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Harm reduction and health services provided by syringe services programs in 2019 and subsequent impact of COVID-19 on services in 2020[☆]

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ABSTRACT

Objectives: This study describes harm reduction and health services provided by U.S syringe services programs (SSPs) in 2019 and changes in provision of those services in 2020.

Methods: SSPs were invited to participate in the Dave Purchase Memorial survey in August 2020. We collected programmatic data on services provided in 2019 and at the time of the survey in 2020. We conducted descriptive analyses using Chi-square and McNemar's tests.

Results: At the time of the survey, > 60% of SSPs reported increased monthly syringe and naloxone distribution and expansion of home-based and mail-based naloxone delivery in Fall 2020 compared to 2019. Approximately three-quarters of SSPs decreased or stopped providing on-site HIV and HCV testing. Nearly half of SSPs offering on-site medications for opioid use disorder (MOUD) in 2019 increased provision of MOUD in 2020. The proportion of SSPs offering on-site mental health care services and primary care services statistically significantly decreased from 2019 to Fall 2020, but telehealth offerings of these services increased.

Conclusions: Many SSPs that offered health services in 2019 and remained operational in 2020 increased telehealth provision of mental health and primary care services, increased MOUD provision, and expanded harm reduction services, but most SSPs reduced or stopped on-site HIV and HCV testing. Sustaining SSP growth and innovation is paramount for preventing overdose deaths and HIV/HCV outbreaks after the deadliest year of the opioid epidemic in 2020.

1. Introduction

The COVID-19 pandemic has exacerbated the opioid epidemic, with reports of increased substance use and the highest overdose fatality rate to date in US history with 90,000 deaths from January to September 2020 (Czeisler et al., 2020; Ahmad et al., 2022). COVID-19 and public health response measures limited the ability of syringe services programs (SSPs) to deliver in-person services. Two surveys of SSPs showed that 15–25% of SSPs had discontinued all SSP operations due to

COVID-19 in March–April 2020 (Bartholomew et al., 2020; Glick et al., 2020). Yet, many SSPs were resilient in continuing to provide life-saving harm reduction supplies (i.e., syringes and naloxone for reversal of opioid overdoses) despite the strain of physical-distancing, reductions in staffing to reduce COVID-19 transmission, lost funding, and stay-at-home policies (Frost et al., 2021; Glick et al., 2020; Wenger et al., 2021). Some SSPs that remained operational responded by expanding secondary syringe exchange, using mail-based distribution of supplies, and delivering overdose education via online platforms to meet the need

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for sterile syringes and naloxone (French et al., 2021; Glick et al., 2020; Wenger et al., 2021).

The Dave Purchase Memorial survey is the longest continuously running survey of SSPs in the United States, providing critical data since 1995; the last survey was conducted in 2015 (Behrends et al., 2018). Since 2015, SSPs underwent substantial growth in response to the opioid epidemic, nearly doubling from 2015 to 2018 in both the number of programs and number of syringes distributed (Des Jarlais et al., 2020). SSPs also provide health services, including HIV and hepatitis C (HCV) testing and treatment and medications for opioid use disorder (MOUD) (Bachhuber et al., 2018; Hood et al., 2020). While there has been growth in the number of SSPs, we know very little about the changes in services provided on-site at SSPs since the 2015 survey. This study describes harm reduction and health services provided by SSPs in 2019. This year was the height of SSP growth and transformation, just before the COVID-19 pandemic, a period of time that is not well described but is crucial to understanding the trajectory of SSPs prior to 2020.

We also describe the provision of SSP services at the time of the survey, a period of August to December 2020. This study provides quantitative data on 2019 SSP activities and subsequent COVID-19 related changes among SSPs that remained operational from 2019 to 2020, including a description of relationships between organizational characteristics and programmatic changes.

2. Methods

A total of 396 SSP directors were invited by email in August 2020 to participate in the Dave Purchase Memorial survey using a list of SSPs maintained by the North American Syringe Exchange Network (NASEN). Approximately 85–95% of SSPs in the US are estimated to be represented in the NASEN database (Des Jarlais et al., 2020). Data were collected via a Qualtrics survey, but SSPs also had the option of completing the survey by phone or email. Programs were considered eligible for the survey if they offered services for at least 3 months in 2019. We emailed the survey to all 396 programs on the NASEN list in August 2020. Of the 396 SSPs, 164 responded, and 153 were eligible and completed the survey. To further examine non-responders, we determined whether they participated in the NASEN Buyers Club. The majority of SSPs on the NASEN directory participate in the Buyers Club, a low-cost distributor of harm reduction supplies. Of the 232 emailed programs that did not respond: 118 did not purchase supplies in 2019 or 2020, suggesting potentially non-operational programs; 42 purchased only in 2020, indicating newly opened programs, and 14 purchased only in 2019, suggesting potential closures. When considering these programs as likely to be ineligible, we obtained responses from 153 of the 211 (73%) active programs in 2019 and 2020. This may be an overestimate given that some SSPs may not take advantage of the discounted supplies through the Buyer's Club. Without consideration of the eligibility or operational status of non-respondents using our method above, we estimate a 40% response rate (153/385). This is likely a substantial underestimate given that SSPs may not have been operational in 2020 due to the COVID-19 pandemic and new SSPs that opened in 2020 would not be eligible for our study. The true response rate is likely between 40% and 73%. Responses were received between August and December 2020, except for one response that was received in February 2021.

We collected program level information about harm reduction and health services provided in 2019 and services provided in 2020 within one survey conducted in the Fall of 2020. Some questions about 2020 were exactly the same questions about 2019, such as questions asking

about any provision of specified on-site services. Some questions about 2020 services asked respondents to directly report if in 2020 they experienced a change in 2020 service levels compared to 2019 (i.e., maintained at the same level, increased, decreased, or no longer provided). For questions about the number of syringes and naloxone kits dispensed in 2020, we asked respondents to report these numbers for the past month rather than the full year. To compare whether the mean number of syringes and naloxone distributed by each SSP per month in 2019 changed in 2020, we created categorical variables reflecting the change between the two years. The outcomes for these service variables were the comparison of the per month mean for 2019 to the past month number reported at the time of completing the 2020 survey, resulting in the following categories: 1) decreased supplies (greater than 10% decrease), 2) stayed the same (within 10% change), or 3) increased (greater than 10% increase). Region was categorized based on Census regions (United States Census Bureau, 2010). We described SSP size utilizing a previously used measure that categorizes SSPs based on the number of syringes dispensed, with small programs defined as those dispensing less than 10,000 syringes, medium programs dispensing 10,000–55,000 syringes, large programs dispensing more than 55,000 and less than 500,000, and very large programs dispensing $\geq 500,000$ syringes per year (Behrends et al., 2018; Des Jarlais et al., 2015). For analysis including questions on the number of syringes, naloxone kits distributed, and participant numbers, we excluded 31 programs that had opened in 2019 since these SSPs may not have been at full capacity for the entire year to get an accurate annual count. For questions where 2020 data were not collected, but 2019 data are reported, we have used "N/A" in the tables to denote that the question was "not asked" in 2020. We excluded missing values from the percentages and note the total denominators in the tables.

We conducted descriptive analysis, including some statistical tests of association to assess differences in key outcomes (i.e., changes in harm reduction, HIV/HCV, and MOUD services) by programmatic characteristics (i.e., geography, organizational type, budget). We assess significant dependent differences in proportions comparing 2019 to 2020 services using the McNemar's test. For questions that ask SSPs to report changes in budget or on-site services directly, we only report descriptive statistics. These questions asked SSPs to estimate the changes in the level (or amount) of services provided in 2020 compared to 2019 with categorical response options presented. We also examined SSP reported changes in key outcomes (HIV/HCV testing, syringe and naloxone dispensing) from 2019 to 2020 by key program characteristics that have been used in previous analysis (i.e., program size, region, location and program type) (Behrends et al., 2018; Des Jarlais et al., 2015). We examine syringe dispensing, naloxone distribution, and HIV/HCV testing as our main outcomes because these are critical harm reduction services provided by a large portion of syringe service programs (Behrends et al., 2018). Differences in proportions across program characteristics are measured using Chi-squared tests of association. This survey was considered non-human subject research because we collected program administration data and do not refer to any individual persons.

3. Results

3.1. Program and participant characteristics

In 2019, SSPs had been operating for a mean of 9 years (median 4 years) and had a mean of 2 fixed sites (Table 1). Over half of SSPs were in urban regions, 30% rural and 13% suburban (Table 1). The Midwest and

Table 1
Program Characteristics of U.S. Syringe Services Programs (SSPs) in 2019 (N = 153).

Program Characteristics in 2019	
	Mean (Median; Range)
Length of Time Operational (months)	104 (47; 13 – 431)
Number of Fixed Sites (N = 152)	1.6 (1; 0 – 10) n (%)
Location ^a	
Rural	46 (30.1)
Suburban	20 (13.1)
Urban	85 (55.5)
Native American (Indian) reservation	2 (1.3)
Region	
Midwest	40 (26.1)
Northeast	23 (15.0)
South	37 (24.2)
West	50 (32.7)
Puerto Rico	3 (2.0)
SEP program size (syringes dispensed) (N = 148) ^b	
Small (1–9,999)	27 (18.2)
Medium (10,000–55,000)	34 (23.0)
Large (55,001–499,999)	55 (37.2)
Very Large (greater or equal to 500,000)	32 (21.6)
Type of organization (N = 151)	
Operated by city, county, or state health department	37 (24.5)
Operated by another non-profit org	11 (7.3)
Operated by another type of org	5 (3.3)
Stand-alone non-profit org (tax exempt)	73 (48.3)
Stand-alone grassroots community-based org	16 (10.6)
Stand-alone other org	9 (6.0)
Budget size	
< \$25,000	52 (34.0)
\$25,000–\$100,000	38 (24.8)
> \$100,000	58 (37.9)
None/unknown/missing	5 (3.3)
Public Funding (N = 149)	
No public funding	56 (37.6)
Less than 50%	17 (11.4)
50% or more	76 (51.0)
SSPs where > 50% of clients inject heroin alone ^a (N = 151)	43 (28.5)
SSPs where > 50% of clients inject heroin in combination ^a (N = 149)	24 (16.1)
SSPs where > 50% of clients inject cocaine alone ^a (N = 150)	3 (2.0)
SSPs where > 50% of clients inject cocaine in combination (not including heroin) ^a (N = 151)	1 (0.7)
SSPs where > 50% of clients inject fentanyl alone/in combination ^a (N = 148)	31 (20.9)
SSPs where > 50% of clients inject methamphetamines alone/in combination ^a (N = 152)	37 (24.3)

^a These percentages are estimates by SSP respondents.

^b SSP program size was defined by the number of syringes dispensed in 2019.

South each represented about 25% of SSPs, with an additional 15% in the Northeast and 33% in the West. Approximately half of the SSPs were stand-alone non-profit organizations (not including health departments) and one quarter were operated by a city, county, or state health department (Table 1).

Based on SSP reported estimates, the mean percentage of clients by gender across all SSPs was 58% men, 39% women, and 3% transgender or non-binary. Eleven percent of SSPs reported that women represented > 50% of clients, and 5% reported that 10–20% of their clients were transgender/non-binary clients. People < 30 years old represented 34% of SSP clients, 51% were 30–50 years old, and 16% were > 50 years old. Fourteen percent of SSPs reported that over 50% of clients were < 30

years old. Most clients were white (69%), followed by Latinx (14%) and Black (11%). Very few SSPs reported having over 50% of clients that were Black (4%) or Latinx (3%). The percentage of SSPs reporting that > 50% of clients injected heroin alone, fentanyl (alone or in combination), and methamphetamines (alone or in combination) was 29%, 21%, and 24%, respectively (Table 1).

3.2. Harm reduction supply delivery

Most SSPs had a brick and mortar building/storefront (64%) and 55% had a mobile unit in 2019 (Table 2). The overall organizational mode of harm reduction delivery did not change substantially from 2019 to 2020, with the exception of a statistically significant increase in mobile unit (55% vs. 63%, p-value < 0.01) and home delivery (38% vs. 44%, p-value < 0.05) (Table 2).

The median number of syringes distributed per SSP in the year 2019 was 139,262 (mean = 489,851, max = 6,255,990) with a median of 201 syringes distributed per participant that year (mean = 344, max = 2355). The mean percentage of syringes distributed via secondary exchange (syringes exchanged for other individuals) was 30% of total syringes distributed by each SSP. Out of 153 SSPs, 148 (97%) distributed naloxone, indicating that just 5 SSPs were not offering naloxone in 2019. The median number of naloxone kits distributed that year was 1000 (mean = 2124, max = 15,000) with a median of 2 naloxone kits distributed per person (mean = 5.7, max = 75). Among the 82 SSPs that reported collecting information on overdose reversals, they reported an average of 373 overdose reversals in 2019.

The mean volume of syringes and naloxone distributed per month in 2019 and in the month prior to the Fall 2020 survey varied by year and program characteristics. In the month prior to the Fall 2020 survey, SSPs distributed a median of 92 syringes per person (mean = 227) and 2 naloxone kits per person (mean = 3). When comparing the 2019 monthly mean to the past month (current) distribution in 2020, 64% and 66% of SSPs increased syringe and naloxone distribution, respectively (Table 3). However, 23% of SSPs decreased the number of syringes distributed and the same proportion decreased naloxone distribution in 2020. SSPs operated by health departments were more likely to decrease their volume of syringe distribution when comparing the 2019 monthly average to the most recent month in 2020 than non-profit SSPs (31% reported decreases among health department vs. 12% non-profits, p-value ≤ 0.001) (Table 4). Small and medium sized SSPs were more likely to decrease their volume of syringe distribution (27%) than large or very large SSPs (21%) (p-value = 0.05) from 2019 to Fall 2020 (Table 4). In 2019, SSPs used multiple modalities for distributing naloxone with 45% of SSPs offering in-person home delivery, 18% mail delivery, 67% community-based overdose education events that were open to the public, and 71% training other organizations' staff and/or clients (Table 2). The delivery of naloxone by SSPs changed between the year 2019 and Fall 2020, with statistically significant increases in home-based delivery (45.3% of SSPs in 2019 vs. 55.4% of SSPs in Fall 2020, p-value ≤ 0.01) and mail-delivery (18.7% of SSPs in 2019 vs. 26.4% of SSPs in Fall 2020, p-value ≤ 0.01) plus decreases in community-based overdose education events (i.e. open to the public) (68.0% of SSPs in 2019 vs. 61.5% of SSPs in Fall 2020, p-value < 0.05) and organization-based overdose education events (i.e. training offered to other organization staff and/or clients) (70.7% of SSPs in 2019 vs. 63.5% of SSPs in Fall 2020, p-value ≤ 0.01) (Table 2).

Table 2

Physical Setup and Services offered at U.S Syringe Service Programs (SSPs) in 2019 and at Time of Survey Completion in 2020 (N = 153).

Services	2019 n (%)	At time of survey (2020)† n (%)
Physical Setup of Program (N = 152)		
Brick and Mortar building/storefront	97 (63.8)	90 (59.2)
Mobile unit (i.e., van, car, etc)**	84 (55.3)	95 (62.5)
Temporary locations (e.g., sidewalk setup)	41 (27.0)	49 (32.2)
Home delivery *	57 (37.5)	67 (44.1)
Backpack delivery	39 (25.7)	39 (25.7)
Mail Order	16 (10.5)	22 (14.5)
Other	11 (7.2)	17 (11.2)
Allow people to receive more syringes than they brought in (N = 151)	135 (89.4)	N/A
Allow participants to exchange syringes for others (secondary exchange) (N = 150)	125 (83.3)	N/A
Supplies provided (N = 152)		
Syringes	151 (99.3)	N/A
Sexual health supplies (i.e., condoms, female condoms, dental dams, lubricant)	148 (97.4)	N/A
Safe injection supplies (i.e., cookers, cotton, alcohol pads, bleach, or water bottles)	151 (99.3)	N/A
Crack kits	48 (31.6)	N/A
Clothes	102 (67.1)	N/A
Food	111 (73.0)	N/A
Hygiene items (soap, toothbrush, etc)	130 (85.5)	N/A
Gift certificates/vouchers/travel incentives	69 (45.4)	N/A
Wound kits	112 (73.7)	N/A
Fentanyl test strips	118 (77.6)	N/A
Other	37 (24.3)	N/A
Distributed naloxone (N = 152)	148 (97.4)	150 (98.7)
Ways naloxone was distributed		
	N = 150	N = 148
Home-based delivery (may include delivery directly to client)**	68 (45.3)	82 (55.4)
Mail delivery (resources mailed to client's home)**	28 (18.7)	39 (26.4)
Secondary distribution (peers distributing to others in network)	115 (76.7)	115 (77.7)
Provider referral for prescription or referral to pharmacy	23 (15.3)	28 (18.9)
Direct distribution from staff to client	144 (96.0)	142 (95.9)
Community-based overdose education events (i.e. open to public)*	102 (68.0)	91 (61.5)
Organization-based overdose education events (i.e. training offered to other organization staff and/or clients)**	106 (70.7)	94 (63.5)
Barriers faced in providing naloxone (N = 149)		
High cost of naloxone	36 (24.2)	N/A
Shortage of naloxone	27 (18.1)	N/A
Legal/political climate	32 (21.5)	N/A
Client-based barriers	25 (16.8)	N/A
Stigma	53 (35.6)	N/A
Other	16 (10.7)	N/A
Did not experience barriers to naloxone distribution	60 (40.3)	N/A
On-site HIV services offered (N = 151)		
HIV education and prevention	125 (82.8)	119 (78.8)
HIV conventional testing (i.e., blood test sent to a lab)	59 (39.1)	58 (38.4)
HIV rapid antibody testing (either saliva or blood-based)	98 (64.9)	89 (58.9)
HIV viral load testing	32 (21.2)	31 (20.5)
PrEP (pre-exposure prophylaxis)	36 (23.8)	34 (22.5)
PEP (post-exposure prophylaxis)	23 (15.2)	22 (14.6)
HIV treatment	18 (11.9)	21 (13.9)
On-site Hepatitis C (HCV) services offered		
	N = 151	N = 150
HCV education and prevention	122 (80.8)	118 (79.2)
HCV conventional testing (i.e., blood test sent to a lab)	51 (33.8)	48 (32.2)
HCV rapid antibody testing (either saliva or blood-based)**	87 (57.6)	74 (49.7)
HCV confirmatory RNA viral load testing	39 (25.8)	38 (25.5)
HCV treatment	21 (13.9)	22 (14.8)
On-site substance use disorder treatment offered		
	N = 146	N = 144
Detoxification	8 (5.5)	9 (6.3)
Methadone maintenance	5 (3.4)	4 (2.8)
Buprenorphine	29 (19.9)	29 (20.3)
Injectable naltrexone	18 (12.3)	18 (12.6)
Other (12 step meetings, drug free outpatient, residential)	13 (8.9)	10 (7.0)
On-site vaccinations and STD services offered (N = 102)		
Hepatitis A vaccine	63 (61.8)	N/A
Hepatitis B vaccine	47 (46.1)	N/A
Flu Vaccine	51 (50.0)	N/A
Sexually transmitted diseases (STD) testing (not including HIV testing)	55 (53.9)	N/A
STD treatment (not including HIV treatment)	39 (38.2)	N/A
Mental health services offered (N = 149)		
On-site mental health counseling **	33 (22.1)	23 (15.4)
On-site mental health medication treatment	8 (5.4)	9 (6.0)
Referred to other agencies and/or programs	104 (69.8)	109 (73.2)
Referred by providing list of contact information of agencies	63 (42.3)	68 (45.6)
Mental health care appointments were made for participants	45 (30.2)	44 (29.5)
Staff accompanied participant to appointment	29 (19.5)	27 (18.1)
Telehealth/telemedicine***	9 (6.0)	26 (17.4)

(continued on next page)

Table 2 (continued)

Services	2019	At time of survey (2020) [‡]
	n (%)	n (%)
Did not provide this service or make referrals	20 (13.4)	17 (11.4)
Wound care offered	N = 151	N = 150
On site, by program staff or staff from other agencies	75 (49.7)	74 (49.3)
Referral/off-site	74 (49.0)	75 (50.0)
Telehealth	1 (0.7)	6 (4.0)
Did not provide the service or referrals	25 (16.6)	19 (12.7)
Other primary care services (other than vaccinations offered)	N = 140	N = 142
On site, by program staff or staff from other agencies [*]	40 (28.6)	32 (22.5)
Referral/off-site	84 (60.0)	92 (64.8)
Telehealth ^{***}	0 (0.0)	7 (4.9)
Did not provide the service or referrals	30 (21.4)	30 (21.1)

[‡]The survey asked these questions for 2019 and then asked if SSPs currently still provided those services at the time of survey completion. Surveys were completed between August 3, 2020 and December 18, 2020, with one survey submitted in February 2021.

Note: N/A = Not asked. Significant difference between 2019 and 2020 measured using a McNemar's test; p-value indicated by ^{***}for ≤ 0.001 , ^{**} for ≤ 0.01 , ^{*} for ≤ 0.05

3.3. HIV and HCV services

The majority of SSPs offered on-site HIV rapid testing (65%) and HCV rapid antibody testing (57%) in 2019 (Table 2). Lab-based testing for HIV and HCV antibodies was offered at similar proportions (39% and 34%, respectively). HIV viral load testing and HCV RNA confirmatory

Table 3

U.S. Syringe Services Program (SSP) Budgets and Service Provision at Time of Survey Completion in 2020 Compared to 2019.

	n (%)
Budget compared to 2019 (N = 148)	
Stayed the same	39 (26.4)
Decreased	20 (13.5)
Increased	86 (58.1)
Uncertain	3 (2.0)
Syringe distribution compared to 2019 (N = 119)^a	
Stayed the same	16 (13.4)
Decreased	27 (22.7)
Increased	76 (63.9)
Naloxone kits distribution compared to 2019 (N = 117)^a	
Stayed the same	13 (11.1)
Decreased	27 (23.1)
Increased	77 (65.8)
Provision of on-site HIV testing compared to 2019 (N = 103)^{a,b}	
Maintaining the same level	22 (21.4)
Increased	5 (4.8)
Decreased	58 (56.3)
No longer providing any on-site HIV testing	15 (14.6)
Not applicable	3 (2.9)
Provision of on-site HCV testing compared to 2019 (N = 93)^{a,b}	
Maintaining the same level	13 (14.0)
Increased	7 (7.5)
Decreased	56 (60.2)
No longer providing any on-site HIV testing	14 (15.1)
Not applicable	3 (3.2)
Provision of on-site MOUD compared to 2019 (N = 30)^{a,b}	
Maintaining the same level	8 (26.7)
Increased	14 (46.7)
Decreased	2 (6.7)
No longer providing any on-site medications for OUD	2 (6.7)
Not applicable	4 (13.2)

The monthly syringe distribution average of 2019 was calculated from the annual number and compared to the last month of distribution reported at the time of the survey in 2020; the percent of change between 2020 and 2019 was calculated using (# of syringes per month in 2020 - # of syringes per month in 2019)/# of syringes per month in 2019, and 10% difference was used to determine for 'stayed the same', 'decreased', and 'increased' categories. The same method was used for naloxone kits distribution monthly change between 2020 and 2019.

^a These Ns reflect the number of programs reporting this service in 2019.

^b These questions asked participants if they are currently (on average) providing the same number of people with on-site services as 2019.

testing rates were offered on site by 21% and 26% of responding SSPs respectively) (Table 2). Pre-exposure prophylaxis (PrEP) and post-exposure prophylaxis (PEP) was offered on-site by 24% and 15% of SSPs, respectively (Table 2). About 12% offered on-site HIV treatment and 14% offered HCV treatment on-site (Table 2).

The proportion of programs that reported offering any HIV testing services on site did not change between the year 2019 and Fall 2020, but offering any on-site HCV rapid antibody testing significantly decreased from 58% to 50% (p-value ≤ 0.01 , Table 2). The majority of SSPs that offered tests reported they had experienced a decrease in the volume of on-site HIV and HCV tests at the time of survey completion in 2020 compared to 2019 (58% reported a decrease for HIV and 61% for HCV) (Table 3). Non-profit SSPs were significantly more likely to no longer provide or to have decreased their volume of HIV and HCV testing (79% for HIV and 83% for HCV, p-value < 0.05) compared to SSPs operated by health departments (65% for HIV and 68% for HCV, p-value < 0.05) (Table 4). Over 90% of suburban SSPs decreased or no longer provided on-site HIV and HCV testing compared to rural (~60%) and urban (75% HIV; 83% HCV) programs, although this was not statistically significant (Table 4). Large or very large SSPs more frequently reported having decreased or stopped providing on-site HCV testing (86%) compared to small to medium sized SSPs (56%, p-value ≤ 0.01) (Table 4).

3.3.1. Substance use disorder treatment and mental health services

In 2019, 20% of SSPs offered one or more forms of medications for opioid use disorder (MOUD) treatment on-site, with 19% of SSPs offering on-site buprenorphine, 12% offering on-site injectable naltrexone, and 3% offering methadone (Table 2). The proportion of SSPs offering on-site MOUD did not substantially change from 2019 to the time the survey was completed in 2020. Among SSPs offering on-site MOUD in 2019, nearly half reported having increased the amount of on-site MOUD provision at the time they completed the survey in 2020, but there were still 18% that had reported decreased or no longer providing on-site MOUD in Fall 2020 (Table 3). The proportion of SSPs offering telehealth provision of MOUD increased from 3% in 2019–8% in Fall 2020 (Table 2).

Overall, the majority of SSPs in 2019 provided referrals to other agencies and/or programs (70%) and 42% provided a list of agency contact information to participants for mental health services (Table 2). However, 22% of SSPs offered on-site mental health counseling and 19% had staff accompany participants to appointments. Only 14% of SSPs did not provide any on site mental health services or mental health referrals in 2019. The provision of on-site mental health services significantly decreased from 2019 to the time of survey in 2020 from 22% to 15% of all SSPs (p-value ≤ 0.01), but mental health services provided by telehealth significantly increased from 6% in 17% in Fall 2020 (p-value ≤ 0.001) (Table 2).

Table 4

U.S. Syringe Services Program (SSP) Physical Setup in 2019 and Service Provision Changes between 2019 and Time of Survey Completion in 2020 by Organizational Characteristics (% of all programs with the same characteristics).

	Decreased/no longer providing on-site HIV testing ^a			Decreased/no longer providing on-site HCV testing ^a			Decreased syringe distribution			Decreased Naloxone distribution		
	%	N	p-values	%	N	p-values	%	N	p-values	%	N	p-values
Organization type			0.033			0.024			0.001			0.795
Health department	64.5	31		67.8	31		31.0	29		14.8	27	
Non-profit	78.7	61		83.3	54		12.0	67		26.5	68	
Other	57.1	7		75.0	4		40.9	22		23.8	21	
Location			0.237			0.072			0.394			0.243
Rural	59.3	27		61.5	26		15.2	33		18.2	33	
Suburban	92.9	14		91.7	12		38.9	18		29.4	17	
Urban	74.6	59		82.7	52		21.2	66		24.3	66	
Region^b			0.256			0.270			0.782			0.189
Northeast	76.5	17		81.3	16		15.0	20		31.6	19	
Midwest	70.4	27		75.0	24		22.6	31		32.3	31	
South	66.7	21		70.6	17		25.0	24		4.4	23	
West	81.8	33		81.8	33		22.0	41		24.4	41	
Program size			0.290			0.002			0.052			0.138
Small/Medium	62.5	32		56.0	25		27.0	37		25.0	36	
Large/Very large	77.3	66		85.7	63		21.3	80		22.8	79	

Note: Chi-squared tests of association were used to assess significance.

^a On-site HIV testing: decreased n = 58, no longer providing n = 15; on-site HCV testing: decreased n = 56, no longer providing n = 14.

^b For comparison purposes, we did not include Puerto Rico because the N was small (N = 3).

3.4. Wound care and primary care services

The proportion of SSPs providing on-site wound care remained the same from 2019 to the time of survey completion in 2020 with approximately 50% of SSPs offering wound care (Table 2). Primary care offered on-site at SSPs significantly decreased from 2019 to Fall 2020 (23%, p-value < 0.05), but primary care offered via telehealth significantly increased during this period of time from 0% to 5% (p-value ≤ 0.001) (Table 2). A large percentage of SSPs provided vaccinations on site in 2019, with 62% administering hepatitis A virus vaccinations, 46% hepatitis B virus vaccinations, and 50% influenza vaccinations in 2019 (Table 2).

3.5. Budget characteristics

Thirty-four percent of SSPs had annual budgets in 2019 less than \$25,000, 38% had a budget more than \$100,000, and 25% had a budget of \$25,000-\$100,000 (Table 1). Fifty-one percent received ≥ 50% of their total funding from public sources and 38% of SSPs received no public funding (Table 1). Only 34% of SSPs in the South received ≥ 50% of their funding from public sources compared to other regions (51%–61%). Budgets for 59% of programs increased in 2020 compared to 2019, stayed the same for 27%, and decreased for 13% (Table 3). SSPs in suburban areas more frequently reported a decrease in budget from 2019 to 2020 (26%) than rural or urban programs (16% and 10%, respectively). SSPs located in the South less frequently reported a budget decrease in 2020 (3%) compared to all other regions (13%–19%).

4. Discussion

SSPs in the United States underwent massive growth and change prior to the COVID-19 pandemic. Not only did the number of SSPs increase from 2015 to 2018 (Des Jarlais et al., 2020), but we found in 2019 rural SSPs had grown to comprise 30% of the sample compared to 21% in 2014 (Behrends et al., 2018). In addition, the proportion of SSPs from the South doubled from 12% in 2014 to 25% in 2019 (Behrends et al., 2018). This potential expansion of SSPs into rural and Southern regions that had the least SSP access previously (Des Jarlais et al., 2015) occurred within a short five-year time frame. However, this potential growth may not mean that people in these regions have their full SSP needs met. This requires further investment and work to understand and sufficiently meet the needs of rural and Southern regions, especially

since many of these regions are at the highest risk for HIV and HCV outbreaks (Van Handel et al., 2016).

Earlier work in 2020 indicated that SSPs increased harm reduction supply distribution in response to the COVID-19 pandemic (Bartholomew et al., 2020; Glick et al., 2020; Wenger et al., 2021). Our findings show that 64% of SSPs reported increased syringe distribution in the most recent month in 2020 compared to the mean number distributed per month in 2019, and 66% reported a similar increase in monthly naloxone distribution. This is consistent with cross-sectional and qualitative research data collected earlier in 2020 (Bartholomew et al., 2020; Glick et al., 2020). Qualitative research has indicated an increase in other forms of harm reduction service delivery during the COVID-19 pandemic, such as secondary exchange and mail-delivered supplies (Wenger et al., 2021). We found that home-based and mail-based delivery were already frequently used prior to the pandemic and statistically significantly increased in Fall 2020 for the delivery of naloxone while SSPs increased the overall use of home-delivery and mobile units for service delivery. Home-based syringe delivery and secondary exchange are effective in reducing HIV and HCV risk and wider uptake of these approaches are essential for expanding harm reduction access (Behrends et al., 2017). Mail-based syringe delivery is also an emerging strategy that is being widely implemented and may be promising for reaching underserved individuals, like women and young adults, and expanding reach in low SSP access areas (French et al., 2021; Hayes et al., 2021; Yang et al., 2021). However, mail-based delivery is limited by syringe paraphernalia policies that prevent mailing supplies to all states (Hayes et al., 2021). Numerous programs only offered services through a brick and mortar building/storefront. Given the high need for harm reduction services, funding streams to facilitate the expansion of more flexible delivery models would be appropriate (Jacka et al., 2021).

In 2019, most SSPs provided on-site HIV and HCV testing and were an important touchpoint for these services, especially given low primary health care engagement by PWID that has now been exacerbated by the COVID-19 pandemic (Behrends et al., 2018; Heinzerling et al., 2006; Murphy et al., 2020). Prior to this study, the only quantitative findings on COVID-19 disruptions to SSP on-site testing and other services in the US were from two surveys conducted in March 2020 that found that three-quarters of all SSPs were no longer providing HIV/HCV testing on site (Bartholomew et al., 2020; Glick et al., 2020). Our study was conducted beginning in August 2020, and we found that about 60% of SSPs had decreased the volume of on-site HIV testing and HCV testing. However, 15% of SSPs had stopped HIV and HCV testing services

entirely, which is much lower than what other studies reported in early 2020. Nearly all of the suburban SSPs had reduced or completely stopped providing on-site HIV testing services, and non-profits more frequently reduced or stopped HIV/HCV testing compared to SSPs operated by health departments. Recent qualitative work with SSP directors and staff suggest that HIV/HCV testing services were difficult to maintain due to social distancing requirements, shortage of skilled staff, and unavailability of testing supplies (Frost et al., 2021). Given recent HIV outbreaks among PWID after the onset of the COVID-pandemic (Freyer, 2021; Health officials struggle to contain Boston HIV outbreak - The Boston Globe; Raby, 2021), providing sufficient resources to restore on-site HIV and HCV testing services is critical to preventing future HIV or HCV outbreaks among this vulnerable population. In fact, Scott County commissioners in Indiana recently voted to close their SSP, despite being the site of one of the largest outbreaks of HIV among people who inject drugs within the past 10 years (Mills, 2021).

SSPs offering on-site provision of MOUD increased from 11% in 2014 to 20% in 2019 (Behrends et al., 2018). Of the SSPs that were already offering on-site MOUD in 2019, nearly half had increased the numbers of people for whom they provided on-site MOUD at the time they completed the survey in 2020. The maintenance and expansion of on-site MOUD is potentially enabled by relaxation of restrictions by the Drug Enforcement Administration and the Substance Abuse and Mental Health Services Administration (Substance Abuse and Mental Health Services Administration (Substance Abuse and Mental Health Services Administration SAMHSA, 2020; United States Department of Justice and Drug Enforcement Agency, 2020). These changes allowed for initiation of MOUD via telemedicine and telephone-based treatment evaluations, which were crucial for MOUD treatment initiation and maintenance during COVID-19 when in-person visits were being avoided to prevent COVID-19 spread (Nunes et al., 2020; United States Department of Justice and Drug Enforcement Agency, 2020). In this study, SSPs reported a modest increase in offering telemedicine-based MOUD. The increase in MOUD provision may be related to relaxation of these policies that improved access, but also may be a response to increased demand for MOUD prompted by changes in drug markets in locations where reliable access to drugs was disrupted by the COVID-19 pandemic or where fentanyl use increased (Niles et al., 2021; Zolopa et al., 2021).

SSPs did not report substantial changes in offering on-site wound care and medications for mental health from 2019 to the time they completed the survey in 2020. These services may have remained available due to specific infrastructure, such as SSPs co-located with medical services that remained operational during the COVID-19 pandemic. We also found that SSPs offering mental health counseling and primary care services, while decreasing on-site provision of these services, statistically significantly increased telehealth provision. This telehealth provision may have extended the ability of SSPs to continue providing some services. Further research on how these health services are implemented on-site at SSPs is needed to better understand how they remained operational during COVID-19 and can continue to do so during other health emergencies. In 2019, approximately half of SSPs provided either hepatitis A, hepatitis B or influenza vaccines. This may be an indicator of the potential capacity for SSPs to provide COVID-19 vaccinations, either for primary COVID-19 vaccination or for boosters. Future work on the willingness, ability, and provision of on-site COVID-19 vaccinations at SSPs is an important next step.

Nearly 60% of SSPs reported a budget increase from 2019 to 2020, with more SSPs in the South having an increase in budget compared to other regions. The reported changes in funding for 2020 may have been based on fiscal year funding that was already predetermined prior to the COVID-19 pandemic, reflecting 2019 trends given the increase in SSPs in the South during that time compared to previous years. These increases in budgets may also be related to one-time, short-term COVID-19 related funding that was made available during this time. However, in as much as the NASEN SSP directory reflects program operations, SSPs that

halted operations during the pandemic or closed because of budget cuts were not represented in this survey. Further research is needed to assess the long-term impact of COVID-19 on SSP sustainability and growth, especially in light of recent policies and efforts to close SSPs in some regions of the US (Cooke and Gonsalves, 2021; Lekhtman, 2021; Vergano, 2021). Moreover, with the majority of SSPs operating on an annual budget less than \$100,000, further expansions or innovations in service delivery to meet increasing demand must be supported with additional funding.

There are some important limitations to this study. SSP participant data were estimated by SSP directors and may not be based on systematically collected data. We asked programs to provide the most recent month's number of syringes and naloxone kits distributed and current provision of other services at the time of the survey, which occurred between August and December 2020. Therefore, the changes in 2020 services reported by SSPs reflect a snapshot in time and may not represent the number of supplies distributed in an average month or the service delivery for all of 2020. Nonetheless, comparisons of past month 2020 syringe and naloxone services to the mean monthly services provided in 2019, while flawed, do provide a general pre-COVID reference point to assess changes in 2020 at that point in time compared to their pre-COVID mean and to data collected earlier in 2020 (Bartholomew et al., 2020; Glick et al., 2020). While we invited 396 SSPs to participate in the survey, we identified only 211 eligible programs that had opened in 2019 or earlier and were still active at the time of the survey, of which 153 responded. We defined active programs as those that had purchased syringes at least once in 2019 or 2020 from the Buyers Club. Some SSPs may not have purchased syringes from the Buyers Club but were still active, introducing some misclassification bias, although this is likely to have been a minority of programs as the Buyers Club supplies syringes to the majority of SSPs. We were unable to confirm the exact reasons why some SSPs did not participate in the study, including whether the SSP had temporarily stopped operations or had recently closed. This limits our results to only describe established SSPs as of 2019 that remained operational through 2020 and were likely less impacted by COVID-19, without further insight on SSPs that closed down or were non-operational during this time. Our study did suggest that several SSPs newly opened in 2020 ($n = 42$) and few 2019 programs had stopped operations in 2020 ($n = 14$), but further work needs to be done to better understand the closures and openings of SSPs that happened during this time.

5. Conclusions

During the COVID-19 pandemic, most SSPs that remained operational largely maintained on-site medical service delivery if it was previously available, increased MOUD provision, and adapted and expanded harm reduction (ie., syringe and naloxone) service delivery to meet the needs of their community during the pandemic. These innovations were already being adopted prior to the pandemic, which may have helped SSPs respond adeptly to disruptions in service access during COVID-19. However, most SSPs curtailed or stopped their on-site HIV and HCV testing services, which are crucial for preventing HIV and HCV outbreaks in this high-risk population. With the record high opioid overdose fatality rates in 2020, sustaining the trajectory of SSP growth and innovation leading up to and through 2020 requires ensuring adequate and flexible funding going forward to support the life-saving work of SSPs in preventing future overdose deaths and outbreaks of HIV and HCV following the most deadly year of the opioid epidemic in the U.S. to date.

CRedit authorship contribution statement

BRS, CNB, and DCD conceived and planned the study design. CNB, GJC, PL, and SMP contributed to data collection and sampling. CNB, DCD, GJC, and XL analyzed data. CNB and DCD led the manuscript

writing. All authors contributed to the interpretation of data throughout the study and provided critical revision to the manuscript. All authors have approved the final manuscript.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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