Reimagining substance use treatment from the ED.

RAMS Research Webinar

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MARCH 21, 2024

EM Residency in Philadelphia

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Poisoning deaths were declining

Figure 1. Overdose death attributed to only cocaine-only, opiates-only and both cocaine and opiate among 15-64 year olds in NYC, 1990-2000

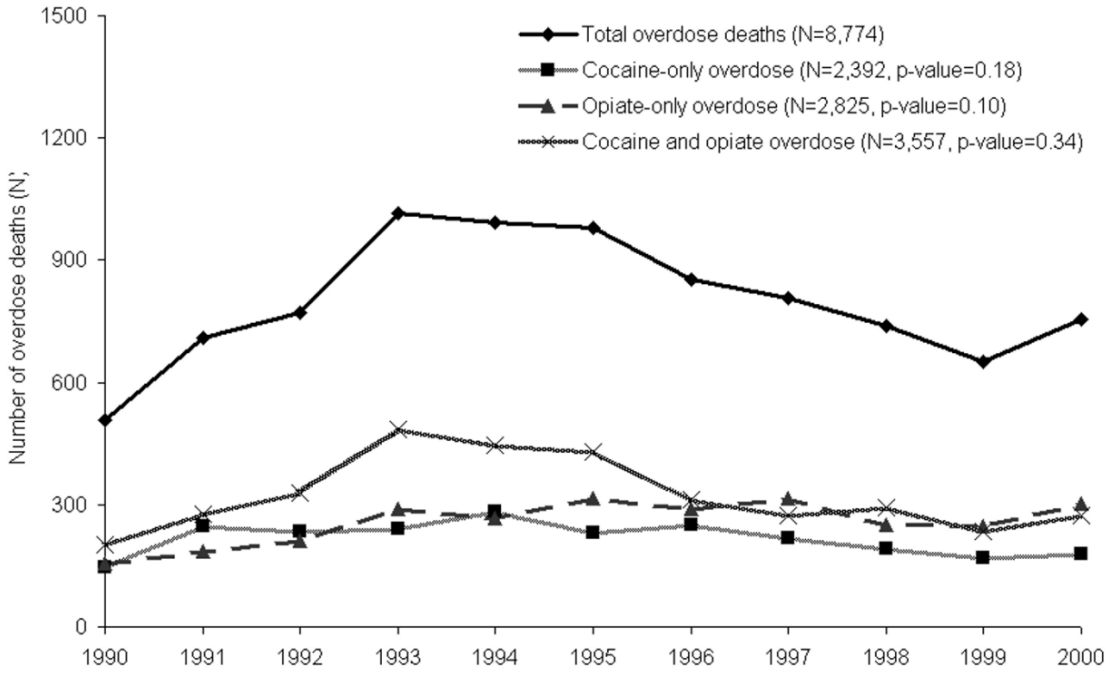


Figure 1
Overdose death attributed to only cocaine-only and opiate only among 15–64 year olds in NYC, 1990–2000 (N = 8,774). Cocaine only overdose deaths were decedents in which cocaine (not in the presence of opiates) was the cause of death; other drugs (except opiates) may also have been contributors of cause of death; Opiate only overdose deaths were decedents in which opiates (without the presence of cocaine) were the cause of death; other drugs (except cocaine) may also have been contributors of cause of death. Cocaine and opiate overdose deaths refers to overdose deaths in which both cocaine and opiates were the cause of death; other drugs may also have been contributors of cause of death.

Poison prevention was working-pediatric deaths declined to under 100/year

Resuscitations were improving –TCA's, APAP/ NAC

"Tox" teaching—great niche, great stories, great saves—published many case reports and few studies

COMMENTARY

JAMA®
The Journal of the American Medical Association

Can Prescription Drug Monitoring Programs Help Limit Opioid Abuse?

Hallam M. Cugelmann, MD, MPH
Jeanmarie Perrone, MD

PRIMARY CARE PHYSICIANS, EMERGENCY PHYSICIANS, oncologists, orthopedic surgeons, and other physicians are at the frontline of providing pain therapy for patients with acute illness and rescue treatments for patients with exacerbations of chronic pain. Increasingly, this role is compromised by concerns about the prevalence of opioid abuse and diversion of prescribed medications from the intended patient to others who abuse opioids. Individual use of prescription opioids increased 402% from 1997 to 2007.[1] This increase in opioid prescribing parallels substantial increases in opioid addiction, fatal overdoses, and diversion of these drugs for recreational or nonmedical use.[2] In 2007, opioid overdose was the second leading cause of unintentional deaths in the United States after motor vehicle collisions. Fatalities associated with prescription drug use are more numerous than deaths from cocaine and heroin combined.[3]

Prescription Drug Monitoring Programs

studies demonstrate other benefits associated with prescriber-accessible monitoring programs. In a 2010 prospective study of 179 clinical records reviewed in Ohio's database, real-time access to patient-specific records changed practitioners' opioid prescription practices in 41% of interactions. Accessing the drug monitoring program database resulted in decreased or no opioid prescriptions following 61% of the queries yet an increase in the remaining 39%.[6] These results indicate that the targeted use of drug monitoring programs by prescribers does not result in indiscriminately decreased administration of pain medications.

The same study also illustrates drug diversion and physician shopping. Individual patients filled from 0 to 128 opioid prescriptions in a 12-month period, with prescriptions in some cases obtained from up to 40 different clinicians. Real-time access to this information—rarely volunteered by patients—could facilitate a more deliberate, patient-specific approach to opioid misuse.

Patients who obtain prescriptions through multiple prescribers are not just a source of frustration for prescribers; this behavior also may be associated with impending overdose[7] and an increased volume of opioids circulating in communities.

JAMA 2011; 306: 2258-9.

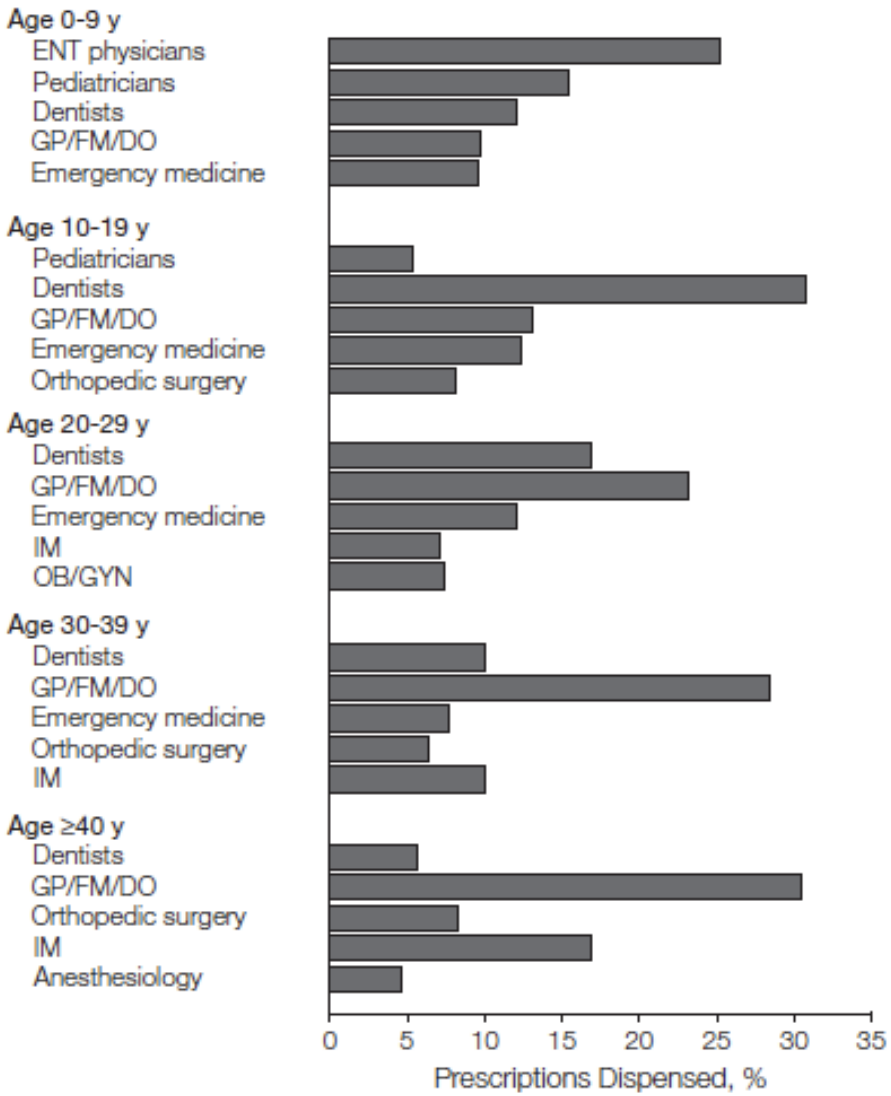
Prescriber Education

ED “4 packs” oxycodone

35% reduction sustained due to provider education

Gugelmann H: Multidisciplinary intervention decreases the use of opioid medication from two urban EDs. AmJ Emerg Med 2013; 31:1343

Figure 1. Percentage of Prescriptions Dispensed for Opioid Analgesics From Outpatient US Retail Pharmacies by Age and Physician Specialty, 2009



Volkow et al. JAMA, 2011; 305: 1299

Opioid Prescribing in a Cross Section of US Emergency Departments

Jason A. Hoppe, DO; Lewis S. Nelson, MD; Jeanmarie Perrone, MD; Scott G. Weiner, MD, MPH*; for the Prescribing Opioids Safely in the Emergency Department (POSED) Study Investigators†

*Corresponding Author. E-mail: sgweiner@partners.org, Twitter: @ScottWeinerMD.

Results: During the study week, 27,516 patient visits were evaluated in the consortium EDs; 19,321 patients (70.2%) were discharged and 3,284 (11.9% of all patients and 17.0% of discharged patients) received an opioid pain reliever prescription. For patients prescribed an opioid pain reliever, mean age was 41 years (SD 14 years) and 1,694 (51.6%) were women. Mean initial pain score was 7.7 (SD 2.4). The most common diagnoses associated with opioid pain reliever prescribing were back pain (10.2%), abdominal pain (10.1%), and extremity fracture (7.1%) or sprain (6.5%). The most common opioid pain relievers prescribed were oxycodone (52.3%), hydrocodone (40.9%), and codeine (4.8%). Greater than 99% of pain relievers were immediate release and 90.0% were combination preparations, and the mean and median number of pills was 16.6 (SD 7.6) and 15 (interquartile range 12 to 20), respectively.

Conclusion: In a study of ED patients treated during a single week across the country, 17% of discharged patients were prescribed opioid pain relievers. The majority of the prescriptions had small pill counts and almost exclusively immediate-release formulations. [Ann Emerg Med. 2015;■:1-7.]

Hoppe JA, Nelson LS, Perrone J: Prescribing Opioids Safely in the ED (POSED) Study Investigators. Opioid prescribing in a cross section of US EDs. Ann Emerg Med. 2015 :233-4.

Prescribe and Dispense Naloxone (Narcan)

Jennifer Love, Bach Fund Grant 2015 PPMC

How would you study the impact of ED naloxone distribution?

Prescribe and Dispense Naloxone (Narcan)

Lowenstein M, Sangha HK, Spadaro A, Perrone J, Delgado MK, Agarwal AK. Patient perspectives on naloxone receipt in the emergency department: a qualitative exploration. Harm Reduct J. 2022 ;19:97.

Spadaro A, Agarwal AK, Sangha HK, Perrone J, Delgado MK, Lowenstein M. Motivation to Carry Naloxone: A Qualitative Analysis of Emergency Department Patients. Am J Health Promot. 2023;37:200-209.

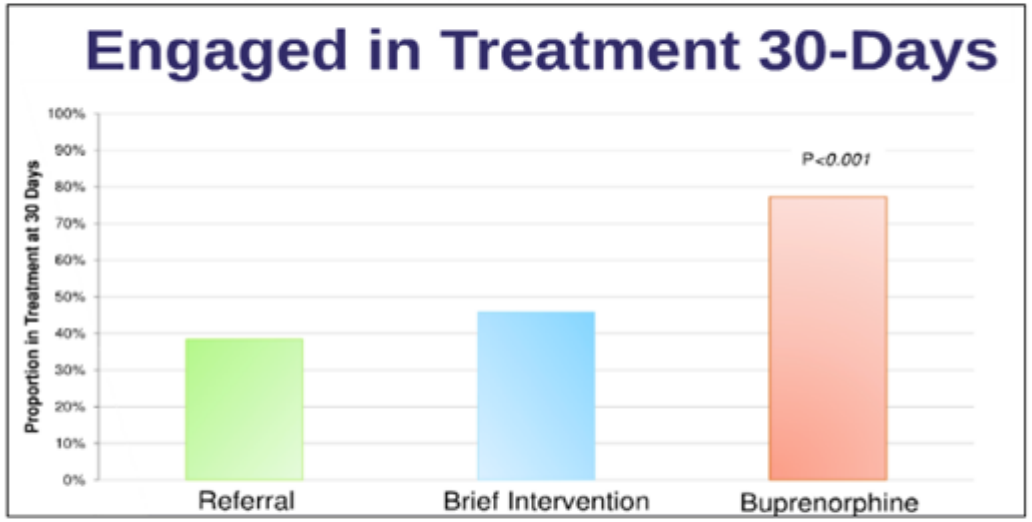
Agarwal AK, Sangha HK, Spadaro A, Gonzales R, Perrone J, Delgado MK, Lowenstein M. Assessment of Patient-Reported Naloxone Acquisition and Carrying With an Automated Text Messaging System After Emergency Department Discharge in Philadelphia. JAMA Netw Open. 2022 Mar

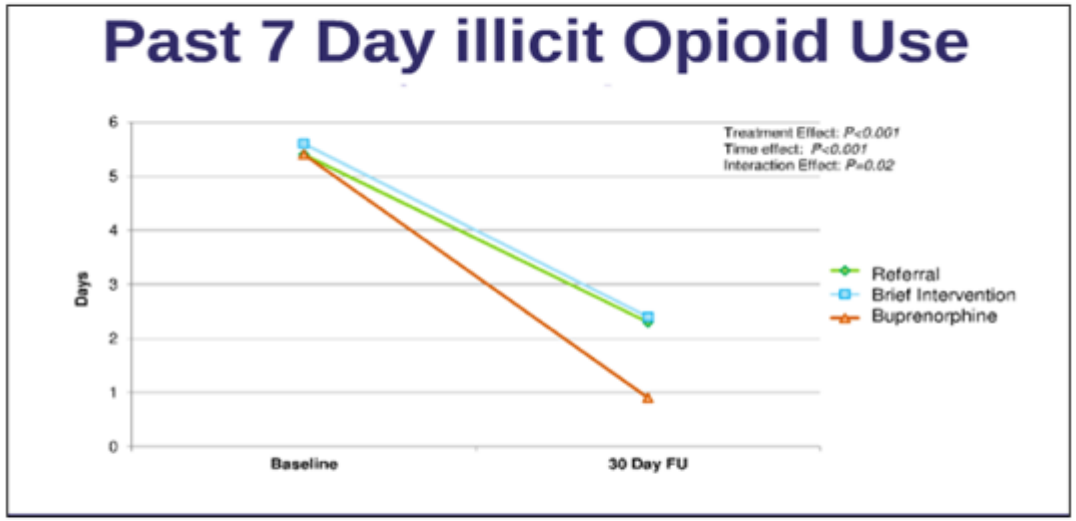
Original Investigation

Emergency Department–Initiated Buprenorphine/Naloxone Treatment for Opioid Dependence

A Randomized Clinical Trial

Gail D'Onofrio, MD, MS; Patrick G. O'Connor, MD, MPH; Michael V. Pantalon, PhD; Marek C. Chawarski, PhD; Susan H. Busch, PhD; Patricia H. Owens, MS; Steven L. Bernstein, MD; David A. Fiellin, MD





- COWS ≥ 12 → 8 mg SL buprenorphine
- One half of those randomized to BUP arm received unobserved/home initiation

New York Times
August 2018

USA TODAY

NEWS SPORTS ENTERTAINMENT LIFE MONEY TECH TRAVEL OPINION 76°

Emergency rooms open new paths for opioid overdose survivors

Kim Painter, USA TODAY Publi

U Penn ED Buprenorphine Program 2018

One champion (X waivered and a few ED friend colleagues who agreed to complete the course)

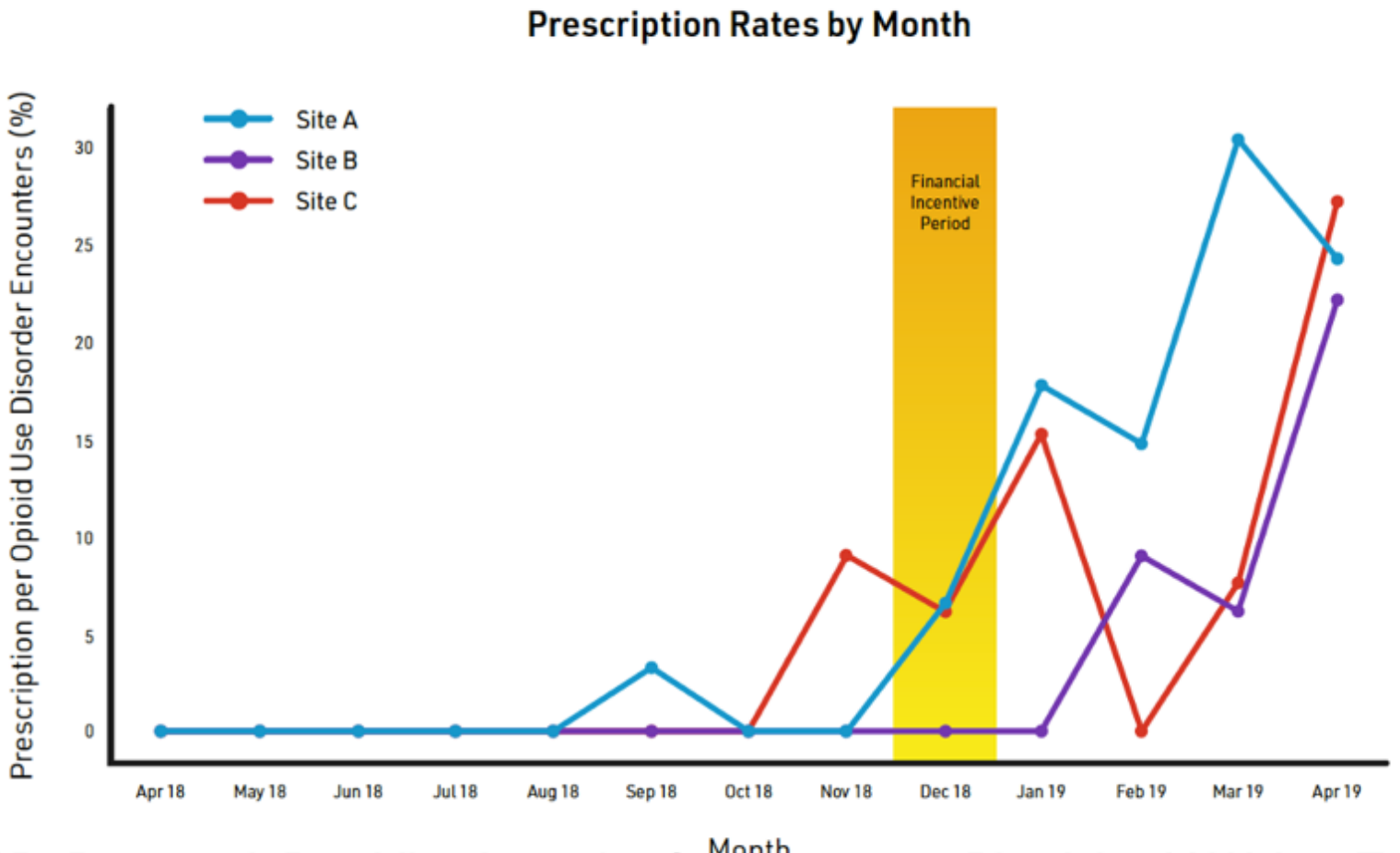
One peer

Buprenorphine on formulary

Socialization/Education

Partnership with primary care

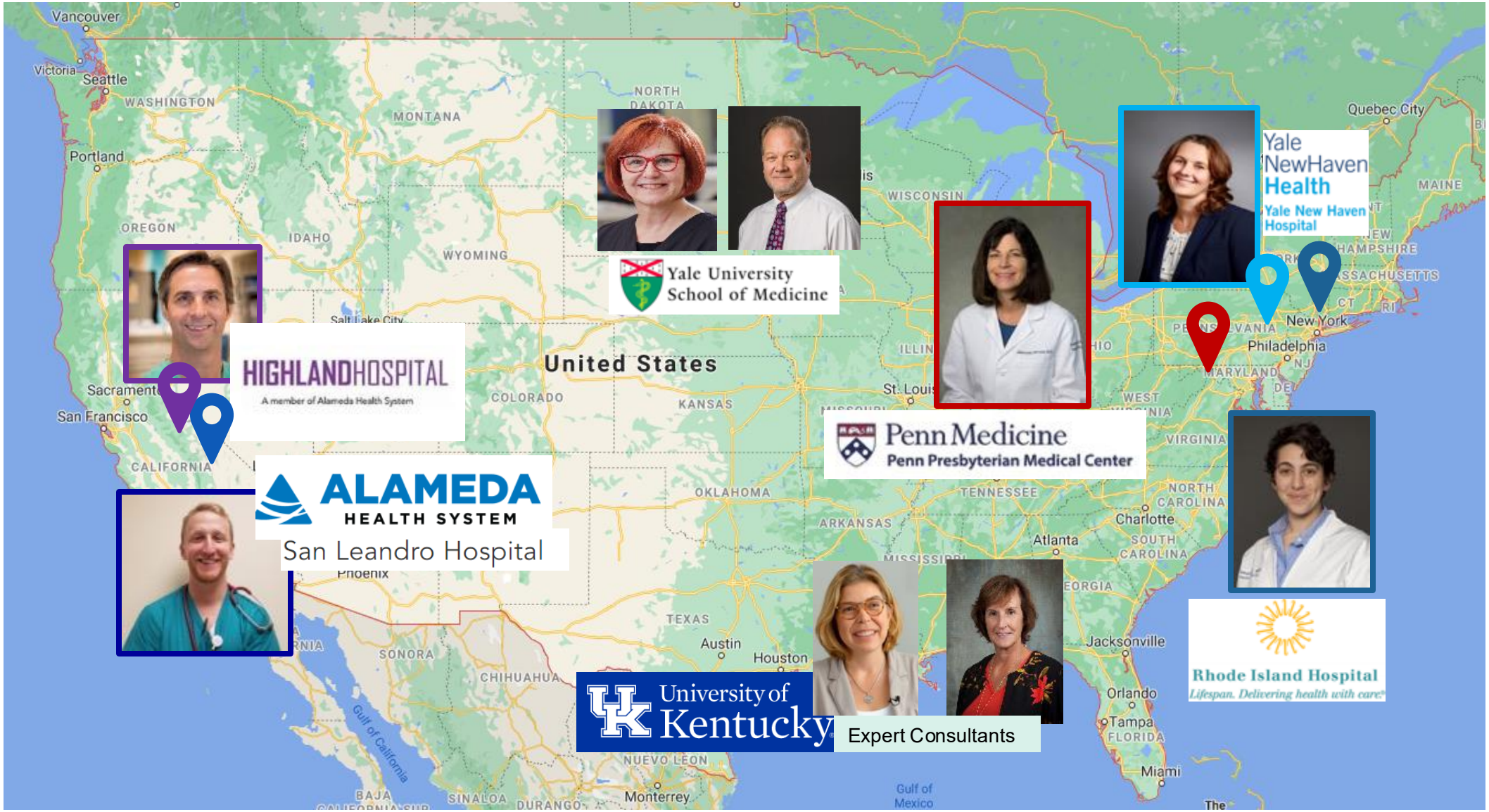
How do you get more physicians to prescribe buprenorphine?



After the incentive, buprenorphine prescribing per OUD encounter increased from **0.5% to 16%**.

Foster SD, Perrone J: Providing Incentive for Emergency Physician X-Waiver Training: An Evaluation of Program Success and Postintervention Buprenorphine Prescribing. Ann Emerg Med. 2020;76:206-214.

ED INNOVATION Team



Ancillary

Objective

To assess the feasibility and safety of XR-BUP in patients with OUD exhibiting minimal signs of withdrawal defined as Clinical Opiate Withdrawal Scale (COWS) score < 8

Ancillary

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To assess the feasibility and safety of XR-BUP in patients with OUD exhibiting minimal signs of withdrawal defined as Clinical Opiate Withdrawal Scale (COWS) score < 8

How would you recruit patients to an injection of an investigational drug in the ED followed by 4 hours of monitoring?

Methods: Monitoring and Observation Pre and Post XR-BUP Injection

Assessments	Pre-Injection	Post-Injection Time Points								
		Immediately after Injection	30 mins	60 mins	90 mins	120 mins	150 mins	180 mins	210 mins	240 mins
Vital Signs	X		X	X	X	X	X	X	X	X
COWS	X		X	X	X	X	X	X	X	X
OOWS	X		X	X	X	X	X	X	X	X
ARSW	X									X
Pupillary Diameter	X		X	X	X	X	X	X	X	X
Desire to Use	X									X
Bad Drug Effects	X		X							X
Post-Injection Medications			X	X	X	X	X	X	X	X
Pain Assessment Numerical Rating Scale		X	X							X
Local Tolerability Scale			X							X
Precipitated Withdrawal		As needed								

Number Enrolled	Primary Outcomes	Result N (%) CI
75	≥ 5 increase in COWS score within 4 hours of the XR-BUP **(Includes the entire cohort)**	**5** (6.7%) 2.20% - 14.88%
	Transition to moderate/severe withdrawal within 4 hours of the XR-BUP injection	**3** (4.0%) 0.83% - 11.25%
	Precipitated withdrawal within 1 hour of the XR-BUP	**2** (2.7%) 0.32% - 9.30%

RCT: ED-INitiated BupreNOrphine VAlidaTION Network Trial

To compare the effectiveness of XR-BUP and SL-BUP induction (8-12mg) in approximately 2000 patients with untreated OUD in the ED on the primary outcome of engagement in formal addiction treatment at 7 days

Patients

- Insurance, photo IDs or pre-authorization hurdles
- Transportation to follow up
- Pharmacy barriers
- Early treatment ambivalence

New challenges in enrollment

How do you engage a patient in *either* treatment arm?

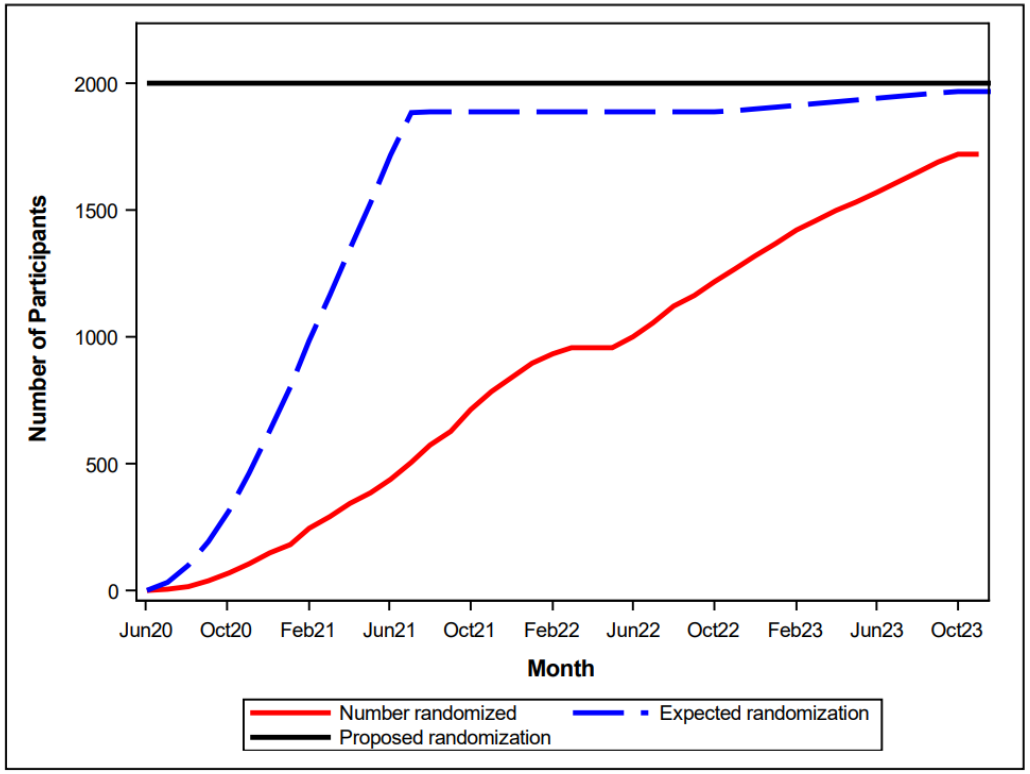
New challenges in enrollment

How do you engage a patient in either treatment arm?

Rising concerns and awareness of precipitated withdrawal?

ED-INitiated BupreNOrphine VAlidaTION Network Trial

To compare the effectiveness of XR-BUP and SL-BUP induction (8-12mg) in approximately 2000 patients with untreated OUD in the ED on the primary outcome of engagement in formal addiction treatment at 7 days



RCT
1867
enrolled

Lead Investigators

Optimize patient identification and eligibility for treatment.

Single screen question

Universal Screening:

ED triage

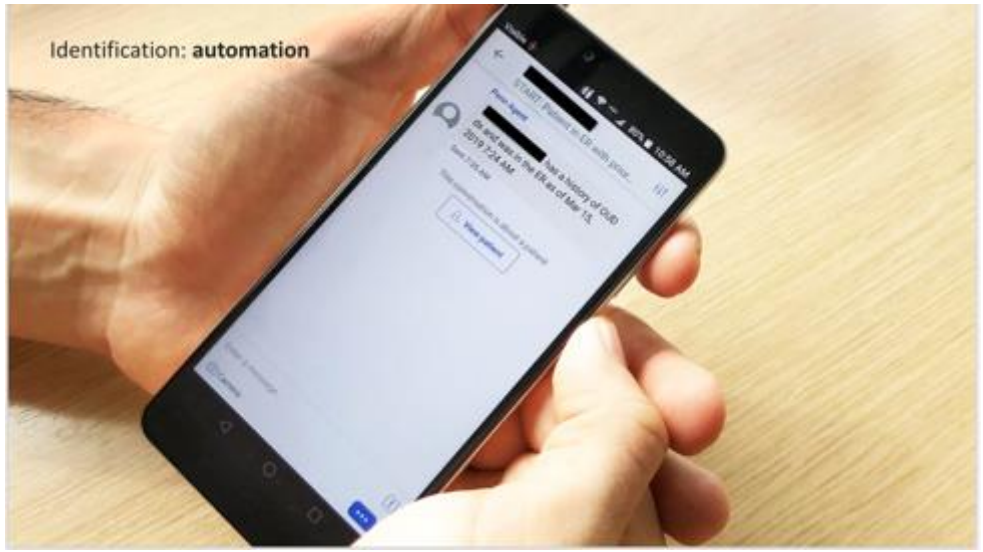
Single Screen Question (SSQ)*:

"In the past month

did you use a painkiller, heroin or fentanyl?"

*Saitz R, Cheng DM, Allensworth-Davies D, Winter MR, Smith PC. The Ability of Single Screening Questions for Unhealthy Alcohol and Other Drug Use to Identify Substance Dependence in Primary Care. *Journal of Studies on Alcohol and Drugs*. 2014;75(1):153-157.

EMR Notifications



Positive screen or drug overdose

Positive

Identification
Universal screening in triage

Withdrawal Assessment
– Subjective
– COWS

Active Withdrawal

Nursing BPA expedite treatment

Provider Banner with treatment pathway

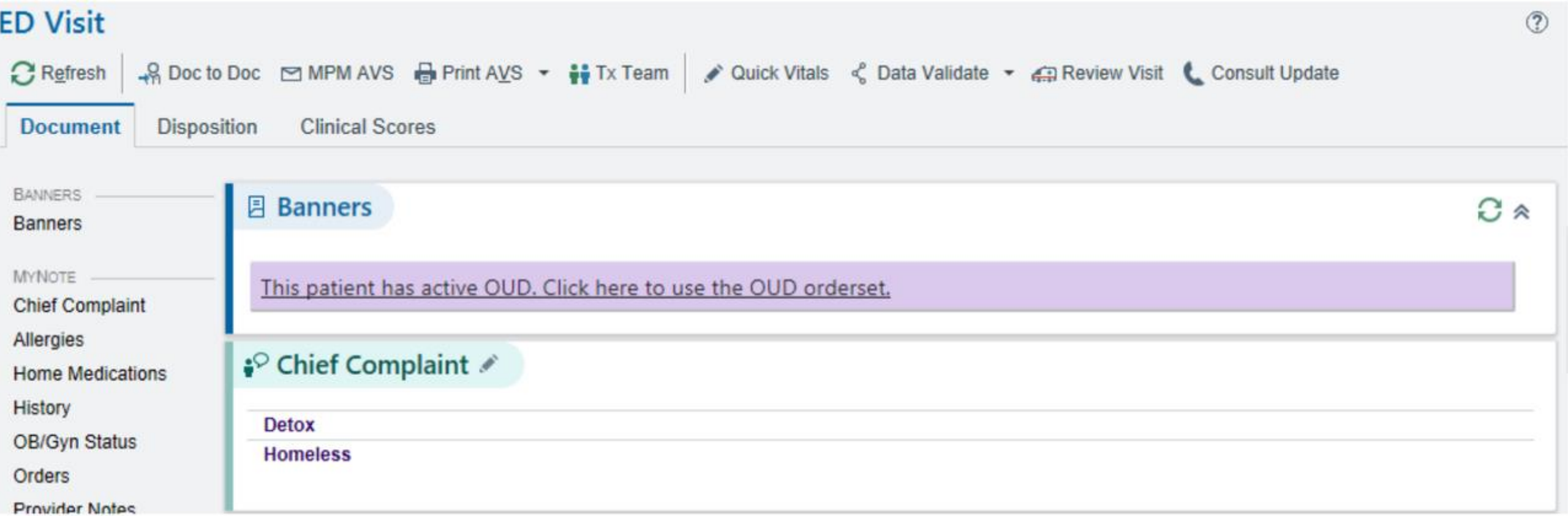
PRS Notification for rapid engagement

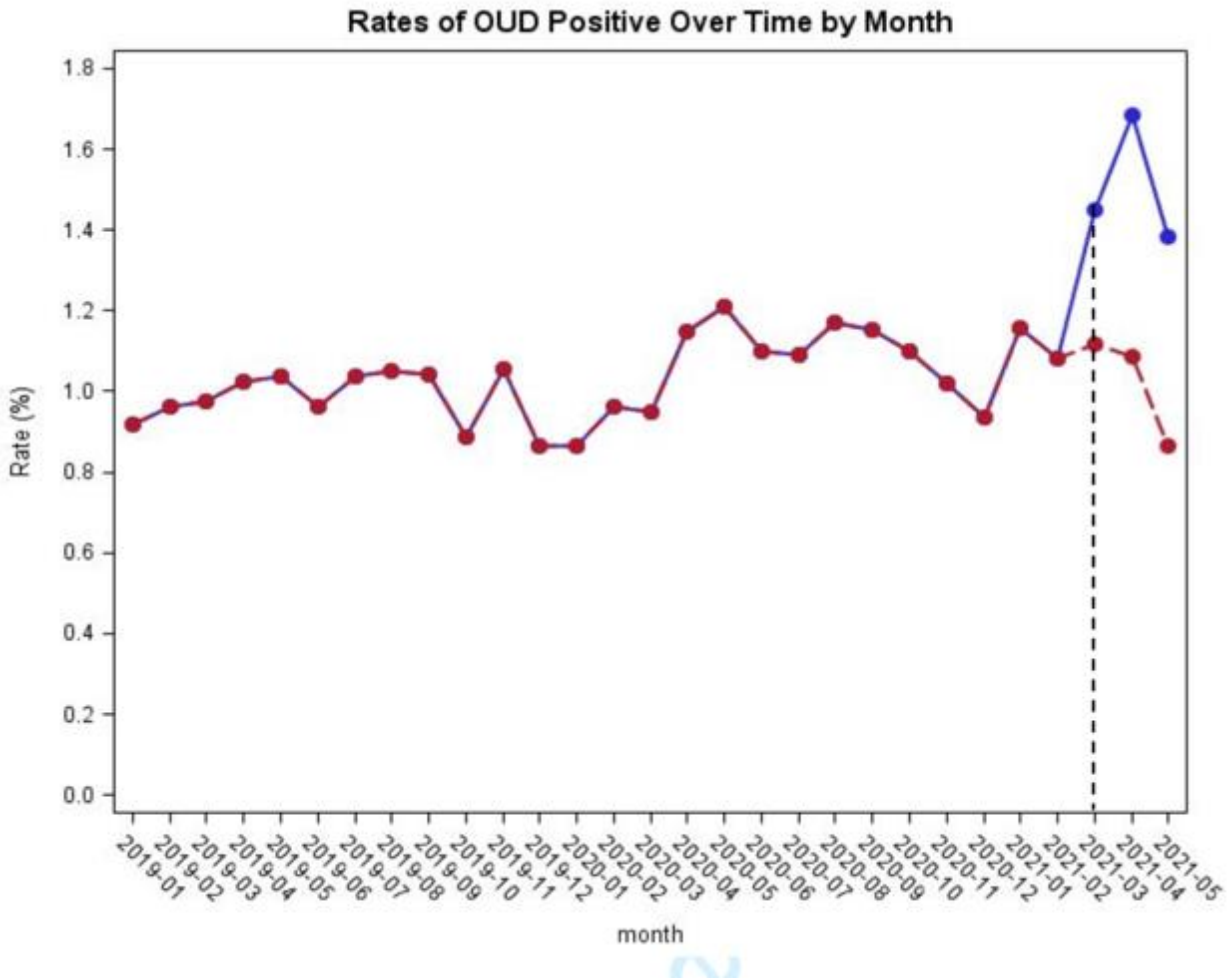
Treatment and Referral

PRS Notification

Nursing BPA with Discharge Guidance

Provider Banner with Discharge Orders


ED Visit
Refresh
Doc to Doc
MPM AVS
Print AVS
Tx Team
Quick Vitals
Data Validate
Review Visit
Consult Update
Document
Disposition
Clinical Scores
BANNERS
Banners
MYNOTE
Chief Complaint
Allergies
Home Medications
History
OB/Gyn Status
Orders
Provider Notes
Banners
This patient has active OUD. Click here to use the OUD orderset.
Chief Complaint
Detox
Homeless



NEJM Catalyst | Innovations in Care Delivery

CASE STUDY

Redesign of Opioid Use Disorder Screening and Treatment in the ED

Margaret Lowenstein, MD, MPhil, MSHP, Rachel McFadden, RN, Dina Abdel-Rahman, Jeanmarie Perrone, MD, Zachary F. Meisel, MD, MPH, MSHP, Nicole O'Donnell, Christian Wood, Gabrielle Solomon, Rinad Beidas, PhD, M. Kit Delgado, MD, MS

Vol. 3 No. 1 | January 2022

TOXICOLOGY/ORIGINAL RESEARCH

Impact of Universal Screening and Automated Clinical Decision Support for the Treatment of Opioid Use Disorder in Emergency Departments: A Difference-in-Differences Analysis

Margaret Lowenstein, MD, MPhil*; Jeanmarie Perrone, MD; Rachel McFadden, RN; Ruiying Aria Xiong, MS; Zachary F. Meisel, MD, MPH; Nicole O'Donnell, CRS; Dina Abdel-Rahman, BA; Jeffrey Moon, MD, MPH; Nandita Mitra, PhD; Mucio Kit Delgado, MD, MS

*Corresponding Author. E-mail: margaw@pennmedicine.upenn.edu.

Study objective: Emergency department (ED)–initiated buprenorphine improves outcomes in patients with opioid use disorder; however, adoption varies widely. To reduce variability, we implemented a nurse-driven triage screening question in the electronic health record to identify patients with opioid use disorder, followed by targeted electronic health record prompts to measure withdrawal and guide next steps in management, including initiation of treatment. Our objective was to assess the impact of screening implementation in 3 urban, academic EDs.

Methods: We conducted a quasiexperimental study of opioid use disorder–related ED visits using electronic health record data from January 2020 to June 2022. The triage protocol was implemented in 3 EDs between March and July 2021, and 2 other EDs in the health system served as controls. We evaluated changes in treatment measures over time and used a difference-in-differences analysis to compare outcomes in the 3 intervention EDs with those in the 2 controls.

Results: There were 2,462 visits in the intervention hospitals (1,258 in the preperiod and 1,204 in the postperiod) and 731 in the control hospitals (459 in the preperiod and 272 in the postperiod). Patient characteristics within the intervention and control EDs were similar across the time periods. Compared with the control hospitals, the triage protocol was associated with a 17% greater increase in withdrawal assessment, using the Clinical Opioid Withdrawal Scale (COWS) (95% CI 7 to 27). Buprenorphine prescriptions at discharge also increased by 5% (95% CI 0% to 10%), and naloxone prescriptions increased by 12% points (95% CI 1% to 22%) in the intervention EDs relative to controls.

Conclusion: An ED triage screening and treatment protocol led to increased assessment and treatment of opioid use disorder. Protocols designed to make screening and treatment the default practice have promise in increasing the implementation of evidence-based treatment ED opioid use disorder care. [Ann Emerg Med. 2023;82:131-144.]

SAMHSA's National Helpline

SAMHSA's National Helpline is a free, confidential, 24/7, 365-day-a-year treatment referral and information service (in English and Spanish) for individuals and families facing mental and/or substance use disorders.

1-800-662-HELP (4357)

FindTreatment.gov

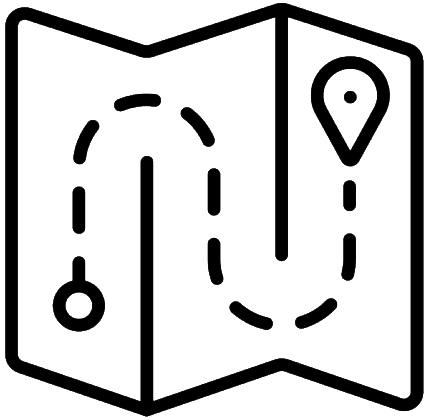
Substance use navigator
intake and triage

1

2

Clinician Telehealth Visit
Audiovisual or
telephone-only

3



Care Linkage
Care navigation, short-term case management, linkage to long-term treatment and resources

Call 484-278-1679

- Patients or providers can call for help
- Same day access to buprenorphine
- Fill gap between patient call and community MOUD appointment
- Ensure patients do not lose access to medication
- Tailored referral to longitudinal treatment (behavioral health or primary care)

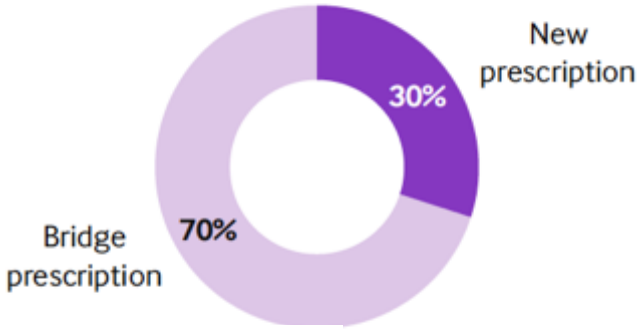
Special Populations

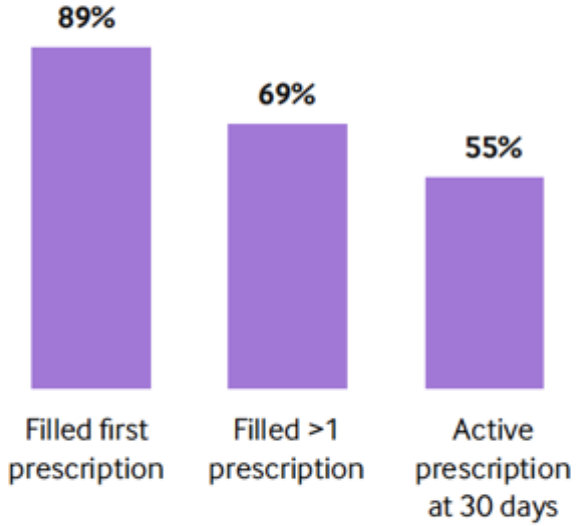
15% Inpatient rehab in past 90 days

9% Incarcerated in past 30 days

1% Currently pregnant

Prescriptions





NEJM Catalyst | Innovations in Care Delivery

CASE STUDY

CareConnect: Adapting a Virtual Urgent Care Model to Provide Buprenorphine Transitional Care

Margaret Lowenstein, MD, MPhil, MSHP, Nicole O'Donnell, CRS, Jasmine Barnes, MPH, Kathryn Gallagher, MPH, Gilly Gehri, Jon K. Pomeroy, DO, MSHI, Shoshana Aronowitz, PhD, MSHP, FNP-BC, Krisda Chaiyachati, MD, MPH, MSHP, Emily Cubbage, Rachel French, PhD, RN, Susan McGinley, CRNP, MSN, Brittany Salerno, Jeanmarie Perrone, MD

Vol. 3 No. 12 | December 2022

Massachusetts Medical Society

Fentanyl and Xylazine

Jan Hoffman, New York Times
January 2023

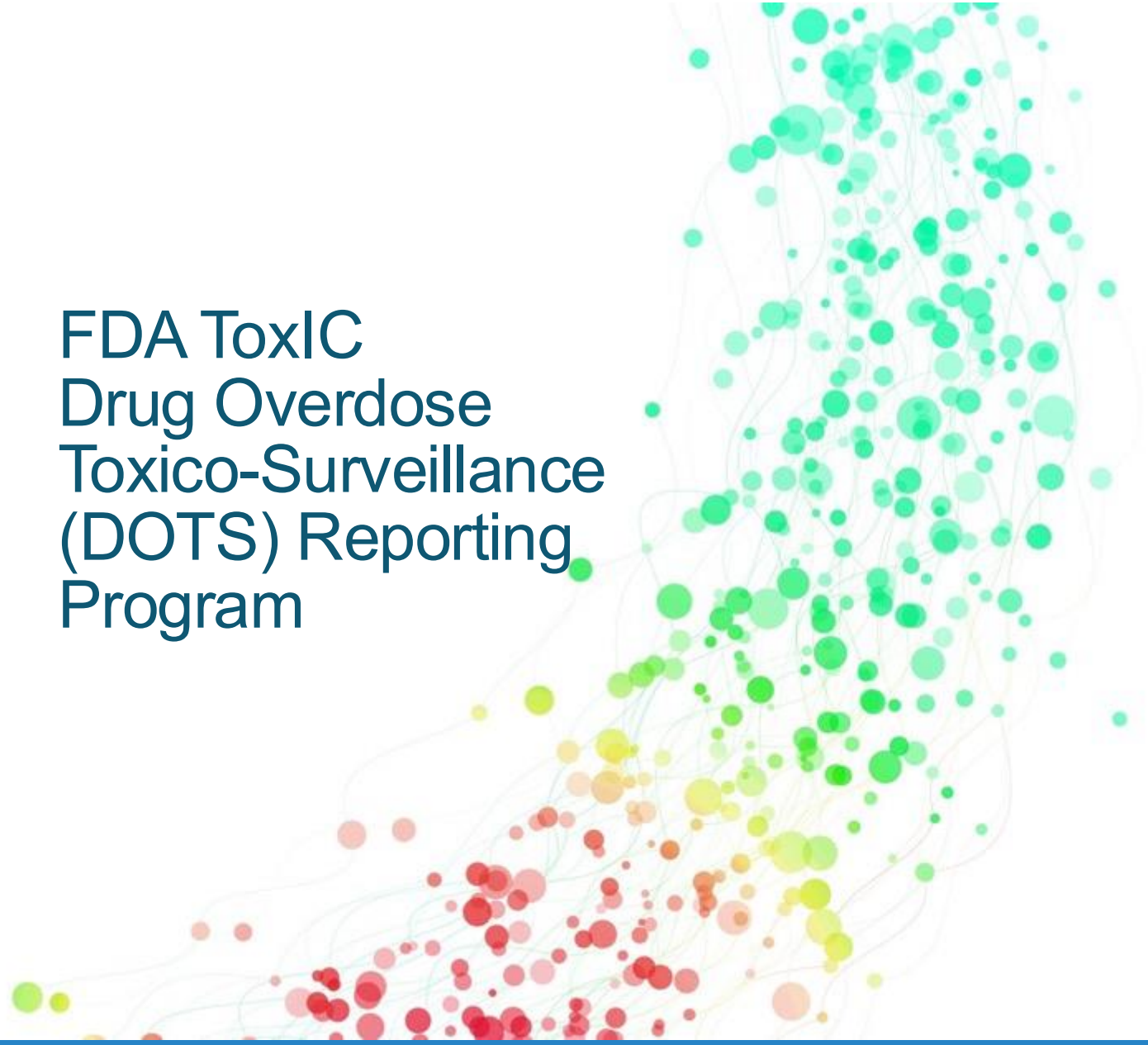
Fentanyl-Xylazine: Clinical questions

What is the impact of xylazine on fentanyl overdose and response to naloxone?

Why is xylazine associated with wounds and how should they be treated and prevented?

Is xylazine associated with dependence and a distinct xylazine withdrawal syndrome?

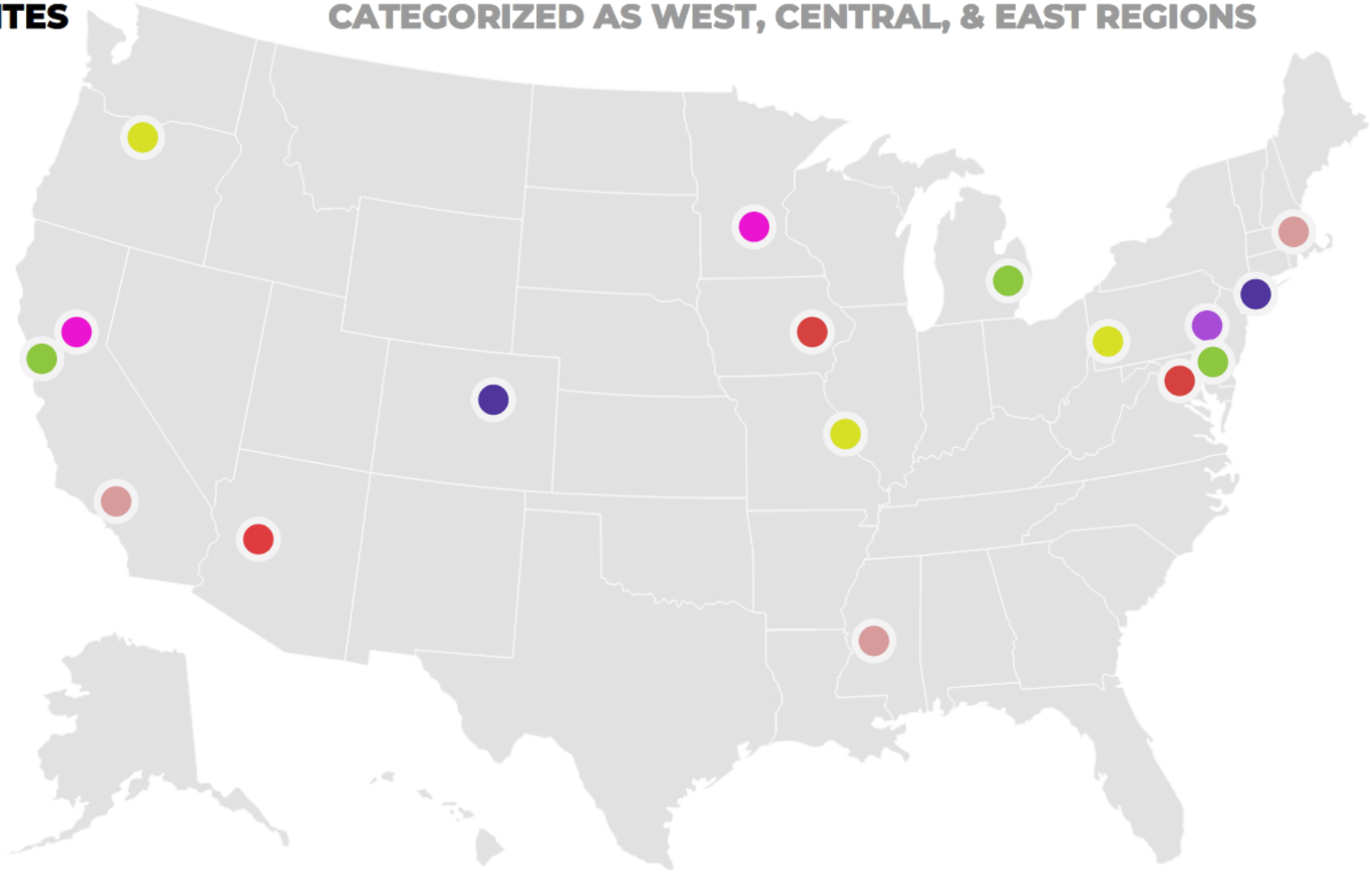
FDA ToxIC Drug Overdose Toxico-Surveillance (DOTS) Reporting Program



DOTS Sites

PARTICIPATING SITES

CATEGORIZED AS WEST, CENTRAL, & EAST REGIONS



WEST

Portland, OR
Oregon Health & Science University

Sacramento, CA
University of California, Davis

San Francisco, CA
University of California,
San Francisco

Los Angeles, CA
University of California,
Los Angeles, Ronald Reagan

Phoenix, AZ
Banner University Medical Center

CENTRAL

Denver, CO
University of Colorado

Minneapolis, MN
Hennepin Medical Center

Iowa City, IA
University of Iowa

EAST

Boston, MA
Harvard University

New York, NY
Weill Cornell Medical Center

Philadelphia, PA
University of Pennsylvania

Baltimore, MD
John's Hopkins Hospital

Washington, DC
Georgetown University

Pittsburgh, PA
University of Pittsburgh

CENTRAL

Detroit, MI
Detroit Medical Center

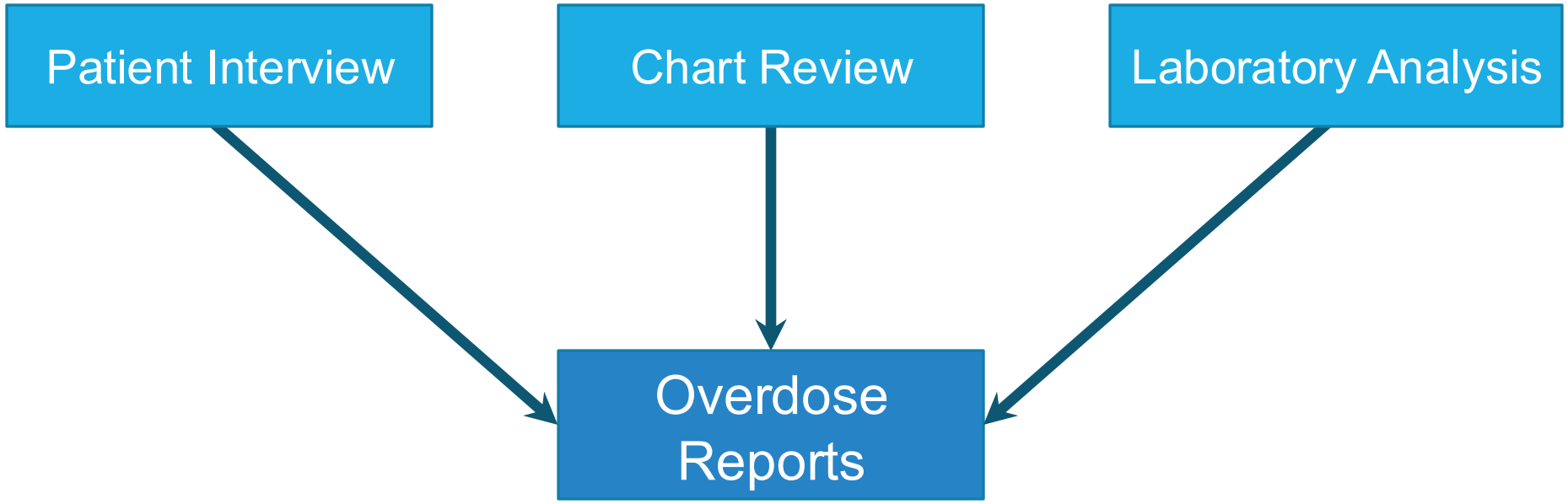
St. Louis, MO
Washington University

Jackson, MS
University of Mississippi

Three populations prospectively enrolled. Eligible patients presenting with:

1. Opioid overdose
2. Stimulant overdose
3. Undifferentiated suspected illicit drug overdose

Drug Overdose Toxico-Surveillance



DOTS-Philadelphia

41 yo M BIBFR. Found on sidewalk with pinpoint pupils and abrasions to forehead. Given 2 mg IV naloxone with improvement but still lethargic when arrives in the ED.

DOTS-Philadelphia

41 yo M found on sidewalk

Intervention:

- **Given 2 more doses of naloxone IV (.04 mg)-- no response.**
- **Head CT/Trauma eval negative**
- **UDS: cocaine, methamphetamine, opioids**

DOTS-Philadelphia

41 yo M BIBFR. Found on sidewalk.

Hospital Course: Suspected polysubstance use; awakens and spoke to counselor and discharged with follow up. Consents to study.

- (Waste) Blood sample collected on arrival now utilized for study

Results:

- Qualitative: Methamphetamine, Xylazine, Norfentanyl, 4-Hydroxy Xylazine, Cocaine, Oxycodone, Naloxone, Fentanyl, Bromazolam, Metonitazene, Protonitazene

- Quantitative: Fentanyl (14 ng/mL), Xylazine (2.4 ng/mL), Norfentanyl (4.9 ng/mL), Naloxone (2.3 ng/mL), Metonitazene (1.0 ng/mL), Protonitazene (Positive, <0.5 ng/mL), Bromazolam (46 ng/mL)

DOTS Reporting Program — Quarterly Report

CLINICAL | Q4 2023

EAST REGION

WASHINGTON, DC (N=16)

- 94% positive for at least one opioid or stimulant
- Fentanyl (25%) was the primary opioid detected
- PCP (38%), methamphetamine (13%), & cocaine (13%) detected
- Combined stimulant and synthetic cannabinoid use was observed (44%)
- Xylazine was detected alongside fentanyl (13%)
- NPS: *N,N*-Dimethylpentylone (69%), Pentylone (38%), MDMB-4en-PINACA (38%), *N*-Cyclohexyl Butylone (6%), Methoxetamine (6%), ADB-BINACA (6%), ADB-INACA (6%), MDMB-INACA (6%), 4F-MDMB-BINACA (6%)

Drug	N	Mean ± Std Dev	Median	Range	Drug	N	Mean ± Std Dev	Median	Range
Ethanol (mg/dL)	2	49±8.0	49	41-57	Cocaine	3	2.1±0.9	1.0	<1-2.1
Fentanyl	3	4.6±2.5	2.3	<1-4.6	BZE	8	230±320	60	<1->1000
Norfentanyl	3	3.7±1.0	3.7	<1-4.7	*N,N*-DMP	10	24±19	16	<10-63
Methamp.	2	2.2±1.0	1.1	<1-2.2	Pentylone	7	16±15	10	<10-54
Naloxone	3	6.7±3.7	4.9	3.4-12	Eutylone	3	25±22	10	<10-57

BALTIMORE, MD (N=27)

- 100% of samples positive for at least one opioid or stimulant
- Fentanyl (93%) was the primary opioid detected
- Cocaine (67%) was the only stimulant detected
- Combined opioid and stimulant use was common (67%)
- Xylazine was found alongside fentanyl (48%)
- NPS: Bromazolam (30%), *N*-Desethyl Isotonitazene (15%), *p*-Fluorofentanyl (15%), *N,N*-Dimethylpentylone (4%)

Drug	N	Mean ± Std Dev	Median	Range	Drug	N	Mean ± Std Dev	Median	Range
Ethanol (mg/dL)	3	43±26	45	10-75	Cocaine	16	2.0±0.5	2.4	<1-2.5
Fentanyl	26	13±16	8.3	<1-77	BZE	24	310±210	260	<1->1000
Norfentanyl	25	17±29	6.6	<1-120	Bromazolam	8	50±21	44	<5-84
Xylazine	13	13±15	5.9	<1-48	*N*-Desethyl Isotonitazene	4	2.0±1.9	1.1	0.5-5.3
Naloxone	5	4.1±1.2	3.3	<1-5.8					

Drug	N	Mean ± Std Dev	Median	Range	Drug	N	Mean ± Std Dev	Median	Range
Fentanyl	3	2.9±0.0	2.9	<1-2.9	Methamp.	1	>1000	-	-
Norfentanyl	3	6.2±3.2	8.5	1.7-8.6	Amp.	1	>1000	-	-
Naloxone	2	5.6±4.1	5.6	1.5-9.8	BZE	3	-	-	<1->1000

PITTSBURGH, PA (N=27)

- 88% of samples positive for at least one opioid or stimulant
- Fentanyl (67%) was the primary opioid detected
- Cocaine (41%) was the primary stimulant detected
- Combined opioid and stimulant use was common (52%)
- Xylazine was detected alongside fentanyl (41%)
- NPS: Bromazolam (15%), *p*-Fluorofentanyl (11%)

Drug	N	Mean ± Std Dev	Median	Range	Drug	N	Mean ± Std Dev	Median	Range
Ethanol (mg/dL)	2	205±25	205	180-230	Methamp.	3	270±350	26	8.3-780
Fentanyl	18	9.4±11	5.0	<1-48	Amp.	3	10±10	4.8	1.5-25
Norfentanyl	18	5.8±7.1	2.3	<1-27	Cocaine	12	2.1±0.8	2.1	<1-2.9
Xylazine	9	10±15	6.0	<1-48	BZE	21	260±180	330	<1->1000
Naloxone	3	6.4±4.3	6.0	1.3-12	Bromazolam	4	170±120	170	30-310

PHILADELPHIA, PA (N=12)

- 100% positive for at least one opioid or stimulant
- Fentanyl (67%) & oxycodone (58%) were primary opioids detected
- Cocaine (58%) was the primary stimulant detected
- Xylazine was found alongside fentanyl (42%)
- NPS: Etizolam (25%), Bromazolam (8%), Metonitazene (8%), Protonitazene (8%)

Drug	N	Mean ± Std Dev	Median	Range	Drug	N	Mean ± Std Dev	Median	Range
Fentanyl	8	10±12	4.3	<1-38	BZE	7	210±230	120	4.7->1000
Norfentanyl	7	11±16	3.4	<1-48	Naloxone	3	1.8±0.4	1.9	1.2-2.3
Xylazine	5	7.1±4.0	7.0	<1-12	Bromazolam	1	46	-	-
Methamp.	1	28	-	-	Metonitazene	1	1.0	-	-
Amp.	1	14	-	-					

BOSTON, MA (N=4)

- 100% positive for at least one opioid or stimulant
- Fentanyl (75%) was the primary opioid detected
- Cocaine (25%) and MDMA (25%) were detected
- Xylazine was found alongside fentanyl (50%)
- NPS: *p*-Fluorofentanyl (25%)

Drug	N	Mean ± Std Dev	Median	Range	Drug	N	Mean ± Std Dev	Median	Range
Fentanyl	3	5.4±2.7	6.7	1.7-8.0	BZE	2	410±407	410	4.1-820
Norfentanyl	3	3.2±1.0	2.5	2.5-4.7					

NEW YORK, NY (N=4)

- 75% positive for at least one opioid or stimulant
- Fentanyl (75%) was the primary opioid detected
- Cocaine (50%) was the primary stimulant identified
- Xylazine detected alongside fentanyl (25%)
- No NPS were detected

Drug	N	Mean ± Std Dev	Median	Range	Drug	N	Mean ± Std Dev	Median	Range
Fentanyl	3	2.9±0.0	2.9	<1-2.9	Methamp.	1	>1000	-	-
Norfentanyl	3	6.2±3.2	8.5	1.7-8.6	Amp.	1	>1000	-	-
Naloxone	2	5.6±4.1	5.6	1.5-9.8	BZE	3	-	-	<1->1000

https://www.cfsre.org/images/content/reports/clinical_reports/2023_Q4_Clinical_ACMT_DOTS_Reporting_Program_Quarterly_Report.pdf?emci=8a23a3fb-03e3-ee11-aaf0-002248223794&emdi=024512e2-22e6-ee11-aaf0-002248223794&ceid=8113162

Xylazine test strip performance in synthetic and human urine biospecimens

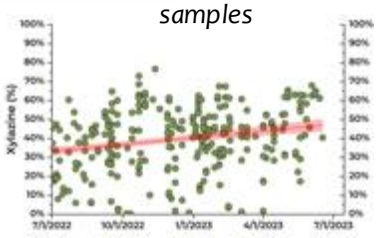
Daisy Unsihuay[1], Ping Wang,[1] Michael Milone,[1] Ashish Thakrar[2] and Jeanmarie Perrone[3]

[1]Department of Pathology and Laboratory Medicine, University of Pennsylvania, Philadelphia, PA. [2]Center for Addiction Medicine and Policy, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA. [3]Department of Emergency Medicine, University of Pennsylvania, PA

Introduction

Opioid samples containing xylazine

Xylazine content in opioid samples



Ref. DeBord, J., et. al. Drug Checking-Quarterly report (2023), CFSRE, NPS

- ✓ Xylazine, a veterinary tranquilizer is increasingly linked with adulteration of illicit opioids in the US.
- ✓ Recent reports indicate the growing prevalence of xylazine detection in street drug samples.
- ✓ MS-based methods are the gold standard method for xylazine confirmation but are time intensive which may delay interventions.
- ✓ We hypothesized that xylazine test strips in urine could serve as a rapid, point-of-care test to detect xylazine exposure

Methods

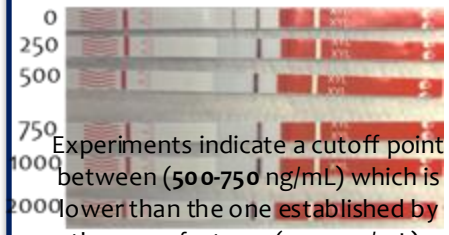
Xylazine tests strips from BTNX

Six synthetic urine samples spiked with xylazine standards at different conc. and 36 human urine samples were tested to evaluate strip sensitivity and specificity. Quantitative data was obtained from an in-house GC-MS method for xylazine . Urine samples were tested within 1-13 days after collection and kept at 5 °C until analyzed.

Results & Discussion

❑ Qualitative analysis using Xylazine test strips

Xylazine standard (ng/mL)

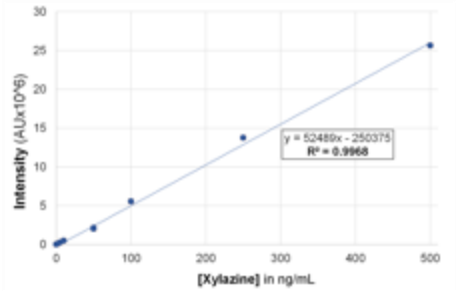


Experiments indicate a cutoff point between (**500-750** ng/mL) which is lower than the one established by the manufacturer (**1000** ng/mL).

Patient samples

Results from xylazine detected in patient urine samples submitted for UDS analysis.

❑ Quantitative analysis using a GC-MS method for xylazine



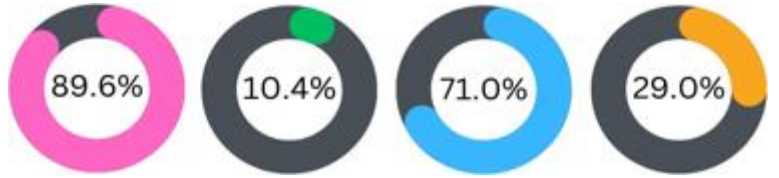
Calibration curve obtained from xylazine standards spiked in synthetic urine using GC-MS based method. Samples were prepared using a liquid-liquid extraction.

Figure to be added.

Distribution of xylazine concentrations in urine collected in exposed patients

❑ Xylazine test strip performance

True positives	False negatives	True negatives	False positives
26/29	3/29	5/7	2/7



- ✓ The 3 false negatives resulted from the lower sensitivity of the xylazine strip compared to GC-MS, which reported to be < 20 ng/mL.
- ✓ One out of the two false positives also tested positive for lidocaine, a known interference reported for the strip.
- ✓ The second false positive is of unknown origin. Interference study carried out with co-detected drugs is shown in the table.

Drug	Concentration	Result (n=3)
cocaine	20 000 ng/mL	neg
benzoylecgonine	20 000 ng/mL	neg
diphehydramine	20 000 ng/mL	neg
nicotine	20 000 ng/mL	neg
cotinine	20 000 ng/mL	neg

Conclusions

Xylazine test strips detected xylazine at a concentration of >750ng/mL in synthetic urine spiked with xylazine and showed moderate sensitivity and lower specificity in detecting xylazine in urine collected in exposed patients. Testing urine with xylazine test strips could be a feasible approach to rapid, point-of-care testing for xylazine exposure in clinical settings and should be rigorously explored.

Toxicosurveillance

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ORIGINAL RESEARCH

Thematic Analysis of Reddit Content About Buprenorphine-naloxone Using Manual Annotation and Natural Language Processing Techniques

Graves, Rachel Lynn MD; Perrone, Jeanmarie MD; Al-Garadi, Mohammed Ali PhD; Yang, Yuan-Chi PhD; Love, Jennifers MD; O'Connor, Karen MS; Gonzalez-Hernandez, Graciela PhD; Sarker, Abeed PhD

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Clinical Toxicology

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/ictx20

Reddit discussions about buprenorphine associated precipitated withdrawal in the era of fentanyl

Anthony Spadaro, Abeed Sarker, Whitney Hogg-Bremer, Jennifer S. Love, Nicole O'Donnell, Lewis S. Nelson & Jeanmarie Perrone

ORIGINAL RESEARCH

PEN

Self-reported Xylazine Experiences: A Mixed-methods Study of Reddit Subscribers

Anthony Spadaro, MD, MPH, Karen O'Connor, MS, Sahithi Lakamana, MS, Abeed Sarker, PhD, Rachel Wightman, MD, Jennifer S. Love, MD, and Jeanmarie Perrone, MD

on Reddit described xylazine as an unwanted adulterant in their opioid


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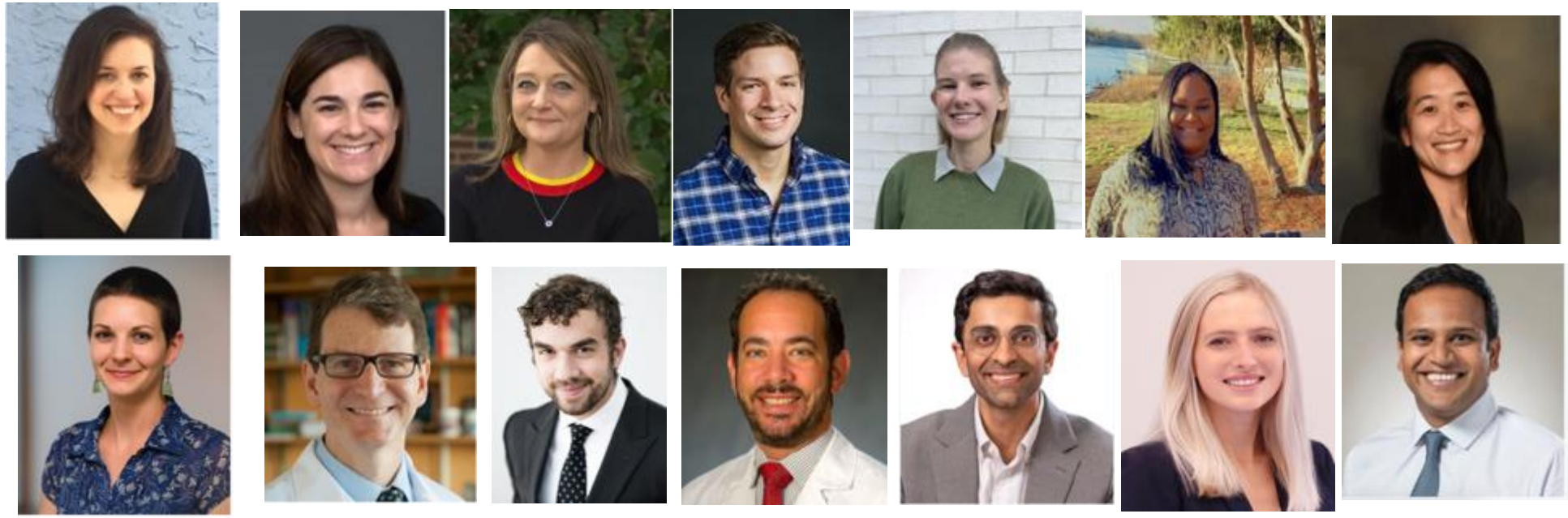
Summary

Study what you see…
Develop an area of focus
Data analytic skills are critical.
Collaborate-–students, nurses, pharmacists, residents and colleagues and form networks.
Share expertise w other organizations
Mentorship-
Medicine is a special privilege- find joy to sustain yourself.

Many collaborators, research coordinators and mentees



Margaret Lowenstein, Judy Chertok, Nicole O'Donnell, Kit Delgado, Gilly Gehri, Jasmine Barnes, Sam Huo, Rachel McFadden, Lewis S. Nelson, Anthony Spadaro, Zack Meisel, Ashish Thakrar, Sophia Faude, Austin Kilaru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