



Nonmedical Prescription and Illicit Opioid Use: Surveillance issues in the National Survey of Drug Use and Health and Other Data

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The Researched Abuse, Diversion and Addiction-Related Surveillance (RADARS®) System

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Today's Talk: Overview

Identify the issues involved with Post-Market Surveillance using national data like NSDUH

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How to lie with statistics to prove your point!

Key Discussion Points

Question: What types of systems are best for early indicators of specific products and usage patterns of Rx misuse?

***multi-component systems like RADARS model**

Question: What non-Rx abuse indicators are relevant?

In EU: NICE requirements and estimates of social value of NDA

In US: long-term health and social consequences rarely considered, exception is heroin?

Question: How can we capture new trends using cost-effective methods?

Why do we care?

The New York Times

Heroin Epidemic Is Yielding to a Deadlier Cousin: Fentanyl



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Impact often related to non-branded medications, like tranquilizers/benzos

Heroin and Nonmedical Prescription Drug Use

- NSDUH is a congressionally mandated survey, to estimate the prevalence of substance abuse as a ***nation as a whole***
- ***The Public Use File (PUF)*** is a masked file that protects against the identify of a respondent, such as: limited geographic identifiers, restricted age identifiers. Lower raw cases than restricted file and re-weighted to protect identifies of respondents
- Periodically, SAMHSA opens a call for restricted use data to be released under the highest level of protection and oversight.
- ***Online Data Portal***, data reviews, and short reports authored by SAMHSA provide information on relevant prescription drug use in the United States.

The National Household Survey on Drug Abuse

- The survey has undergone several design changes over the past several decades, such as the NHSDA to NSDUH (2002,2004)
- These changes cause fundamental break in SAMHSA's ability to draw trends over time. Major change involved a redesign to sample more homeless/marginally housed populations
- Several studies have argued that NSDUH may undercount substance use in the US by as much as 25% (See Kilmer et al. 2012). Undercoverage error and/or reporting error
- State and sub-state identifiers are tricky due to disclosure limitations and the “stretching” of data to an unsupportable estimate (RSE>50%)
- Sample: 4 repeated replicates per year; also pair subsample

Heroin and Nonmedical Prescription Drug Use

- Need for surveillance data to monitor:
 - Prevalence of Substance Use in General Population
 - Trends of specific drugs in the General Population
 - Adverse events or public health crises linked to:
 - Fentanyl (Deaths linked to counterfeit medications in NorCAL)
 - Opana and HIV (Indiana)
 - Zohydro (the crisis that wasn't)
 - OxyContin (OC prior to reformulation to OP in 2010)
 - The NSDUH is congressionally mandated to provide annual prevalence estimates for the *nation as a whole*. Data are also used to update state requests for the Substance Abuse Block Grant Applications
 - *Governed by OMB for privacy and research integrity, and privacy disclosures*
 - *Limited on type of information that can be produced*

Some Brief Issues to Consider

The NSDUH has limited utility for studying abuse and/or dependence

- *Best for estimating the prevalence of current need for treatment, but abuse/dependence does not ask about lifetime, only past year.*
- *Persons with lifetime AB/DEP are often counted as Never Users/Past Users*

Low Event Rates: If relative standard error is greater than 50% of the estimate, then you have an unreliable estimate.

- *Low prevalence outcomes like heroin use and sub-group analyses*

NMPOU versus NMPAU?

Why do we need the weights and standard error adjustments?

- *Weights allow for an estimate to generalize the population of interest.*
- *“estimate of NMPOU should be adjusted for age, sex, and race”*
- *Debate of whether you need aOR*

I GET DIFFERENT RESULTS BASED ON MY PROCEDURES

- All packages should use the same weight procedure, estimates of means are unbiased
- Inference tests are biased depending on procedures used:
 - Jackknife Repeated Replicate (JRR): Compute variance components by subtracting each and averaging across $k-1$ clusters
 - Generalized Estimating Equation (GEE): linearize (Taylor-Series)

Statistical packages differ in handling of complex survey data:

Handling of cluster and strata variance components

Single strata—exclude them or deviance from grand mean?

Stratification: often people with just select out persons but need a SUBPOP statement

NSDUH and Prescription Drug Use

- NSDUH often criticized for being overly inclusive of definition of Rx Misuse, Abuse, and Diversion.
- Until recently, nonmedical use:
 - “drug was not prescribed for you”
 - “you took the drug only for experience or feeling it caused”
- Redesign in 2015:
 - Focus moved from lifetime time frame to 12 month timeframe
 - Redesign to any use then questions of misuse and then specific behaviors that indicate misuse; gather information on specific drugs based on active pharmacological ingredients (buprenorphine), but not branded (e.g., Suboxone versus Bunavail)
 - Using it without a prescription of your own, altering dosage, or way not prescribed doctor.

NSDUH WRITE-IN Process

NSDUH allows for “write in”

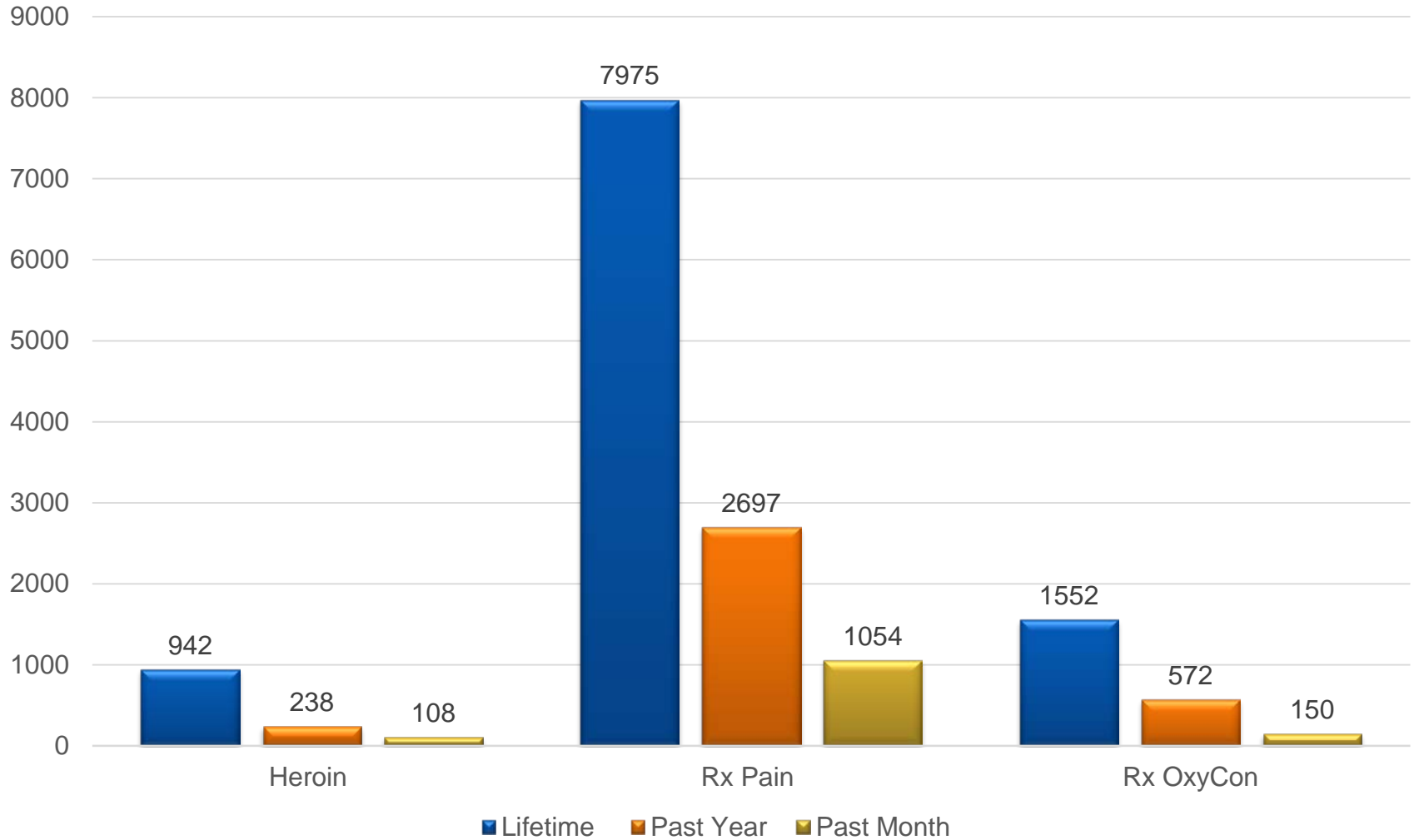
2014: In PUF-149 different mentions of 923 different events.

Translates to 5% of all NMPAUs

- Mentions include:
- Legit (Hydrocodone)
- Branded (Tramadol, Kadian, Avinza)
- New Trends (Gabapentin)
- Street Names (Roxies)
- OTC (Tylenol PM)
- Other related drug (Zoloft)
- Other drug (THC, marinol)
- Hmmm: (Midol and Pepto Bismol, Lamisil)
- ?? (7-14)

In PUF documentation—explains recoding process.

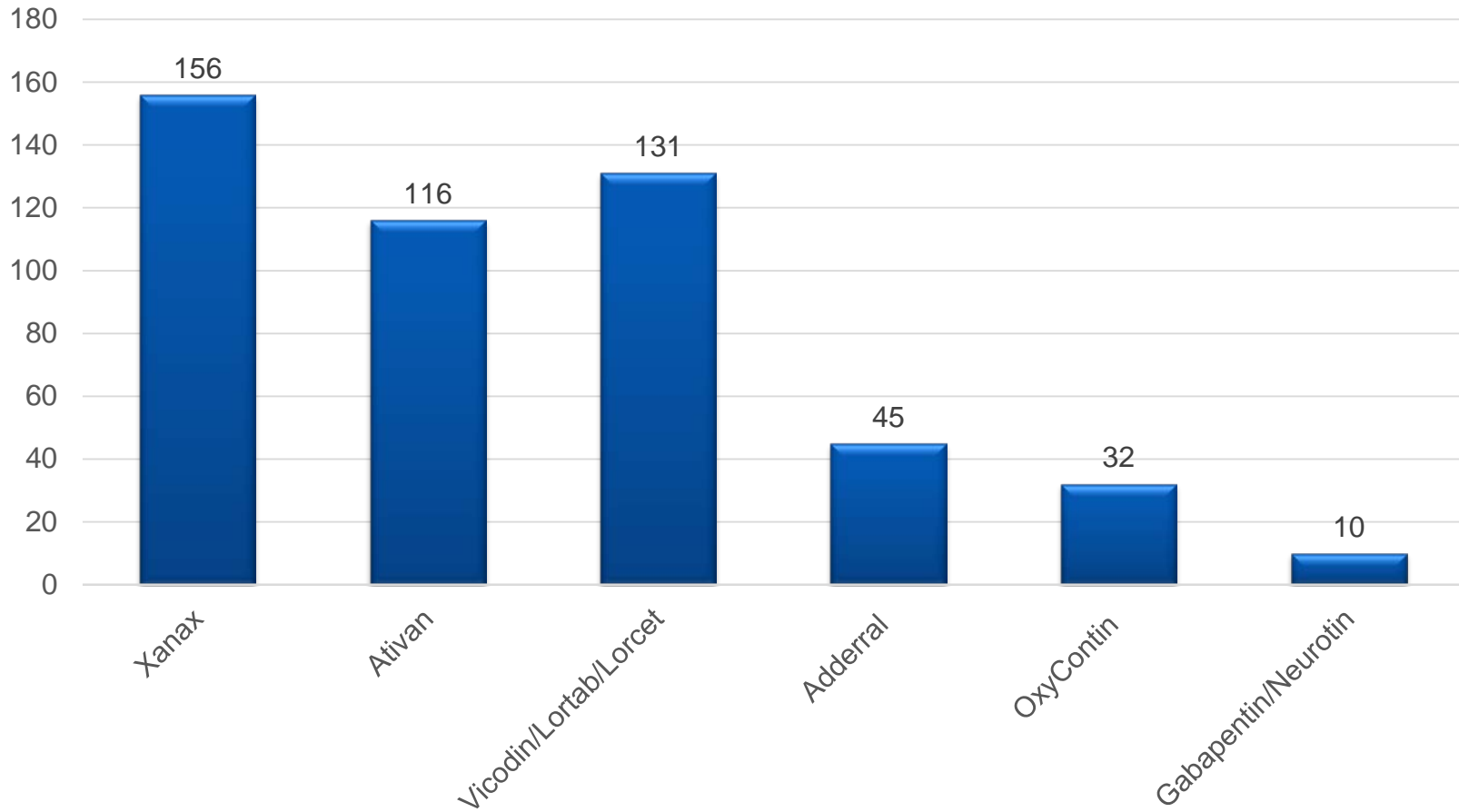
Statistical Power: Number of Cases is Important



2014 NSDUH PUF (raw cases)

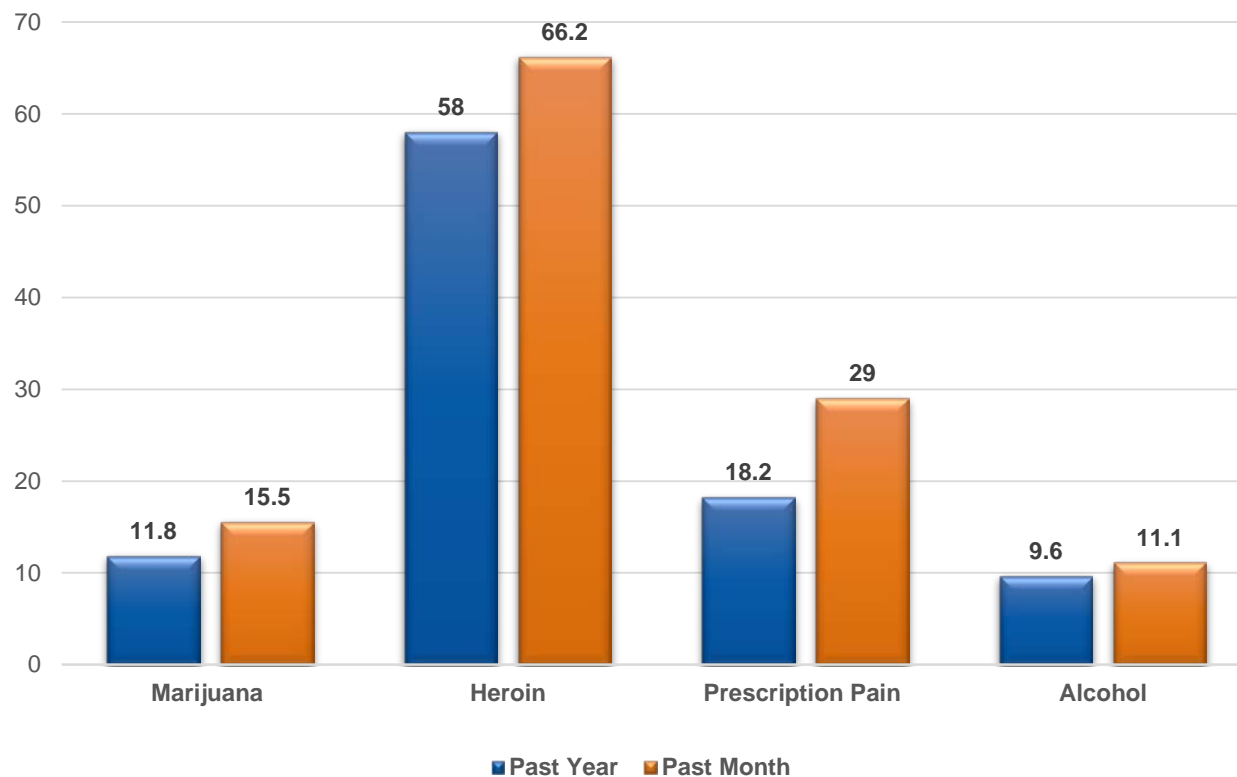
Measurement Error

Most NMPAU Common Mentions 2014 NSDUH

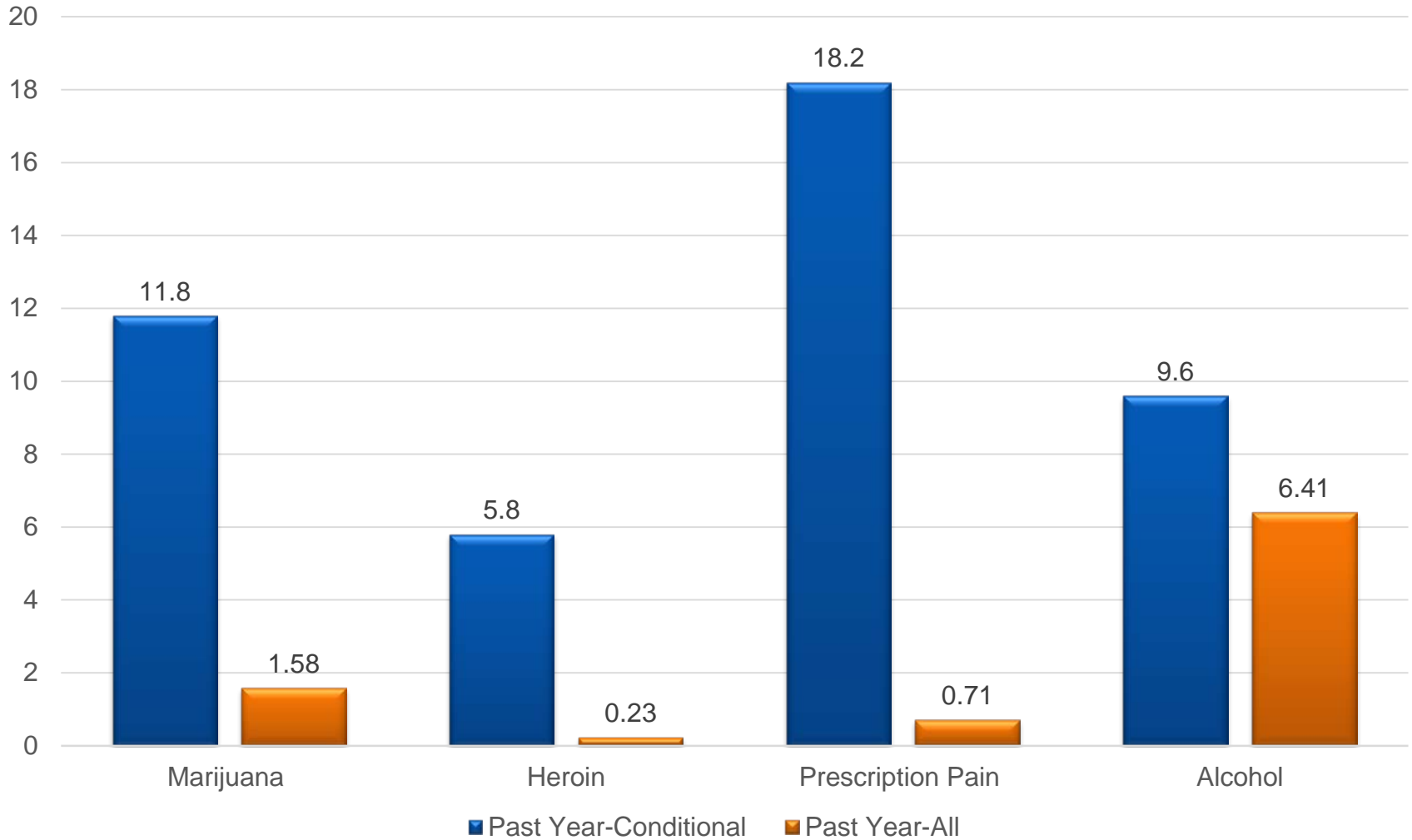


How Big is the Problem of Disordered Use?

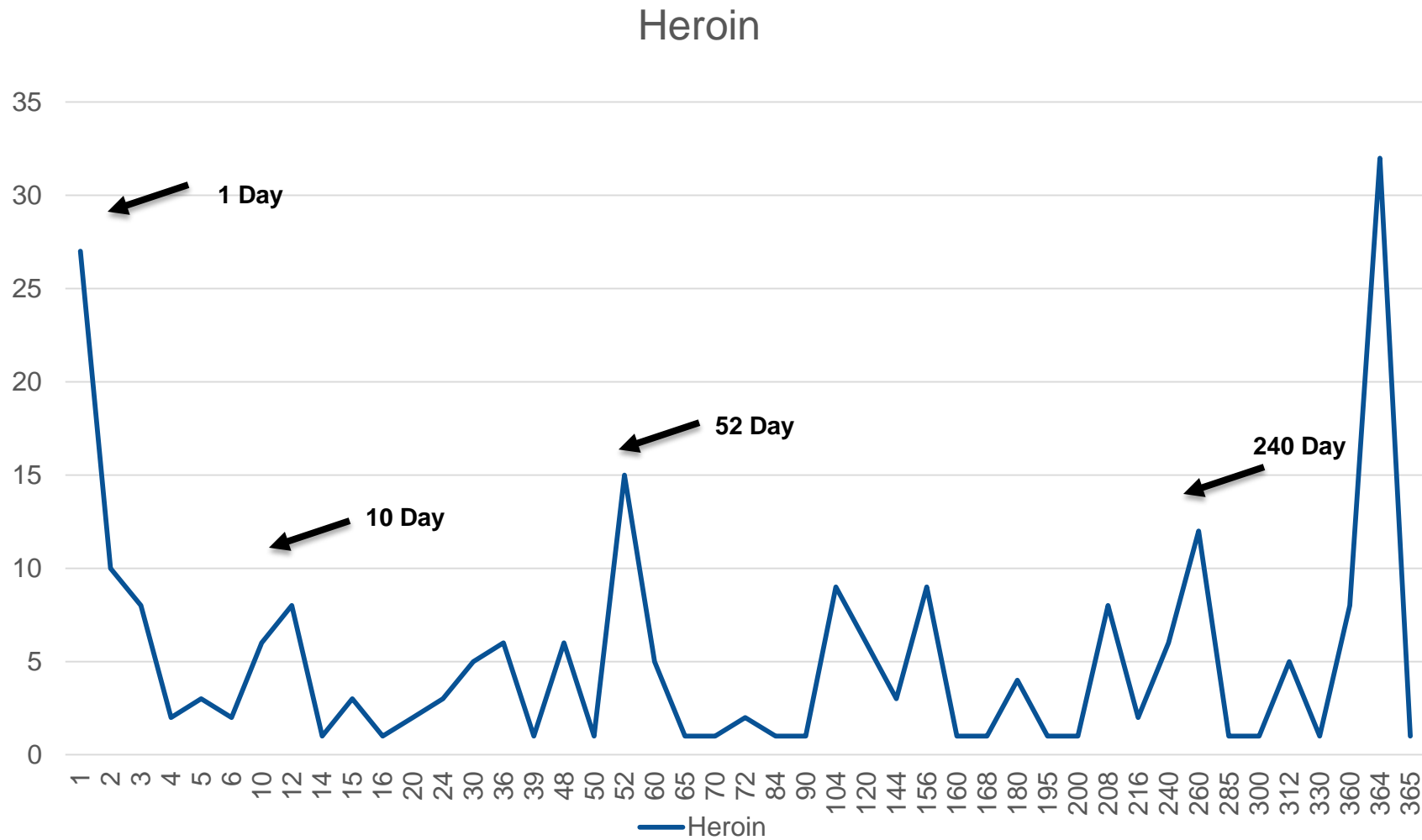
- Ways of Conditional Exposure can Change Perception of Outcome
 - Lifetime
 - Past Year
 - Past Month (Current and often viewed as most accurate because of recall)



Comparison of Prevalence of Disordered Use by Unadjusted and Conditional Prevalence Methods

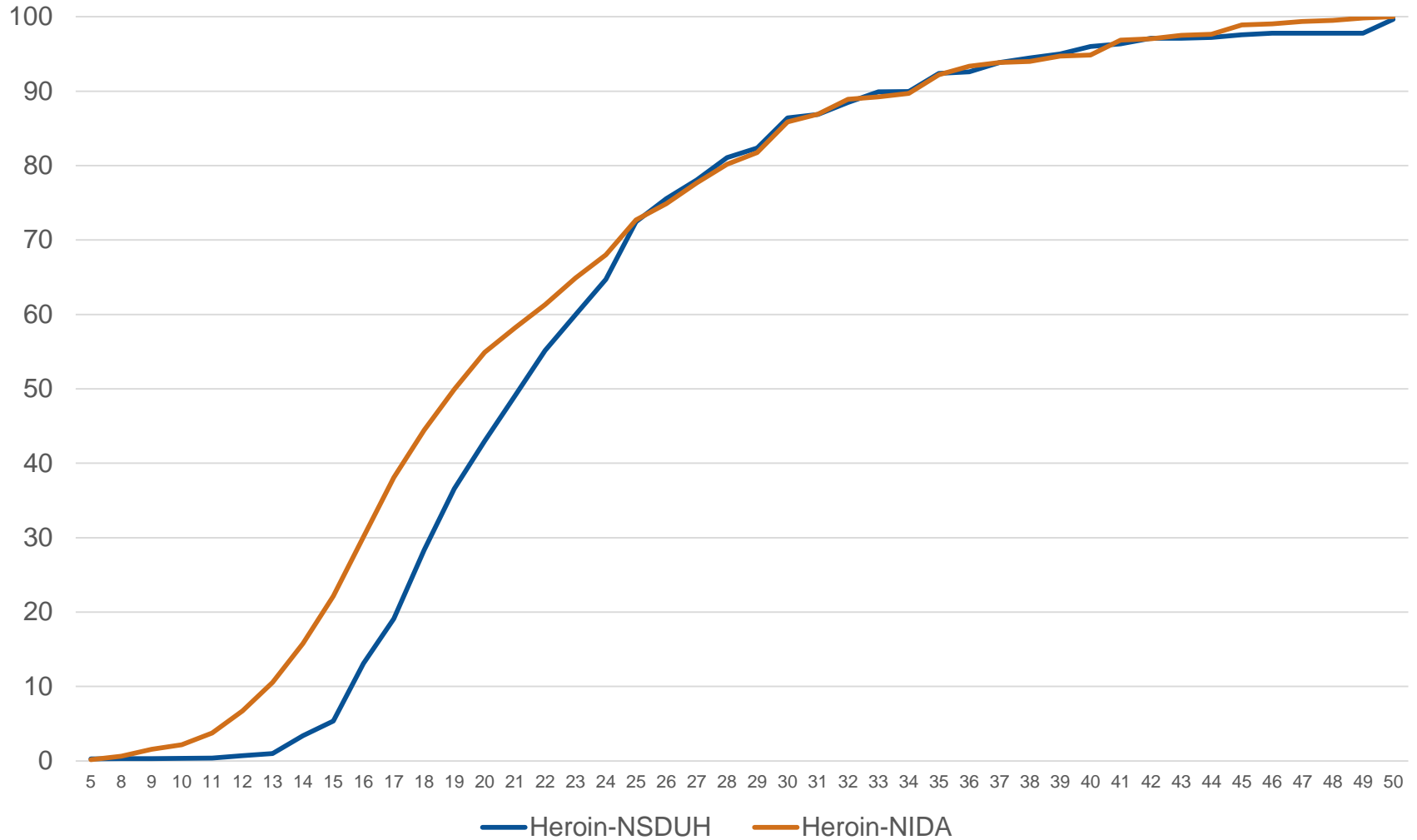


Recall for number of days used Heroin: 2014 NSDUH



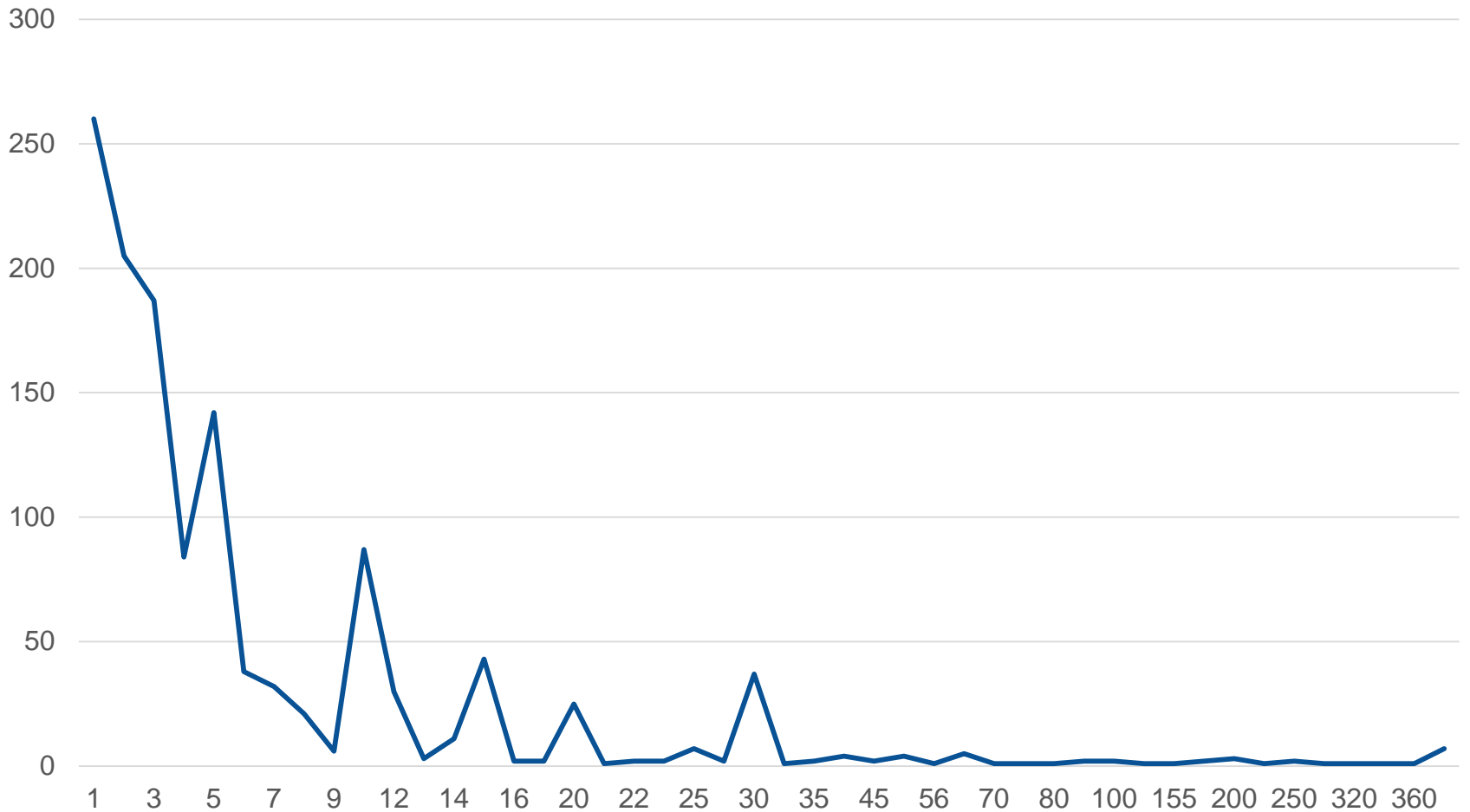
Note: n=232; Source 2014 NSDUH PUF

CDF in Age of Onset: 2014 NSDUH and 2010 NIDA



Recall for number of days used Prescription Pain Reliever

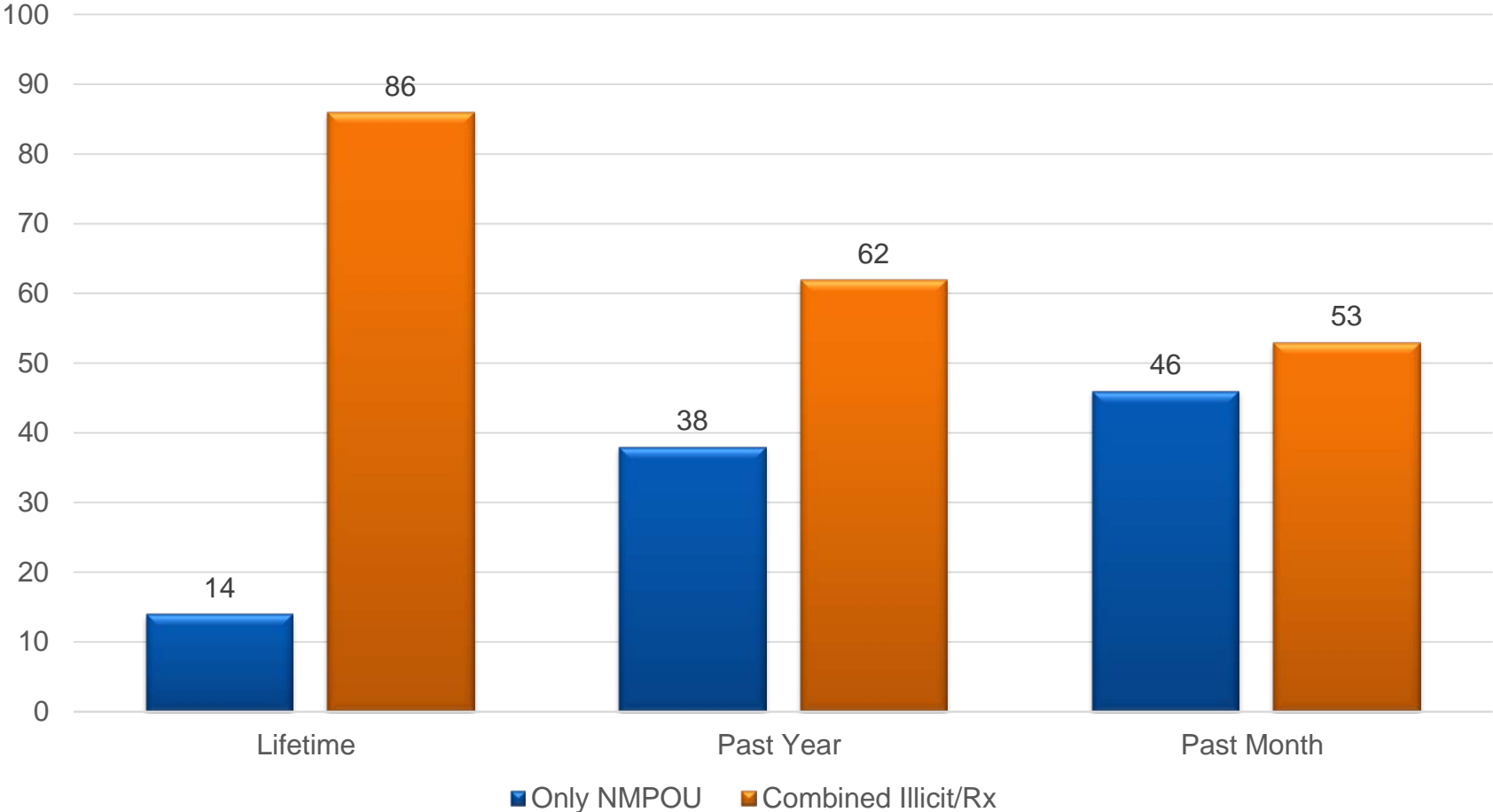
Frequency of Cases by Number of Days



Note: n=1276; Source 2014 NSDUH PUF

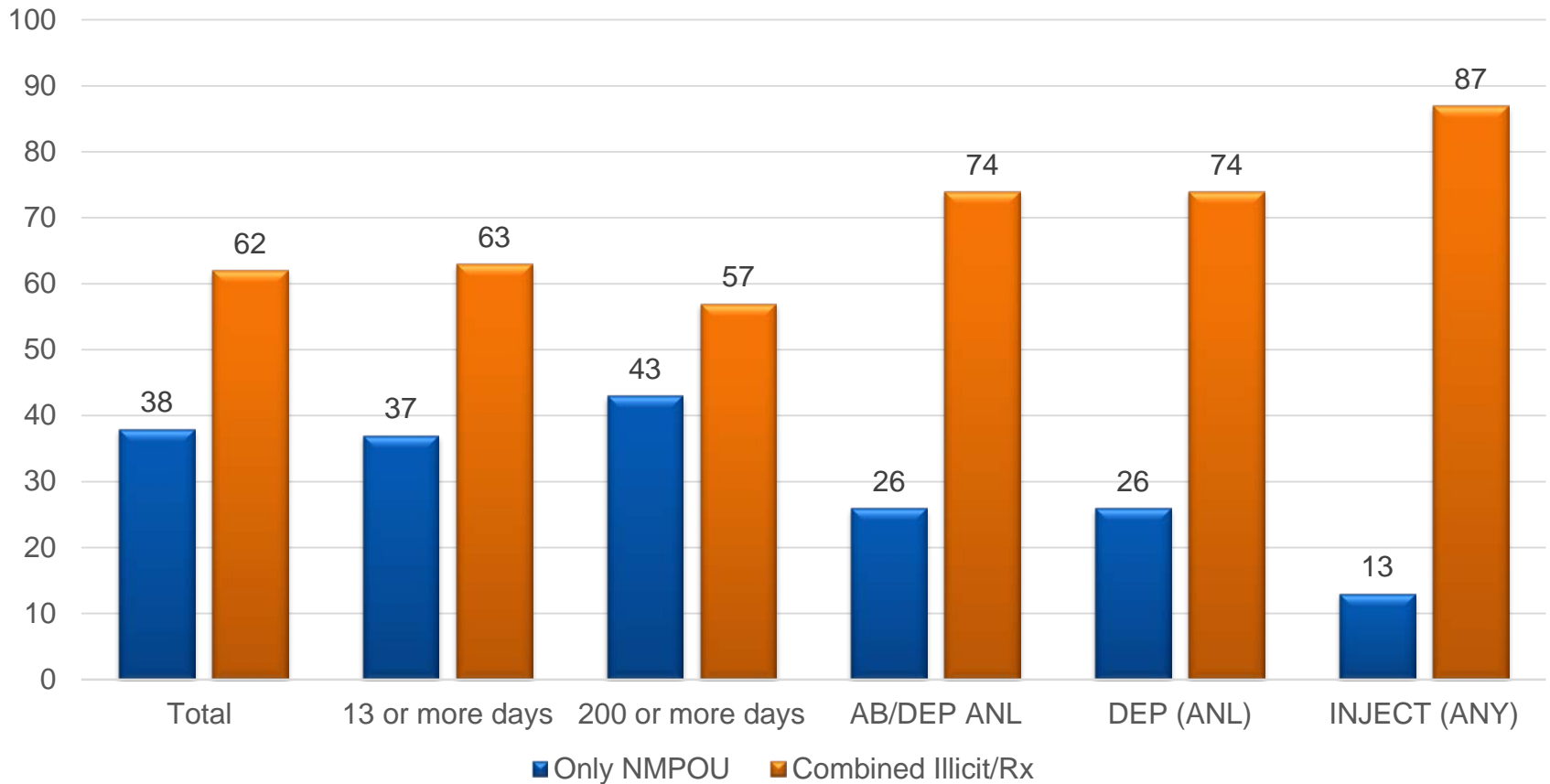
Who's really at risk?

Percent of NMPAUs Engaging in Poly-Drug Use



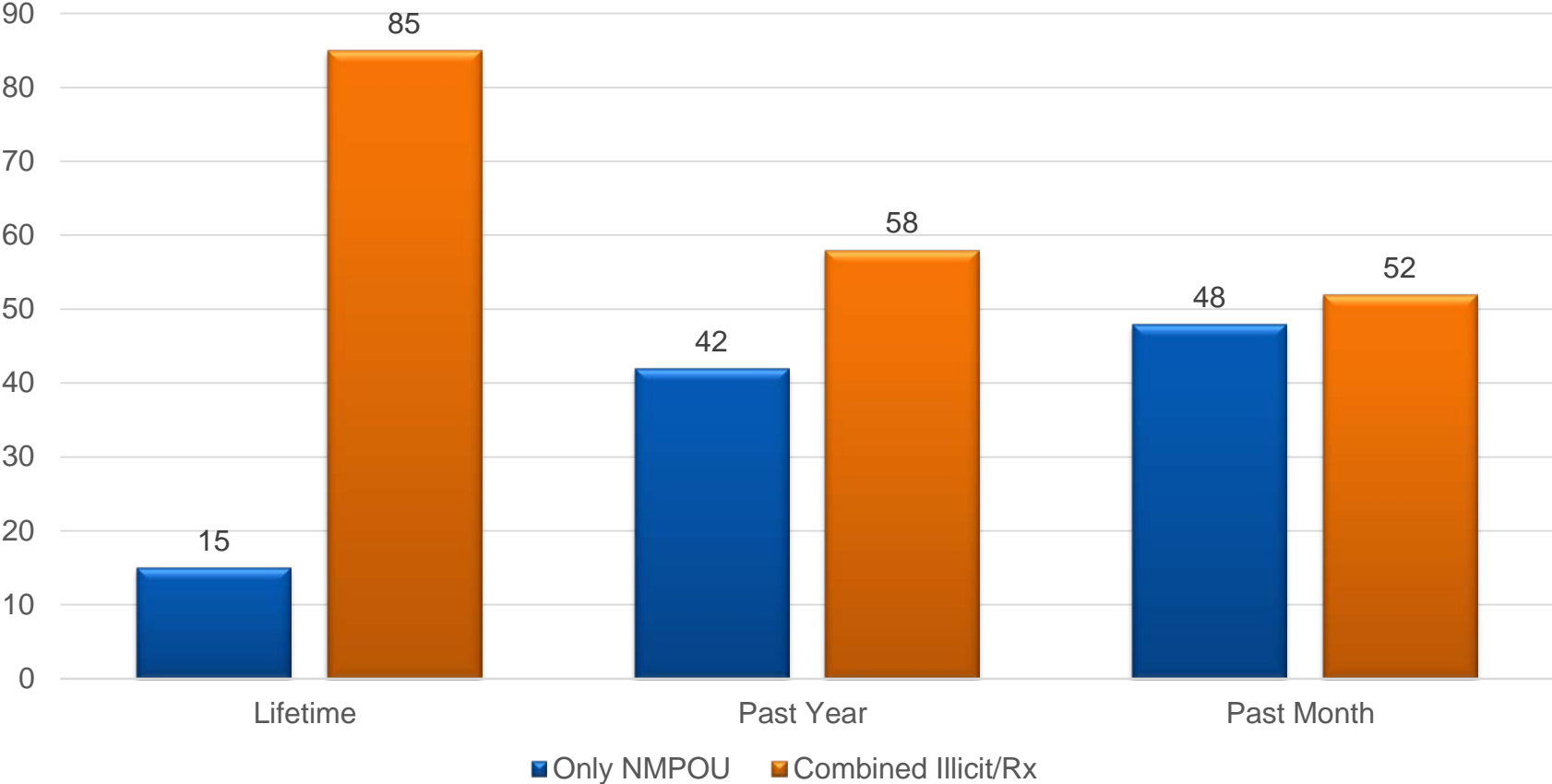
Who's really at risk?

Percent of PY NMPAUs Engaging in Poly-Drug Use



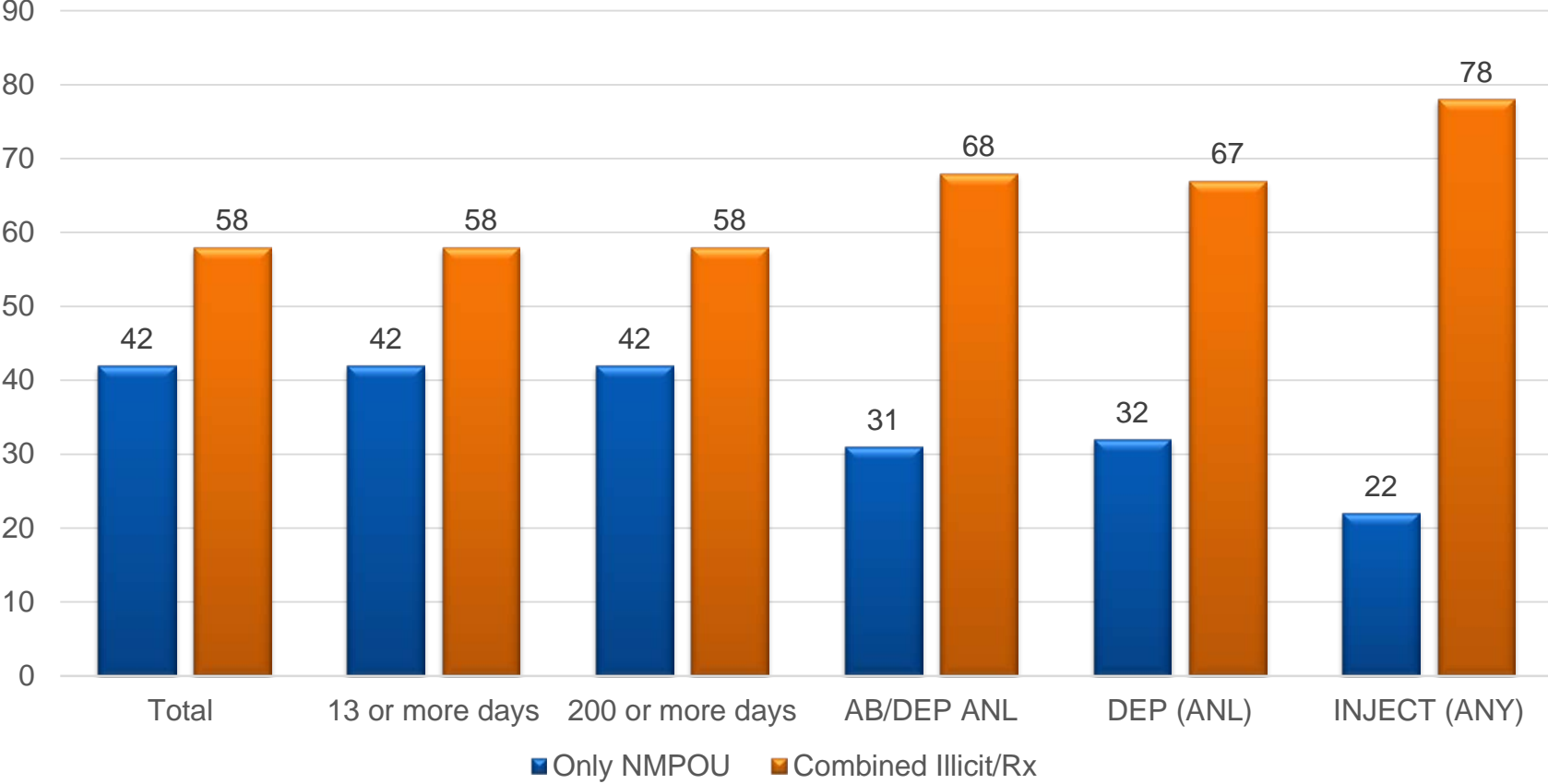
Who's really at risk?

Percent of NMPAUs Engaging in Poly-Drug Use; HEROIN NAÏVE

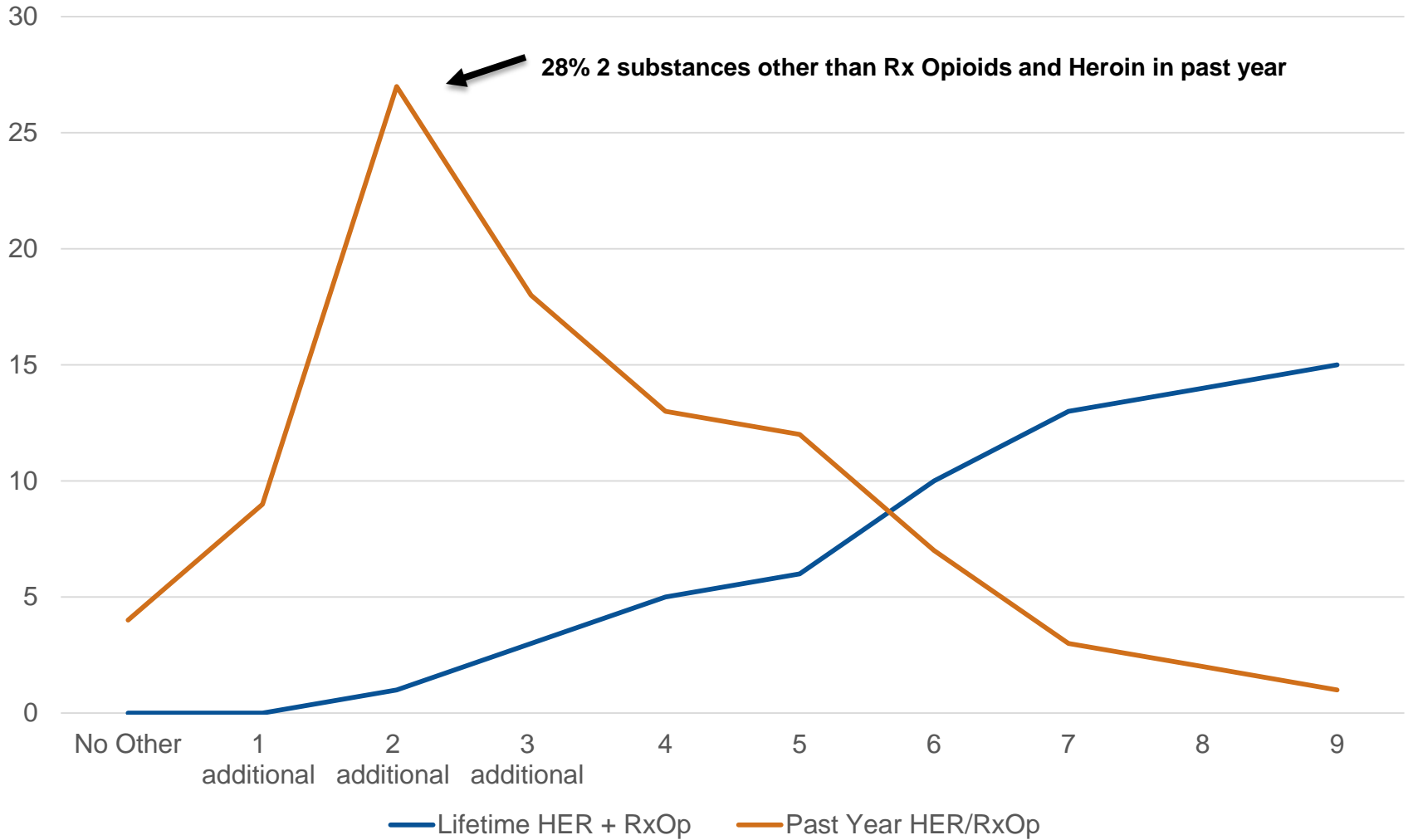


Who's really at risk?

Percent of NMPAUs Engaging in Poly-Drug Use BUT HEROIN



Characteristics of Heroin Initiates (Percent by Number)



Brief Summary

- **NMPAUs engage in multiple domains of substance use**
- **Heroin initiates have lengthy histories of SUD beyond rx drugs, including mental disorders**
- **How can we access national and regional populations of abusers?**

How to Access the Population of Abusers?

- From 2010-12 NIDA-PWID Study (SF/CA):
 - 80% of PWIDS reported ever accessing the Internet
 - 50% of PWIDS had active e-mail account (most access through Library)
 - Only 6% of those with an active e-mail account never checked it.
 - 40% of those with an active e-mail account checked it daily
 - 90% had no trouble sharing private information like sexual history and drug use
 - 80% had a working cell phone in the past 6 months
 - Of those with a working cell phone, 76% received text messages
 - 36% of those with a working cell phone had it stolen, 20% sold it, 44% lost
 - 33% of those interviewed were “under the influence at the time of the interview”

How good are Internet Panels?

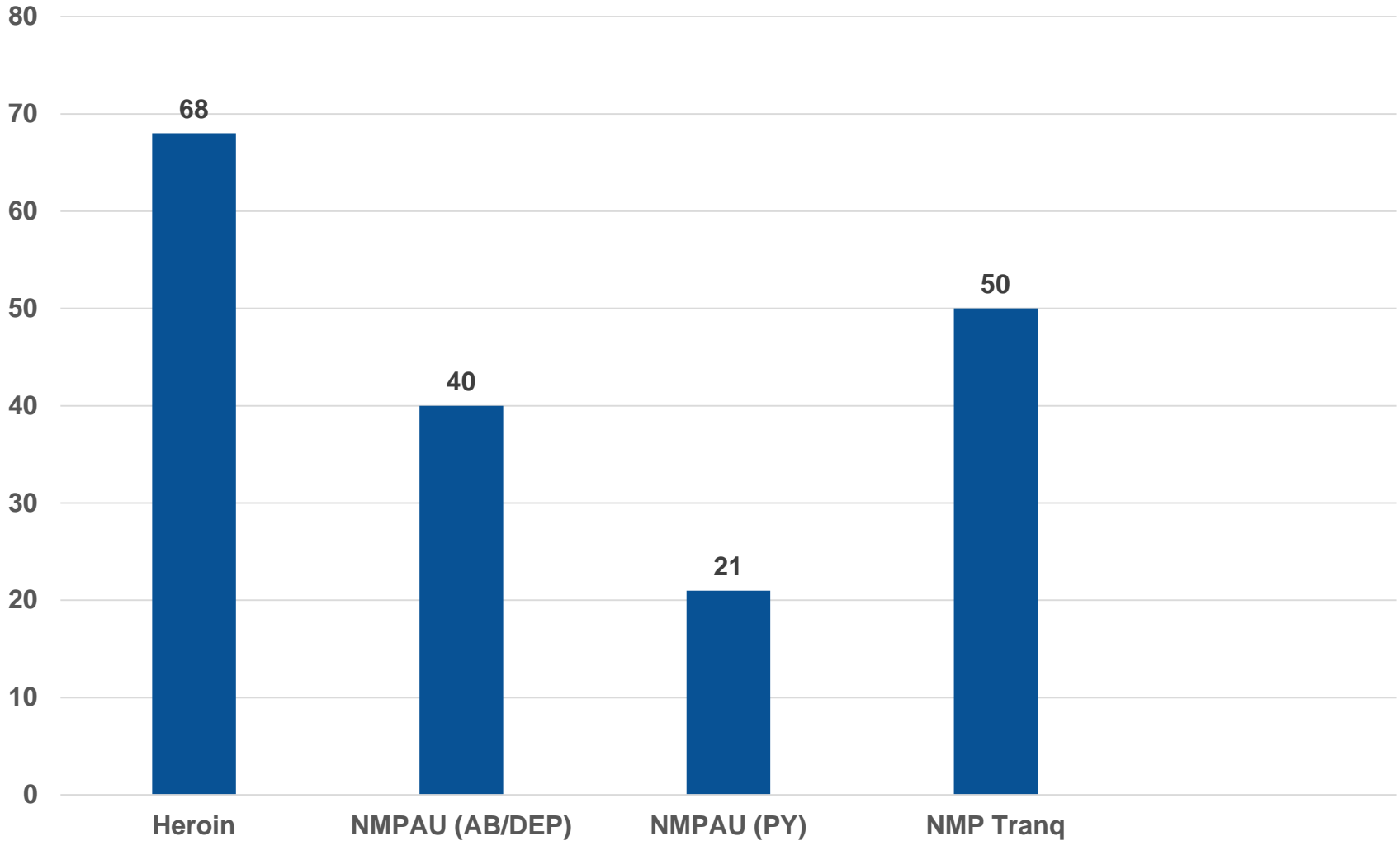
Lifetime Drug Use	2005 Diversion N=4,297	2005 NSDUH PUF N=32,104	P-Value
Marijuana	57 (1.8)	53 (0.5)	.05
Cocaine	23 (2.0)	20 (0.3)	.08
Rx stim	4 (0.8)	4 (0.1)	.66
Ritalin	4 (0.8)	3 (0.6)	.09
Dextroamphetamine	0.6 (0.3)	0.2(0.1)	.10
Supraval	0.11 (0.1)		
Darnital	0.10 (0.1)		

Used national data on nicotine to weight the internet panel data post-hoc

Transitive theorem: find a variable highly related to outcome (Rx stim) as a benchmark. If know prevalence of that variable, and correlation to target of interest (Rx Stim) you can weight and then other variables (products) will exhibit lower bias, but remain inefficient (wider 95% C.I.)

Surveillance Using Drug Treatment Centers

Percent of Substance Use in Past Year by Treatment (Alc/Drug)



Summary

- Methodological challenges in national data sources
- Rx abuse and heroin drive by a life-course history, rather than specific exposure (e.g. prescription for pain via iatrogenic addiction)
- Post-Marketing Surveillance of therapeutic classes and specific drugs will be easier with NSDUH redesign, but new methods are needed to capture new and emerging products and behaviors (non-injection routes of tampering)
- Non-probability methods and enriched population surveillance methods (e.g., substance abuse treatment centers) have utility for estimating early trends and relationships to key variables of interest

More Information

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