Supplementary Online Content

Yu Y, Meng Q, Munot S, Nguyen TN, Redfern J, Chow CK. Assessment of community interventions for bystander cardiopulmonary resuscitation in out-of-hospital cardiac arrest: a systematic review and meta-analysis. *JAMA Netw Open*. 2020;3(7):e209256. doi:10.1001/jamanetworkopen.2020.9256

This supplementary material has been provided by the authors to give readers additional information about their work.

eMethods. Search Strategy

1. Cardiopulmonary Resuscitation/

2. Cardiopulmonary Resuscitation/ed [Education]

3. exp Resuscitation/

4. Resuscitation/ed [Education]

5. Cardio-pulmonary resuscitation.mp.

6. CPR certification.mp.

7. CPR training.mp.

8. 1 or 2 or 3 or 4 or 5 or 6 or 7

9. exp First Aid/

10. First Aid/ed [Education]

11. Basic life support.mp.

12. BLS training.mp.

13. 9 or 10 or 11 or 12

14. (lay person* or lay responder* or layperson* or bystander* or layman or laywoman or laymen or laywomen or first responder*).mp.

15. 13 or 14

16. exp Education, Nonprofessional/

17. exp Education/

18. exp Health Education/

19. Teaching/

20. Learning/

21. 16 or 17 or 18 or 19 or 20

22. 8 and 15 and 21

23. ((CPR or cardiopulmonary resuscitation or BLS or basic life support or resuscitation) adj3 (train* or teach* or educat* or learn*)).mp.

24. cardiac arrest.mp.

25. 14 and 21 and 24

26. 22 or 23 or 25

27. (survival or cerebral performance category or ROSC or return of spontaneous circulation).mp.

28. 26 and 27

eTable 1. Other related outcomes reported by studies included

Author, Year	Number of people with OHCA	Bystander witnessed OHCA (%)	Bystander defibrillation (%)	ROSC (%)	Admitted to hospital (%)	Good neurological outcome (%)
Smith, et al. 2001	Control : 268 Intervention: 161	Control : 78 (29.1%) Intervention: 35 (21.7%) No p value and OR	NA	NA	NA	NA
Lick, et al. 2011	Control: 106 Intervention: 247	NA	NA	Control: 40 (38%) Intervention: 116 (47%) OR 1.46, [95% CI 0.90–2.40], p=0.13	Control: 37 (35%) Intervention: 95 (38%) OR 1.17, [95% CI 0.71–1.93], p=0.55	NA
Wissenberg, et al. 2013	2001: 1262 2010: 1906	2001: 599 (51.6%) 2010: 1020 (53.9%) p=0.001, no OR	2001: 13 (1.1%) 2010: 36 (2.2%) p=0.003, no OR	NA	2001: 91 (7.9%) 2010: 354 (21.8%) p<0.001, no OR	NA
Nielsen, et al. 2014	Control: 90 Intervention: 124	Control: 35 (39%) Intervention: 49 (40%) No p value and OR	NA	Control: 17 (19%) Intervention: 28 (23%) p=0.61, no OR	NA	NA
Ringh, et al. 2015	Control: 361 Intervention: 306	Control: 186 (57.6%) Intervention: 165 (56.9%) No p value and OR	NA	Control: 105(29.1%) Intervention: 90 (29.4%) Difference 0.3, [95% CI −6.5–7.3], p=0.93	NA	NA
Lai, et al. 2015	Before: 2428 After: 3025	Before: 1318 (54.3%) After: 1483 (49.0%) No p value and OR	Before: 0 (0.0%) After: 29 (1.0%) No p value and OR	Before: 239 (15.0%) After: 526 (23.2%) OR 1.7, [95% CI 1.4–2.0], no p value	Before: 111 (6.9%) After: 323 (14.3%) OR 2.2, [95% CI 1.8–2.8], no p value	NA

eTable 1. Other related outcomes reported by studies included (continued)

Author, Year	Number of people with OHCA	Bystander witnessed OHCA (%)	Bystander defibrillation (%)	ROSC (%)	Admitted to hospital (%)	Good neurological outcome (%)
Hansen, et al. 2015	2010: 1167 2013: 1341	2010: 502 (43.0%) 2013: 620 (46.2%) p=0.22, no OR	2010: 34 (9.3%) 2013: 127 (6.0%) p=0.16, no OR	2010: 285 (24.5%) 2013: 406 (30.3%) p<0.01, no OR	2010: 263 (22.5%) 2013: 366 (27.3%) p<0.01, no OR	2010: 82 (7.1%) 2013: 129 (9.7%) p=0.02, no OR
Ro, et al. 2015	Seoul Control: 1054 Intervention: 2355 Osaka Control: 3559 Intervention: 4693	Seoul Control: 620 (58.8%) Intervention: 1201 (51.0%) p<0.01, no OR Osaka Control: 1470 (41.3%) Intervention: 1882(40.1%) p=0.30, no OR	Seoul Control: 0 (0%) Intervention: 0 (0%) p=0.2, no OR Osaka Control: 14 (0.4%) Intervention: 47 (1.0%) p<0.01, no OR	NA	NA	Seoul Control: 15 (1.4%) Intervention: 94 (4.0%) p<0.01, no OR Osaka Control: 127 (3.6%) Intervention: 224 (4.8%) p=0.30, no OR
(Pijls, et al. 2016	Control: 131 Intervention: 291	Control: 99 (75.6%) Intervention: 218 (74.9%) p=0.885, no OR	NA	Control: 42 (32.3%) Intervention: 121 (41.7%) p=0.098, no OR	NA	NA
Hasselqvist, et al. 2017	Control: 5155 Intervention:3543	Control: 3062 (60.5%) Intervention: 2001 (58.3%) No p value and OR	Control: 94 (1.8%) Intervention: 65 (1.8%) No p value and OR	NA	Control: 1143 (32.4%) Intervention: 1143 (32.4%) No p value and OR	NA
Hwang, et al. 2017	Control: 182 Intervention:282	Control: 109 (59.9%) Intervention: 172 (61.0%) p=0.843, no OR	Control: 0 (0%) Intervention: 1 (0.3%) No p value and OR	Control: 36 (19.8%) Intervention: 125 (44.3%) No p value and OR	Control: 29 (15.9%) Intervention: 101 (35.8%) p<0.001, no OR	Control: 6 (3.3%) Intervention: 24 (8.5%) No p value and OR
Diepen, et al. 2017	2011: 6,762 2015: 16,103	2011: 2673 (39.5%) 2015: 6609 (41.0%) p=0.001, no OR	2011: 217 (3.2%) 2015: 902 (5.6%) p<0.001, no OR	NA	2011: 2712 (40.1%) 2015: 5475 (34.0%) p<0.001, no OR	2011: 701 (10.4%) 2015: 1426 (8.9%) p=0.002, no OR

eTable 1. Other related outcomes reported by studies included (continued)

Author, Year	Number of people with OHCA	Bystander witnessed OHCA (%)	Bystander defibrillation (%)	ROSC (%)	Admitted to hospital (%)	Good neurological outcome (%)
Fordyce, et al. 2017	At Home 2010: 1063 2014: 1242 In Public: 2010: 470 2014: 605	At Home 2010: 425 (40.0%) 2014: 532 (42.8%) p=0.13, no OR In Public: 2010: 213 (45.3%) 2014: 306 (50.6%) p=0.22, no OR	At Home 2010: 5 (1.6%) 2014: 2 (0.5%) p=0.06, no OR In Public: 2010: 37 (21.1%) 2014: 49 (19.9%) p=0.19, no OR	NA	NA	At Home 2010: 52 (4.9%) 2014: 76 (6.1%) p=0.06, no OR In Public: 2010: 44 (9.5%) 2014: 89 (14.7%) p=0.02, no OR
Adabag, et al. 2017	2011: 1067 2014: 1473	2011: 442 (41%) 2014: 661 (45%) p=0.06, no OR	NA	NA	2011: 343 (32%) 2014: 405 (27%) p=0.004, no OR	2011: 150 (14%) 2014: 157 (11%) p=0.02, no OR
Uber, et al. 2018	Control: 899 Intervention: 587	Control: 414 (46%) Intervention 232 (40%) p=0.01, no OR	NA	Control: 263 (29%) Intervention: 181 (31%) p=0.52, no OR	NA	Control: 75 (8%) Intervention: 51 (9%) p=0.87, no OR

OHCA: Out-of-hospital cardiac arrest; ROSC: Return of spontaneous circulation; OR: odds ratio.

eTable 2. Interventions reported in the included studies

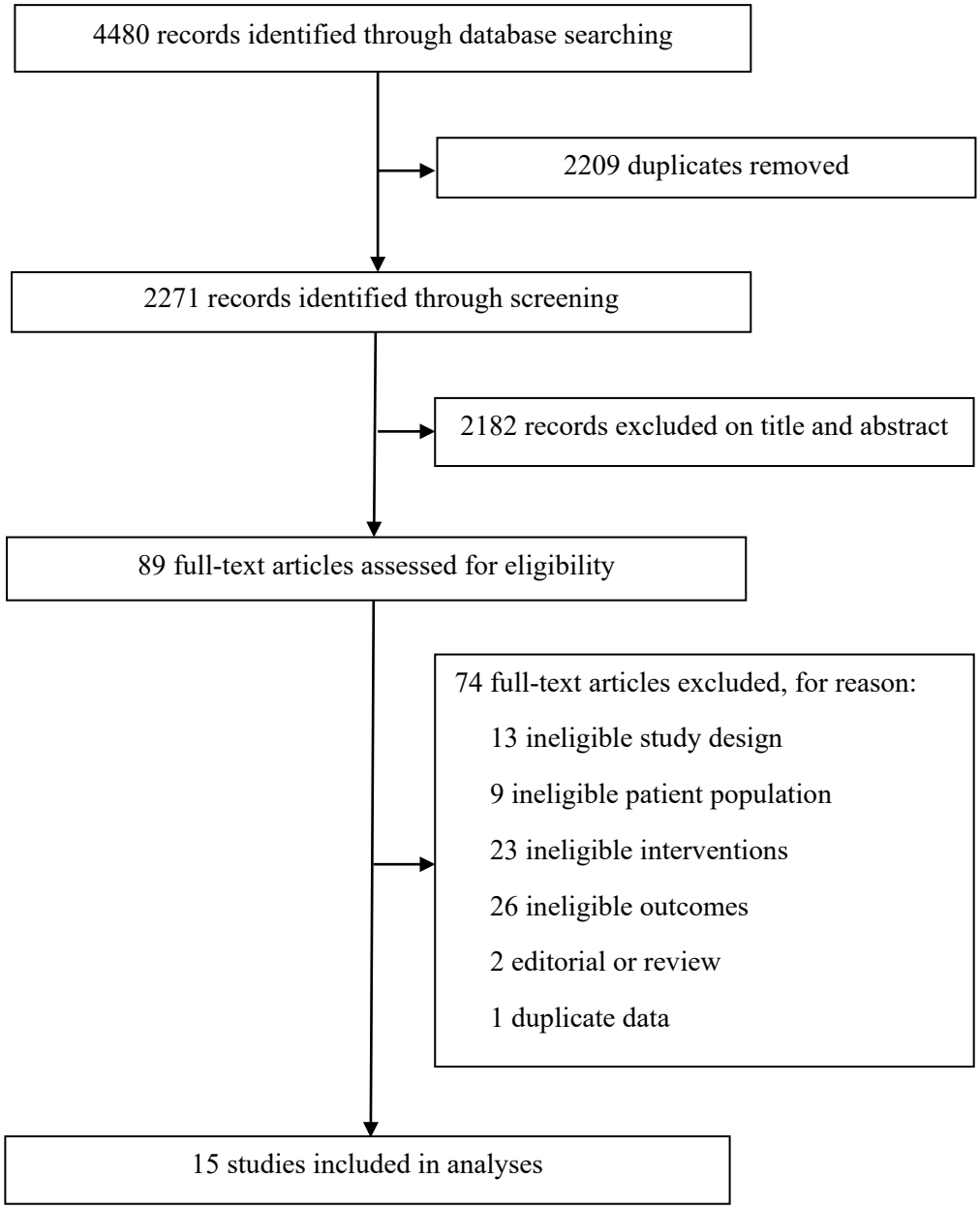
Author Year	Interventions
Smith, et al. 2001	**Community intervention** Additional dispatch of fire fighters (trained in BLS, use of AEDs in an 8-day training course and equipped with AEDs) to the existing two-tiered EMS dispatch system
Ringh, et al. 2015	**Community intervention** Mobile phone dispatch of laypersons for CPR
Pijls, et al. 2016	**Community intervention** Text message alert system to activate trained volunteers
Hasselqvist, et al. 2017	**Community intervention** EMS dispatch of first responders for CPR
Uber, et al. 2018	**Community intervention** One time, point-of-contact compression-only CPR training at public locations on a single day
Lick, et al. 2011	**Community Intervention** - increasing public awareness, community CPR training - distribution of AHA CPR Anytime 25-min training kit to school-students and their family members - CPR training was provided to civic groups, city employees, and various businesses - public television produced and broadcasted a 30-min documentary on CPR education program - additional deployment of AEDs in schools and public places **Health services intervention** - retraining of all EMS personnel in high performance CPR - protocols for therapeutic hypothermia, coronary artery evaluation.
Wissenberg, et al. 2013	**Community intervention** - implementation of mandatory resuscitation training in elementary schools and in those acquiring a driver's license - increasing voluntary first aid training - distribution of CPR self-instruction training kits - increasing AEDs located outside hospitals **Health services intervention** - nationwide improvement of DACPR - efforts to improve therapeutic hypothermia and early revascularization - overall strengthening of EMS system.
Nielsen, et al. 2014	**Community intervention** **-** Mass media campaign & widespread education (including broadcasting resuscitation on local television) - Distribution of 24-min DVD-based-self-instruction BLS courses; 4-h BLS/AED courses for the public. - Increase of AEDs in public area **Health services intervention** - Training staff at the hospitals and EMS.
Lai, et al. 2015	**Community intervention** - Public education on CPR - Public access defibrillators **Health services intervention** - Increase in the number of ambulances - Improvement of paramedic skills - Introduction of therapeutic hypothermia.

eTable 2. Interventions reported in the included studies (continued)

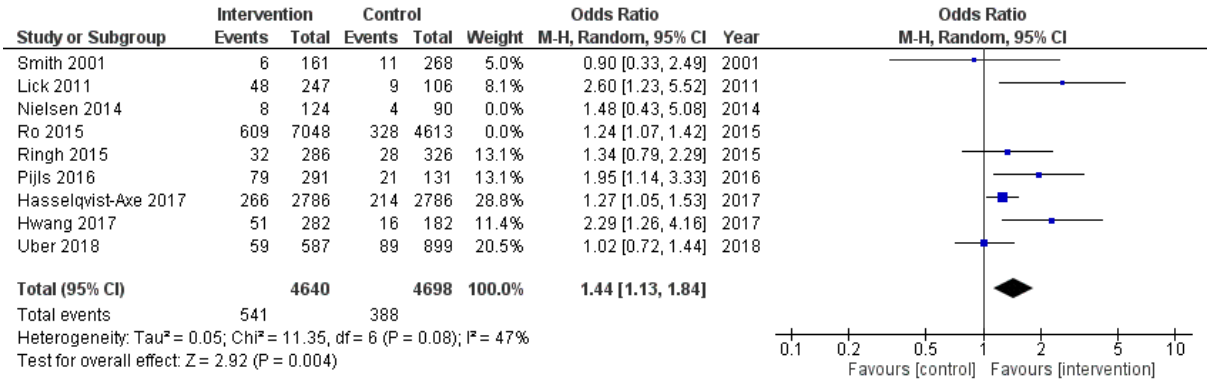
Author Year	Interventions
Hansen, et al. 2015	**Community intervention** - Statewide initiatives: training the population in CPR and AED use. - training first responders in team-based CPR including AED use and high-performance CPR **Health services intervention** - Training dispatch centres in recognizing cardiac arrest symptoms in order to implement bystander CPR within 60 seconds of call receipt.
Ro, et al. 2015	**Community intervention** **-** Public education and CPR training programmes **-** high-quality bystander CPR education programmes - Increasing AEDs in public locations - Enactment of the Good Samaritan Law **Health services intervention** - EMS system quality control programmes - advanced CPR skill training for EMS staff
Hwang, et al. 2017	**Community intervention** - public CPR training, teaching compression-only CPR in addition to standard BLS courses **Health services intervention** - implementation of DACPR protocol - quality improvement of EMS - advanced life support protocol in hospital
Diepen, et al. 2017	**Community intervention:** Arizona SHARE Bystander CPR Initiative (brief online video training; free training kits sent to school students; free training in many locations throughout the state, etc.); Minnesota Bystander CPR Training, etc. **Health services intervention** - Heart Rescue Project (establishment of a statewide resuscitation registry, - measure performance and outcomes and a focus on incremental system quality improvement
Fordyce, et al. 2017	The North Carolina RACE CARS program **Community intervention** - community training in chest compression–only CPR - first-responder training in team-based CPR **Health services intervention** - providing emergency medical dispatcher training on early recognition of cardiac arrest and instructing bystanders to provide CPR, - several in-hospital interventions
Adabag, et al. 2017	State-wide integrated resuscitation program **Community intervention** - training sessions for CPR and AED use in schools, workplaces and special events **Health services intervention** - increasing the utilization of therapeutic hypothermia, emergency cardiac catheterization - gathering first responders, EMS, police and fire departments, hospital emergency departments, cardiology, intensive care unit services under the same organization

Abbreviations: BLS, basic life support; AED, automatic external defibrillator; EMS, emergency medical services; CPR, cardiopulmonary resuscitation; AHA, American heart association; DACPR, dispatcher-guided bystander CPR; RACE CARS: regional approach to cardiovascular emergencies cardiac arrest resuscitation.

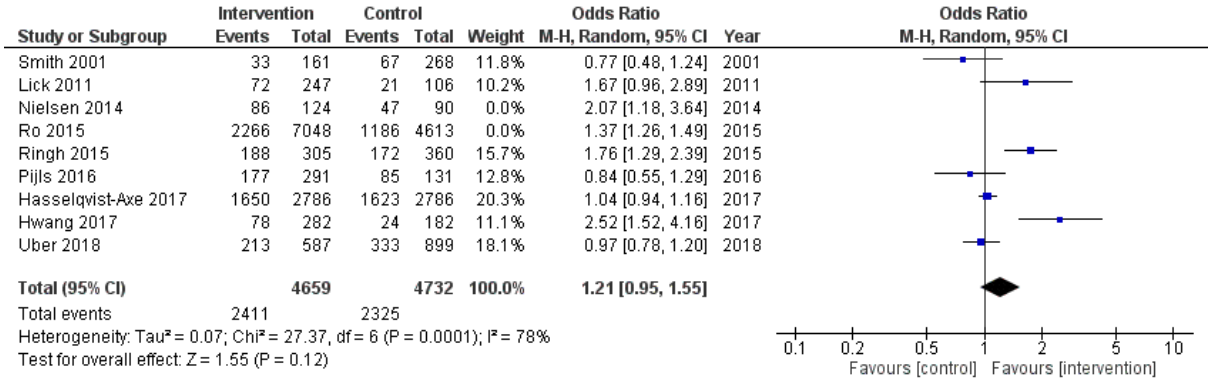
eFigure 1. The study selection process



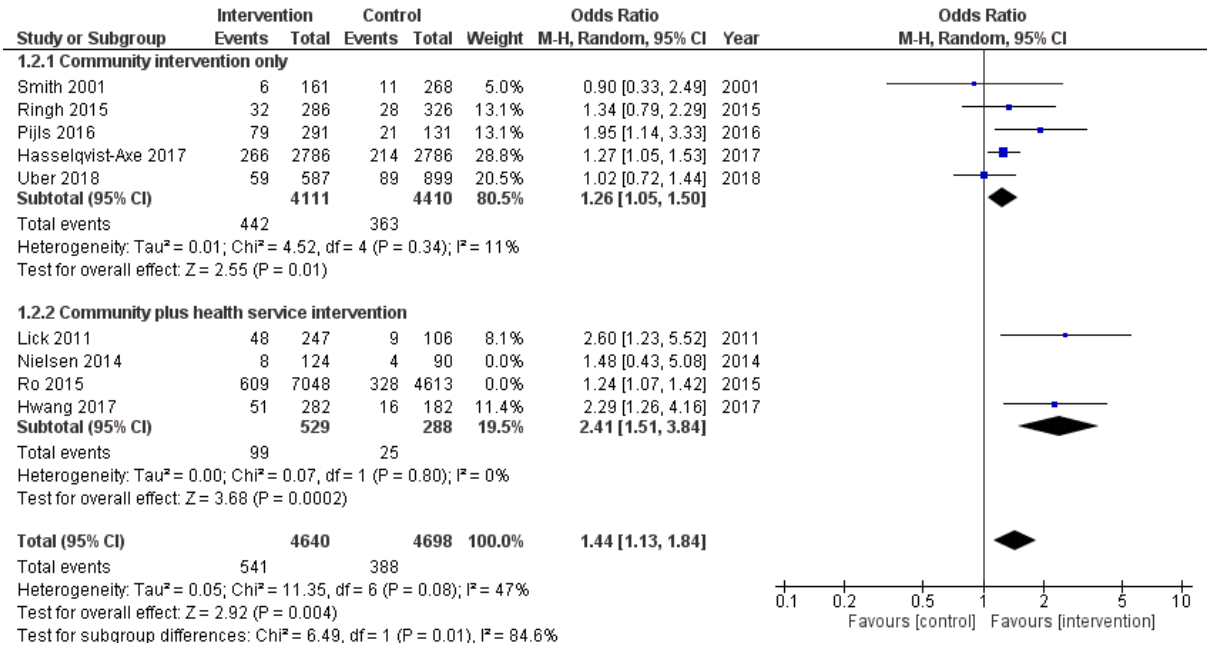
eFigure 2. Forest plot of effects of community interventions on survival from OHCA after removing Nielsen 2014 and Ro 2015



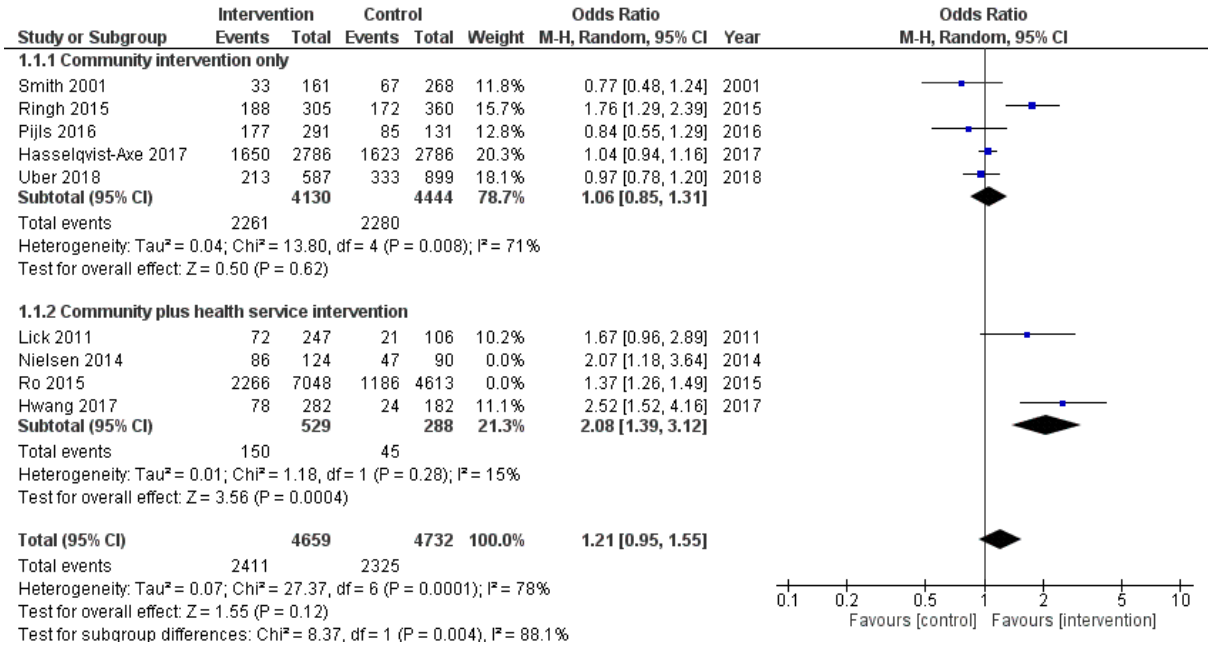
eFigure 3. Forest plot of effects of community interventions on bystander CPR after removing Nielsen 2014 and Ro 2015



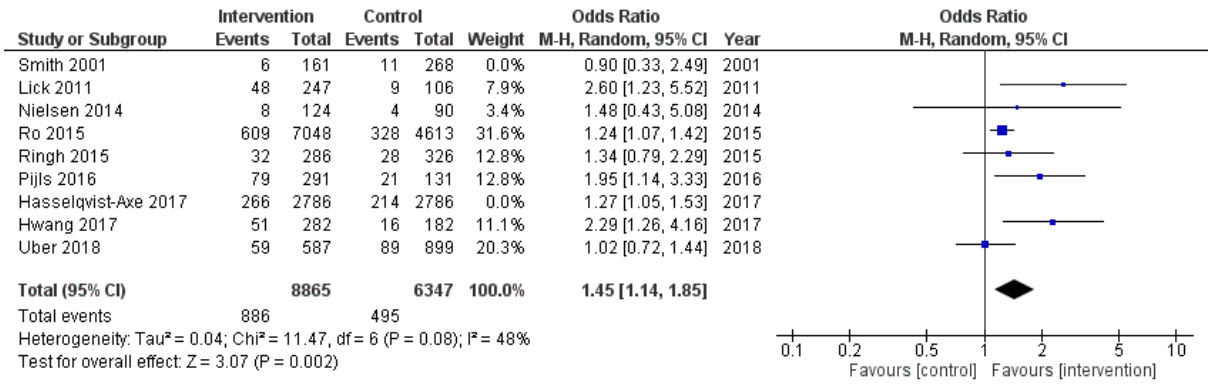
eFigure 4. Forest plot of subgroup comparison on survival from OHCA after removing Nielsen 2014 and Ro 2015



eFigure 5. Forest plot of subgroup comparison on bystander CPR rate after removing Nielsen 2014 and Ro 2015



eFigure 6. Forest plot of effects of community interventions on survival from OHCA after removing studies involving firefighters/policemen (Smith 2001 and Hasselqvist-Axe 2017):



eFigure 7. Forest plot of effects of community interventions on bystander CPR after removing studies involving firefighters/policemen (Smith 2001 and Hasselqvist-Axe 2017):