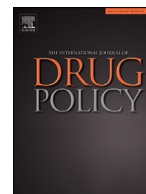




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## Research Paper

# Changes in supervised consumption site use and emergency interventions in Montréal, Canada in the first twelve months of the COVID-19 pandemic: An interrupted time series study



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## ABSTRACT

**Background:** The COVID-19 pandemic has impacted supervised consumption site (SCS) operations in Montréal, Canada, potentially including changes in SCS visits, on-site emergency interventions, injection of specific drugs, and distribution of harm reduction materials.

**Method:** We used administrative data from all four Montréal SCS from 1 March 2018 - 28 February 2021 to conduct an interrupted time series study with 13 March 2020 as the intervention point. We employed segmented regression using generalised least squares fit by maximum likelihood. We analysed monthly SCS visits and materials distributed as counts, and emergency interventions and drugs injected as proportions of visits.

**Results:** SCS visits (level change = -1,286; 95% CI [-1,642, -931]) and the proportion of visits requiring emergency intervention (level = -0.27% [-0.47%, -0.06%]) decreased immediately in March 2020, followed by an increasing trend in emergency interventions (slope change = 0.12% [0.10%, 0.14%]) over the ensuing 12 months. Over the same period, the proportion of injections involving opioids increased (slope = 0.05% [0.03%, 0.07%]), driven by increasing pharmaceutical opioid and novel synthetic opioid injections. Novel synthetic opioids were the drugs most often injected prior to overdose. The proportion of injections involving unregulated amphetamines increased immediately (level = 7.83% [2.93%, 12.73%]), then decreased over the next 12 months (slope = -1.86% [-2.51%, -1.21%]). There was an immediate increase in needle/syringe distribution (level = 16,552.81 [2,373, 30,732]), followed by a decreasing trend (slope = -2,398 [-4,218, -578]). There were no changes in pre-existing increasing trends in naloxone or fentanyl test strip distribution.

**Conclusion:** Reduced SCS use and increasing emergency interventions at SCS are cause for serious concern. Findings suggest increased availability of novel synthetic opioids in Montréal, heightening overdose risk.

The heightened vulnerability of people who inject drugs to the direct and indirect effects of the COVID-19 pandemic has been well documented (e.g., Ali et al., 2020; Haley & Saitz, 2020; Santé Montréal, 2022; Vasylyeva et al., 2020). For example, people who use drugs bear a potentially elevated risk of morbidity associated with COVID-19 infection due to underlying health problems (Wang et al., 2021). Risks of infection

may also be heightened by high levels of homelessness and incarceration, as well as overcrowded living situations (Vasylyeva et al., 2020). Additionally, pandemic-related disruptions in essential harm reduction services such as needle and syringe programs, opioid agonist treatment clinics, and supervised consumption sites may potentiate drug-related harms such as blood-borne viral infections and overdose (Ali et al., 2020; RCCET, 2020; Schlosser & Harris, 2020). People who inject drugs are also often already socially and economically marginalized, height-

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**Table 1**  
Capacity of Montréal's supervised consumption services before and during the first 12 months of the COVID-19 pandemic.

Service	Capacity pre-pandemic (n of cubicles)	Date of closure (2020)	Date of re-opening (2020)	N days closed	Reduced capacity (n of cubicles)
CACTUS	10	Did not close	Did not close	0	3-7
L'Anonyme	2	19 March	7 June	80	1
Spectre de rue	6-7	26 March	29 April	34	3-4
Dopamine	3	25 March	28 April	34	1-2

N.B. Capacity refers to the number of clients able to be accommodated in the SCS injecting room at a given time. Capacity varied throughout the peri-pandemic period in line with public health regulations and guidance. Accordingly, service managers' best estimates of average capacity during the observation period are reported.

ening their vulnerability to pandemic-related financial destabilization (May et al., 2022).

The Canadian province of Québec declared a public health emergency in relation to COVID-19 on 13 March 2020 (Public health emergency declaration, 2020). Montréal, the largest city in the province, has four SCS, consisting of three fixed sites and one mobile service. Following the onset of the pandemic, three of the four SCS closed temporarily, for varying periods of time (Table 1). The largest SCS, CACTUS Montréal, receives the majority of visits across the four sites and was able to remain open throughout the pandemic. However, while clients had previously been able to wait inside the building for access to the injecting space, physical distancing restrictions required that people queued outside; staff observed that people in the queue would often leave before accessing the SCS. The provincial requirement of two meters of physical distance between individuals also reduced CACTUS Montréal's capacity from 10 injection cubicles to a maximum of seven cubicles, though it often operated with fewer than five cubicles available at a time. A separate room in the same building was repurposed to provide an additional three cubicles while allowing for physical distancing. The other three Montréal SCS all similarly reduced capacity, typically by half, in order to accommodate the required two meters of distance between clients and the enhanced decontamination of injection cubicles (Table 1).

While supervised injection sites and other services for people who inject drugs were disrupted, shifts were also reported in the availability, quality, and price of unregulated drugs (Minoyan et al., 2022). Such shifts are often, but not always, associated with increased overdose risk (Zolopa et al., 2021). In Montréal, public health authorities issued warnings about the presence of unusually coloured (e.g., purple, blue, and green, among others) powders in the unregulated market, usually sold as heroin or fentanyl (RCCT, 2020). Although these powders were first reported prior to 2020, public health warnings regarding their availability increased in frequency during the first 12 months of the pandemic (Santé Montréal, 2022). Overdose deaths and ambulance attendances with naloxone administration also increased in frequency following the onset of the pandemic (INSPQ 2021). Indeed, fatalities suspected to be drug-related increased by about 25% in Montréal during the 12 months following March 2020, from 137 deaths between April 2019 and March 2020 to 170 deaths between April 2020 and March 2021 (Santé Montréal, 2022).

Changes in the utilisation of harm reduction services following pandemic-related closures and reopenings have been reported elsewhere, with service utilisation not always recovering to pre-pandemic levels (Trayner et al., 2022). In the context of a disrupted injecting risk environment and increasing overdose rates, this is highly concerning and suggests a need to assess the extent and persistence of changes in SCS utilisation in Montréal. Furthermore, service utilisation data from SCS can offer insights into changes in unregulated drug markets and overdose risk in the period following the onset of the pandemic, serving to inform SCS and other harm reduction service provision.

Using administrative data from before and after the onset of the COVID-19 pandemic, we aimed to assess changes in SCS visits, on-site emergency interventions, injection of specific drugs, and distribution of

harm reduction materials. We expected reductions in visits and harm reduction material distribution during the immediate onset of the pandemic, which would recover to pre-pandemic levels over the following year. We also anticipated increased emergency interventions and changes in drugs used during the pandemic period due to market disruption.

## Method

There are no consensus guidelines for the reporting of interrupted time series studies; therefore, we have followed STROBE guidelines for the reporting of observational studies (von Elm et al., 2007) with attention to reporting recommendations on interrupted time series by Jandoc and colleagues (Jandoc et al., 2015). Ethical approval for this study was provided by the Comité d'éthique de la recherche du CHUM (CÉR CHUM authorisation number 20.450) and the Comité d'éthique de la recherche en Dépendance, Inégalités sociales et Santé publique of the Centre intégré universitaire de santé et de services sociaux du Centre-Sud-de-l'Île-de-Montréal (CÉR CIUSSS authorisation number MEO-02-2022-476).

## Study design

We employed an interrupted time series design. We selected 13 March 2020 as the key change point, being the date of the declaration of a public health emergency by the Québec provincial government (Public health emergency declaration, 2020). Data from 1 March 2018 to 28 February 2021 were used, providing two years of pre-pandemic data and permitting analysis of changes over the first 12 months of the pandemic. The time series analysis provides estimates of changes in the level (i.e., the change from the final month pre-pandemic to the first month of the pandemic) and slope (i.e., changes across months during the pandemic period) of each indicator.

## Setting and data sources

In Montréal, SCS are operated by a public health and social services network (Centre intégré universitaire de santé et de services sociaux du Centre-Sud-de-l'Île-de-Montréal; CIUSSS) in cooperation with community and peer-based organisations. In addition to operating an SCS, each site also offers other harm reduction services, including the distribution of sterile needles and syringes, other drug use equipment, drug checking kits, and naloxone to SCS clients and other individuals. Each SCS collects detailed data on client visits and other harm reduction activities. For SCS visits, variables include a unique client identifier, basic demographic data (e.g., gender, age), and the drugs to be injected during the visit. Drugs to be injected are recorded as reported by the client. Other program activity at each site (i.e., distribution of harm reduction materials) is recorded without identifying details. Data are co-owned by CIUSSS and the community organisation operating each SCS and are compiled each month for monitoring and reporting purposes. Data for the current analyses were cleaned and provided by CIUSSS.

## Participants

We included information from all visits recorded by the SCS from 1 March 2018 to 28 February 2021. All data is anonymized at the point of collection. Upon entry to the service, staff ask clients for demographic and drug use information, which is entered in an online database shared between the four sites and managed by the public health department. First-time clients are asked to provide a nickname that they will use to access the service; this is used to record information regarding their subsequent SCS visits. In the analysis data, nicknames are replaced by unique numeric identifiers. All client data were analysed; stratified analyses of potential subgroups (e.g., by gender) were not performed as we had no prior hypotheses on differences by subgroup.

## Outcomes and variables

Outcomes were tabulated on a monthly basis from March 2018 to February 2021. Outcomes of interest were the number of SCS visits; the number of first-time SCS clients; the number of SCS visits requiring a) any emergency intervention, and b) naloxone administration specifically; the number and proportion of SCS visits during which clients reported injection of specific drug classes; and the distribution of harm reduction materials. Emergency interventions included 911 calls, ambulance attendance, cardiopulmonary resuscitation, naloxone administration, nurse evaluation, observation and stabilisation, oxygen administration, and salbutamol administration. Harm reduction materials include needle/syringes (including 0.5cc, 1cc, and 3cc syringes), naloxone kits, and fentanyl test strips.

Clients report which drugs they intend to inject to SCS staff at each visit. These data are potentially imprecise due to rapid changes and counterfeit products in the drug supply. We re-coded reported drugs to be injected into major categories as follows: (1) 'traditional' unregulated opioids, including substances reported to be heroin, and powders that were white, beige/brown, or black; (2) novel synthetic opioids, including any substance reported to be fentanyl, isotonitazene, or powders of any other colours (e.g., mauve, green); (3) pharmaceutical opioids, often reported by clients using their brand name; (4) cocaine, including both powder and crack cocaine; (5) unregulated amphetamines; and (6) pharmaceutical stimulants (e.g. methylphenidate), also often reported by brand name. Details on drug coding are included in the Supplemental Materials.

## Statistical analysis

As an initial exploratory step, key outcomes were tabulated for each 12-month period (March-February of 2018/19, 2019/20, 2020/21), and we calculated rates and 95% confidence intervals for emergency intervention and naloxone administration per 1000 visits. For planned time series analyses, total visits and the distribution of harm reduction materials were analysed based on raw counts per month and are reported in their original units. First-time clients, visits requiring emergency response and/or naloxone administration, and drugs injected at each visit were analysed as a proportion of total visits per month. Additional analyses based on raw counts for these outcomes are reported in Supplemental Table 1.

We developed regression models for all outcomes for the period 1 March 2018 – 28 February 2021. The intervention date was 13 March 2020 (Public health emergency declaration, 2020); March 2020 was considered the first post-exposure month. Therefore, we compared 24 months of data prior to the intervention to 12 months of data following the intervention. While it is possible that changes in drug use due to market disruption would lag behind the declaration of the public health emergency, we expected that most outcomes would show an immediate effect of pandemic-related public health measures, particularly due to physical distancing requirements and associated decreases in SCS capacity.

We conducted interrupted time series analyses using generalised least squares fit by maximum likelihood (GLS) (Bernal et al., 2017; Chan et al., 2022). Autocorrelation was estimated by examining plots of the autocorrelation and partial autocorrelation functions. Correlation terms were included in the final GLS models for each outcome. Several alternative models were tested, and their Bayesian information criteria (BIC) was used to assess the best-fit model. Following our hypotheses about both immediate and gradual effects, we assessed both immediate changes ("level changes") and changes in trend ("slope changes") for each outcome.

We also analysed outcomes using autoregressive moving average models (ARIMA), which can account for autocorrelation, nonstationarity, and seasonality (Schaffer et al., 2021). ARIMA models indicated a lack of seasonality for most outcomes, as well as low levels of nonstationarity (see Supplemental Table 2). GLS and ARIMA methods indicated similar directions and significance of effects; our reported results and findings are the GLS models.

Analyses were conducted using R 4.1.3 (R Core Team, 2022). Code is included in the Supplemental Materials.

## Results

Between March 2018 and February 2021, the four Montréal SCS received 84,079 visits from 1,697 unique clients. In 80,591 of these visits, the client injected on-site; results regarding visits, interventions, and drugs injected are based on this subset of total visits. Both the number of people attending SCS and the number of visits to SCS increased from 2018 to 2019, then decreased in 2020 (Table 2). In contrast, the number and rate of visits requiring emergency intervention, and specifically naloxone administration, increased in each 12-month period. During the 12 months beginning with the onset of the pandemic, the proportion of emergency interventions following the use of pharmaceutical and 'traditional' unregulated opioids decreased, and emergency interventions following the use of novel synthetic opioids increased (Table 2).

### Visits and emergency interventions

As expected, the emergency health declaration was associated with an immediate decrease of 1,286 SCS visits in the following month (95% CI [-1,642, -931],  $p < .001$ ), representing about half of average monthly visits during the preceding two years. However, the pre-pandemic trend of increasing SCS visits over time continued (Fig. 1, panel a). The attendance of new clients has declined over time and was not significantly affected by the pandemic (Fig. 1, panel b). In March 2020, there was an immediate decline in the proportion of visits requiring any emergency intervention (level change = -0.27%, 95% CI [-0.47%, -0.06%],  $p = 0.01$ ), as well as those specifically requiring naloxone administration (level change = -0.18%, 95% CI [-0.27%, -0.09%],  $p < .001$ ). As the pandemic period progressed, however, both indicators demonstrated increasing trends: 0.12% more visits each month required any emergency intervention (95% CI [0.10%, 0.14%],  $p < .001$ ), and 0.06% more visits each month required naloxone administration (95% CI [0.05%, 0.07%],  $p < .001$ ) (Fig. 1, panels c and d). Complete GLS results are reported in Table 3.

### Drugs injected

#### Opioids

The proportion of visits with any opioid injection did not demonstrate an immediate change, but did increase over time following the onset of the pandemic (slope change = 0.05%, 95% CI [0.03%, 0.07%],  $p < .001$ ) (Fig. 2, panel a). This overall trend encompasses distinct trajectories for the three categories of opioids we derived. The pandemic was associated with a decreasing trend in visits with traditional unregulated opioid (e.g., heroin) injection (slope change = -1.13%, 95% CI [-1.97%, -0.29%],  $p = 0.01$ ) (Fig. 2, panel b). In contrast, the proportion

**Table 2**

Emergency intervention rate per 1,000 visits and drugs injected at SCS visits requiring an emergency intervention, before and after the onset of the COVID-19 pandemic.

	March 2018 - February 2019	March 2019 - February 2020	March 2020 - February 2021 <sup>1</sup>
Number of individuals	934	1,034	832
Number of visits to the injecting room	27,940	33,365	19,286
Visits requiring emergency intervention <sup>2</sup>	74	106	190
Emergency interventions per 1000 visits (95% CI)	2.6 (2.0, 3.3)	3.4 (2.8, 4.0)	9.5 (8.1, 10.9)
Visits requiring naloxone administration	20	30	62
Naloxone administration per 1000 visits (95% CI)	0.7 (0.4, 1.0)	0.9 (0.6, 1.3)	3.2 (2.4, 4.0)
Drug(s) injected on-site prior to emergency intervention (n, %) <sup>3</sup> :			
'Traditional' unregulated opioids	29 (44%)	39 (41%)	55 (27%)
Novel synthetic opioids <sup>4</sup>			
Pharmaceutical opioids	2 (3%)	2 (2%)	97 (47%)
Cocaine	20 (30%)	24 (26%)	11 (6%)
Unregulated amphetamines	10 (15%)	12 (13%)	13 (6%)
Pharmaceutical stimulants	1 (2%)	9 (10%)	19 (9%)
Other	0	0	0
Substance not recorded	4 (6%)	8 (9%)	10 (5%)
	11 (17%)	20 (21%)	14 (7%)

<sup>1</sup> Includes the period 19 March - 1 May 2020 when some SCS were closed.

<sup>2</sup> Includes any of the following interventions: 911 call; ambulance attendance; cardiopulmonary resuscitation; naloxone administration; nurse evaluation; observation and stabilisation; oxygen administration; salbutamol administration.

<sup>3</sup> Visits may be counted more than once if more than one substance was reported.

<sup>4</sup> Includes substances sold as fentanyl and unusually coloured (e.g. mauve or blue) powders sold as heroin or fentanyl, as reported by clients on entry to the SCS.

of visits with pharmaceutical opioid injection demonstrated an increasing trend over time (slope change = 1.39%, 95% CI [0.45%, 2.34%],  $p = 0.01$ ) (Fig. 2, panel d). Novel synthetic opioids (including illegally manufactured fentanyl and isotonitazene) were rarely injected prior to the pandemic and demonstrated an abrupt decrease following the emergency health declaration (level change = -3.40% of visits, 95% CI [-4.78%, -2.03%],  $p < .001$ ). This was followed, however, by an increasing trend during the peri-pandemic period (slope change = 1.35%, 95% CI [1.19%, 1.51%],  $p < .001$ ). Visual inspection of the plot suggests a lag of 3-4 months between the emergency declaration and increased injection of novel synthetic opioids (Fig. 2, panel c).

#### Stimulants and other drugs

There was an immediate increase in the proportion of visits with unregulated amphetamine injection after the onset of the pandemic (level change = 7.83%, 95% CI [2.93%, 12.73%],  $p < 0.01$ ), followed by a decreasing trend (slope change = -1.86%, 95% CI [-2.51%, -1.21%],  $p < .001$ ) (Fig. 2, panel f). Inverse effects were observed in the injection of pharmaceutical stimulants, which demonstrated an immediate decrease (level change = -1.83%, 95% CI [-2.73%, -0.93%],  $p < .001$ ), followed by an increasing trend (slope change = 0.23%, 95% CI [1.15%, 0.35%],  $p < .001$ ) during the peri-pandemic period, though the overall prevalence of pharmaceutical stimulant injection remained low (Fig. 2, panel g). There were no significant pandemic-associated changes in the proportion of visits with cocaine injection, nor with the injection of other psychoactive substances not included in our major categories (Fig. 2, panels e and f).

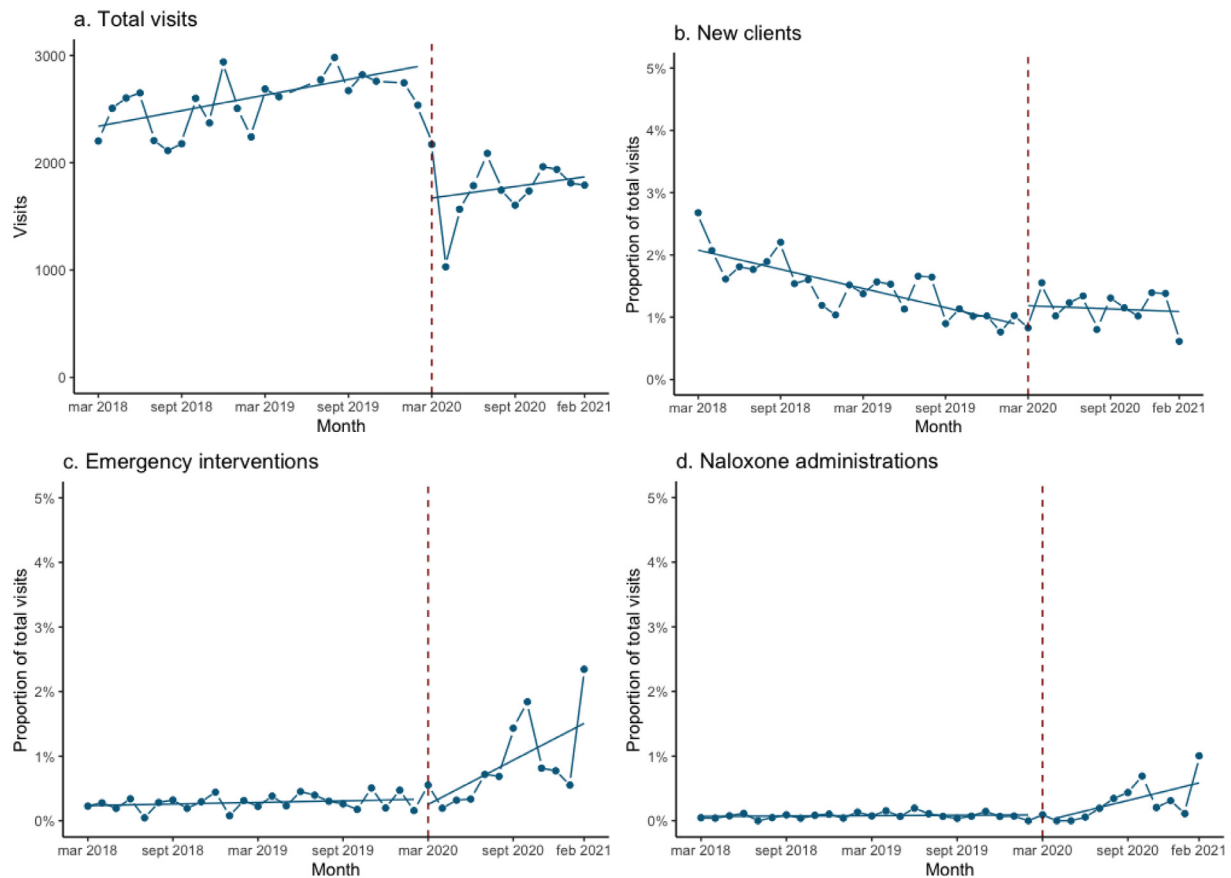
#### Harm reduction material distribution

There was an immediate increase in the number of needles/syringes distributed after the onset of the pandemic (level change = 16,553 per month, 95% CI [2,373; 30,732],  $p < 0.05$ ), followed by a decreasing trend during the peri-pandemic period (slope change = -2,398, 95% CI [-4,218; -578],  $p < 0.05$ ) (Fig. 3, panel a). In contrast, distribution of naloxone kits and fentanyl test strips, both of which were increasing prior to March 2020, continued to increase following pandemic onset without significant interruption (Fig. 3, panels b and c).

#### Discussion

We analysed changes in the use of supervised consumption services (SCS) in Montréal during the 12 months following the onset of the COVID-19 pandemic using an interrupted time series design. The pandemic was associated with an immediate decrease in the overall number of visits to SCS, as well as in the proportion of visits requiring emergency interventions; however, during the following 12 months, while the number of visits remained stable below the pre-pandemic baseline, the proportion of visits requiring emergency intervention increased. This occurred alongside a declining trend in traditional unregulated opioid (e.g., heroin) injection and an increasing trend in novel synthetic opioid and pharmaceutical opioid injection. There was an immediate increase, followed by a declining trend, in the proportion of visits with unregulated amphetamine injection, partially offset by an increasing trend in pharmaceutical stimulant injection. There was an immediate increase





**Fig. 1.** Trends in SCS visits, new client registrations, and emergency interventions, March 2018-February 2021

*Note:* “Total visits” includes all visits to the injecting room; clients may be counted multiple times. “New clients” includes those who indicated that it was their first visit to the SCS. Naloxone administrations are a subset of all emergency interventions. New clients, emergency interventions, and naloxone administrations are reported as proportions of monthly visits.

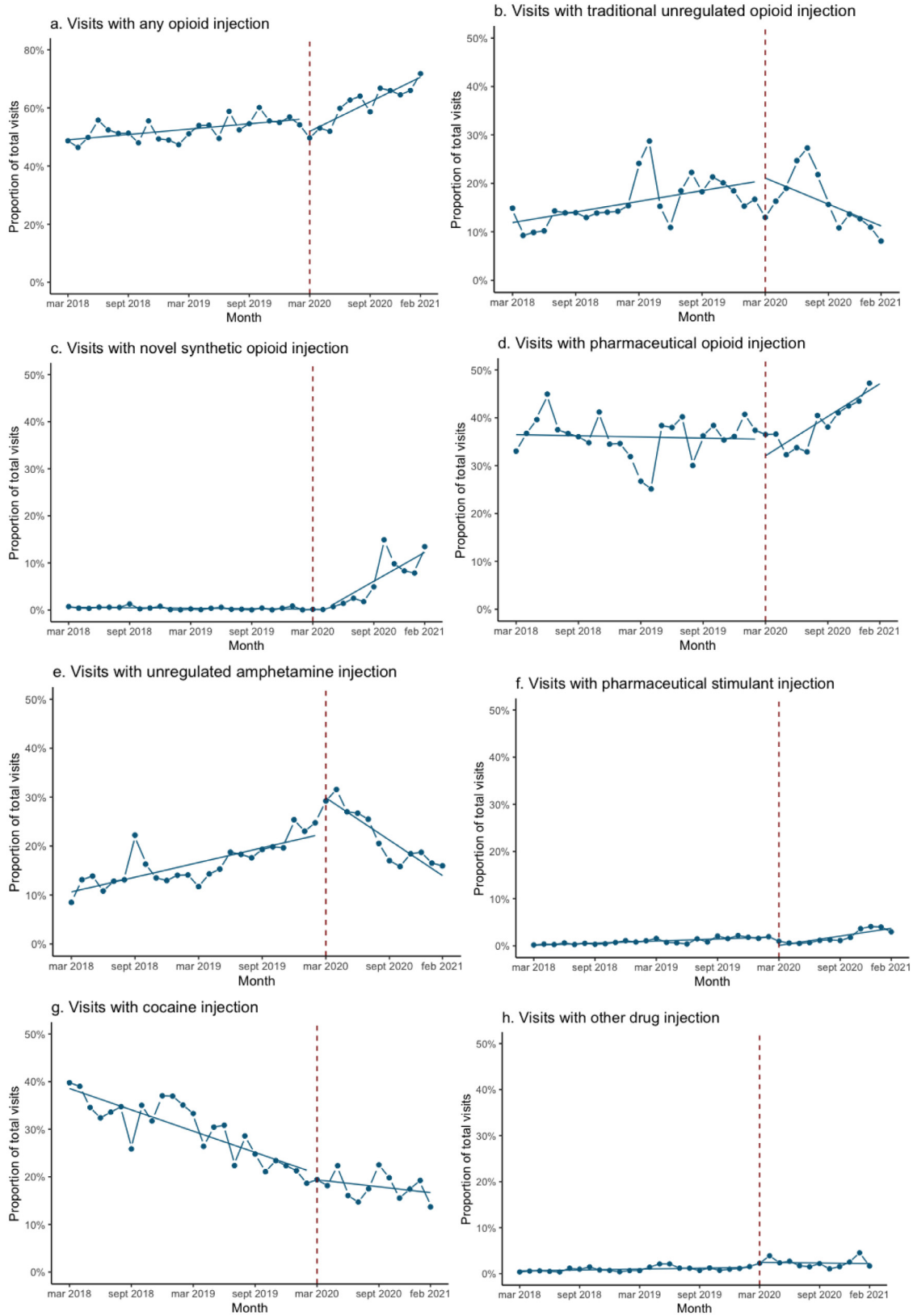
in needle and syringe distribution, followed by a declining trend. Distribution of both naloxone and fentanyl test strips showed no evidence of pandemic-related disruption, suggesting that service providers responded flexibly to maintain distribution of harm reduction supplies despite physical distancing requirements that limited service capacity. However, these findings suggest that despite this rapid service adaptation, overdose risk has been heightened by the peri-pandemic environment.

Observed immediate declines in service visits are attributable to public health measures mandating physical distancing, which reduced service capacity. Barriers to service access due to pandemic-related restrictions, including closures, capacity limitations, reduced hours of operation, have been reported in many settings (Glick et al., 2020; Russell et al., 2021; Trayner et al., 2022; Whitfield et al., 2020). In addition to these service disruptions, SCS clients may have avoided attending in order to minimise their infection risk, particularly given the underlying vulnerabilities many clients face (Ali et al., 2020; Bouck et al., 2022). Following the large, immediate decrease in monthly SCS visits, the trend of increasing SCS visits over time continued. As capacity restrictions lift, service use may rebound to pre-pandemic levels; however, as of February 2021 visits were still below the pre-pandemic baseline, indicating long-lasting disruptions to service delivery. Ongoing monitoring of this outcome is warranted.

The increasing trend in visits requiring an emergency response, along with changes in the drugs injected at SCS, adds to evidence that overdose risk has increased in Montréal in recent years. Historically, Montréal had been less affected by the overdose crisis in comparison with

other major Canadian cities such as Toronto and Vancouver, suggesting some insulation against drug market shifts such as the predominance of highly potent unregulated fentanyl (BCCDC, 2021; Interactive Opioid Tool, n.d.; Santé Montréal, 2022). Indeed, only a small proportion of opioid-involved deaths in Montréal were linked to novel synthetic opioids until 2019, when fentanyl became increasingly common (INSPQ 2021). This shift was heightened during the pandemic, with the proportion of drug-related deaths in which fentanyl was detected rising from 8% during April 2019 to March 2020 to 17% during April 2020 to March 2021 (INSPQ, 2021; Santé Montréal, 2022). Border closures and other infection mitigation measures, as well as the increased use of certain drugs in medical settings, may have disrupted the drug market and affected modes of drug use, potentiating the transition to more potent synthetic opioids (Krausz et al., 2021; Otiashvili et al., 2022; Schlosser & Harris, 2020). These findings dovetail with reports that increasingly scarce heroin is being replaced by novel synthetic opioids including higher concentrations of fentanyl, benzodiazepine-fentanyl mixtures, and benzimidazole in counterfeit opioid tablets (RCCET, 2020).

SCS visits with reported pharmaceutical opioid and stimulant use both increased during the peri-pandemic period. While we do not have data on the origin of pharmaceuticals injected at Montréal SCS, increasing pharmaceutical opioid use might reflect the prevalence of counterfeit tablets. Alternatively, the gradual increase in the use of pharmaceutical drugs after the public health emergency was declared might reflect increases in safer supply or risk mitigation prescribing in Montréal (Bonn et al., 2020; Glegg et al., 2022; Goyer et al., 2020). In an effort to mitigate potential drug-related harms, the pan-

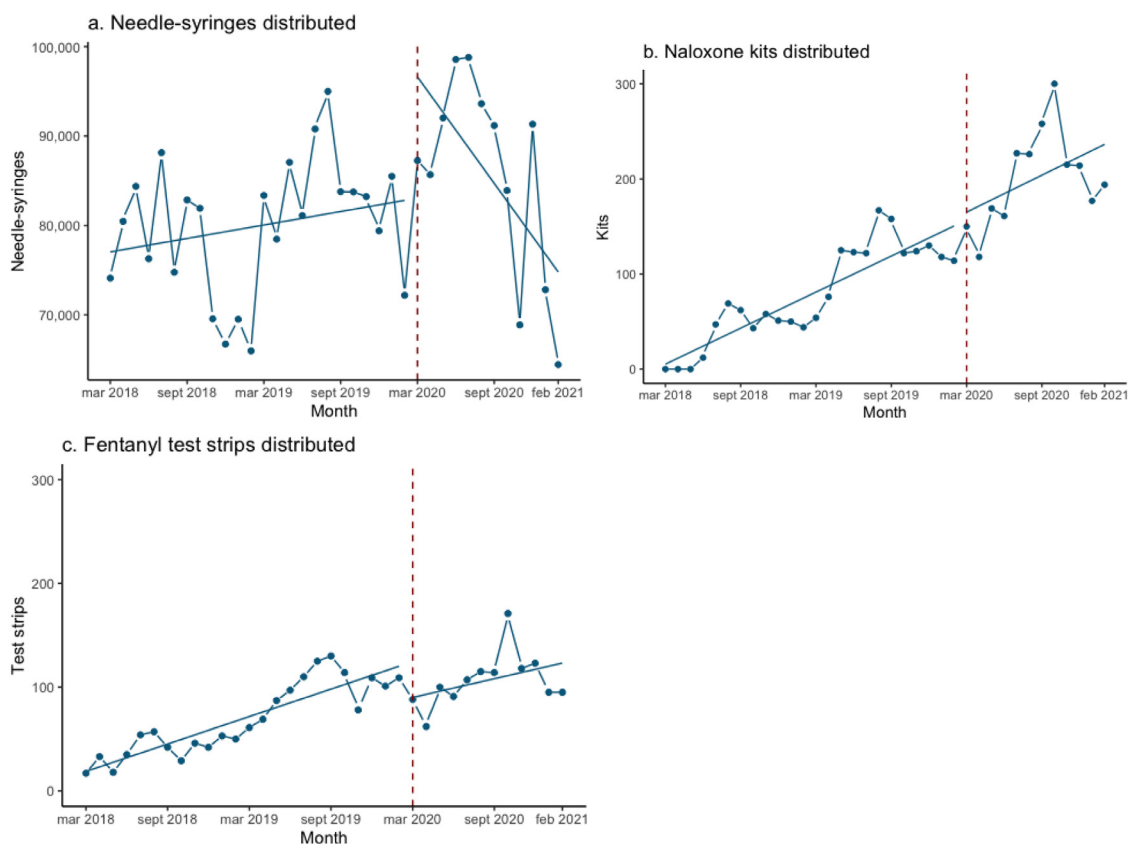


**Fig. 2.** Trends in injection of specific drug classes at SCS, March 2018 - February 2021  
 N.B. Panel a uses a different scale than the other panels and represents the combined influences of panels b, c, and d.

**Table 3**  
Results from models generated by Generalised Least Squares fit by maximum likelihood (GLS).

Outcome	Level change	95% CI	Slope change	95% CI
Visits	<b>-1,286.45</b>	[-1642.39, -930.50]	-3.23	[-46.04, 39.58]
First-time clients, as a proportion of all visits	0.30%	[-0.09%, 0.70%]	0.04%	[-0.004%, 0.09%]
Emergency interventions, as a proportion of all visits	<b>-0.27%</b>	[-0.47%, -0.06%]	<b>0.12%</b>	[0.10%, 0.14%]
Naloxone administrations, as a proportion of all visits	<b>-0.18%</b>	[-0.27%, -0.09%]	<b>0.06%</b>	[0.05%, 0.07%]
As a proportion of all visits, visits with injection of:				
Any opioid	-0.15%	[-0.33%, 0.02%]	<b>0.05%</b>	[0.03%, 0.07%]
Traditional unregulated opioids	-0.42%	[-6.78%, 5.94%]	<b>-1.13%</b>	[-1.97%, -0.29%]
Novel synthetic opioids	<b>-3.40%</b>	[-4.78%, -2.03%]	<b>1.35%</b>	[1.19%, 1.51%]
Pharmaceutical opioids	-4.43%	[-11.69%, 2.84%]	<b>1.39%</b>	[0.45%, 2.34%]
Cocaine	-1.48%	[-6.76%, 3.80%]	0.48%	[-0.17%, 1.13%]
Unregulated amphetamines	<b>7.83%</b>	[2.93%, 12.73%]	<b>-1.86%</b>	[-2.51%, -1.21%]
Pharmaceutical stimulants	<b>-1.83%</b>	[-2.73%, -0.93%]	<b>0.23%</b>	[0.12%, 0.35%]
Other drugs	1.09%	[-0.05%, 2.24%]	-0.06%	[-0.20%, 0.08%]
Distribution of:				
Needle-syringes	<b>16,552.81</b>	[2,373.31, 30,732.32]	<b>-2,397.92</b>	[-4,217.97, -577.87]
Naloxone kits	25.67	[-32.19, 83.54]	-2.02	[-11.07, 7.04]
Fentanyl test strips	-27.55	[-63.08, 7.98]	-2.22	[-6.98, 2.54]

Note. Numbers in bold indicate changes significant at the level of  $p < 0.05$ .



**Fig. 3.** Trends in distribution of harm reduction materials by SCS host sites, March 2018-February 2021.



demic period saw the emergence of prescribed safer supply medications to facilitate physical distancing and empower people who use drugs to avoid reliance on the increasingly toxic unregulated drug supply (Bonn et al., 2020; Brothers et al., 2022; Glegg et al., 2022). In Canada, the prevalence of safer supply programmes, operating independently of SCS, increased rapidly during the pandemic; while many reported underfunding (Glegg et al., 2022), their safety and efficacy were demonstrated (Brothers et al., 2022). Further research would be required to disentangle these distinct but possibly co-occurring drivers of the drug-use changes reported at Montréal SCS. Greater drug-checking coverage would aid in establishing the provenance of supposed pharmaceuticals.

The pandemic was associated with an immediate increase in needle/syringe distribution, followed by a decreasing trend (Fig. 3, panel a). Harm reduction services in Montréal operate under a “saturation strategy,” in which clients are encouraged to collect as much equipment as they need so that each injection can be performed with new materials (CACTUS Montréal, 2021). As this strategy continued during the pandemic, clients may have responded proactively to the emergency health declaration by stocking up on materials, with distribution returning to pre-pandemic levels over the following year. Evidence from Scotland suggests that people who inject drugs obtained more supplies per visit and engaged in secondary/peer distribution during the pandemic (Trayner et al., 2022). The pre-pandemic trend of increasing naloxone kit and fentanyl test strip distribution remained stable during the peri-pandemic period despite the large reduction in total visits, suggesting that SCS and the community organisations that house them adapted rapidly to the pandemic context to maintain harm reduction material distribution. These findings are corroborated by a survey of people who use drugs in Montréal; the majority of participants who reported trying to access harm reduction services during the early pandemic period were able to do so (Minoyan et al., 2022). Indeed, services and public health organisations in Montréal demonstrated remarkably rapid response to the large-scale disruption engendered by the COVID-19 pandemic, as evidenced by the relatively short-lived closure of SCS in the city (Table 1).

Though the overdose crisis is not a new phenomenon, it has been heightened during the COVID-19 pandemic in many settings (Bonn et al., 2020; Haley & Saitz, 2020; Holland et al., 2021). Throughout Canada, difficulties accessing harm reduction supplies and opioid agonist treatment (OAT), as well as public health mandates potentiating solo drug use, have likely contributed to riskier drug use environments during the pandemic period (Public Health Agency of Canada, 2021; Schlosser & Harris, 2020). Public health departments, community organisations, and people who use drugs have undertaken a variety of initiatives to mitigate these risks. In addition to aforementioned safer supply medications, national guidance promoting increased telehealth and take-home dose coverage for OAT was established following the public health emergency declaration (CRISM, 2020; CDSA Exemption and Interpretive Guide for Controlled Substances, 2020). Positive findings have emerged from Toronto, Ontario, where the pandemic was associated with an increase in OAT enrolment and take-home doses, but not in opioid-involved overdoses (Bouck et al., 2022). While we do not have data on pandemic responses that occurred in Montréal outside of SCS, people who use drugs in Canada also developed other innovations to promote safety, including “virtual spotting” or supervising drug consumption remotely over video or telephone (outside of an SCS) (Perri et al., 2021). Despite these risk-reduction efforts, overdose and drug-related harms increased throughout Canada during the pandemic period (BCCDC, 2021; INSPQ, 2021; Public Health Agency of Canada, 2021; Santé Montréal, 2020). Given the important role of community organisations and SCS in supporting clients’ health (Kerr et al., 2007; Marshall et al., 2011; Potier et al., 2014), continued monitoring is necessary to assess drug-related outcomes, including overdoses, blood-borne viral infections, and changes in drug use patterns, as the peri-pandemic context evolves.

## Limitations

This study relied on administrative data collected for non-research purposes. Drugs injected during visits are recorded by SCS staff as reported by clients, and therefore may not reflect the actual contents of the drugs. This may particularly limit analyses of opioid consumption, given the presence of counterfeit pharmaceutical opioid pills as well as powders containing fentanyl analogues or benzodiazepines, which clients might report as heroin or as unspecified “down.” This study included data only from the four SCS operating in Montréal, the largest city in Québec, and therefore cannot address pandemic-related impacts in other areas of the province, particularly in suburban and rural environments. As there is less service coverage for people who inject drugs in these locales as compared to Montréal, drug use risk may have been heightened in different ways in the peri-pandemic context.

We did not collect data on pandemic-related regulations or responses that occurred outside of SCS, nor on perceptions of the pandemic by site staff or clients. Although drug use risk and service utilisation may also have differed for more marginalised clients, including older adults, women, and racialized people, we did not analyse by subgroup (and SCS in Montréal do not collect data on race/ethnicity). Future investigations focusing on vulnerable subgroups are warranted. Additionally, inclusion of an unaffected control group of participants was not possible. However, a strength of interrupted time series designs is the inclusion of a pre-intervention trend, which serves as a control (Wagner et al., 2002). Finally, this study was exploratory in nature and included multiple statistical comparisons for both level and trend changes across several outcomes, which might have inflated the risk of false positives (Type I error). However, the overall findings were generally consistent with our pre-existing hypotheses as to the direction of effects.

## Conclusions

Observed increases in emergency interventions at Montréal’s SCS during the first 12 months of the COVID-19 pandemic add to the evidence of an increase in overdose risk for people who use drugs in this environment. The sharp declines in SCS visits observed in March 2020 are poised to stabilise over time as pandemic-related capacity restrictions are lifted, while the increasing presence of novel synthetic opioids seems unlikely to abate. Service providers will need to continue to adapt to creatively confront riskier drug use environments by enhancing harm reduction services and potentially expanding SCS coverage. Sustained monitoring of drug use risk environments and outcomes will be necessary as the syndemic of COVID-19 and overdose continues.

## Authorship

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Thomas D. Brothers: Conceptualization, Methodology, Writing (review & editing)

Pascale Leclerc: Investigation, Resources, Data curation, Writing (review & editing)

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## Declarations of 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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## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.drugpo.2022.103894.

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