**Author(s):** Barbara Farquharson, Kasper Glerup, Andrea Cortegiani, Joyce Yeung, Robert Greif

**Question:** Training with a specific emphasis on teamwork competencies compared to training without a specific emphasis on teamwork competencies for life support training

**Setting:** any

| **Certainty assessment** | **№ of patients** | **Effect** | **Certainty** | **Importance** |
| --- | --- | --- | --- | --- |
| **№ of studies** | **Study design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** | **training with a specific emphasis on teamwork competencies** | **training without a specific emphasis on teamwork competencies** | **Relative(95% CI)** | **Absolute(95% CI)** |
| **Patient survival (assessed with: Extracted from trauma registry)** |
| 1 | randomised trials | very seriousa | not serious | not serious | very seriousb | none | 12/112 (10.7%)  | 14/112 (12.5%)  | not estimable |  | ⨁◯◯◯Very low | CRITICAL |
| **CPR skill performance (course completion)** |
| 11 | randomised trials | seriousc | not serious | not serious | very seriousd | none | Eleven studies (10 RCTs3,4,7,8,11,12,13,14,16,17 and one before and after1) reported CPR skill performance outcomes: **Time to resuscitation behaviours** Three1,11,14  of five1,3,11,12,14  studies reporting time to key resuscitation behaviours reported no significant difference between intervention and control groups. One RCT12 reported significantly shorter time for one of five behaviours measured (time to chest compressions) and another3 for eight of nine behaviours measured. **Technical skill score** Seven4,8,12-14,16,17  of eight1,4,8,12-14,16,17  studies reporting performance scores found no significant difference between intervention and control groups and nor did single RCT11 reporting rate of correct arm and shoulder positioning. One non-randomised study1 reported higher median patient care scores in intervention group (95%) vs control (85%), p=.001. **Adherence to guidelines** A single study7 reported adherence to ALS guidelines, finding greater adherence in intervention group (37.58) vs control (31.41), 95% CI: -10.3, -2.4, p=.002)  | ⨁◯◯◯Very low | IMPORTANT |
| **CPR skill performance (beyond course completion but <1 yr)** |
| 4 | randomised trials | seriousc | not serious | not serious | very seriouse | none | Four RCTs4,11,13,17 reported CPR skill performance beyond course completion, Two13,17 reported no significant difference in performance scores at 4 months17 and 6 months13. One RCT4 reported significantly higher technical CPR skill scores (calculated from compression depth and rate; detection of shockable rhythm; ventilation efficiency and time to CPR initiation) in the intervention group (70%) vs control (62%), p=0.014 at follow-up (time unspecified) despite finding no difference at course completion. One RCT11 reported significantly shorter time to first meaningful resuscitation measure in intervention group at 4 months. | ⨁◯◯◯Very low | CRITICAL |
| **CPR quality (at course completion)** |
| 4 | randomised trials | very seriousc | not serious | not serious | very seriouse | none | Four RCTs reported measures of CPR quality at course completion6,7,9,11. Two RCTs6,7 measured no-flow time, one6 reported significantly shorter no flow time in intervention group (31.4 secs) vs. in the control group (36.3 sec), (p=0.014) and the other7 found no significant difference between the intervention and control. One RCT11 measured hands-on time and compression rate and found no difference between intervention and control group. One RCT9 found no difference in chest compression quality or in chest compression pauses.  | ⨁◯◯◯Very low | IMPORTANT |
| **CPR quality (beyond course completion but <1 year)** |
| 1 | randomised trials | seriousf | not serious | not serious | very seriousg | none | One RCT11 reported CPR quality beyond course completion. Four months after intervention they reported increased hands-on time in the intervention group (120 secs) vs control (87 secs), p=.001; higher rates of recommended rate of compression in the intervention group (19) vs control (6), p=.002 and higher median compressions per minute in intervention group (109 cpm) vs control (93 cpm), p=.001. | ⨁◯◯◯Very low | CRITICAL |
| **Confidence (course completion)** |
| 1 | randomised trials | seriousc | not serious | not serious | very seriousf | none | One RCT4 reported self-efficacy and found no significant difference between intervention and control group | ⨁◯◯◯Very low | IMPORTANT |
| **Confidence (beyond course completion but < 1 year)** |
| 1 | randomised trials | seriousf | not serious | not serious | very seriousg | none | One RCT4 reported self-efficacy and found no significant difference between intervention and control group | ⨁◯◯◯Very low | IMPORTANT |
| **Teamwork competencies (at course completion)** |
| 14 | randomised trials | seriousc | not serioush | not serious | seriouse | none | Fourteen studies (12 RCTs3-6, 9-12,14-17 and 2 non-randomised studies1,2) reported teamwork competencies at course completion. **Communication** One RCT6 measured 'teamwork verbalisations' and found significantly higher verbalisations in intervention group vs control: directed orders, task assignments, undirected orders and planning. Two RCTs9,15 also reported significantly greater proportion of leadership statements in intervention group vs control and three RCTs5,14,15 identified significantly increased directed team communication in intervention group vs control. One14 also reported increased completed closed-loop communication and follower-initiated communication in intervention group vs control. One RCT11identified more leading utterances in the control group vs intervention. **Decision making and leadership behaviour** Two RCTs8,10 reported increased leadership behaviour in intervention group vs control. One10 trial also reported significantly increased correction of improper chest compressions in intervention group. One RCT9 reported increased decision-making in intervention group vs control. One non-randomised study2 reported no significant difference in leadership behaviour between intervention and control. **Teamwork** One RCT4 reported significantly higher team-level efficacy in intervention group vs control and one non-randomised study1 reported more teamwork intervention events in intervention group vs control. Two RCTs16,17 and a non-randomised study2 found no significant difference in measures of teamwork between intervention and control groups. **Non-technical skills** Two RCTs3,12 reported significantly higher non-technical skill performance3 and total behavioural skills scores12 in the intervention group vs control. **Workload management** Two RCTs15,16 reported significantly improved workload management in intervention group vs control.  | ⨁⨁◯◯Low | IMPORTANT |
| **Teamwork competencies (beyond course completion but < 1 year)** |
| 3 | randomised trials | seriousc | serioush | not serious | not serious | none | Three RCTs4,11,17 reported teamwork competency outcomes beyond course completion. One RCT11 reported more leadership utterances, task assignments, commands and decisions about what to do in intervention group at 4 months than control group. One RCT4 reported significantly higher self-reported teamwork in intervention group at follow-up (timepoint of FU not reported). One RCT17 reported no significant difference between intervention and control group in TEAM scores at 3 months (following no significant difference at course completion) | ⨁⨁◯◯Low | IMPORTANT |

**CI:** confidence interval

#### Explanations

a. Some concerns in RoB assessment, no specified analysis plan for survival data

b. No effect size, confidence interval reported, potential confounders not evaluated

c. None of included studies rated low risk of bias

d. Mainly small sample sizes (7 of 10 studies less than 100 participants)

e. Mainly small sample sizes

f. Single study, some concerns RoB

g. single study

h. Some inconsistent findings

## [References](#_heading=h.3dy6vkm)

1. Gonçalves, B. A. R., Melo, M. D. C. B. D., Ferri Liu, P. M., Valente, B. C. H. G., Ribeiro, V. P., & Vilaça e Silva, P. H. (2022). Teamwork in Pediatric Resuscitation: Training Medical Students on High-Fidelity Simulation. *Advances in Medical Education and Practice*, 697-708.
2. Rovamo, L., Nurmi, E., Mattila, M. M., Suominen, P., & Silvennoinen, M. (2015). Effect of a simulation-based workshop on multidisplinary teamwork of newborn emergencies: an intervention study. *BMC research notes*, *8*, 1-8.
3. Blackwood, J., Duff, J. P., Nettel-Aguirre, A., Djogovic, D., & Joynt, C. (2014). Does teaching crisis resource management skills improve resuscitation performance in pediatric residents?. *Pediatric Critical Care Medicine*, *15*(4), e168-e174.
4. Coppens, I., Verhaeghe, S., Van Hecke, A., & Beeckman, D. (2018). The effectiveness of crisis resource management and team debriefing in resuscitation education of nursing students: A randomised controlled trial. *Journal of clinical nursing*, *27*(1-2), 77-85.
5. Fagan, M. J., Connelly, C. D., Williams, B. S., & Fisher, E. S. (2018). Integrating team training in the pediatric life support program: an effective and efficient approach?. *JONA: The Journal of Nursing Administration*, *48*(5), 279-284.
6. Castelao, E. F., Russo, S. G., Cremer, S., Strack, M., Kaminski, L., Eich, C., ... & Boos, M. (2011). Positive impact of crisis resource management training on no-flow time and team member verbalisations during simulated cardiopulmonary resuscitation: a randomised controlled trial. *Resuscitation*, *82*(10), 1338-1343.
7. Fernandez Castelao, E., Boos, M., Ringer, C., Eich, C., & Russo, S. G. (2015). Effect of CRM team leader training on team performance and leadership behavior in simulated cardiac arrest scenarios: a prospective, randomized, controlled study. *BMC medical education*, *15*(1), 1-8.
8. Fernandez, R., Rosenman, E. D., Olenick, J., Misisco, A., Brolliar, S. M., Chipman, A. K., ... & Chao, G. T. (2020). Simulation-based team leadership training improves team leadership during actual trauma resuscitations: a randomized controlled trial. *Critical Care Medicine*, *48*(1), 73-82.
9. Hochstrasser, S. R., Amacher, S. A., Tschan, F., Semmer, N. K., Becker, C., Metzger, K., ... & Marsch, S. (2022). Gender‐focused training improves leadership of female medical students: A randomised trial. *Medical Education*, *56*(3), 321-330.
10. Haffner, L., Mahling, M., Muench, A., Castan, C., Schubert, P., Naumann, A., ... & Celebi, N. (2016). Improved recognition of ineffective chest compressions after a brief Crew Resource Management (CRM) training: a prospective, randomised simulation study. *BMC Emergency Medicine*, *17*(1), 1-8.
11. Hunziker, S., Bühlmann, C., Tschan, F., Balestra, G., Legeret, C., Schumacher, C., ... & Marsch, S. (2010). Brief leadership instructions improve cardiopulmonary resuscitation in a high-fidelity simulation: a randomized controlled trial. *Critical care medicine*, *38*(4), 1086-1091.
12. Litke-Wager, C., Delaney, H., Mu, T., & Sawyer, T. (2020). Impact of task-oriented role assignment on neonatal resuscitation performance: a simulation-based randomized controlled trial. *American Journal of Perinatology*, *38*(09), 914-921.
13. Peltonen, V., Peltonen, L. M., Rantanen, M., Säämänen, J., Vänttinen, O., Koskela, J., ... & Tommila, M. (2022). Randomized controlled trial comparing pit crew resuscitation model against standard advanced life support training. *Journal of the American College of Emergency Physicians Open*, *3*(3), e12721.
14. Scicchitano, E., Stark, P., Koetter, P., Michalak, N., & Zurca, A. D. (2021). Blindfolding improves communication in inexperienced residents undergoing ACLS training. *Journal of graduate medical education*, *13*(1), 123-127.
15. Thomas, E. J., Taggart, B., Crandell, S., Lasky, R. E., Williams, A. L., Love, L. J., ... & Helmreich, R. L. (2007). Teaching teamwork during the Neonatal Resuscitation Program: a randomized trial. *Journal of Perinatology*, *27*(7), 409-414.
16. Thomas, E. J., Williams, A. L., Reichman, E. F., Lasky, R. E., Crandell, S., & Taggart, W. R. (2010). Team training in the neonatal resuscitation program for interns: teamwork and quality of resuscitations. *Pediatrics*, *125*(3), 539-546.
17. Truchot, J., Michelet, D., Philippon, A. L., Drummond, D., Freund, Y., & Plaisance, P. (2023). Effect of a specific training intervention with task interruptions on the quality of simulated advance life support: A randomized multi centered controlled simulation study. *Australasian Emergency Care*, *26*(2), 153-157.