

# Cross-sectional Study of Tampering in an Abuse-Deterrent Formulation of an Extended-Release Opioid in a Treatment Center Population

Jennifer Jewell, DrPH<sup>a</sup>, Joshua Black, PhD<sup>a</sup>, Matthew Ellis, PhD<sup>b</sup>, Heather Olsen, MPH<sup>a</sup>, Janetta Iwanicki, MD<sup>a</sup>, Richard Dart, MD PhD<sup>a</sup>

## INTRODUCTION

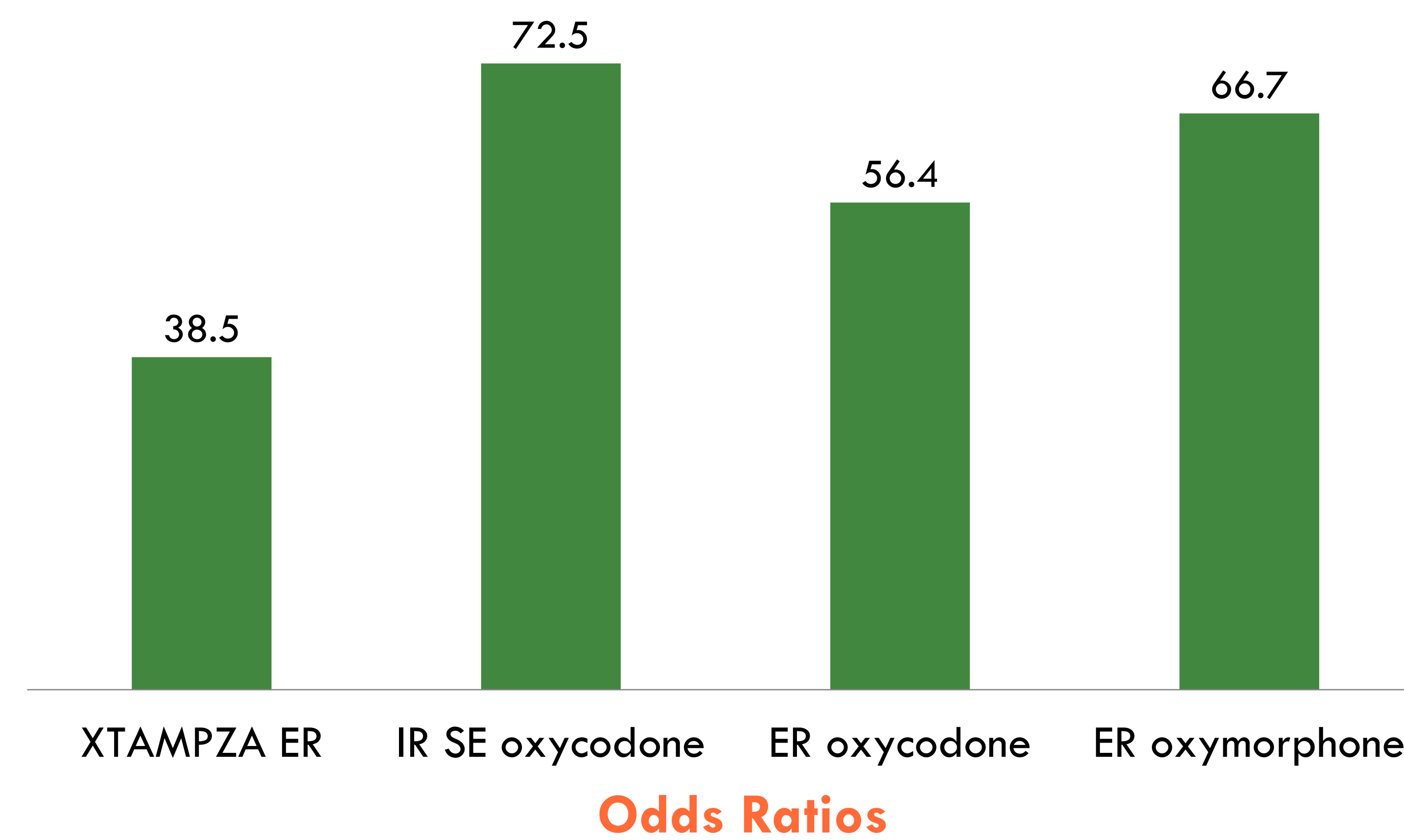
Opioid use disorders continue to plague many individuals even as misuse and abuse of prescription opioids have decreased. **Though prescription opioid abuse, in general, remains high among those with opioid use disorder (OUD), abuse of immediate-release (IR) and extended release (ER) formulations does not occur equally.** Though IR formulations have had higher rates of misuse, ER formulations have historically been physically tampered with and used via unintended methods which is associated with more severe medical outcomes. In response to the increased risks of manipulating ER formulations, pharmaceutical companies have developed abuse deterrent formulations (ADFs) for extended-release opioids. These formulations are designed to reduce a person's ability to easily tamper with a drug, and they present a barrier against the person using in a manner not intended by the drug manufacturer, which has been shown to dissuade some individuals from transitioning from oral use to non-oral use. While all ER oxycodone drugs now utilize ADFs to reduce tampering, there is still information to be gathered about their real-world utility. **The chemical formulation for XTAMPZA ER's ADF is oxycodone myristate, which keeps its extended-release properties even with tampering to the drug.** To test the effectiveness of XTAMPZA ER, its rate of tampering in a treatment center population was compared to immediate release (IR) single entity (SE) oxycodone, other ER oxycodone opioids, and ER oxymorphone.

To test the effectiveness of XTAMPZA ER, its rate of tampering in a treatment center population was compared to immediate release (IR) single entity (SE) oxycodone, other ER oxycodone opioids, and ER oxymorphone.

## METHODS

This cross-sectional study utilized data from the Treatment Center Programs Combined, which are included in the Researched Abuse, Diversion and Addiction-Related Surveillance (RADARS®) System. These data were collected between the third quarter of 2018 and the third quarter of 2021 from individuals upon entry into opioid treatment programs, and it included basic demographic data as well as drug history. **The 163 treatment centers participating in the study are nationally distributed throughout 46 states and the District of Columbia.** Both privately funded clinics and publicly funded opioid treatment programs participate. Surveys are self-administered and anonymous. Participants are asked about which drug products they used "to get high" in the past month and the route they used. Participants could have used more than one drug group during the study period. **Logistic regression was used to estimate odds of manipulating XTAMPZA ER compared to each drug comparator.**

Percent of Manipulation in Each Drug Category

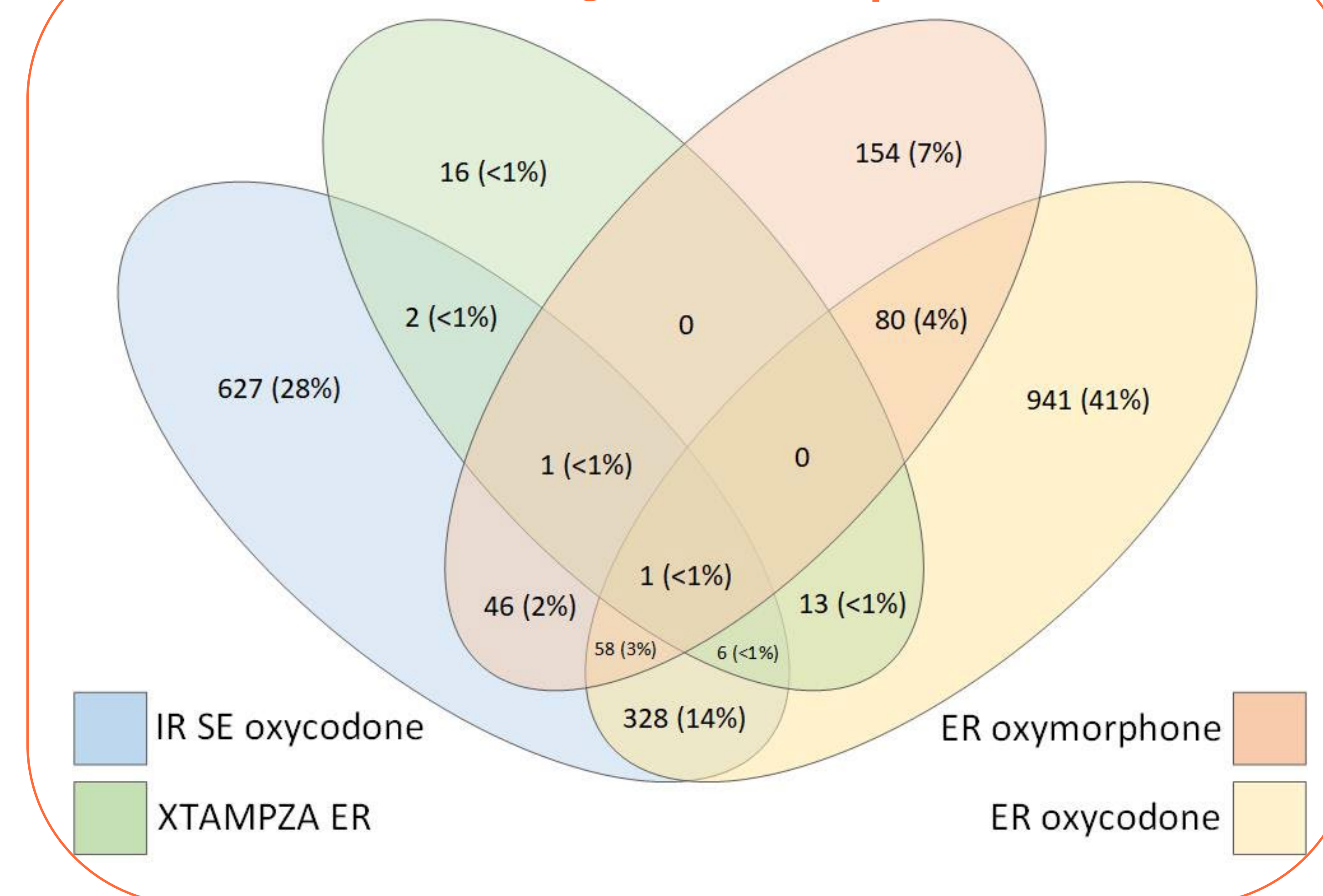


Odds Ratios

	Unadjusted Odds Ratios		Adjusted Odds Ratios <sup>a</sup>	
	OR	p-value	Adjusted OR	p-value
XTAMPZA ER vs IR SE oxycodone	0.23 (0.11,0.50)	0.0002	0.26 (0.12,0.56)	0.0007
XTAMPZA ER vs ER oxycodone	0.50 (0.24,1.03)	0.0612	0.52 (0.25,1.08)	0.0806
XTAMPZA ER vs ER oxymorphone	0.30 (0.14,0.67)	0.0038	0.32 (0.14,0.72)	0.0067

<sup>a</sup> Odds ratios were adjusted for age and gender.

Drug Use Overlap



## RESULTS

The participants in this study were 57.6% male and predominantly white (78.4%). The mean age was 36.7 (SD=9.9). Of the 2,273 participants, 35.2% had previously overdosed on an opioid, and 33.9% had never previously been in a substance abuse treatment program. Health care professionals made up 5.6% of the sample, and 3.1% were former active-duty armed forces personnel. **The highest percent of manipulation was seen in IR SE oxycodone (72.5%, 95% CI: 69.9, 74.9).** ER oxymorphone had the next highest rate at 66.7% (95% CI: 62.1, 71.2), followed by ER oxycodone with 56.4% (95% CI: 53.9, 58.8) and XTAMPZA ER with the lowest manipulation rate at 38.5% (95% CI: 23.4, 55.4). **Overlap among the categories of drug manipulation was high.** Only 16 individuals (<1%) tampered with XTAMPZA ER alone, while 941 individuals (41%) tampered with ER oxycodone alone. Those that tampered with both IR SE oxycodone and ER oxycodone made up 14% (N=328) of the sample. Logistic regression analyses found that **XTAMPZA ER had lower odds of manipulation when compared to both IR SE oxycodone (OR=0.23 [0.11, 0.50], p=0.0002) and ER oxymorphone (OR=0.30 [0.14, 0.67], p=0.0038).** **XTAMPZA ER was not significantly different from other ER oxycodone opioids (OR=0.5 [0.24, 1.03], p=0.0612).** These findings did not change when the estimates were adjusted for age and gender.

XTAMPZA ER had lower odds of manipulation when compared to both IR SE oxycodone and ER oxymorphone; however, it was not significantly different from other ER oxycodone opioids.

## CONCLUSIONS

**The results of this study provide community-based, real-world evidence of the abuse deterrence of the XTAMPZA ER formulation.** These findings also provide additional post-market evidence of the real-world utility of ADF opioids. Though the estimated odds ratio was notable, no significant difference was observed between the two types of abuse-deterrent oxycodone products. This suggests that individual abuse-deterrent technologies could result in different reductions in abuse, but, due to the rarity of manipulation of XTAMPZA ER, this study was insufficiently powered to detect smaller effects. This finding highlights a need to evaluate each individual ADF technology separately.

The RADARS System is supported by subscriptions from pharmaceutical manufacturers, government and non-government agencies for surveillance, research and reporting services. RADARS System is the property of Denver Health and Hospital Authority, a political subdivision of the State of Colorado. Denver Health retains exclusive ownership of all data, databases and systems. This work was supported by Collegium Pharmaceutical. Collegium did not participate in the analysis or drafting this abstract. Collegium reviewed only for proprietary information.

<sup>a</sup> Rocky Mountain Poison and Drug Safety, Denver Health and Hospital Authority, 1391 Speer Blvd UNIT 600, Denver, CO 80204

<sup>b</sup> Department of Psychiatry, School of Medicine, Washington University in St. Louis, 660 S Euclid Ave, St. Louis, MO 63110