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

Worksheet author(s)

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Clinical question.

In BLS providers (P), does video self-instruction (I) compared with traditional instructor-led courses (C) improve skill acquisition and retention (O)?

Is this question addressing an intervention/therapy, prognosis or diagnosis?   Intervention

State if this is a proposed new topic or revision of existing worksheet: New topic

Conflict of interest specific to this question

Do any of the authors listed above have conflict of interest disclosures relevant to this worksheet?
Co-author of one paper quoted (Jones et al 2007). Research and other studies published on subject of self-instruction.

Search strategy (including electronic databases searched).

UPDATED SEARCH 16 AUGUST 2009

Medline (direct); Scopus: to 2009

Basic life support OR BLS AND skill acquisition	1 hit Medline; 1 hit Embase - none relevant
Basic life support OR BLS AND video	1 hit Medline; 2 hits Embase – none relevant
Basic life support OR BLS AND self-instruction	0 hits Medline; 0 hits Embase
Basic life support OR BLS AND DVD	1 hit Medline; 8 hits Embase – none relevant
Basic life support OR BLS AND instruction	1 hit Medline; 3 hits Embase – none relevant

No hits on Cochrane; no further hits on EndNote

End Note Library X1 2008
Basic life support OR BLS AND video
Basic life support OR BLS AND instruction
Basic life support OR BLS AND distance-learning
Basic life support OR BLS AND teaching
CPR AND teaching
E-learning
Self-instruction

Follow-up of references including citations via Scopus

Embase: 1974 – 2009 (April)
Search strategies as for Medline

Cochrane Database: To 2009
None found

• State inclusion and exclusion criteria
All results to 16 August 2009
None for initial search
Review inclusion: Comparison of video/DVD/on-line self-instruction with instructor-led course
Review exclusion: AED only

• Number of articles/sources meeting criteria for further review:
734 papers met the above initial criteria; 69 papers were reviewed; 13 papers met the review inclusion criteria; 1 paper was subsequently discarded; 12 papers relevant.

Updated search: A further 12 papers met the criteria (some overlap Medline with Embase); 3 papers reviewed – none relevant to question.

Summary of evidence

Evidence Supporting Clinical Question

Good	Lynch 2005 E				
Fair	Todd 1998 E Einspruch 2007 E	Batcheller 2000 E	Braslow 1997 E		
Poor		Moule 2008 E			
	1	**2**	**3**	**4**	**5**
	Level of evidence				

A = Return of spontaneous circulation   C = Survival to hospital discharge   E = Other endpoint
B = Survival of event   D = Intact neurological survival   *Italics = Animal studies*

Evidence Neutral to Clinical question

Good	Todd 1999 E				
Fair	Reder 2006 E	Liberman 2000 E Isbye 2006 E Jones 2007 E			
Poor	Roppolo 2007 E				
	1	**2**	**3**	**4**	**5**
	Level of evidence				

A = Return of spontaneous circulation   C = Survival to hospital discharge   E = Other endpoint
B = Survival of event   D = Intact neurological survival   *Italics = Animal studies*

Evidence Opposing Clinical Question

Good					
Fair					
Poor	Dracup 1998 E				
	1	**2**	**3**	**4**	**5**
	Level of evidence				

A = Return of spontaneous circulation   C = Survival to hospital discharge   E = Other endpoint
B = Survival of event   D = Intact neurological survival   *Italics = Animal studies*

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

Five studies (3 LOE 1: Lynch 2005, 31; Todd 1998, 364; Einspruch 2007, 476. 1 LOE 2: Batcheller 2000, 101. 1 level 3: Braslow 1997, 207) showed that subjects self-taught CPR by use of a video (8-34 min duration) have significantly better skills at the end of training than those attending a traditional, instructor-led course of 1-6 hours duration. The skills acquired through self-instruction deteriorate, but at about the same speed as those acquired through an instructor-led course.

A single study (LOE 2: Moule 2008, 427) showed that healthcare professionals learnt BLS/AED theory as well from an e-learning program as from an instructor.

Six studies (3 LOE 1: Todd 1999, 730; Reder 2006 ,443; Roppolo 2007, 276. 3 LOE 2: Liberman 2000, 249; Isbye 2006, 435;   Jones 2007, 350) showed no significant difference in skill acquisition and/or retention for video (interactive computer program in one case), self-instruction or instructor-led teaching, but the tendency was for video self-instruction to give better results.

A single study (LOE 1: Dracup 1998, 170) showed better infant CPR skill acquisition after instructor-led training than video, but study protocol had deficiencies.

Although different studies identified certain skills that appeared to be better acquired by self-instruction or instructor-led training, the skills were not consistent from study to study and no conclusions can be drawn.

Most studies included manikin practice for both self- and instructor- training, but one study (Reder 2006, 443) showed better skills when the subjects had hands-on practice.

Citation List

Batcheller A M, Brennan RT, Braslow A, Urrutia A, Kaye W. Cardiopulmonary resuscitation performance of subjects over forty is better following half-hour video self-instruction compared to traditional four-hour classroom training." Resuscitation 2000; 43: 101-110.

Level 2; fair; supporting: 34-minute self-instruction video compared with instructor-led course (?up to 4 hours) in lay volunteers. Randomized but course cancelled and some other volunteers re-allocated; poor overall randomization. Skills tested immediately after course (acquisition, not retention). Highly significant benefit for video group for overall skills, correct compressions, and correct ventilation.

Braslow A, Brennan RT, Newman MM, Bircher NG, Batcheller AM, Kaye W. CPR training without an instructor: development and evaluation of a video self-instructional system for effective performance of cardiopulmonary resuscitation. Resuscitation 1997; 34: 207–220.

Level 3; fair; supportive: 34-minute practice-as-you-watch video compared with 3-4hour instructor-led course. Pilot video and revised version used – revised version more effective. No randomization. More healthcare workers and more with previous BLS training in instructor-led group. Tested immediately and 60 days after training. Skill acquisition significantly better for video group; 60-day testing showed better results for video group, but not significant.

Dracup K, Moser DK, Doering LV, Guzy PM. Comparison of cardiopulmonary resuscitation training methods for parents of infants at high risk for cardiopulmonary arrest. Ann Emerg Med 1998; 32: 170-177.

Level 1; poor; opposing: 480 parents of at-risk infants taught CPR. Randomized to instructor-led + video, instructor-led + social discussion+ video, video alone. Significantly more successful if instructor-led. No pre-allocation comparison of groups; no details of randomization; no details of course and/or video duration; instructor-led training also received video.

Einspruch EL, Lynch B, Aufderheide TP, Nichol G, Becker L. Retention of CPR skills learned in a traditional AHA Heartsaver course versus 30-min video self-training: A controlled randomized study. Resuscitation 2007; 74: 476-486.

Level 1; fair; supportive: Follow-up of Lynch 2005 study (see below). Volunteers re-tested 2 months after training (retention). Skill scores decayed in both groups compared with immediate testing, but remained better than original control. Self-trained (video) group still showed better overall skill level, but no statistical comparison between them is given.

Isbye DL, Rasmussen LS, Lippert FK, Rudolph SF, Ringsted CV. Laypersons may learn basic life support in 24 min using a personal resuscitation manikin. Resuscitation 2006; 69: 435-442

Level 2; fair; neutral: 24-min DVD-based self-instruction compared with 6-hour instructor-led course. Laypersons without BLS training within 5 years randomized according to place of work. DVD group also took manikin home for further practice. Feedback device (CPR Coach) used by DVD group. Tested at 3 months. Ventilation volume and compression depth greater in DVD group, but overall no difference.

Jones I, Handley AJ, Whitfield R, Newcombe R, Chamberlain D. A preliminary feasibility study of a short DVD-based distance-learning package for basic life support. Resuscitation 2007; 75: 350-356.

Level 2; fair; neutral: Lay volunteers who had requested CPR training. Allocated according to place of training (not true randomization). 8-minute video (up to 15-min training) compared with 1-hour instructor-led course. Tested before and immediately after training. Overall no significant difference in post-training skills, but video group displayed less deep compressions an dmore hands-off time.

Liberman M, Golberg N, Mulder D, Sampalis J. Teaching cardiopulmonary resuscitation to CEGEP students in Quebec--a pilot project. Resuscitation 2000; 47: 249-257.

Level 2; fair; neutral: Nursing students randomized into 4 groups: 11-minute video + unlimited time on manikin; 2 instructor-led courses (different student:manikin ratios); 2-hr practical teaching. Tested immediately after training and at 17 weeks. No overall difference in skill scores. .

Lynch B, Einspruch EL, Nichol G, Becker LB, Aufderheide TP, Idris A. Effectiveness of a 30-min CPR self-instruction program for lay responders: a controlled randomized study. Resuscitation 2005; 67: 31-43.

Level 1; good; supportive: Lay volunteers aged 40-70 – no BLS training within 5 years. Randomized. 22-minute video (plus manikin & feedback of compression depth) compared with 3-4 hour Heartsaver, instructor-led course. Control group. Tested immediately after training. Video group had better overall skills (acquisition) than instructor-led (p=0.031) but both better than control.

Moule P, Albarran JW, Bessant E, Brownfield C, Pollock J. A non-randomized comparison of e-learning and classroom delivery of basic life support with automated external defibrillator use: A pilot study International Journal of Nursing Practice 2008; 14: 427–434.

Level 2; poor; supportive: Healthcare professionals (mental health) allocated to 2.5h lecture or 3h e-learning programme (not specified). Both groups then received 1h instructor-led practical training. No randomization. Groups unequal numbers and professional mix. MCQ and performance tests pre- and post-training. Both groups had better theory and practical scores after training. E-learning group had tendency to better practical performance but no statistical difference between groups.

Reder S, Cummings P, Quan L. Comparison of three instructional methods for teaching cardiopulmonary resuscitation and use of an automatic external defibrillator to high school students. Resuscitation 2006; 69: 443-453.

Level 1; fair; neutral: High-school children. 45-min interactive computer programme vs. 45-minute computer programme plus 45 mins of instructor training vs.45min x 2 instructor training vs. control (no teaching). Tested 2 days after training and 2 months late. Those that reeived hands-on training performed better than those without, but otherwise little difference in skill performance. Interactive computer programme led to better knowledge.

Roppolo LP, Pepe PE, Campbell L, Ohman K, Kulkarni H, Miller R, Idris A, Bean L, Bettes TN, Idris AH. Prospective, randomized trial of the effectiveness and retention of 30-min layperson training for cardiopulmonary resuscitation and automated external defibrillators – The American Airlines Study. Resuscitation 2007; 74: 276-285.

Level 1; poor; neutral: Laypeople without CPR training within 5 years randomized to 23-min video + demonstrations of choking management + use of feedback device and use of AED, or 3-4 Hour Heartsave AED, instructor-led course. Tested immediately after training and at 6 months. No significant difference between the skills immediately after training or 6 months later. Confused by additional skills and feedback device.

Todd KH, , Braslow A, Brennan RT, Lowery DW, Cox RJ, Lipscomb LE, Kellerman AL. Randomized, controlled trial of video self-instruction versus traditional CPR training. Ann Emerg Med 1998; 31: 364-369.

Level 1, fair, supportive: Medical students. 34-min video + manikin compared with 4-hr Heartsaver instructor-led course. Randomized. Tested 2-6 weeks after training (average time same for each group). Overall scores for 14 skills significantly betterfor video group.

Todd KH, Heron SL, Thompson M, Dennis R, O'Connor J, Kellerman AL. Simple CPR: a randomized, controlled trial of video self-instructional cardiopulmonary resuscitation training in an African American church congregation. Ann Emerg Med 1999; 34: 730-737.

Level 1, good, neutral: Adults from a church congregation. Randomized to 34-min video self-instruction + simple manikin compared with 4-hour Heartsaver course. Tested 1+ month after training. Generally skills were poor, but no significant difference between the groups except for position on chest which was significantly better performed by video group.