

## A Description of South Carolina Patients who Repeatedly Utilize EMS for Naloxone Administration

**Introduction:** The opioid overdose problem has reached epidemic proportions with no end in sight. Opioid overdoses are not definitively confirmed by EMS in the field. EMS uses a set of signs and symptoms to indicate the likelihood of an opioid overdose and the subsequent need for administration of naloxone. Among the common misconceptions both in EMS and in the general public is that EMS is “enabling” the addicts by administering naloxone.

**Objective:** To quantify and describe patients in South Carolina who repeatedly utilized EMS for administration of naloxone from 2014 to 2016.

**Methods:** This was a retrospective observational study. Patients who utilized EMS for repeat naloxone administrations within 24 hours, 1 week, and anytime from 2014 to 2016 were assessed. Study data were obtained from the SC State EMS Data System located within the EMS Performance Improvement Center at the University of North Carolina – Chapel Hill. All patients with at least one repeated use of EMS for naloxone administration were included. To ensure that the administration represented an additional utilization of EMS and not simply additional administrations during the same call, administrations within two-hours were omitted. Prehospital Care Reports with incomplete date and time data were also omitted. Analysis included calculation of the percent change in patients who utilized EMS for repeat naloxone administrations. Descriptive statistics were also calculated to assess demographics (age, race, ethnicity, sex, and community size). The analysis did not differentiate between accidental or intentional overdoses, nor did it discriminate between prescription or non-prescription sources of the overdose.

**Results:** During the study period, there were 1040 patients who utilized EMS for repeat naloxone administrations. There were 46 patients omitted because the repeat use was within 2 hours and 69 were omitted due to missing date and time data, leaving a study population of 925 patients. There was a 263.0% increase in patients who utilized EMS for repeat naloxone administrations from 2014 (138) to 2016 (501). There were more males than females, 57.6% vs. 42.4%, respectively. White patients accounted for 88.7% of the study population (black = 10.1%, other race = 1.2%) and 99.0% were not Hispanic or Latino. Age ranged from 16 to 94 years. The average age of the population was 45.9 ( $\pm 16.3$ ) with a median age of 46. There were more of these patients in urban environments (86.7%) than in rural environments (13.3%). There was no statistically significant change in the demographics of this population from 2014 to 2016 ( $p$ -value  $> 0.05$ ). The overwhelming majority (843, 91.1%) of these patients required repeat administration in greater than one week following the initial administration. However, 58 (6.3%) patients utilized EMS for repeat naloxone in less than a week and 24 (2.6%) utilized EMS for repeat naloxone in less than 24 hours. While there was an increase in the overall number of patients from 2014 to 2016, the proportions of patients who utilized EMS for repeat naloxone administrations within 24 hours, 1 week, or anytime within the study period remained consistent ( $p$ -value  $> 0.05$ ) and there were no differences among these groups with respect to race, ethnicity, or community size ( $p$ -value  $> 0.05$ ). While the majority of this population was male, they tended to represent an even higher proportion of those in the 24 hour and 1 week groups ( $< 24$  hours = 75.0% male,  $< 1$  week = 69.0% male, anytime = 56.3% male;  $p$ -value = 0.04). Finally, as the timeframe for repeat EMS use for naloxone decreased, there was a statistically significant decrease in the patients' average age ( $p$ -value = 0.01). The average age for those in the 24 hour group was 40.3 ( $\pm 16.6$ ) with a median age of 31.5. The average age for those in the 1 week group was 40.7 ( $\pm 14.6$ ) with a median age of 36.5 and the average age for the anytime group was 46.4 ( $\pm 16.3$ ) with a median age of 46.

**Conclusion:** There was a dramatic increase in the number of patients who utilized EMS for repeat naloxone administrations. It is important to identify this segment of the at-risk population since they are the most likely to have a repeat overdose with a fatal outcome.