

PURPOSE: This report provides new information regarding comprehensive drug testing of clinical toxicology specimens collected after suspected opioid overdoses in cities across the United States (U.S.).

OVERVIEW: Drug use can lead to adverse events and overdose scenarios where individuals present to emergency departments (EDs) for clinical evaluation and/or treatment. The culprit can be traditional drugs (e.g., heroin, fentanyl, cocaine, methamphetamine) or novel psychoactive substances (NPS); however, proper drug testing methodologies must be used for accurate identification and characterization. Street-level drug preparations can contain undeclared or unwanted substances (e.g., toxic adulterants or NPS) which can potentiate effects or lead to adverse reactions. Understanding emerging drug trends and drug testing results can help direct new or revised approaches to clinical treatment and harm reduction.

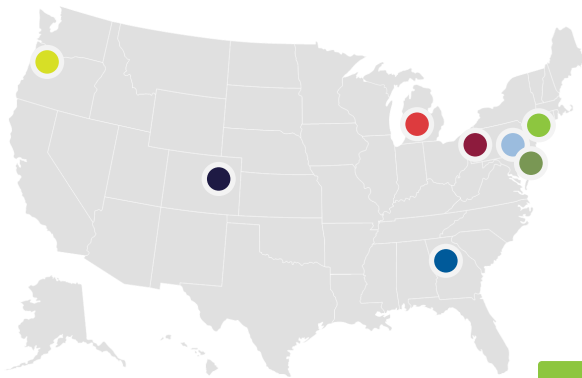
OBJECTIVE: A partnership between the American College of Medical Toxicology (ACMT) and the Center for Forensic Science Research and Education (CFSRE) was established to comprehensively assess the role and prevalence of synthetic opioids and other drugs among suspected overdose events in the U.S.

SAMPLE SOURCE: Patients presented to EDs within ACMT's Toxicology Investigators Consortium (Toxic) experiencing a suspected opioid overdose. Residual, discarded biological samples were obtained for testing against an expansive library of drugs and other substances. Our findings provide a near real-time assessment of the drug market and allude to resulting implications on clinical institutions.

TOXICOLOGY TESTING: Analysis was performed via liquid chromatography quadrupole time-of-flight mass spectrometry (LC-QTOF-MS). The scope of testing targeted more than 1,200 drugs, including a vast majority of NPS and metabolites. Drug classes included opioids, benzodiazepines, cannabinoids, stimulants, and hallucinogens, among other drugs.

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NEWARK, NJ (N=5)

- ▶ 100% positive for at least one opioid
- ▶ Fentanyl identified in all samples
- ▶ Xylazine detected alongside fentanyl (20%)
- ▶ Opioid and stimulant use (60%) and opioid and benzodiazepine use (20%) observed
- ▶ **NPS: p-Fluorofentanyl (20%)**

PITTSBURGH, PA (N=35)

- ▶ 94% positive for at least one opioid
- ▶ Fentanyl (89%) most commonly detected, followed by methadone (14%) and oxycodone (9%)
- ▶ Xylazine detected alongside fentanyl (40%)
- ▶ Opioid and stimulant use (43%) and opioid and benzodiazepine use (23%) observed
- ▶ *Note: p-Fluorofentanyl not detected*
- ▶ **NPS: Bromazolam (6%), N-Desethyl Isotonitazene (3%), Metonitazene (3%), N-Pyrrolidino Etonitazene (3%)**

GRAND RAPIDS, MI (N=11)

- ▶ 73% positive for at least one opioid
- ▶ Fentanyl (73%) in all opioid positive samples, followed by tramadol (18%)
- ▶ Xylazine detected with fentanyl (45%)
- ▶ Opioid & stimulant use (27%), opioid & benzodiazepine use (18%) observed
- ▶ **NPS: p-Fluorofentanyl (9%),**

NEW YORK, NY (N=107)

- ▶ 92% positive for at least one opioid
- ▶ Fentanyl (80%) most commonly detected, followed by methadone (21%), heroin (13%)
- ▶ Xylazine detected alongside fentanyl (35%)
- ▶ THC and metabolites detected (21%)
- ▶ Opioid and stimulant use (39%) and opioid and benzodiazepine use (25%) observed
- ▶ PCP detected in absence of opioids (2%)
- ▶ **NPS: Bromazolam (4%), p-Fluorofentanyl (5%), Flubromazepam (1%), N-Pyrrolidino Protonitazene (3%), MDMB-4en-PINACA (2%), Protonitazene (1%), N-Cyclohexyl Butylone (1%)**

PORTLAND, OR (N=60)

- ▶ 93% positive for at least one opioid
- ▶ Fentanyl (85%) most commonly detected, followed by oxycodone (7%)
- ▶ Opioid and stimulant use (70%) and opioid and benzodiazepine use (8%) observed
- ▶ **NPS: p-Fluorofentanyl (2%), Bromazolam (3%)**

ALLENTOWN, PA (N=12)

- ▶ 92% positive for at least one opioid
- ▶ Fentanyl (83%) most commonly detected; followed by buprenorphine (17%)
- ▶ Xylazine detected alongside fentanyl (42%)
- ▶ Opioid and stimulant use (25%) and opioid and benzodiazepine use (25%) observed
- ▶ **NPS: p-Fluorofentanyl (17%)**

DENVER, CO (N=49)

- ▶ 90% positive for at least one opioid
- ▶ Fentanyl (78%) most commonly detected, followed by methadone (6%)
- ▶ THC and metabolites detected (16%)
- ▶ Opioid and stimulant use (69%) and opioid and benzodiazepine use (27%) observed
- ▶ *Note: Xylazine not detected*
- ▶ **NPS: p-Fluorofentanyl (2%)**

ATLANTA, GA (N=28)

- ▶ 86% positive for at least one opioid
- ▶ Fentanyl (86%) identified in all opioid positive samples
- ▶ Xylazine detected alongside fentanyl (32%)
- ▶ Opioid and stimulant use (79%) common; opioid and benzodiazepine use (18%) less commonly observed
- ▶ NPS benzodiazepines common (25%)
- ▶ **NPS: Bromazolam (18%), p-Fluorofentanyl (14%), Flualprazolam (4%), Clonazolam (4%), Metonitazene (4%)**