WORKSHEET for Evidence-Based Review of Science for Veterinary CPCR

1. Basic Demographics

Worksheet author(s)

Patricia Walters	**Date Submitted for review:** 4/11/11

[redacted]

2. Clinical question:

In veterinary CPR providers (P) does debriefing after CPR (I) compared with no debriefing (C), improve outcome (O) (eg. CPR performance, ROSC, survival to discharge) (O)?

3. Conflict of interest specific to this question:

None

4. Search strategy (including electronic databases searched):

4a. Databases

Pub Med on 5/29/11
Debriefing and cardiac arrest and survival: 10 hits
Debriefing and heart arrest: 21 hits
Debriefing and resuscitation: 61 hits
Debriefing and resuscitation and ROSC: 2 hits
Debriefing and ACLS and survival: 1 hit
Debriefing and CPR and ROSC: 1 hit
Debriefing and CPR: 33 hits
CPR and crew resource management: 3 hits
CPR and quality assurance and survival: 277 hits

EMBASE 5/29/11
Debriefing and CPR: 17 hits
Debriefing and cardiac arrest: 33 hits
Debriefing and cardiac arrest team and outcome: 4 hits
Debriefing and cardiac arrest and outcome: 13 hits
Debriefing and heart arrest: 21 hits
Debriefing and ACLS and survival: 2 hits
Team training and CPR: 85 hits
Patient care team and CPR and outcome: 61 hits
Training and CPR and outcome: 206 hits
Debriefing and hospital team and outcome: 15 hits
CPR and team training 83 hits
CPR and quality assurance and survival: 8 hits

CAB abstracts via OVID 1910 to 2011 week 20 on 5/29/11
CPR and outcome and debriefing (basic search no related terms): 16 hits
CPR and ROSC and feedback (basic search no related terms): 155 hits
Resuscitation and debriefing and survival (basic search no related terms): 118 hits
Cardiac arrest and ROSC and survival (basic search including limited related terms): 823 hits
Cardiac arrest and ROSC and debriefing (basic search no related terms): 108 hits

4b. Other sources

4c. State inclusion and exclusion criteria for choosing studies and list number of studies excluded per criterion

Inclusion criteria

Peer reviewed
Retrospective
Prospective
Simulation
Review

Exclusion criteria

Abstract or Poster only
Foreign language
Editorial

4d. Number of articles/sources meeting criteria for further review:

Search on 5/29/11

PubMed

[Debriefing and cardiac arrest and survival] 10 hits
8 relevant articles for further review
1 Addition of voice prompts to AV feedback and debriefing Bohn A, Weber TP et al, 2011
1 Addition of debriefing additive to AV feed back, manikin study Dine CJ, Gersh RE et al, 2008
1 Performance debriefing after CPR improves performance Edelson DP, Litzinger B et al 2008
1 Simulation training plus debriefing improves performance DeVita MA 2005
3 reviews to scan for additional references (Soar, Seethala, Steen)

[Debriefing and heart arrest] 21 hits
3 further articles for review
1 Anesthesia residents no improvement with no debriefing Salvodelli GL, Naik VN et al, 2006
1 Recent simulation training improved response in CPR Smith HM, Jacob AK et al 2008
1 Simulation training plus debriefing no difference Weidman EK, Bell G 2010

[Debriefing and Resuscitation] 61 hits
2 further articles for review
1 AV training device and debrief improves performance in manikin CPR Krasteva V, Jekova I, 2011
1 Computer audiovisual debriefing as effective as oral debriefing Welke TM, LeBlanc VR 2009

[Debriefing and Resuscitation and ROSC] 2 hits
0 additional articles identified

[Debriefing and ACLS and Survival] 2 hits
0 additional articles identified

[Debriefing and CPR and ROSC] 1 hit
0 additional articles identified

[Debriefing and CPR] 33 hits
1 further article for review
1 Postsimulation debrief vs In simulation debrief Van Heukelom JN, Begaz T, 2010

[CPR and Crew Resource Management] 3 hits
0 additional articles identified

[CPR and Quality Assurance and Survival] 277 hits
4 additional articles identified
3 Further articles for review
1 CPR quality improvement during in-hospital cardiac arrest using a real-time audiovisual feedback system Abella, Edelson 2010
1 Quality of out-of-hospital CPR with real-time automated feedback: a prospective interventional study Kramer-Johansen, Myklebust H, 2006
1 Efficacy of High Fidelity Simulation Debriefing on anesthetist performance Morgan PJ, Tarshis J et al 2009
1 additional review to scan for references Bhanji F, 2010

Embase

[Debriefing and CPR]: 17 hits
0 additional relevant articles

[Debriefing and cardiac arrest]: 33 hits
0 additional articles identified

Debriefing and cardiac arrest team and outcome: 4 hits
0 additional articles identified

Debriefing and cardiac arrest and outcome: 13 hits
0 additional articles identified

Debriefing and heart arrest: 21 hits
1 relevant article identified for further review
1 Simulation and debriefing improves pediatric CPR survival Andreatta P, Saxton E

[Debriefing and ACLS and survival] 2 hits
0 additional articles for review

[Team training and CPR] 85 hits
0 additional articles for review

[Patient care team and CPR and outcome] 61 hits
0 additional articles for review

[Training and CPR and outcome] 206 hits
0 additional articles for review

[Debriefing and hospital team and outcome]: 15 hits
0 additional articles for review

[CPR and team training] 83 hits
0 additional articles for review

[CPR and quality assurance and survival]: 8 hits
0 additional articles for review

CAB abstracts OVID
[CPR and Outcome and debriefing (Basic search, No related terms)] 16 hits
0 relevant articles

[CPR and ROSC and Feedback (Basic search, No related terms)] 155 hits
0 relevant articles

[Resuscitation and debriefing and survival (Basic search, no related terms:] 118 hits
Several Veterinary review articles

[Cardiac arrest and ROSC and survival (basic search, no related terms)]: 838 hits
1 review to scan for references (Scroggin JD, Quandt 2009)

[Cardiac arrest and ROSC and debriefing] basic search, no related terms)]: 108 hits
0 relevant articles

Google Scholar cited by (Edelson et al)
No additional relevant articles identified

5. Summary of evidence

Evidence Supporting Clinical Question

Good						Andreatta P 2011 DeVita MA 2005 Dine CJ 2008 Morgan 2009 Salvodelli 2006
Fair						Abella BS 2007 Edelson DP 2008 Krasteva V 2011 Smith 2008 Welke TM 2009
Poor						
	1	**2**	**3**	**4**	**5**	**6**
Level of evidence (P)						

A = Return of spontaneous circulation
B = Survival of event
C = Survival to hospital discharge
D = Intact neurological survival
E = Other endpoint
Italics = Non-target species studies

Evidence Neutral to Clinical question

Good						Weidman EK 2010
Fair						Bohn A 2011
Poor						VanHeukelom 2010
	1	**2**	**3**	**4**	**5**	**6**
Level of evidence (P)						

A = Return of spontaneous circulation
B = Survival of event
C = Survival to hospital discharge
D = Intact neurological survival
E = Other endpoint
Italics = Non-target species studies

Evidence Opposing Clinical Question

Good						
Fair						
Poor						
	1	**2**	**3**	**4**	**5**	**6**
Level of evidence (P)						

A = Return of spontaneous circulation
B = Survival of event
C = Survival to hospital discharge
D = Intact neurological survival
E = Other endpoint
Italics = Non-target species studies

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

7. Conclusion

In studies of human CPR, debriefing appears to improve performance measured as ROSC (return of spontaneous circulation), decreased ventilation and improved chest compression depth. A potential issue in many of these studies is whether automated feedback is the same teaching tool as debriefing. The two are very similar with the exception that the CPR responder can instantly adjust to automated feedback but if the intervention is debriefing the CPR provider needs to wait until the next CPR intervention to make adjustments in technique. It seems that the two could be treated equally despite that assessment of performance for automated feedback is immediate and the assessment of performance after debriefing is delayed until the next scenario.
Overall, debriefing seems to be a practical tool that can provide significant benefit in veterinary CPR if routinely utilized. This is an easy to apply method that can be used even without the immediate feedback manikin devices that are utilized in human medicine. A veterinary manikin could be developed for use in training.

8. Acknowledgement

9. Citation list

Abella BS , Edelson DP CPR quality improvement during in-hospital cardiac arrest using a real-time audiovisual feedback system Resuscitation (2007) **73**, 54-61. This is a prospective study evaluating real time audiovisual feedback via a defibrillator/monitor. It is an extension from studies performed in manikins that show improvement in CPR technique designed to determine if in-hospital human CPR would demonstrate similar improvements. This is a sequential study performed over 2 serial periods of time, not a randomized, controlled trial. Patients were enrolled consecutively but importantly those in the operating room or emergency room were not included because these areas of the hospital did not utilize the same team for resuscitation. Only CPR performance (not outcome measures) were evaluated. Compression depth, no flow fraction, compression pauses and ventilation rate were evaluated. A total of 55 patients were evaluated in the baseline cohort. A total of 101 patients were in the intervention group. There were no statistically significant differences in the demographics of the 2 groups. However, the power of the study is low due to the small number of patients enrolled. There were no statistically significant changes in CPR performance levels (i.e. the changes were slight and could reflect a trend towards improvement). **Evidence Supporting clinical question LOE 6 fair**

Andreatta P, Saxton E Simulation-based mock codes significantly correlate with improved pediatric patient cardiopulmonary arrest survival rates. Pediatric Critical Care Med 2011; 12:33–38. Clinicians responsible for pediatric resuscitations responded to mock codes randomly called at increasing rates over a 48-month period, just as they would an actual CPA event. Events were recorded and used for immediate debriefing facilitated by clinical faculty to provide residents feedback about their performance. Survival rates increased to approximately 50%, correlating with the increased number of mock codes. This is an impressive study, both simulation and debriefing were utilized to provide a sustained increase in survival of pediatric patients. **Evidence Supporting clinical question LOE 6 Good**

Bohn A, Weber TB et al; The addition of voice prompts to audiovisual feedback and debriefing does not modify CPR quality or outcomes in out of hospital cardiac arrest – A prospective, randomized trial. Resuscitation 82 (2011) 257–262. All groups were debriefed. Feedback was given via an external automated defibrillator. Limited feedback is as efficacious as extended feedback. Survival did not differ between the extended and limited feedback groups (47.8% vs 43.9%, p = 0.49). Average compression depth (mean±SD: 4.74±0.86cm vs 4.84±0.93 cm, p = 0.31) was similar in both groups. There were no differences in compression rate (103±7 vs 102±5 min(−1), p = 0.74)or hands-off fraction (16.16%±0.07 to 17.04%±0.07, p = 0.38). Bystander CPR, public arrest location, presenting rhythm and chest compression depth were predictors of short term survival (ROSC to ED). Historical control group used for comparison is from Wik et al. **Evidence Neutral to clinical question LOE 6 Fair**

DeVita MA, Schaefer J, Improving medical emergency team (MET) performance using a novel curriculum and a computerized human patient Simulator. Qual Saf Health Care 2005;14:326–331. A group of ACLS trained nurses, physicians and respiratory therapists were trained a web based presentation and pretest before the course; a brief reinforcing didactic session on the day of the course; three of five different simulated scenarios; each followed by debriefing and analysis with the team. Debriefing focused on reinforcing organizational aspects of team performance: assuming designated roles independently, completing goals (tasks) assigned to each role, and directed communication. Simulator ''survival'' depended on supporting oxygenation, ventilation, circulation within 60 seconds, and delivering the definitive treatment within 3 minutes. Simulated survival (following predetermined criteria for death) increased from 0% to 89%. The initial team task completion rate was 10–45% and rose to 80–95% during the third session. **Evidence Supportive of Clinical Question LOE 6 Good**

Dine CJ, Gersh RE et al, 2008 Improving cardiopulmonary resuscitation quality and resuscitation training by combining audiovisual feedback and debriefing. Crit Care Med 2008; 36:2817–2822; Prospective, randomized, interventional study. Three groups of nurses underwent three trials of simulated cardiac arrest. The "feedback" group received real-time audiovisual feedback during the second and third trials, whereas the "debriefing-only" group performed cardiopulmonary resuscitation without feedback. Both groups received short individual debriefing after the second trial. **Evidence Supportive of Clinical Question LOE 6 Good**

Edelson DP, Litzinger B et al 2008 The combination of RAPID and realtime audiovisual feedback improved CPR quality compared with the use of feedback alone and was associated with an increased rate of return of spontaneous circulation. Cardiopulmonary resuscitation quality and outcome data from 123 patients resuscitated during the intervention period were compared with 101 patients in the baseline cohort. Compared with the control period, the mean (SD) ventilation rate decreased (13 [7]/min vs 18 [8]/min; *P*_.001) and compression depth increased (50 [10] vs 44 [10] mm; *P*=.001), among other CPR improvements. These changes correlated with an increase in the rate of return of spontaneous circulation in the RAPID group (59.4% vs 44.6%; *P*=.03) but no change in survival to discharge (7.4% vs 8.9%; *P*=.69). **Evidence Supportive of Clinical Question LOE 6 Fair**

Krasteva V, Jekova I An audiovisual feedback device for compression depth, rate and complete chest recoil can improve the CPR performance of lay persons during self-training on a manikin. Physiological Measurement 32 (2011) 687–699. This is a prospective study in which 63 lay people received a debriefing to basic life support and then performed two consecutive 3 min trials of hands-only CPR on a manikin. Volunteers performed CPR on a manikin and then received a debriefing to basic life support techniques. Each volunteer then performed two consecutive 3 min trials of hands-only CPR on the manikin with 3 min resting period in between. In trial 1 the participants did not receive a feedback from the CC-Device in order to assess the pre-training skills of the lay persons. In trial 2 the participants received full visual feedback and audio guidance from the CC-Device in order to assess the training process. The high quality of compression-only CPR during training was attained when the full attention of the trained person was focused on the audio guidance and the visual feedback CC-Device indications. There was no control group per se, each individual served as their own control (ie pre-training performance evaluation in Trial 1). This study supports the concept that AV feedback can improve CPR skills in lay persons (increased compression depth). **Evidence supportive of clinical question LOE 6 Fair**

Morgan PJ, Tarshis J 2009 Efficacy of High Fidelity Simulation Debriefing on anesthetist performance. Three groups of anesthetists were randomly assigned to simulation debriefing (A), home study (B) or no intervention (C). Two surgical scenarios were generated, each of which required an ACLS intervention. After random assignment of the intervention, each individual within the group was randomly assigned to scenario 1 or scenario 2 as a pre-test. Each individual was then retested with the alternate scenario at the end of the study. Group A (debriefing) demonstrated significant improvement over the other 2 groups following the debriefing intervention. This study strongly supports the process of debriefing in that the debriefing group achieved sustained improvement for 6-9 months after the test scenario. **Evidence Supportive of clinical question LOE 6 Good**

Salvodelli GL, Naik VN et al, Value of Debriefing During Simulate Crisis Management, Anesthesiology 2006; 105:279–85
Forty-two anesthesia residents were enrolled in the study. After completing a pretest scenario, participants were randomly assigned to receive no debriefing, oral feedback, or videotape-assisted oral feedback. The debriefing focused on nontechnical skills performance guided by crisis resource management principles. Participants were then required to manage a posttest scenario. The videotapes of all performances were later reviewed by two blinded independent assessors who rated participants' nontechnical skills using a validated scoring system. *Results:* Participants' nontechnical skills did not improve in the control group, whereas the provision of oral feedback, either assisted or not assisted with videotape review, resulted in significant improvement ($P < 0.005$). There was no difference in improvement between oral and video-assisted oral feedback groups. *Conclusions:* Exposure to a simulated crisis without constructive debriefing by instructors offers little benefit to trainees. The addition of video review did not offer any advantage over oral feedback alone. Valuable simulation training can therefore be achieved even when video technology is not available. **Evidence supportive of Clinical Question LOE 6 Good**

Smith HM, Jacob AK et al Simulation Education in Anesthesia Training: A Case Report of Successful Resuscitation of Bupivacaine-Induced Cardiac Arrest Linked to Recent Simulation Training. 2008 This a case where the prompt and effective response to a cardiac arrest event induced by a reaction to a spinal anesthetic (bupivicaine) was attributed to a recent simulation training event that 2 of the anesthesiologists had attended. The training was regarding local anesthetic complications. Their attendance was felt to have resulted in a more immediate and effective response to the patient in this report (patient survived). **Evidence Supportive of Clinical Question LOE 6 Fair**

VanHeukelom JN, Begaz, T Comparison of Postsimulation Debriefing Versus In-Simulation Debriefing in Medical Simulation. Simulation in Healthcare 5:91–97, 2010. This study evaluates the performance of third year medical students in 2 simulated medical events. The first is ventricular fibrillation and the second is third degree AV block that required pacing. The study found that debriefing following the medical events was more effective that feedback during the event. The simulations in this study made it awkward for instructors to give feedback without interrupting the process of CPR. There was no difference between the 2 groups (i.e. both debriefing approaches appeared to be useful). No real outcome or performance improvement measures were evaluated. **Evidence neutral to clinical Question LOE 6 Poor**

Weidman EK, Bell G Assessing the impact of immersive simulation on clinical performance during actual in-hospital cardiac arrest with CPR-sensing technology: A randomized feasibility study. Resuscitation 81 (2010) 1556–1561. This is the first study to prospectively evaluate the effects of an immersive simulation curriculum with video-assisted debriefing on CPR quality during actual resuscitations. There was no difference detected between residents who were trained versus those who received no additional training, however, the authors postulate that a larger study with lower baseline performance of the study subjects (ie less well trained residents) might detect a difference. **Evidence neutral to Clinical Question LOE 6 Good**

Welke TM, LeBlanc VR Personalized Oral Debriefing Versus Standardized Multimedia Instruction After Patient Crisis Simulation Anesth Analg 2009;109:183–9). First and second year anesthesia residents participated in simulation scenarios utilizing a manikin, of common crises that occur during anesthesia. The trial used a prospective randomized design with two treatment groups: traditional personalized video-assisted oral debriefing or a standardized computer-based multimedia debriefing. Three ACLS situations were simulated. One group received traditional oral feedback from an experienced instructor. The second group received instruction through a standardized multimedia presentation that was learner controlled with a computer. The results disclosed no significant difference between the 2 methods of instruction implying that multimedia instruction may be as effective as personalized video-assisted oral debriefing. **Evidence supportive of clinical question LOE 6 fair**