

Fentanyl Testing Associated with Short-Term Survival Benefits; Increased Long-Term Mortality Risk Among Overdose Patients

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Key Findings:

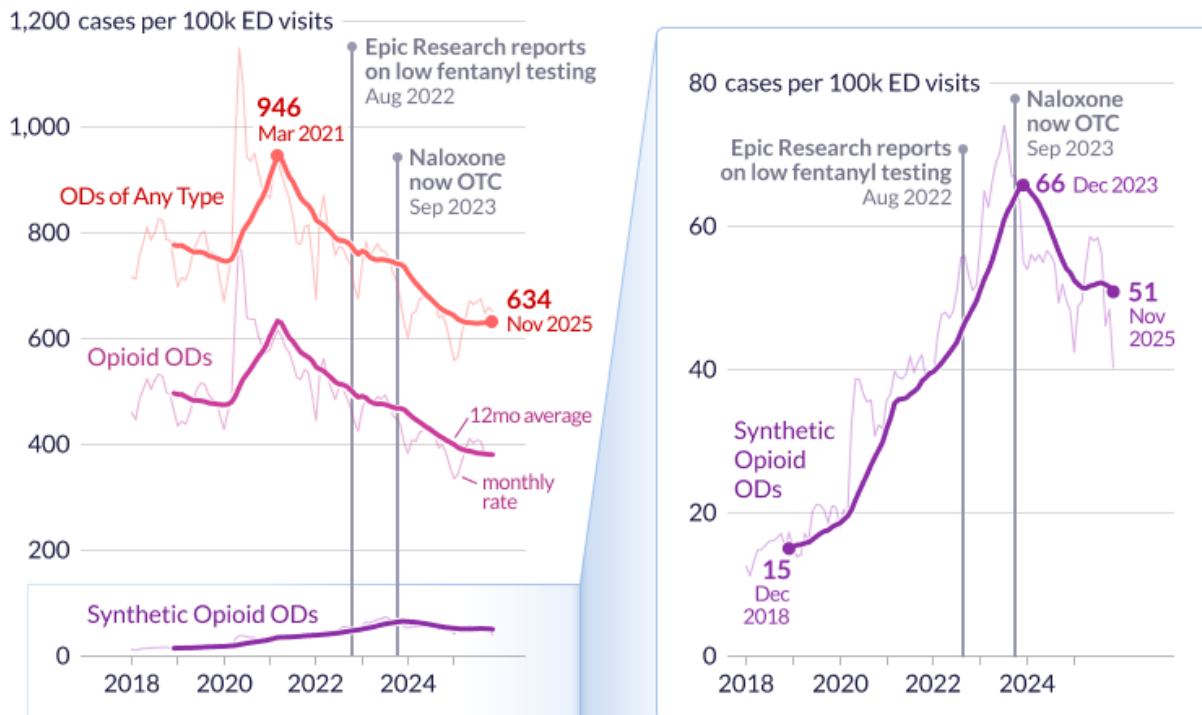
- The 12-month average rate of emergency department (ED) visits for overdoses of all types declined from a peak of 946 per 100,000 ED visits in March 2021 to 634 per 100,000 ED visits in November 2025, falling below pre-COVID-19 pandemic levels. Testing for fentanyl in these encounters more than quadrupled over this period, from 5% of encounters to 28% of encounters.
- Patients who were tested for fentanyl during an overdose visit were 147% more likely to begin a medication for opioid use disorder (MOUD) during their overdose encounter. Testing was also associated with an 11% lower likelihood of death within 30 days compared to those who were not tested.
- However, patients who were tested for fentanyl had a higher likelihood of mortality and repeat overdose at one year, suggesting tested patients may represent a higher-risk population whose long-term outcomes require sustained treatment engagement.

Opioid misuse continues to pose a critical public health issue in the United States, particularly due to the increasing prevalence of synthetic opioids such as fentanyl.¹ Efforts to curb this epidemic have been implemented, such as increased fentanyl screening and increasing access to naloxone². However, questions remain about whether fentanyl testing during ED encounters is associated with subsequent treatment and survival.

To understand trends in overdose visits, we studied more than 230 million ED visits between January 2018 and November 2025. We studied overall overdoses, overdoses from opioids, and overdoses from synthetic opioids, each a subset of the preceding broader category.

The 12-month rolling average rate of ED visits for all types of overdoses peaked at 946 per 100,000 in March 2021, a period when overall ED volumes were unusually low, as seen in Figure 1.³ By November 2025, the rate had declined to 634 per 100,000, reflecting a 33% decline and falling below pre-pandemic levels. Opioid overdoses followed a similar trajectory, with rates trending downward after naloxone became available over the counter in 2023.² In contrast, synthetic opioid overdoses increased more than threefold from 15 to 51 per 100,000 visits between December 2018 and November 2025, though rates have declined after peaking at 66 per 100,000 in December 2023. Notably, testing for synthetic opioids also increased by more than 400% from the first quarter of 2021 to the fourth quarter of 2025, as seen on the [Epic Research Fentanyl and Opiate Toxicology data tracker](#).⁴

12-Month Rolling Rate of Overdose Emergency Department Visits Over Time



N=233,809,304 ED Visits "12-Month Rolling Rate of Overdose Emergency Department Visits Over Time," 2026. EpicResearch.org

Figure 1. The 12-month rolling average rate of ED visits for any overdose, opioid overdose, and synthetic opioid overdose.

There has been a rise in the incidence of synthetic opioid overdose mortality cases since 2018,⁵ picking up in 2020 and reaching a peak of 77,695 cases in June 2023, [according to the U.S. Centers for Disease Control and Prevention \(CDC\)](#), as seen in Figure 2. Since then, the number of synthetic opioid overdose deaths has declined substantially, reaching a low of 38,514 cases in August 2025, a reduction of more than 50% from the peak.

12-Month Rolling Rate of Synthetic Opioid Overdose Deaths

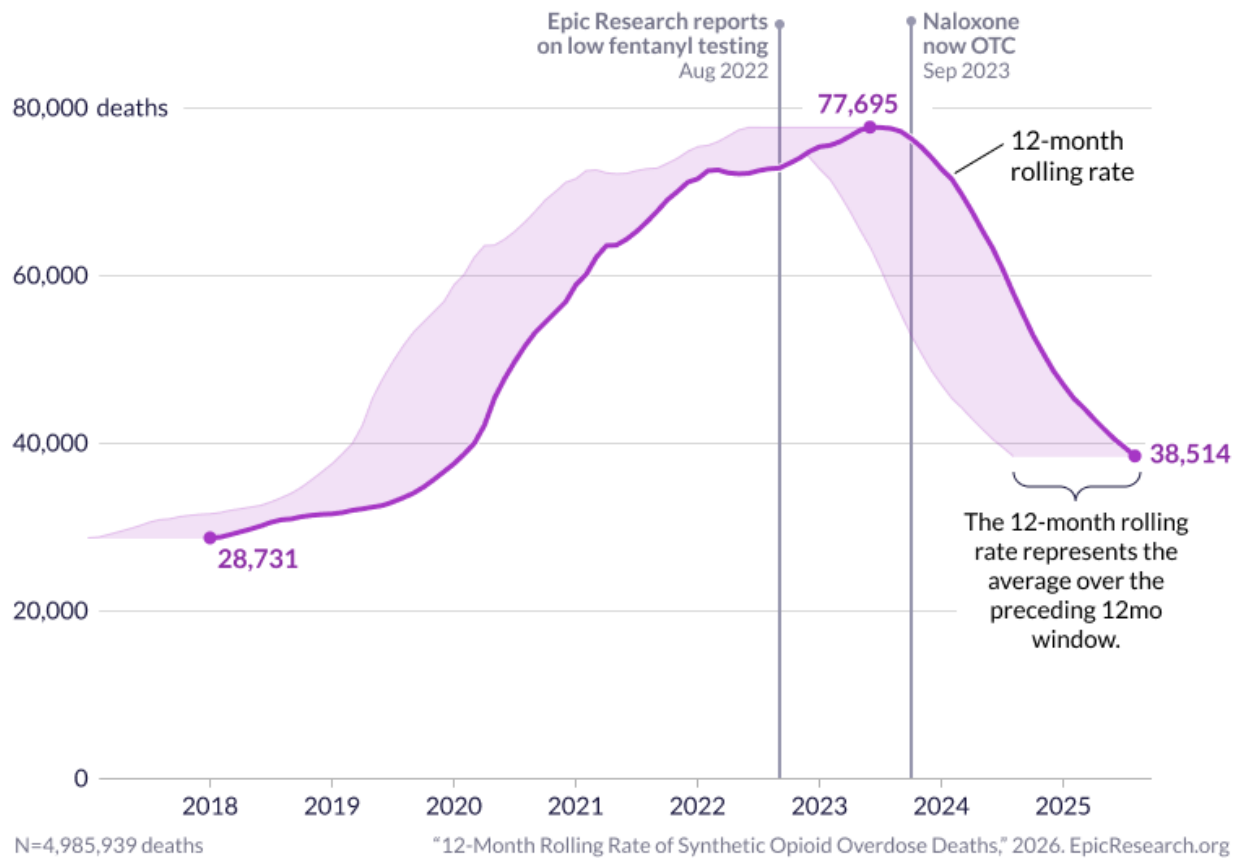
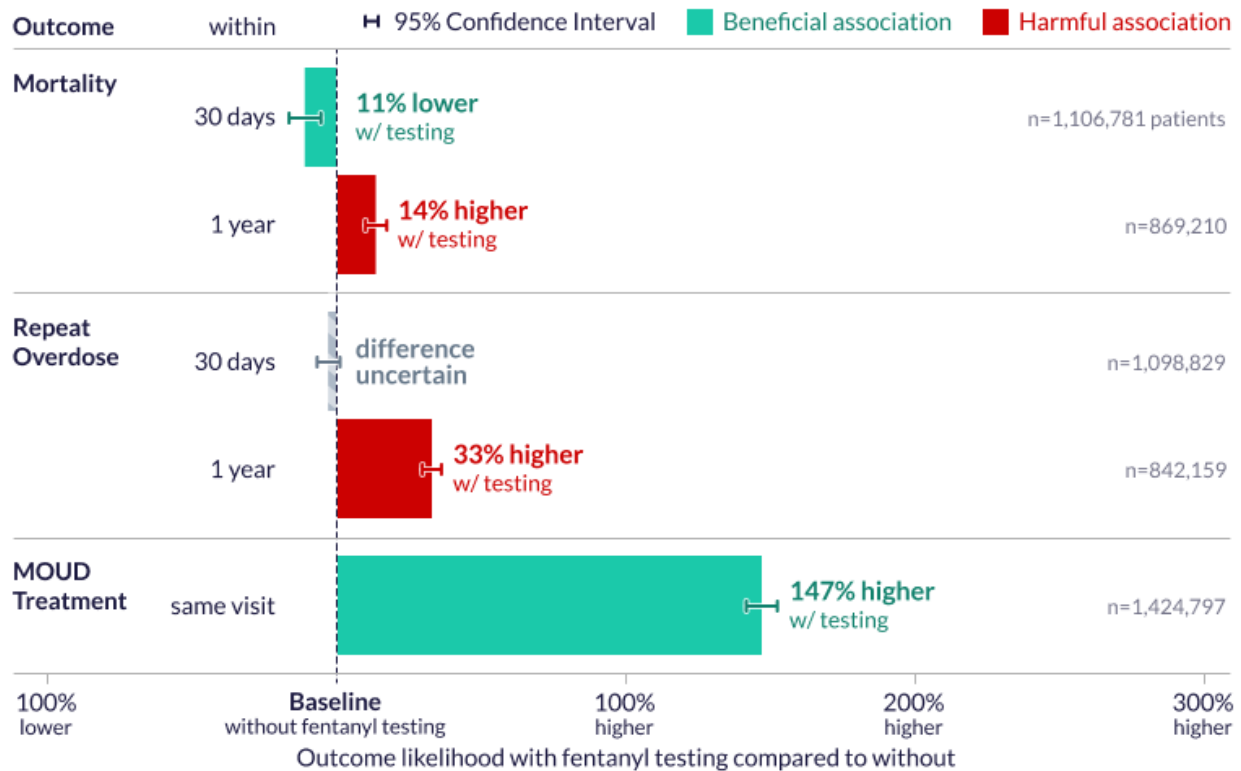


Figure 2. The rate of synthetic opioid overdose deaths for the previous 12 months based on data from the CDC.

To understand the relationship between fentanyl testing and outcomes such as mortality and repeat overdose encounters, we studied more than 1 million patients who had a non-fatal ED visit for an overdose. We accounted for demographics, social vulnerability and rurality based on most recently documented address, count of prior overdose encounters, administration of naloxone during the ED visit, and ED acuity score.

Among patients who were tested for fentanyl, the likelihood of being prescribed a medication for opioid use disorder (MOUD) during the encounter was 147% higher compared to those who were not tested for fentanyl, as seen in Figure 3. Short term outcomes were also improved: the likelihood of death within 30 days was 11% lower. There was not a significant difference in the likelihood of a repeat ED visit for an overdose within 30 days between patients who had fentanyl testing and those who did not. The likelihood of mortality or a repeat overdose within one year was higher among those who had fentanyl testing than those who were not tested. This pattern might reflect that patients who receive fentanyl testing represent a higher-risk population with more severe substance use disorders.

Likelihood of Mortality, Subsequent Overdose, or MOUD Treatment by Fentanyl Testing



"Likelihood of Mortality, Subsequent Overdose, or MOUD Treatment by Fentanyl Testing," 2026. EpicResearch.org

Figure 3. The likelihood of mortality, subsequent overdose, or MOUD treatment by whether the patient was tested for fentanyl during an overdose encounter.

Importantly, fentanyl testing might indicate clinical suspicion or resource availability. Indications for testing patients for fentanyl might include additional considerations we were not able to fully assess as part of this analysis.

These data come from Cosmos, a dataset created in collaboration with a community of Epic health systems representing more than 300 million patient records from 1,900 hospitals and more than 42,000 clinics from all 50 U.S. states, Lebanon, and Saudi Arabia. This study was completed by two teams that worked independently, each composed of a clinician and research scientists. The two teams came to similar conclusions. Graphics by Brian Olson.

References

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3. Noel A, Alban C, Trinkl J et al. Fewer Visits, Sicker Patients: The Changing Character of Emergency Department Visits During the COVID-19 Pandemic. Epic Research. <https://epicresearch.org/articles/fewer-visits-sicker-patients-the-changing-character-of-emergency-department-visits-during-the-covid-19-pandemic>. Accessed on August 11, 2025.
4. Fentanyl and Opiate Toxicology in Emergency Department Overdoses. Epic Research. <https://www.epicresearch.org/data-tracker/fentanyl-and-opiate-toxicology>. Accessed August 26, 2025.
5. Ahmad FB, Cisewski JA, Rossen LM, Sutton P. Provisional drug overdose death counts. National Center for Health Statistics. 2025. DOI: <https://dx.doi.org/10.15620/cdc/20250305008>

Data Definitions

| Term | Definition |
|-----------------------------|--|
| Study period | ED visits between 1/1/2018 and 10/31/2025 |
| Study population: inclusion | <p>Overdose rates:</p> <ul style="list-style-type: none"> • Emergency visits: Encounters with a type of "Emergency" or "Emergency to Inpatient" • U.S. encounters only from departments contributing data for full study period <p>Fentanyl testing outcomes:</p> <ul style="list-style-type: none"> • ED encounters for an overdose. If a patient had more than one, a random one was selected. • For 30-day and 1-year outcomes, the patient was required to have either the outcome or a follow-up face-to-face encounter after the end of the risk window. |
| Study population: exclusion | <p>Fentanyl testing outcomes:</p> <ul style="list-style-type: none"> • Patients who had a discharge disposition of deceased |
| Exposure | Fentanyl testing: a lab result with LOINC code 73938-3, 105203-4, 72760-2, 3636-8, 74136-3, 3637-6, 78766-3, 58381-5, 55537-5, 73936-7, 87815-7, 29356-3, 61042-8, 11235-9, 40839-3, 59673-4, 66130-6, 66129-8, 58379-9 |
| Outcomes | <p>Any overdose</p> <p>Opioid overdose</p> <p>Synthetic opioid overdose</p> <p>30-day and 1-year all-cause mortality</p> <p>30-day and 1-year repeat overdose ED encounter</p> <p>MOUD prescription</p> |
| Confounders | <p>Evaluated sex</p> <p>Race and ethnicity</p> <p>Social Vulnerability Index quintile</p> <p>RUCA</p> <p>Count of overdose ED encounters prior to inclusion encounter</p> <p>Administration of naloxone in the ED</p> <p>ED acuity score</p> |
| Overdose | A billing or encounter diagnosis with ICD-10-CM T36*, T37*, T38*, T39*, T40*, T41*, T42*, T43*, T44*, T45*, T46*, T47*, T48*, T49*, or T50* with a third and fourth digits after the decimal place of 1A, 2A, or 4A or SNOMED code 1149222004 |

| | |
|---|--|
| Opioid overdose | A diagnosis with ICD-10-CM code T40.[0-4,6]* with a subcode of 1A, 2A, or 4A |
| Synthetic opioid overdose | A diagnosis with ICD-10-CM code T40.4*A |
| MOUD | A prescription for a medication with ATC code N07BC* or N07BB04 |
| Naloxone | A medication with a type of patient reported, administered, or prescription and an ATC code V03AB15 or N07BC51 |
| Follow-up face-to-face encounter | An encounter of type "Emergency," "Office Visit," "Well Child," "Follow-Up," "Telemedicine," "Urgent Care," "Walk-In," "Routine Prenatal," "Postpartum Visit," "Fetal Care Consult," "Hospital Outpatient Visit," "Hospital Outpatient Visit to Inpatient," "Inpatient Admission," or "Emergency to Inpatient" |
| Model specifications | Overdose rates: Time series Fentanyl testing outcomes: Unconditional logistic regression |
| Limitations | Death data in Cosmos is limited to deaths recorded by Cosmos organizations. Naloxone given to the patient prior to arriving at the ED is not assessed as part of this study. |

Table 1: 12-Month Rolling Rate of Overdose Emergency Department Visits Over Time

| Month | Rate per 100k | | | Rate per 100k (12mo weighted avg) | | |
|----------------|---------------|-----------|------------------|-----------------------------------|-----------|------------------|
| | ED Encounters | Opioid OD | Synthetic Opioid | OD | Opioid OD | Synthetic Opioid |
| 2018 January | 2,599,288 | 460.36 | 12.58 | | | |
| 2018 February | 2,448,613 | 446.70 | 11.23 | | | |
| 2018 March | 2,572,499 | 486.22 | 13.22 | | | |
| 2018 April | 2,411,512 | 504.58 | 14.85 | | | |
| 2018 May | 2,530,613 | 524.18 | 14.90 | | | |
| 2018 June | 2,457,236 | 504.23 | 15.51 | | | |
| 2018 July | 2,502,939 | 521.39 | 16.06 | | | |
| 2018 August | 2,489,273 | 532.85 | 16.11 | | | |
| 2018 September | 2,470,007 | 528.95 | 16.56 | | | |
| 2018 October | 2,540,849 | 498.65 | 17.16 | | | |
| 2018 November | 2,385,236 | 493.28 | 15.22 | | | |
| 2018 December | 2,489,399 | 463.41 | 17.27 | 777.33 | 496.99 | 15.05 |
| 2019 January | 2,579,414 | 435.06 | 15.39 | 775.84 | 494.83 | 15.29 |
| 2019 February | 2,304,388 | 444.11 | 13.89 | 776.33 | 494.86 | 15.52 |
| 2019 March | 2,636,557 | 438.60 | 14.15 | 772.23 | 490.63 | 15.60 |
| 2019 April | 2,542,934 | 457.07 | 17.15 | 767.89 | 486.65 | 15.79 |
| 2019 May | 2,576,361 | 483.98 | 16.19 | 764.05 | 483.25 | 15.90 |
| 2019 June | 2,479,288 | 504.42 | 20.21 | 763.74 | 483.28 | 16.29 |
| 2019 July | 2,528,848 | 516.48 | 21.20 | 763.55 | 482.90 | 16.72 |
| 2019 August | 2,528,902 | 513.78 | 21.08 | 761.66 | 481.37 | 17.13 |
| 2019 September | 2,517,410 | 494.99 | 20.38 | 756.95 | 478.60 | 17.45 |

| | | | | | | |
|----------------|-----------|--------|-------|--------|--------|-------|
| 2019 October | 2,621,756 | 484.94 | 18.58 | 754.93 | 477.46 | 17.58 |
| 2019 November | 2,469,976 | 482.15 | 21.01 | 752.30 | 476.60 | 18.04 |
| 2019 December | 2,622,820 | 453.94 | 20.82 | 749.63 | 475.73 | 18.34 |
| 2020 January | 2,747,332 | 428.63 | 17.94 | 746.86 | 474.93 | 18.56 |
| 2020 February | 2,527,822 | 459.64 | 20.45 | 746.57 | 475.98 | 19.06 |
| 2020 March | 2,523,058 | 488.02 | 20.02 | 750.27 | 480.18 | 19.56 |
| 2020 April | 1,590,519 | 657.02 | 32.38 | 764.23 | 491.61 | 20.45 |
| 2020 May | 1,538,984 | 792.67 | 38.73 | 784.78 | 508.44 | 21.82 |
| 2020 June | 1,792,825 | 739.39 | 38.65 | 803.67 | 523.58 | 23.04 |
| 2020 July | 2,102,190 | 639.29 | 36.63 | 814.81 | 533.05 | 24.24 |
| 2020 August | 2,118,367 | 637.00 | 35.50 | 825.35 | 542.95 | 25.41 |
| 2020 September | 2,040,087 | 636.88 | 35.78 | 840.53 | 554.65 | 26.68 |
| 2020 October | 2,134,446 | 605.22 | 30.73 | 854.39 | 565.74 | 27.82 |
| 2020 November | 2,070,363 | 583.67 | 32.31 | 866.51 | 575.18 | 28.84 |
| 2020 December | 2,076,484 | 573.47 | 31.69 | 883.39 | 587.63 | 29.90 |
| 2021 January | 2,050,041 | 579.79 | 35.71 | 905.70 | 604.75 | 31.72 |
| 2021 February | 1,826,032 | 599.72 | 36.69 | 926.53 | 619.74 | 33.30 |
| 2021 March | 2,085,725 | 616.33 | 39.79 | 946.20 | 633.62 | 35.31 |
| 2021 April | 2,194,651 | 605.84 | 38.91 | 940.80 | 629.54 | 35.83 |
| 2021 May | 2,395,137 | 584.06 | 38.75 | 922.74 | 615.07 | 35.93 |
| 2021 June | 2,381,478 | 574.31 | 39.43 | 906.70 | 602.51 | 36.07 |
| 2021 July | 2,531,062 | 552.57 | 41.88 | 896.24 | 594.65 | 36.59 |
| 2021 August | 2,641,095 | 526.79 | 39.64 | 881.53 | 584.47 | 36.98 |
| 2021 September | 2,553,358 | 523.00 | 41.12 | 866.51 | 574.68 | 37.46 |
| 2021 October | 2,518,346 | 541.70 | 42.09 | 857.51 | 569.25 | 38.42 |
| 2021 November | 2,357,113 | 535.87 | 38.69 | 851.91 | 565.32 | 38.90 |
| 2021 December | 2,491,261 | 493.32 | 39.54 | 841.52 | 558.32 | 39.49 |
| 2022 January | 2,584,959 | 445.07 | 39.38 | 824.60 | 546.53 | 39.75 |
| 2022 February | 1,991,876 | 536.78 | 44.68 | 819.14 | 542.47 | 40.29 |
| 2022 March | 2,283,817 | 562.35 | 47.68 | 814.49 | 538.71 | 40.91 |
| 2022 April | 2,330,420 | 524.03 | 48.02 | 807.40 | 532.47 | 41.63 |
| 2022 May | 2,533,791 | 505.49 | 47.20 | 799.93 | 525.89 | 42.35 |
| 2022 June | 2,506,564 | 485.09 | 48.15 | 790.84 | 518.47 | 43.08 |
| 2022 July | 2,555,315 | 507.77 | 51.07 | 786.00 | 514.60 | 43.88 |
| 2022 August | 2,555,093 | 506.56 | 55.69 | 785.20 | 512.80 | 45.29 |
| 2022 September | 2,516,789 | 489.31 | 55.86 | 783.05 | 509.88 | 46.57 |
| 2022 October | 2,620,089 | 470.82 | 53.17 | 776.97 | 503.66 | 47.54 |
| 2022 November | 2,645,818 | 442.51 | 51.06 | 766.81 | 495.63 | 48.56 |
| 2022 December | 2,702,416 | 425.10 | 51.81 | 759.57 | 489.44 | 49.61 |
| 2023 January | 2,503,471 | 465.19 | 57.64 | 765.42 | 491.25 | 51.17 |
| 2023 February | 2,216,545 | 491.53 | 65.01 | 762.63 | 488.25 | 52.63 |

| | | | | | | |
|----------------|-----------|--------|-------|--------|--------|-------|
| 2023 March | 2,527,726 | 473.51 | 62.63 | 754.23 | 481.41 | 53.84 |
| 2023 April | 2,460,790 | 479.81 | 66.28 | 750.38 | 478.01 | 55.30 |
| 2023 May | 2,567,311 | 490.36 | 69.02 | 749.00 | 476.76 | 57.13 |
| 2023 June | 2,474,335 | 486.19 | 70.36 | 749.77 | 476.84 | 58.95 |
| 2023 July | 2,513,471 | 493.46 | 74.12 | 748.91 | 475.61 | 60.87 |
| 2023 August | 2,529,087 | 478.79 | 71.37 | 747.35 | 473.27 | 62.19 |
| 2023 September | 2,527,602 | 454.58 | 66.98 | 744.98 | 470.37 | 63.11 |
| 2023 October | 2,595,718 | 449.12 | 67.03 | 742.18 | 468.51 | 64.31 |
| 2023 November | 2,497,936 | 437.44 | 63.65 | 740.50 | 468.22 | 65.42 |
| 2023 December | 2,650,484 | 402.27 | 54.93 | 736.42 | 466.28 | 65.72 |
| 2024 January | 2,656,232 | 383.32 | 53.99 | 724.22 | 459.08 | 65.36 |
| 2024 February | 2,421,399 | 408.52 | 56.08 | 713.77 | 452.69 | 64.64 |
| 2024 March | 2,622,686 | 406.03 | 55.21 | 704.65 | 446.96 | 64.00 |
| 2024 April | 2,504,636 | 422.94 | 56.06 | 697.17 | 442.34 | 63.17 |
| 2024 May | 2,630,250 | 426.16 | 55.01 | 688.68 | 436.93 | 61.97 |
| 2024 June | 2,537,745 | 426.88 | 56.63 | 681.35 | 432.12 | 60.86 |
| 2024 July | 2,586,049 | 434.60 | 55.99 | 674.47 | 427.32 | 59.36 |
| 2024 August | 2,614,743 | 413.92 | 54.80 | 667.23 | 421.96 | 57.99 |
| 2024 September | 2,597,193 | 393.58 | 49.32 | 660.26 | 416.91 | 56.53 |
| 2024 October | 2,674,146 | 398.82 | 51.98 | 654.79 | 412.65 | 55.26 |
| 2024 November | 2,580,635 | 381.69 | 49.68 | 650.70 | 408.09 | 54.12 |
| 2024 December | 2,682,242 | 355.67 | 48.24 | 647.54 | 404.07 | 53.54 |
| 2025 January | 2,791,627 | 335.29 | 42.45 | 643.51 | 399.69 | 52.51 |
| 2025 February | 2,565,819 | 343.94 | 48.87 | 636.92 | 394.45 | 51.94 |
| 2025 March | 2,784,313 | 368.39 | 49.56 | 633.40 | 391.18 | 51.46 |
| 2025 April | 2,649,387 | 391.83 | 54.84 | 630.77 | 388.73 | 51.38 |
| 2025 May | 2,752,142 | 411.50 | 58.57 | 630.32 | 387.60 | 51.70 |
| 2025 June | 2,625,335 | 402.92 | 57.97 | 629.50 | 385.74 | 51.82 |
| 2025 July | 2,665,346 | 408.65 | 58.45 | 628.77 | 383.70 | 52.04 |
| 2025 August | 2,649,605 | 406.10 | 56.16 | 629.67 | 383.08 | 52.16 |
| 2025 September | 2,611,280 | 382.03 | 46.11 | 630.26 | 382.15 | 51.89 |
| 2025 October | 2,667,791 | 387.66 | 48.47 | 631.56 | 381.21 | 51.60 |
| 2025 November | 2,453,386 | 379.72 | 40.35 | 633.68 | 381.06 | 50.89 |

Table 2: 12-Month Rolling Rate of Synthetic Opioid Overdose Deaths – [Data courtesy of CDC](#)

| Year | 12-month period ending in month | Count of Synthetic Opioid OD Deaths |
|------|---------------------------------|-------------------------------------|
| 2018 | January | 28,731 |
| 2018 | February | 28,811 |
| 2018 | March | 29,120 |
| 2018 | April | 29,453 |
| 2018 | May | 29,777 |
| 2018 | June | 30,158 |
| 2018 | July | 30,575 |
| 2018 | August | 30,884 |
| 2018 | September | 30,991 |
| 2018 | October | 31,262 |
| 2018 | November | 31,426 |
| 2018 | December | 31,525 |
| 2019 | January | 31,585 |
| 2019 | February | 31,754 |
| 2019 | March | 32,019 |
| 2019 | April | 32,197 |
| 2019 | May | 32,402 |
| 2019 | June | 32,594 |
| 2019 | July | 33,035 |
| 2019 | August | 33,514 |
| 2019 | September | 34,057 |
| 2019 | October | 34,768 |
| 2019 | November | 35,677 |
| 2019 | December | 36,603 |
| 2020 | January | 37,579 |
| 2020 | February | 38,712 |
| 2020 | March | 40,006 |
| 2020 | April | 42,163 |
| 2020 | May | 45,438 |
| 2020 | June | 47,744 |
| 2020 | July | 49,794 |
| 2020 | August | 51,653 |
| 2020 | September | 53,243 |
| 2020 | October | 54,472 |
| 2020 | November | 55,672 |
| 2020 | December | 56,894 |
| 2021 | January | 58,908 |

| | | |
|------|-----------|--------|
| 2021 | February | 60,159 |
| 2021 | March | 62,195 |
| 2021 | April | 63,591 |
| 2021 | May | 63,642 |
| 2021 | June | 64,378 |
| 2021 | July | 65,305 |
| 2021 | August | 66,444 |
| 2021 | September | 67,716 |
| 2021 | October | 69,058 |
| 2021 | November | 70,049 |
| 2021 | December | 71,143 |
| 2022 | January | 71,570 |
| 2022 | February | 72,519 |
| 2022 | March | 72,614 |
| 2022 | April | 72,263 |
| 2022 | May | 72,155 |
| 2022 | June | 72,215 |
| 2022 | July | 72,536 |
| 2022 | August | 72,765 |
| 2022 | September | 72,843 |
| 2022 | October | 73,400 |
| 2022 | November | 74,012 |
| 2022 | December | 74,829 |
| 2023 | January | 75,390 |
| 2023 | February | 75,548 |
| 2023 | March | 75,993 |
| 2023 | April | 76,683 |
| 2023 | May | 77,375 |
| 2023 | June | 77,695 |
| 2023 | July | 77,693 |
| 2023 | August | 77,581 |
| 2023 | September | 77,201 |
| 2023 | October | 76,373 |
| 2023 | November | 75,367 |
| 2023 | December | 74,091 |
| 2024 | January | 72,718 |
| 2024 | February | 71,519 |
| 2024 | March | 69,624 |
| 2024 | April | 67,616 |
| 2024 | May | 65,372 |
| 2024 | June | 63,311 |

| | | |
|------|-----------|--------|
| 2024 | July | 60,781 |
| 2024 | August | 58,040 |
| 2024 | September | 55,390 |
| 2024 | October | 52,875 |
| 2024 | November | 50,724 |
| 2024 | December | 48,661 |
| 2025 | January | 46,882 |
| 2025 | February | 45,202 |
| 2025 | March | 43,825 |
| 2025 | April | 42,233 |

Table 3: 30-Day All-Cause Mortality with Fentanyl Testing

| | Odds Ratio | OR CI Low | OR CI High |
|------------------------------|------------|-----------|------------|
| Acuity Level 1 | 2.48 | 2.35 | 2.61 |
| Acuity Level 3+ | 0.84 | 0.80 | 0.87 |
| Acuity Not Specified | 1.46 | 1.28 | 1.67 |
| Age 26-39 | 2.32 | 2.06 | 2.60 |
| Age 40-64 | 4.32 | 3.87 | 4.82 |
| Age 65+ | 14.94 | 13.41 | 16.65 |
| Asian | 0.89 | 0.74 | 1.07 |
| Black | 0.65 | 0.62 | 0.69 |
| Hispanic | 0.64 | 0.58 | 0.70 |
| Multiracial | 0.55 | 0.51 | 0.59 |
| Other Race | 0.23 | 0.20 | 0.26 |
| Female | 0.76 | 0.74 | 0.79 |
| Other Sex | 0.45 | 0.35 | 0.57 |
| SVI Q2 | 1.12 | 1.04 | 1.21 |
| SVI Q3 | 1.14 | 1.07 | 1.23 |
| SVI Q4 | 1.17 | 1.10 | 1.25 |
| SVI Q5 | 1.14 | 1.06 | 1.22 |
| SVI Not Specified | 1.16 | 0.83 | 1.62 |
| RUCA Micropolitan | 1.30 | 1.23 | 1.39 |
| RUCA Small Town | 1.25 | 1.14 | 1.37 |
| RUCA Rural | 1.34 | 1.20 | 1.50 |
| RUCA Not Specified | 1.15 | 0.81 | 1.64 |
| Naloxone Given | 1.41 | 1.35 | 1.47 |
| Opioid Dependence Treatment | 0.80 | 0.72 | 0.89 |
| One ED OD in Two Prior Years | 1.18 | 1.10 | 1.27 |
| Two ED OD in Two Prior Years | 1.28 | 1.11 | 1.48 |

| | | | |
|-----------------------------|------|------|------|
| 3+ ED OD in Two Prior Years | 1.35 | 1.12 | 1.63 |
| intercept | 0.00 | 0.00 | 0.00 |
| Synthetic Opioid Testing | 0.89 | 0.84 | 0.95 |

Table 4: One-Year All-Cause Mortality with Fentanyl Testing

| | Odds Ratio | OR CI Low | OR CI High |
|------------------------------|------------|-----------|------------|
| Acuity Level 1 | 1.44 | 1.40 | 1.49 |
| Acuity Level 3+ | 0.91 | 0.89 | 0.93 |
| Acuity Not Specified | 1.46 | 1.36 | 1.55 |
| Age 26-39 | 2.11 | 1.99 | 2.22 |
| Age 40-64 | 4.72 | 4.48 | 4.96 |
| Age 65+ | 16.88 | 16.05 | 17.75 |
| Asian | 0.93 | 0.84 | 1.02 |
| Black | 0.81 | 0.79 | 0.83 |
| Hispanic | 0.66 | 0.63 | 0.69 |
| Multiracial | 0.64 | 0.62 | 0.66 |
| Other Race | 0.25 | 0.23 | 0.27 |
| Female | 0.73 | 0.72 | 0.75 |
| Other Sex | 0.57 | 0.52 | 0.63 |
| SVI Q2 | 1.01 | 0.97 | 1.04 |
| SVI Q3 | 1.06 | 1.02 | 1.09 |
| SVI Q4 | 1.08 | 1.05 | 1.12 |
| SVI Q5 | 1.10 | 1.07 | 1.14 |
| SVI Not Specified | 1.05 | 0.88 | 1.25 |
| RUCA Micropolitan | 1.15 | 1.12 | 1.19 |
| RUCA Small Town | 1.13 | 1.07 | 1.18 |
| RUCA Rural | 1.27 | 1.19 | 1.34 |
| RUCA Not Specified | 1.11 | 0.93 | 1.34 |
| Naloxone Given | 1.39 | 1.36 | 1.42 |
| Opioid Dependence Treatment | 1.14 | 1.09 | 1.20 |
| One ED OD in Two Prior Years | 1.39 | 1.34 | 1.44 |
| Two ED OD in Two Prior Years | 1.62 | 1.52 | 1.73 |
| 3+ ED OD in Two Prior Years | 1.93 | 1.78 | 2.09 |
| intercept | 0.01 | 0.01 | 0.02 |
| Synthetic Opioid Testing | 1.14 | 1.10 | 1.17 |

Table 5: Likelihood of Opioid Treatment Following Fentanyl Testing

| | Odds Ratio | OR CI Low | OR CI High |
|------------------------------|------------|-----------|------------|
| Acuity Level 1 | 1.11 | 1.08 | 1.14 |
| Acuity Level 3+ | 0.89 | 0.87 | 0.91 |
| Acuity Not Specified | 1.06 | 0.99 | 1.13 |
| Age 26-39 | 2.54 | 2.44 | 2.64 |
| Age 40-64 | 2.69 | 2.59 | 2.80 |
| Age 65+ | 1.46 | 1.39 | 1.53 |
| Asian | 0.41 | 0.35 | 0.48 |
| Black | 0.64 | 0.62 | 0.66 |
| Hispanic | 0.88 | 0.85 | 0.91 |
| Multiracial | 1.00 | 0.97 | 1.03 |
| Other Race | 0.87 | 0.84 | 0.90 |
| Female | 0.93 | 0.91 | 0.95 |
| Other Sex | 1.05 | 0.97 | 1.13 |
| SVI Q2 | 0.93 | 0.90 | 0.96 |
| SVI Q3 | 0.84 | 0.81 | 0.87 |
| SVI Q4 | 0.83 | 0.80 | 0.86 |
| SVI Q5 | 0.85 | 0.83 | 0.88 |
| SVI Not Specified | 0.74 | 0.63 | 0.87 |
| RUCA Micropolitan | 0.71 | 0.68 | 0.74 |
| RUCA Small Town | 0.74 | 0.70 | 0.79 |
| RUCA Rural | 0.73 | 0.68 | 0.80 |
| RUCA Not Specified | 1.15 | 0.98 | 1.36 |
| Naloxone Given | 6.25 | 6.13 | 6.38 |
| One ED OD in Two Prior Years | 1.54 | 1.49 | 1.59 |
| Two ED OD in Two Prior Years | 1.80 | 1.70 | 1.91 |
| 3+ ED OD in Two Prior Years | 2.01 | 1.87 | 2.16 |
| intercept | 0.01 | 0.01 | 0.01 |
| Synthetic Opioid Testing | 2.47 | 2.42 | 2.52 |

Table 6: Likelihood of 30-Day ED Overdose

| | Odds Ratio | OR CI Low | OR CI High |
|----------------------|------------|-----------|------------|
| Acuity Level 1 | 0.91 | 0.87 | 0.96 |
| Acuity Level 3+ | 1.09 | 1.06 | 1.12 |
| Acuity Not Specified | 1.00 | 0.91 | 1.10 |
| Age 26-39 | 1.32 | 1.27 | 1.38 |
| Age 40-64 | 1.18 | 1.13 | 1.23 |
| Age 65+ | 0.98 | 0.93 | 1.03 |

| | | | |
|------------------------------|-------|-------|-------|
| Asian | 0.73 | 0.62 | 0.86 |
| Black | 0.96 | 0.93 | 0.99 |
| Hispanic | 0.89 | 0.85 | 0.94 |
| Multiracial | 1.00 | 0.96 | 1.04 |
| Other Race | 0.84 | 0.79 | 0.89 |
| Female | 0.72 | 0.70 | 0.74 |
| Other Sex | 1.07 | 0.99 | 1.17 |
| SVI Q2 | 0.95 | 0.91 | 1.00 |
| SVI Q3 | 0.99 | 0.94 | 1.03 |
| SVI Q4 | 1.02 | 0.97 | 1.06 |
| SVI Q5 | 1.09 | 1.04 | 1.14 |
| SVI Not Specified | 1.21 | 0.99 | 1.48 |
| RUCA Micropolitan | 0.92 | 0.87 | 0.96 |
| RUCA Small Town | 0.80 | 0.74 | 0.86 |
| RUCA Rural | 0.84 | 0.76 | 0.93 |
| RUCA Not Specified | 0.98 | 0.79 | 1.22 |
| Naloxone Given | 1.18 | 1.15 | 1.21 |
| Opioid Dependence Treatment | 0.99 | 0.94 | 1.06 |
| One ED OD in Two Prior Years | 3.02 | 2.92 | 3.12 |
| Two ED OD in Two Prior Years | 5.31 | 5.04 | 5.60 |
| 3+ ED OD in Two Prior Years | 11.00 | 10.45 | 11.58 |
| intercept | 0.02 | 0.02 | 0.02 |
| Synthetic Opioid Testing | 0.97 | 0.93 | 1.01 |

Table 7: Likelihood of One-Year ED Overdose

| | Odds Ratio | OR CI Low | OR CI High |
|----------------------|------------|-----------|------------|
| Acuity Level 1 | 0.96 | 0.94 | 0.99 |
| Acuity Level 3+ | 0.99 | 0.97 | 1.00 |
| Acuity Not Specified | 1.05 | 0.99 | 1.11 |
| Age 26-39 | 1.26 | 1.23 | 1.29 |
| Age 40-64 | 1.12 | 1.09 | 1.14 |
| Age 65+ | 0.82 | 0.79 | 0.84 |
| Asian | 0.68 | 0.61 | 0.75 |
| Black | 0.98 | 0.96 | 1.00 |
| Hispanic | 0.89 | 0.87 | 0.92 |
| Multiracial | 1.02 | 0.99 | 1.04 |
| Other Race | 0.84 | 0.81 | 0.87 |
| Female | 0.69 | 0.68 | 0.70 |
| Other Sex | 1.04 | 0.98 | 1.09 |

| | | | |
|------------------------------|-------|-------|-------|
| SVI Q2 | 0.94 | 0.92 | 0.97 |
| SVI Q3 | 0.97 | 0.94 | 1.00 |
| SVI Q4 | 1.02 | 0.99 | 1.05 |
| SVI Q5 | 1.11 | 1.08 | 1.14 |
| SVI Not Specified | 1.30 | 1.14 | 1.47 |
| RUCA Micropolitan | 0.86 | 0.84 | 0.89 |
| RUCA Small Town | 0.77 | 0.73 | 0.81 |
| RUCA Rural | 0.80 | 0.75 | 0.85 |
| RUCA Not Specified | 0.99 | 0.86 | 1.13 |
| Naloxone Given | 1.41 | 1.39 | 1.44 |
| Opioid Dependence Treatment | 1.26 | 1.22 | 1.31 |
| One ED OD in Two Prior Years | 3.58 | 3.51 | 3.66 |
| Two ED OD in Two Prior Years | 6.84 | 6.60 | 7.09 |
| 3+ ED OD in Two Prior Years | 15.12 | 14.47 | 15.79 |
| intercept | 0.08 | 0.08 | 0.08 |
| Synthetic Opioid Testing | 1.33 | 1.30 | 1.36 |