Doi: 10.32481/djph.2025.09.06

Statewide Prehospital Buprenorphine in Delaware:

Two-Years of Paramedic-Initiated Medication for Opioid Use Disorder After Overdose

Gregory K. Wanner, DO, FACEP;[1] Mollee Dworkin, MS;[2] & Robert A. Rosenbaum, MD, FAEMS, FACEP[3]

1. Emergency Medical Services and Preparedness Section, Delaware Division of Public Health; ChristianaCare

2. Emergency Medical Services and Preparedness Section, Delaware Division of Public Health

3. Emergency Medical Services and Preparedness Section, Delaware Division of Public Health

Abstract

The Delaware Division of Public Health, Office of Emergency Medical Services (EMS) implemented the first statewide program enabling paramedics throughout the state to initiate buprenorphine treatment for opioid use disorder (OUD) in the prehospital setting. Building on a model from Camden, New Jersey, this protocol was approved in 2022 in response to rising overdose deaths and was fully implemented across Delaware's advanced life support (ALS) EMS agencies in April 2023. Eligible patients—those 18 years or older, resuscitated with naloxone, and able to consent—received up to 24 mg of sublingual buprenorphine along with ondansetron for nausea. Between April 2023 and May 2025, paramedics administered 118 buprenorphine doses to 105 patients, with improvement in withdrawal symptoms reported after 63.6% of doses. Despite a rise in patient ineligibility due to altered mental status—likely linked to sedating adulterants,such as xylazine and medetomidine,in regional street drugs—paramedics increased the percentage of eligible patients accepting offered buprenorphine from 19.0% to 22.8% between the first and second year of the program. This protocol not only addresses acute overdose management in the field but also connects patients to ongoing care, aiming to reduce mortality and expand access to medications for opioid use disorder.

Intervention

The opioid crisis has ravaged our communities in recent years. With escalating overdose deaths and healthcare systems strained, innovative methods of starting medications for opioid use disorder (MOUD)—such as buprenorphine—became a focus of Delaware's Division of Public Health (DPH) and Division of Substance Abuse and Mental Health (DSAMH). Buprenorphine, an opioid receptor partial agonist medication with high receptor binding affinity, is an established and effective treatment for opioid use disorder (OUD).[1,2] However, paramedics starting buprenorphine in a prehospital setting after an opioid overdose is a novel and innovative approach.[2,3] The Delaware prehospital buprenorphine program incorporated the experiences from an emergency medical service (EMS) agency in Camden, New Jersey to produce a statewide protocol in Delaware.[2,3] The Delaware protocol authorizes county advanced life support (ALS) agency paramedics to administer buprenorphine for patients under the following protocol and criteria:

Doi: 10.32481/djph.2025.09.06

Delaware ALS Buprenorphine Protocol[4]

Indications: Opioid overdose 18 years of age or older, requiring administration of naloxone. After explanation of the treatment, the patient expresses interest in buprenorphine administration and is agreeable to treatment for opioid addiction. Agency is approved to participate in the buprenorphine program by OEMS.

Exclusions: Patient is unwilling to give name AND date of birth, pregnancy, methadone dose less than 48 hours ago,* altered mental status and unable to give consent.

Perform Clinical Opioid Withdrawal Scale (COWS).[1] If COWS score is greater than 5 **OR** the patient was opiate-free for 72 hours prior to the overdose, Administer Buprenorphine bundle.

- Administer 16 mg buprenorphine sublingual (SL)
- Administer 4-8 mg ondansetron (Zofran) oral disintegrating tablet (ODT) or intravenous (IV) as needed for nausea.

If after 10 minutes the symptoms worsen or persist, **Contact Medical Control** to administer 8 mg buprenorphine SL.

- Maximum of 24 mg buprenorphine.

Provide the patient Medication Assisted Treatment (MAT) brochure and provide a clinic appointment; transport to hospital, or obtain refusal of service.

*NOTE: Guidance was issued by the Delaware Office of EMS (OEMS) in November 2024 increasing the methadone exclusion period to 5 days since last methadone dose--rather than 48 hours--to further decrease the risk of precipitated withdrawal. Buprenorphine is administered as the combination product 8mg-buprenorphine/2mg-naloxone (Suboxone®) sublingual film.

Goals

The goals of the Delaware prehospital buprenorphine protocol are twofold:

1. Safely start patients on buprenorphine after opioid overdose, avoiding buprenorphine precipitated withdrawal (BPW), and
2. Link patients to ongoing care

BPW is a rapid worsening of opioid withdrawal symptoms which can occur when buprenorphine displaces a full opioid agonist, such as fentanyl. Risks of BPW appear related to chronic fentanyl use, methadone use, time frame from last use of opioids, and starting dose of buprenorphine.[1,2,5] Based on prior research, the risk of BPW is very low when buprenorphine is administered shortly after naloxone resuscitation of an opioid overdose.[2,3,5]

Using this protocol, Delaware paramedics can start patients on buprenorphine—a potentially life-saving medication—and link the patient to ongoing care through a local MOUD provider if the patient declines transportation to the emergency department (ED).

Place and Time

In 2022, Delaware EMS providers recognized the potential to provide additional assistance to patients after an opioid overdose. Information was obtained from regional experts and through

the efforts of EMS field providers, county ALS agencies, and the Delaware Office of EMS, a protocol for prehospital buprenorphine was drafted and approved in November of 2022.[4] Training was provided to all county-based paramedics in Delaware over the following months. In April of 2023, the prehospital buprenorphine protocol was implemented throughout the State of Delaware through the cooperation of all county-based ALS agencies, making Delaware the first state to fully implement prehospital buprenorphine by all emergency response ALS agencies statewide.

Population

People throughout the State of Delaware who experience an opioid overdose and receive naloxone to reverse the effects of the overdose are eligible for inclusion in the prehospital buprenorphine protocol. As previously mentioned, additional criteria include at least 18 years of age, ability to consent to the treatment, and a COWS score greater than 5, unless they have been opioid-free for at least 72 hours prior to the overdose. Excluded from receiving buprenorphine are patients who are unwilling to provide their name and date of birth, pregnancy, have recently received methadone, or have altered mental status (AMS) and are unable to give consent.[4] Regarding methadone and as stated above, the protocol initially required at least 48 hours since the last dose of methadone, however, guidance was issued in November 2024 increasing this period of time since last methadone to 5 days to further reduce the risk of precipitated withdrawal.

Purpose

Delaware EMS providers see the consequences of the opioid crisis every day, and they are trying to help. Basic life support (BLS) providers have been administering naloxone to overdose victims since 2014, and EMS agencies across Delaware have been distributing “leave behind” naloxone rescue kits since 2020. The naloxone rescue kits, provided by the Delaware Department of Health and Social Services, include two doses of naloxone, a pocket mask, and resources for OUD treatment. These efforts have saved countless lives in Delaware. Unfortunately, the number of overdose-related deaths associated with synthetic opioids (fentanyl) and polysubstance use continued to rise.[6] In 2019, there were 431 overdose deaths in Delaware, increasing to 447 deaths in 2020, 514 deaths in 2021, and 537 deaths in 2022.[7] The need for additional pathways to OUD treatment became clear.

Implementation

In 2019, an innovative treatment pathway with prehospital buprenorphine after overdose was developed and studied by Cooper University Hospital EMS in Camden, New Jersey.[2] With the increasing numbers of overdoses and deaths in Delaware, a statewide effort to increase the availability of OUD care and MOUD was undertaken. The Delaware Office of EMS, paramedic agencies, and medical directors, with the input of experts from Cooper University Hospital, drafted a prehospital buprenorphine protocol, approved in November 2022. Following approval of the protocol, a coordinated training effort took place for all of Delaware’s county-based paramedics. Training included four hours of instruction in:

- Pharmacology of buprenorphine-naloxone
- Benefits and risks of prehospital buprenorphine

- Stigma reduction
- Discussions with patients about starting MOUD
- Referral planning, including county-specific resources

Training topics were chosen to assist paramedics in understanding how buprenorphine can help with OUD, the benefits of MOUD, and the difficulties stigma can have related to engagement and treatment of this patient population. Following training, the Delaware prehospital buprenorphine program was fully implemented throughout the State of Delaware in April of 2023 as the first statewide EMS buprenorphine program in the country. With this program, Delaware paramedics can administer buprenorphine after an opioid overdose and provide follow-up appointment resources for ongoing OUD care.

During a similar timeframe, the Delaware Overdose System of Care (OSOC) Acute Stabilization Subcommittee—consisting of representatives from emergency departments, EMS, MOUD providers, DPH, and DSAMH—worked to develop MOUD referrals pathways and guidelines to improve OUD care across the acute care system, benefitting EMS and ED patients. Delaware OSOC was created through legislation in 2018 to "ensure that consistent, humane, evidence-based treatment and care is available and provided to those requiring acute management for overdose or substance use disorder" and "improve care, treatment, and survival of the overdose patient in the State of Delaware."[8]

Evaluation

Within the first week of implementation, patients in all Delaware counties received prehospital buprenorphine after opioid overdose. We tracked the number of eligible patients, ineligible patients, doses given, COWS scores, and demographics. From April 2023 through May 2025 there were 118 doses of buprenorphine administered by paramedics to 105 patients. Eighty (76.2%) of these patients were transported to the ED and 25 (23.8%) declined transportation and received MOUD follow-up appointment resources. Demographics, dispositions, dosages, and COWS Scores are reported in Table 1.

Table 1. Patient Demographics, Disposition, Buprenorphine Dose, and COWS Scores

Patient Demographic	**Buprenorphine Patients (n=105)**
Gender	
Male	63 (60%)
Female	42 (40%)
Average Age (years)	42.3
Race	
Black or African American	31 (29.5%)
White	66 (62.9%)
Other Race or Unknown Race	8 (7.6%)
Patient Disposition	
Transported to ED	80 (76.2%)
Patient Declined Transport	25 (23.8%)
Buprenorphine Dose (Total)	
8 mg	3 (2.8%)

Doi: 10.32481/djph.2025.09.06

16 mg	93 (88.6%)
24 mg	9 (8.6%)
COWS Score	**Average Score**
Initial Score (n=81)	10.5 (SD=6.3)
Second Score (n=71)	5.8 (SD=4.5)

Buprenorphine Dose and Response

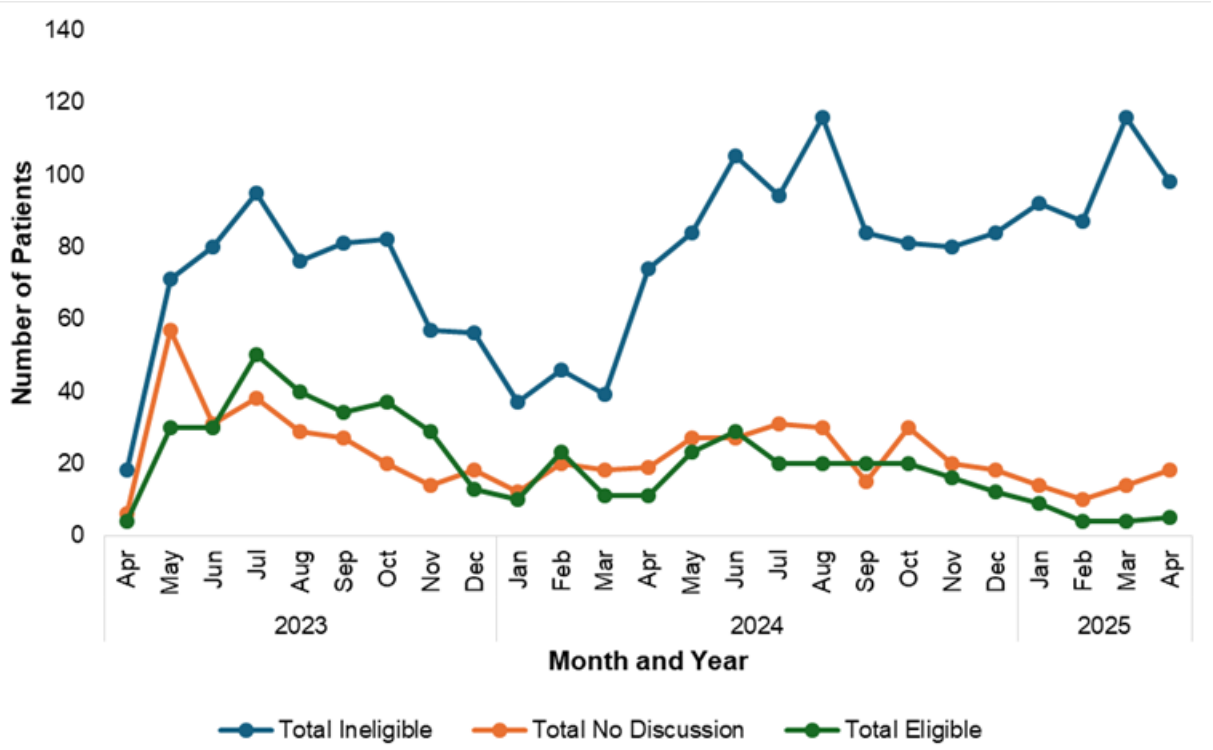
The average dose per patient was 16.5 mg, doses administered are reported in Table 1. The specific initial COWS score was documented for 81 (77.1%) of patients receiving buprenorphine, and a second optional COWS score was documented in 71 (68%) of patients that received buprenorphine. Under documentation of medication response, 75 (63.6%) doses were documented as the patient feeling "Improved," 42 (35.6%) doses were documented as "Unchanged," and 1 (0.8%) was documented as feeling "Worse."

Eligibility and Offers for Prehospital Buprenorphine

Between April 2023 and April 2025 there were 3,000 patients that received naloxone after overdose and treated by paramedics; of these 504 patients were eligible for prehospital buprenorphine and 1,933 patients were ineligible. In 563 cases either the patient would not discuss or the EMS provider did not discuss buprenorphine for various case-specific reasons. Over this time frame the number of eligible patients decreased and ineligible patient numbers increased (Figure 1). The decreasing eligibility and increasing cases with "altered mental status and unable to consent" appear to correspond to the regional increase in sedating adulterants in the street drug supply, including xylazine and medetomidine.

Figure 1. Number of Paramedic Naloxone Encounters with Ineligible and Eligible for Buprenorphine Patients, Delaware, Monthly, April 2023-April 2025

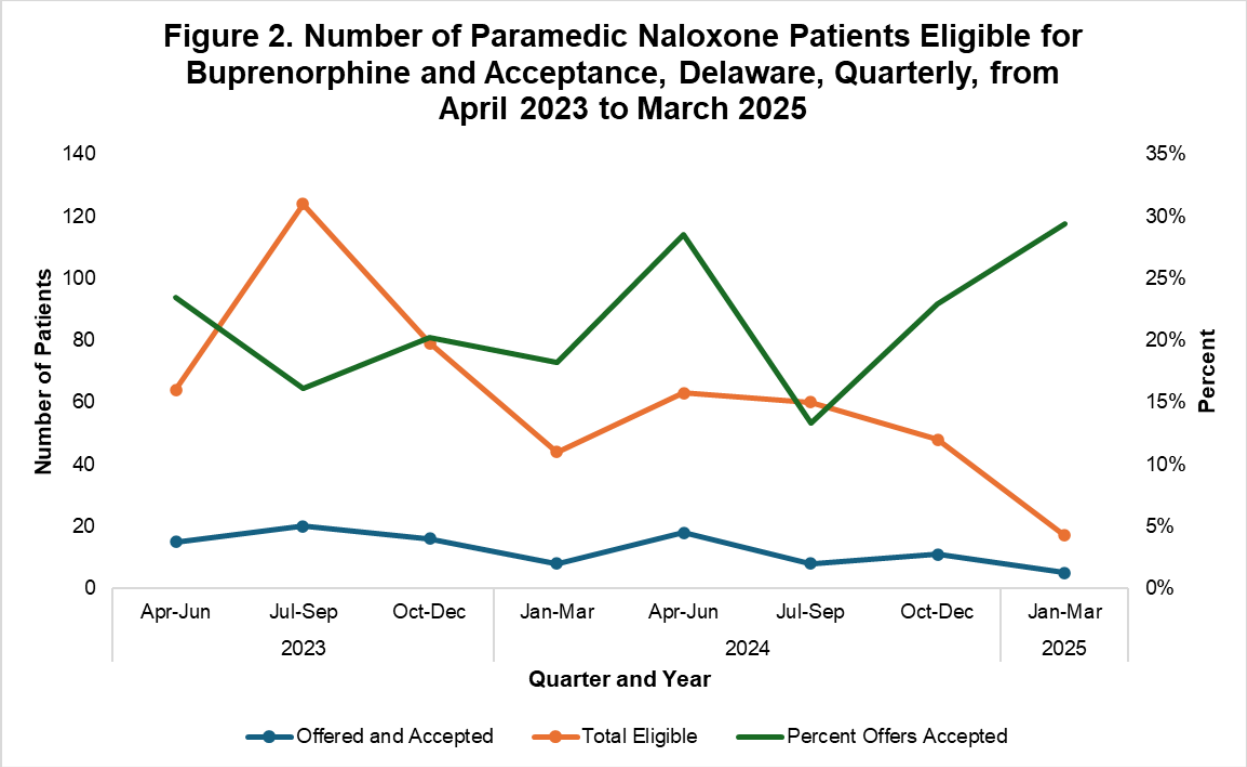
Doi: 10.32481/djph.2025.09.06



Even with the total number of eligible patients decreasing in the second year of the program (Figure 1), paramedics increased the percentage of buprenorphine offers accepted by eligible naloxone patients from 19.0% in year one (April 2023-March 2024), to 22.8% in year two (April 2024-April 2025), as shown in Figure 2.

Figure 2. Number of Paramedic Naloxone Patients Eligible for Buprenorphine and Acceptance, Delaware, Quarterly, April 2023-March 2025

Doi: 10.32481/djph.2025.09.06

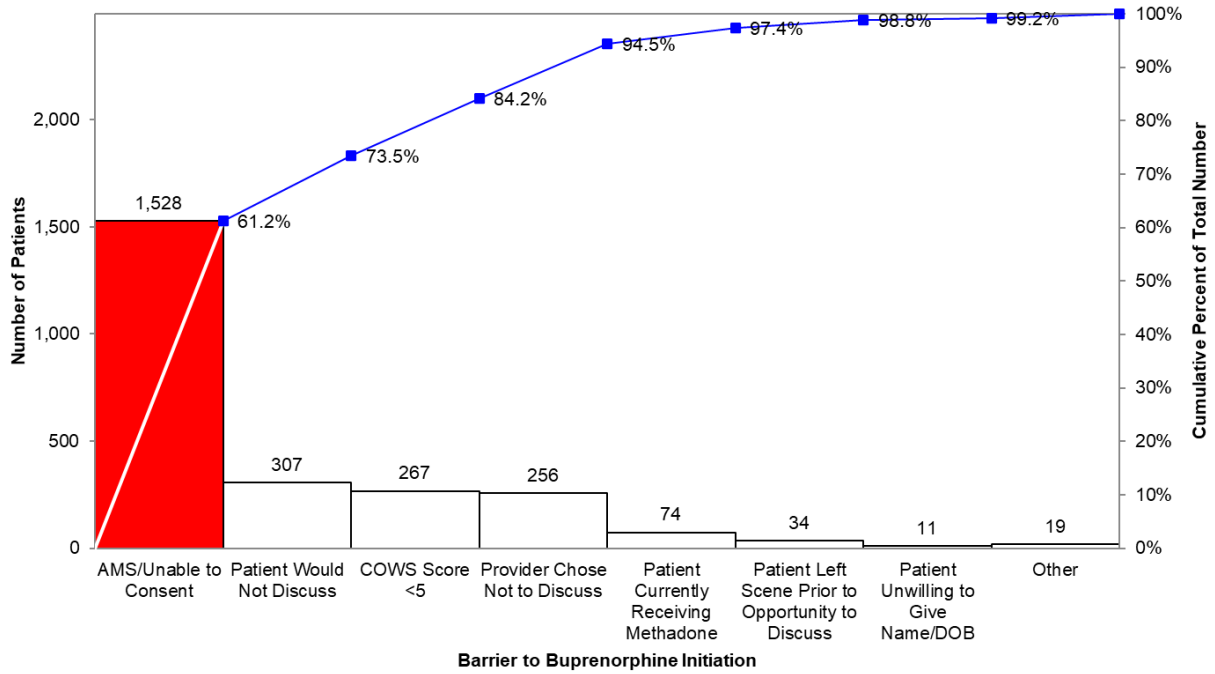


Of the 2,496 cases in which the patient was ineligible for buprenorphine or buprenorphine was not offered or discussed (Figure 3), “altered mental status and unable to consent” was the most common reason for ineligibility (61.2%), followed by “patient would not discuss” (12.3%), “COWS score <5” (10.7%), “provider chose not to discuss” (10.3%), “currently on methadone” (3%), “patient left the scene prior to discussion” (1.4%), and several “other” exclusions such as age less than 18 years or pregnancy (1.2%).

Figure 3. Prehospital Buprenorphine Ineligibility and Reasons Buprenorphine Not Offered, Delaware, April 2023-April 2025

Doi: 10.32481/djph.2025.09.06

Figure 3. Prehospital Buprenorphine Ineligibility and Reasons Buprenorphine Not Offered, Delaware, April 2023-April 2025



Adverse Effects

Based on prior studies, high-dose buprenorphine initiation in the prehospital or ED settings appears to be safe, and few adverse effects would be expected, including a very low risk of precipitated withdrawal.[2,3,5] Few adverse effects of buprenorphine were reported in Delaware, however, follow-up after EMS contact was unavailable in most of our cases. As stated above, in 41 of our cases, withdrawal was documented as "unchanged" and one case documented as feeling "worse" after a second dose of buprenorphine. Recent methadone use was identified as a potential concern in a few cases with ongoing withdrawal symptoms. While 75 patients were excluded due to taking methadone within 48 hours prior to overdose and EMS contact, with the prolonged half-life and potentially high doses of methadone being received, we updated guidance to exclude patients who have taken methadone in less than 5 days.

Conclusion

Sustainability

Prehospital buprenorphine initiation is one part of our multi-faceted public health response to the opioid crisis. Funding for the Delaware prehospital buprenorphine program was provided through the First Responders—Comprehensive Addiction and Recovery Act (FR-CARA) Grant. In addition to funding, we recognized that ongoing education is an important part of program sustainability. To further improve prehospital buprenorphine acceptance rates, we will continue providing education for paramedics, emergency department staff, community members, and patients. Additionally, we intend to increase the use of EMS physicians and Post-Overdose Response Teams (PORT)—outreach teams with the ability to assist overdose patients who decline EMS transport--to help educate and engage patients in OUD care and treatment. The

need for OUD treatment is expected to continue into the future. With continued funding and education, EMS providers are well-positioned to continue "meeting patients where they are" to provide care.

Public Health Significance

The complicated impact of the opioid crisis on individuals, families, and communities cannot be understated. In Delaware, the public health response has been coordinated by Delaware Health and Social Services, including the Division of Public Health (DPH), Division of Substance Abuse and Mental Health (DSAMH), and Delaware Overdose System of Care (OSOC), along with Delaware medical and OUD treatment providers, hospitals, emergency departments, and EMS organizations. Prehospital buprenorphine is only one aspect of this response. Over the first 2 years of this program, 105 patients were started on buprenorphine by paramedics in Delaware. However, the number started on buprenorphine alone does not fully account for the impact of this program. For opioid use disorder, research suggests that it takes between 3 and 8.5 recovery attempts to enter OUD remission.[9] Every contact after an overdose and every discussion of treatment can help bring a patient one step closer to OUD treatment, recovery, and remission. Delaware paramedics from all three county paramedic agencies have initiated well over 500conversations with patients about OUD treatment. Whether starting buprenorphine in the field or initiating conversations and providing resources for treatment, the Delaware prehospital buprenorphine program has brought care for OUD directly to the patient—literally meeting the patient where they are.

Dr. Wanner may be contacted at Gregory.wanner@delaware.gov.

Acknowledgements

We acknowledge the vitally important teamwork of our partners in EMS administration and paramedics in Kent, New Castle, and Sussex counties, MOUD providers, hospital emergency departments, Delaware Overdose System of Care (OSOC), Overdose Response Center (ORC), Division of Public Health (DPH), and Division of Substance Abuse and Mental Health (DSAMH).

Funding Disclosure

Funding for the Delaware prehospital buprenorphine program was provided through the First Responders—Comprehensive Addiction and Recovery Act (FR-CARA) Grant.

References

1. American Society of Addiction Medicine. (2020). The ASAM national practice guideline for the treatment of opioid use disorder: 2020 focused update. Journal of Addiction Medicine, 14(2S Suppl 1), 1–91. https://doi.org/10.1097/ADM.0000000000000633
2. Carroll, G. G., Wasserman, D. D., Shah, A. A., Salzman, M. S., Baston, K. E., Rohrbach, R. A., . . . Haroz, R. (2021, Mar-Apr). Buprenorphine field initiation of rescue treatment by emergency medical services (Bupe First EMS): A case series. *Prehospital Emergency Care*, *25*(2), 289–293. https://doi.org/10.1080/10903127.2020.1747579 PubMed

3. Carroll, G., Solomon, K. T., Heil, J., Saloner, B., Stuart, E. A., Patel, E. Y., . . . Haroz, R. (2023, February). Impact of administering buprenorphine to overdose survivors using emergency medical services. *Annals of Emergency Medicine*, *81*(2), 165–175. https://doi.org/10.1016/j.annemergmed.2022.07.006 PubMed

4. Delaware Department of Health and Social Services. (2024). Delaware advanced life support protocols, guidelines, policies, and standing orders. Office of Emergency Medical Services. https://dhss.delaware.gov/dhss/dph/ems/files/ALSProtocols2024.pdf

5. Joiner, A. P., Wanthal, J., Murrell, A. N., Cabañas, J. G., Carroll, G., Hern, H. G., . . . Glenn, M. (2025). A scoping review and consensus recommendations for emergency medical services buprenorphine (EMS-Bupe) programs. *Prehospital Emergency Care*, *29*(4), 384–406. https://doi.org/10.1080/10903127.2024.2445739 PubMed

6. Garnett, M. F., & Minino, A. M. (2024). Drug overdose deaths in the United States, 2002-2023. *NCHS Data Brief*, Number 522. https://dx.doi.org/10.15620/cdc/170565

7. Delaware Division of Forensic Science. (2024). Division of Forensic Science 2023 annual report. State of Delaware Department of Safety and Homeland Security. https://forensics.delaware.gov/resources/contentFolder/pdfs/2023%20DFS%20Annual%20Report.pdf

8. An Act to Amend Title 16 of the Delaware Code Relating to the Creation of an Overdose System of Care, H.B 440. 149th General Assembly. (2018). https://legis.delaware.gov/BillDetail?legislationId=26746

9. Kelly, J. F., Greene, M. C., Bergman, B. G., White, W. L., & Hoeppner, B. B. (2019, July). How many recovery attempts does it take to successfully resolve an alcohol or drug problem? Estimates and correlates from a national study of recovering u. S. Adults. *Alcoholism, Clinical and Experimental Research*, *43*(7), 1533–1544. https://doi.org/10.1111/acer.14067 PubMed