**Clinical question.**
In emergency treatment education in developing countries (P), does the inclusion of any specific educational strategies (I) compare with existing strategies (including none) (C) improve any outcomes (O)?

**Is this question addressing an intervention/therapy, prognosis or diagnosis?** Yes, educational 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? No

**Search strategy (including electronic databases searched).**

<table>
<thead>
<tr>
<th>Cochrane Review:</th>
<th>ID</th>
<th>Search</th>
<th>Cochrane Reviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td></td>
<td>MeSH descriptor Developing Countries explode all trees reviewed by title and all excluded</td>
<td>13</td>
</tr>
<tr>
<td>#2</td>
<td></td>
<td>MeSH descriptor Education explode all trees reviewed by title and 6 identified (see below)</td>
<td>95</td>
</tr>
<tr>
<td>#3</td>
<td></td>
<td>MeSH descriptor Emergency Treatment explode all trees reviewed by title and all excluded</td>
<td>52</td>
</tr>
<tr>
<td>#4</td>
<td></td>
<td>(( #1 AND #2 ) OR ( #1 AND #3 ))</td>
<td>7</td>
</tr>
</tbody>
</table>

**PubMed:**

2. Developing countries[ALL] AND Resuscitation Education[ALL]:

**Google Scholar:**
Search strategy: Resuscitation education[ALL] and Developing Countries[TI] and 2004-2009[DP]:

**Embase:**

**AHA Endnote library:**
Search ‘Developing Countries’ AND Resuscitation Education:

Additional articles EIT group aware of that were not identified by initial search or through references of above articles; Carlo, 2009, 504; Couper, 2005, 459; Enweronu-Laryea, 2009, PAP; Husum, 2003, 142; Husum, 2003, 1188; Kimura, 2008, 511; McClure, 2007, 1135 O’Hare, 2006, 376; Olutu, 2009, p 69; Zafar, 2009, 449

**State inclusion and exclusion criteria:** None

Exclusion: Articles whose title or abstract that did not describe emergency medical training (Trauma, Newborn Resuscitation, Basic Life Support, Pediatric Advanced Life Support, Adult Cardiac Life Support, First Aid), WHO ENC. (128 Articles, 7 Cochrane reviews).

Exclusion: Studies were not performed in developing countries (as defined by World Bank, extracted from website http://web.worldbank.org/WEBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20421402~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html on July 30th, 2009) (1 Article, 0 Cochrane review)

**Number of articles/sources meeting criteria for further review:** 31. Of these 1 were LOE 1, 1 LOE 2, 12 LOE 3, 2 LOE 4, and 15 LOE 5.
# Summary of evidence

## Evidence Supporting Clinical Question

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Level of evidence**

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

<table>
<thead>
<tr>
<th>Good</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fair</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td></td>
<td>Bhat, 1993 E</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

**Level of evidence**
- **A** = Return of spontaneous circulation
- **B** = Survival of event
- **C** = Survival to hospital discharge
- **D** = Intact neurological survival
- **E** = Other endpoint

*Italics = Animal studies*

### Evidence Opposing Clinical Question

<table>
<thead>
<tr>
<th>Good</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fair</td>
<td></td>
<td></td>
<td>Deorari, 2001, C O’Hare, 2006, C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ariyanayagam, 1992, B</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

**Level of evidence**
- **A** = Return of spontaneous circulation
- **B** = Survival of event
- **C** = Survival to hospital discharge
- **D** = Intact neurological survival
- **E** = Other endpoint

*Italics = Animal studies*
**REVIEWER'S FINAL COMMENTS AND ASSESSMENT OF BENEFIT / RISK:**

**Course independent research of educational strategies for emergency treatment education in developing countries:**
There were several studies that examined barriers and suggested strategies for optimizing implementation of developed nation emergency medical education programs. Prevalent themes were that scenarios should be tailored to the local clinical setting (Smith, 1997, 15; Tennant, 2000, 10; Young, 2008, 271), having sufficient functioning equipment for adequate practice (Couper, 2005, 459; Tennant, 2000, 10; Young, 2008, 271), rationalizing and using only essential equipment, anticipating higher degree of maintenance requirements to keep the equipment functioning (Young, 2008, 271), enlisting local counterparts in local modification of course to maintain overarching themes, while adapting to local cultural settings (Bhat, 1993, 87; Smith, 1997, 15), increasing allotted time for course to incorporate local cultural norms (Bhat, 1993, 87; Smith, 1997, 15), minimizing comparison of practice in local setting to developed country setting (Smith, 1997, 15), utilizing dual language slides for didactics (Smith, 1997, 15; Young, 2008, 271). Also reported in the literature is the use of logbooks to document operational performance and patient outcomes after training. (Zafar, 2009, 449)

Most studies reported positive outcomes in knowledge acquisition using cognitive assessments pre- and immediately post-training intervention (Couper, 2005, 459; Ergenekon, 2000, 225; Enweronu-Laryea, 2009, 1308; Jabir, 2009, 1265; Ali, 1998, 1192). Baseline scores were around 50-60%, and were often lower when compared to repeat course participants (Aboutanos, 2007, 714) and developed country subjects (Ali, 1994, 695; Trevisanuto, 2007, 28). Interestingly, multiple studies showed that after training all subjects had similar cognitive scores (overall ranging from 70-88%). (Aboutanos, 2007, 714; Ali, 1994, 695) Where specified, subject knowledge acquisition was best in the areas of basic trauma (Aboutanos, 2007, 714) and worst in CPR (Capone, 2000, 259).

**Course specific research of educational strategies for emergency treatment education in developing countries:**

1. **Trauma:**
   a. **Studies comparing 2 different specific educational strategies:**

   Arreola-Risa looked at pre-hospital provider (EMT) training in three communities Intervention: PHTLS/BTLS vs. BTLS + ACLS + local advanced airway course vs. no training. The training was effective for both intervention services, with increases in basic airway maneuvers for patients in respiratory distress in PHTLS/BTLS group (16% before versus 39% after) and BTLS + ACLS + local Airway group (14% versus 64%). The role of endotrachal intubation for patients with respiratory distress increased only in BTLS + ACLS+ local Airway (5% versus 46%), however mortality decreased only in PHTLS/BTLS, where it had been the highest (8.2% before versus 4.7% after) and where the simplest and lowest cost interventions were implemented (USD 150 vs. 400/medic trained). There was no change in process or outcome in the control site (Arreola-Risa, 2004, 318).

   b. **Studies comparing specific educational strategies to no existing training:**

   There have been conflicting studies when examining the efficacy of ATLS in resource limited settings. When Ariyanayagam et al, compared 6-hour mortality pre ATLS training to post ATLS training implementation, they found no change (Ariyanayagam, 1992, 72), but during the same time period at the same hospital in Trinidad and Tobago, there was a 100% decrease in in-hospital mortality among patients with Injury Severity Score (ISS) > or = to 16 after the introduction of the ATLS program (Ali, 1993, 890). In two studies Husum et al compared trauma patient mortality in Cambodia and Northern Iraq pre to post a low-cost modified ATLS training intervention, finding a decrease in the annual mortality rate from 23.9 % to 8.8% (Husum, 2003, 142; Husum, 2003, 1188).

   Pre-hospital life support (PHTLS) has demonstrated improvements in several studies. Following the successful demonstration on the impact of ATLS on trauma patient survival, Ali and his colleagues examined impact of PHTLS in Trinidad and Tobago and demonstrated a reduction in mortality with either penetrating (8.6 % pre-PHTLS, 5.6 % post-PHTLS) or blunt (18% pre-PHTLS and 12.8% post-PHTLS) injuries, as well as major disability (40% pre-PHTLS vs. 8.6% post-PHTLS) and length of stay (14.6 days pre-PHTLS vs. 8.9 days post-PHTLS) (Ali, 1997, 1018). A 3-month EMT course taken by pre hospital personnel in Santa Catarina, Nuevo Leon, Mexico demonstrated a 45% reduction in severity-adjusted risk of pre-hospital death (at scene with treatment attempted, died en route, in the ED of the receiving hospital) when compared to pre-training control group. Patient overall mortality was reduced from 6.3% to 2.5%, the PHI-adjusted odds ratio for death in the after period was 0.55 (95%CI 0.30–0.99) compared
with the before period (Arreola-Risa, 2007, 914). Interestingly, there was no change in cervical or thoracic immobilization (61%), airway maneuvers (4.4 vs 2/7 for intubated for respiratory distress), or IV fluid resuscitation (9.6 to 5.0%) use of any iv fluids for Adults with SBP < 100) or scene time, between the pre and post intervention groups. After trauma team training in Tanzania, participants demonstrated high scores in scenario testing, but this result was mitigated as this checklist was not validated to assess competence (Bergman, 2008, 879). Tchorz implemented a modified ATLS course in India and required competence in ultrasound and airway management for passing, but was limited by utilization of subjective criteria (instructor observation)(Tchorz, 2007, 373). Additionally, this study was limited in that it eliminated other technical skills requirements such as although tube thoracostomy, central line placement and splinting due to costs, despite these being common procedures required of study subjects.

2. **Newborn Resuscitation:**
   a. **Studies comparing 2 different specific educational strategies:**

   Three studies were identified that examined different effects of training interventions. Bhat et al found no difference in post training intervention cognitive scores when the compared a half-day neonatal resuscitation course taught to final year medical students prior to the start of labor room rounds to a multi-day course taught as part of the curriculum independent of the temporal relationship to their rotation in the labor ward and delivery room (historical controls) (Bhat, 1993, 87). Participants expressed a high degree of approval this just-in-time type of training, but was not compared to control group’s perceptions.

   b. **Studies comparing specific educational strategies to no existing training:**

   In 1990, the AAP’s Neonatal Resuscitation Program was rolled out to 14 hospitals via a train the trainer methodology and taught to doctors and nurses responsible for care of delivery room. While there was a 33% reduction in asphyxiial related deaths after the training, there was no demonstrable difference in neonatal mortality rates (3.7% vs. 3.5%) between the 7,070 births prior to training and the 25,713 births after the health care staff was trained. (Deorari, 2001, 29) A significant shift towards more rational resuscitation practices was indicated by a decline in the use of chest compression and medication (p < 0.001 for each), and an increase in the use of bag and mask ventilation (p < 0.001). (Deorari, 2001, 29)

   Conversely, when neonatal resuscitation was incorporated into Traditional Birth Attendant training in Rapiur Rani Community Development Block of India, there was 20% reduction in perinatal mortality in intervention group (49.4/1000 vs. 61.0/1000). (Kumar, 1995, 29) Although Kumar demonstrated higher proportion of resuscitation techniques utilization, the overall mortality decrease could be not attributed to a decrease in asphyxia-related deaths. (Kumar, 1995, 29).

   Carlo et al found that NRP training of midwives working in low-risk maternity clinics in Zambia significantly improved cognitive and psychomotor skills immediately after training, but while cognitive skills returned to baseline at 6 months, psychomotor skills persisted. Surprisingly, it was the participants with lower self efficacy score that best maintained their skills during the follow-up period.(Carlo, 2009, 504) After doctors and nurses in large maternity hospital in Nairobi, Kenya were trained in a modified version of the UK resuscitation councils’ Neonatal Life Support Course, they demonstrated higher “perfect” and “adequate” resuscitation practice (defined by observed checklist) than control (24 and 66% vs. 10 and 27% respectively). (Opiyo, 2008, e1599)

3. **Basic Life Support/CPR:**
   a. **Studies comparing 2 different specific educational strategies:**

   None.

   b. **Studies comparing specific educational strategies to no existing training:**

   After brief videotape exposure about CPR, skills performance of factory workers in Brazil was very poor in both groups (Capone, 2000, 259).
4. **Advanced Pediatric Life Support:**
   a. Studies comparing 2 different specific educational strategies:
      None.
   b. Studies comparing specific educational strategies to no existing training:
      None.

5. **Advanced Cardiac Life Support:**
   a. Studies comparing 2 different specific educational strategies:
      Arreola-Risa looked at pre-hospital provider (EMT) training in three communities. Intervention: PHTLS/BTLS vs. BTLS + ACLS + local advanced airway course vs. no training. The training was effective for both intervention services, with increases in basic airway maneuvers for patients in respiratory distress in PHTLS/BTLS group (16% before versus 39% after) and BTLS + ACLS + local Airway group (14% versus 64%). The role of endotracheal intubation for patients with respiratory distress increased only in BTLS + ACLS + local Airway (5% versus 46%), however mortality decreased only in PHTLS/BTLS, where it had been the highest (8.2% before versus 4.7% after) and where the simplest and lowest cost interventions were implemented (USD 150 vs. 400/amedic trained). There was no change in process or outcome in the control site (Arreola-Risa, 2004, 318).
   b. Studies comparing specific educational strategies to no existing training:
      None.

6. **First Aid:**
   a. Studies comparing 2 different specific educational strategies:
      None.
   b. Studies comparing specific educational strategies to no existing training:
      After brief videotape exposure about live saving skills and first aid, Over 50% factory workers in Brazil performed correctly 5 of the eight first aid skills, including positioning and hemorrhage control, and increased correct airway control performance from 5 to 25% of trainees (3% in the control group)(Capone, 2000, 259).

Acknowledgements:
Nil

Citation List


Notes: Selected. Trauma. Population: Rural Physicians in Ecuador. Intervention: Self-made Trauma Course (Non-ATLS) Comparator: None Outcome: mean mcq overall test score improved from 72-79%, best categories were: head injury, abd trauma, pelvic injury. Greatest improvement in scores were extremity injury, prehospital care, adjuncts to physical examination. Worst performing were airway and abd trauma. Repeat course takers (from 2 years previous) had higher overall mean scores (both pre and post), but less improvement (incr 4% vs. 18%) from course naive counterparts. Level of Evidence: 4. Methodological Quality: Fair - semi-objective (checklists and mcq tests not validated, confounders such as degree of relevant previous training not controlled for (except the previous course), only immediate cognitive and OSCE evaluated). Magnitude of Any Effect: None measured.

Selected. Trauma. Taken from Ali J Trauma 1997 References. Population: Trauma patients served by Port of Spain General Hospital in Trinidad and Tobago. Intervention: ATLS . Comparator: Trauma patients in 4 year period prior to ATLS training. Outcome: Patient Outcomes: 50% reduction in overall mortality, 4.2-4.5 x propensity for survival (ORs) if in the post ATLS group compared to pre for lower and mid Injury Severity Score, and no difference with ISS 41+ (both groups 100% mortality). Level of Evidence:3. Methodological Quality: Good. Magnitude of Any Effect: 100% reduction of patient mortality.


This study demonstrates improved cognitive and trauma management skills performance among prehospital paramedical personnel who complete the basic PHTLS program.


Notes: Selected. Trauma. Outcomes: Cognitive and attitudinal assessment. Population: Physicians in Trinidad and Tobago 1986-1990. Intervention: ATLS. Comparator: precourse self, post course Nebraska physicians taking ATLS. Outcome: 22% improvement in Cognitive scores pre vs. post. No difference in mean post course cognitive score between Neb and T+T docs, T+T had higher % of passing scores comp to Neb. T+T coworkers (docs and nurses) had high degree of differentiation between docs who had taken ATLS and those that didn't with respect to resuscitation and trauma C/S. Level of Evidence: 2. Methodological Quality: Good (comparison groups defined, outcomes measured objectively, confounders not identified, follow-up sufficient. Magnitude of Any Effect: Not able to be assessed.


Notes: Selected. Taken from references from Arreola-Risa "cost effectiveness..." Population: Pre-hospital paramedics in Trinidad and Tobago. Intervention: PHTLS. Comparator: No training (historical controls. Outcome: the mortality (in percent, with n values in parenthesis) for blunt and penetrating injuries was significantly lower in the post-PHTLS period compared with the pre-PHTLS period with an 18.6% (n = 43) mortality pre-PHTLS for blunt injury compared with 12.8% post-PHTLS (n = 31). The mortality for penetrating injuries in the pre-PHTLS period was 8.9% (n = 9) compared with 5.6% (n = 61) for the post-PHTLS group. Clearly, mortality was, therefore, higher in the pre-PHTLS group for both blunt and penetrating injuries. Level of Evidence: 3. Methodological Quality: Fair. Magnitude of Any Effect: Not able to be assessed.

D. C. Ariyanayagam, V. Naraynsingh and I. Maraj. The impact of the atls course on traffic accident mortality in trinidad and tobago. West Indian Med J 1992;41:72-4


Notes: Selected. Trauma. Outcomes: patient care delivery and patient outcome. Take away: Basic Trauma instruction appears to impact trauma mortality in training naïve provider population, ACLS in current form not well suited for same training population. Population: Pre-Hospital EMTs in Mexico. Intervention: #1 PHTLS/BTLS, #2 BTLS+ACLS+Airway course. Comparator: no training. Outcome: decreased overall mortality, increased use of spinal stabilization, increased use of IV fluids and large bore IV in #1, higher use of airway in #1 and #2, higher use of advanced airway in #2. Level of Evidence: 2. Methodological Quality: Fair (self-reporting of medics, incomplete follow up (only fu on high risk), poor passing rate of ACLS, unknown passing/competency with local derived airway course, lack of equipment as confounder not controlled. Magnitude of Any Effect: Not able to be assessed.


Historical controls (before and during training). Outcome: mortality (at scene with treatment attempted, died enroute, in the ED of the receiving hospital) reduction from 6.3% to 2.5%, but confounded by lower PHI in post training group, (adj OR has interval that includes 1). No change in cervical or thoracic immobilization (61%), airway maneuvers (4.4 vs 2/7 for intubated for respiratory distress), or IV fluid resuscitation (9.6 to 5.0%) use of any iv fluids for Adults with SBP < 100) or scene time. Level of Evidence: 3. Methodological Quality: Fair (clear defined group, standard reporting form but not blinded, not all confounder controlled for (and one that did negated outcome), follow-up did NOT include hospital mortality. Magnitude of Any Effect: Not able to be assessed.


Notes: Selected. Neonatal Resuscitation: Population: Final Year Medical Students, Pondicherry India, 1993. Intervention: Single day classes, NALS (AHA, 1987) immediately prior to rotation with high need for areas for skill (labor room rotation). Comparator: historical controls, training over several days as part of overall medical curriculum. Outcome: cognitive assessment (differences in pre-post), qualitative review from study subjects. Level of Evidence: 3 (historical controls. Methodological Quality: Poor (poor description of comparison groups, no description intervention training, no attempt to control for confounding). Magnitude of Any Effect: Not able to be assessed.


Notes: Selected. First Aid and BLS. Outcome: Skills assessment in simulated scenarios. Population: auto part industrial plant employees in Brazil. Intervention: 116 exposed to brief LSFA skill demonstrations on TV. Comparator: 86 controls without TV exposure to LSFA. Outcome: Brief Videotape training of laypersons can be effective in some, but not all life saving skills, with some degree of knowledge retention at 13 months. Simulated skill performance on the evaluating nurse or manikin was tested at 1 week, 1 month, and 13 months. Over 50% of the television group performed correctly 5 of the eight skills, including positioning and hemorrhage control. Television viewing increased correct airway control performance from 5 to 25% of trainees, while it remained at 3% in the control group. CPR – ABC performance, however, was very poor in both groups. Level of Evidence: 1. Methodological Quality: Good (subjects not blinded to group (no control TV watching). Magnitude of Any Effect: Not able to be assessed.


Selected. Neonatal (NRP). Outcome: cognitive training improved from 57 to 80% but returned to baseline at 6 months, skills improved fro a score of 55 to 90%, and this was sustained at 6 months (80%). Self efficacy improved from 3.6 to 4.3/5 and was sustained as well. Surprisingly, it was the participants with poor self efficacy that maintained the best skills . Population: Nurse Midwives working in low-risk clinics in Zambia. Intervention: American Academy of Pediatrics Neonatal Resuscitation Program (NRP). Comparator: None. Outcome: Outcome: self-efficacy, cognitive and psychomotor skills. Level of Evidence: 3 (own historical control). Methodological Quality: Good. Magnitude of Any Effect: Not able to be assessed.


Selected. neonatal resuscitation Population: Doctors nurses, paramedics and medical students.Intervention: Locally derived Neonatal resus course Outcome: Cognitive (pre/post), self efficacy (post only) Level of Evidence: 3. Methodological Quality: fair. Magnitude of Any Effect: Not able to be assessed. Additional Notes: Holding course at local facilities identified deficiencies in local clinics in equipement for both training and clinical care


Additional Notes:..


Additional Notes:..


Notes: Selected. Neonatal. Population: OB(26) and Peds residents(2) at Bagdad Teaching Hospital in Iraq Intervention: AAP/AHA NRP course Outcome: Cognitive (pre/post), psychomotor (post only), self efficacy (post only). Level of Evidence: 3. Methodological Quality: good. Magnitude of Any Effect: Not able to be assessed. Additional Notes: Cognitive scores were significantly improved (pre vs post). Post psychomotor skills were poor except for peds residents. pymotomotor skill checklist not validated.


Notes: Selected from references from "Improved Neonatal Resuscitation by TBA (Duncan). Population: Traditional Birth Attendants in India. Intervention: Newborn Resuscitation Training incorporated into TBA training. Comparator: Traditional TBA training alone. Outcome: Improvement in TBAs that were taught resuscitation techniques, high proportion of utilization. Also, there was a high utilization of traditional techniques. Overall 20% reduction in perinatal mortality in intervention group, but could not attribute decrease to decreased asphyxia-related deaths. Level of Evidence: 2 (no randomization). Methodological Quality: Good (comparison groups adequately defined, control of confounders not described, objective measures, sufficient follow-up. Magnitude of Any Effect: Not able to be assessed.


Notes: Selected. Neonatal Resuscitation. Outcomes: Skills assessment during patient care delivery. Population: Doctors and Nurses in Large Maternity Hospital in Nairobi, Kenya. Intervention: Early Newborn resuscitation training (modified UK resus council training to local environment). Comparator: No training (Newborn resuscitation training after study). Outcome: higher perfect, adequate resuscitation practice than control (24 and 66% vs. 10 and 27% respectively) level of resuscitation practices (perfect, adequate, not adequate). no effect on patient mortality (not powered to detect though). Level of Evidence: 3 (not true randomization). Methodological Quality: Fair (clearly defined comparison groups, outcome clearly defined (if not great - unclear how great practices were recorded vs. actually performed), confounders not controlled for (previous experience, previous training), follow up appears adequate. Note: not sure why early vs. late. Maybe failed to detect in each subgroup group so pooled, but unclear. Magnitude of Any Effect: Not able to be assessed.


Notes: Selected. Trauma. Outcome: Knowledge Assessment. Skills assessment in Airway management and Ultrasound. Population: Private and public GPs, residents with MBBS degree in Bangalore, India. Intervention: 2 day Essential Principles and Practices of Trauma Care (ATLS-like). Comparator: None. Outcome: ATLS like programs should be targeted to non-surgeons and doctors in training. Improvement in overall score of 20 question cognitive test (70% pre, 87.5 post). Greatest improvement in scores were GPs, junior residents (both medical and surgical) and senior non-surgical residents. Attendings had low improvement scores and lowest post test scores. Level of Evidence: 4. Methodological Quality: Good. Magnitude of Any Effect: Not able to be assessed.


D. Trevisanuto, S. A. Ibrahim, N. Doglioni, S. Salvadori, P. Ferrarese and V. Zanardo. Neonatal resuscitation courses for pediatric residents: Comparison between Khartoum (Sudan) and Padova (Italy). Paediatric anaesthesia 2007;17:28-31


