

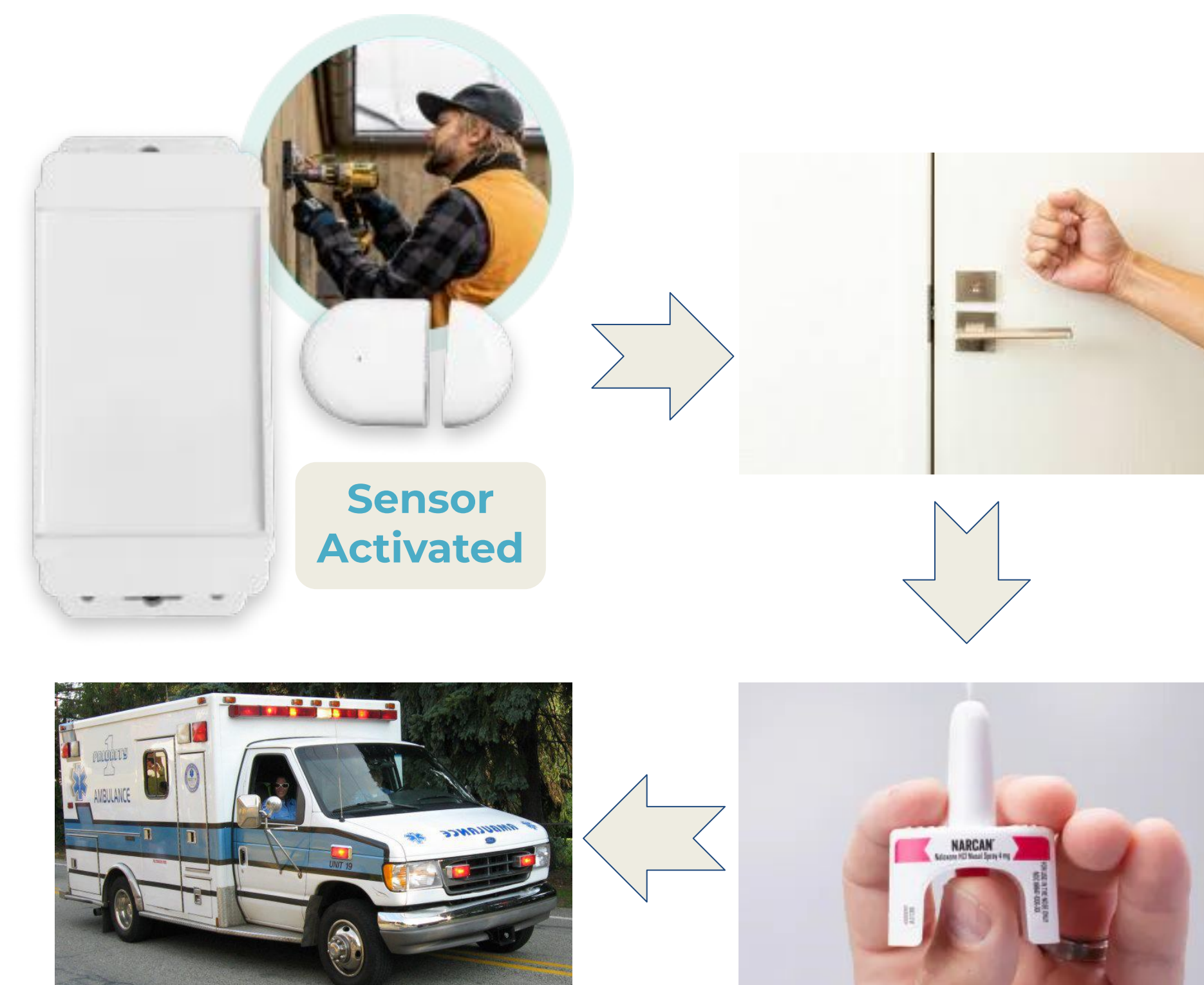
Overdose Detection Technologies for People Who Use Alone

Ju Nyeong Park, PhD,^{1,3*} Ryan Koch,² Joseph G. Rosen PhD,^{2,3} Erin Thompson, MPH,² Jessica Tardif,² Christina Vasquez,^{1,2} Michelle McKenzie,³ Traci C. Green, PhD, MSc^{1,3,5} Josiah D. Rich, MD,^{1,3} Susan Ramsey PhD^{1,3}

Background

- In the U.S., over 100,000 lives were lost to overdose in 2022, and more than half occurred in the absence of bystanders.
- Solitary drug use increases the risk of fatal overdose, as bystanders are unavailable to administer naloxone and call emergency medical services (EMS).
- Overdose detection technologies (ODTs), including buttons and reverse motion sensors, could expedite response to drug overdoses and reduce the risk of overdose death in clinical and community settings.¹⁻⁴
- To date, there has been limited study of the acceptability and feasibility of overdose detection technologies, which can influence their adoption and sustained implementation in a variety of settings.
- We conducted a mixed-methods study exploring service provider and client perspectives of the feasibility and acceptability of one overdose detection technology for restrooms, the reverse motion sensor system developed by Brave Technology Co-op in 2019 (Vancouver, BC Canada; Dayton, OH, USA):

Figure 1. Sensor activation and response

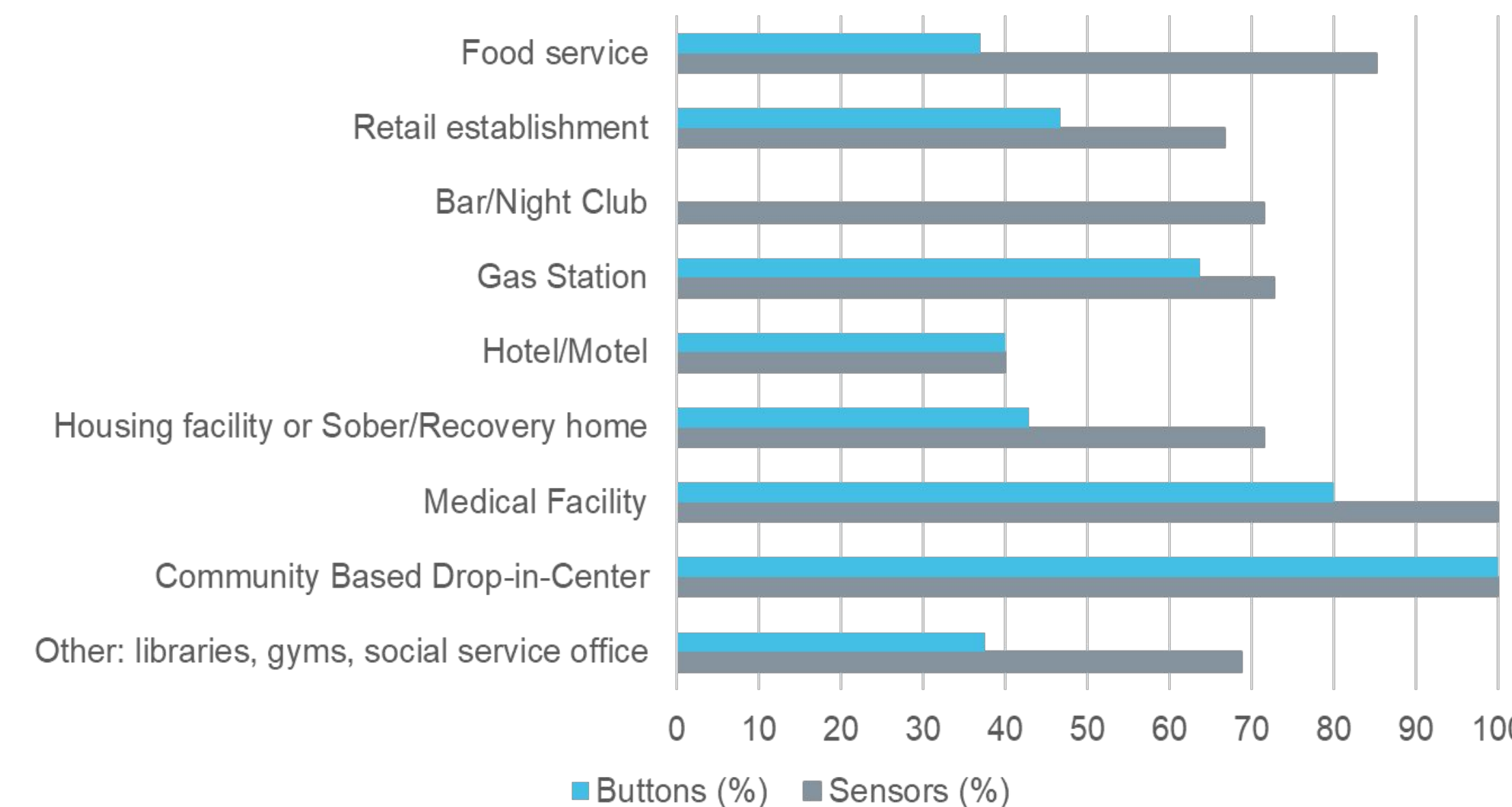


Methods

- We conducted 100 surveys of workplaces located in 8 high burden cities and towns in Rhode Island (manager or staff).
- Categories of surveyed sites we any indoor workplace where overdose may occur including but not limited to: food service (27%), retail (15%), gas stations (11%), bars/clubs (7%), hotels/motels (10%), housing programs (7%), medical facilities (5%), community drop-in centers (2%), and other locations (16%).
- Descriptive analysis was completed in Stata 16.
- Additionally, we facilitated 8 focus group discussions with staff (N=20) and patients (N=20) in housing facilities, outpatient drug treatment centers, and harm reduction organizations across Rhode Island.
- Semi-structured guides elicited discussant perspectives and experiences and we used blended thematic analysis to interrogate the perceived feasibility and acceptability of Buttons and Sensors across implementation contexts.

Results

Figure 2. ODT Acceptability



"You never know what could happen. They could be going—nobody ever knows what someone's going through. I could come—I could be a staff member. I could be clean for 20 years, but guess what? If I lose my daughter, or let's just say I got an urge that's so bad that I go and I go into the bathroom and I do what I do. Guess what? Game over, all because that technology wasn't there."

"We're still going to be out there doing the same thing we've always done, just with an extra set of eyes."

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

"Everyone here knows I do drugs, but if my boss found out that I fucking smoke meth, he'd probably fire me, even though I work fucking seven days a week and I don't complain..."

They have tremendous issues about confidentiality and who they come in contact with, and who we come in contact with... Many of our patients are involved with child protection services, probation...parole... Their whole life is being monitored"

"To save somebody's life?"
"Yeah, it's worth it. It's worth it."
"Yeah, are you kidding me? That's \$41 a month. Come on."

Survey data revealed a substantial interest in restroom sensor systems to complement existing safety procedures.

- Acceptability of restroom sensors was highest among community-based centers, medical facilities and food service (85-100%), lowest among hotels/motels (40%), and moderately high among all other locations (67-73%).
- However, there was virtually no awareness of this technology (4%).
- Many (37%) knew of one or more overdoses that had occurred inside their workplace and additional overdoses that had occurred immediately outside of their premises (36%). Only 34% of workplaces had protocols in place for overdose detection and response.
- However only 41% of workplaces had naloxone onsite and only 16% reported that their staff were fully trained in naloxone administration.

Feasibility was mixed: although all sites had restrooms where the sensors could be installed, there was moderate willingness to train all staff in overdose response and CPR (50%), and only 34% of workplaces had a staff cell phone that could receive text alerts.

- Focus group discussants embraced the prospect of sensor installations especially in housing facilities and public restrooms.
- Optimism towards sensors stemmed from anxiety/stress that onsite overdose monitoring induced for staff and traumas from prior onsite overdoses.
- Discussants expressed enthusiasm about the plurality of overdose detection technology applications (i.e., responding to overdose and other emergencies that cause loss of movement).
- Other perceived benefits included technology affordability, protection of client anonymity during overdose responses, and potential to circumvent EMS callouts during non-emergency overdoses.
- Discussants reported varying current procedures regarding manual restroom checks in the absence of sensors, from every 5 minutes to once a day depending on the type of facility.
- Staff cited a constant concern that implementation of sensors or overdose response training would result in legal liability for the workplace and for overdose victims (e.g., eviction, fired from job, program discharge, arrest if 911 is called).
- Staff were also concerned about dealing with the trauma of loss and lost patronage as a result of an onsite overdose, as well as staff capabilities required for overdose response, and long-term costs of continuous training and technology maintenance.

- Staff and patients shared concerns surrounding data stewardship

"Yeah, the information: how it's held, where is it going, who's holding it"

Conclusion

- To optimize adoption and implementation of overdose detection technologies, service providers across settings should:
 - Provide adequate staff sensitization to Sensors and support
 - Make naloxone readily available to staff and community members
 - Bolster staff capacity and self-efficacy to respond to Sensor alerts
- Findings demonstrated high feasibility and acceptability of ODTs among staff and patients but revealed barriers to their adoption and implementation in certain contexts.
- Investments in implementation and supportive policy change will be required to ensure scale up and sustainment.
- If successful, ODT interventions will represent a major expansion in the field of overdose prevention

Acknowledgments

We thank all service providers and clients for sharing their time and expertise during focus group discussions. We also acknowledge contributions from the innovators at Brave Technology Co-op (Gordon Casey, Oona Krieg, Dana Fleetham).

This study was funded by the Patterson Trust and the Center of Biomedical Research Excellence (COBRE) on Opioids and Overdose, a program of the National Institute of General Medical Sciences (P20GM125507). The contents of this poster are solely the responsibility of the authors and do not necessarily represent the official position of the funders.

Author Affiliations

- Warren Alpert Medical School, Brown University
- Harm Reduction Innovation Lab, Rhode Island Hospital
- COBRE on Opioids and Overdose, Rhode Island Hospital
- Bloomberg School of Public Health, Johns Hopkins University
- Heller School for Social Policy and Management, Brandeis University

Contact Information

Ju Nyeong Park, PhD, MHS
ju_park@brown.edu

- Lombardi AR, Arya R, Rosen JG, Thompson E, Welwain R, Tardif J, Rich JD, Park JN. Overdose detection technologies to reduce solitary overdose deaths: a literature review. International Journal of Environmental Research and Public Health. 2023 Jan 10;20(2):1230.
- Donnell A, Unnithan C. Digital interventions to save lives from the opioid crisis prior and during the SARS COVID-19 pandemic: a scoping review of Australian and Canadian experiences. Frontiers in Public Health. 2022 Jul 12;10:900733.
- Oteo A, Daneshvar H, Baldacchino A, Matheson C. Overdose alert and response technologies: state-of-the-art review. Journal of Medical Internet Research. 2023 Feb 15;25:e40389.
- Park JN, Green TC, Rich JD. Overdose Detection Technologies—A New Frontier in Preventing Solitary Drug Overdose Deaths. JAMA Psychiatry. 2023 Jul 1;80(7):657-9.
- Loverock A, Marshall T, Viste D, Safi F, Rioux W, Sedaghat N, Kennedy M, Ghosh SM. Electronic harm reduction interventions for drug overdose monitoring and prevention: a scoping review. Drug and alcohol dependence. 2023 Jun 30;110878.