

QUESTION

Should patients/cases where DA-CPR is provided vs. patients/cases where unassisted bystander CPR is provided be used for children with cardiac arrest in out of hospital settings?

POPULATION:	Children with cardiac arrest in out of hospital settings
INTERVENTION:	Patients/cases where DA-CPR is provided
COMPARISON:	Patients/cases where unassisted bystander CPR is provided
MAIN OUTCOMES:	Survival with CPC 1-2-unadjusted data; Survival with CPC 1-2- unadjusted data to hospital discharge; Survival-unadjusted data; Survival -unadjusted data to hospital discharge; Sustained ROSC-unadjusted data; Shockable initial rhythm-unadjusted data; Time to CPR;
SETTING:	Out of hospital cardiac arrests (OHCA)
PERSPECTIVE:	This topic was prioritized by the Pediatric Life Support Task Force following publication of several new studies since the previous systematic review was published in 2011. The 2011 review found limited evidence to support dispatch-assisted CPR (Bohm, 2011 1490). In considering the importance of this topic, the Pediatric Life Support Task Force noted that bystander CPR significantly improves the likelihood of survival from OHCA but bystander cardiopulmonary resuscitation (CPR) rates remain very low. In developing the consensus on science and treatment recommendations, the Pediatric Life Support Task Force agreed that consideration of both unadjusted and adjusted analyses was essential to provide a full picture of the evidence. We recognize that unadjusted analysis might be confounded by temporal changes, systematic and patient care differences between and within EMS systems.
BACKGROUND:	The evidence base compared with adult data is limited, but the publications since 2011 provided the stimulus to re-examine the scientific literature.
CONFLICT OF INTERESTS:	None

ASSESSMENT

Problem

Is the problem a priority?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> No <input type="radio"/> Probably no <input type="radio"/> Probably yes <input checked="" type="radio"/> Yes <input type="radio"/> Varies <input type="radio"/> Don't know	<p>Out-of-hospital cardiac arrest (OHCA) is a significant cause of death worldwide with an annual rate of over 400,000.</p> <p>The current average survival rates for OHCA victims remains very low at approximately 10%.</p> <p>A victim is almost 4 times more likely to survive a cardiac arrest event when someone witnesses their arrest and performs CPR while emergency personnel are en route.</p> <p>Unfortunately, bystander CPR rates have remained astoundingly low over the past decade, rarely exceeding 35%.</p>	

Desirable Effects

How substantial are the desirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> ● Trivial ○ Small ○ Moderate ○ Large ○ Varies ○ Don't know 	<p>Survival with good neurological outcome at 1mo: unadjusted OR 0.57 (0.39-0.84); RR 0.59 (0.41-0.84); p=0.004</p> <p>Survival with good neurological outcome at hospital discharge: unadjusted OR 0.97 (0.58-1.62); RR 0.97 (0.61-1.56); p=0.91</p> <p>Survival at 1 mo: unadjusted: OR 0.74 (0.58-0.95); RR 0.77 (0.62-0.95); p=0.02</p> <p>Survival at hospital discharge: unadjusted: OR 0.98 (0.65-1.48); RR 0.99 (0.69-1.41); p=0.94</p> <p>Sustained ROSC: unadjusted OR 0.82 (0.56-1.19); RR 0.84 (0.62-1.16); p=0.29</p> <p>Shockable initial rhythm: OR 0.50 (0.33-0.74)); RR 0.54 (0.35-0.82); p=0.0007</p> <p>Arrest to CPR-initiation time: Goto: median 4 min (inter quartile range 0-13 minutes); vs. 1 min (inter quartile range 0-5), no p-value; Ro median 4 min (inter quartile range 0-13 minutes); vs. 2 min (inter quartile range 0-10) = longer times</p>	<p>* all unadjusted</p>

Undesirable Effects

How substantial are the undesirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> ○ Large ● Moderate ○ Small ○ Trivial ○ Varies ○ Don't know 	<p>Survival with good neurological outcome at 1mo: unadjusted OR 0.57 (0.39-0.84); RR 0.59 (0.41-0.84); p=0.004</p> <p>Survival with good neurological outcome at hospital discharge: unadjusted OR 0.97 (0.58-1.62); RR 0.97 (0.61-1.56); p=0.91</p> <p>Survival at 1 mo: unadjusted: OR 0.74 (0.58-0.95); RR 0.77 (0.62-0.95); p=0.02</p> <p>Survival at hospital discharge: unadjusted: OR 0.98 (0.65-1.48); RR 0.99 (0.69-1.41); p=0.94</p> <p>Sustained ROSC: unadjusted OR 0.82 (0.56-1.19); RR 0.84 (0.62-1.16); p=0.29</p> <p>Shockable initial rhythm: OR 0.50 (0.33-0.74)); RR 0.54 (0.35-0.82); p=0.0007</p> <p>Arrest to CPR-initiation time: Goto: median 4 min (inter quartile range 0-13 minutes); vs. 1 min (inter quartile range 0-5), no p-value? ; Ro median 4 min (inter quartile range 0-13 minutes); vs. 2 min (inter quartile range 0-10) = longer times</p>	<p>These results are similar to the adult unadjusted studies- similarly all worse outcomes. In the adult studies, the adjusted analyses showed no benefit for all outcomes, except benefit for survival to 1 mo.</p>

Certainty of evidence

What is the overall certainty of the evidence of effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
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<ul style="list-style-type: none"> ● Very low ○ Low ○ Moderate ○ High ○ No included studies 	<p>All studies are unadjusted. This is particularly relevant as the patients differed significantly on important prognostic indicators for at least 2 of the 3 studies included in this analysis.</p>	
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Values

Is there important uncertainty about or variability in how much people value the main outcomes?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> ○ Important uncertainty or variability ○ Possibly important uncertainty or variability ● Probably no important uncertainty or variability ○ No important uncertainty or variability 	<p>Main outcome is survival, and neurologically intact survival. COSCA has confirmed importance of these outcomes.</p> <p>No published evidence regarding this intervention for quality of life in survivors, and in general the population varies in how much they value survival (at all costs) vs neurologically-intact survival.</p>	<p>COSCA: Haywood K, Whitehead L, Nadkarni VM, Achana F, Beesems S, Bottiger BW, et al. COSCA (Core Outcome Set for Cardiac Arrest) in Adults: An Advisory Statement From the International Liaison Committee on Resuscitation. Resuscitation. 2018;127:147-63.</p>

Balance of effects

Does the balance between desirable and undesirable effects favor the intervention or the comparison?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> ○ Favors the comparison ● Probably favors the comparison ○ Does not favor either the intervention or the comparison ○ Probably favors the intervention ○ Favors the intervention ○ Varies ○ Don't know 	<p>Probably favors the comparison if you look strictly at the ORs, however as discussed, the evidence is very low quality, is unadjusted, and the comparison group in at least some of the analyses had better prognostic factors than the intervention. Thus, the more important answer may be "Don't know".</p>	

Resources required

How large are the resource requirements (costs)?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
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<ul style="list-style-type: none"> ○ Large costs ○ Moderate costs ○ Negligible costs and savings ○ Moderate savings ○ Large savings ● Varies ○ Don't know 	<p>No relevant published data was identified for review.</p> <p>Existing systems may be in place, but additional training will be required to introduce Dispatch Assist instructions.</p> <p>Widespread availability of phone equipment (landline/mobile), phone reception, and loudspeaker mode may be a limitation and require resources.</p> <p>Community education may increase likelihood of following instructions.</p>	
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Certainty of evidence of required resources

What is the certainty of the evidence of resource requirements (costs)?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> ○ Very low ○ Low ○ Moderate ○ High ● No included studies 	<p>No relevant published data was identified for review so unable to provide any certainty here.</p>	

Cost effectiveness

Does the cost-effectiveness of the intervention favor the intervention or the comparison?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> ○ Favors the comparison ○ Probably favors the comparison ○ Does not favor either the intervention or the comparison ○ Probably favors the intervention ○ Favors the intervention ○ Varies ● No included studies 	<p>Pubmed search: (("Cost-Benefit Analysis"[Mesh]) AND ("Heart Arrest"[Mesh] OR "Out-of-Hospital Cardiac Arrest"[Mesh] OR "Death, Sudden, Cardiac"[Mesh])) AND "Emergency Medical Dispatcher"[Mesh]</p> <p>No relevant published data was identified for review.</p>	<p>One study identified suggested that bystander CPR appeared "cost-effective": Geri G, Fahrenbruch C, Meischke H, Painter I, White L, Rea TD, Weaver MR. Effects of bystander CPR following out-of-hospital cardiac arrest on hospital costs and long-term survival. Resuscitation. 2017 Jun 1;115:129-34.</p>

Equity What would be the impact on health equity?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> Reduced <input type="radio"/> Probably reduced <input type="radio"/> Probably no impact <input type="radio"/> Probably increased <input type="radio"/> Increased <input type="radio"/> Varies <input checked="" type="radio"/> Don't know	<p>No relevant published data was identified for review.</p> <p>There may be populations that reflect geographical and cultural issues where the interventions may be less effective (widening the potential gap between outcomes).</p>	
Acceptability Is the intervention acceptable to key stakeholders?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> No <input type="radio"/> Probably no <input checked="" type="radio"/> Probably yes <input type="radio"/> Yes <input type="radio"/> Varies <input type="radio"/> Don't know	<p>No relevant published data was identified for review.</p> <p>Rescuers have requested assistance and could expect instructions for them to carry out.</p> <p>Unaware of any perverse community implications (other strategies to promote CPR are widely accepted).</p>	
Feasibility Is the intervention feasible to implement?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> No <input type="radio"/> Probably no <input checked="" type="radio"/> Probably yes <input type="radio"/> Yes <input type="radio"/> Varies <input type="radio"/> Don't know	<p>Some limitations to the maximal benefit of implementation that were identified in existing studies include: how instructions for DA-CPR are delivered (DA protocol, dispatcher handling delays induced by the caller); motivation of dispatcher, the previous training experience and compliance rate of bystanders; and the quality of the CPR provided.</p>	

SUMMARY OF JUDGEMENTS

	JUDGEMENT						
PROBLEM	No	Probably no	Probably yes	Yes		Varies	Don't know
DESIRABLE EFFECTS	Trivial	Small	Moderate	Large		Varies	Don't know
UNDESIRABLE EFFECTS	Large	Moderate	Small	Trivial		Varies	Don't know

	JUDGEMENT						
CERTAINTY OF EVIDENCE	Very low	Low	Moderate	High			No included studies
VALUES	Important uncertainty or variability	Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability			
BALANCE OF EFFECTS	Favors the comparison	Probably favors the comparison	Does not favor either the intervention or the comparison	Probably favors the intervention	Favors the intervention	Varies	Don't know
RESOURCES REQUIRED	Large costs	Moderate costs	Negligible costs and savings	Moderate savings	Large savings	Varies	Don't know
CERTAINTY OF EVIDENCE OF REQUIRED RESOURCES	Very low	Low	Moderate	High			No included studies
COST EFFECTIVENESS	Favors the comparison	Probably favors the comparison	Does not favor either the intervention or the comparison	Probably favors the intervention	Favors the intervention	Varies	No included studies
EQUITY	Reduced	Probably reduced	Probably no impact	Probably increased	Increased	Varies	Don't know
ACCEPTABILITY	No	Probably no	Probably yes	Yes		Varies	Don't know
FEASIBILITY	No	Probably no	Probably yes	Yes		Varies	Don't know

TYPE OF RECOMMENDATION

Strong recommendation against the intervention ○	Conditional recommendation against the intervention ○	Conditional recommendation for either the intervention or the comparison ●	Conditional recommendation for the intervention ○	Strong recommendation for the intervention ○
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CONCLUSIONS

Recommendation

We cannot make a recommendation for or against dispatch assistance when bystander CPR is already initiated (no recommendation, very low quality evidence).

Justification

In abstaining from recommending for or against DA-CPR when bystander CPR is already in progress in the face of very low quality evidence, we valued the consistency of inferior and neutral results for all of the critical outcomes offset by the lack of any adjusted analyses for this group. We suspect the negative results are due to: 1- bystander CPR was initiated earlier when it did not require the additional steps of calling a dispatcher, the dispatcher recognizing OHCA, and then providing CPR instructions, and 2- a bystander who performed CPR and refused dispatch assistance was likely trained in CPR and thus potentially superior to an untrained bystander who accepted remote dispatch assistance.

Subgroup considerations

Implementation considerations

Existing system for DA-CPR

Short response times.

Bystander CPR rates.

Mobile phone uptake and coverage.

Monitoring and evaluation

Research priorities

- 1- only one study adjusted for type of CPR/DACPR provided, all future POHCA should adjust for this important co-variable
- 2- only short term outcomes were evaluated, future studies should document long term outcomes, including QoL outcomes
- 3- future studies of bystander CPR should adjust for bystander characteristics
- 4- all POHCA studies should include data on quality of bystander CPR and in-hospital (post-arrest) factors
- 5- effect of EMS response times on outcomes with DACPR