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## 062. Naloxone Blood Concentrations After Treatment of Presumed Opioid Overdose Among Patients Presenting to Emergency Departments at 17 U.S. Medical Centers

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**Background:** Limited research exists describing naloxone blood concentrations after naloxone treatment of suspected opioid overdose. Naloxone blood concentrations may inform real-world analyses of naloxone's effectiveness, particularly comparing intranasal (IN) versus intramuscular/intravenous (IM/IV) administration.

**Hypothesis or Research Question:** Among patients presenting to the emergency department (ED) after suspected opioid overdose, do blood naloxone concentrations differ between IN and IV/IM administration, and is there a correlation between total dose and measured concentrations?

**Methods:** The Toxicology Investigators Consortium (ToxIC) Drug Overdose Toxicology Surveillance (DOTS) Reporting Program consisted of ED patients ages >13 who presented to 17 U.S. medical centers with suspected opioid or stimulant overdose. Data collection included chart reviews, patient interviews, and qualitative/quantitative toxicology analyses conducted by the Center for Forensic Science Research and Education. Medians and interquartile ranges (IQR) were calculated for naloxone concentrations above the level of quantitation (LOQ), and Spearman's correlation coefficients were computed for total naloxone dose and naloxone blood concentrations drawn within 2 hours of ED presentation.

**Results:** There were 414 subjects with opioid overdose whose blood was drawn within 2 hours, and 306 (73.9%) received naloxone. Of these 306, half (159/306; 52.0%) had naloxone concentrations above LOQ. Overall, there was a statistically significant difference in naloxone concentrations and route of administration ( $p < 0.001$ ). Among those who received naloxone only with quantitative naloxone concentrations above the LOQ ( $n = 66$ ), the median concentration was 2.1 ng/mL (IQR: 1.8, 3.2) for those who received  $\leq 2.0$  mg, 3.7 ng/mL (IQR: 1.9, 5.8) for doses 2.1 - 4.0 mg, 6.6 ng/mL (IQR: 4.2, 14.0) for doses 4.1 - 8.0 mg, and 7.9 ng/mL (IQR: 3.7, 16.6) for doses  $> 8.0$  mg. There was a moderate correlation ( $\rho = 0.42$ ,  $p = 0.002$ ) between the total IN dose administered and blood concentrations. There were no

statistically significant correlations between naloxone concentrations and total dose for IV only naloxone, IM only naloxone, or combination IV/IM/ IN naloxone.

**Conclusion:** Among subjects who had blood drawn within 2 hours of ED presentation after receiving naloxone, only half had naloxone concentrations above the LOQ. Overall, blood naloxone concentrations were statistically different among routes of administration. When stratifying by route of administration, there was a moderate correlation between the total IN dose administered and naloxone quantitative concentrations, but this association was not detected for other routes of administration.

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