



Differences in Risk Factors and Primary Cause of SUD By Timing Criteria

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PURPOSE

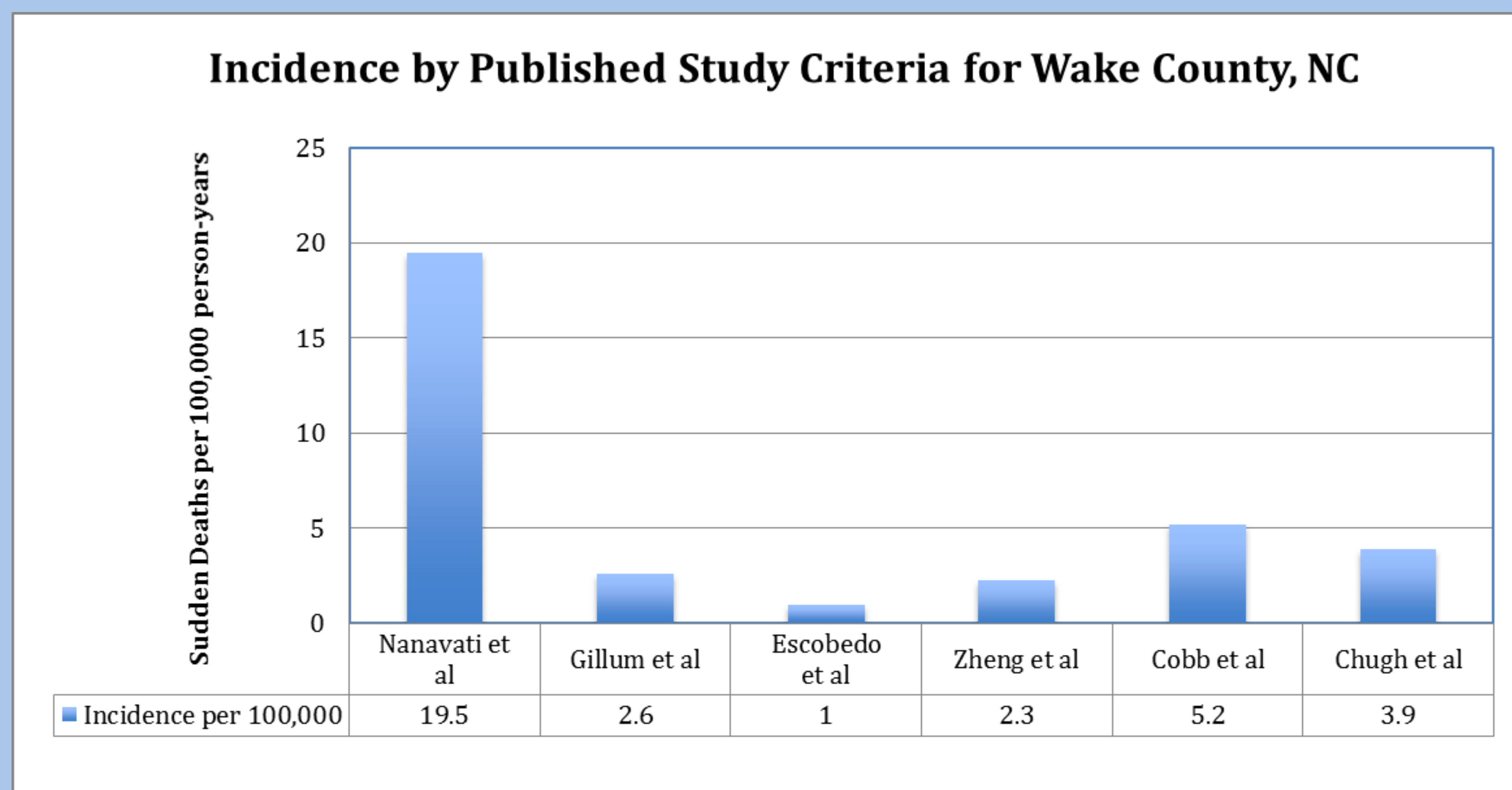
- Estimates of Sudden Unexpected Death incidence vary between 150,000 – 450,000 persons per year^{1,2} mainly because of wide variability in definitions.
- Standard definitions employ time limits—such as witnessed (instantaneous) death or unwitnessed death within 24 hours— and this leads to underestimation of incidence calculations
- The SUDDEN Project is a population-based study of out of hospital, unexpected deaths in 18 to 65 year olds using a definition of sudden death without restrictions on the timing or witnessing of death³
- We assessed Sudden Unexpected Death incidence in a North Carolina county using SUDDEN criteria, and compared this with the incidence we would have observed using time limiting definitions from previous studies.

METHODS

- Potential cases of out of hospital sudden unexpected death were captured from 1138 Emergency Medical Service referrals in Wake County, North Carolina, United States of America, pop. c1million, from March 2013 – March 2014. 310 potential cases were identified
- Medical records were obtained for presumed sudden death subjects and cases were adjudicated for inclusion by three independent cardiologists and 187 cases were adjudicated into the study based on our time independent criteria
- We stratified the study population by timing of death (less than 24 hours versus above 24 hours and unknown) and analyzed the observed difference in incidence between the two groups using unadjusted odds ratios

RESULTS

Figure 1. Incidence of OHSUD varies by study criteria



- Figure 1 shows OHSUD incidence in Wake County calculated using time independent SUDDEN criteria (Nanavati et al) compared with the incidence we would have obtained using published criteria for SUD⁴⁻⁸.
- The calculated annual incidence of sudden death in Wake County, NC, is 4- to 19 times higher than published methods would report in our study population
- Only 31% of our cases either died instantaneously or were last seen alive \leq 24 hours before death. In 59% of cases time of death was unknown (Figure 2)

Figure 2. Timing of death as reported by Wake County EMS or Medical Examiner

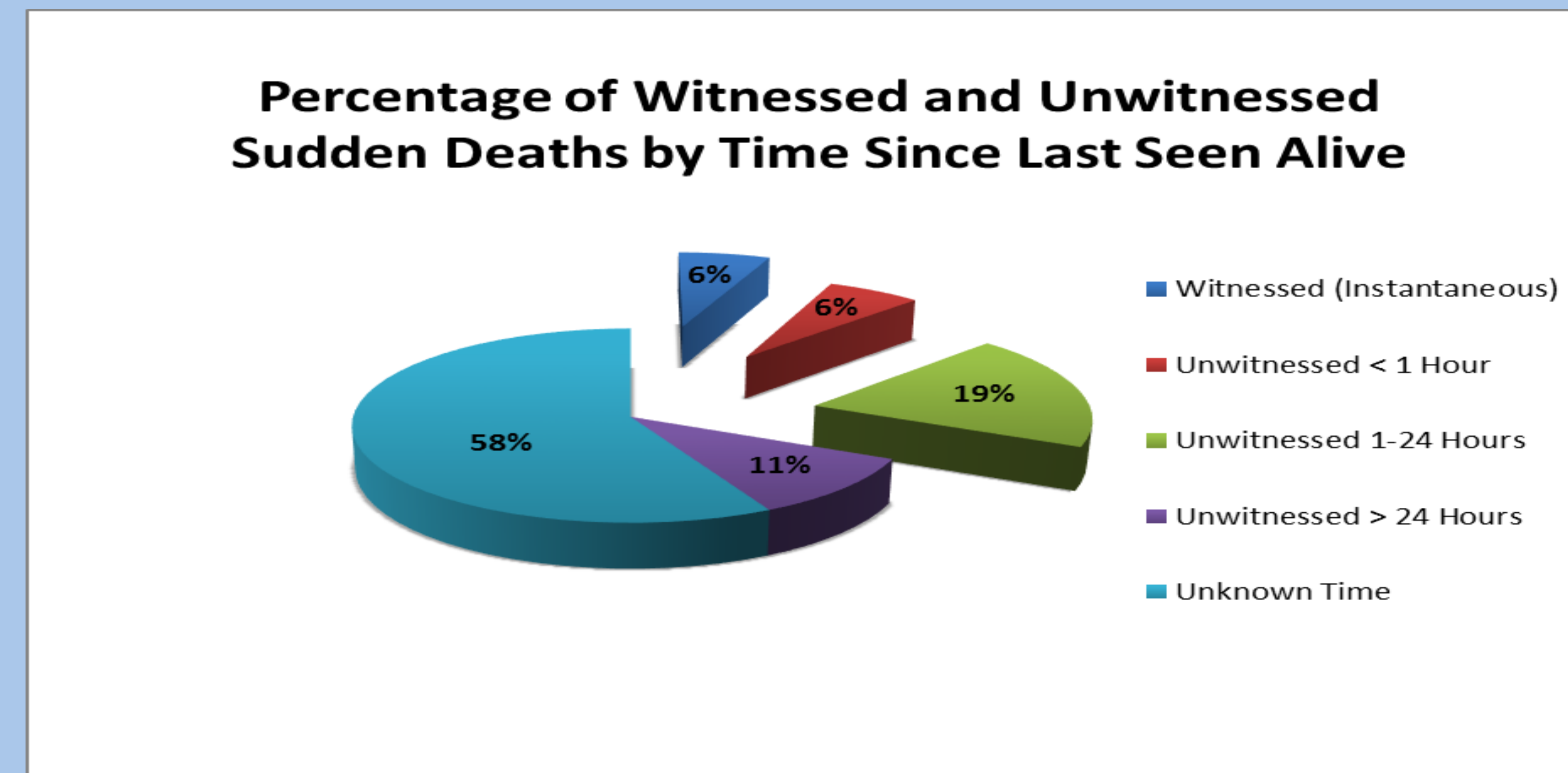


Table 1. Characteristics of SUDDEN cohort by timing of death

Demographic		Witnessed or death within 24h	Unwitnessed, >24h and Unknown Time	OR	95% CI
Total Cases		60	127		
Mean Age (SD)		50.1 (9.8)	54.5 (8.2)	1.06	1.02 – 1.09*
Mean BMI (SD)		32.4 (12.4)	29.3 (9.0)	0.97	0.94 – 1.01
Marriage Status at death	Married	18(38%)	46(46%)	1	
	Unmarried	29(62%)	55(54%)	0.74	0.37-1.50
	Missing	13	26		
Death Certificate Signatory	Physician	10(17%)	84(66%)	1	
	Medical Examiner	50(83%)	43(34%)	0.11	0.05-0.23*
Gender	Male	40(67%)	80(63%)	1	
	Female	20(33%)	47(37%)	1.09	0.58-2.07
Race	Caucasian	34(57%)	79(64%)	1	
	Black	24(40%)	44(36%)	0.79	0.42-1.50
	Other	2(3%)	4(3%)	0.86	0.15-4.94
Cause of Death	Cardiac Cause	32(53%)	67(52%)	1	
	Non-cardiac cause	17(28%)	52(41%)	1.57	0.79-3.11
	External cause	4(7%)	7(6%)	0.86	0.24-3.15
	Unknown cause	7(12%)	1(1%)	0.07	0.01-0.60*

*Cases meeting WHO criteria (Witnessed or death within 24 hours) were:

- Younger (50.1 ± 9.8 years 54.5 ± 8.2 years, $p < 0.001$)
- Had a higher likelihood of a medical examiner issued death certificate (86.3% vs. 34.9%)
- Almost all the unknown causes of death in Wake County were included as SUDDEN cases

DISCUSSION

- Time-limiting definitions underestimate the annual incidence of sudden unexpected death
 - 69% of the SUDDEN cohort would have been excluded if time-limiting definitions were used
 - Adjudication of sudden death cases resulted in a much larger proportion of unknown primary causes of death when compared to death certificate-based case review
 - An expanded study sample of a population-based cohort similar to SUDDEN is needed to understand the differences in this often misclassified population
- ## LIMITATIONS
- The SUDDEN cohort consists of only out of hospital deaths: we have not yet analyzed survivors transported to the hospital
 - Timing of death was obtained exclusively from Emergency Medical Services and Medical Examiner reports
 - Medical records were not obtained for some subjects (33%), despite a systematic approach for record retrieval

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