

Mortality Following Naloxone Encounters with Emergency Medical Services

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Background: In response to rising rates of opioid overdose in the United States, naloxone is now widely administered by emergency medical services to prevent overdose-related deaths. To date, several studies have examined short-term mortality outcomes following naloxone administration by pre-hospital emergency services. However, few studies have examined the frequency of repeat naloxone encounters among patients with a prior overdose or long-term mortality outcomes following an overdose event. We sought to address this limitation by examining the frequency of naloxone encounters with emergency medical services and associated mortality outcomes over a six-year period. **Methods:** We conducted a retrospective investigation of all cases in Marion County, Indiana between January 2011 and December 2016 where emergency medical services used naloxone to resuscitate a patient. Cases were linked to vital records to assess mortality and cause of death over the same time period. We used Cox regression survival analysis to assess whether repeat naloxone encounters were associated with the hazard of mortality, both overall and by cause of death. **Results:** Of 4,276 patients who overdosed and were administered naloxone, 10.4% (n=444) died an average of 354 days (SD=412.09 Range: 1-1980) following resuscitation. Decedents who died of drug-related causes (35.1%, n=154) were younger and more likely to have had repeat naloxone encounters. Patients who experienced multiple naloxone encounters (13.3%, n=632) had a 2.07 [95% CI=1.59, 2.71] times higher hazard of all-cause mortality and a 3.06 [95% CI=2.13, 4.40] times higher hazard of drug-related mortality. **Conclusions:** A small proportion of overdose patients are at risk of death or repeat overdose in the years following a naloxone encounter. Repeat overdose patients are at a much higher risk of mortality, particularly drug-related mortality, and should be targeted for interventions aimed at reducing fatal overdose.