

Supplemental Table 1 Search strategy Pubmed (n = 3148)

Searches	Results
1 "Feedback"[MESH] or "feedback device" or [("real-time" or "real time" or "visual" or "audio" or "audio-visual" or "audio visual" or "automated") and ("feedback" or "device" or "measur" or "monitor*")] or "feedback" or "quality improvement"[MESH]	317553
2 "Heart arrest"[MESH] or "out-of-hospital cardiac arrest"[MESH] or "death, sudden, cardiac"[MESH] or "cardiopulmonary resuscitation"[MESH] or "heart massage"[MESH] or "resuscitation"[MESH] or "cardiac arrest" or "CPR" or (cardia* or heart or circulat* or cardiopulmonary* or "cardio-pulm*") and (arrest* or death* or standstill* or attack* or resuscit*) or "in-hospital cardiac arrest" or "resuscitation" or "cardiopulmonary resuscitation"	359666
4 "Manikin" or "simulation"	476890
5 #1 and #2	3786
6 #5 not #4	3148

CPR: Cardiopulmonary resuscitation.

Supplemental Table 2 Risk of bias in randomized controlled trials

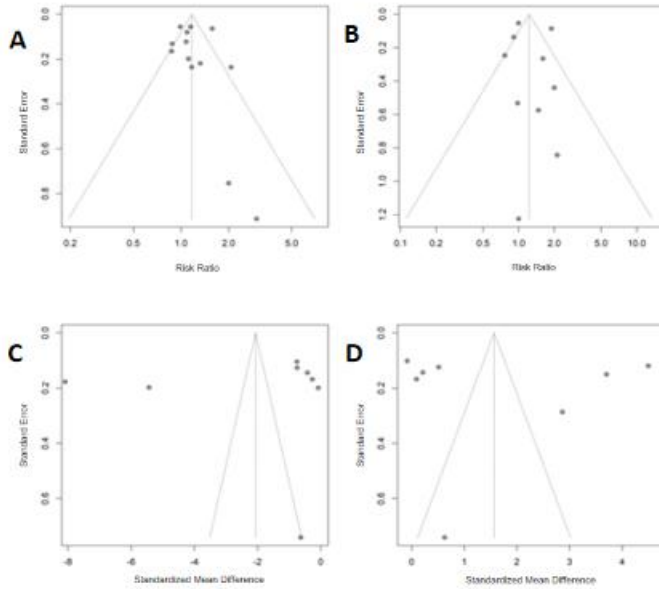
Ref.	Selection bias	Attrition bias	Reporting bias	Performance bias	Detection bias
	Allocation Randomization concealment				
Goharani <i>et al</i> ^[45] 2019	Low risk-cluster randomized trial	Medium risk-19% of patients were excluded from analysis due to incomplete data or logistical impediment to data collection	Low risk-reported positive and neutral outcomes	Medium risk-participants blinded to assignment. Healthcare provider was not present during CPR ethical concerns	Low risk-outcome assessors blinded to assignment and not present during CPR intervention
Hostler <i>et al</i> ^[46] 2011	Low risk-cluster randomized controlled trial	High risk-CPR process Low risk information was missing from 26% of patients enrolled. Audible positive feedback was muted in multiple times 14% of cases in the exposure cohort	Low risk. Reported, Audible positive and neutral outcomes	High risk-healthcare provider not blinded if to intervention. Unclear if participants were blinded to assignment	High risk-unclear outcome assessors were blinded to participant assignment

Vahedian- Azimi <i>et al</i> ^[52] 2020	Low risk-cluster randomized trial	Low risk-randomiz ed externally to conceal	High risk-42% of patients were excluded from analysis due to incomplete data or logistical impediment to data collection	Low risk-reported positive and neutral outcomes	Medium risk-participants blinded to assignment. Healthcare provider was not present not blinded due to during ethical concerns	Low risk-outcome assessors blinded to assignment and intervention
Vahedian- Azimi <i>et al</i> ^[51] 2016	Low risk-randomize d controlled trial	Medium risk-single blind, randomized to patient and data analyzer	Medium risk-16% of patients were ultimately excluded from analysis due to incomplete data or logistical impediment to data collection	Low risk-reported positive and neutral outcomes	Medium risk-participants blinded to assignment. Healthcare provider was not present not blinded due to during ethical concerns	Low risk-outcome assessors blinded to assignment and intervention

CPR: Cardiopulmonary resuscitation.

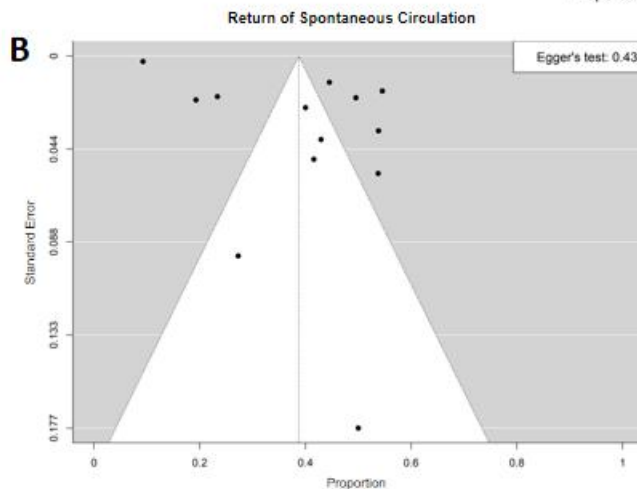
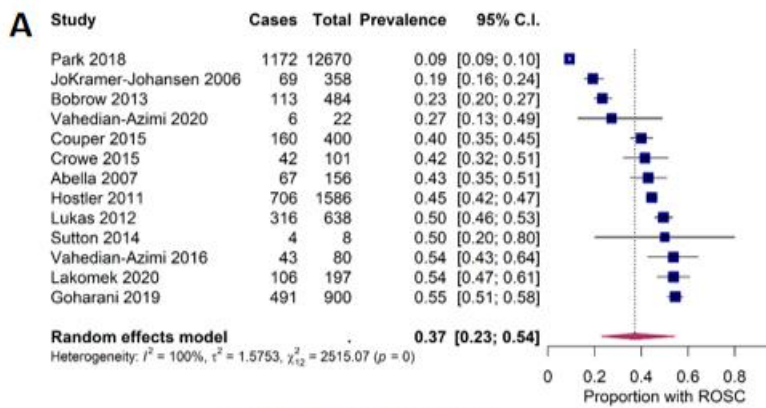
Supplemental Table 3 Risk of bias in included studies using the Newcastle-Ottawa scale

Ref.	Selection of study group	of Comparability of study group	Assessment of study group	of Overall outcome
Abella <i>et al</i> ^[26] 4 2007	1	2	2	7-low risk
Bobrow <i>et al</i> ^[8] 3 2013	2	2	2	7-low risk
Couper <i>et al</i> ^[43] 3 2015	2	1	1	6-low risk
Crowe <i>et al</i> ^[44] 3 2015	2	2	2	7-low risk
Kramer-Johans en <i>et al</i> ^[27] 2006	1	1	1	6-low risk
Lakomek <i>et al</i> ^[47] 4 2020	0	2	2	6-low risk
Lukas <i>et al</i> ^[48] 3 2012	2	2	2	7-low risk
Park <i>et al</i> ^[49] 4 2018	2	2	2	8-low risk
Sutton <i>et al</i> ^[50] 3 2014	0	2	2	5-medium risk



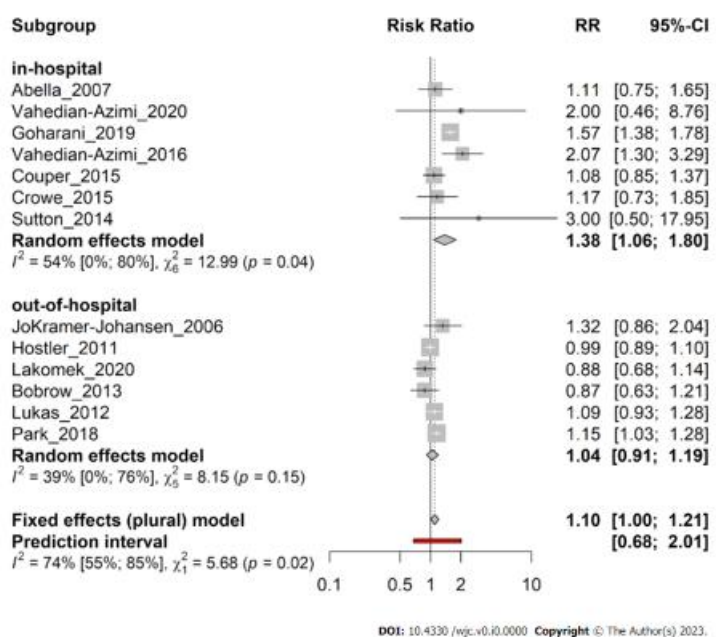
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Supplemental Figure 1 Funnel plots. A: Return of spontaneous circulation; B: Survival to hospital discharge; C: Chest compression rate; D: Chest compression depth.

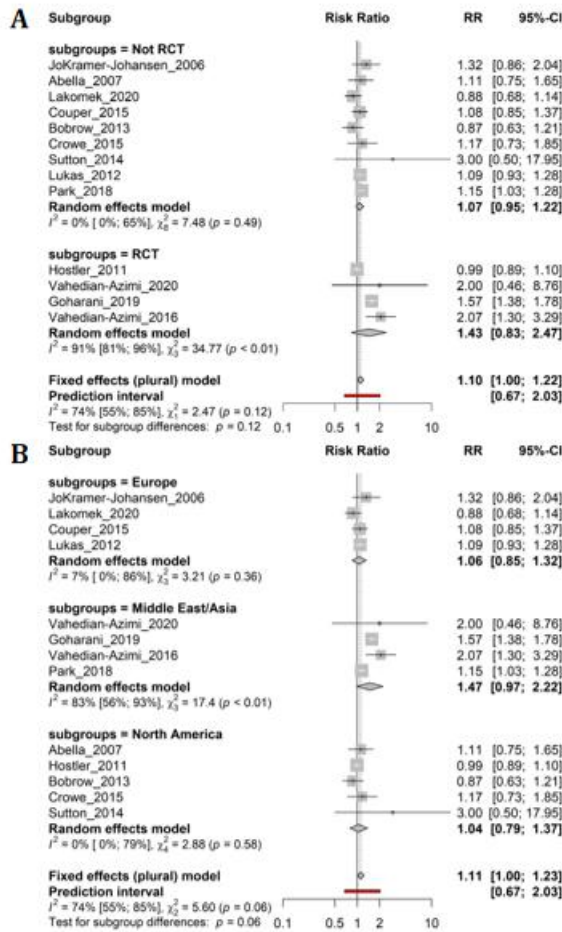


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Supplemental Figure 2 Overall survival. A: Results of pooled return of spontaneous circulation analysis; B: Funnel plot with Egger's test.

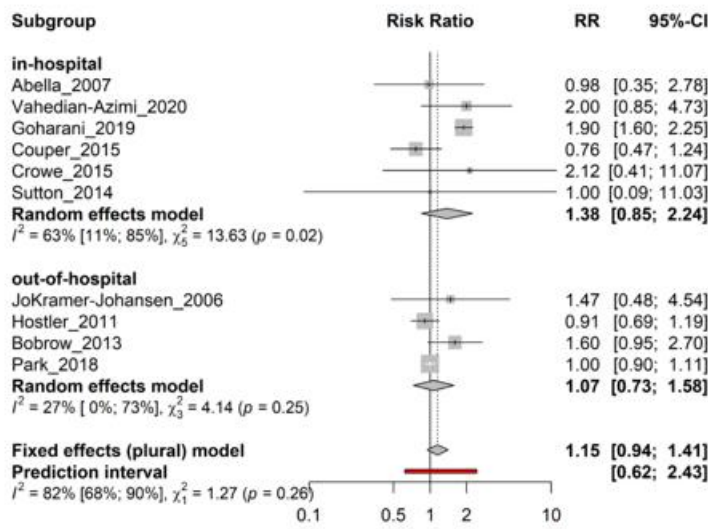


Supplemental Figure 3 Return of spontaneous circulation subgroup analysis-location of cardiac arrest.



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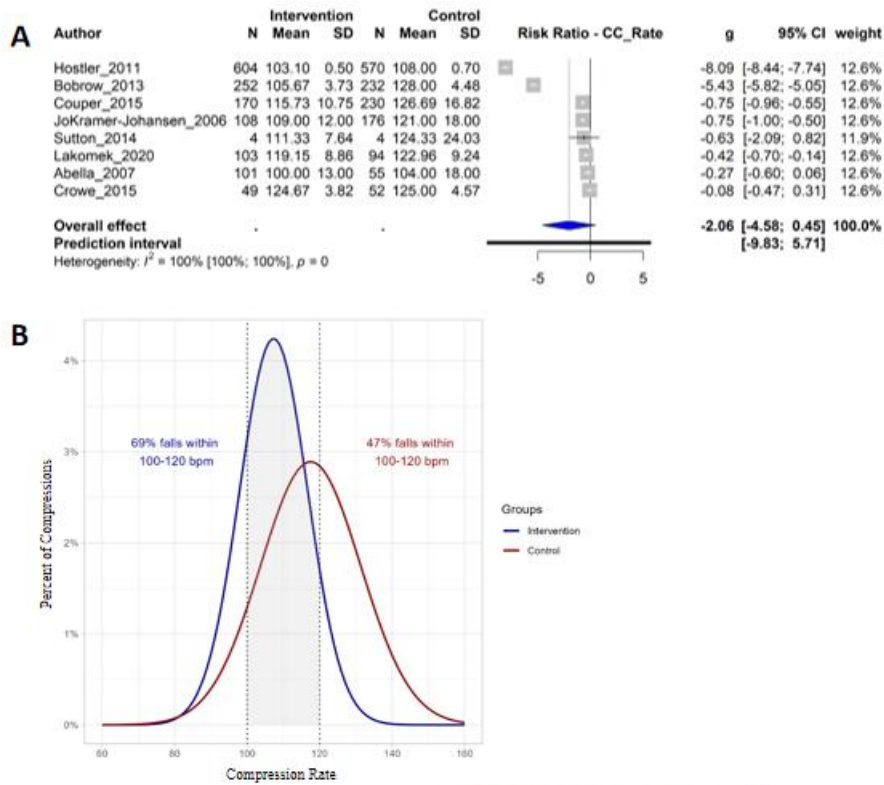
Supplemental Figure 4 Subgroup analysis. A: Study type; B: Region.



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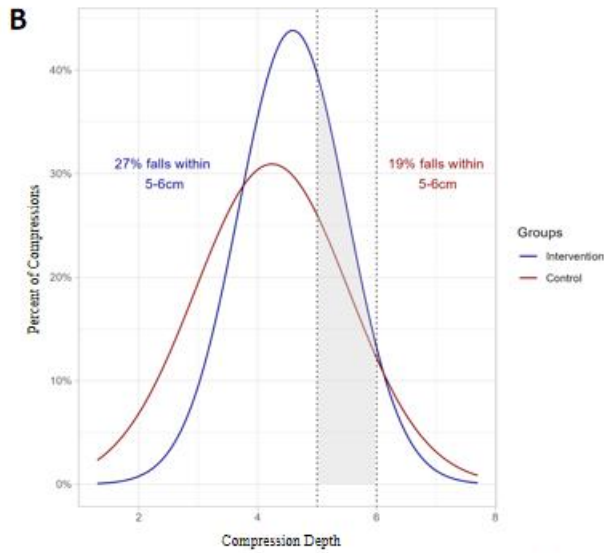
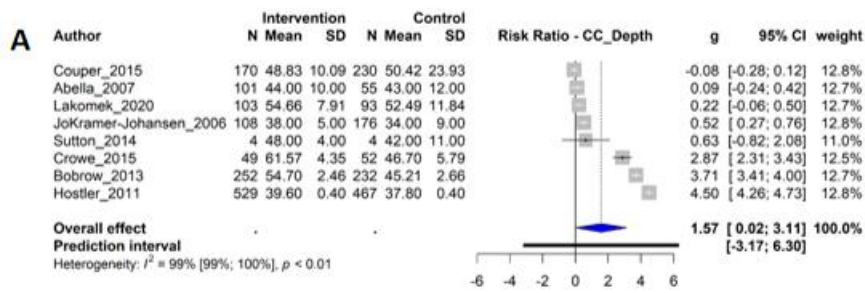
Supplemental Figure 5 Subgroup analysis of survival to hospital discharge

by location of cardiac arrest.



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Supplemental Figure 6 Compression rate. A: Forest plot; B: Proportion of compressions that fell within the American Heart Association Guidelines.



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Supplemental Figure 7 Compression depth. A: Forest plot; B: Proportion of compressions that fell American Heart Association Guidelines.