

# Trends in Fentanyl Analysis in Workplace Urine Drug Testing at CRL

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## INTRODUCTION

Fentanyl began its dramatic impact on the opioid epidemic around 2013, and since 2021 has turned this public health emergency into a polysubstance overdose crisis. Combined with other drugs, fentanyl boosts potency and causes fatalities at lower than expected doses. The United States Center for Disease Control (CDC) and Drug Enforcement Administration (DEA) have reported that fentanyl has contributed to an estimated 70% of more than 300,000 overdose deaths in the US over the last three years. CRL began providing urine fentanyl analysis to clients in 2006, but increasing fentanyl abuse has caused more employers to add fentanyl to their standard workplace testing panels.

## OBJECTIVE

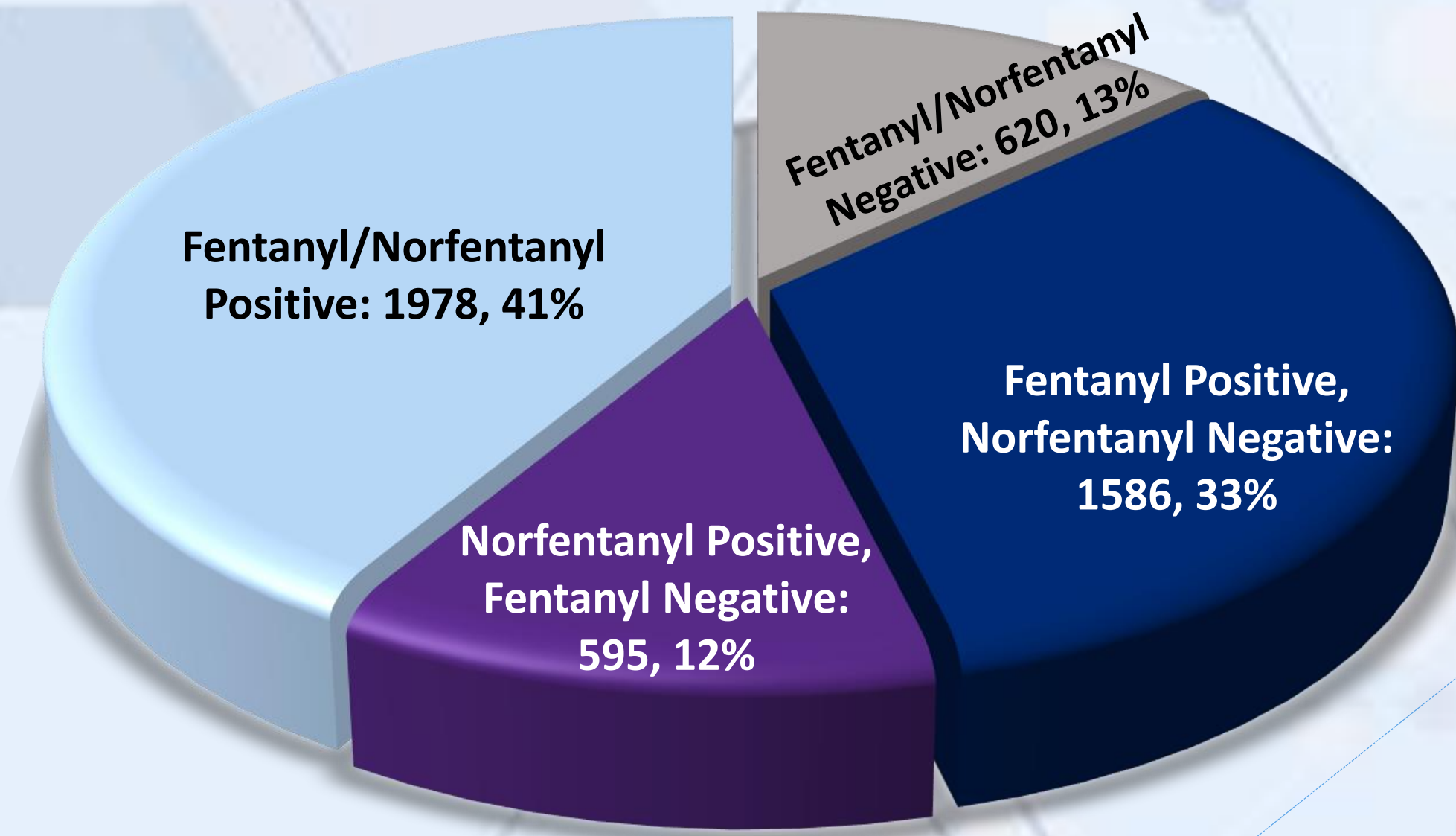
Explore trends in fentanyl analysis in workplace urine drug testing through examining positivity rates, reasons for test, and concurrence of fentanyl positive results with other drugs of abuse.

## METHODS

CRL tests for fentanyl and its metabolite norfentanyl in urine through enzyme immunoassay (EIA) screening with confirmation of all presumptive positives by HPLC-MS/MS. Cutoff concentrations for both screening and confirmation are variable by client, with screening cutoffs most commonly at 1.0 ng/mL, followed by 0.5 ng/mL, and confirmation cutoffs most commonly 0.5 ng/mL, followed by 1.0 ng/mL. For this study, demographic information and reported results for workplace urine drug testing samples analyzed at CRL from January 2022 to January 2024 were reviewed; specimens tested through professional monitoring programs, parole and probation groups, and rehabilitation services were omitted. Either fentanyl or norfentanyl concentrations greater than the cutoff were considered a positive reported result.

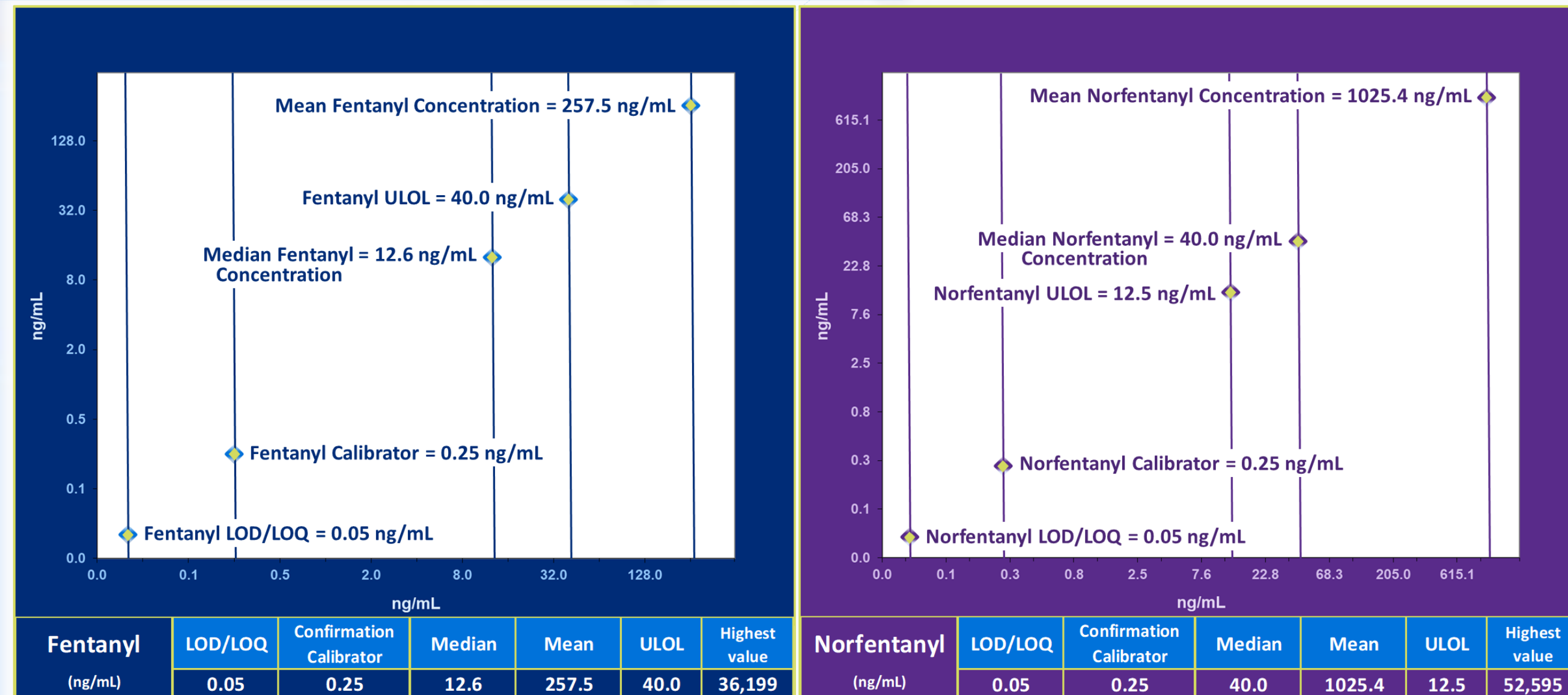
## RESULTS / DISCUSSION

Figure A: Urine Fentanyl and Norfentanyl Confirmation Status (n=4779)



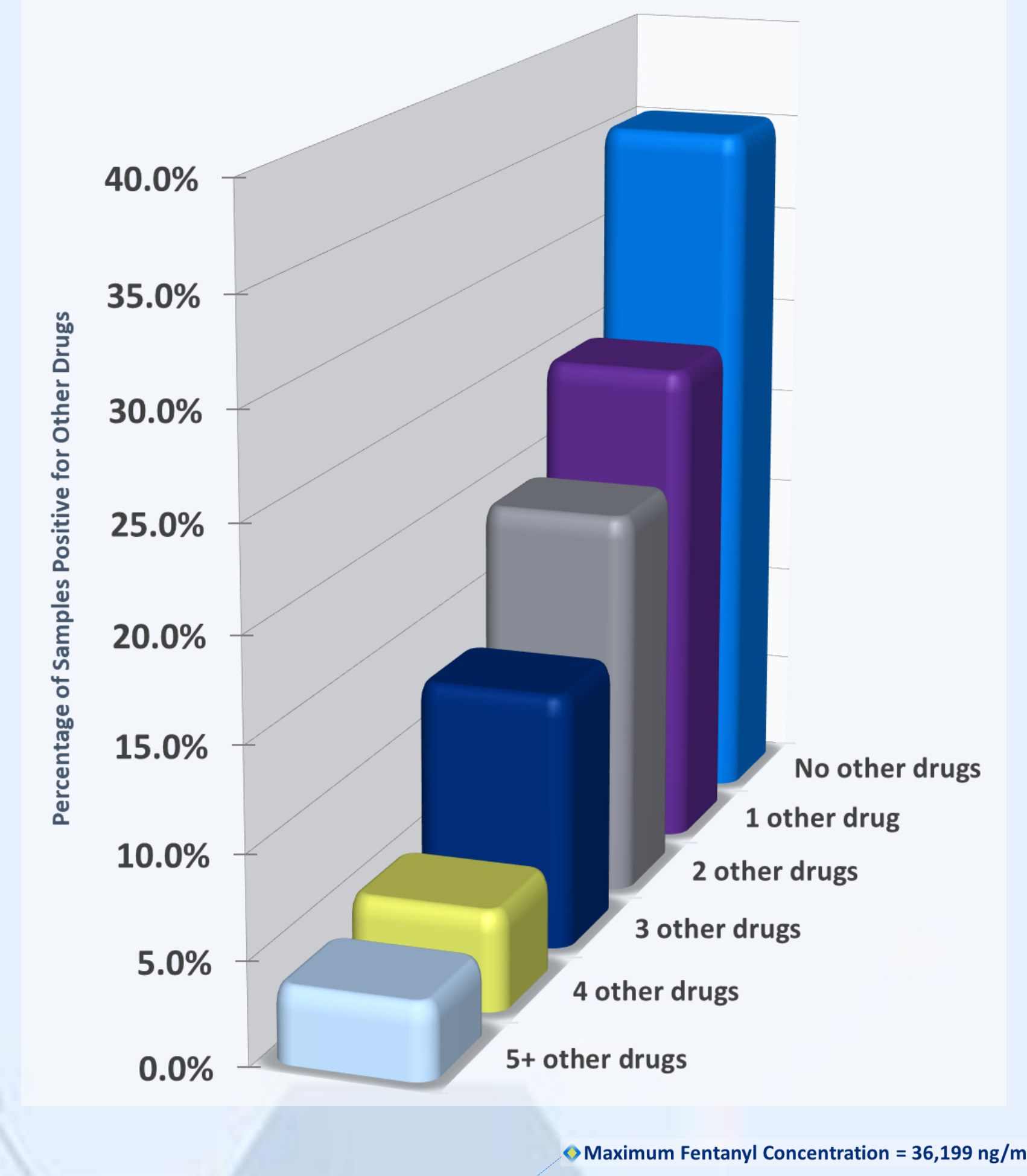
For almost 5,000 workplace urine drug testing specimens screening positive by immunoassay, the overall confirmation rate was 87%. Reported positives were comprised of 41% of samples testing greater than cutoff for both fentanyl and norfentanyl, 33% testing positive for fentanyl and less than cutoff for norfentanyl, and 13% testing below cutoff for fentanyl but positive for norfentanyl. See Figure A.

Figure B: Urine Fentanyl and Norfentanyl Confirmation Values



Median positive values for fentanyl and norfentanyl were 12.6 ng/mL and 40.0 ng/mL, respectively. Mean positive results were 257.5 ng/mL for fentanyl and 1025.4 ng/mL for norfentanyl. Maximum concentrations were 36,199 ng/mL for fentanyl and 52,595 ng/mL for norfentanyl. See Figure B.

Figure C: Proportion of Concurrent Drug use in Reported Positives



A total of 64.8% of fentanyl positives were polydrug positives, and 21.2% of those samples were positive for 3 or more drugs in addition to fentanyl (Figure C). The drug most commonly found in combination with fentanyl was THC, appearing in 22.6% of fentanyl positives. This was followed by amphetamine and methamphetamine, which were present in 20.4% and 19.9% of fentanyl-positive samples (Figure D). Only 12% of fentanyl positives involved an opiate, but of those samples, almost 60% contained 2 or more opiates (Figures E, F).

Figure D: Most Common Drugs in Urine Fentanyl Polydrug Combinations

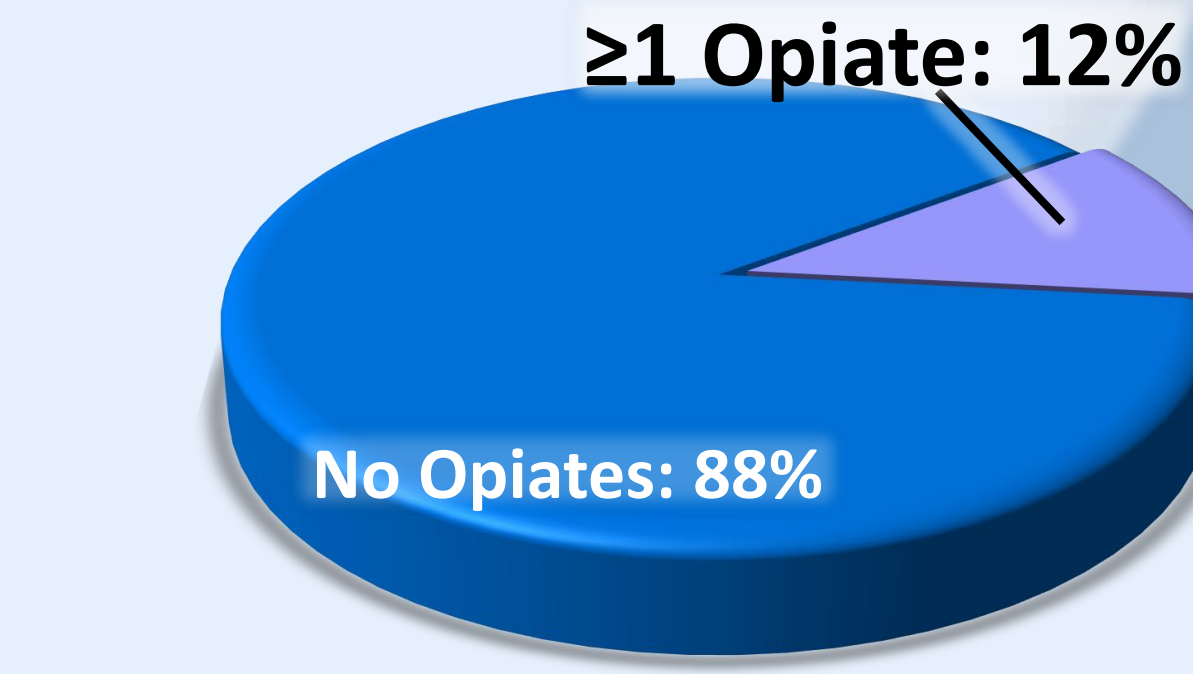
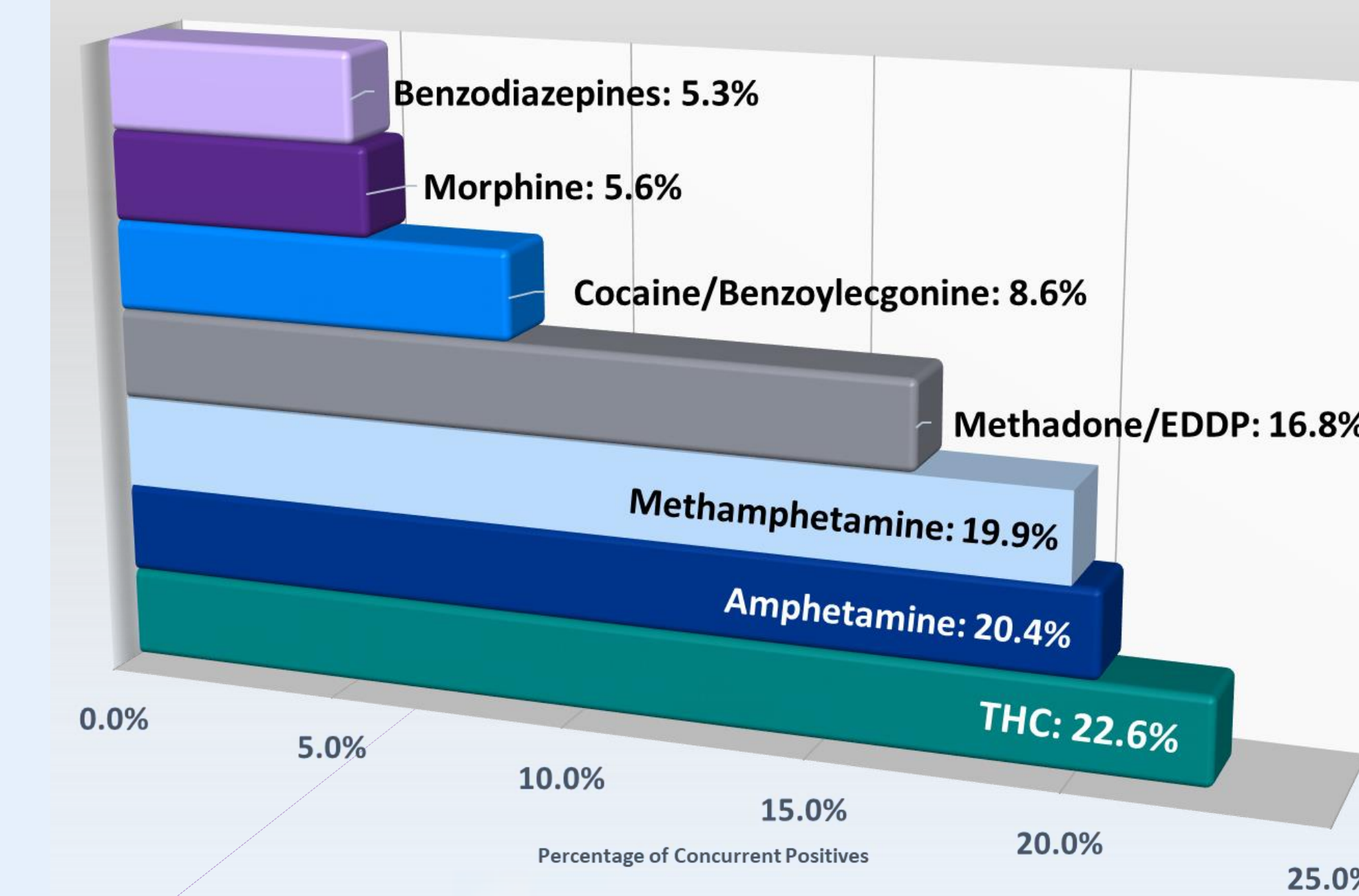


Figure E: Breakdown of Urine Fentanyl and Opiate Polydrug Positives

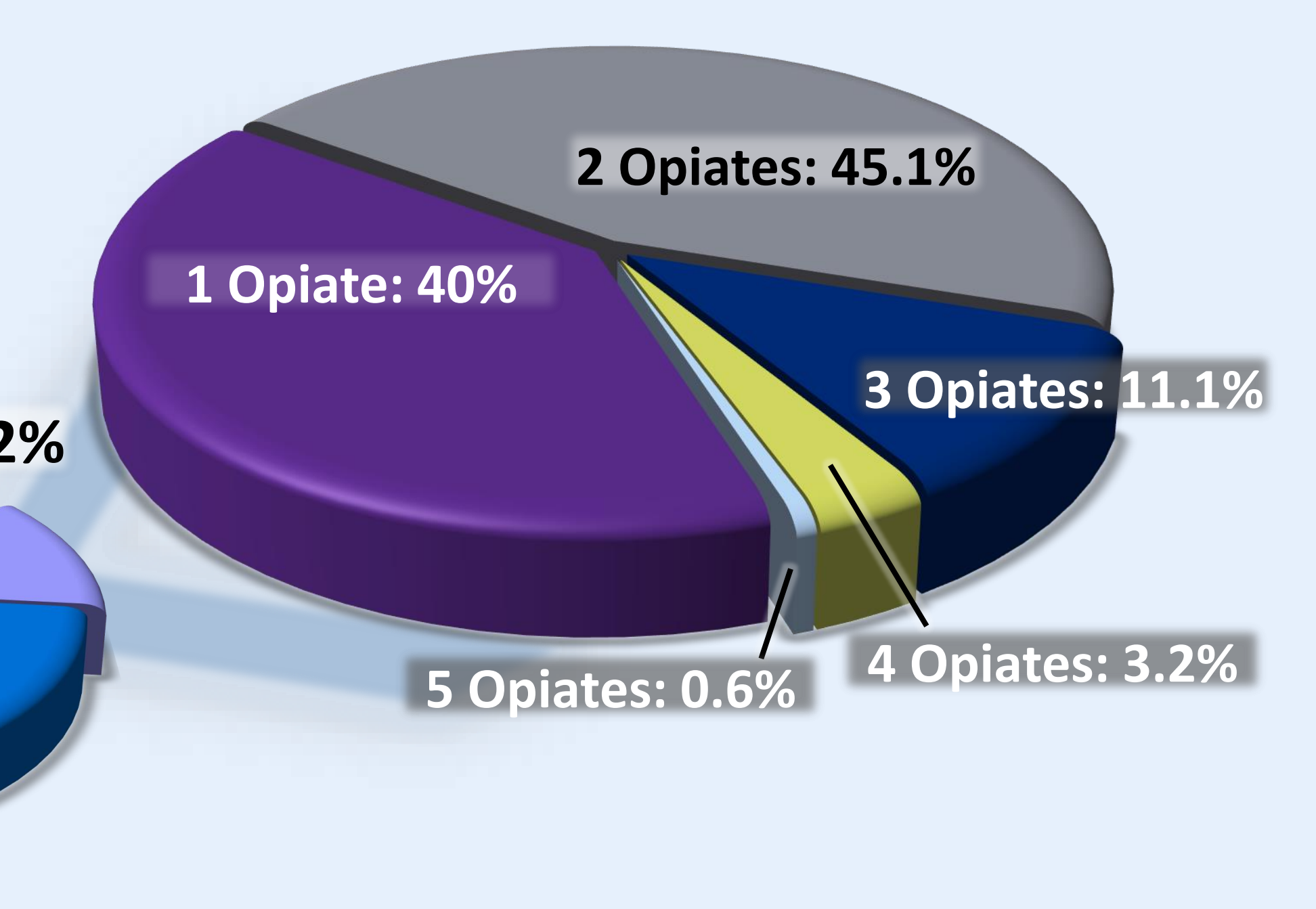


Figure F: Opiates Present in Urine Fentanyl-Opiate Polydrug Positives

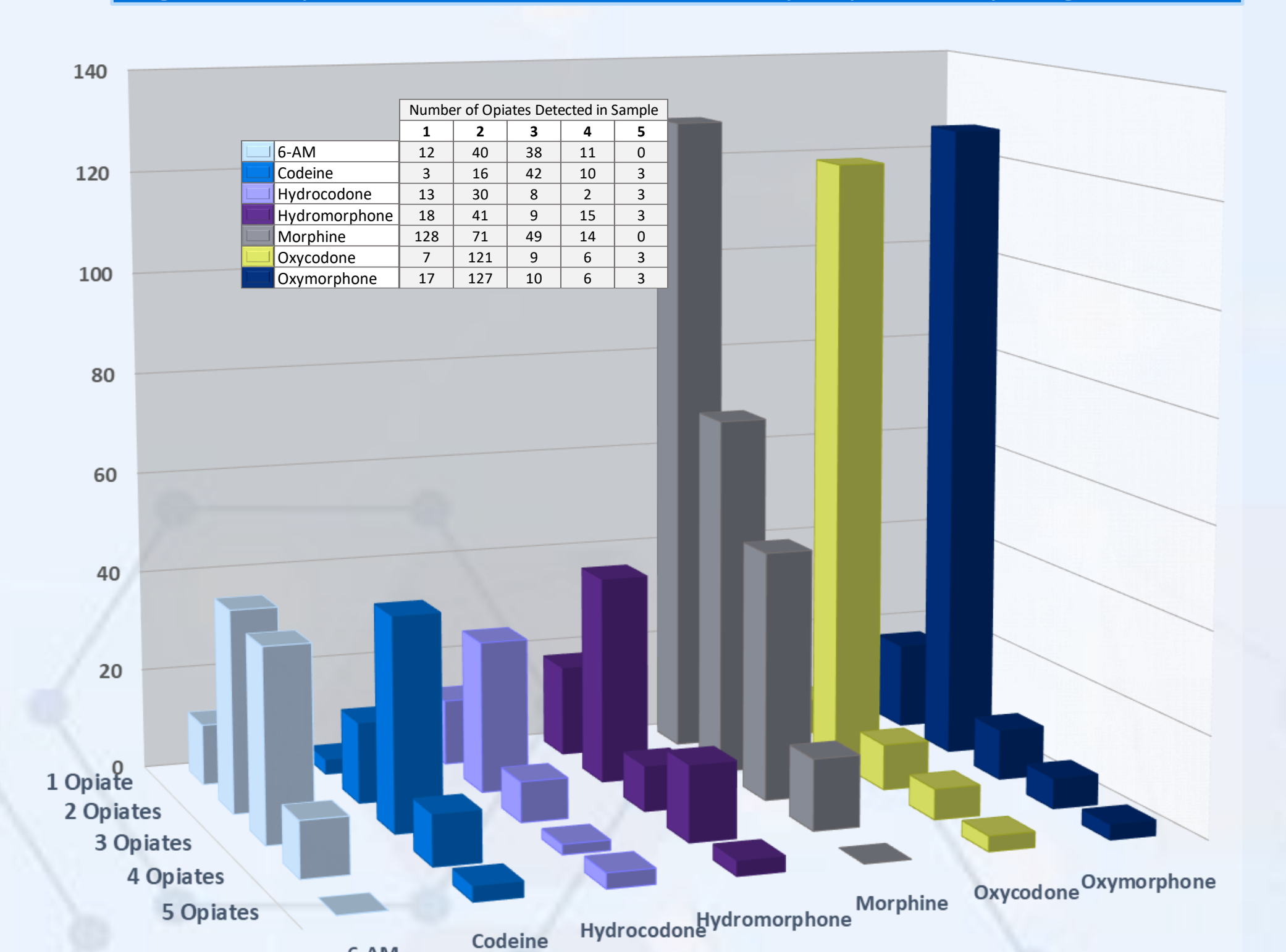
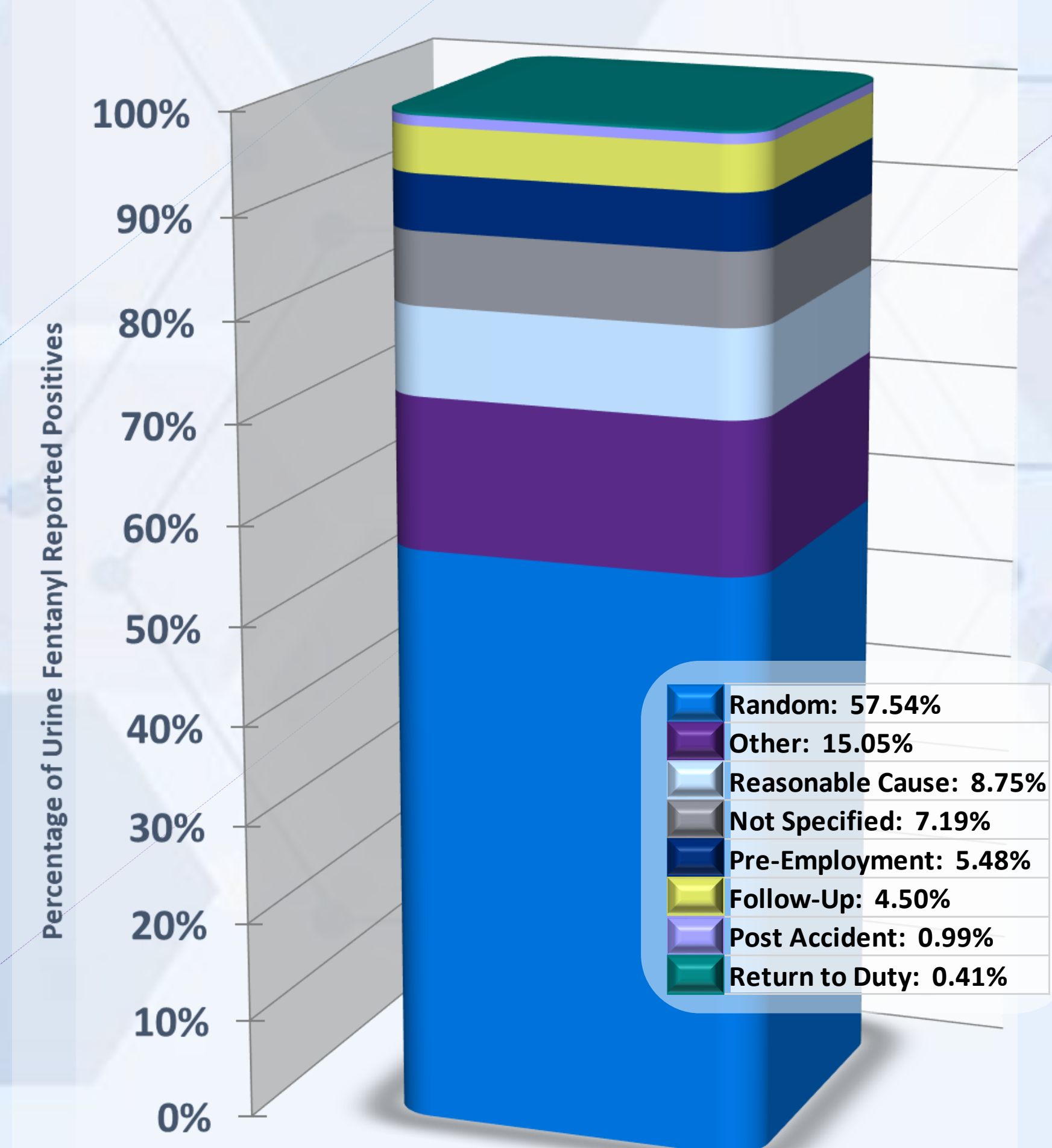
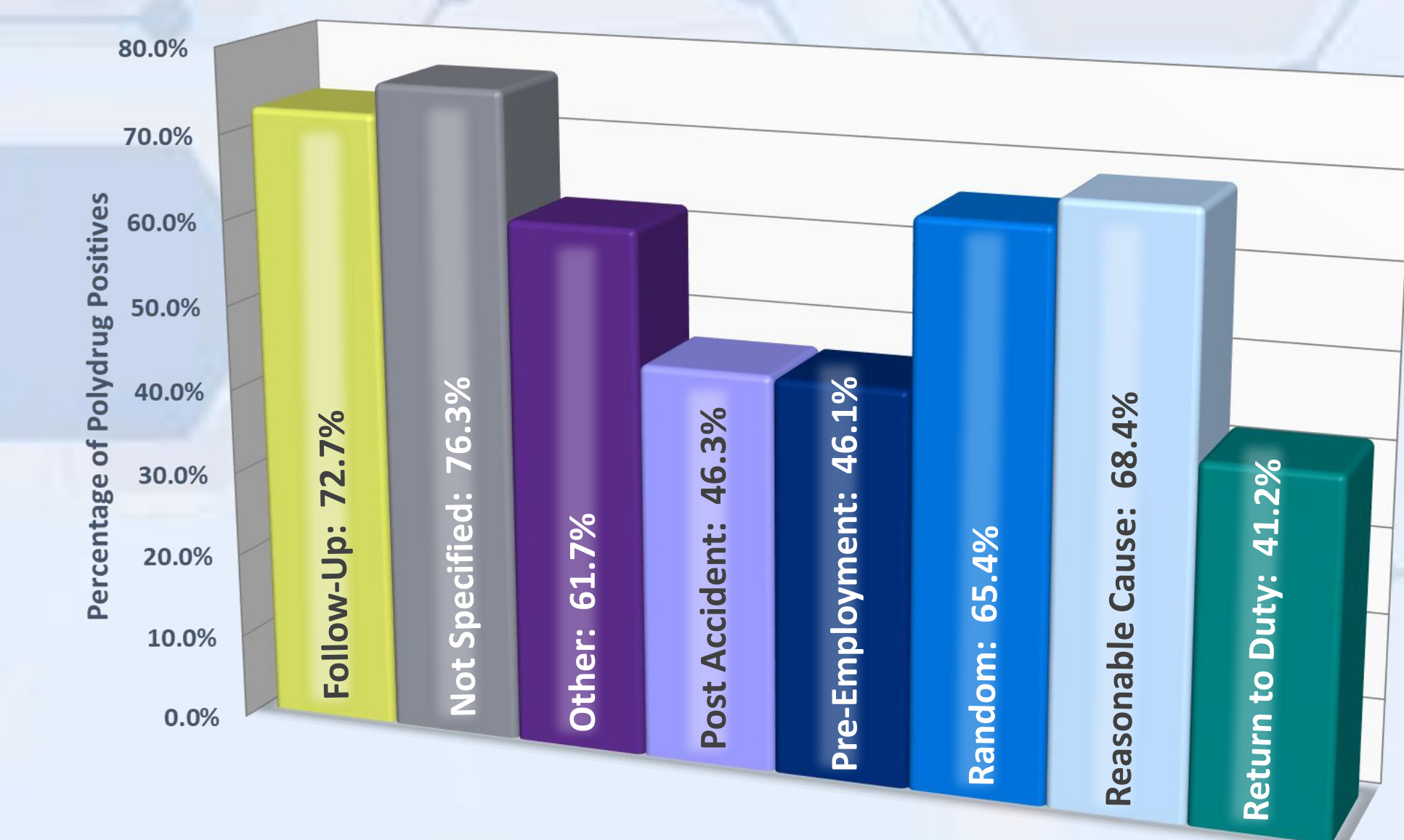


Figure G: Urine Fentanyl Reported Positives by Collection Reason



Random drug screens produced 57.5% of fentanyl positives, while the reasons for test "other" and "reasonable cause" combined for almost 25% of reported positives. Pre-employment tests accounted for only 5.5% of fentanyl-positive samples. See Figure G for categorization of reported urine fentanyl positives by collection reason. For breakdown of fentanyl-polydrug positives by reason for test, see Figure H. Refer to Table 1 and Figure I for further expansion of polydrug positives for the main categories of collection reason.

Figure H: Concurrent Drug use in Reported Positives by Reason for Test



## CONCLUSION

The typical detection window for fentanyl and norfentanyl in urine is 2-4 days, but can extend past 7 days depending on dosage, frequency of use, and testing methodology. The high confirmation rate for fentanyl in workplace urine drug testing at CRL indicates the importance of this testing for workplace safety; with the majority of workplace urine drug tests being conducted as pre-employment screens, the number of fentanyl positives generated from random drug tests was alarming. Trends in concurrent drug use with fentanyl were supported by the numbers of polydrug positives observed, especially the combinations with stimulants like amphetamine and methamphetamine. Fentanyl-opiate combination positives were lower than expected, considering the prevalence of fentanyl-adulterated heroin and counterfeit prescription opioid pills.

This study indicates that workplace urine fentanyl testing results reflect current patterns of concern in the opioid epidemic. CRL offers 1600 testing panels that include fentanyl, providing various cutoffs and accompanying analytes. With no foreseeable decline in fentanyl distribution and abuse, it is essential for employers to recognize the importance of fentanyl testing to workplace safety.

Table 1: Number of Single and Polydrug Positives by Collection Reason

	FOLLOW-UP	NOT SPECIFIED	OTHER	POST ACCIDENT	PRE-EMPLOYMENT	RANDOM	REASONABLE CAUSE	RETURN TO DUTY
5+	16	11	11	1	1	100	15	0
4	13	22	24	1	3	123	19	0
3	23	54	79	4	13	300	48	0
2	47	71	102	5	34	444	86	4
1	37	69	170	8	54	598	81	3
0	51	71	240	22	123	828	115	10

Figure I: Proportion of Single and Concurrent Drug Use by Collection Reason



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**DISCLOSURE**  
No relevant financial or nonfinancial relationships to disclose.

