate quality of evidence for each outcome

P
I
C
O

Outcome Critical

Outcome Critical

Outcome Important

Outcome Not important

Summary of findings & estimate of effect for each outcome

High
Moderate
Low
Very low

Randomization increases initial quality

Grade down

1. Risk of bias
2. Inconsistency
3. Indirectness
4. Imprecision
5. Publication bias

Grade up

1. Large effect
2. Dose response
3. Confounders

Systematic review

Guideline development

Formulate recommendations:

- For or against (direction)
- Strong or conditional/weak (strength)

By considering:

- ❑ Quality of evidence
- ❑ Balance benefits/harms
- ❑ Values and preferences

Revise if necessary by considering:

- ❑ Resource use (cost)

Grade overall quality of evidence across outcomes based on lowest quality of ***critical*** outcomes

- "We recommend using…"
- "We suggest using…"
- "We recommend against using…"
- "We suggest against using…"

Prehospital Guidelines Consortium

Step 4: Guideline Development

Usually involves a diverse expert panel involving input from multiple stakeholders, such as:

- EMS medical directors
- EMS professionals
- EMS administrators
- Patient representatives

Must weight the risks and benefits of interventions

Must account for the values and preferences of the population

Must put in the context of real-life EMS care

Step 5: Model EMS Protocols

Often created as part of the guideline development process

Facilitate easier implementation in EMS systems

May not be a one-size fits all

- Maybe one-size fits most?

May be used as a template that can be adapted to local practices

- Scope of practice
- Availability of personnel, medications and equipment
- Education and training needs

Step 6: Guideline Dissemination

Guidelines often published in peer-reviewed journals

- May not be read by the general EMS community
- Often not easily accessible to the general community

Stakeholder organizations help dissemination

- Education through standardized courses
- E.g. Advanced Cardiac Life Support, International Trauma Life Support

Step 7: Guideline Implementation

One of the greatest challenges to use of guidelines

Must consider:

- Buy-in or support from end-users
- Education and training
- New medications or equipment
- Funding for new initiatives

Implementing EBGs in EMS is Challenging!

Very challenging to change engrained practice

May implement something without changing practice

Equipment issues may be limiting

Funding may be limited or non-existent

Buy-in can’t be bought

May not have a mechanism to evaluate the impact of implementation

Remember when Implementing Change

EMS agencies require on average over 1 year to implement national guidelines such as cardiac arrest guidelines*

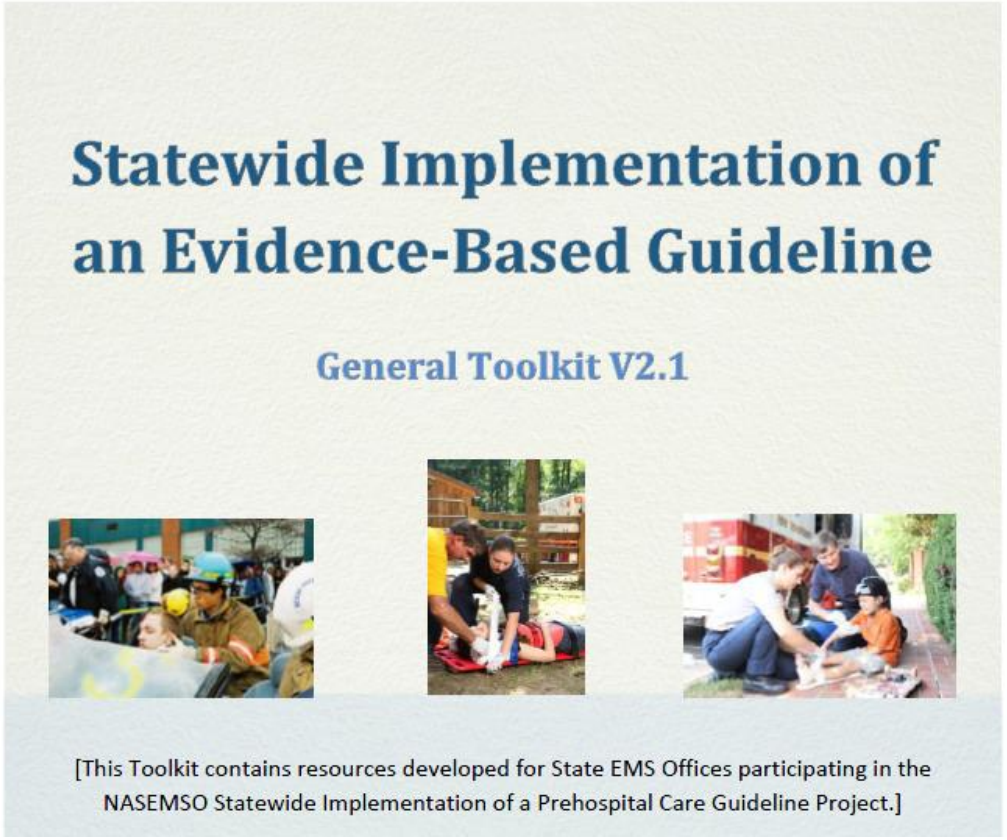
It may take up to 17 years for clinical research to make it into everyday practice**

Good evidence for the change can reduce resistance and decrease the time needed for full implementation

*Bigham et al. Delayed prehospital implementation of the 2005 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiac care. *Prehosp Emerg Care.* 2010;14(3):355-360.

**Balas EA, Boren SA. (2000) Managing clinical knowledge for health care improvement. In: Bemmel J, McCray AT, editors. Yearbook of Medical Informatics 2000: Patient-Centered Systems. Stuttgart, Germany: Schattauer Verlagsgesellschaft mbH; 2000:65-70.

Implementation Toolkits Can Help



Step 8: Evaluation

A critical component of the guideline process

Should evaluate whether a guideline:

- Was truly implemented (i.e. is it being used how it was intended)
- Is effective at positively impacting outcomes
- Is cost effective

National EMS Information System (NEMSIS)

National database used to store EMS data from the U.S.

Universal standard for patient care information from 911 responses

Funded through the National Highway Traffic Safety Administration (NHTSA)

Serves as a tool to facilitate evaluation of evidence-based guidelines

NEMSIS
Powered by NHTSA's Office of EMS

Cardiac Arrest Registry to Enhance Survival (CARES)

Program for standardized data collection for out-of-hospital cardiac arrest (OHCA)

Aims to help communities determine standardized outcome measures for OHCA

Can facilitate evaluation of implementation of guidelines related to OHCA

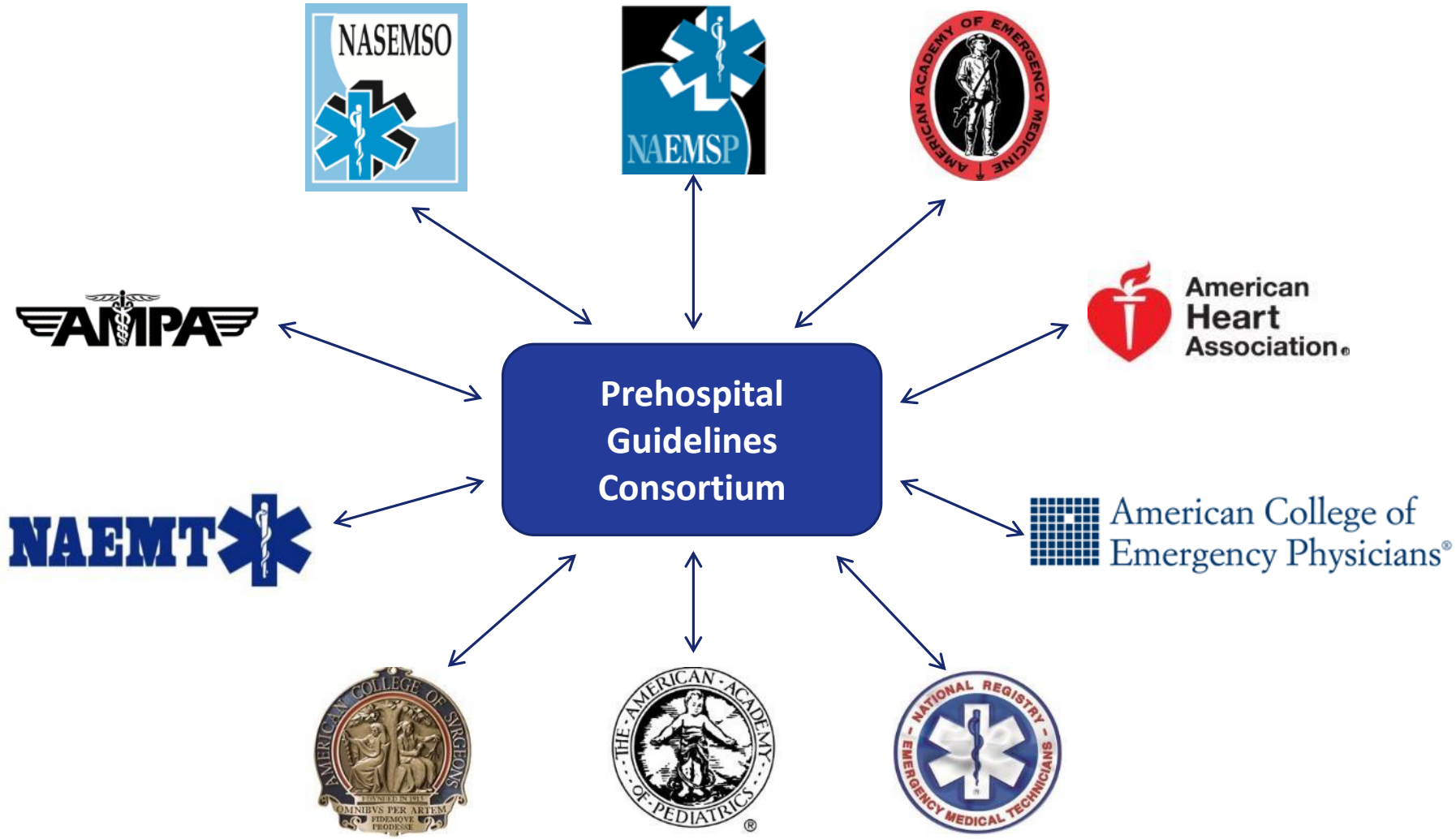
Ongoing Efforts to Promote Evidence-Based Practice

National Highway Traffic Safety Administration (NHTSA)

Supporting efforts to increase evidence-based medicine in EMS care

- Development of EMS evidence-based guidelines (EBGs)
- Implementation projects for prehospital EBGs
- National Prehospital Evidence-Based Guidelines Strategy

Many national organizations are engaged in developing and implementing prehospital EBGs



Where do I find more information on prehospital guidelines?

www.prehospitalguidelines.org