

# Improving outcomes in out-of-hospital cardiac arrest: Modelling the survival impact of early public defibrillation in the East of England

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## Introduction

Survival after out-of-hospital cardiac arrest (OHCA) in the UK is approximately 8%, which is lower than in countries with widespread public defibrillator access and CPR training. Early defibrillation using public automated external defibrillators (AEDs) significantly improves outcomes, yet AEDs are used in only ~10% of cases. This study models the potential survival impact of increasing early defibrillation (<5 minutes) in the East of England Ambulance Service Trust (EEAST) region.

## Methods

The study analysed adult OHCA cases of presumed cardiac cause attended by EEAST between 01/04/2021 and 31/03/2025 (four years) where resuscitation was attempted or continued.

The primary outcome was 30-day survival. Survival rates for patients defibrillated within 5 minutes were calculated by age (18–69, 70+) and sex. These stratified rates were applied to the wider cohort, with adjustment for the age: sex probability of survival and presenting in a shockable rhythm. This approach was used to model the survival benefit of receiving an earlier shock and to estimate the additional patients who may have had a shockable rhythm if defibrillation had been attempted earlier, given that the probability of a rhythm being amenable to defibrillation declines with time from arrest.

## Results

Of 12,510 OHCA patients, 1006 (8.0%) survived to 30 days. 1026 patients (8.2%) received defibrillation <5 minutes, with a survival rate of 37.3%. Applying the early defibrillation model to the full cohort suggests an additional 836 patients could have survived if defibrillation had been attempted <5 minutes of all arrests, increasing overall survival to 14.7%.

## Conclusion

These findings reinforce the critical importance of time to defibrillation. The 37.3% survival rate for early defibrillation aligns with existing literature. The model suggests that up to 209 additional lives per year could be saved with universal early defibrillation. While idealised, this scenario highlights the potential impact of expanding public AED access, ensuring 24/7 availability, and increasing CPR/AED training for the public. Future work should focus on identifying optimal AED placement and public engagement strategies to maximise survival return on investment.

### POTENTIAL ADDITIONAL SURVIVORS FROM CARDIAC ARREST

if all patients had a public access defibrillator used within 5 minutes of their arrest

 **836** more lives saved 

	Survived	Potential survival
 +346 Male 18–69	13.3%	21.7%
 +233 Male ≥70	5.6%	11.2%
 +186 Female 18–69	8.7%	18.8%
 +71 Female ≥70	2.6%	5.6%



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