

# The effects of a mobile GPS-tracking system in activating volunteer first responders to bring an automated external defibrillator to critically ill patients: A prehospital study in a rural community

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## Background

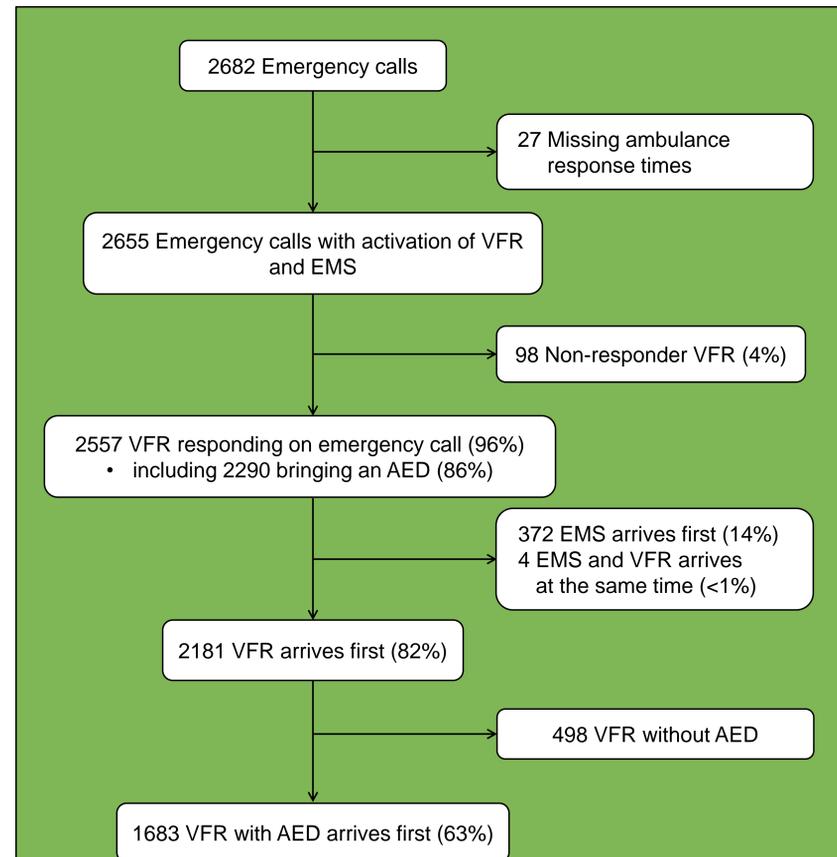
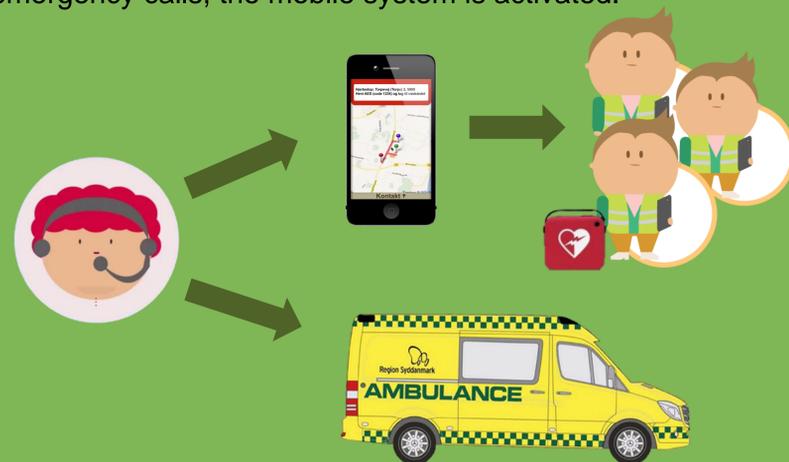
In recent years there has been increasing public awareness of the importance of early cardiopulmonary resuscitation and consequently a wide-spread dissemination of public automated external defibrillators (AEDs). If an AED is used before the arrival of the first emergency medical service (EMS), chances of survival increase to 50-70%. However, the use of AED's remains low, especially in residential areas. New strategies are needed to improve the prehospital use of AEDs.

## Purpose

To evaluate to which extent an AED arrives before EMS at an emergency site in a rural community when using a mobile GPS-activated system to activate volunteer first responders (VFR).

## Methods

In 2012 a mobile GPS-tracking system was brought into use by a first aid volunteer corps on the island of Langeland with circa 12,000 inhabitants. In cases of emergency calls, the mobile system is activated.



**Flowchart 1.** The inclusion-exclusion process of emergency calls. AED: Automated external defibrillator. EMS: Emergency medical service. VFR: Volunteer first responder.

We retrospectively collected ambulance response data from the emergency medical coordination center from April 2012 to November 2017. These data were matched with the response times of the VFRs using data from the mobile GPS-tracking system.

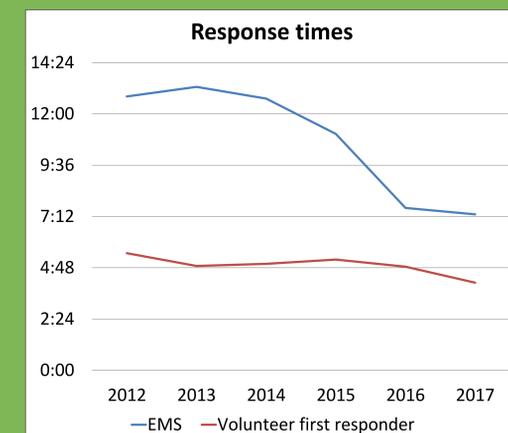
## Results

In the 6-year period from 2012 to 2017 there was a total of 2655 emergency calls, in which the mobile GPS-tracking system was activated.

The VFRs arrived before the EMS in 2181 cases (82%), and in 1683 of these cases (63%), the VFR had collected an AED at arrival. The median response time for all VFRs that were dispatched (N=2557) was 4:48 min:sec (IQR 3:18-6:56). The median response time for volunteer first responders arriving to the emergency site with an AED was 6:24 min:sec (IQR 4:31-8:53). For comparison, the median response time for the first arriving EMS was 10:20 min:sec (IQR 6:19-15:45). In a non-parametric Wilcoxon Signed-Rank test, the response times for both VFR groups were significantly lower compared with EMS response time (both  $p < 0.0001$ ).

## Conclusion

In this prehospital study, we found that the use of a mobile GPS-tracking system significantly reduced response times for VFR compared with response times for EMS. These results promote the potential early use of AEDs in out-of-hospital cardiac arrest patients.



**Figure 1.** The response time in time:sec for EMS and volunteer first responders in the years 2012-2017. EMS: Emergency medical service.