

Expanded Re-testing of Urine Specimens from Patients at Scripps Mercy Hospital, San Diego Reveals Methamphetamine Most Commonly Detected

Method

Scripps Mercy Hospital San Diego sampled 150 de-identified specimens from consecutive ED patients who received urine drug tests (excluding trauma patients) seen in March 2021 and sent them to EDDS for expanded re-testing for approximately 500 drugs. One hundred specimens had tested positive for any drug in their routine panel (hospital positives) and 50 had tested negative for all of the drugs (hospital negatives). The hospital routinely tests for 12 drugs: amphetamines, barbiturates, benzodiazepines, cocaine, marijuana, methadone, methamphetamine, opiates, oxycodone, PCP, and TCA (tricyclic antidepressants). Fentanyl testing is available by separate order if requested. Limited demographic and clinical information for each specimen was also sent to EDDS. For technical reasons, no electronic health record data was sent to EDDS and this bulletin necessarily focuses only on the expanded re-testing component of the EDDS project. Table 1 presents the results from the expanded re-testing, according to whether the hospital had indicated they had tested positive or negative via the hospital's routine testing.

Table 1: EDDS Re-Test Results, by Hospital's Drug Screen Result

EDDS Found Positive for:	Hospital Found Positive for any drug (N=100) %	Hospital Found Negative for all drugs (N=50) %
Marijuana	48	12
Cocaine	5	4
Any Amphetamine	76	50
Methamphetamine	67	50
Amphetamine	46	2
Any Benzodiazepine	43	12
Lorazepam	25	12
Alprazolam/α-Hydroxyalprazolam	10	0
Demoxepam	7	0
Oxazepam	6	0
Any Non-Fentanyl Opioid	11	4
Morphine	5	2
Oxycodone	5	0
Any Fentanyl	6	4
Fentanyl/Norfentanyl	6	4
Other Drugs		
Diphenhydramine	21	10
Gabapentin	11	6
Trazodone/mCPP	11	4
Ephedrine/Pseudoephedrine	9	0
Dextromethorphan	5	0

Note: Drugs included in the hospital's routine drug screen are bolded.

Results of Expanded Re-testing¹

As would be expected, the hospital positive specimens were most likely to test positive for drugs included in the hospital's routine screen. While 76% were positive for any amphetamine, this was mainly attributable to methamphetamine (67%). Also, 48% were positive for marijuana and 43% were positive for any benzodiazepine, largely lorazepam. Non-fentanyl opioids (11%) and fentanyl (6%) were rarely detected. A surprising number of drugs were found in specimens that tested negative by the hospital's screen. 50% of the hospital negative specimens contained methamphetamine and 12% were positive for marijuana and/or lorazepam. Diphenhydramine was found in 10-21% of both hospital groups. Polydrug positives were common. Additional analyses, not shown, found that almost half of the hospital positive specimens that contained amphetamine/methamphetamine also tested positive for marijuana and/or benzodiazepines, primarily lorazepam, and 26% tested positive for diphenhydramine. The fact that the EDDS laboratory used much more sensitive tests than the hospital laboratory may explain why the EDDS re-testing found drugs in specimens that the hospital indicated had tested totally negative. It is not possible to determine from the EDDS test results whether the presence of benzodiazepines or any prescribed drugs were due to illicit use, unintentional exposure, or administration by a physician.

Implications

The most prevalent drug found was methamphetamine, detected in 67% of hospital positive and 50% of hospital negative specimens. This represents some of the highest levels of methamphetamine ever detected in an EDDS hospital. The high percentage of methamphetamine detected is consistent with the mortality data reported by the County.² San Diego is close to the

¹All tables and figures are available online at: <https://cesar.umd.edu/landingtopic/edds-hospitals-data>

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²San Diego County Methamphetamine Strike Force. (2020). *2020 Report Card*. Retrieved from https://53c3c324-192b-47c0-8030-d285a20511c1.filesusr.com/ugd/6b5bbf_caeed3e3bd9b4784b43d303bfc63176c.pdf

Mexican border, a supply entry for this illicit drug and its use is prevalent in the homeless population. EDDS testing for methamphetamine used a cutoff of 5 ng/mL, while the hospital testing had a much less sensitive cutoff of 500 ng/mL. This difference may explain why 50% of the specimens testing negative by the hospital's drug testing were in fact positive for methamphetamine. Amphetamine is a metabolite of methamphetamine and is therefore frequently seen along a positive methamphetamine test. It may therefore be advisable for the hospital to introduce more sensitive tests for methamphetamine.

Fentanyl deaths in San Diego County have tripled over the past year, and therefore it was surprising to find only 6% of hospital positive and 4% of hospital negative specimens to be positive for fentanyl. However, this correlates with local medical examiner data which reported a decrease in fentanyl fatalities during the study period (March 2021).³

Diphenhydramine and lorazepam are both frequently administered in the ED to patients with "excited delirium", a state that often presents in methamphetamine users. Given the large amount of methamphetamine found in the specimens, the detection of these drugs may be due to hospital administration rather than self-administration by the subjects. Future studies will be required to differentiate medications administered in the hospital.

Marijuana is legal both medically and recreationally in San Diego. The San Diego County Marijuana Prevention Initiative reported an increase of 776% (from 77 to 675) between 2008 and 2018 in the number of persons discharged from San Diego County EDs with cannabis listed as a primary diagnosis.⁴ The EDDS re-testing detected marijuana (THC) in 48% of the hospital positive and 12% of hospital negative specimens. Also, marijuana was found to be positive in 46% of the hospital positive specimens determined to be positive for amphetamine/methamphetamine. While the EDDS laboratory used more sensitive testing for this drug (5 ng/ml vs. 50 ng/mL), the re-testing only found marijuana in 12% of the hospital negative specimens. More research is needed to understand the role of marijuana use in ED admissions.

There were several novel psychoactive substances that were detected in 6% or less of the hospital positive or negative specimens including: methcathinone/ephedrone, 3,4,5-trimethoxycocaine, pentylone, psilocin, PV8, ketamine/norketamine, and mitragynine/7-hydroxy-mitragynine. Ketamine may have been administered by the hospital as it is used to treated "excited delirium." These drugs warrant tracking, but do not yet pose a change in management in terms of treatment or prevention.

EDDS Overview

EDDS provides the nation with a new tool to display near real-time trends in a hospital's urine drug test results and to discover emerging drugs that may not be included in a hospital's routine urinalysis screens. This information is vital to ensuring that hospitals and localities are better prepared to understand the local drug problems they and their patients face. EDDS obtains quarterly exports of de-identified test results from emergency department patients' electronic health records (EHRs) and annually re-tests 150 de-identified urine specimens for almost 500 drugs. This model was pilot tested in seven Maryland hospitals and is now being launched in other states. An *EDDS Bulletin* will be published to announce the release of each hospital's detailed findings.

Go here for all EDDS publications and current data: <https://cesar.umd.edu/landing/EDDS>.

³San Diego County Department of the Medical Examiner. (2021). *Reports and Statistics*. Unpublished.

⁴San Diego County Marijuana Prevention Initiative. (2021). *2020 Report*. Retrieved from <https://www.ccrconsulting.org/media/attachments/2020/05/04/mpi-report-5.4.2020-corrections.pdf>