

# Out of Hospital Sudden Death in a Rural Population: Low Rates of ICD Underutilization Among Decedents

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## Abstract

**Introduction:** The implantable cardioverter defibrillator (ICD) reduces mortality in patients at risk for potentially life-threatening arrhythmias. Access and distribution of ICDs in rural or economically disadvantaged populations is suspected to be low. This study examined Out of Hospital Premature Natural Death data (OHPND) and electronic medical record (EMR) data to identify rates of non-implantation of ICDs in a sample of decedents in eastern North Carolina. **Methods and Results:** Death certificate information on 1,316 decedents were matched with EMR data (N = 967, 73.4%). Chart review identified 70 (7.2%) potential ICD candidates with a left ventricular ejection fraction (LVEF)  $\geq 35\%$ . Of the 70 identified patients, 5 (7.1%) did not meet criteria because LVEF subsequently improved. Of the remaining 65 patients, 32 (49.2%) already received an ICD or a wearable cardioverter-defibrillator (WCD), and 33 patients (50.7%) met ICD implantation criteria but had not received one. The reasons identified for non-implantation of ICDs included: limited life expectancy secondary to comorbidities, principally chronic kidney disease (CKD) (N=11, 17%), lack of physician adherence to guidelines (N=9, 14%), lost to follow-up (N=7, 11%), patient refusal (N=5, 8%), and patients yet to commence guideline-directed medical therapy (N=1, 2%). Among our cohort of 967 individuals who died unexpectedly at home, 9 (0.9%) patients may have avoided unexpected death with an ICD/WCD. **Conclusion:** This study using decedent data shows low rates of ICD-underutilization in a rural population, but also emphasizes the role that advanced comorbidities such as CKD play in ICD-underutilization.

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