Motion Sensor Systems to Prevent Overdoses: Findings from the US Northeast
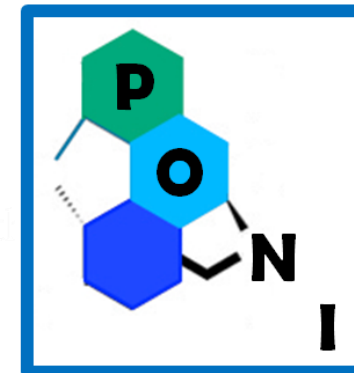
Joseph "Greg" Rosen, PhD, MSPH

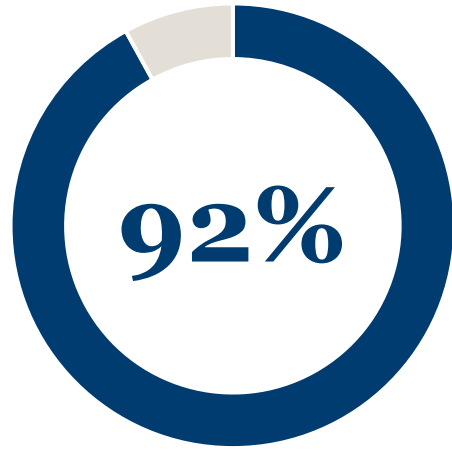Assistant Professor of Medicine and Epidemiology (Research)

Harm Reduction International Conference (HR25)

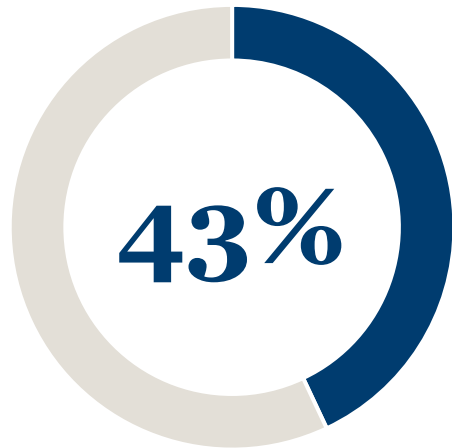*Emerging Drug Risks and Harm Reduction Innovations*

April 29, 2025

Unmonitored drug use is common, but strategies increasing safety during solitary drug use events are underutilized

92% — *Overdose decedents discovered alone at the time of response*

43% — *Potential responders were present at the time of response*

"I don't want anyone to see me use"

"I don't have enough to share today"

"I'm sick and need to use now"

"I can't risk getting robbed if I nod off"

"I have a better time using alone"

BROWN

Motion sensor systems are effective tools that expedite detection and response to overdoses in bathrooms

BROWN

Study Goals and Objectives

Identify determinants of implementation and effectiveness of motion sensor systems for overdose detection and response in Rhode Island

Aim 1: Examine the feasibility and acceptability of motion sensor systems among managers/staff at community organizations with public bathrooms

Aim 2: Explore barriers, facilitators, and ethical dimensions of motion sensor system installation and implementation in housing and clinical facilities

Aim 3: Pilot test the safety and preliminary effectiveness of implementing motion sensor systems for overdose detection in high-traffic bathrooms

BROWN

Aim 1: Examine the feasibility and acceptability of motion sensor systems among managers/staff at community organizations with public bathrooms
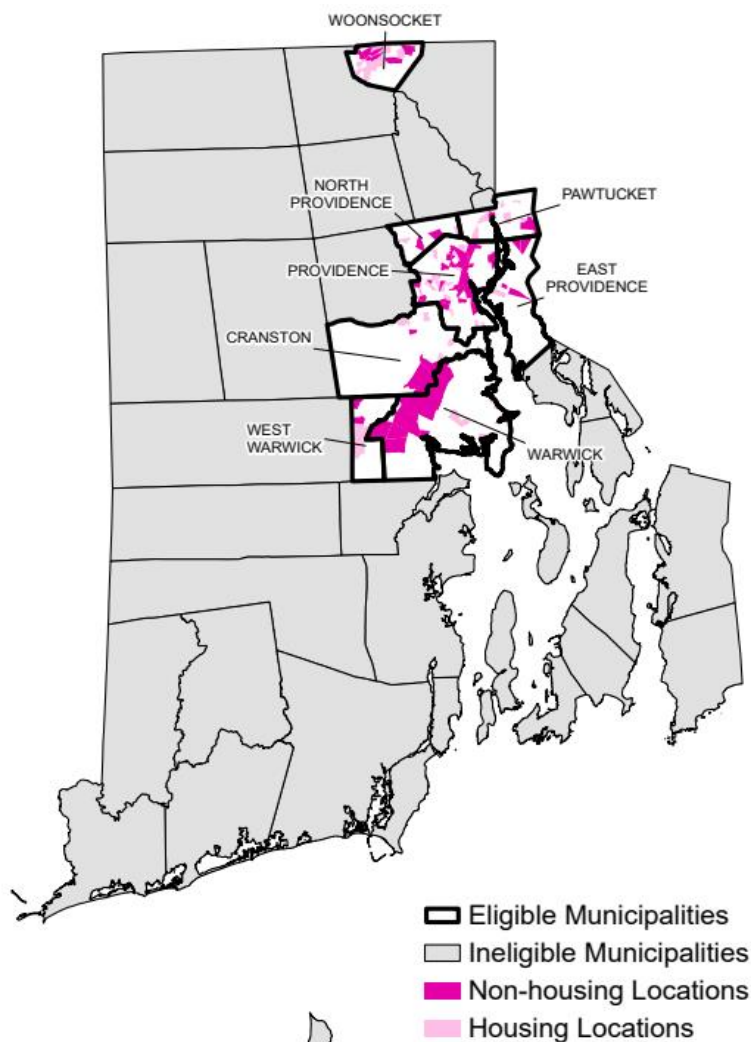
Mapping of non-fatal opioid overdoses (2020-2022) to identify hotspots from which to sample businesses and community organizations (N = 100)

Structured Workplace Survey (Director/Managers/Staff)

Strongly disagree ● ⋯ ● ⋯ ● ⋯ ● ⋯ ● Strongly agree
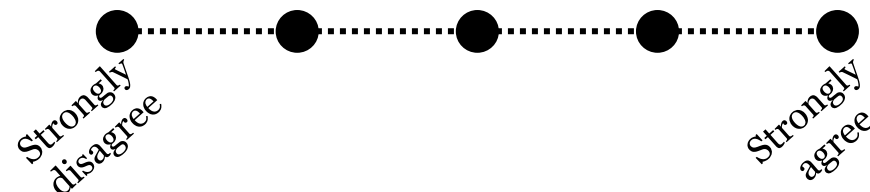
Feasibility

"I am confident that this building can use sensors for overdose detection/response"

Acceptability

*"I am comfortable with this building using sensors for overdose detection/response"*

Legend:
☐ Eligible Municipalities
☐ Ineligible Municipalities
■ Non-housing Locations
■ Housing Locations

Despite low prior awareness (4%), staff perceived motion sensor systems to be feasible (66%) and acceptable (73%)

35%
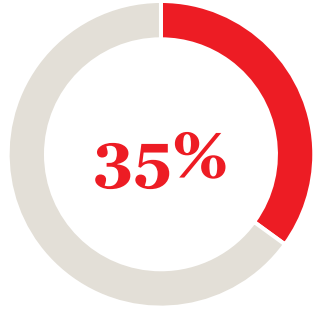
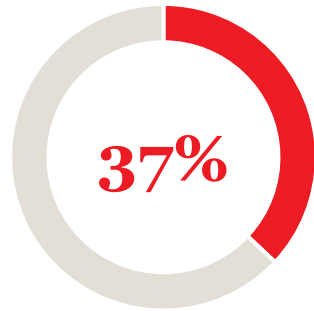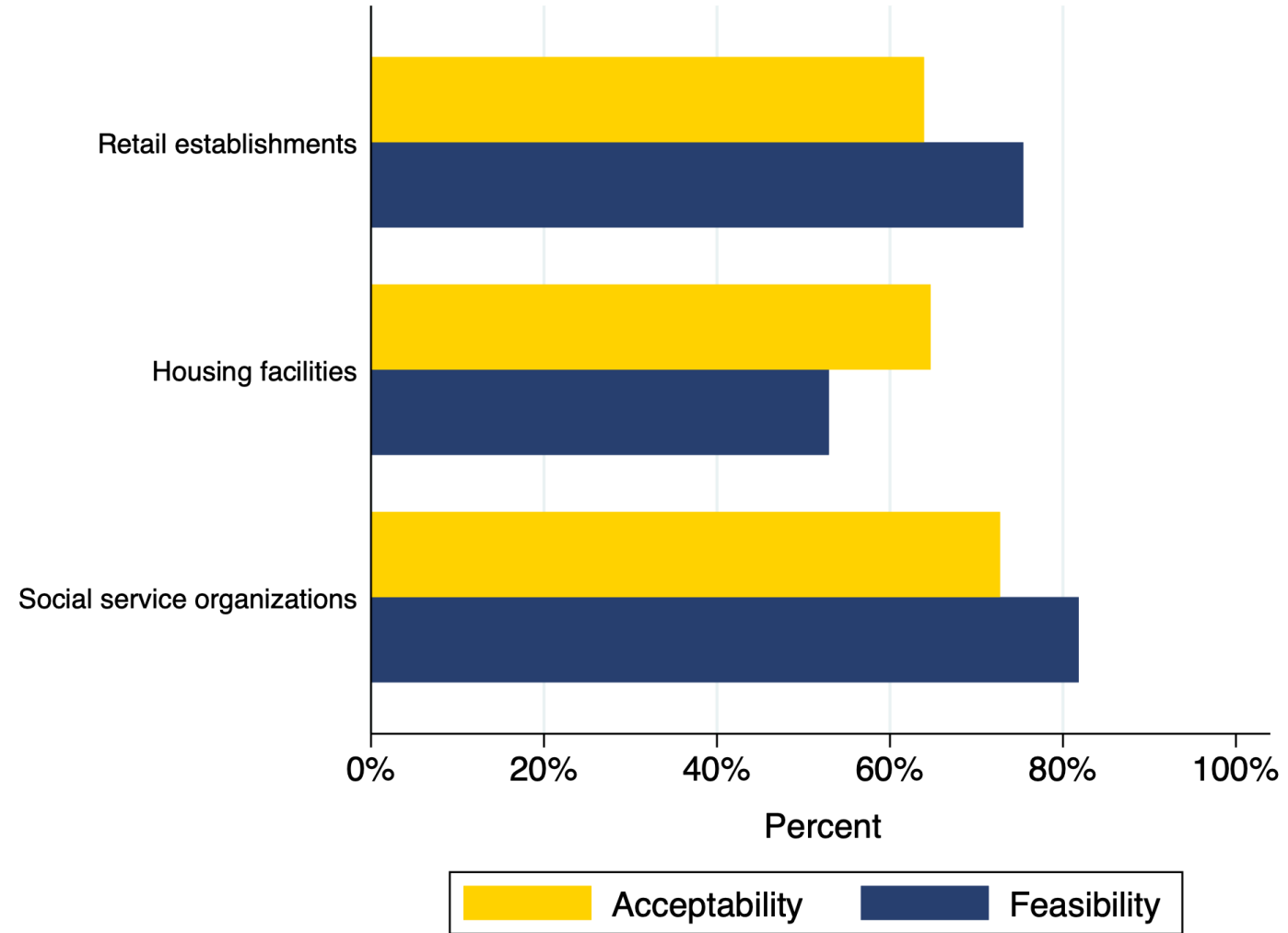**Protocols for OD detection**

48%
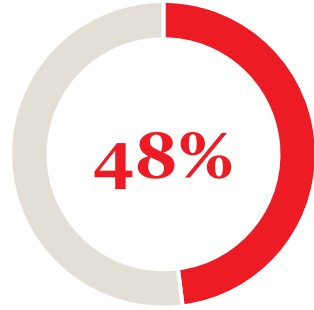
Staff trained in naloxone

41%

Naloxone available onsite

37%
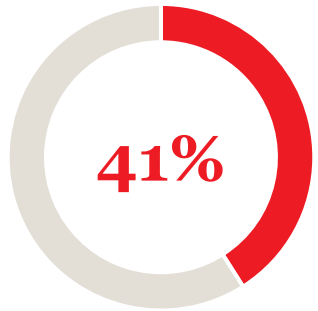
History of an onsite OD

BROWN

Aim 2: Explore barriers, facilitators, and ethical dimensions of motion sensor system installation and implementation in housing and clinical facilities

Focus groups with clients (*N* = 4) and staff (*N* = 4)

Motion sensor system demonstration, semi-structured dialogue

	Site 1	Site 2	Site 3	Site 4
Type				
Outpatient drug treatment	✓			
Community drop-in center		✓	✓	
Supportive housing facility				✓
Days of operation				
Weekdays only		✓	✓	
Weekdays and weekends	✓			✓
Has policy prohibiting onsite drug use	✓	✓	✓	✓
Fatal overdose onsite		✓	✓	✓
Manual bathroom safety check protocol used	✓	✓	✓	✓
Naloxone available onsite	✓	✓	✓	✓

Framework-guided thematic analysis, mapped to constructs from the Theoretical Framework of Acceptability

Gale et al, 2013; Sekhon et al, 2017; Park et al., 2025

BROWN

Ethical dimensions and determinants of motion sensor system installation and implementation

Facilitators

🔓 "Peace of mind"

🔐 Privacy protections

🛡️ Trust between staff and clients

🚑 Reduced ambulance/police callouts

💸 Relative affordability

Barriers

🏠 Loss of employment or housing

🔗 Consequences of arrest

💾 Data-sharing concerns

🚨 False alarms

⇄ Staff burdens and scope creep

I get so nervous when we open that bathroom. I'm always sitting outside the door, hoping they don't overdose...I worry so much.

To save someone's life? Yeah, it's worth it. Are you kidding me? That's $41 a month. Come on.

You never know what could happen...I could be clean for 20 years, but...I got an urge that's so bad that I go into the bathroom, and I do what I do. Guess what? Game over—all because the technology wasn't there.

Everyone here knows I do drugs, but if my boss found out that I fucking smoke meth, he'd probably fire me.

BROWN

Conclusions, Implications, and Next Steps

Anticipated implementation barriers (e.g., staff burdens, false alarms, privacy concerns) did not diminish provider and client enthusiasm for motion sensor systems

Despite perceived acceptability and feasibility, workplaces require infrastructure (e.g., training, protocols, naloxone) to effectively implement motion sensor systems

Research-practice partnerships require investment from all parties but are essential ingredients to scaling novel technologies for fatal overdose prevention

Ethical dimensions of the technology (e.g., consent, surveillance, automated data capture) are critical determinants of installation and implementation

Additional research is needed to document strategies that promote uptake and appropriate use of motion sensor systems in community settings

BROWN

Acknowledgments and Funding

BROWN

Contact Information

Greg Rosen, PhD, MSPH

Assistant Professor (Research)
Department of Medicine
The Warren Alpert Medical School
Brown University

greg_rosen@brown.edu

Ju Nyeong Park, PhD, MHS

Principal Investigator
Assistant Professor (Research)
Department of Medicine
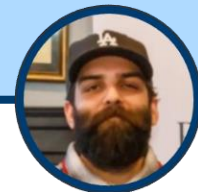The Warren Alpert Medical School
Brown University

ju_park@brown.edu

Rehan Aslam, MPH

Project Coordinator
Division of General Internal Medicine
Rhode Island Hospital
Brown University Health

raslam@brownhealth.org

HARM REDUCTION INNOVATION LAB

1125 N Main Street
Suite 215
Providence, RI 02906
harmreductionlab.com

Hablamos español

BROWN