WORKSHEET for Evidence-Based Review of Science for Veterinary CPCR

1. Basic Demographics

Worksheet author(s)

James Barr	**Date Submitted for review:** 4/11/11

[redacted]

2. Clinical question:

In veterinary CPR teams (P), does a more experienced team leader (board certified, advanced training) (I) compared to a less experienced team leader (house officer, non-boarded clinician) improve outcome (O) (eg. ROSC, survival to discharge)?

3. Conflict of interest specific to this question:

Do any of the authors listed above have conflict of interest disclosures relevant to this worksheet?

No

4. Search strategy (including electronic databases searched):

4a. Databases

Pubmed

- **Limits Activated:** Veterinary Science
- #2 = resuscitation AND outcome – 605 results, 7 relevant matches
- #3 = #2 and experience – 11 results, 0 relevant matches
- #4 = #2 and training – 6 results, 0 relevant matches
- #5 = resuscitation and survival – 959 results
- #6 = #5 and training - 11 results, 0 relevant matches
- #7 = #5 and experience - 15 results, 1 relevant match
- #8 = arrest and outcome - 462 results, no additional matches
- #9 = #8 and experience - 5 results, no additional matches
- #10 = #8 and training - 5 results, no additional matches
- #11 = arrest and survival – 931 results
- #12 = #11 and experience - 12 results, no additional matches
- #13 = #11 and training - 5 results, no additional matches

CAB

- same as for pubmed

4b. Other sources

Google Scholar

- arrest training veterinary resuscitation – 943 matches, 5 relevant matches

Veterinary Information Network

- arrest training veterinary resuscitation – 0 matches
- arrest training resuscitation – 5 matches, 0 relevant matches
- CPR training - 8 matches, 0 relevant matches

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

Inclusion criteria

Studies describing cardiac arrest in veterinary patients describing outcome and team leader of CPR. Applicable human medical literature.

Exclusion criteria

articles that do not discuss the people that performed CPR
case reports
experimental studies that include mechanical means for compressions

4d. Number of articles/sources meeting criteria for further review: 13

- 0 randomized trials
- 3 retrospective veterinary studies = 0 with pertinent information
- 3 veterinary review articles = 0 with pertinent information
- 7 relevant animal studies were identified = 0 with pertinent information
-

5. Summary of evidence

Evidence Supporting Clinical Question

Good						Olasveengen 2009; E=better quality CPR
Fair						Schneider 1994; E=better quality CPR
Poor						Dickinson 1997; C Soo 1999; C
	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						Estner 2007; C Gottschalk 2002; C
Fair						Olasveengen 2009; B, C Frandsen 1991; C Eisenburger 2001; C Schneider 1994; C Yen 2006; C
Poor						Dickinson 1997; B Soo 1999; C Hampton 1977; C
	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						Yen 2006; B
Poor						Mitchell 1997; C
	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:

The presence of a more experienced person being the team leader in CPR has been investigated in the human literature extensively. Unfortunately there is no published literature in veterinary medicine discussing if the presence of a more experienced team leader improves outcome.

Conventional wisdom would indicate that a more experienced leader would create a smoother CPR and fewer mistakes made. The human literature is mixed in this area and indicates that there is no clear consensus on if it makes a difference or not. The evidence in this area comes mainly from studies investigating the benefit of physicians manning ambulances and comparing CPR performed with and without a physician present. Studies that indicate that there is a positive impact of physicians involved in CPR mostly center around that CPR went better (Olasveengen 2009, Schneider 1994) and that there was a modest improvement in survival with physicians present (Dickinson 1997, Soo 1999).

The bulk of the evidence demonstrates that there is no difference with physicians present in either survival of the event (Olasveengen 2009, Dickinson 1997) or survival to discharge (Olasveengen 2009, Frandsen 1991, Estner 2007, Eisenburger 2001, Gottschalk 2002, Hampton 1977, Schneider 1994, Soo 1999, Yen 2006). There are, in fact, a few studies that report worse outcome when physicians are present (Mitchell 1997, Yen 2006).

7. Conclusion

There are no randomized, controlled clinical trials exploring this in either the human or veterinary medical fields. Based on the existing, conflicting human evidence, there is no evidence that there is any benefit or harm from a more experienced team leader in CPR.

8. Acknowledgement

9. Citation list

1. *Olasveengen TM, Lund-Kordahl I, Steen PA, et al. Out-of hospital advanced life support with or without a physician: Effects on quality of CPR and outcome. Resuscitation. 2009;80:1248 –1252.*

The physician present arrests had more positive prognostic indicators (bystander witnessed arrests and initial VF/VT) and the CPRs went better (shorter hands-off intervals and pre-shock pauses and having a greater proportion of patients intubated) The physician present arrests, however, had no better short-term and long-term outcomes despite having a group of patients that had more positive prognostic factors and better CPR quality.

Value	PMA	Non PMA	p value
ROSC	34%	33%	(p = 0.74) achieving return of
Surviving event	28%	25%	(p = 0.50)
Hospital discharge	13%	11%	(p = 0.28)

2. *Schneider T, Mauer D, Diehl P, et al. Quality of on-site performance in prehospital advanced cardiac life support (ACLS). Resuscitation. 1994;27:207–213.*

162 out-of-hospital cardiac arrests (ventricular fibrillation or ventricular tachycardia = 72; asystole or EMD = 90). Patients with arrests due to non-cardiac etiologies were excluded. Physicians diagnosed arrest rhythm quicker, but countershocks were delivered at the same time. All patients were intubated and given epinephrine within 4 minutes.
Weaknesses: small n. Did not assess outcome differences.

3. *Dickinson ET, Schneider RM, Verdile VP. The impact of prehospital physicians on out-of-hospital non-asystolic cardiac arrest. Prehosp Emerg Care. 1997;1:132–135.*

Looked at out-of-hospital nontraumatic, nonasystolic cardiac arrest. **Retrospective case series.** N= 49 nine in the physician group and 40 in the paramedics only group. There was no difference between the groups with respect to age, response time, scene time, number of personnel on the scene initial cardiac rhythm, the presence of bystander or first-responder CPR, and time to first defibrillation.
Results: Nonsignificant tendency toward more frequent ROSC in the OSMCP group [$p < 0.07$], and a significantly higher incidence of survival to discharge in the OSMCP group [$p < 0.009$].

4. *Soo LH, Gray D, Young T, et al. Resuscitation from out-of-hospital cardiac arrest: Is survival dependent on who is available at the scene? Heart. 1999;81:47–52.*

Retrospective, observational study. 1547 patients whose arrest were of cardiac etiology.
Results: Patients resuscitated by a paramedic from out-of-hospital cardiac arrest caused by cardiac disease were more likely to survive to hospital discharge than when resuscitation was provided by an ambulance technician. Resuscitation by a paramedic assisted by a physician gave the best chances of surviving the event.

5. *Frandsen F, Nielsen JR, Gram L, et al. Evaluation of intensified prehospital treatment in out-of hospital cardiac arrest: Survival and cerebral prognosis. The odense ambulance study. Cardiology. 1991;79:256 –264.*

393 out-of-hospital cardiac arrest presided over by people with basic, intermediate, or advanced care training. No statistical difference in outcome found but basic EMS had 5% discharge; specially trained paramedics 1% were discharged; and ambulances with doctors collaborating 13% were discharged.

6. *Estner HL, Gunzel C, Ndrepepa G, et al. Outcome after out-of-hospital cardiac arrest in a physician staffed emergency medical system according to the utstein style. Am Heart J. 2007;153:792–799.*

Prospective, observational study with 539 consecutive patients with out of hospital cardiac arrest. 11.4% were discharged alive. Multivariate analysis identified v-fibrillation on first ECG, observed arrest, short response time intervals were independent predictor of survival, but not the unit that performed the first CPR.

7. *Eisenburger P, Czappek G, Sterz F, et al. Cardiac arrest patients in an alpine area during a six year period. Resuscitation. 2001;51:39–46.*

Descriptive observational study with prospective data collection. 338 patients resuscitation was attempted. ROSC in 46% of v-fibrillation. Data focused on the v-fib patients. Very small non-physician group and no statistical significance reported.

8. *Gottschalk A, Burmeister MA, Freitag M, et al. Influence of early defibrillation on the survival rate and quality of life after CPR in prehospital emergency medical service in a german metropolitan area. Resuscitation. 2002;53:15–20.*

Prospective observational . All patients ventricular fibrillation of cardiac origin. Evaluated early defibrillation by EMTs against defibrillation by physicians. N = 103 Found that there was a higher incidence of return of a spontaneous circulation, a reduced need for antiarrhythmics and shorter in-hospital treatment times but no difference in discharge.

9. *Hampton JR, Dowling M, Nicholas C. Comparison of results from a cardiac ambulance manned by medical or non-medical personnel. Lancet. 1977;1:526 –529.*

In a 20-month period in one "cardiac" ambulance was manned on alternate days by specially-trained ambulance personnel only or by such personnel AND a doctor. The presence of a doctor did not lead to any reduction in the mortality of patients with heart-attacks.

10. *Schneider T, Mauer D, Diehl P, et al. Early defibrillation by emergency physicians or emergency medical technicians? A controlled, prospective multi-centre study. Resuscitation. 1994;27:197–206.*

Prospective multi-center observational study, EMTs was compared with defibrillation by emergency physicians. 159 patients with VF only. No difference in discharge from hospital or long-term outcome.

11. *Soo LH, Gray D, Young T, et al. Influence of ambulance crew's length of experience on the outcome of out-of hospital cardiac arrest. Eur Heart J. 1999;20:535–540.*

Retrospective observational study investigating whether an ambulance crew's length of experience affected the outcome of out-of-hospital cardiac arrest. 1547 consecutive arrests of cardiac etiology. The chances of a patient surviving to be discharged from hospital alive did not appear to be affected by the paramedic's length of experience (among survivors, 18 months experience vs non-survivors 16 months experience, P=0.347).

12. *Yen ZS, Chen YT, Ko PC, et al. Cost-effectiveness of different advanced life support providers for victims of out-of-hospital cardiac arrests. J Formos Med Assoc. 2006; 105:1001–1007.*

Prospective, observational, multicenter study comparing ALS provided by EMTs vs. physicians for the management of victims of out of hospital cardiac arrest. Non-traumatic cardiac arrests in Taiwan.
The survival to discharge rate was 9.3% for the EMT program and 2.6% for the EP program which was NON-significant. Survival of the episode was 37.2% for the EMTs and 14.8% for physicians demonstrating a WORSE outcome when a more experienced person performed CPR.

13. *Mitchell RG, Brady W, Guly UM, et al. Comparison of two emergency response systems and their effect on survival from out of hospital cardiac arrest. Resuscitation. 1997;35:225–229.*

This study indirectly compares two groups of centers that perform CPR. It indicates that centers that have first responders do CPR (Edinburgh) rather than physicians as a first responder (Milwaukee) have better outcome. The cases in Edinburgh had a significantly higher survival to discharge (12.4% vs. 7.2%, $P < 0.01$). The patients in Edinburgh were more likely to have a witnessed arrest and to receive bystander CPR. When those two effects were accounted for there was no difference in outcome.