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Expanding The Accessibility of Harm Reduction Services in The United States: Measuring the Impact of An Automated Harm Reduction Dispensing Machine

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Structured Abstract:

Background: In 2021, approximately 107,622 Americans died from drug overdose in the United States. With overdose deaths rising rapidly, it is imperative that prevention efforts focus on expanding proven, evidence-based strategies to curb overdose death rates such as targeted naloxone distribution and syringe service programs (SSPs). The COVID-19 pandemic placed additional strain on SSPs, increasing the need for programs that minimize direct contact and potential COVID-19 exposure. The purpose of this study is to evaluate the impact of an automated harm reduction dispensing machine on the local accessibility of harm reduction services.

Objectives: The primary outcome of the study is the number of harm reduction supplies distributed to the community by the dispensing machine in its first year compared to the number of supplies distributed by the same organization in the previous year. Secondary outcomes include the countywide incidence of fatal drug overdose and HIV compared to previous years.

Methods: The machine is located outside, in the same location as a once weekly, in-person SSP. Clients register with the program over the phone with a harm reduction coordinator. Each client is connected to products and services such as naloxone, sharps containers, safer injection/smoking kits, pregnancy tests, HIV tests, substance use disorder treatment and more.

Results: Since installation, 637 individuals registered with the program, 12% of whom had never reportedly used harm reduction services before. Within its first year of use, the machine dispensed 3,360 naloxone doses and 10,155 fentanyl test strips, more than any other SSP in the county.

Conclusion: The implementation of an automated harm reduction dispensing machine led to an increased accessibility of harm reduction products and services and was associated with a lower

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Prior Presentations: Portions of this work have been presented at the Ohio Opiate and other drugs conference and the Equitas Health Transforming Care Conference. Neither presentation contained the full data and results/conclusions.

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countywide incidence of unintentional overdose death and HIV. The association with decreased overdose death and HIV incidence should be further investigated to assess causality.

Graphical Abstract

Keywords

Harm Reduction; Substance-Related Disorders; Naloxone; Needle-Exchange Programs; Drug Overdose; Fentanyl; Blood-Borne Infections

BACKGROUND:

In 2021, approximately 107,622 Americans died from drug overdose in the United States, an increase of 15% from 2020.[1] Historically when discussing opioid use, much of the focus has been on prescription opioids. In 2020, however, the national opioid dispensing rate (which has been steadily declining since 2012) fell to the lowest it has been since 2006, when the Centers for Disease Control and Prevention began tracking the statistic.[2] The opioid landscape in the US is rapidly changing, and the fatality associated with opioid use is continuing to rise. It is therefore imperative that prevention efforts focus on expanding proven, evidence-based strategies to curb overdose death rates.

The Centers for Disease Control and Prevention have recently acknowledged, that ideas, which initially seemed counter-intuitive, have shown to be highly effective.[3] They have therefore called for the implementation of ten, evidence-based strategies for preventing opioid overdoses, including targeted naloxone distribution, and syringe services programs (SSPs).[3] Research suggests that at least one in every ten naloxone kits distributed to people who use drugs saves a life.[4,5] Despite the proven safety and efficacy of programs that distribute items such as syringes and naloxone, access to SSPs in the United States has been limited, especially in southern and midwestern states.[6] In 2020, then Surgeon General Jerome Adams highlighted the role that stigma plays in limiting the utility of these programs.[7] These challenges are not unique to America. To limit the role that stigma plays in SSP access, various communities in Europe and Australasia developed Syringe Vending

Machines (SVMs).[8] These SVMs were shown to reduce needle sharing and were utilized by injection drug users who were less likely to attend staffed SSPs.[8]

The United States, however, has been slow to adopt this practice. Puerto Rico implemented the first syringe vending machine on US soil in 2009, however, it took until 2017 for a machine to be placed in the continental United States.[9] In 2017, Nevada became the first state to implement a syringe vending machine. Although early SVMs focused primarily on syringes and injection related equipment, their utility has expanded. In 2019, Las Vegas began including the opioid overdose reversal agent naloxone in their machines, alongside other harm reduction supplies and information about available health/social services.[10] The success of their SVMs has led to expansion within the city, but other metropolitan areas have been slow to follow suit. As such, data regarding the impact of SVMs in the US is limited. Additionally, limited historical data exists regarding the impact of adding naloxone to these machines. Early data from Las Vegas, however, suggests that the inclusion of naloxone within their SVMs were associated with a reduction in opioid-involved overdose fatalities.[10]

Unfortunately, since drug paraphernalia laws and syringe regulations vary across the United States, many communities may be limited in their ability to implement similar programs.[11] Prospective organizations will therefore need to pay special attention to what they can and cannot provide within their own community. Additionally, it will be critical to gather data regarding the efficacy of harm reduction vending machines that include/exclude specific harm reduction products, such as syringes.[11]

In addition to legal barriers, the COVID-19 pandemic has placed additional strain on SSPs, leading to an increased demand for harm reduction programs that not only provide accessible, stigma-free services, but also do so in a manner that minimizes direct contact and potential COVID-19 exposure.[12]

In response to the challenges SSPs have been facing during the COVID-19 pandemic, a new harm reduction dispensing machine was developed in Cincinnati, Ohio. The machine was designed to be located outdoors and available twenty-four / seven, with program registration completed over the phone, allowing full anonymity and stigma-free access. However, in Ohio, state law requires all SSPs to receive approval to operate from their local jurisdiction, this process specifically requires law enforcement consultation. Despite the proposed vending machine being located at the same site as a once-weekly, in-person SSP, local leaders did not approve the inclusion of syringes in the machine, citing concerns regarding the anonymity and lack of face-to-face contact. Although syringes were not permitted to be included, other products such as naloxone, sterile smoking equipment and fentanyl test strips, were able to be included. Evaluating the impact of this machine will, therefore, be crucial to developing a better understanding of how specific characteristics of harm reduction vending machines (such as location, hours of operation, available products etc.) impact their overall efficacy.

This paper aims to describe the development, implementation and impact of this machine and provide specific insights into the barriers that future programs may face while

developing similar initiatives whilst providing recommendations on how harm reductionists may overcome them.

OBJECTIVE(s):

The objective of this study is to describe the machine and its use, as well as measure the impact that a syringe-less, outdoor, 24/7, harm reduction dispensing machine has on the accessibility of harm reduction products and services in a large metropolitan area in the midwestern United States.

METHODS:

Study design and funding

This prospective, IRB-approved, observational study took place in Cincinnati, the largest metropolitan area in Hamilton County, Ohio. The study was locally funded via a grant from Interact for Health and was developed via collaboration between Caracole (a local harm reduction organization) and The University of Cincinnati James L. Winkle College of Pharmacy. Study data was collected and managed using REDCap electronic data capture tools, hosted by The Center for Clinical & Translational Science & Training program (CCTST) at The University of Cincinnati.[13,14] The CCTST program at the University of Cincinnati is funded by the National Institutes of Health Clinical and Translational Science Award Program via grant number UL1TR001425.

Dispensing machine program overview

The machine was placed outside, underneath an awning behind the Caracole headquarters in Cincinnati, Ohio, the same location as a once weekly in-person SSP. Once registered with the program, clients obtain a unique client access code which allows them to access the machine twenty-four hours a day, seven days a week. When clients approach the machine and type in their access code, they can dispense up to one of each of the following products every seven days: two doses of IM naloxone, two doses of naloxone nasal spray, a sharps container, a safer injection kit, a safer smoking kit, a PPE kit, a safer sex kit, a pregnancy test, and a box of bandages. Each client access code is unique and is valid for ninety days, after which, clients must re-enroll with the program. This ninety-day check-in ensures continued interaction between clients and harm reduction coordinators, and provides another opportunity to connect clients to additional harm reduction services.

Harm reduction coordinators, who registered individuals for the program, were equipped to refer clients to a variety of services, including medical treatment for substance use disorder, pre-natal healthcare, HIV testing/prevention/treatment, Hepatitis C testing/treatment, local housing programs, vaccinations, and counseling services. Clients were additionally able (but not required) to provide their name and contact information, allowing coordinators to periodically follow up and reinforce healthy/safe behaviors.

Dispensing machine program registration and re-enrollment process overview

Critically, the registration and re-enrollment processes were anonymous. Clients registered and/or re-enrolled in the program remotely, Monday-Friday from 9am-5pm by calling the phone number provided on the front of the dispensing machine which routed them to an available harm reduction coordinator. While registering clients, harm reduction coordinators educated them on the program and additionally obtained informed consent for the collection of their responses. The coordinator then entered their responses into a Research Electronic Data Capture (REDCap) Survey. Since the machine served a largely vulnerable population, the very first question of the survey explained the process for the collection and retention of the data, harm reduction coordinators additionally ensured that clients knew that their study participation was optional, if they did not want their answers to be recorded, that would be respected, and the individual would still be permitted to use the machine.

No identifying information was required during the survey and the harm reduction coordinators who answered calls were not the same coordinators who control the syringes at the weekly in-person SSP. Enrollment phone calls were routed to a Google Voice number which then redirected the phone call to the harm reduction coordinators on duty. Individuals without a phone could still register for the machine but they had to do so in-person, which is a limitation of the program. These individuals however were still able to decline to have their answers recorded and would be able to utilize the machine regardless. We are unaware of any instances where a patient registered in person due to lack of phone access. All aspects of the study, including the informed consent process, were approved by the local institutional review board.

During these phone registrations, harm reduction coordinators assessed the clients for the products and services they would benefit from and then provided them with their unique client access code. All clients eighteen years or older who provided informed consent were included in the study.

Dispensing machine contents

Each safer injection kit contained the following: two doses of IM Naloxone with two syringes and instructions, ten alcohol pads, five Fentanyl test strips with instructions, one small bottle of bleach, two tourniquets, one bag of cottons, five cookers, one container of lubricant, and four condoms. The syringes for the IM naloxone were approved for inclusion because they were specifically for use with the IM naloxone product and because the needles are longer and thicker than needles typically used for IV injection. Each safer smoking kit contained the same supplies listed above but also included one glass straight stem or one glass bubbler (depending on the kit chosen), a lighter, five rubber pipe covers, and lip balm.

Outcomes and statistical methods

The primary outcome of the study was the number of harm reduction supplies distributed to the community by the dispensing machine in its first year, compared to the number of supplies distributed by the same organization in the previous year. The tracked supplies were the number of naloxone doses, fentanyl test strips, sterile pipes, safer sex kits, and pregnancy tests distributed. Secondary outcomes include the proportion of supplies distributed by the

vending machine compared to the rest of the organization in 2021, the number of naloxone doses and fentanyl test strips distributed to the community by the various SSPs located in Hamilton County, and the incidence of unintentional overdose deaths and HIV within Hamilton County compared to previous years. The primary outcome was assessed for significance with a paired t-test, and an alpha value set a priori to 0.05.

Secondary endpoints such as overdose and HIV incidence were not assessed for statistical significance due to the inherently large number of confounding variables present with such broad, county-wide endpoints. Clients were not recruited to this observational study, therefore a power analysis was not completed. The dispensing machine was installed in February 2021, endpoints utilizing a one-year period comparison utilize the date range of 3/1/21 – 3/1/22 for the first year of vending machine use.

RESULTS:

Registrant demographics (table 1)

Since installation in February of 2021, 637 individuals registered with the program, 12% of whom had never reportedly used harm reduction services before. Most registrants were between 25 and 44 years old and approximately 19% of clients voluntarily provided contact information for follow up. Although most clients using the machine were White, Black individuals made up 5.6% of the clients that utilized the machine. Although this is certainly not an adequate representation of the diversity of Hamilton County, a county where Black individuals make up roughly 27% of the population, this still represents an increase compared to the demographics of the in-person SSP that is located at the same site, where only 2.5% of clients were Black individuals.[15] There was an even 50-50 split of individuals identifying as male and female who used the machine. Demographic data from the in-person SSP however, showed a lower percentage (39%) of clients who identify as female. Age demographics were similar between the clients who used the machine and those who used the in-person SSP. Smoking kits and injection kits made up the two most requested items from the machine, followed by naloxone and sharps containers. The product dispensed most from the machine, however, was naloxone, as it was additionally contained within the injection and smoking kits. During the registration process, harm reduction coordinators, connected 44 clients to HIV testing, 21 clients to Hepatitis C testing and 17 to local housing programs.

Re-enrollment demographics (table 2)

Of the 637 clients who registered with the machine, 105 of them completed an additional re-enrollment survey after ninety days. Re-enrollment surveys were completed by 124 clients but only 105 of the 124 clients that completed a re-enrollment survey had a corresponding initial registration survey which confirmed that they had used the machine before and completed their initial survey. When clients utilize the machine, they can request that their answers not be collected for study purposes. These patients are still able to utilize the machine, but their survey responses are not stored. If after using the machine, clients changed their mind prior to completing the re-enrollment survey, they would appear in the system with a re-enrollment survey but no initial registration survey. Demographic data

is collected entirely during the initial registration survey to minimize survey burden. For this reason, the demographic data listed in table 2 is based on the 105 clients that had both an initial and a re-enrollment survey. The follow up questions regarding how clients have been impacted by the machine is based on all 124 re-enrollments. It should also be mentioned that these re-enrollment numbers are artificially low, as there were issues which prevented access codes from being turned off after ninety days of use. This was not fixed until 2022, as such, longer term data regarding those who continued use of the machine is limited. Of the clients who continually used the machine and completed the re-enrollment process, the majority were White, female, and between 25-44 years of age. Of re-enrollees, 107 (86%) reported previously receiving naloxone from the machine, with 78 (71%) naloxone recipients reporting that they used that naloxone to reverse an overdose. Re- enrollees reported that naloxone from the machine was used to reverse an overdose 288 times. Of re-enrollees, 98 (79%) had previously received fentanyl test strips from the machine and over two-thirds of them would later detect fentanyl within their drug supply. These fentanyl detections led clients to either throw away their supply or use a lower dose 702 times (approximately 75% of the time that fentanyl was detected). Of the re-enrollees, 48 (39%) had previously received a pregnancy test from the machine. These tests detected 13 pregnancies and 5 of these clients then required a referral for pre-natal healthcare. Lastly, 15 (12%) of re-enrollees received an HIV test due to using the machine, despite making up an at-risk population, none were HIV+.

Impact of the dispensing machine (tables 3 and 4)

The dispensing machine had a substantial impact on the availability and distribution of harm reduction products and services in Hamilton County. The machine distributed more sterile pipes, naloxone, fentanyl test strips, and pregnancy tests within its first year than the entire organization had within the previous year. Within the year, the dispensing machine was responsible for 100% of the sterile pipes, 69% of the naloxone doses, 72% of the fentanyl test strips, 100% of the pregnancy tests and 27% of the safer sex kits distributed by the organization. When compared to SSPs in the county, the dispensing machine distributed over 1,200 more doses of naloxone and 3,800 more fentanyl test strips than the next largest SSP.[16] Still, the number of naloxone doses distributed by the machine was lower than the demand. Due to naloxone shortages, there were periods of time where naloxone was unable to be included in injection and/or smoking kits. During these shortages, signs were placed on the machine to ensure that clients were aware that naloxone was not currently included within the kits. Based upon the quantity of safer injection/smoking kit distribution that occurred during these instances, it is estimated that an additional 2,000 naloxone doses would have been distributed had these shortages not occurred.

In 2021, the US experienced a 15% increase in fatal drug overdoses.[1] Ohio, additionally reported an increase in fatal overdoses, going from 5,017 in 2020 to 5,300 in 2021, an increase of roughly 5%.[17] Contrary to rising opioid overdose incidence in the US and in Ohio, especially during COVID-19, Hamilton County has reported a near 10% decrease in unintentional overdose deaths, going from 499 in 2020 to 454 in 2021.[17] Although the introduction of the vending machine was associated with a lower incidence of opioid overdose death in Hamilton county, it is unknown if this relationship is causative in nature.

Lastly, the number of new HIV cases in Hamilton County has continued to decrease in recent years, decreasing from 175 in 2019 to 132 in 2020 and to 127 in 2021. In neighboring counties, HIV cases decreased in 2020 during the initial phase of the COVID-19 pandemic but began climbing back towards pre-pandemic numbers in 2021. It is unclear if this change in HIV incidence is reflective of COVID-19 measures related to social distancing or related to a decreased availability of testing services due to the pandemics impact on harm reduction programs.[12] Regardless, it is interesting to note that Hamilton County specifically, has bucked this trend, continuing to shrink their HIV incidence even further during 2021.[18] It is unknown if the introduction of the dispensing machine had any impact on these numbers.

DISCUSSION:

The dispensing machine has had a demonstrable impact on the accessibility and overall distribution of harm reduction products and services within the county. Use of the machine was directly attributed to an overdose reversal for at least 78 individuals. The machine, within its first year, distributed more naloxone and fentanyl test strips than any other SSP within the county and reached 78 new individuals, who had never reportedly utilized harm reduction services before.[16]

The machine was also associated with a decrease in countywide overdoses by around 10%, despite overdose rates increasing dramatically across the nation.[1] This decrease is certainly a product of a variety of harm reduction initiatives, beyond simply the machine. However, it is important to note that recent findings from the naloxone dispensing machine in Las Vegas, also found an association between their machine and a lower incidence of opioid-associated fatalities. Additionally, when considering the sheer number of overdoses reversed which were directly attributed to naloxone from the dispensing machine, it is more than reasonable to associate the implementation of the machine with a decreasing risk of unintentional overdose.

Previous estimates have shown that for every ten naloxone kits distributed to people who use drugs, one overdose is reversed.[4,5] Within this study, there were 288 overdoses reported to have been reversed as a direct result of the 3,360 naloxone doses dispensed. Therefore 7% of the naloxone doses distributed were confirmed to have been used to reverse an overdose. This is likely an underestimation of it’s true impact, however, as the number of overdose reversals was collected solely from re-enrollment surveys. These surveys were underutilized due to a delay in shutting off client access codes and additionally only provides data on naloxone doses given to those who re-enrolled after ninety days. Despite these plausible mechanisms, and an increasing body of evidence, the association between machine implementation and decreasing incidence of unintentional overdose cannot be assumed to be causal, further investigation is warranted.

The implementation of the dispensing machine was also associated with a lower incidence of HIV in the county. Whether this association is causal or coincidental is unclear. Roughly 12% of individuals who utilized the machine had never reportedly used harm reduction products or services before. Despite the machine not containing syringes), it is in the same location as a once weekly SSP. It is plausible that the implementation of the machine in

this location could result in an increased use of the weekly SSP, an intervention known to reduce HIV incidence.[5,6] Additionally, despite lacking syringes, the machine contained sterile pipes, which when included within other SSPs has led to decreases in the frequency with which individuals inject drugs and increases in the frequency with which they smoke instead.[19] Despite these plausible mechanisms, the association between the machine's implementation and a decreased incidence of HIV cannot be assumed to be a causal relationship, further investigation is warranted.

This study provides additional evidence to support the benefits of harm reduction dispensing machines in the United States and critically provides evidence that even without syringes, these machines can have a profound impact on the community. As the most accessible healthcare professional, pharmacists are well-positioned to complement these programs or implement similar programs within their own practice settings, particularly those in community pharmacies. Currently, one of the largest barriers to the expansion of harm reduction services is the presence (and variability) of state drug paraphernalia laws.[11] In order to complement or integrate similar programs into pharmacy practice settings, pharmacists should first familiarize themselves with their state's laws regarding naloxone and syringe access. Although, laws differ from state to state, most states allow pharmacists to dispense naloxone without a prescription.[20] As it pertains to syringes, however, access is much more limited. Although many states provide exemptions from drug paraphernalia laws for SSPs, this is not true for all states. Additionally, the exemptions for SSPs that do exist are far from perfect, in some states the exemption does not protect against prosecution for any drug residue that may remain on returned syringes. These outdated drug paraphernalia laws serve as the primary legal barrier to scaling up harm reduction programs.

As it pertains to automated harm reduction dispensing machines, requirements will once again, differ based on state. Ohio, for example has added a specific law allowing naloxone for emergency use to be dispensed via automated mechanisms. Pharmacists in states without these rules may consider proposing them to their state board of pharmacy for adoption. In the meantime, pharmacists should familiarize themselves with the laws related to pharmacist dispensing of naloxone and/or syringes in their specific states to best determine what they can and cannot provide for patients. Even in states where dispensing machines may not be approved, pharmacists may be able to provide various harm reduction products and services directly. Additionally, pharmacists should be aware of what resources already exist within their community and refer patients to those resources as appropriate. Pharmacists in states with similar automated naloxone dispensing laws may even decide to incorporate an automated machine within their own pharmacy. Due to the variability of paraphernalia laws, only some may be able to include syringes. In locations where syringe access would not be approved for automated dispensing, placement of a machine at (or near) a pharmacy may allow clients who require syringes to visit the pharmacy and receive a non-prescription syringe after receiving other products/services from the machine. In addition to working around these laws, pharmacists can and should help lead the public discourse to encourage state and federal leaders to repeal these harmful drug paraphernalia laws.

This study adds to the literature to suggest that these machines can be helpful in combatting rising overdose deaths, even when the inclusion of all harm reduction products (such as

syringes) is not permitted. As such, pharmacists should continue to implement and research novel methods for the distribution of harm reduction products and share their results, even when projects are limited by local regulations.

CONCLUSION:

This study demonstrates that the implementation of an automated harm reduction dispensing machine (even without syringes) dramatically increased the accessibility of harm reduction products and services within a large metropolitan area of the midwestern United States within its very first year. Additionally, its implementation was associated with a lower incidence of both overdose death and HIV, although this association should be further investigated to assess for causality.

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Name	Degree	Affiliation
Linda Seiter	Bachelor of Science in Social Science and Psychology	Caracole Inc.
Midge Hines	Master of Social Work	Caracole Inc.
Suzanne Bachmeyer	Bachelor of Arts in Psychology	Caracole Inc.
Rob Goeller	Bachelor of Science in Social Work	Caracole Inc.
Lisa Myers	Master of Business Administration	Interact For Health

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Key Points:

What was already known:

- Increased distribution of harm reduction products/services reduce overdose deaths and decrease the spread of HIV and other blood borne pathogens
- Vending machines have been used to distribute harm reduction products and services in other countries around the world with great success

What this study adds:

- Harm reduction dispensing machines are very effective at the distribution of harm reduction products and services within the Unites States (even without syringes)
- This harm reduction dispensing machine was not only responsible for an increase in the distribution of harm reduction products and services but was also associated with a lower incidence of both unintentional overdose death and HIV.

Table 1

Initial Registration: Client Demographics

Characteristic	Number of Clients (n (%))	
Have you ever used Harm Reduction Services Before?	**Total Clients:**	**637 (100%)**
No:		78 (12%)
Age *(Select one)*	**Total Clients:**	**637 (100%)**
18-24 years:		27 (4.2%)
25-34 years:		212 (33.3%)
35-44 years:		262 (41.1%)
45-54 years:		97 (15.2%)
55-64 years:		30 (4.7%)
≥ 65 or older:		9 (1.4%)
Race *(Check all that apply)*	**Total Clients:**	**637 (100%)**
American Indian of Alaska Native:		8 (1.3%)
Asian:		2 (0.3%)
Black or African American:		36 (5.6%)
Native Hawaiian or other Pacific Islander:		1 (0.2%)
Hispanic/Latinx:		15 (2.4%)
White:		579 (90.9%)
Other:		20 (3.1%)
Gender Identity *(Select one)*	**Total Clients:**	**637 (100%)**
Female:		318 (49.9%)
Male:		317 (49.8%)
Other / Do not Know:		2 (0.3%)
Product Requested *(Check all that apply)*	**Total Clients:**	**637 (100%)**
*, [a] Injection Kit:		397 (62.3%)
*, [a] Smoking Kit:		465 (73.0%)
*Naloxone (IM or Intranasal):		346 (54.3%)
Pregnancy Test:		123 (19.3%)
HIV Testing:		19 (3.0%)
PPE Kit:		215 (33.8%)
Sharps Container:		310 (48.7%)
Band Aids Box:		266 (41.8%)
Safer Sex Kit:		213 (33.4%)
Product Training Requested *(Check all that apply)*	**Total Clients:**	**Varies Per Product**
	Received Naloxone:	*594 (93.2%)*
Requested Naloxone Training:		33 (5.5%)
	Received Test Strips:	*561 (88%)*
Requested Fentanyl Test Strip Training:		42 (7.5%)

Characteristic	**Number of Clients (n (%))**	
	Received Tests:	*123 (19.3%)*
Requested Pregnancy Test Training:		2 (1.6%)
Service Referral Requested *(Check all that apply)*	**Total Clients:**	**637 (100%)**
HIV Testing / Pre-Exposure Prophylaxis:		44 (6.9%)
Hepatitis C Testing:		21 (3.3%)
Vaccinations:		1 (0.2%)
Counseling Services:		6 (1.0%)
Medical Treatment for SUD:		10 (1.6%)
Local Housing Programs		17, (2.6%)
Pre-Natal Healthcare:		1 (0.2%)
None / Do not Know:		563 (88.4%)
Need Transport:		4 (0.6%)
Provide Contact Info for Follow Up *(Select one)*	**Total Clients:**	**637 (100%)**
Yes:		118 (18.5%)
No:		515 (80.8%)
Do not Know / No Answer:		4 (0.6%)

[*] Indicates that the product listed includes naloxone

[a] Indicates that the product listed includes fentanyl test strips

Table 2

90 Day Re-enrollment: Client Demographics

124 Clients Completed a Re-enrolled Survey – 19.5% of overall clients **105 Clients had a Completed, Corresponding Initial Registration Survey with Demographic Data**		
Have you ever used Harm Reduction Services Before?	**Total Clients:**	**105 (100%)**
No:		4 (3.8%)
Age *(Select one)*	**Total Clients:**	**105 (100%)**
25-34 years:		30 (28.6%)
35-44 years:		54 (51.4%)
45-54 years:		18 (17.1%)
55-64 years:		1 (0.9%)
≥ 65 or older:		2 (1.9%)
Race *(Check all that apply)*	**Total Clients:**	**105 (100%)**
Hispanic/Latinx:		3 (2.9%)
White:		101 (96.2%)
Other:		2 (1.9%)
Gender Identity *(Select one)*	**Total Clients:**	**105 (100%)**
Female:		66 (62.9%)
Male:		38 (36.2%)
Other / Do not Know:		1 (0.9%)
Impact of the Machine: Product Receipt & Use	**Total Clients:**	**124 (100%)**
No. of clients who received naloxone		107 (86.3%)
No. of clients who reported using the naloxone		78 (71%)
No. of times the naloxone was used to reverse an overdose		288
No. of clients who received fentanyl test strips (FTS)		98 (79%)
No. of clients who detected fentanyl		66 (67.3%)
No. of times clients detected fentanyl		937 fentanyl detections
No. of times clients used a lower dose or did not use their supply		702 (74.9%) of fentanyl detections
No. of clients who received pregnancy tests		48 (38.7%)
No. of clients who detected a pregnancy		13
No. of clients requiring a referral for pre-natal healthcare		5
No. of clients who received an HIV test		15 (12.1%)
No. of HIV Positive Results		0
No. of HIV negative results		15
Product Requested *(Check all that apply)*	**Total Clients:**	**124 (100%)**
*, [a] Injection Kit:		48 (38.7%)
*, [a] Smoking Kit:		100 (80.6%)
*Naloxone (IM or Intranasal):		45 (36.3%)
Pregnancy Test:		17 (13.7%)

124 Clients Completed a Re-enrolled Survey – 19.5% of overall clients		
105 Clients had a Completed, Corresponding Initial Registration Survey with Demographic Data		
HIV Testing:		1 (0.8%)
PPE Kit:		24 (19.4%)
Sharps Container:		44 (35.5%)
Band Aids Box:		56 (45.2%)
Safer Sex Kit:		19 (15.3%)
Service Referral Requested *(Check all that apply)*	**Total Clients:**	**124 (100%)**
HIV Testing / Pre-Exposure Prophylaxis:		10 (8.1%)
Hepatitis C Testing:		3 (2.4%)
Local Housing Programs		1 (0.8%)
Provide Contact Info for Follow Up *(Select one)*	**Total Clients:**	**124 (100%)**
Yes:		26 (21%)
No:		98 (79%)

[*] Indicates that the product listed includes naloxone

[a] Indicates that the product listed includes fentanyl test strips

Table 3

Impact of The Dispensing Machine on Harm Reduction Distribution / Accessibility

Primary Endpoint: The number of harm reduction supplies distributed to the community by the dispensing machine in its first year compared to the number of supplies distributed by the same organization in the previous year, prior to the organization implementing the vending machine. P-value is a direct comparison between the dispensing machine and the caracole distribution from 3/1/20 – 3/1/21 analyzed by a paired-t test.				
Harm Reduction Products	**Products distributed by Caracole (3/1/19 – 3/1/20)**	**Products distributed by Caracole (3/1/20 – 3/1/21)**	**Products distributed by Dispensing Machine (3/1/21 – 3/1/22)**	**P-values**
Sterile Pipes	--	--	1,278	N/A
Naloxone Doses	354	2,610	3,360 *	< 0.0001
Fentanyl Test Strips	721	3,948	10,155	< 0.0001
Pregnancy Tests	N/A	N/A	303	N/A
Safer Sex Kits	110	929	349	< 0.0001

Secondary Endpoint: The proportion of supplies distributed by the dispensing machine compared to the rest of the caracole organization from 3/1/21 – 3/1/22.			
Harm Reduction Products	**Products distributed by The Dispensing Machine**	**Products distributed by Caracole**	**Percent distributed by The Dispensing Machine**
Sterile Pipes	1,278	--	100%
Naloxone Doses	3,360 *	4,848	69%
Fentanyl Test Strips	10,155	14,106	72%
Pregnancy Tests	303	--	100%
Safer Sex Kits	349	1,290	27%

Secondary Endpoint: The number of naloxone doses and fentanyl test strips distributed to the community by the various S.A.F.E. (Stigma-Free Access for Everyone) services programs in Hamilton County from 3/1/21 – 3/1/22						
Harm Reduction Products	**Dispensing Machine**	**Corryville S.A.F.E. Program**	**Middletown S.A.F.E. Program**	**Northside S.A.F.E. Program**	**OTR S.A.F.E. Program**	**Western Hills S.A.F.E. Program**
** Naloxone Doses	3,360	1,472	--	2,018	1,419	2,140
** Fentanyl Test Strips	10,155	5,249	3,528	5,716	4,117	6,340

* 3,360 doses of naloxone were distributed by the dispensing machine from 3/1/21 – 3/1/22, this was a result of an IM naloxone shortage that limited the ability of the team to keep naloxone doses as part of the safer injection and safer smoking kits at times during the year. Had the shortage not limited the supply, the actual number of naloxone doses dispensed would have been 5,460 based on kit usage.

** Source: Hamilton County Public Health Department. SAFE Services Program Report - Supplies Distribution.; 2022. https://analytics.hcph.org/views/SSPDashboard/SuppliesDistribution?%3Aembed_code_version=3&%3Aembed=y&%3AloadOrderID=2&%3Adisplay_spinner=no&%3AshowAppBanner=false&%3Adisplay_count=n&%3AshowVizHome=n&%3Aorigin=viz_share_link. Accessed June 27, 2022.

Table 4

Overdose and HIV Incidence: Impact of The Dispensing Machine

Secondary Endpoints: The incidence of unintentional overdose and newly diagnosed HIV infection in 2021 compared to 2020 and 2019.			
Overdose and HIV Incidence Statistics	**2019**	**2020**	**2021**
[1]No. of fatal overdoses in Hamilton County	487	499	454
[1]No. of fatal overdoses in Hamilton County involving Hamilton County residents	353	366	381
[1]No. of fatal overdoses in Ohio involving Ohio residents	4028	5017	5300
[2]No. of overdose related Emergency Department Visits in Hamilton County involving Hamilton County residents	704	634	508
[3,4]No. of new HIV infections in Hamilton County	175	132	127
[3,4]No. of new HIV infections attributed to Injection Drug Use in Hamilton County	53	16	10

[1]Hamilton County Addiction Response Coalition. State Of the Addiction Crisis - Annual Report.; 2022:13. https://www.hamiltoncountyohio.gov/common/pages/DisplayFile.aspx?itemId=18437461. Accessed June 27, 2022.

[2]Hamilton County Public Health Department. ED Visit Demographics.; 2022. https://analytics.hcph.org/views/MonthlyOverdoseReport_16191930890170/Demographics2?%3Adisplay_count=n&%3Aembed=y&%3AisGuestRedirectFromVizportal=y&%3Aorigin=viz_share_link&%3AshowAppBanner=false&%3AshowVizHome=n. Accessed June 27, 2022.

[3]Hamilton County Public Health Department. Region 8 HIV Quarterly Report Volume 2, Issue 4.; 2021:4. https://www.hamiltoncountyhealth.org/wp-content/uploads/HIV-Q4-2021.pdf. Accessed June 27, 2022.

[4]Hamilton County Public Health Department. Region 8 HIV Quarterly Report Volume 6, Issue 4.; 2022:4. https://www.hamiltoncountyhealth.org/wp-content/uploads/HIV-Q4-2021.pdf. Accessed June 27, 2022.