WORKSHEET for Evidence-Based Review of Science for Emergency Cardiac Care

Worksheet author(s)

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Clinical question.

For hospital resuscitation teams (P), do team briefings/debriefings (I), when compared to no briefings/debriefings (C), improve team performance (O)?

Is this question addressing an intervention/therapy, prognosis or diagnosis? Intervention/therapy
State if this is a proposed new topic or revision of existing worksheet: Revision

Conflict of interest specific to this question

Author of main study assessed in this worksheet.
Research funding: NIH, AHA, Philips healthcare; Speaking honoraria/consulting: Philips Healthcare; Advisory Board: Triage Wireless

Search strategy (including electronic databases searched).

Search parameters:
Medline and Cochrane via OvidSP: 520 hits (496 hits in Medline and 24 hits in Cochrane) on 9/23/2009
((heart arrest[MESH/keyword] OR resuscitation[keyword] OR cardiopulmonary resuscitation[keyword] OR advanced cardiac life support[keyword] or heart massage[keyword]) AND (debriefing[keyword] OR feedback[keyword] OR briefing[keyword] OR team performance[keyword] OR educational review[keyword] OR quality assurance[keyword] OR performance review[keyword])) OR ("crew resource management"[keyword])

Medline and Embase via Embase: 709 hits on 9/23/2009
((“heart arrest” OR “resuscitation” OR “cardiopulmonary resuscitation” OR “advanced cardiac life support” OR “heart massage”) AND (“debriefing” OR “feedback” OR “briefing” OR “team performance” OR “educational review” OR “quality assurance” OR “performance review”)) OR (“crew resource management”)

AHA EndNote Master library. Forward search using Web of Science. Review of references from articles.

- State inclusion and exclusion criteria

The following studies were excluded: abstract only studies, non-peer reviewed articles, real-time audiovisual feedback studies, and studies that did not directly answer the question. In addition, we omitted studies where the effects of briefing or debriefing could not be isolated from a larger intervention.

Studies of both simulation and actual resuscitation debriefing were included. Trauma resuscitation debriefing studies were included as well.

- Number of articles/sources meeting criteria for further review: 1097 articles were identified by initial searching, of which 70 met criteria for further review. Upon careful review, articles that did not specifically address the question were excluded, leaving two LOE 1 (RCTs), one LOE 2 (concurrent control), two LOE 3 (historic control), one LOE 4 (no control), and one LOE 5 (different P – not resuscitation teams)

Summary of evidence

Evidence Supporting Clinical Question

Good	*Dine, 2008 E1* *Savoldelli, 2006 E2*		Edelson, 2008 A, E1		
Fair		Hoyt, 1988 E2	Townsend, 1993 E2		DeFontes, 2007 E2, E3
Poor				Scherer, 2003 E2	
	1	**2**	**3**	**4**	**5**
Level of evidence					

A = Return of spontaneous circulation
B = Survival of event
Italics = Simulation studies
C = Survival to hospital discharge
D = Intact neurological survival
E1 = Compression quality
E2 = Team performance
E3 = Participant attitudes

Evidence Neutral to Clinical question

Good			Edelson, 2008 C		
Fair					Townsend, 1993 C
Poor					
	1	**2**	**3**	**4**	**5**
Level of evidence					

A = Return of spontaneous circulation
B = Survival of event
Italics = Simulation studies

C = Survival to hospital discharge
D = Intact neurological survival

E1 = Compression quality
E2 = Team performance
E3 = Participant attitudes

Evidence Opposing Clinical Question

Good					
Fair					
Poor					
	1	**2**	**3**	**4**	**5**
Level of evidence					

A = Return of spontaneous circulation
B = Survival of event
Italics = Simulation studies

C = Survival to hospital discharge
D = Intact neurological survival

E1 = Compression quality
E2 = Team performance
E3 = Participant attitudes

REVIEWER'S FINAL COMMENTS AND ASSESSMENT OF BENEFIT / RISK:

One clinical study of debriefing following in hospital cardiopulmonary resuscitation attempts (Edelson, 2008, 168) used a historic control group to assess the impact of weekly in-hospital resuscitation team debriefing sessions using data from a CPR sensing, feedback enabled defibrillator to provide objective data regarding resuscitation performance. 112 physician trainees attempted resuscitation on 123 patients during the intervention period compared with 142 trainees and 101 resuscitations in the control period. When compared to the control period, during the intervention period, CPR quality was improved as was the rate ROSC (59% vs 45%). The main limitations of this study were its limited generalizability secondary to a single institution location and possible confounder due to the release of the 2005 consensus resuscitation guidelines preceding the start of the intervention period. However, improvements in compression rate and depth, which were not influenced by guidelines changes (as opposed to ventilation rates and NFF) were seen as well. Also, patient and arrest level characteristics were adjusted for using logistic regression. The results of this study are summarized here:

	Control (n = 101)	**Debriefing** (n = 123)	***p-value***	**Adjusted OR (95%CI)**
Compression depth, mm, (in range)	44±10 (70%)	50±10 (86%)	.0001, <.001	
Compression rate, /min, (in range)	100±13 (65%)	105 ±10 (82%)	.003, <.001	
Ventilation rate, /min, (in range)	18±8 (38%)	13±7 (49%)	<.0001, <.001	
No-flow fraction	0.20±0.13	0.13±0.10	<.0001	
Pre-shock pause, s (Q25-Q75)	16.0 (8.5-24.1)	7.5 (2.8-13.1)	<.0001	
Post-shock pause, s (Q25-Q75)	7.1 (2.7-14.8)	2.4 (1.9-3.6)	<.0001	
Appropriate shocks, n/tot (%)	110/151 (73%)	104/117 (89%)	.001	
ROSC, n/tot (%)	45/101 (45%)	73/123 (59%)	0.03	1.83 (1.06-3.16)
Survival to discharge, n/tot (%)	9/101 (9%)	9/123 (7%)	0.69	

Two RCT studies in a simulated setting demonstrated improved individual and team leader performance with debriefing. Dine et al. (Dine, 2008, 2817) showed debriefing improved the proportion of participants who achieved adequate compression depth (23/34 vs 13/34, p=0.015), while defibrillator feedback in addition to debriefing improved the proportion of participants with adequate compression rate (26/31 vs 14/31, p=0.001) and with a combination of adequate depth and rate (20/31 vs. 9/31, p=0.005). Salvoldelli et al. (Savoldelli, 2006, 279) demonstrated that team leader performance improved with either oral debriefing ($p<0.05$) or video-assisted oral debriefing ($p<0.01$) compared to a control group, with no significant difference between the two intervention groups. Three additional trauma resuscitation studies (Hoyt, 1988, 435; Townsend, 1993, 133; Scherer, 2003, 516), all using video-assisted debriefing sessions of actual trauma resuscitations, showed improvement in various aspects of team performance over non-randomized control groups who did not participate in debriefings. Furthermore, one LOE 5 study of preoperative briefing as a pre-operative intervention demonstrated decreased wrong-site procedures and improved participant attitudes (DeFontes, 2007, 21).

Debriefing appears to be an effective method for improving resuscitation performance and potentially patient outcomes. The unifying feature of all the debriefing studies is that the objective data form the basis for the discussion. This can be achieved with video recordings, defibrillator downloads or trained observer feedback. The ideal format remains to be determined.

Acknowledgements:

Citation List

Edelson, D. P., B. Litzinger, et al. Improving in-hospital cardiac arrest process and outcomes with performance debriefing. Archives of Internal Medicine, 2008;168(10): *in press*.

Level 3, good, supportive. Cohort study design using a historical control to assess the impact of weekly debriefing sessions using transcripts from a CPR sensing defibrillator. Ventilation rate, compression rate and depth, no-flow fraction, pre- and post-shock pauses, percent of shocks for the right rhythm and return of spontaneous circulation rates significantly improved with debriefing. There was no significant difference in survival to discharge between the groups (101 patients treated during control period, 123 treated during intervention period). 2005 ACLS guidelines were released at the end of the control period which could affect ventilation rates, no-flow fraction and post-shock pause times. This work was supported by a grant from Philips Medical Systems, Andover, Massachusetts.

Dine, C. J., R. E. Gersh, et al. Improving cardiopulmonary resuscitation quality and resuscitation training by combining audiovisual feedback and debriefing. Critical Care Medicine, 2008; 36(10): 2817-22.

Level 1, good, favorable. Prospective randomized interventional study of debriefing and defibrillator feedback on compression quality. 80 nurses with similar baseline characteristics were randomized into two groups – debriefing group and feedback group. Both debriefing only and feedback from the defibrillator only improved the percentage of participants providing adequate chest compression depth. Compression rate did not improve significant with either intervention. The combination of feedback and debriefing improved compression rate compliance and doubled the number of participants who provided both adequate compression rate and depth. This work was in part supported by a grant from Philips Medical Systems, Andover, Massachusetts.

Hoyt, D. B., S. R. Shackford, et al. Video Recording Trauma Resuscitations - an Effective Teaching Technique. Journal of Trauma-Injury Infection and Critical Care. 1988;28(4): 435-440.

Level 2, fair, favorable. Observational study of a weekly intervention of video assisted debriefing of trauma resuscitations (n=180 resuscitations), using a concurrent control group of resuscitations in which the houseofficer was unable to attend the weekly conferences due to scheduling conflicts(n=60 resuscitations). The intervention group showed a larger percent improvement in time to definitive care as measured by time of attending physician presence over a three month period in the subgroup of patients with an Injury Severity Score (ISS) >20 (44% vs 15%) but no difference for ISS <20. The treatment group also showed more improvement in percent of resuscitations with wasted time and percent of priorities attended to. Insufficent data presented to assess the magnitude of the effect or the statistical significance. Confounders not properly controlled for. No discussion of study funding.

Savoldelli, G. L., V. N. Naik, et al. Value of debriefing during simulated crisis management - Oral versus video-assisted oral feedback. Anesthesiology, 2006; 105(2): 279-285.

Level 1, good, supportive. RCT assessing the impact of debriefing on individual resident performance (as opposed to team performance) during simulated cardiac arrest scenarios. Anesthesia residents were randomized to one of three groups: no debriefing (control), oral debriefing, or video-assisted debriefing. All resuscitations were videotaped and scored by two trained and blinded evaluators using a previously validated scoring system (Anethesia Non-Technical Skills (ANTS) scoring system) which assessed task management, team working, situation awareness and decision making skills. 14 residents were randomized to each group. Both feedback groups showed a statistically significant improvement in total ANTS score from pre-test to post-test. Effect sizes were largest in task management and team working skills. There were no statistically significant differences in improvement for any of the assessments between the oral and video-assisted debriefing groups. No industry funding.

Scherer, L. A., M. C. Chang, et al. Videotape review leads to rapid and sustained learning. American Journal of Surgery, 2003; 185(6): 516-520.

Level 4, poor, favorable. Observational study of a weekly intervention of video assisted team debriefing of trauma resuscitations, using a historical control with verbal and written feedback alone. 54% of resuscitations were (randomly?) videotaped during a 6-month period. During the first three months surgical residents received verbal and written feedback on their resuscitations while in the next three months a different group of residents participated in weekly video-assisted debriefing sessions. Video tapes were reviewed for specific actions including transfer of patient to gurney before exam, assessing the airway, blood pressure and back, maintaining spinal cord precautions, examining pt prior to ordering labs, prompt arrival of the team, ordering radiographs within 4 min, and dispo of pt within 10 min. Immediate

improvement was noted in the video debriefing group in 5/9 parameters at 1 month. No improvement noted over the course of 3 months with oral/written feedback but the gap between video debriefing and control was significant in all behaviours except spinal precautions, prompt arrival and radiograph ordering, which were similar between the groups. Confounders, such as individual resident factors, were not properly controlled for and the improvement at 1 month suggests a potential secular trend. Additionally, there is no control without any debriefing. There is no discussion of study funding.

Townsend RN, Clark R, Ramenofsky ML, Diamond DL. ATLS-based videotape trauma resuscitation review: education and outcome. J Trauma. 1993 Jan;34(1):133-8.

Level 3, fair, favorable. Observational study of an educational intervention of videorecording and debriefing of trauma resuscitations using a historic control. 522 resuscitations in the second half of two academic years which were videotaped and debriefed with the resuscitation teams were compared to 361 resuscitations in the second half of the two preceding years. Outcomes were time spent in ER, abbreviated injury scale scores (AIS), ISS and mortality. Time spent in the ER was significantly shorter in the intervention period. DPL time was also longer in the control group. Mortality was unchanged despitea higher than expected survival using TRISS evaluation in the intervention group. P-values were not adjusted for the multiple tests (ie Bonferoni). No discussion of study funding.

DeFontes, J., and Subida, S (2007). Preoperative Safety Briefing Project. Permanente Journal 8(2):21-27.

Level 5, fair, supportive
Preoperative briefing for surgical teams was introduced at a single institution. The perception of safety and positive teamwork (measured by Safety Attitude Questionnaire) improved. Wrong-site surgeries decreased from 3 the year before intervention to 0 the year after. Limitations: the measured outcomes were mainly based on perceptions, giving limited data for comparison. Confounders were not controlled as this was a before-and-after study.

Insufficent data for inclusion

DeVita, M. A., J. Schaefer, et al. (2005). "Improving medical emergency team (MET) performance using a novel curriculum and a computerized human patient simulator." Quality & Safety in Health Care 14(5): 326-331.

No control: unable to separate the effects of debriefing from experience. Favorable.

Santora TA, Trooskin SZ, Blank CA, Clarke JR, Schinco MA. Video assessment of trauma response: adherence to ATLS protocols. Am J Emerg Med. 1996 Oct;14(6):564-9.

No control: unable to separate the effects of debriefing from experience. Favorable.

Carbine, D. N., N. N. Finer, et al. (2000). "Video recording as a means of evaluating neonatal resuscitation performance." Pediatrics 106(4): 654-658.

No control: unable to separate the effects of debriefing from experience. Favorable.

Olasveengen, T. M., A. E. Tomlinson, et al. (2007). "A failed attempt to improve quality of out-of-hospital CPR through performance evaluation." Prehospital Emergency Care 11(4): 427-433.

Not a trial of debriefing but rather feedback of aggregated results to head instructors in OOHCA. Neutral.

Adams, D. A., J. Dobbs, et al. A model to enhance staff response in cardiopulmonary arrest. Journal of Nursing Care Quality, 2000; 17(1): 43-50.

Discussion on developing an education session and did not address question.

Haller, G., P. Garnerin, et al. (2008). "Effect of crew resource management training in a multidisciplinary obstetrical setting." International Journal for Quality in Health Care 20(4): 254-263.

Intervention did not include briefing or debriefing.

Makary, M. A., C. G. Holzmueller, et al. (2006). "Operating room debriefings." Joint Commission Journal on Quality & Patient Safety 32(7): 407-10.

No interventions tested. Article was a description regarding application and implementation of debriefings.

Grogan, E. L., R. A. Stiles, et al. (2004). "The impact of aviation-based teamwork training on the attitudes of health-care professionals." Journal of the American College of Surgeons 199(6): 843-8.

Intervention did not have briefing or debriefing as a component.

France, D. J., S. Leming-Lee, et al. (2008). "An observational analysis of surgical team compliance with perioperative safety practices after crew resource management training." American Journal of Surgery 195(4): 546-53.

Measured outcome was compliance to CRM practices rather than team performance.

Barker, J. M., C. C. Clothier, et al. (1996). "Crew resource management: a simulator study comparing fixed versus formed aircrews." Aviation Space & Environmental Medicine 67(1): 3-7.

Study did not test the effect of briefing/debriefing or CRM as an intervention, but rather looked at the effects of simulation as the intervention.

Gaba, D. M., S. K. Howard, et al. (1998). "Assessment of clinical performance during simulated crises using both technical and behavioral ratings.[see comment]." Anesthesiology 89(1): 8-18.

Intervention did not include briefing or debriefing.

Fisher, J., E. Phillips, et al. (2000). "Does crew resource management training work?" Air Medical Journal 19(4): 137-9.

No intervention was tested. The study surveyed air medical programs to see correlation between CRM training and other outcomes.

Morey, J. C., R. Simon, et al. (2002). "Error reduction and performance improvement in the emergency department through formal teamwork training: evaluation results of the MedTeams project." Health Services Research 37(6): 1553-81.

Intervention included components other than debriefing, and the effects of debriefing were not isolated. Favorable.

Taylor, C. R., J. T. Hepworth, et al. (2007). "Effect of crew resource management on diabetes care and patient outcomes in an inner-city primary care clinic." Quality & Safety in Health Care 16(4): 244-7.

Intervention included components other than debriefing, and the effects of debriefing were not isolated. Favorable.

McCulloch, P., A. Mishra, et al. (2009). "The effects of aviation-style non-technical skills training on technical performance and outcome in the operating theatre." Quality & Safety in Health Care 18(2): 109-15.

Intervention included components other than debriefing, and the effects of debriefing were not isolated. Favorable.

Awad, S. S., S. P. Fagan, et al. (2005). "Bridging the communication gap in the operating room with medical team training." American Journal of Surgery 190(5): 770-4.

Intervention included components other than debriefing, and the effects of debriefing were not isolated. Favorable.

Nielsen, P. E., M. B. Goldman, et al. (2007). "Effects of teamwork training on adverse outcomes and process of care in labor and delivery: a randomized controlled trial.[see comment]." Obstetrics & Gynecology 109(1): 48-55.

Intervention included components other than debriefing, and the effects of debriefing were not isolated. Furthermore, measured outcomes were not in hospital resuscitation but rather in labor and delivery. Favorable.