

# EMS Research

C. Mateo Garcia, MD

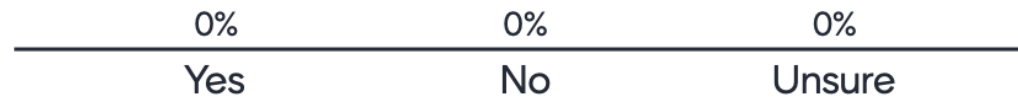


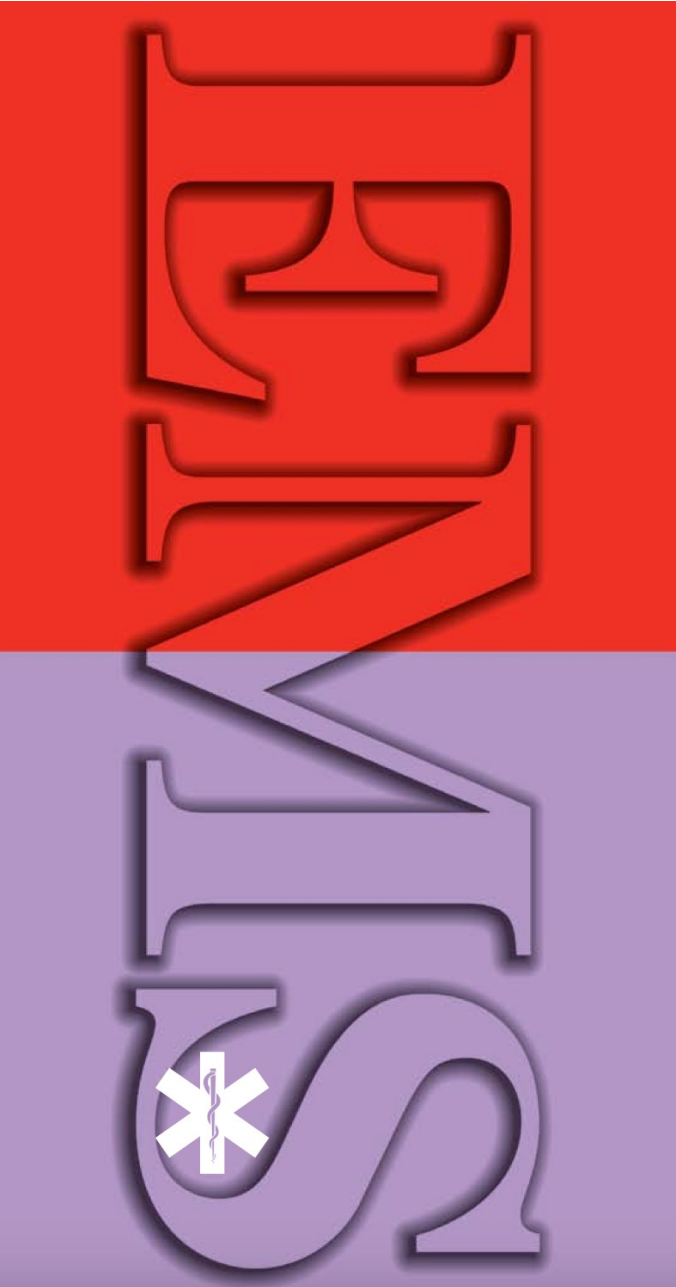
*“The future of EMS is indelibly linked to the future of EMS research. This reality provides EMS with its greatest opportunities, its greatest risks, and its greatest single need to depart from the ways of the past. EMS must grasp this quickly closing window of opportunity.”*

*Daniel W. Spaite, MD*

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# Have you utilized primary research articles to answer a clinical question?





EMERGENCY

MEDICAL

SERVICES

AGENDA

FOR

THE

FUTURE

# EXECUTIVE SUMMARY

During the past 30 years, emergency medical services (EMS) in the United States have experienced explosive development and growth. Yet initiatives to create a system to provide emergency medical care for the nation's population began with limited knowledge about what constituted the most efficient processes for delivering ideal resources to the spectrum of situations encountered by contemporary EMS.

The *EMS Agenda for the Future* provides an opportunity to examine what has been learned during the past three decades and create a vision for the future. This opportunity comes at an important time, when those agencies, organizations, and individuals that affect EMS are evaluating its role in the context of a rapidly evolving health care system.

The *EMS Agenda for the Future* project was supported by the National Highway Traffic Safety Administration and the Health Resources and Services Administration, Maternal and Child Health Bureau. This document focuses on aspects of EMS related to emergency care

They are:

- Integration of Health Services
- EMS Research
- Legislation and Regulation
- System Finance
- Human Resources
- Medical Direction
- Education Systems
- Public Education
- Prevention
- Public Access
- Communication Systems
- Clinical Care
- Information Systems
- Evaluation

Currently there are five major impediments to the development of quality EMS research:

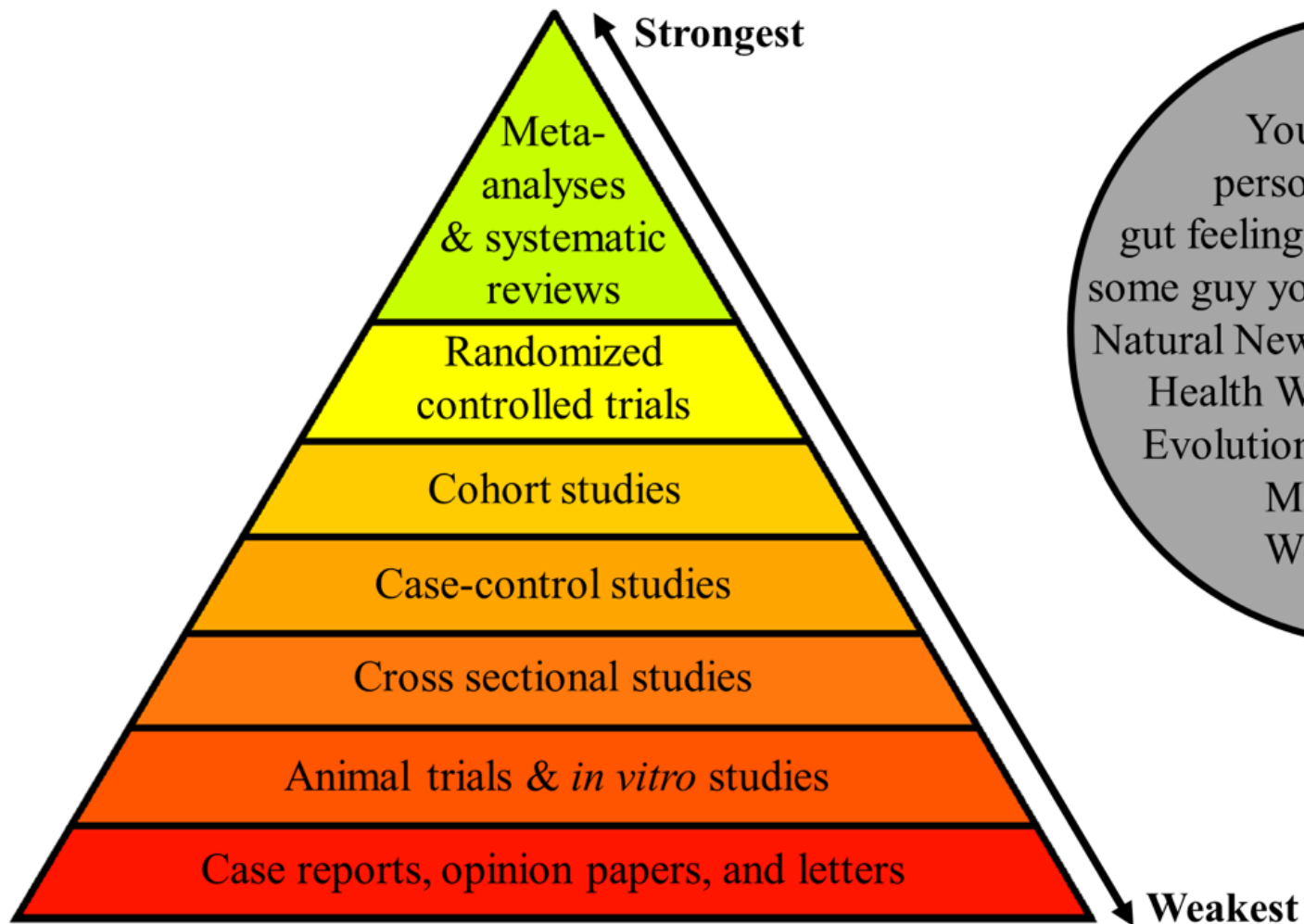
- \* inadequate funding
- \* lack of integrated information systems that provide for meaningful linkage with patient outcomes
- \* paucity of academic research institutions with long-term commitments to EMS systems research
- \* overly restrictive informed consent interpretations
- \* lack of education and appreciation by EMS personnel regarding the importance of EMS research.

## **EMS RESEARCH:**

- ✦ Allocate federal and state funds for a major EMS systems research thrust
- ✦ Develop information systems that provide linkage between various public safety services and other health care providers
- ✦ Develop academic institutional commitments to EMS-related research
- ✦ Interpret informed consent rules to allow for the clinical and environmental circumstances inherent in conducting credible EMS research
- ✦ Develop involvement and/or support of EMS research by all those responsible for EMS structure, processes, and/or outcomes
- ✦ Designate EMS as a physician subspecialty, and a subspecialty for other health professions
- ✦ Include research related objectives in the education processes of EMS providers and managers
- ✦ Enhance the quality of published EMS research
- ✦ Develop collaborative relationships between EMS systems, medical schools, other academic institutions, and private foundations



## Hierarchy of Scientific Evidence



## Not Scientific Evidence

Youtube videos, personal anecdotes, gut feelings, parental instincts, some guy you know, websites like Natural News, Info Wars, Natural Health Warriors, Collective Evolution, Green Med Info, Mercola.com, Whale.to, etc.

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What are the current "EMS Research Resources" you use?

1 response

Jems



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FAKE NEWS!!

*Don't trust  
everything  
you read*

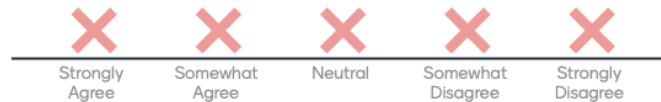


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 Mentimeter

# I feel Confident critically appraising literature to answer my questions?

None of the options are correct!



# PICOT Framework

P

**POPULATION**

What is the target population?



I

**INTERVENTION**

What is the intervention (treatment, diagnostic test or procedure)?



C

**COMPARISON**

Is there a control group or comparison for the intervention?



O

**OUTCOME**

What are the outcomes of the study?



T

**TIME**

What is the time frame for the study? What is the appropriate follow-up time to assess outcome?



EXCLUSIVE EMS FEATURES, COLUMNS,  
AND OPINIONS

SIGN UP



Patient Care

# As Pacific Northwest Fentanyl Crisis Surges, Officials Grapple with How to Curb It

*Recent figures estimate that more than 78,000 people died nationwide from overdoses involving synthetic opioids in the 12 months ending June 2023.*

Associated Press

12.14.2023

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# Epinephrine dosing frequency for cardiac arrest?

- Population
- Intervention
- Comparison
- Outcome
- Time

**How Often?**

Contents lists available at [ScienceDirect](#)

## Resuscitation

journal homepage: [www.elsevier.com/locate/resuscitation](http://www.elsevier.com/locate/resuscitation)



Clinical

Adrenaline (epinephrine) dosing period and survival after in-hospital cardiac arrest: A retrospective review of prospectively collected data<sup>☆</sup>



Sam A. Warren<sup>a,b,c,\*</sup>, Ella Huszti<sup>a,b</sup>, Steven M. Bradley<sup>b,f</sup>, Paul S. Chan<sup>d,e</sup>, Chris L. Bryson<sup>b,f</sup>, Annette L. Fitzpatrick<sup>c,g,h</sup>, Graham Nichol<sup>a,b,i</sup>, for the American Heart Association's Get With the Guidelines-Resuscitation (National Registry of CPR) Investigators<sup>1</sup>

- Retrospective review of 20,000 in hospital cardiac arrest patients
- Time between first epi and endpoint of resuscitation  
Total doses of epi
- Longer dosing intervals improved survival
  - True for both shockable and non-shockable rhythms



**How  
Much?**

## High-Dose Epinephrine in Adult Cardiac Arrest

..., Brian N. Weitzman, M.D., George A. Wells, Ph.D., Sankaranarayanan Raman, Ph.D., Ryan M. Stark, M.Sc., Lyall A.J. Higginson, M.D., Jan Ahuja, M.D., and Garth E. Dickinson, M.D.

## A Comparison of High-Dose and Standard-Dose Epinephrine in Children with Cardiac Arrest

Maria Beatriz M. Perondi, M.D., Amelia G. Reis, M.D., Ph.D., Edison F. Paiva, M.D., Ph.D., Vinay M. Nadkarni, M.D., and Robert A. Berg, M.D.

**Table 3. Outcomes.\***

Outcome	High-Dose Epinephrine (N=34)	Standard-Dose Epinephrine (N=34)	Unadjusted Odds Ratio (95% CI)*	P Value
	<i>no. of patients (%)</i>			
Return of spontaneous circulation	20 (59)	21 (62)	1.1 (0.4–3.0)	0.80
For ≤20 min	4 (12)	6 (18)	1.6 (0.4–6.3)	0.49
For >20 min but <24 hr	15 (44)	8 (24)	0.4 (0.1–1.1)	0.07
Survival at 24 hr	1 (3)	7 (21)	8.6 (1.0–397.0)	0.05
Survival to hospital discharge	0	4 (12)		0.11

\* CI denotes confidence interval.



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

# Resuscitation

homepage: [www.elsevier.com/locate/resuscitation](http://www.elsevier.com/locate/resuscitation)



**What  
Route?**

Clinical

## **Intravenous versus intraosseous adrenaline administration in out-of-hospital cardiac arrest: A retrospective cohort study**

*Yongshu Zhang<sup>a,1</sup>, Jieming Zhu<sup>b,1</sup>, Zhihao Liu<sup>a,1</sup>, Liwen Gu<sup>a</sup>, Wanwan Zhang<sup>a</sup>, Hong Zhan<sup>a</sup>, Chunlin Hu<sup>a</sup>, Jinli Liao<sup>a,\*</sup>, Yan Xiong<sup>a,c,\*</sup>, Ahamed H. Idris<sup>c</sup>*

- Retrospective analysis of over 35,000 OHCA patients
- Primary outcome survival to hospital discharge
  - Secondary ROSC and neurological outcome
- IO group had lower ROSC rates, survival to discharge and positive neurological outcomes



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## A Randomized Trial of Epinephrine in Out-of-Hospital Cardiac Arrest

**GOOD:** Epi improves ROSC and likelihood of discharge

**Neutral:** Epi DOES NOT improve neurologically intact survival

**BAD:**

Epi INCREASES likelihood of neurological devastation

Epi DOES NOT increase number of neuro intact survivors

# Ventilator Management and Respiratory Care After Cardiac Arrest

Oxygenation, Ventilation, Infection, and Injury

*Nicholas J. Johnson, MD; David J. Carlborn, MD; and David F. Gaieski, MD*



**Allows consistent control of rate and volume**