

Supplementary Online Content

Wissenberg M, Lippert FK, Folke F, et al. Association of national initiatives to improve cardiac arrest management with rates of bystander intervention and patient survival after out-of-hospital cardiac arrest. *JAMA*. doi:10.1001/jama.2013.278483

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This supplementary material has been provided by the authors to give readers additional information about their work.

eTable 1. Changes in Bystander CPR and 30-Day Survival During the Study Period in Selected Subgroups

	OHCA Year										P Value	2001-2010	No.	
	2001 ^a	2002	2003	2004	2005	2006	2007	2008	2009	2010			Total With Data ^b	Missing Data ^c
Bystander CPR, arrest in private home, No. (%)	87 (16.0)	155 (14.5)	219 (18.6)	215 (18.5)	241 (19.5)	210 (22.1)	271 (26.4)	403 (32.5)	485 (33.8)	507 (36.8)	<.001	2793 (24.9)	11 216	4049
Bystander CPR, arrest outside private home, No. (%)	91 (37.1)	155 (36.4)	181 (39.0)	179 (43.1)	207 (46.4)	149 (54.2)	171 (52.1)	244 (57.3)	280 (60.7)	318 (69.3)	<.001	1975 (50.1)	3945	3440
Nonwitnessed arrest with CPR, No. (%)	67 (11.9)	104 (10.0)	138 (14.2)	167 (17.4)	184 (18.7)	173 (21.5)	197 (24.6)	246 (29.0)	288 (32.1)	310 (35.8)	<.001	1874 (21.5)	8732	1262
Bystander-witnessed arrest with CPR, No. (%)	176 (29.4)	296 (30.0)	353 (31.8)	322 (33.3)	352 (35.4)	339 (37.9)	360 (42.9)	467 (48.3)	509 (47.7)	535 (52.6)	<.001	3709 (39.3)	9439	1266
30-day survival, arrest in private home, No. (%)	17 (2.8)	18 (1.5)	33 (2.5)	29 (2.3)	43 (3.2)	50 (4.6)	59 (5.2)	79 (6.3)	96 (6.6)	90 (6.5)	<.001	514 (4.3)	12 083	3182
30-day survival, arrest outside private home, No. (%)	18 (6.8)	47 (9.8)	47 (9.4)	54 (11.8)	43 (9.2)	64 (20.1)	61 (16.7)	95 (22.2)	98 (21.1)	112 (24.2)	<.001	639 (15.2)	4203	3182
30-day survival, in non-witnessed arrest, No. (%)	5 (0.9)	8 (0.8)	7 (0.7)	13 (1.4)	13 (1.3)	15 (1.9)	14 (1.7)	25 (2.9)	22 (2.4)	29 (3.3)	<.001	151 (1.7)	8763	1231
30-day survival, in witnessed arrest, No. (%)	36 (6.0)	67 (6.8)	87 (7.8)	79 (8.1)	83 (8.3)	103 (11.5)	100 (11.9)	163 (16.8)	179 (16.7)	176 (17.3)	<.001	1073 (11.3)	9474	1231
30-day survival, in arrest without bystander CPR, No. (%)	14 (1.5)	33 (2.0)	44 (2.7)	37 (2.6)	31 (2.2)	50 (4.2)	39 (3.6)	57 (5.2)	64 (5.5)	50 (4.8)	<.001	419 (3.3)	12 654	1193
30-day survival, in arrest with bystander CPR, No. (%)	28 (11.3)	38 (9.3)	51 (10.3)	56 (11.4)	66 (12.2)	68 (13.2)	75 (13.3)	131 (18.4)	137 (17.2)	155 (18.3)	<.001	805 (14.3)	5621	1193

Temporal trends were tested. A p-value <.05 was considered statistically significant.

^a2001 consists of 7 months from June to December. All abbreviations can be found in Table 1.

^bNumber of patients with data for variable(s) of interest.

^cNumber of patients with missing value for variable(s) of interest.

eTable 2. New Onset of Neurologic Diseases Related to Cardiac Arrest in 1-Year Survivors^a

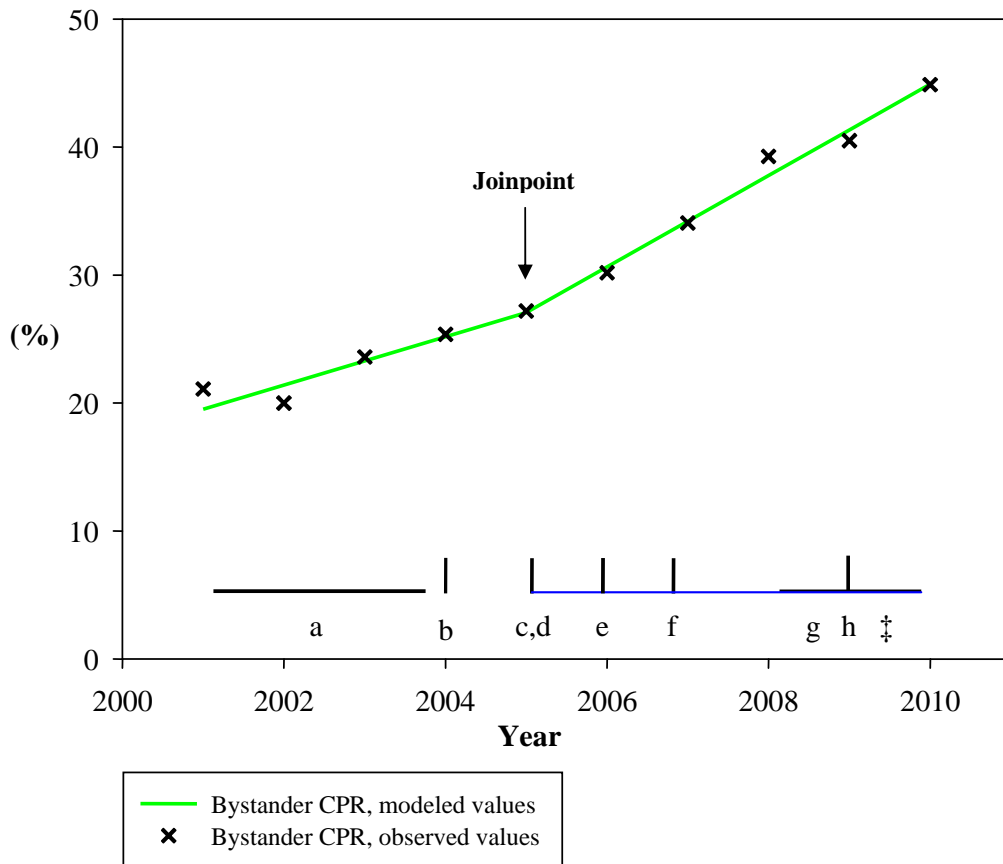
	OHCA Year										P Value	2001-2010
	2001 ^b	2002	2003	2004	2005	2006	2007	2008	2009	2010		
1-year survival, No.	37	75	90	87	100	133	122	173	184	195		1196
Anoxic brain damage, No. (%)	5 (13.5)	11 (14.7)	9 (10.0)	14 (16.1)	9 (9.0)	11 (8.3)	19 (15.6)	15 (8.7)	16 (8.7)	14 (7.2)	.03	123 (10.3)
Dementia, No. (%)	1 (2.7)	3 (4.0)	1 (1.1)	1 (1.2)	0 (0.0)	1 (0.8)	3 (2.5)	2 (1.2)	3 (1.6)	0 (0.0)	.14	15 (1.3)
Hemiplegia, paraplegia, or tetraplegia, No. (%)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (2.0)	1 (0.8)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.5)	.41	4 (0.3)
Epilepsy or status epilepticus, No. (%)	1 (2.7)	1 (1.3)	0 (0.0)	2 (2.3)	0 (0.0)	0 (0.0)	1 (0.8)	2 (1.2)	2 (1.1)	0 (0.0)	.36	9 (0.8)
Disorder of central nervous system, unspecified; disorder of brain, unspecified; encephalopathy, unspecified, No. (%)	0 (0.0)	1 (1.3)	0 (0.0)	4 (4.6)	1 (1.0)	4 (3.0)	3 (2.5)	7 (4.1)	5 (2.7)	5 (2.6)	.24	30 (2.5)
Neurologic diseases, total, No. (%)	6 (16.2)	13 (17.3)	10 (11.1)	17 (19.5)	11 (11.0)	16 (12.0)	26 (21.3)	20 (11.6)	23 (12.5)	18 (9.2)	.07	160 (13.4)

Temporal trends were tested. $P < .05$ was considered statistically significant.

^aPatients with no similar diagnosis up to 5 years prior to cardiac arrest were considered to have a new onset. New onset was defined as an event in the period from hospital discharge to 30 days after discharge following cardiac arrest.

^b2001 consists of 7 months from June to December.

eFigure 1. Temporal Trends in Bystander CPR With Joinpoint Analysis



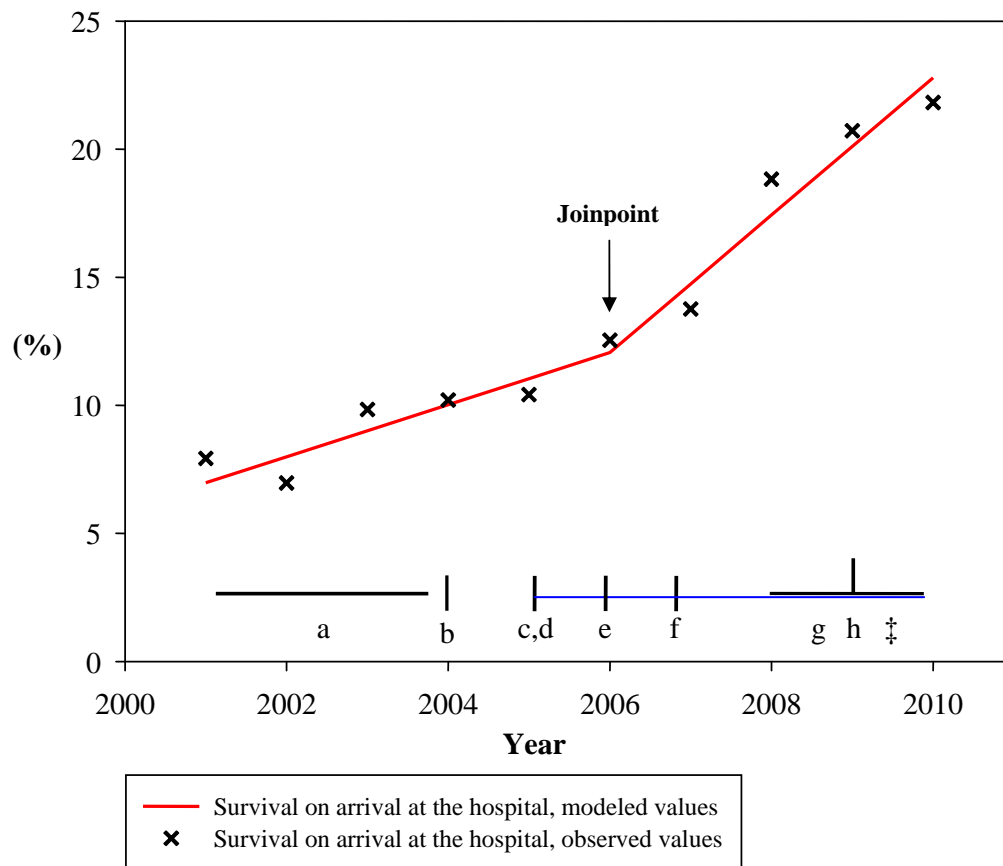
- a) about 175,000 first aid certificates distributed in Denmark annually, 2001-2004
 b) introduction of therapeutic hypothermia in Denmark starting from 2004
 c) mandatory education in resuscitation in elementary schools (January 2005)
 d) distribution of around 150,000 CPR self-instruction training kits between 2005-2010
 e) new guidelines for resuscitation (November 2005)
 f) mandatory resuscitation course when acquiring a driver's license (October 2006)
 g) increase to about 300,000 first aid certificates distributed in Denmark annually, 2008-2010
 h) the addition of healthcare professionals at dispatch centers starting from 2009
 ‡ throughout the study period:
 1) a large increase in number of AEDs located outside hospitals (approximately 15,000 in 2011)
 2) implementation of paramedics, and/or mobile emergency care units staffed with anesthesiologists

eFigure 1 (cont'd). Temporal Trends in Bystander CPR With Joinpoint Analysis

Proportion of patients who received bystander CPR according to calendar year. One statistically significant joinpoint was identified in 2005 (95% CI, 2003-2008) followed by an increasing slope along with the national initiatives. A two-sided p-value <0.05 was considered statistically significant.

AED = automated external defibrillators; CI = confidence interval; CPR = cardiopulmonary resuscitation.

eFigure 2. Temporal Trends in Survival on Arrival at the Hospital With Joinpoint Analysis



- a) about 175,000 first aid certificates distributed in Denmark annually, 2001-2004
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eFigure 2 (cont'd). Temporal Trends in Survival on Arrival at the Hospital With Joinpoint

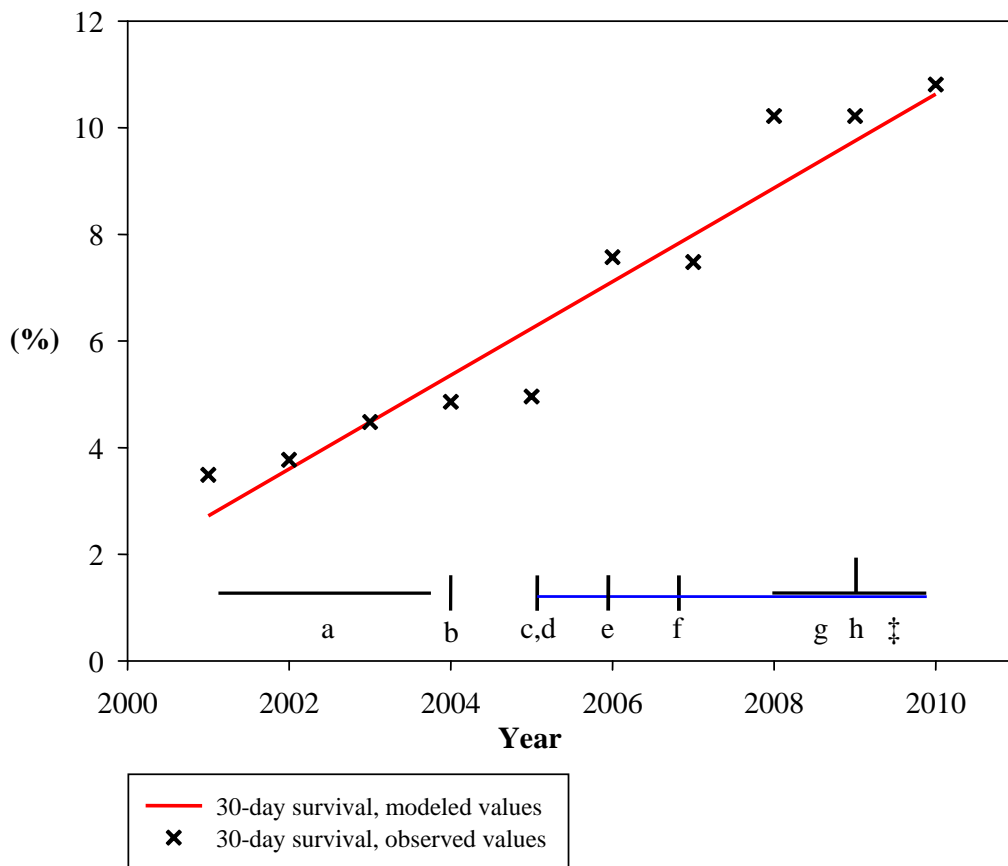
Analysis

Proportion of patients who achieved survival upon arrival at the hospital according to calendar year.

One statistically significant joinpoint was identified in 2006 (95% CI, 2003-2008) followed by an increasing slope along with the national initiatives. A two-sided p-value <0.05 was considered statistically significant.

AED = automated external defibrillators; CI = confidence interval

eFigure 3. Temporal Trends in 30-Day Survival With Joinpoint Analysis



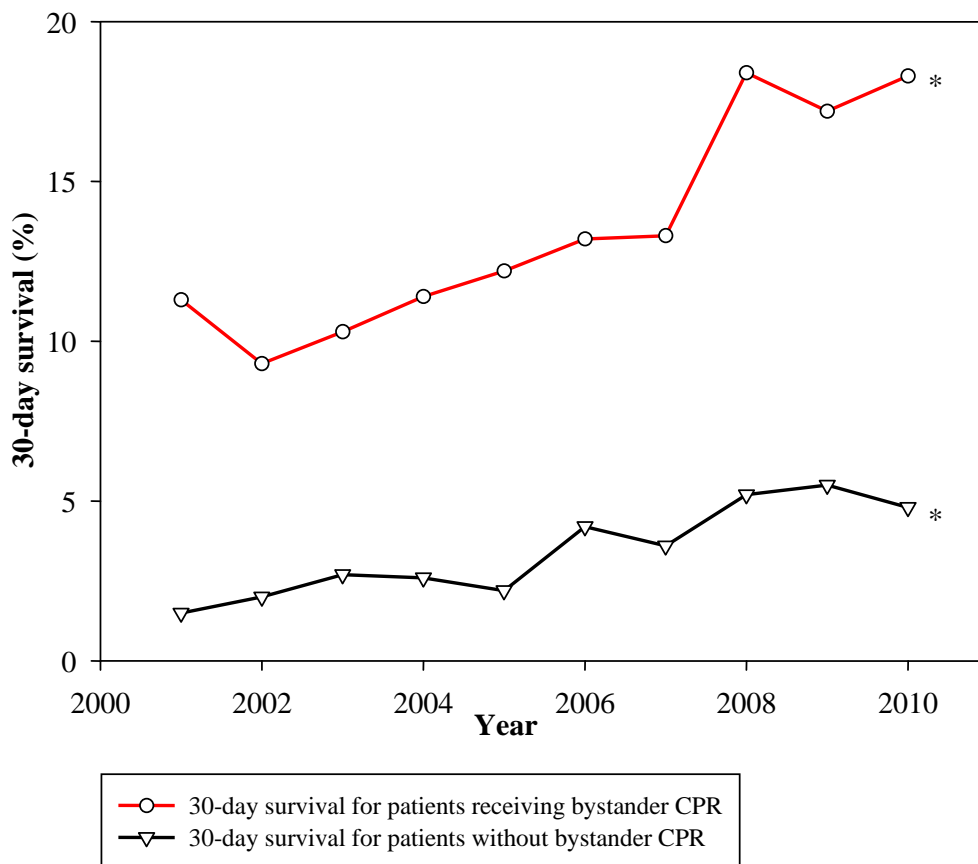
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 1) a large increase in number of AEDs located outside hospitals (approximately 15,000 in 2011)
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eFigure 3 (cont'd). Temporal Trends in 30-Day Survival With Joinpoint Analysis

Proportion of patients who achieved 30-day survival according to calendar year. No statistically significant joinpoint was identified, $p=0.09$.

AED = automated external defibrillators

Figure 4. Temporal Trends in 30-Day Survival in Relation to Bystander CPR

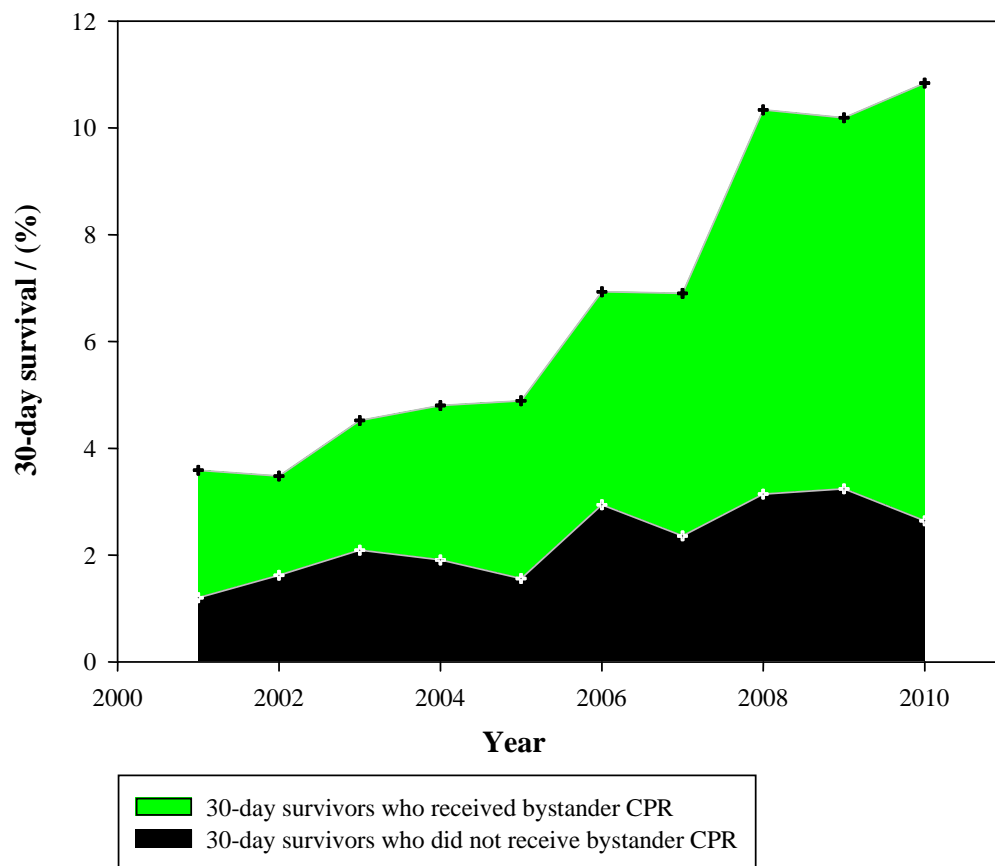


Proportion of patients achieving 30-day survival according to calendar year for: (1) patients who received bystander CPR; and (2) patients who did not receive bystander CPR. Patients with missing data for whether bystander CPR was given were excluded in the analysis (n=1193 [6.1%]). A two-sided p-value <0.05 was considered statistically significant.

CPR = cardiopulmonary resuscitation

*P<0.001

Figure 5. Proportion of Patients Receiving Bystander CPR Among 30-Day Survivors



Proportion of patients achieving 30-day survival according to calendar year with survivors stratified according to whether bystander CPR was given. Patients with missing data for whether bystander CPR was given were excluded in the analysis (n=1193 [6.1%]).

CPR = cardiopulmonary resuscitation