

Evidence - Pre-hospital Care

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Pre-hospital Care

Practice of Modern Medicine is increasingly Evidence based

However, many of the interventions are driven
Empirically or are Consensus based

Pre-hospital Care

‘Danger in consensus guidelines endorsed by clinicians: they may feel pressured to adopt interventions that may, in the longer term to cost more or do more harm than good.’

Liu B, Finfer S, BMJ, 339 4th July; 3-4, 2009

Pre-hospital Care

This review is part of the ICoRSI EGM on Road safety

Prehospital Care comes in when other preventive interventions
have failed

Preventing Death and Disability even when they seem Imminent

Pre-hospital Care

Topics Selected for evidence evaluation

Looking at what interventions

make a difference to outcome of injured

Looking at type and number of papers

Looking at Systematic Reviews

Pre-hospital Care

Topics Selected for evidence evaluation

Key Components of Emergency Care

- Extrication
- Ambulances
- Level of personnel
- First Aid Training
- 'Stay and Play' or 'Scoop and Run'
- Time to hospital
- Drugs and Medications

Post Crash Pre Hospital Care: Impact Evaluations and Systematic Reviews

Impact Evaluation and SR	Fatal Crashes	Non Fatal Crashes
Extraction / Extrication	1 1	1 0
Ambulances	4 0	2 1
Level of Medical Personnel	5 0	3 1
First aid Training of bystanders, drivers and policemen	0 0	0 0
Stay and Play vs Scoop and Run	1 0	0 0
Time to Hospital	4 1	3 0
Drugs and Medications	3 0	3 0



Impact Evaluation Studies




Systematic Reviews

Post Crash Pre Hospital Care: Impact Evaluations and Systematic Reviews

Impact Evaluation and SR	Fatal Crashes	Non Fatal Crashes
Extraction / Extrication	1 1	1 0

 Impact Evaluation Studies

 Systematic Reviews

Pre-hospital Care

Extrication is not considered significantly important by many clinicians

However, it can influence the outcome

Therefore, lack of significant literature is a matter of concern

Pre-hospital Care

Comparably more occupants extracted from vehicles after collisions were drivers than other occupant types

Westhoff, J., Haasper, C., Otte, D., Probst, C., Krettek, C., & Richter, M. (2007). Motor vehicle accidents with entrapment. A medical and technical investigation of crash mechanism, injury pattern and severity of entrapment of motor vehicle occupants between 1983 and 2003 .Chirurg, 78(3), 246–253.

Post Crash Pre Hospital Care: Impact Evaluations and Systematic Reviews

Impact Evaluation and SR	Fatal Crashes	Non Fatal Crashes
Ambulances	0 4	1 2



Impact Evaluation Studies



Systematic Reviews

Ambulances and Helicopters

GEMS vs HEMS

In a series on severe trauma to the head

GEMS-patients showed a fatality rate of 41,2%,
HEMS showed fatality rate of 34,6%,

Even though GEMS-average-ISS was 2 points lower than
the HEMS ISS of 33

Schweigkofler et al. (2014)

Pre-hospital Care

Overuse on helicopter transport in Minimally injured
27% Plus were minimally injured

Vercruyesse GA et al, journal of Trauma, 78(3);511-515, 2015

Pre-hospital Care

The **National transportation safety board (NTSB)**

ranks Helicopter emergency medical services

as one of the most perilous occupations in USA 1998 – 2012

139 Crashes

120 Killed

146 seriously injured

Habib AF Journal of Trauma, 77(6);989- 993, 2014

Pre-hospital Care

EMS vs NON EMS transfer of critically ill patients

Los Angeles county 103 Patients, ISS 13 or more

Non EMS patients reached **faster** than EMS patients

Deaths, hospital stay and complications similar

Cornwell EE, Arch of Surg. 2000
Bertram JP et al 2009

Post Crash Pre Hospital Care: Impact Evaluations and Systematic Reviews

Impact Evaluation and SR	Fatal Crashes	Non Fatal Crashes
Level of Medical Personnel	0 5	1 3



Impact Evaluation Studies



Systematic Reviews

Pre-hospital Care

“Critical Care Paramedics: Where Is the Evidence?
A Systematic Review.”

‘....but the impact of critical care
paramedics remains unclear for many conditions’

von Vopelius-Feldt, Johannes, John Wood, and Jonathan Benger. (2014)
Emergency Medicine Journal 31(12):1016–24

Pre-hospital Care

Cochrane Review

At this time evidence suggests that there is no benefit of ALS training for Ambulance crews

Cochrane Database systematic reviews, Journal of trauma 2010, 20(1)

Pre-hospital Care

Cochrane Review

‘Based on the limited data, there is at present no evidence to recommend ALS training of ambulance crews to care for injury victims’

Advanced training in trauma life support for ambulance crews

Cochrane Systematic Review - **Intervention** Version published: 21 August 2014

Post Crash Pre Hospital Care: Impact Evaluations and Systematic Reviews

Impact Evaluation and SR	Fatal Crashes	Non Fatal Crashes
First aid Training of bystandards, drivers and policemen	0	0



Impact Evaluation Studies



Systematic Reviews

Pre-hospital Care

First aid training improves
first aid knowledge, skills and self-confidence
Immediately after training and 3 months or longer after training.

**Research on possible effects of first aid training
on traffic mortality is scarce**

Goldenbeld, Ch., Weijermars, W. (2017), First aid training for drivers, European Road Safety Decision Support System, developed by the H2020 project SafetyCube.

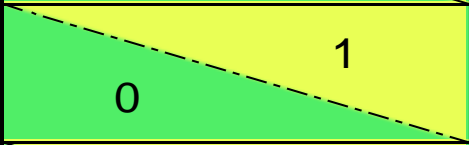
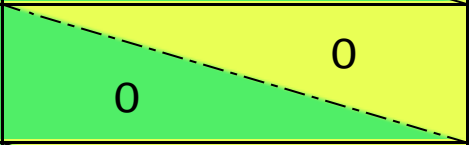
Pre-hospital Care

Evaluation of dispatcher guidance bystander first aid in trauma

Dispatcher guidance did not significantly influence whether on-scene bystander first aid was performed correctly

Bakke HK, 2017, Scand.J Trauma Resusc. Emerg. Med Vol 25 (5), 27

Post Crash Pre Hospital Care: Impact Evaluations and Systematic Reviews

Impact Evaluation and SR	Fatal Crashes	Non Fatal Crashes
Stay and Play vs Scoop and Run	 1	 0



Impact Evaluation Studies



Systematic Reviews

Pre-hospital Care

In an Urban environment with relatively short transport times there is no strong evidence supporting field ALS – and only a suggestion of harm.


Stop short of saying Scoop and run is the best policy

[Barbara Haas](#) and [Avery B Nathens](#), Pro/con debate: Is the scoop and run approach the best approach to trauma services organization? [Crit Care](#). 2008; 12(5): 224.

Post Crash Pre Hospital Care: Impact Evaluations and Systematic Reviews

Impact Evaluation and SR	Fatal Crashes	Non Fatal Crashes
Time to Hospital	1 4	0 3

 Impact Evaluation Studies

 Systematic Reviews

Pre-hospital Care

The Golden hour

The golden hour scientific fact or urban legend ?

There are no large, well-controlled studies in the civilian population that either strongly support or refute the idea that faster is universally better in trauma care. The numerous smaller studies are not sufficiently similar to use meta-analysis to resolve the question. While it appears the term most

Lerner EB, Mascati R, Academic Emerg. Medicine, 8(7); 758-760, 2001

Pre-hospital Care

A survival benefit exists in patients arriving earlier at hospital after severe head injury but the **benefit may extend beyond the golden hour**

Dinh, Michael M. et al. 2013. "Redefining the Golden Hour for Severe Head Injury in an Urban Setting: The Effect of Prehospital Arrival Times on Patient Outcomes." *Injury* 44(5):606–10.

Pre-hospital Care

In a Systematic review and meta-analysis


No difference in outcomes for
secondary transfer or direct transport to a trauma centre

Pickering A, Cooper K, Harnan S, Sutton A, Mason S, Nicholl J. 2015. Impact of prehospital transfer strategies in major trauma and head injury: systematic review, meta-analysis, and recommendations for study design. *J Trauma Acute Care Surg.*;78(1):164-77.

Post Crash Pre Hospital Care: Impact Evaluations and Systematic Reviews

Impact Evaluation and SR	Fatal Crashes	Non Fatal Crashes
Drugs and Medications	0 3	0 3

 Impact Evaluation Studies

 Systematic Reviews

Pre-hospital Care

Cochrane Systematic Review

Insufficient evidence for or against the use of early or larger volume fluid resuscitation in the treatment of uncontrolled **haemorrhage**

Timing and volume of fluid administration for patients with bleeding

Cochrane Systematic Review - **Intervention** Version published: 05 March 2014

Pre-hospital Care

Tranexamic Acid

Available data support the efficacy of Tranexamic Acid
in the prehospital setting

Aussey S et al , Journal of Trauma 76(3); S70-S78, 2014

Pre-hospital Care

The value of Tranexamic acid (TXA) is recognised widely now.

High-level evidence supports its use in trauma

Implementation in the prehospital setting offers a survival advantage to many patients

Particularly when evacuation to surgical care may be delayed.

CRASH-2 collaborators, 2011

CRASH-2 trial collaborators, 2010 Guerriero, Cairns, Perel, Shakur, & Roberts

Pre-hospital Care

Systematic review of literature to look at **cervical spine immobilization**

Lack of high-level evidence on
pre-hospital cervical spine immobilization on patient outcomes

Velopoulos et al., 2017

Pre-hospital Care

Cochrane Review on Spinal Immobilisation

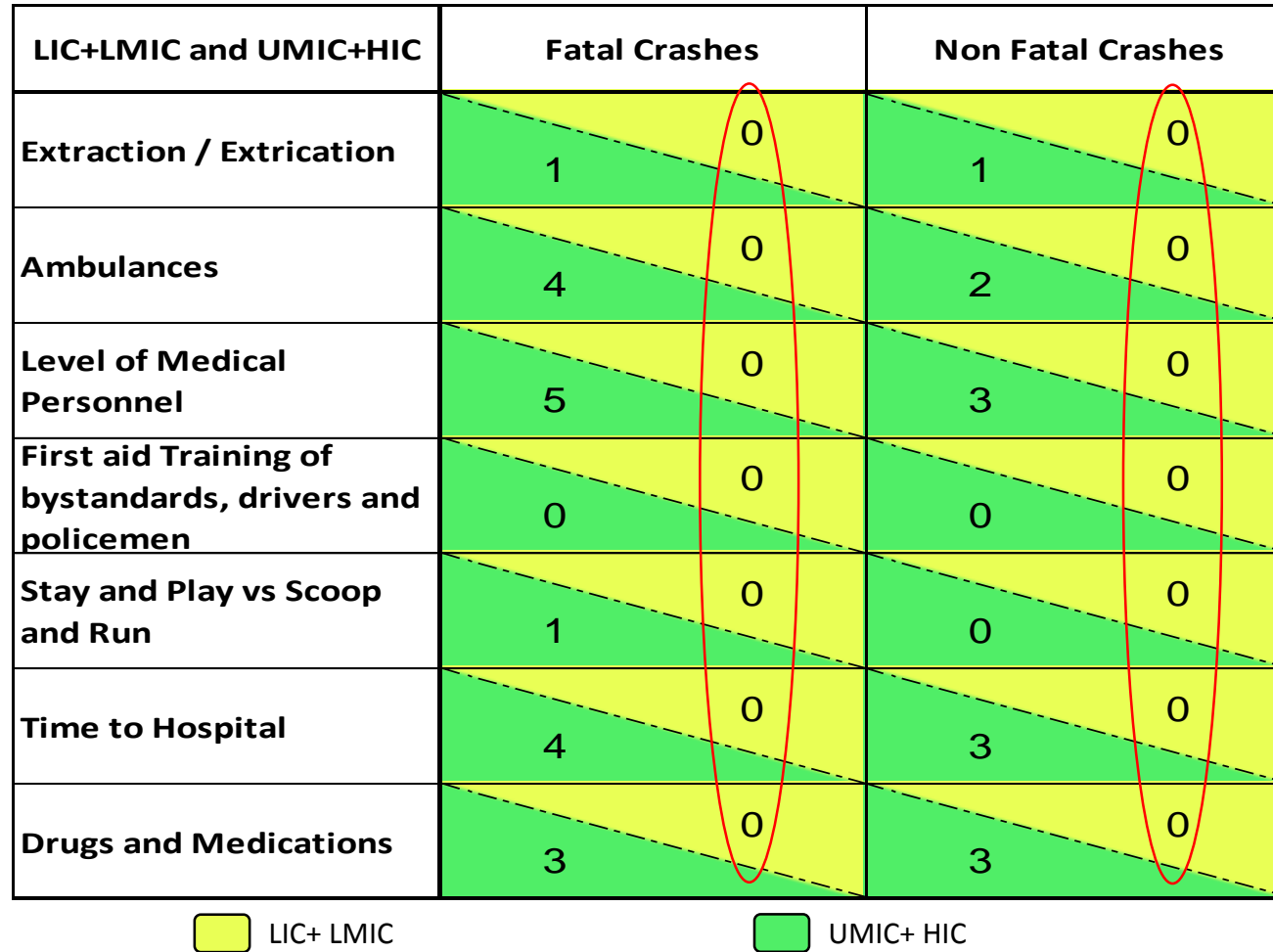
We did not find any RCT that met the inclusion criteria

Effect remain Uncertain on

Mortality, Neurological injury, Spinal stability and Adverse effects
in trauma patients remains uncertain

Spinal immobilisation for trauma patients Cochrane Systematic Review -
Intervention Version published: 23 April 2001

Post Crash Pre Hospital Care: LIC+LMIC and UMIC+HIC



LIC- Low Income Countries, LMIC- Lower Middle Income Countries, UMIC- Upper Middle Income Countries, HIC- High Income Countries

Post Crash Pre Hospital Care: SA+SAA+LAC+MENA and EAP+ECA+NA

SA+SAA+LAC+MENA and EAP+Euro+NA	Fatal Crashes	Non Fatal Crashes
Extraction / Extrication	1 0	1 0
Ambulances	4 0	2 0
Level of Medical Personnel	5 0	3 0
First aid Training of bystanders, drivers and policemen	0 0	0 0
Stay and Play vs Scoop and Run	1 0	0 0
Time to Hospital	4 0	3 0
Drugs and Medications	3 0	3 0

SA+SAA+LAC+MENA
 EAP+ECA+NA

SA- South Asia, SAA- Sub Saharan Africa, LAC- Latin America and Caribbean, MENA- Middle East and North Africa, EAP- East Asia and Pacific, ECA- Europe and Central Asia, NA- North America

Post Crash Pre Hospital Care: NMT and MT

NMT and MT	Fatal Crashes	Non Fatal Crashes
Extraction / Extrication	1 (NMT), 1 (MT)	1 (NMT), 1 (MT)
Ambulances	4 (NMT), 4 (MT)	2 (NMT), 2 (MT)
Level of Medical Personnel	5 (NMT), 4 (MT)	3 (NMT), 3 (MT)
First aid Training of bystanders, drivers and policemen	0 (NMT), 0 (MT)	0 (NMT), 0 (MT)
Stay and Play vs Scoop and Run	1 (NMT), 0 (MT)	0 (NMT), 0 (MT)
Time to Hospital	4 (NMT), 3 (MT)	3 (NMT), 3 (MT)
Drugs and Medications	3 (NMT), 2 (MT)	3 (NMT), 2 (MT)

 NMT

 MT

NMT- Non-motorized transport, MT- Motorized transport

Pre-hospital Care

Where are we after all this review?

What the EGM on Pre hospital has revealed
is a matter of **Serious concern**

We cannot let this pass

Pre-hospital Care

It is **NOT about Cost cutting** or economics

It is about

Understanding the true science of Prehospital care

Pre-hospital Care

Road Map for way ahead

Pre-hospital Care

We need a **Research GPS** to guide us

We need to develop a research agenda

Pre-hospital Care

Issue of Low quality Research Vs No Research

Where do we look if we have NON RCTs or where RCTs are difficult?

Pre-hospital Care

Where Non RCTs can be used?

Where exposure allocation is unrelated to outcome

Where allocation to exposure is Nearly Random

Where confounding variables can be identified, measured and adjusted for in analysis

Vandenbroucke JP, when are observational studies as credible as Randomised trials, and two views of medicine. PLoS Med2004, 363(9422):1728-1731

Pre-hospital Care

Issue of Equity

This is important Looking at the striking lack research papers from low and middle income countries

Pre-hospital Care

‘Given the nature of the empirical evidence in this study, however, developing countries should be encouraged to adopt prehospital trauma systems at the policy level.’

Henry JA, (2012) Prehospital trauma systems reduce mortality in developing countries:
A systematic review and meta-analysis
J Trauma Acute Care Surg: 73(1), 261-270

Pre-hospital Care

How do you generate POLICY

When you do not know

What should be done and what should not be?

What can be harmful?

Challenges

To prove the predictability of outcomes after injury,
several physiological parameters Need monitoring

Pulse

Blood pressure

Respiratory Rate

These are **time-dependent variables** ,

Difficult to gather in the field setting.

Challenges

Care of Injured is at different levels

Crash site

Transportation

Emergency Room

Hospital care

Rehabilitation

Challenges

With multiplicity of providers

Bystanders, EMS providers, ER room carers,
ICU intensivists Surgeons.....

Severe fragmentation,

Absence of coordination and

Lack of accountability

Pre-hospital Care

We must recognize

Lack of transferability of many of the interventions

We must also recognize the need to generate evidence

Pre-hospital Care

1. Recognise need for Research in Prehospital care
2. Generating protocols for prehospital look for confounding factors and multiplicity of variables
3. Need for minimum data elements
4. Do RCTs across nations in interventions where you can do RCTS
5. Where you cannot do RCTs plan high Quality research across chain of survival

Pre-hospital Care

7. Need to look at high quality research where the numbers or the RCT Criteria do not measure up
8. If there is a harm reported with an intervention need for a review before adopting it
9. Need to differentiate influences on Physiological science that are universal from those that can be influenced by environmental and societal factors
10. Need to research Role of newer technologies should be researched
Eg. Automatic crash reporting from newer cars with AI to trauma care hospitals

Pre-hospital Care

Until clarity on many of these issues
Perhaps in Urban areas think of Scoop and Run
Seems the best issue

Pre-hospital Care

Thank You

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