Transition of medical records from paper to electronic records - implications for Out-of-Hospital Cardiac Arrest registration

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BACKGROUND

Copenhagen EMS changed to electronic records in ambulances in May 2015. Henceforth all registrations of Out-of-Hospital Cardiac Arrest (OHCA) are documented as an integrated part of the electronic medical record. Previously OHCA was documented by EMS-personnel filling in and submitting a paper-record to the cardiac registry. We investigated consequences in respect to incidence and completeness of registrations before and after the transition.

METHODS

A total of 8,010 records regarding OHCA were retrospectively reviewed. The paper record group consisted of 3,481 records for all OHCA collected nationally 1 January 2016 to 31 December 2016. The historic cohort has been reported. (1) In the electronic record group for 1 January 2016 to 31 December 2018 a total of 4,529 records were eligible for review. All electronic records were validated. Endpoints were incidence and completeness.

Tablet used for the new electronic record including registration of Out-of-hospital Cardiac Arrest

RESULTS:

The incidence of reported OHCA was significantly lower in paper records compared to electronic records (61 vs 85 per 100,000 inhabitants). A declining incidence was observed in the years prior to 2016, explained by receding attention to the paper records as the electronic records being implemented, though the protocol for reporting OHCA on paper did not change. Characteristics of OHCA was similar in the two samples. A significantly higher completeness of datapoints in the electronic records was observed (5.7% vs 10.6%). Validation of data from the medical records revealed cases of OHCA not previously reported. These were patients successfully resuscitated prior to arrival of EMS-personnel needing no further treatment or cases with irreversible signs of death, where EMS-personnel attempted resuscitation.

	Paperbased 2016 Denmark nationwide	Electronic records 2016 Copenhagen	Electronic records 2017 Copenhagen	Electronic records 2018 Copenhagen
Value				
Entries		1500	1539	1490
missing person IDnumber		80	87	78
OHCA, n	3481	1420	1452	1412
Median age	72	73	73	74
IQR 25%-75%	(62-82)	(62-83)	(62-82)	(62-83)
Male	71	71	71	72
IQR 25%-75%	(61-80)	(59-80)	(59-80)	(60-80)
Female	75	78	77	77
IQR 25%-75%	(65-85)	(67-86)	(66-85)	(65-86)
Male, n	2230	862	879	881
(%)	64,10%	60,70%	60,60%	62,39%
OHCA in private home	2532	1026	1103	1123
(%)	74,30%	72,25%	75,96%	79,53%
Witnessed	1278	697	683	622
(%)	37,00%	49,08%	47,04%	44,05%
EMS-witnessed	463	139	139	137
(%)	13,40%	9,79%	9,57%	9,70%
Unwitnessed OHCA	1711	584	630	653
(%)	49,60%	41,13%	43,39%	46,25%
Shockable rythm	577	242	227	211
(%)	17,70%	18,22%	16,19%	15,90%
ROSC	679	410	377	372
(%)	21,50%	28,87%	25,96%	26,35%
CPR prior to ambulance arrival	2027	981	1003	941
(%)	58%	69,08%	69,08%	66,64%

Table 1: Characteristics of OHCA-registrations with respectively paperbased registrations and electronic medical records.

CONCLUSION:

Using electronic records significantly increased recorded incidence of OHCA. A large group of previously not registered OHCA were identified.

1. Hansen S, Ringgreen K, Wissenberg M, Mortensen R, Folke F, Lippert F, et al. Rapport fra dansk hjertestopregister 2001–2016 [Available from: http://genoplivning.dk/wp-content/uploads/2018/04/Dansk_Hjertestopregister2016.pdf. (accessed 3 February 2019).