Do public access defibrillation (PAD) programmes lead to an increase of patients surviving to discharge from hospital following out of hospital cardiac arrest: a literature review

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CRD summary
This review concluded that use of level one responders probably had a slight benefit for patients suffering an out of hospital cardiac arrest. Use of level two responders may have greater benefit but only for a small section of the population suffering out of hospital cardiac arrest. These conclusions reflect the limitations of the data and are likely to be reliable.

Authors' objectives
To assess the effectiveness of public access defibrillation programmes.

Searching
MEDLINE, EMBASE, CINAHL, Cochrane Database of Systematic Reviews, ACP Journal Club, DARE and Cochrane Central Register of Controlled Trials (CENTRAL) were searched from inception to March 2005 without language restrictions. Search terms were reported. Relevant journals were handsearched for any recent relevant studies not indexed by the databases. A request was placed with colleagues for information on any relevant trials.

Study selection
Prospective clinical controlled trials that compared first responder defibrillation with defibrillation delivered by an emergency medical system were eligible for inclusion. Studies that allocated the patient to the intervention or control group after the onset of cardiac arrest were excluded. The outcome of interest was survival to discharge from hospital following out of hospital cardiac arrest.

Two trials assessed use of level one responders (public access defibrillation by traditional first responders by police and/or fire fighters) and one trial assessed level two responders (public access defibrillation by targeted first responders). The control used in each trial varied. In one trial fire fighters were ordered to attend arrest calls and provide cardiopulmonary resuscitation. In the second trial patients in control group areas were attended by the police units (who performed cardiopulmonary resuscitation) but not fire fighters; the intervention group received both services as responders. In the third trial patients in control group areas were attended by non-automatic external defibrillator equipped lay responders who provided cardiopulmonary resuscitation only. All three studies were conducted in urban settings (two in USA and one in Holland). The included studies were published between 1993 and 2004.

The author did not state how many reviewers assessed studies for inclusion.

Assessment of study quality
Study quality was assessed using criteria for randomisation, blinding, sample size, intention-to-treat analysis and completeness of follow-up.

The author did not state how many reviewers performed quality assessment.

Data extraction
Data on the outcome were extracted in the form of odds ratios (OR) or relative risks (RR), each with 95% confidence intervals (CI).

The author did not state how many reviewers performed data extraction.

Methods of synthesis
The studies were combined in a narrative synthesis.

Results of the review
Three trials were included in the review: two cluster randomised controlled trials (RCTs) and one non-randomised control trial. Numbers of events in the intervention arms ranged from 128 to 447 and numbers of events in the control arms ranged from 107 to 432. The two RCTs did not report information on randomisation. It was not possible to blind patients or responders in any of the trials. None of the trials reported a preset sample size. All of the trials used intention-to-treat analysis and had 100% follow-up for their participants.

Two trials reported no statistically significant benefit of survival to hospital charge with public access defibrillation using level one responders when compared with the control group (OR 1.6, 95% CI 1.0 to 2.6 and OR 1.3, 95% CI 0.8 to 2.2).

One trial reported that provision of public access defibrillation using level two responders was associated with a statistically significant improvement of survival to hospital discharge when compared with the control group (RR 2.0, 95% CI 1.07 to 3.77).

Authors’ conclusions
Use of level one responders probably had a slight benefit for patients suffering an out of hospital cardiac arrest. Use of level two responders may lead to a greater beneficial effect but only for a small section of the population suffering an out of hospital cardiac arrest

CRD commentary
The review question was clear and supported by appropriate inclusion criteria. Several relevant databases were searched. Insufficient attempts were made to find unpublished studies for publication bias to be ruled out. No language restrictions were applied in the search which reduced the risk of language bias. It was unclear whether sufficient attempts were made to minimise errors and biases during the review process. Study quality was assessed using suitable criteria. A narrative synthesis was appropriate given the high level of clinical differences between studies. Full details on the characteristics of participants were not reported.

The author’s cautious conclusions reflect the data limitations and are likely to be reliable.

Implications of the review for practice and research
Practice: The author stated that emphasis must be placed on improvement of ambulance response times and bystander cardiopulmonary resuscitation rates.

Research: The author stated a need for further studies with large sample sizes to evaluate the effectiveness of public access defibrillation programmes over a prolonged time period.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.