

## Supplementary Online Content

Hansen SM, Hansen CM, Folke F, et al. Bystander defibrillation for out-of-hospital cardiac arrest in public vs residential locations. *JAMA Cardiol*. Published online March 15, 2017. doi:10.1001/jamacardio.2017.0008

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

## eMethods. Location of Automated External Defibrillators

Publicly available municipal land-use plans were used to determine the type of area each registered AED was located in. These municipal land-use plans are based on cadastral mappings covering land parcels in Denmark and are free to use for everyone (PlansystemDK).<sup>1</sup>

PlansystemDK provides a uniform and standardized system for designating the usage of land areas in Denmark. PlansystemDK defines areas according to the table below. For our study, we used the geocoded location of each AED to assign what type of area the AED was located in. We classified the AED areas into three groups based on PlansystemDK (outlined in the table below): i) Residential areas (private homes cover more than 80% of the parcel), ii) Mixed residential and public areas (20%-80% of the parcel is private homes mixed with buildings used for business), iii) Public areas (e.g. educational buildings, healthcare institutions, shopping areas, business areas, recreational areas etc.).

Type of area	Area code (ANVGEN)	Definition
Residential areas	11	Limited access to shopping facilities. Private homes cover more than 80% of the parcel
Mixed residential and public areas	21	20%-80% of the parcel is private homes mixed with buildings used for business also covering between 20%-80% of the parcel
Business areas	31	Businesses cover more than 80% of the parcel
Shoppingcenters	41	Larger shoppingcenters. Including clusters of shopping facilities and malls
Recreational area	51	Areas used for leisure and tourist facilities as well as recreational areas such as parks. Both in urban and non-urban areas.
Cottage area	61	Cottage area
Public purpose area	71	Public areas for educational, health, cultural, administrative, or social purposes
Technical facilities	81	This category includes traffic facilities, communication facilities, storage facilities, environment plants, sewage treatment plants, landfills etc.
Land area	91	This category includes agricultural areas, larger nature areas, military areas, and areas used for mining and quarrying.
Other	96	This category includes other areas not defined by the categories above.
This table is based on the original table available in Danish at <a href="https://erhvervsstyrelsen.dk/plandk2">https://erhvervsstyrelsen.dk/plandk2</a> (accessed 28 October 2016)		

## Reference

1. Erhvervsstyrelsen. PlansystemDK. <https://erhvervsstyrelsen.dk/plansystemdk>. Accessed November 29, 2016.

**eTable 1. Defibrillation of Cardiac Arrest Patients in Denmark According to Location, 2001-2012**

	2001 *	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
<b>Public</b>													
Bystander defibrillation	3 (1.2)	9 (2.1)	8 (1.7)	8 (1.9)	14 (3.1)	10 (3.6)	12 (3.8)	11 (2.9)	19 (4.8)	29 (6.8)	42 (8.9)	78 (15.3)	243 (5.1)
Non-bystander defibrillation	242 (98.8)	419 (97.9)	457 (98.3)	408 (98.1)	432 (96.9)	266 (96.4)	302 (96.2)	374 (97.1)	379 (95.2)	397 (93.2)	432 (91.1)	432 (84.7)	4,540 (94.9)
<b>Residential</b>													
Bystander defibrillation	7 (1.3)	9 (0.8)	10 (0.8)	6 (0.5)	9 (0.7)	6 (0.6)	8 (0.8)	6 (0.5)	5 (0.4)	11 (0.8)	19 (1.4)	21 (1.3)	117 (0.8)
Non-bystander defibrillation	535 (98.7)	1,063 (99.2)	1,169 (99.2)	1,158 (99.5)	1,231 (99.3)	944 (99.4)	980 (99.2)	1,125 (99.5)	1,283 (99.6)	1,284 (99.2)	1,368 (98.6)	1,648 (98.7)	13,788 (99.2)
All results are reported as no. (%). Year 2001 is from June and forth.													

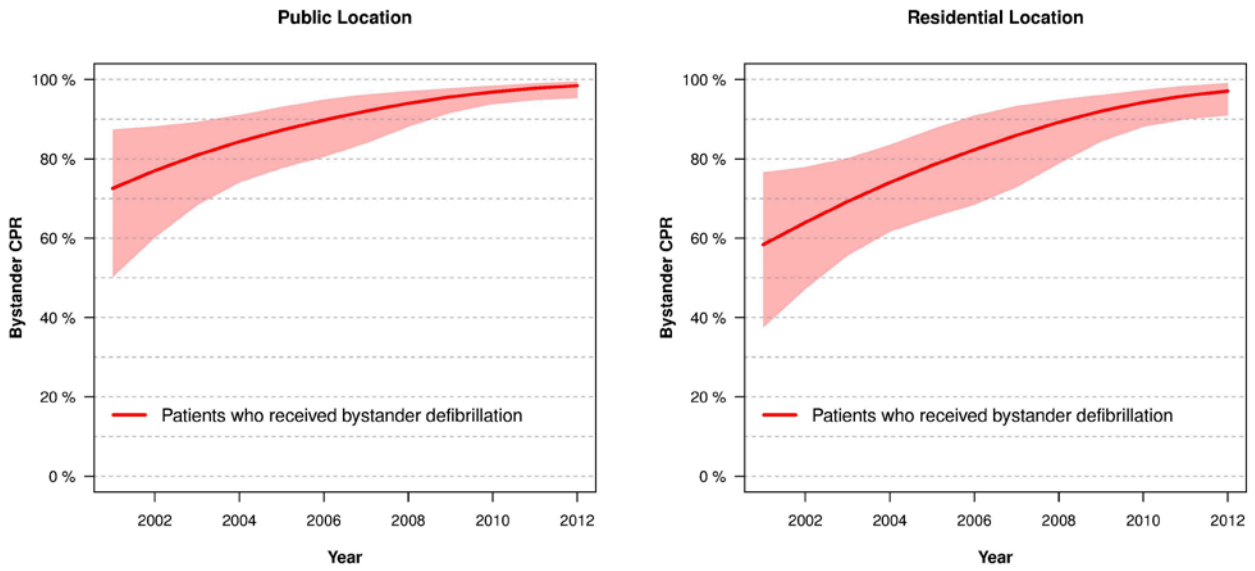
**eTable 2. Cumulative Number of Registered AEDs According to Location and the Estimated Total Number of AED Units Sold in Denmark, 2007-2012**

Variable	2006 <sup>a</sup>	2007	2008	2009	2010	2011	2012
Number of registered AEDs	-	141	648	1,575	3,816	5,652	7,800
Registered AED locations, No. (%)							
Residential	-	13 (9.8)	45 (7.3)	102 (6.9)	229 (6.3)	361 (6.7)	579 (7.8)
Mixed public/residential	-	9 (6.8)	61 (10)	132 (8.9)	322 (8.8)	533 (9.8)	721 (9.7)
Public	-	111 (83.5)	507 (82.7)	1,254 (84.3)	3,102 (84.9)	4,519 (83.5)	6,167 (82.6)
Missing location	-	8	35	87	163	239	333
Estimated AED units sold <sup>b</sup>	3,000	-	-	-	-	15,000	-
All results are reported as the number of patients (%) unless otherwise specified. AED, automated external defibrillator <sup>a</sup> The Danish AED network was established in 2007 <sup>b</sup> Based on estimated wholesale data							

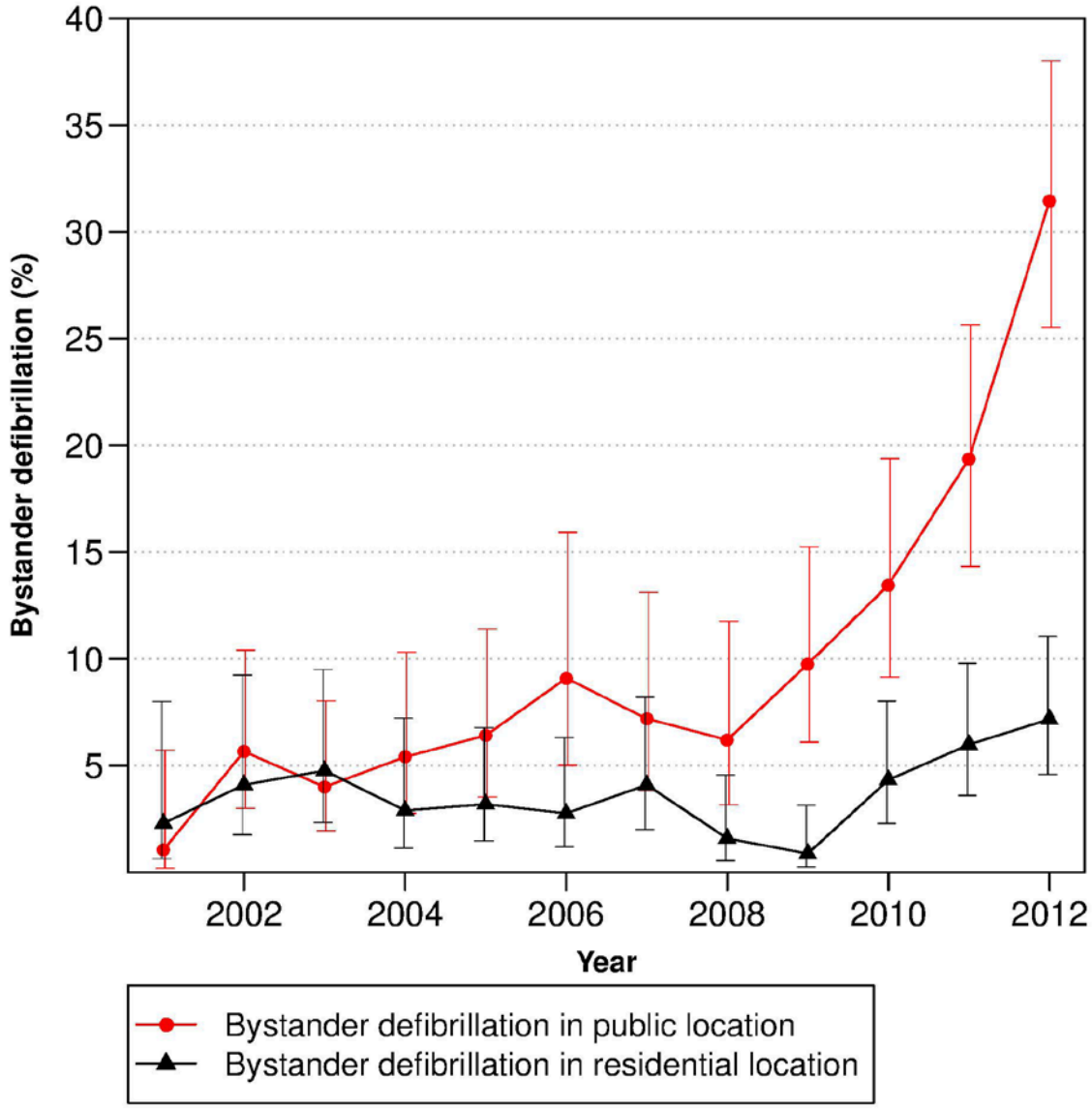
**eTable 3. Baseline Characteristics and Survival of the Patients With Out-of-Hospital Cardiac Arrest Included for Analysis (n = 18 688) and of Patients Excluded Due to Missing Data on the Location of Arrest and/or Bystander Defibrillation (n = 5424)**

Variable	Cardiac arrests included for analysis	Cardiac arrests with missing location and/or bystander defibrillation
Count, No.	18,688	5,424
Median age, years [IQR]	72 [62, 80]	72 [62, 82]
Male, No. (%)	12,676 (67.8)	3,544 (65.3)
Out-of-hospital cardiac arrest characteristics, No. (%)		
Bystander CPR	7,133 (38.3)	1,320 (31.4)
<i>Missing</i>	47	1,220
Bystander-witnessed arrest	9,759 (52.5)	2,201 (52.6)
<i>Missing</i>	103	1,239
Shockable heart rhythm	5,195 (28.9)	1,158 (26.4)
<i>Missing</i>	722	1,034
Bystander defibrillation	360 (1.9)	52 (1.6)
<i>Missing</i>	0	2,192
Median time interval <sup>a</sup> [IQR]	11.00 [7.00, 19.00]	11.00 [6.00, 18.00]
<i>Missing</i>	1771	2502
Location of cardiac arrest, No. (%)		
Residential	13,905 (74.4)	1,330 (65.9)
Public	4,783 (25.6)	688 (34.1)
<i>Missing</i>	0	3,406
Comorbidity, No. (%)		
Ischemic heart disease (MI not included)	4,803 (25.7)	1,387 (25.6)
Previous myocardial infarction	2,330 (12.5)	708 (13.1)
Heart failure	3,881 (20.8)	1,197 (22.1)
Chronic obstructive pulmonary disease	2,681 (14.3)	795 (14.7)
Malignant disease	2,132 (11.4)	647 (11.9)
Renal disease	876 (4.7)	232 (4.3)
Survival, No. (%)		
ROSC at hospital arrival	2,998 (16.3)	327 (10.2)
<i>Missing</i>	347	2,232
30-day survival	1,473 (7.9)	425 (7.8)
All results are reported as the number of patients (%) unless otherwise specified. CPR, cardiopulmonary resuscitation; IQR, interquartile range; min, minutes; MI, myocardial infarction; ROSC, return of spontaneous circulation <sup>a</sup> Estimated time interval from recognition of arrest to first rhythm analysis by the emergency medical service personnel		

eFigure 1. Bystander CPR Performed During the Study Period 2001-2012 for Patients Receiving Bystander Defibrillation

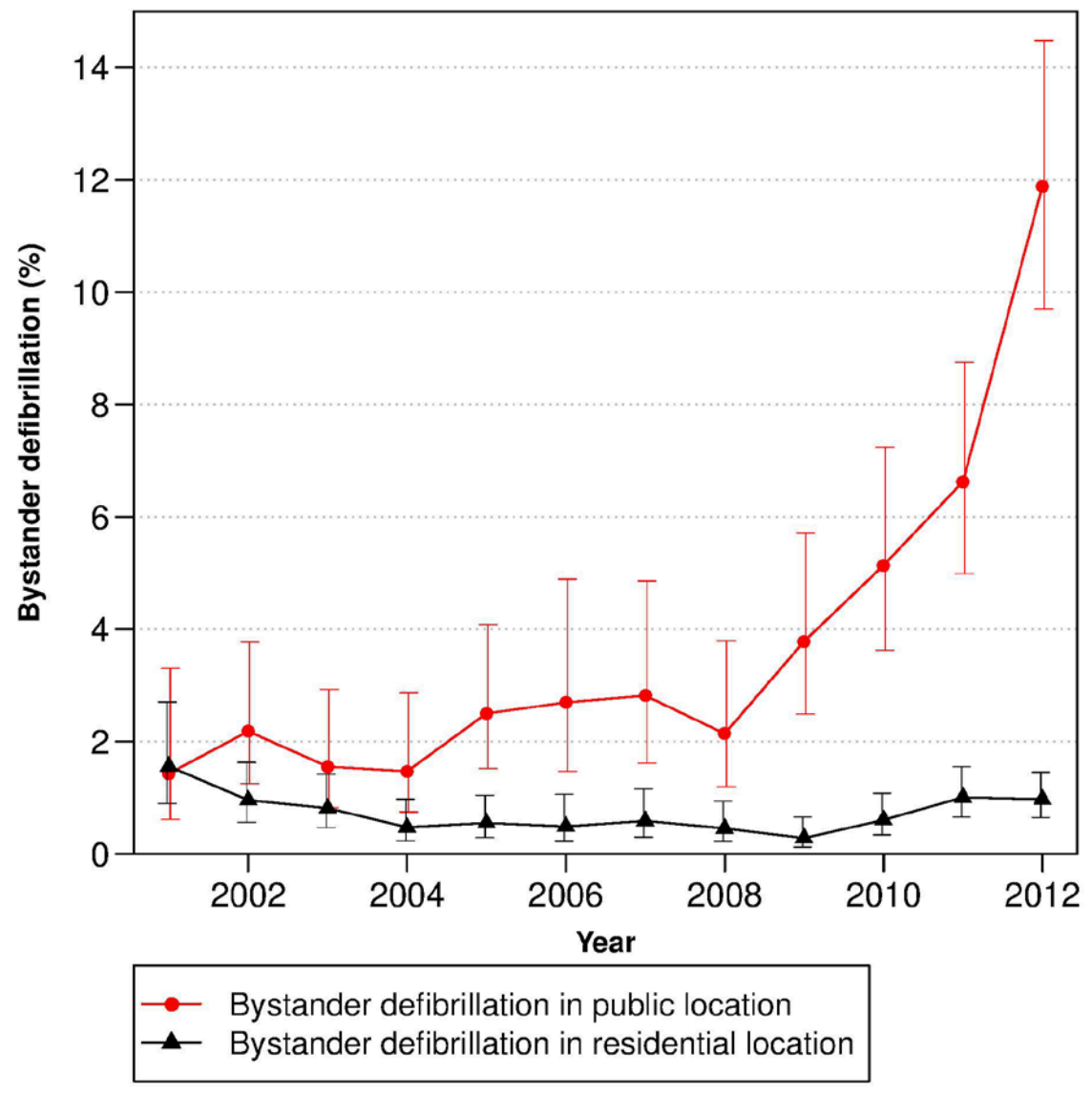


eFigure 2. Bystander Defibrillation for Public and Residential Locations From 2001-2012 for Patients With a Bystander-Witnessed OHCA of Presumed Cardiac Cause and a Shockable Rhythm (n = 3972)

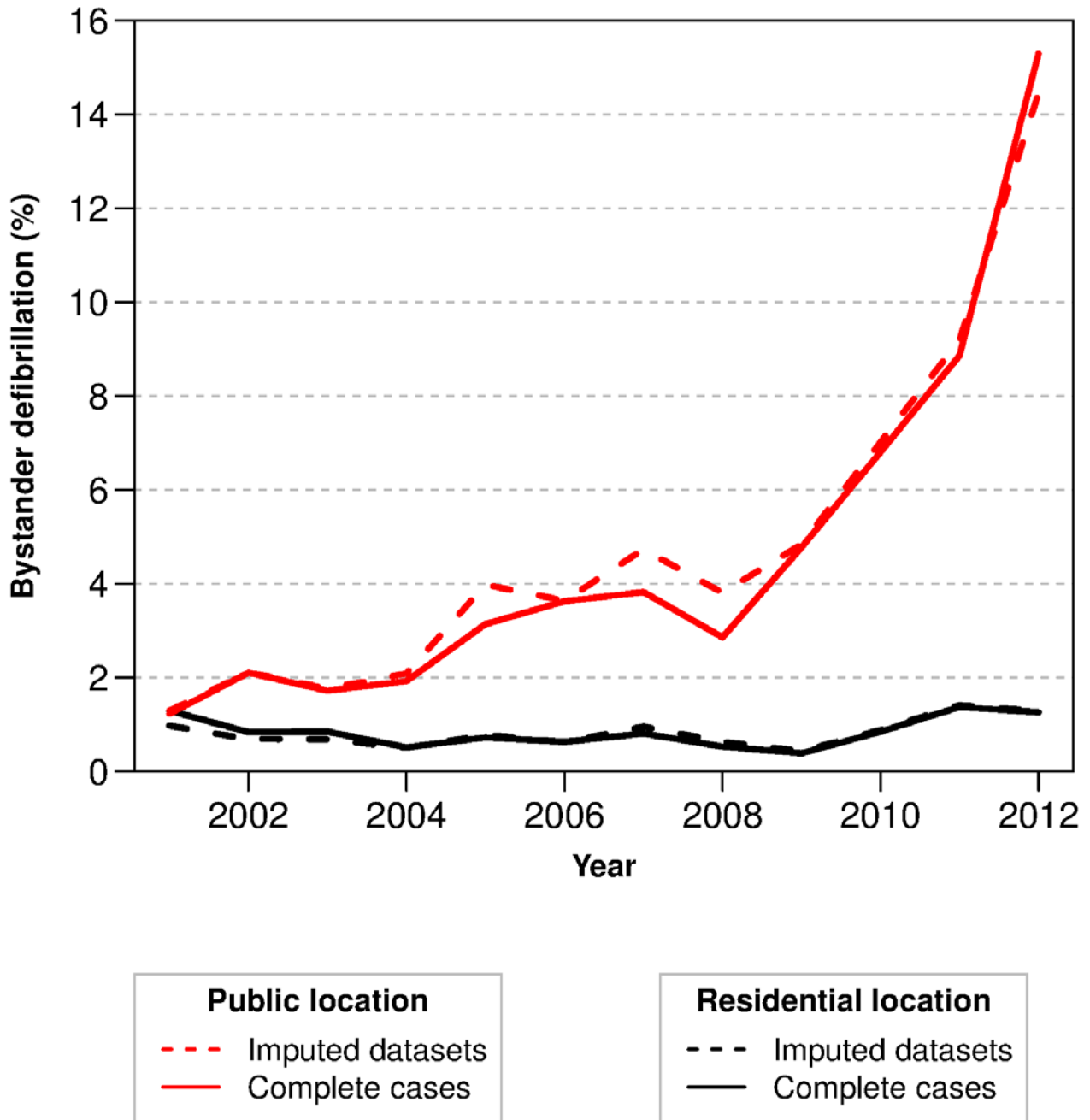




eFigure 3. Bystander Defibrillation for Public and Residential Locations From 2001-2012 for Patients With a Non-EMS-Witnessed OHCA, Irrespective of Presumed Cause

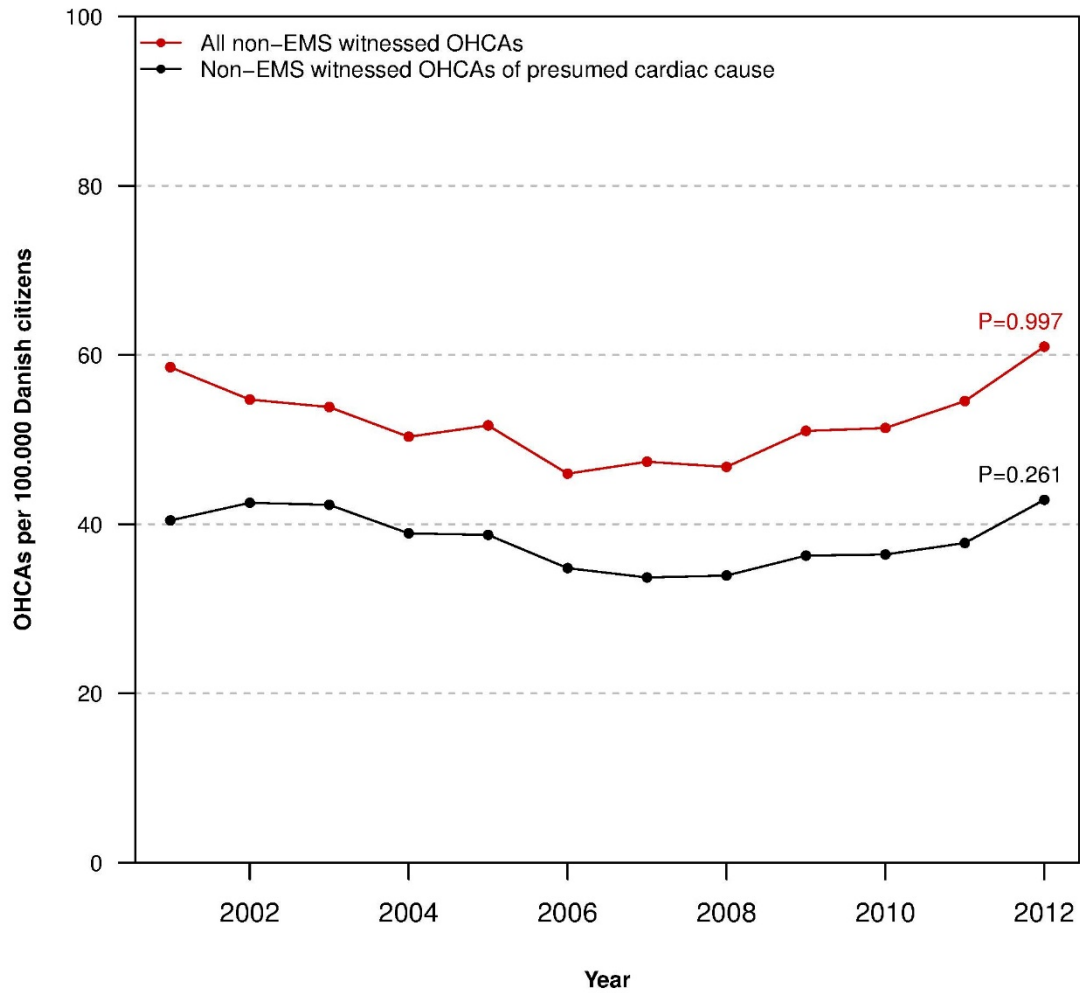


eFigure 4. Multiple Imputation vs Complete Case Analysis of Bystander Defibrillation Probability According to the Location of Out-of-Hospital Cardiac Arrest in Denmark



Comparison of multiple imputation results (n=24 112; 100 imputations) and complete case analysis (n=18 688) of bystander defibrillation probabilities according to the location of the cardiac arrest.

eFigure 5. Incidence of OHCA per 100 000 Danish Citizens From 2001-2012 for All Non-EMS-Witnessed OHCA and Non-EMS-Witnessed OHCA of Presumed Cardiac Cause



Negative binomial regression was used to evaluate whether a change in incidence had occurred during the study period. No significant increase or decrease was observed over time for both all non-EMS witnessed OHCA ( $P=0.997$ ) and non-EMS witnessed OHCA of presumed cardiac cause ( $P=0.261$ ).