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### Denmark: Increased Bystander CPR, Decreased Mortality in Out-of-Hospital Cardiac Arrest

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A registry study from Denmark has investigated the 1-year risk of anoxic brain damage or nursing home admission and of mortality among patients who survived to day 30 after an out-of-hospital cardiac arrest. The risks were analysed according to whether bystander CPR or defibrillation was performed. The study is published in the *New England Journal of Medicine*.

The number of survivors to 30 days in the study period, 2001 through 2012, totalled 2855. OHCA incidence remained stable, but the percentage surviving to 30 days increased from 3.9% to 12.4%, with recipients of bystander CPR more likely to survive to 30 days. Of note, the rate of bystander CPR increased from 66.7% to 80.6% and all-cause mortality decreased from 18% to 7.9%. The risk of anoxic brain damage or nursing home admission was also significantly lower in those who received bystander CPR. The authors write that their findings “underscore the need to implement or improve strategies that help bystanders initiate CPR and strategies that facilitate public access to automated external defibrillators.”

ICU Management & Practice asked the study's first author, Kristian Kragholm, MD, PhD, Department of Departments of Cardiology and Epidemiology/Biostatistics, Aalborg University Hospital, Denmark, how other countries might replicate the success in optimising bystander CPR in Denmark.

He explained that in Denmark mandatory basic life support courses in elementary schools and when acquiring a driver's licence were introduced on a nationwide level in 2005 and 2006, respectively. The annual number of completed voluntary courses in basic life support nearly doubled in the past decade, and media commercials and annual awareness campaigns in later years may also have had an impact on the increased rates of bystander CPR from around 20% in 2001 to nearly 65% in 2014 (based on all included patients in the Danish Cardiac Arrest Registry during 2001-2014). Healthcare professionals were introduced in emergency dispatch centres in 2009 and on a nationwide level from 2011. These healthcare professionals are able to guide bystanders to recognise cardiac arrest and start CPR.

Facilitating early defibrillation is also important, noted Dr. Kragholm. Between 2006 and 2011, the number of registered AEDs in Denmark increased from approximately 3,000 to nearly 15,000. An AED registry was formed in 2007 in Copenhagen that established a platform to register the location and accessibility of AEDs. This AED registry was expanded to a nationwide level in 2010. Information from the AED registry was integrated with emergency dispatch centres in Copenhagen beginning in 2010 and nationwide from 2011, enabling healthcare professionals to not only guide bystanders to initiate CPR but also to find and use the nearest available AED. The AED registry data is available through a smartphone app, so citizens can locate the nearest available AED. In Denmark, there has also been increased media attention directed towards placing AEDs outside buildings, thus making them accessible on a 24/7 basis.

“Our study underscores the importance of bringing an AED to the scene before emergency medical services personnel arrive. In Denmark, there are ongoing and future research studies planned on how to engage lay first responders in parallel with ambulances to increase CPR rates and use of AEDs before ambulance personnel arrival. Such interventions could be used in other settings but it should also be noted that it may be more sensible to engage fire fighter or police officers as first responders, depending on area coverage and AED availability and dissemination in the community,” Dr. Kragholm observed.

The researchers are also investigating hospital costs, length of stay and admission to intensive care units in relation to early bystander efforts, and they will look at longer-term outcomes, including mortality and nursing home care, in comparison to the background population.

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