

# Proper placement of defibrillators key to effective use

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The appropriate placement of automated external defibrillators (AEDs) is critical to optimize their use in public places, according to two studies published in *Circulation: Journal of the American Heart Association*.

Sudden [cardiac arrest](#) is the sudden, abrupt loss of [heart function](#). Without immediate bystander cardiopulmonary resuscitation (CPR), brain death and permanent death start to occur in just four to six minutes after someone experiences cardiac arrest. Cardiac arrest can be reversed by immediate bystander CPR and treatment within a few minutes with an [electric shock](#) to allow the heart to restore a normal heartbeat. More than 92 percent of out-of-hospital cardiac arrest victims don't survive to hospital discharge. In cities where bystander CPR and defibrillation is provided within 5 to 7 minutes, the survival rate from out-of-hospital sudden cardiac arrest is as high as 30 percent to 45 percent, according to the American Heart Association.

In one study, researchers found that school-based AED programs have a high rate of survival for students and others on school grounds.

Researchers found that 83 percent of 1,710 U.S. high schools with AED programs that they studied had an established [emergency response](#) plan for sudden cardiac arrest. However, only 40 percent practiced and reviewed their plans at least annually with potential school responders.

Of 36 cases of sudden cardiac arrests at the 1,710 schools:

- 94 percent received bystander CPR,
- 83 percent received an AED shock and
- 64 percent survived to [hospital discharge](#) including 9 of 14 student athletes and 14 of 22 non students.

Three factors — prompt recognition of sudden cardiac arrest, the presence of a trained rescuer to initiate CPR and access to early defibrillation through on-site AEDs — are critical to improving survival from sudden cardiac arrest in schools, said Jonathan A. Drezner, M.D., lead author of the study and associate professor and team physician in the Department of Family Medicine at the University of Washington-Seattle.

"It is not just about the AEDs — schools must have a comprehensive emergency response plan for sudden cardiac arrest that includes training anticipated responders in CPR and AED use, access to an AED, and practice and review of the response plan," Drezner said.

"It is crucial to recognize that AEDs permit early defibrillation not only in young athletes but also in other individuals who may experience an unexpected sudden cardiac arrest. We found that more than half of sudden cardiac arrest events reported in schools occur in adults working at the school or attending a school event. Schools are a strategic location for AED programs to serve large concentrations of people at risk for sudden cardiac arrest."

In a Danish study, researchers examined strategic placement of AEDs in public urban locations. A significant amount of interest and money is focused on AED deployment and public access defibrillation programs worldwide, but knowledge about where and how widespread AED deployment in the community should be is lacking, said Fredrik Folke,

M.D., lead author of the study and a cardiology research fellow at Gentofte University Hospital, Hellerup, in Denmark.

To evaluate whether public AEDs were located where the majority of cardiac arrests occurred, Folke and colleagues digitally marked the exact locations of all arrests on a map and then analyzed the locations of 104 AEDs placed in municipal institutions in Copenhagen, Denmark, from 1994 through 2005. About 25 percent of out-of-hospital cardiac arrests occurred in public places.

According to the cardiac arrest analysis, carefully choosing AED coverage in 10 percent of the city area would provide coverage for about 67 percent of all cardiac arrests occurring in public. The highest rates of cardiac arrest in cities were in high-density public areas such as major train stations, large shopping centers, central bus terminals and sports centers.

"Our findings suggest that public access defibrillation programs should cover the greatest possible number of arrests in public, which is consistent with the recommendations from the American Heart Association," Folke said. "But if AED deployment in the community is driven by local or political initiatives and not on strategic AED placement, there is a high risk of AEDs being placed primarily in low-incidence areas of cardiac arrest and hence low likelihood of the AEDs ever being used."

Placing AEDs in about 10 percent of the city area cost an estimated \$41,000 per extra year of a survivor's life — deemed "acceptable" by the researchers. However, unguided AED placement trying to cover the entire city had an estimated cost of \$108,700 per extra life year.

In an accompanying editorial, Dianne L. Atkins, M.D., a pediatric cardiologist at the University of Iowa, wrote that the two "informative"

studies demonstrate that the mere presence of an AED in the general area of an arrest does not guarantee success. Successful AED programs require immediate bystander CPR and non-equipment components in addition to AED-availability, she said.

"The need for ongoing CPR training, fully-developed and executed emergency plans and links to EMS are vital to the immediate and long-term outcomes of shock delivery," Atkins wrote.

Source: American Heart Association ([news](#) : [web](#))

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