Trends from the Rhode Island Harm Reduction Surveillance System: 2021–2024

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ABSTRACT

Amid the increase in fatal overdoses in Rhode Island (RI) over the past decade, understanding substance use and harm reduction practices is critical for informing prevention strategies. This work aimed to evaluate trends in substance use behaviors, overdose experiences, and harm reduction practices among people who use non-prescribed substances in RI. In a convenience sample of 673 participants from the 2021–2024 Harm Reduction Surveillance System (HRSS), the most reported substances used in the past 30 days were: alcohol (73%), crack cocaine (72%), cannabis (69%), cocaine (42%), and fentanyl/heroin (39%). We observed a decrease in harm reduction practices in 2024, including always using fentanyl test strips and always using substances in the presence of others after an increase from 2021 to 2023. Notably, 86% of respondents reported having a disability. These findings emphasize the ongoing need for comprehensive harm reduction programs to engage high-risk individuals, tailored to those with disabilities.

KEYWORDS: harm reduction; overdose; substance use

INTRODUCTION

Over the last 10 years, deaths from accidental drug overdoses in Rhode Island (RI) increased by 68%, from 240 in 2015 to 404 in 2023.[1] To address the overdose epidemic, the Rhode Island Department of Health (RIDOH), in partnership with community organizations, promotes harm reduction strategies to improve the health of individuals who use substances.[2,3] To help inform these prevention strategies, RIDOH launched the Harm Reduction Surveillance System (HRSS) to understand how substance use, overdose experience, and harm reduction practices may have changed among individuals in RI who use non-prescribed substances.

METHODS

The HRSS was launched in January of 2021 by RIDOH in partnership with Preventing Overdose and Naloxone Intervention (PONI) based at The Miriam Hospital. The HRSS used a convenience sampling method to collect information from people who were actively using non-prescribed substances in RI, including capturing data on demographics, substance use behaviors, overdose experience, harm reduction practices, and access to health services and substance abuse treatment. In 2023, the survey added a question to collect self-reported diagnosed disability information on physical, sensory, developmental disability, mental health, traumatic brain injury, and post-traumatic stress disorder (PTSD). Participants were recruited via targeted canvassing and referrals at community outreach and needle exchange programs, encampments, and overdose hotspots in RI. Individuals who participated in this survey were given $25 compensation. Recruitment for the HRSS ended on December 31, 2024.

Survey participants were included in this analysis if they were a current RI resident, aged 18 or older, provided verbal consent, and self-reported use of non-prescribed substances in the past 30 days (excluding individuals who only used cannabis). We compared demographic characteristics, alcohol and non-prescribed substance use, overdose experience, and harm reduction practices stratified by year using chi-square or Fisher's exact tests when expected cell counts were less than or equal to five (p=0.05). This work is considered public health surveillance and was deemed exempt by the RIDOH Institutional Review Board (IRB) and approved by the Miriam Hospital IRB. All analyses were performed in SAS (Version 9.4).

RESULTS

From 2021 to 2024, 673 RI residents met inclusion criteria. Most participants were ages 25–54 (79%), male (66%), non-Hispanic White (40%), experienced housing instability (77%), and had health insurance (93%) [**Table 1**]. Since the disability module was added in 2023, 86% reported having a disability, and the most common disability types were mental health (73%), PTSD (58%), and developmental disabilities (42%). When looking at harm reduction practices by diagnosed disability types, significant differences were observed in currently carrying naloxone and use of fentanyl test strips between those who reported having diagnosed developmental disability compared to those who did not [**Table 2**].

Alcohol (73%), crack cocaine (72%), cannabis (69%), cocaine (42%), and fentanyl/heroin (39%) were the most

Table 1. Demographics of respondents by year, Rhode Island Harm Reduction Surveillance System, 2021–2024

	2021 N=200	2022 N=193	2023 N=111	2024 N=169	Total N=673
Age[a]					
18–24	9 (4.5)	10 (5.2)	5 (4.6)	10 (5.9)	34 (5.1)
25–34	54 (27.0)	57 (29.5)	26 (23.6)	28 (16.6)	165 (24.6)
35–44	50 (25.0)	65 (33.7)	41 (37.3)	58 (34.3)	214 (31.9)
45–54	54 (27.0)	37 (19.2)	28 (25.5)	36 (21.3)	155 (23.1)
55–64	26 (13.0)	21 (10.9)	9 (8.2)	34 (20.1)	90 (13.4)
65+	7 (3.5)	<5	<5	<5	14 (2.1)
Sex assigned at birth					
Male	129 (64.5)	127 (65.8)	74 (67.3)	116 (69.1)	446 (66.5)
Female	71 (35.5)	66 (34.2)	36 (32.7)	52 (31.0)	225 (33.5)
Race and ethnicity					
Hispanic (any race)	44 (22.0)	53 (27.5)	36 (32.4)	49 (29.0)	182 (27.0)
Non-Hispanic Black	35 (17.5)	38 (19.7)	16 (14.4)	34 (20.1)	123 (18.3)
Non-Hispanic White	93 (46.5)	69 (35.8)	46 (41.4)	61 (36.1)	269 (40.0)
Other	28 (14.0)	33 (17.1)	13 (11.7)	25 (14.8)	99 (14.7)
Housing status[a]					
Housing Stable	45 (23.0)	54 (28.4)	26 (24.1)	26 (15.5)	151 (22.8)
Housing Instable	151 (77.0)	136 (71.6)	82 (75.9)	142 (84.5)	511 (77.2)
Health insurance					
Yes	191 (95.5)	181 (93.8)	102 (91.9)	154 (91.1)	628 (93.3)
No	9 (4.5)	12 (6.2)	9 (8.1)	15 (8.9)	45 (6.7)
Diagnosed disabilities[b,c]					
Physical	—	—	35 (32.1)	60 (36.4)	95 (34.7)
Sensory[a]	—	—	17 (15.6)	47 (28.5)	64 (23.4)
Developmental	—	—	47 (43.5)	69 (41.6)	116 (42.3)
Mental Health	—	—	74 (68.5)	124 (75.2)	198 (72.5)
Traumatic Brain Injury	—	—	16 (14.8)	37 (22.3)	53 (19.3)
Post Traumatic Stress Disorder (PTSD)	—	—	54 (50.9)	102 (61.8)	156 (57.6)

Notes: Percentages may not add up to 100% due to rounding; Count may not add up to total due to missing/unknown responses.

Counts less than 5 are reported as <5.

[a] Statistically significant at p<0.05

[b] Diagnosed disabilities question was asked starting in 2023; Total percentages are based on 2023 and 2024 participants

[c] Physical category include conditions such as cerebral palsy, mobility impairment, and multiple sclerosis. Sensory category includes any problems with hearing or seeing. Developmental category includes autism, ADHD, and dyslexia. Mental health category includes conditions such as depression, bipolar, and anxiety.

reported non-prescribed substances used in the past 30 days [**Table 3**]. In all included years, at least 85% of respondents reported using more than one substance in the past 30 days. From 2021 to 2024, we observed decreases in the proportion of respondents who reported using benzodiazepines (30% to 7%), fentanyl/heroin (49% to 36%), and opioid pain medications (22% to 9%). About one-third of respondents reported consuming alcohol most days per week (4–7 times). The proportion of those who reported not using alcohol at all in the past 12 months, however, increased from 22% in 2021 to 27% in 2024.

Respondents experiencing an overdose in the last 12 months decreased from 41% in 2021 to 24% in 2024 [**Table 4**]. The percentage of respondents reporting they witnessed an overdose in the past 12 months, however, was similar between 2021 (64%) and 2024 (63%). When asked about the most recent overdose witnessed by the respondents, the two most frequent actions following the overdose were someone (not Emergency Medical Technician (EMT)/police) gave naloxone (69%) and someone called 911 (60%). Among those who witnessed an overdose in the past 12 months, 54% of respondents in 2024 said someone (excluding EMT or police) gave the individual who overdosed naloxone, which is a decrease compared to 2021 (68%). The percentage of those who witnessed an overdose where 911 was called remained similar from 2021 to 2024, at roughly 60%.

In 2024, 4% of respondents reported always using fentanyl test strips to test a new batch of drugs, 55% that they currently had naloxone, 47% reporting always using with others, and 20% always starting with a low dose [**Table 5**]. The proportion of respondents who always use fentanyl test strips decreased down to similar proportions to 2021 (5%), while the proportion of those who always use substances in the presence of others decreased down to proportions in 2022 (43%) [**Figure 1**]. The proportion of respondents who never used with others remained similar in all four years at around 10%.

Table 2. Harm reduction practices by diagnosed disability types, Rhode Island Harm Reduction Surveillance System 2023–2024

	Physical N=95	Sensory N=64	Developmental N=116	Mental Health N=198	Traumatic Brain Injury N=53	PTSD N=156
Currently have naloxone						
Yes	60 (63.2)	45 (70.3)	79 (68.1)*	120 (60.6)	30 (56.6)	99 (63.5)
No	35 (36.8)	19 (29.7)	37 (31.9)*	78 (39.4)	23 (43.4)	57 (36.5)
Had naloxone past 12 months						
Yes	74 (77.9)	54 (84.4)	96 (82.8)	155 (78.3)	42 (79.3)	126 (80.8)
No	21 (22.1)	10 (15.6)	20 (17.2)	43 (21.7)	11 (20.8)	30 (19.2)
Used fentanyl test strip						
Always	<5	<5	14 (12.4)*	15 (7.7)	<5	12 (7.8)
Most/sometimes	21 (22.3)	12 (19.4)	28 (24.8)*	42 (21.4)	12 (23.1)	36 (23.4)
Never	69 (73.4)	46 (74.2)	71 (62.8)*	139 (70.9)	39 (75.0)	106 (68.8)
Use with other people						
Always	49 (52.1)	28 (45.2)	59 (52.2)	108 (55.1)	29 (55.8)	82 (53.3)
Most/sometimes	37 (39.4)	26 (41.9)	44 (38.9)	72 (36.7)	18 (34.6)	61 (39.6)
Never	8 (8.5)	8 (12.9)	10 (8.9)	16 (8.2)	5 (9.6)	11 (7.1)
Start with low dose						
Always	24 (26.1)	18 (28.6)	22 (20.6)	47 (25.0)	8 (15.4)	41 (27.3)
Most/sometimes	31 (33.7)	24 (38.1)	38 (35.5)	59 (31.4)	18 (34.6)	49 (32.7)
Never	37 (40.2)	21 (33.3)	47 (43.9)	82 (43.6)	26 (50.0)	60 (40.0)
Share needles						
Always	<5	<5	<5	<5	<5	<5
Most/sometimes	<5	<5	6 (21.4)	5 (13.9)	<5	5 (16.1)
Never	17 (94.4)	14 (87.5)	22 (78.6)	31 (86.1)	10 (83.3)	26 (83.9)
Share a pipe						
Always	7 (9.5)	7 (13.2)	7 (8.1)	11 (7.1)	<5	11 (9.1)
Most/sometimes	35 (47.3)	24 (45.3)	41 (47.7)	77 (50.0)	19 (48.7)	62 (51.2)
Never	32 (43.2)	22 (41.5)	38 (44.2)	66 (42.9)	17 (43.6)	48 (39.7)

Notes: Percentages may not add up to 100% due to rounding
Count may not add up to total due to missing/unknown responses.
Counts less than 5 are reported as <5.
Diagnosed disability categories are not mutually exclusive.
* Statistically significant at p<0.05

DISCUSSION

Among this convenience sample of marginalized individuals who use non-prescribed substances in RI, many individuals had witnessed (66%) or experienced (30%) an overdose in the last 12 months, highlighting the continued need to provide harm reduction services to this population. It is concerning to see that in 2024, only 55% of respondents currently had naloxone, given that 63% of respondents witnessed and 24% of respondents experienced an overdose in the past 12 months. Additionally, the percentage of most recently witnessed overdose in which someone called 911 remained similar over all years (~60%), while the proportion of someone (not EMT or police) administering naloxone decreased from 84% in 2023 to 54% in 2024. These data together underscore the importance of sustaining low-barrier naloxone availability and distribution in RI through a variety of settings for high-risk individuals who use non-prescribed substances to prevent future fatal overdoses.

There was a decline in some harm reduction practices in 2024, including always using fentanyl test strips and always using substances in the presence of others, after yearly positive increases from 2021 to 2023. The proportion of those who never used with others remained similar across all years, suggesting the shift in proportions were within those who always and mostly or sometimes used with others. These behaviors are critical components of prevention efforts aimed to reduce the number of non-fatal and fatal overdoses, especially in the context of the high prevalence of polysubstance use.[4,5] The observed decrease in 2024 presents a meaningful trend and may be due to several underlying factors such as potential gaps in awareness or education, burnout from responding to overdose events, stigma towards using substances and harm reduction strategies that discourage users from adopting life-saving behaviors. It is also possible that the timing of data collection in 2024 may have coincided with periods of lower service engagement or during a temporal shift in offered services which may have impacted access to harm reduction supplies or programs. Therefore, we offer these factors as hypotheses to inform future research, rather than as definitive conclusions.

Nonetheless, these results highlight the need for continued efforts to promote harm reduction strategies and ensure individuals have access to necessary resources and programs for this population. As most fatal overdoses occur in private settings in the absence of a bystander, education on programs such as the Safe Spot or Never Use Alone hotline should be promoted to mitigate some of this risk for individuals who use alone.[6-8] Future analyses with mixed-methods approaches integrating HRSS data and participant perspectives should investigate specific factors such as demographics and

Table 3. Alcohol and non-prescribed substance use among survey respondents, Rhode Island Harm Reduction Surveillance System, 2021–2024

	2021 N=200	2022 N=193	2023 N=111	2024 N=169	Total N=673
Alcohol use					
4–7 times/week	70 (35.0)	60 (31.1)	35 (31.5)	56 (33.1)	221 (32.8)
1–3 times/week	41 (20.5)	48 (24.9)	25 (22.5)	34 (20.1)	148 (22.0)
2 or less per month	46 (23.0)	26 (13.5)	17 (15.3)	34 (20.1)	123 (18.3)
None in the past 12 months	43 (21.5)	59 (30.6)	34 (30.6)	45 (26.6)	181 (26.9)
Non-prescribed substances[a]					
Benzodiazepines[b]	59 (29.5)	46 (23.8)	12 (10.8)	11 (6.5)	128 (19.0)
Cannabis	133 (66.5)	138 (71.5)	86 (77.5)	109 (64.5)	466 (69.2)
Cocaine	85 (42.5)	88 (45.6)	48 (43.2)	63 (37.3)	284 (42.2)
Crack	150 (75.0)	130 (67.4)	77 (69.4)	126 (74.6)	483 (71.8)
Fentanyl/Heroin[b]	97 (48.5)	64 (33.2)	38 (34.2)	61 (36.1)	260 (38.6)
Methamphetamines	61 (30.5)	45 (23.3)	26 (23.4)	39 (23.1)	171 (25.4)
Opioid Pain Medications[b]	44 (22.0)	28 (14.5)	13 (11.7)	16 (9.5)	101 (15.0)
Other Stimulants[b]	26 (13.0)	27 (14.0)	17 (15.3)	8 (4.7)	78 (11.6)
Polysubstance use	179 (89.5)	170 (88.1)	101 (91.0)	144 (85.2)	594 (88.3)

Notes: Percentages may not add up to 100% due to rounding
Count may not add up to total due to missing/unknown responses.
a Categories are not mutually exclusive.
b Statistically significant at p<0.05

type of substances used that encourage these behaviors among people who use non-prescribed substances in RI.

The newly added disability measure shows that the prevalence of disabilities in this sample of adults who use non-prescribed substances in RI is higher than the national average. In 2022, the CDC estimated that 1 in 4 adults in the US had a disability, while 86% of 2023–2024 HRSS respondents reported having at least one type of disability (data not shown).[9,10] This is consistent with other current research that adults with disabilities are at increased risk for having a substance use disorder.[11-13] In addition, prior research has demonstrated that people with disabilities are at an increased risk for opioid overdose-related emergency department visits, and other quantitative and qualitative research has shown that people with disabilities experience barriers to receiving treatment.[14-16] The intersection of disability, substance use, and harm reduction can present significant challenges in public health, and this population should be considered more intentionally with prevention work and in clinical settings.[11] Treatment programs including modified residential settings and other tailored interventions that intentionally accommodate for the person's disability while providing integrated care have shown improved outcomes by addressing both substance use and disability as interconnected issues.[17,18] This highlights the importance of person-centered, accessible outreach, and tailored prevention and treatment efforts when serving this population.

This work also highlights the high prevalence of cannabis, cocaine, and alcohol use in this marginalized population and the continued need to develop harm reduction strategies, ways to reach, and ways to provide services to individuals who are not using opiods. While not representative of all individuals who use non-prescribed substances in RI, the data from this survey does align with recent fatal data from 2024 showing a decline in opioid, fentanyl, and benzodiazepines contributing to fatal overdoses in RI. While the number of fatal overdoses has declined from 2022 in RI, the number of stimulant-involved fatal overdoses has remained relatively stable from 2021–2024, highlighting the continued need of harm reduction for this population.[19]

Limitations for this data include the use of convenience sampling method to recruit from a high-risk population. While cost effective and easy to implement, this introduces biases that limit the generalizability of these results to just the studied population and not more broadly to all individuals who use drugs in RI, particularly those less connected to services. The use of convenience sampling may also skew the data if recruitment sites and/or outreach patterns change over time. Shift in recruitment from harm reduction centers to encampments and overdose hotspots, where harm reduction practices are harder to maintain, may result in lower levels of harm reduction practices.[20-22] This makes it difficult to attribute the observed trends in harm reduction practices to actual behavioral change among survey participants or simply due to sampling variation in sampling sites. Additionally, because the survey is primarily administered face-to-face by an interviewer, social desirability bias may be present.[23] Lastly, this study relied on bivariate analyses which does not account for potential confounding or effect modification. While this approach provides descriptive insights in factors associated with harm reduction practices, the findings should not be interpreted as causal. Future research with larger, probability-based samples may be able to explore adjusted associations.

Despite the decline in fatal overdoses in 2023 and 2024 compared to 2022, the results from this analysis revealed a notable reversal in several harm reduction practices. This trend highlights the importance of education, prevention, and policy efforts targeting high-risk individuals who use non-prescribed substances to reinforce harm reduction practices.

Table 4. Overdose experience among survey respondents, Rhode Island Harm Reduction Surveillance System 2021–2024

	2021 N=200	2022 N=193	2023 N=111	2024 N=169	Total N=673
Witness overdose in past 12 months					
Yes	128 (64.0)	137 (71.0)	74 (67.3)	105 (62.5)	444 (66.2)
No	72 (36.0)	56 (29.0)	36 (32.7)	63 (37.5)	227 (33.8)
What happened after overdose[a]					
Someone (not EMT or police) gave naloxone[b,c]	87 (68.0)	100 (73.0)	62 (83.8)	57 (54.3)	306 (68.9)
Someone called 911	77 (60.2)	77 (56.2)	48 (64.9)	64 (61.0)	266 (59.9)
Police administered naloxone[b]	13 (10.2)	7 (5.1)	9 (12.2)	<5	32 (7.2)
EMT administered naloxone	48 (37.5)	38 (27.7)	18 (24.3)	24 (22.9)	128 (28.8)
Someone gave rescue breaths	47 (36.7)	48 (35.0)	34 (46.0)	33 (31.4)	162 (36.5)
Someone administered chest compression[b]	51 (39.8)	52 (38.0)	39 (52.7)	32 (30.5)	174 (39.2)
Ambulance arrived[b]	64 (50.0)	58 (42.3)	31 (41.9)	29 (27.6)	182 (41.0)
Someone took them to the hospital	6 (4.7)	<5	<5	<5	9 (2.0)
Person came to their own	6 (4.7)	<5	<5	<5	13 (2.9)
Person died	10 (7.8)	6 (4.4)	8 (10.8)	<5	27 (6.1)
Witness left area before or when EMT/police arrived	8 (6.3)	13 (9.5)	<5	12 (11.4)	35 (7.9)
Experienced overdose in past 12 months[b]					
Yes	82 (41.2)	44 (23.3)	30 (27.3)	40 (24.0)	196 (29.5)
No	117 (58.8)	145 (76.7)	80 (72.7)	127 (76.1)	469 (70.5)

Notes: Percentages may not add up to 100% due to rounding
Count may not add up to total due to missing/unknown responses.
Counts less than 5 are reported as <5.
a Count and percentages are among respondents who witnessed an overdose in the past 12 months. Categories are not mutually exclusive.
b Statistically significant at p<0.05
c "Someone" includes anyone who may have administered naloxone excluding EMT or police.

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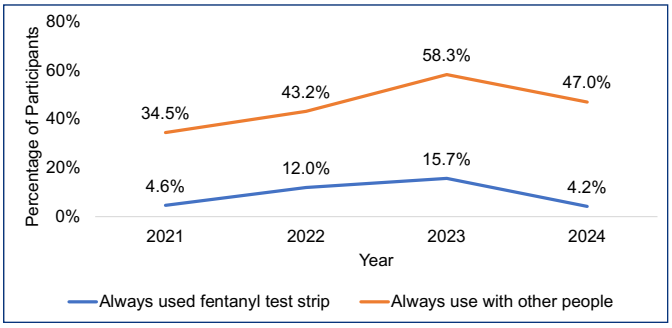
Table 5. Harm reduction practices among survey respondents, Rhode Island Harm Reduction Surveillance System 2021–2024

	2021 N=200	2022 N=193	2023 N=111	2024 N=169	Total N=693
Currently have naloxone					
Yes	130 (65.3)	108 (56.3)	74 (67.3)	93 (55.0)	405 (60.5)
No	69 (34.7)	84 (43.8)	36 (32.7)	76 (45.0)	265 (39.6)
Had naloxone past 12 months					
Yes	161 (80.5)	142 (73.6)	88 (79.3)	127 (75.2)	518 (77.0)
No	39 (19.5)	51(26.4)	23 (20.7)	42 (24.9)	155 (23.0)
Used fentanyl test strip[a]					
Always	9 (4.6)	23 (12.0)	17 (15.7)	7 (4.2)	56 (8.4)
Most/sometimes	41 (20.7)	51 (26.6)	17 (15.7)	35 (20.8)	144 (21.6)
Never	148 (74.8)	118 (61.5)	74 (68.5)	126 (75.0)	466 (70.0)
Use with other people[a]					
Always	68 (34.5)	82 (43.2)	6 (58.3)	79 (47.0)	292 (44.0)
Most/sometimes	110 (55.8)	86 (45.3)	33 (30.6)	71 (42.3)	300 (45.3)
Never	19 (9.6)	22 (11.6)	12 (11.1)	18 (10.7)	71 (10.7)
Start with low dose					
Always	48(24.5)	41 (21.9)	32 (32.0)	33 (19.8)	154 (23.7)
Most/sometimes	67 (34.2)	52 (27.8)	23 (23.0)	62 (37.1)	204 (31.4)
Never	81 (41.3)	94 (50.3)	45 (45.0)	72 (43.1)	292 (44.9)
Share needles					
Always	<5	<5	<5	<5	<5
Most/sometimes	19 (27.5)	5 (10.6)	<5	5 (16.1)	30 (17.8)
Never	49 (71.0)	41 (87.2)	21 (95.5)	26 (83.9)	137 (81.1)
Share a pipe					
Always	15 (9.2)	17 (11.6)	9 (11.3)	10 (7.3)	51 (9.7)
Most/sometimes	85(52.2)	57 (39.0)	30 (37.5)	70 (51.1)	242 (46.0)
Never	63 (38.7)	72 (49.3)	41 (51.3)	57 (41.6)	233 (44.3)

Notes: Percentages may not add up to 100% due to rounding
Count may not add up to total due to missing/unknown responses.
Counts less than 5 are reported as <5.
a Statistically significant at p<0.05

Figure 1. Trends in always using fentanyl test strip and using with other people among survey participants by year, Rhode Island Harm Reduction Surveillance System 2021–2024



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