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3 Evaluation of an emergency safe supply drugs and managed alcohol program in COVID-19 isolation hotel  
4 shelters for people experiencing homelessness

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27

28 **ABSTRACT**

29 **Background:** During a COVID-19 outbreak in the congregate shelter system in Halifax, Nova Scotia,  
30 Canada, a multidisciplinary health care team provided an emergency “safe supply” of pharmaceutical-  
31 grade medications and beverage-grade alcohol to facilitate isolation in COVID-19 hotel shelters for  
32 residents who are dependent on these substances. We aimed to evaluate (a) substances and dosages  
33 provided, and (b) effectiveness and safety of the program.

34 **Methods:** We retrospectively reviewed medical records of all COVID-19 isolation hotel shelter residents  
35 during May 2021. We extracted data on medication and alcohol dosages provided each day. The primary  
36 outcome was residents prematurely leaving isolation against public health orders. Adverse events  
37 included (a) overdose; (b) intoxication; and (c) diversion, selling, or sharing of medications or alcohol.

38 **Results:** Over 25 days, 77 isolation hotel residents were assessed (mean age  $42 \pm 14$  years; 24% women).  
39 Sixty-two (81%) residents were provided medications, alcohol, or cigarettes. Seventeen residents (22%)  
40 received opioid agonist treatment medications (methadone, buprenorphine, or slow-release oral  
41 morphine) and 27 (35%) received hydromorphone tablets. Thirty-one (40%) residents received stimulant  
42 tablets with methylphenidate (27; 35%), dextroamphetamine (8; 10%), or lisdexamfetamine (2; 3%). Six  
43 residents (8%) received benzodiazepines. Forty-two (55%) residents received alcohol, including 41 (53%)  
44 with strong beer, three (3%) with wine, and one (1%) with hard liquor. Over 14 days in isolation, mean  
45 daily dosages increased of hydromorphone ( $45 \pm 32$  to  $57 \pm 42$ mg), methylphenidate ( $51 \pm 28$  to  $77 \pm$   
46  $37$ mg), dextroamphetamine ( $33 \pm 16$  to  $46 \pm 13$ mg), and alcohol ( $12.3 \pm 7.6$  to  $13.0 \pm 6.9$  standard  
47 drinks). Six residents (8%) left isolation prematurely, but four of those residents returned. Over 1,059  
48 person-days in isolation, there were zero overdoses. Documented concerns regarding intoxication  
49 occurred six times (0.005 events/person-day) and medication diversion or sharing three times (0.003  
50 events/person-day).

51 **Conclusions:** An emergency safe supply and managed alcohol program, paired with housing, was  
52 associated with low rates of adverse events and high rates of successful completion of the 14-day  
53 isolation period in COVID-19 isolation hotel shelters. This supports the effectiveness and safety of  
54 emergency safe supply prescribing and managed alcohol in this setting.

55  
56 **MESH Term Keywords:** Substance Use; Drug Addiction; Harm Reduction; Substance Abuse, Intravenous;  
57 Substance-Related Disorders; Needle-Exchange Programs; Opiate Substitution Treatment; Coronavirus  
58

59 **BACKGROUND**

60 The COVID-19 pandemic and associated public health restrictions have had a disproportionate impact on  
61 people who use drugs and/or alcohol (1–3). Disruptions to drug supply routes have led to an increasingly  
62 toxic and unpredictable drug supply, while physical distancing requirements cause more people to use  
63 drugs alone (where they cannot be resuscitated if they overdose) and have reduced capacity and  
64 operating hours at harm reduction and addiction treatment programs (4–6). People who are dependent  
65 on substances may be unable to follow public health directives to isolate if they have been exposed to  
66 COVID-19, due to withdrawal symptoms or compulsive use (1). For people who use drugs and/or alcohol  
67 and are also experiencing homelessness, staying in congregate shelters increases risks of COVID-19  
68 infection; people in this situation would be unable to isolate unless given a private place to stay (7,8).

69  
70 To facilitate physical distancing and decrease risks of COVID-19 infection, withdrawal, and overdose,  
71 Canadian clinicians developed rapid guidelines to provide a regular, safe supply of pharmaceutical-grade  
72 drugs and of beverage-grade alcohol to people who are dependent on these substances (9–12). The  
73 rationale for providing an alternative “safe supply” of substances to remove harms caused by reliance  
74 on the criminalized, unregulated, and poisonous drug market was first advanced by the Canadian  
75 Association of People who Used Drugs (CAPUD)(1,13,14) and developed clinically by Sereda and  
76 colleagues(15) and by Tyndall and colleagues(16), before the COVID-19 pandemic. Provisional  
77 prescribing of safe supply medications and managed alcohol to facilitate COVID-19 related physical  
78 distancing or isolation has also been termed “risk mitigation” or “pandemic prescribing” (1,9,17–19).  
79 The uptake of these prescribing guidelines on a population level is under evaluation (17,20), but the  
80 clinical safety and effectiveness of this approach for people in COVID-19 isolation has not been  
81 demonstrated.

82

83 In May 2021, there was a COVID-19 outbreak in the congregate shelter housing system in Halifax, Nova  
84 Scotia, Canada, and all residents in shelters experiencing COVID-19 outbreaks were moved to isolation  
85 hotel shelters for 14 days. A multidisciplinary health care team provided emergency, temporary safe  
86 supply medications and beverage-grade alcohol to facilitate isolation for residents who are dependent  
87 on these substances.

88

89 We aimed to describe the organization and delivery of an emergency, provisional safe supply drug and  
90 managed alcohol program during a COVID-19 outbreak in the congregate shelter system in Halifax, Nova  
91 Scotia, Canada. We evaluated safety of the program through the frequency of substance-related adverse  
92 events (including fatal and non-fatal overdose), and effectiveness through the rate of premature  
93 resident-initiated discharge from isolation against Public Health orders.

94

## 95 **METHODS**

### 96 **Setting and data sources**

97 This study comprises a retrospective case series of all COVID-19 isolation hotel shelter residents  
98 admitted during the Spring 2021 COVID-19 outbreak in the congregate shelter system in Halifax, Nova  
99 Scotia. This manuscript is reported in accordance with the Strengthening The Reporting of Observational  
100 studies in Epidemiology (STROBE) checklist (21).

101

102 People who stayed at shelters identified to have COVID-19 outbreaks were moved to isolation in hotels  
103 funded by the provincial government. At this stage in the pandemic, they were mandated to isolate for  
104 14 days under authority of the Nova Scotia *Health Protection Act*. Isolation hotel shelters were in the city  
105 centre, several blocks away from residents' usual congregate shelters. Residents of a given shelter  
106 typically stayed on the same hotel floor, with shelter staff continuing to support them there.

107

108 Data were extracted from the shared electronic medical record, including progress notes, electronic  
109 prescriptions, and messaging. Using structured chart review, each resident's information was extracted  
110 in duplicate, once by a graduate student researcher (ML) and once by a clinician with experience  
111 prescribing these medications (TDB, MG, or AG). Discrepancies were resolved by TDB.

112

### 113 **Program description**

114 Mobile Outreach Street Health (MOSH) organized a team of physicians and nurse practitioners with  
115 experience in addiction medicine and harm reduction, established a weekly clinical care coverage  
116 schedule, and provided access to a shared digital electronic medical record. MOSH was established in  
117 2009 to provide outreach primary care to people experiencing homelessness and people who use drugs  
118 in Halifax; the organization has long-standing relationships with the city's shelters and many of the  
119 residents. All residents being moved to isolation were referred to the harm reduction prescribing team  
120 for assessment. Nurses, nurse practitioners, and physicians performed intake assessments on substance  
121 use and health history; most assessments were done over the phone, but some were done in person.  
122 Prescribers had access to province-wide pharmacy information system to confirm patient reports of  
123 prescribed medications, including opioid agonist treatment (OAT). Some patients were previously seen  
124 by MOSH or the associated North End Community Health Centre, and in this case had existing medical  
125 records the team could access.

126

127 Physicians and nurse practitioners prescribed pharmaceutical-grade substances generally following the  
128 BC Centre on Substance Use (BCCSU) Guidelines: Risk Mitigation in the Context of Dual Public Health  
129 Emergencies document (9), and beverage-grade alcohol according to MOSH managed alcohol program's  
130 protocols. See Table 1 for a summary of prescribing guidance used by the MOSH team. Residents were

131 aware that both the hotel-based private housing and the safe supply medications would only be  
132 provided for 14 days while they were isolating under Public Health orders.

133

134 The BCCSU guidelines were developed in British Columbia, which has a more potent and unpredictable  
135 illicit drug supply than Nova Scotia; as a result, prescribers did not know whether the recommended  
136 dosing ranges in the BCCSU guidelines would be required or appropriate. Compared to Nova Scotia,  
137 British Columbia has much higher rates of illicitly manufactured fentanyl, fentanyl analogues, novel  
138 benzodiazepines, and methamphetamine availability and use (22). People who use drugs in Nova Scotia  
139 most often use hydromorphone tablets (immediate release or extended release) and cocaine, though  
140 rates of illicitly manufactured fentanyl use are increasing (23–26). Largely due to these regional  
141 differences in the illicit drug supply, British Columbia experienced a rate of opioid poisoning deaths (39.4  
142 per 100,000 people) eight times higher than Nova Scotia (4.9 per 100,000) from January to June, 2021  
143 (26).

144

145 Prescribed medications could be taken orally, or crushed and injected or snorted; prescribers reviewed  
146 with residents that oral tablets were not designed to be crushed and injected, and provided guidance on  
147 safer use within a harm reduction framework. Resident preferences as to specific brands or formulations  
148 (e.g. those that might be more soluble in water to facilitate safer injecting) were followed as closely as  
149 possible. Liquid hydromorphone for injection use is not included in the BCCSU guidelines and was not  
150 considered here; this oversight has been criticized by people who use drugs because of the relatively  
151 increased harms associated with injecting oral tablets (27). Cannabis withdrawal is not mentioned in the  
152 BCCSU guidelines and the prescribing team initially underappreciated the importance of cannabis  
153 cravings and withdrawal symptoms (28), once other needs were met. While trying to facilitate funding  
154 for cannabis deliveries to the hotels, prescribers began to offer nabilone as an agonist replacement

155 therapy to residents with cannabis withdrawal symptoms and residents began to order their own  
156 cannabis.  
157  
158 Medications were delivered daily by a local community pharmacist with experience with OAT and a  
159 harm reduction philosophy of care. Alcohol was delivered daily by the MOSH managed alcohol program  
160 outreach team or dispensed by shelter staff on site. For residents who reported intense binge drinking,  
161 alcohol dispensing would be divided into two times per day. Prescribers performed frequent phone  
162 follow-ups to adjust dosages, usually daily for the first three days and then as needed. MOSH nurses  
163 and/or prescribers would assess residents in person if needed. The team communicated via mobile  
164 secure messaging app and discussed challenging cases by phone and virtual video conferences. Mainline  
165 Needle Exchange, a local harm reduction outreach organization, provided all residents receiving safe  
166 supply medications with take-home naloxone kits, sterile drug preparation and injecting equipment, and  
167 support. No dedicated safe consumption space was created; instead, residents were encouraged to try  
168 “virtual spotting”(29) with friends or family or with the National Overdose Response Service (NORS)  
169 phone line (30), or otherwise to let shelter staff know they were going to be using so they could check in  
170 soon after.

171

172 There were no costs to residents at the COVID-19 isolation hotels. Medications were covered either  
173 through public drug insurance plans (for those who were enrolled) or by Nova Scotia Public Health (for  
174 those without insurance). Alcohol costs were initially covered by the MOSH managed alcohol program,  
175 and then through provincial government funding. Sterile injecting equipment and take-home naloxone  
176 kits are free to everyone in Nova Scotia, funded by the provincial government.

177

178 **Measures**



179 *Descriptive characteristics*

180 We extracted data on resident demographic characteristics including age and gender. Race and  
181 Indigenous status were not routinely evaluated in the medical assessments and therefore were not  
182 available for extraction in the medical record. We extracted data on dosages of medications dispensed  
183 and calculated daily dosages and averages among patients receiving the medications. Alcohol was  
184 converted into Canadian standard drink units (17.05mL or 0.5765oz of pure ethanol).(31)

185

186 *Primary outcome*

187 The primary outcome was the frequency of residents leaving the isolation hotel shelter against public  
188 health orders before the mandatory 14 day isolation period was completed.

189

190 *Adverse events*

191 We extracted data on adverse events including documentation of (a) overdose; (b) intoxication; and (c)  
192 diversion, sharing, or selling of safe supply medications or alcohol.

193

194 Overdose was defined as fatal or non-fatal drug or alcohol poisoning that would require basic life  
195 support, administration of naloxone or oxygen, and/or transfer to the emergency department.

196 Intoxication and diversion, sharing, or selling was documented in medical records as part of prescribers'  
197 assessment and plan to continue or change dosages of medications and alcohol, based on prescribers'  
198 clinical impression (usually by telephone), by resident report, or by *ad hoc* descriptions by shelter  
199 support staff, the pharmacist, or the managed alcohol program outreach team.

200

201 **Analysis**

202 We used Microsoft Excel for data management and to calculate summary statistics and R 3.6.3 for data  
203 visualizations. We described individual trajectories by creating separate plots for each resident's daily  
204 dosages of opioids, stimulants, and alcohol. To compare different substances on the same visual scale,  
205 we transformed individual's daily dosages into a percentage of the maximum daily dosage of that  
206 substance received across the whole sample; for example, the maximum daily hydromorphone dosage  
207 across all residents was 158mg, so an individual resident receiving 48mg of hydromorphone in a day  
208 would have a percentage value of  $48\text{mg} \div 158\text{mg} \times 100\% = 30\%$  for that day.

209

## 210 **RESULTS**

### 211 **Participants**

212 Over 25 days, 77 residents were admitted to COVID-19 isolation hotel shelters and referred to the  
213 medical team (Table 2). In total, there were 1,059 person-days in isolation after medical assessment.  
214 Most participants were men, and average age differed by gender. Mean age for men was  $46 \pm 14$  years,  
215 and for women was  $30 \pm 10$  years. After intake assessment, 15 residents (19%) were determined to have  
216 no concerns about substance withdrawal or dependence while in isolation and were given no  
217 medications, alcohol, or cigarettes. Sixty-two residents (81%) were provided medications, alcohol, or  
218 cigarettes, summarized by day of isolation in Figure 1.

219

220 Cigarettes were the most commonly provided substance (64 residents; 83% of total sample), followed  
221 by alcohol (42 residents; 55% of total sample), and hydromorphone tablets (27 residents; 35% of total  
222 sample). Seventeen residents (22%) received any OAT, including eight who initiated OAT medications in  
223 the isolation hotel shelters. All eight of these residents initiated SROM, and no residents initiated  
224 methadone or buprenorphine-naloxone. Twelve residents received both OAT and hydromorphone  
225 tablets on the same day (71% of residents receiving OAT); four of these residents were already on OAT

226 before isolation. Two residents accepted offers of nicotine replacement therapy, including one resident  
227 who also had cigarettes delivered.

228

### 229 **Safe supply medication and managed alcohol dosages**

230 Among the 27 residents receiving hydromorphone, average dosages increased over residents' time in  
231 isolation from day one (mean 45mg  $\pm$  32mg; median 32mg; range 16 - 158mg daily) to day 14 (mean  
232 57mg  $\pm$  42mg; median 48mg; range 16 - 158mg daily) (Supplementary Figure S1). Three (12%) of these  
233 27 residents were prescribed hydromorphone dosages above the BCCSU guideline suggested upper limit  
234 of 112mg daily (14 x 8mg tablets). Individual daily dosage trajectories for hydromorphone and OAT are  
235 visualized in Figure 2, plotted as percentages of the maximum daily dosage of each medication across  
236 the whole sample. The maximum daily dosage for methadone was 195mg, for buprenorphine was 12mg,  
237 for SROM was 800mg; and for hydromorphone was 158mg.

238

239 Among residents receiving stimulants, average dosages also increased over time (Supplementary Figure  
240 S2). Methylphenidate daily dosages increased from day one (mean 51mg  $\pm$  28mg; median 40mg; range  
241 10 - 107mg) to day 14 (mean 77mg  $\pm$  37mg; median 80mg; range 15 - 160mg). Dextroamphetamine daily  
242 dosages increased from day one (mean 33mg  $\pm$  16mg; median 30mg; range 20 – 60mg) to day 14 (mean  
243 46mg  $\pm$  13mg; median 40mg; range 30 – 60mg). Four (15%) of 27 residents receiving methylphenidate  
244 were prescribed doses above the BCCSU guideline suggested upper limit of 100mg daily. Of eight  
245 residents receiving dextroamphetamine, one (13%) required dosages above the guideline suggested  
246 upper limit of 120mg daily. Individual daily dosage trajectories for stimulant medications are visualized  
247 in Figure 3, plotted as percentages of the maximum daily dosage of each medication across the whole  
248 sample (methylphenidate 160mg, dextroamphetamine 80mg, and lisdexamfetamine 60mg).

249

250 Average daily alcohol dosages increased slightly over time from day one (mean  $12.3 \pm 7.6$  standard  
251 drinks; median 11.25 standard drinks; range 1.25 - 33.75 standard drinks) to day 14 (mean  $13.0 \pm 6.9$   
252 standard drinks; median 13.1 standard drinks; range 1.25 - 30.75 standard drinks) (Supplementary  
253 Figure S3). Individual daily dosage trajectories for alcohol are visualized in Figure 4, plotted as  
254 percentages of the maximum daily dosage of alcohol across the whole sample (37.5 standard drinks).

255  
256 Benzodiazepine dosages were relatively stable. Clonazepam increased slightly from day one (mean  $1.67$   
257  $\pm 1.15$ ; median 1mg; range 1 – 3mg) to day 14 (mean  $2.00 \pm 1.41$ mg; median 1mg; range 1 - 4mg) and  
258 the only lorazepam daily dosage was stable at 1mg. Nabilone dosages increased from mean  $2\text{mg} \pm 0\text{mg}$   
259 on day one to mean  $2.79\text{mg} \pm 1.25\text{mg}$  on day 14, while an unknown number of residents had cannabis  
260 delivered to the isolation hotel shelters.

261

## 262 **Primary outcome**

263 Among the 77 isolation hotel residents, six (8%) left against public health orders. Four of these six soon  
264 returned and remained in isolation, resulting in two (3%) persistent premature discharges from  
265 isolation.

266

## 267 **Adverse events**

268 Over 1,059 person-days in isolation, there were zero overdoses in the isolation hotel shelters. Concerns  
269 regarding intoxication were documented six times (0.005 events per person-day); four of these residents  
270 with documented intoxication were provided alcohol and four were provided opioids (three with OAT  
271 plus hydromorphone, and one with hydromorphone only). Concerns regarding diversion, sharing, or  
272 selling of medications was documented three times (0.003 events per person-day), including among two

273 residents who also had documented intoxication. All three of these residents were provided multiple  
274 substances, including opioids, stimulants, and alcohol.

275

## 276 **DISCUSSION**

277 Among residents of a COVID-19 isolation hotel shelter for people experiencing homelessness, we found  
278 that an emergency, provisional safe supply program (i.e. prescribing pharmaceutical-grade medications  
279 and beverage-grade alcohol) was associated with low rates of adverse events and high rates of  
280 successful completion of the 14-day isolation period. No shelter residents experienced an overdose  
281 during their stay. We identified medication dosage ranges that generally fell within those recommended  
282 in “risk mitigation” prescribing guidelines, which were urgently produced in response to evolving risks of  
283 COVID-19. This supports the safety and effectiveness of this approach in this setting.

284

285 The safe supply drug and alcohol prescribing practices described in this evaluation are a recent  
286 development. While the relative safety of medications and alcohol dispensed for unwitnessed  
287 consumption has not been previously well-described in the literature, the practice is an extension of the  
288 evidence from witnessed consumption settings (14,15,18,25,32,33). Witnessed injectable OAT (iOAT)  
289 with liquid hydromorphone or diacetylmorphine (Heroin) has a robust evidence-based and has been  
290 incorporated into Canadian clinical practice guidelines for opioid use disorder (34,35). Qualitative  
291 studies have evaluated the benefits of witnessed hydromorphone tablet consumption, which is more  
292 flexible and less resource-intensive than witnessed iOAT (36,37). A recent study from Ottawa, Canada,  
293 describes positive outcomes for people with severe opioid use disorder who are provided  
294 hydromorphone iOAT along with supported housing (38). Benefits of managed alcohol programs are  
295 also clearly established for people with severe alcohol use disorder, and particularly people who drink

296 non-beverage alcohol (39–41). Some existing managed alcohol programs include daily and/or  
297 unwitnessed ingestion (42).  
298  
299 The dosing strategy informed by the BCCSU guidelines were appropriate for most patients in this setting  
300 (Halifax, Nova Scotia) where the illicit drug supply is comprised primarily of pharmaceutical  
301 hydromorphone and of cocaine, with relatively little fentanyl and methamphetamine availability in the  
302 community (23,24,43,44). In other settings, dosages may need to be higher than those recommended in  
303 these guidelines or different medications may be for effective. For example, a recent survey of people  
304 who use drugs in British Columbia, Canada, showed that in that province most would prefer heroin or  
305 fentanyl safe supply over prescription opioids like hydromorphone (45). For the emergency safe supply  
306 program in Halifax described in our study, many residents were able to report their usual daily use of  
307 non-prescribed hydromorphone tablets which could be matched with the safe supply prescription.  
308 While the mean dosages of hydromorphone, methylphenidate, and dextroamphetamine increased over  
309 residents' 14 days in isolation, many patients stayed at the same dose throughout. As there were no  
310 overdoses and very few premature discharges from isolation, this suggests that residents knew how  
311 much medication they would need and were willing to work with the prescriber if started too low. While  
312 these medications were not offered as substance use disorder treatment, the options available to  
313 patients (in terms of medications, dosages, and brands or formulations) to help facilitate goals of  
314 successful 14 day isolation represented elements of shared decision-making and patient-centered care  
315 (25,46,47). It is notable that with the broad selection of options available to avoid reliance on the  
316 criminalized drug supply, no residents chose to start methadone or buprenorphine OAT. This differs  
317 from other settings like acute care hospitals, where patients with medical complications of opioid use  
318 disorder may not initially be treatment-seeking, but are often motivated to engage in OAT when offered

319 (24,25,48). Prior research in the hospital setting has shown that offering SROM in addition to  
320 methadone and buprenorphine may increase treatment uptake (25).  
321  
322 Descriptions of harm reduction practices in COVID-19 isolation shelters have been reported from  
323 Toronto(49) and Hamilton(50,51), Canada; Boston(49,52) and San Francisco(53,54), USA; Lisbon,  
324 Portugal (55); and Tshwane, South Africa (56). The other Canadian harm reduction programs are most  
325 like the one described in our study. The Toronto program supported isolation shelter residents with an  
326 emergency managed alcohol program, safe supply hydromorphone prescribing, opioid agonist  
327 treatment, take-home naloxone kits, sterile injecting equipment, and telephone or in-person check-ins;  
328 specific medication and alcohol dosages and frequencies are not reported. They established a  
329 supervised consumption site for witnessed injections, after applying for federal approval. The Toronto  
330 program reported 4 suspected overdose deaths among 1700 admissions (0.2%), which were all  
331 unwitnessed (49). The Hamilton program supported residents isolating at a men’s congregate shelter  
332 with sterile injecting equipment, take-home naloxone, a flexible OAT delivery model, and  
333 hydromorphone safe supply prescribing (51). A community organization set up a supervised  
334 consumption space within the shelter where residents could consume their prescribed hydromorphone.  
335 The Hamilton program reported no fatal overdoses and three non-fatal overdoses during the month-  
336 long intervention (all of which occurred outside the safe consumption site), compared to 20 non-fatal  
337 overdoses in the month before the isolation period (51). The Hamilton program description did not  
338 mention managed alcohol, and neither report includes the frequency of residents leaving isolation  
339 prematurely.  
340  
341 In Boston, OAT was offered but safe supply prescriptions and alcohol were not (49,52). Naloxone and  
342 sterile syringes were distributed at discharge from the isolation shelters, but not provided to residents

343 during their stay. In San Francisco, prescribers offered OAT (with buprenorphine or methadone), medical  
344 cannabis, nicotine replacement therapy, and managed alcohol (53). Residents were provided with sterile  
345 injecting equipment and naloxone, and \$20 gift cards for completing their stay. Opioids, stimulants, and  
346 benzodiazepines were not offered. Some San Francisco shelter programs limited managed alcohol to a  
347 maximum dosage of 10 standard drinks per day (54,54), which was below the mean and median dosages  
348 for the residents in Halifax in our study. Nineteen percent of San Francisco residents left isolation  
349 shelters prematurely (53), which was higher than the 3-8% in Halifax. In Lisbon, harm reduction  
350 organizations provided support, sterile injecting equipment, naloxone, and a mobile drug consumption  
351 room to shelter residents. Residents had access to benzodiazepines for alcohol withdrawal  
352 management, but no safe supply or managed alcohol program was provided (55). In Tshwane,  
353 prescribers provided methadone in the stadium-based emergency shelter. The local needle exchange  
354 program was asked not to deliver sterile injecting equipment, as “municipal and national police were  
355 actively confiscating needles and the city regarded the concurrent provision of needle and syringe  
356 services and [opioid substitution treatment] as a form of mixed messaging” (56).

357  
358 The decision to revoke hotel-based private housing and safe supply medications after 14 days, despite  
359 the apparent benefits to individual residents and despite the ongoing COVID-19 pandemic, raises  
360 challenging ethical issues (57–59) and prevents evaluation of the potential long-term impact of these  
361 housing and safe supply interventions. These decisions were made by government and public health  
362 officials independent of the prescribers and study investigators.

363  
364 Our study has important limitations. First, as the decision was made to offer all shelter residents this  
365 program for drug and alcohol withdrawal management, there is no control group of residents without  
366 this program to compare rates of adverse events or resident-initiated premature discharge from the



367 isolation shelters against public advice. Nevertheless, the rate of premature discharge was lower here  
368 than reported in San Francisco, and our findings here of relatively safety are reassuring. Second, as our  
369 study relied on retrospective evaluation of medical records, we may be missing data on events  
370 (including medication diversion, sharing, or selling) that were not disclosed to shelter staff. The program  
371 described here did not have a systemic approach to surveillance or of gathering information on  
372 diversion, sharing, or selling from shelter staff. Other study designs, including qualitative interviews,  
373 could be used to get a better sense of the scale of medication diversion, sharing, and selling, that was  
374 not reported back to the medical team. Third, as our study occurred in a city with relatively little  
375 fentanyl and crystal methamphetamine use, the dosing ranges here may not be sufficient in populations  
376 with higher drug tolerance and this may limit generalizability.

377

### 378 *Conclusion*

379 We found that an emergency, provisional safe supply program providing pharmaceutical-grade  
380 medications and beverage-grade alcohol in COVID-19 isolation hotel shelters was associated with low  
381 rates of adverse events and of high rates of successful completion of the mandatory 14-day isolation  
382 stay. This suggests this approach is safe and effective in this setting.

383 **Abbreviations**

384 ABV: Alcohol by volume

385 BCCSU: British Columbia Centre on Substance Use

386 MOSH: Mobile Outreach Street Health

387 NORs: National Overdose Response Service

388 OAT: Opioid agonist treatment

389 SROM: Slow-release oral morphine

390

391 **Declarations**

392 *Ethics approval and consent to participate*

393 Requirements for full ethics review and individual participant consent were waived by the Nova Scotia

394 Health Research Ethics Board, who determined this project to be quality assessment (REB FILE #:

395 1027156).

396

397 *Consent for publication*

398 Not applicable.

399

400 *Availability of data and materials*

401 All data generated or analysed during this study are included in this published article.

402

403 *Competing interests*

404 MB reports personal fees from AbbVie, a pharmaceutical research and development company, and

405 grants and personal fees from Gilead Sciences, a research-based biopharmaceutical company, outside of

406 the submitted work. The other authors declare that they have no competing interests.

407

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419 TDB contributed to conceptualization, developed and piloted the data extraction form, performed  
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676

677 Table 1. Summary of prescribing guidelines used in emergency safe supply drug and managed alcohol  
 678 program in COVID isolation hotels in Halifax.

| Substance       | Summary of prescribing guidance  |
|-----------------|--|
| Opioids         | <ul style="list-style-type: none"> <li>• Offer OAT to all patients with opioid use disorder.</li> <li>• It is helpful to prescribe a long-acting opioid (e.g. slow-release oral morphine) in conjunction with a short-acting opioid for those not on OAT.</li> </ul>   |
| Stimulants      | <ul style="list-style-type: none"> <li>• Oral hydromorphone 8mg tablets, 1-3 tablets every hour as needed.</li> <li>• Maximum daily dose of 14 tablets (112mg).</li> </ul>   |
| Benzodiazepines | <ul style="list-style-type: none"> <li>• Methylphenidate SR 20-40mg tablets once daily and/or methylphenidate IR 10-20mg tablets twice daily.</li> <li>• Maximum daily dose of 100mg methylphenidate.</li> </ul>   |
| Alcohol         | <ul style="list-style-type: none"> <li>• Dextroamphetamine SR 10-20mg tablets twice daily and/or dextroamphetamine IR 10-20mg tablets twice or thrice daily.</li> <li>• Maximum daily dose of 80-120mg dextroamphetamine.</li> </ul>   |
| Tobacco         | <ul style="list-style-type: none"> <li>• If temporary maintenance is being prescribed, generally consider switching to a long-acting benzodiazepine (e.g. diazepam or clonazepam) and reduce dose by 50% to start and then titrate daily.</li> </ul>   |
| Alcohol         | <ul style="list-style-type: none"> <li>• Convert patient-reported alcohol consumption into “Canadian Standard Drinks”.</li> <li>• Most mouthwash estimated at 26% ABV, regular wine at 12% ABV, and fortified wine at 20%.</li> <li>• Prescribe managed alcohol dose in number of cans of strong beer (6% ABV; 1.25 standard drinks per can) or red wine (12% ABV; 5.2 standard drinks per 750mL bottle). Limited hard liquor (40% ABV; 0.69 standard drinks per ounce) was also available on a case-by-case basis.</li> <li>• Preference is to use beer, as it can be more easily spread throughout the day.</li> </ul> |
| Tobacco         | <ul style="list-style-type: none"> <li>• Offer nicotine replacement therapy (i.e., patch, gum, lozenge, inhaler).</li> <li>• Residents requiring tobacco would be delivered 1-2 packs of cigarettes daily by a local harm reduction organization outreach team.</li> </ul>   |

679 SR: sustained-release formulation. IR: immediate release formulation. ABV: Alcohol by volume.

680  
 681

682 Table 2. Descriptive characteristics of the sample of residents in COVID-19 isolation.

|   |          |
|---|----------|
| Sample size (n)                                     | 77       |
| Age, years (mean ± standard deviation)              | 42 ± 14  |
| Gender, women (%)                                   | 19 (25%) |
| Residents provided opioid agonist treatment (n)     |          |
| Any opioid agonist treatment                        | 17 (22%) |
| Methadone   | 7 (9%)   |
| Buprenorphine-naloxone                              | 1 (1%)   |
| Slow-release oral morphine                          | 10 (13%) |
| Residents provided hydromorphone (n)                | 27 (35%) |
| Residents provided benzodiazepines (n)              |          |
| Any benzodiazepine                                  | 6 (8%)   |
| Clonazepam  | 5 (6%)   |
| Lorazepam   | 1 (1%)   |
| Residents provided stimulants (n)                   |          |
| Any stimulant                                       | 31 (40%) |
| Methylphenidate                                     | 27 (35%) |
| Dextroamphetamine                                   | 8 (10%)  |
| Lisdexamfetamine                                    | 2 (3%)   |
| Residents provided alcohol (n)                      |          |
| Any alcohol   | 42 (55%) |
| Strong beer (6% ABV)                                | 41 (53%) |
| Wine (12% ABV)                                      | 3 (4%)   |
| Liquor (40% ABV)                                    | 1 (1%)   |
| Residents provided nicotine replacement therapy (n) | 2 (3%)   |
| Residents provided cigarettes (n)                   | 64 (83%) |
| Residents provided nabilone (n)                     | 14 (18%) |

ABV: alcohol by volume.

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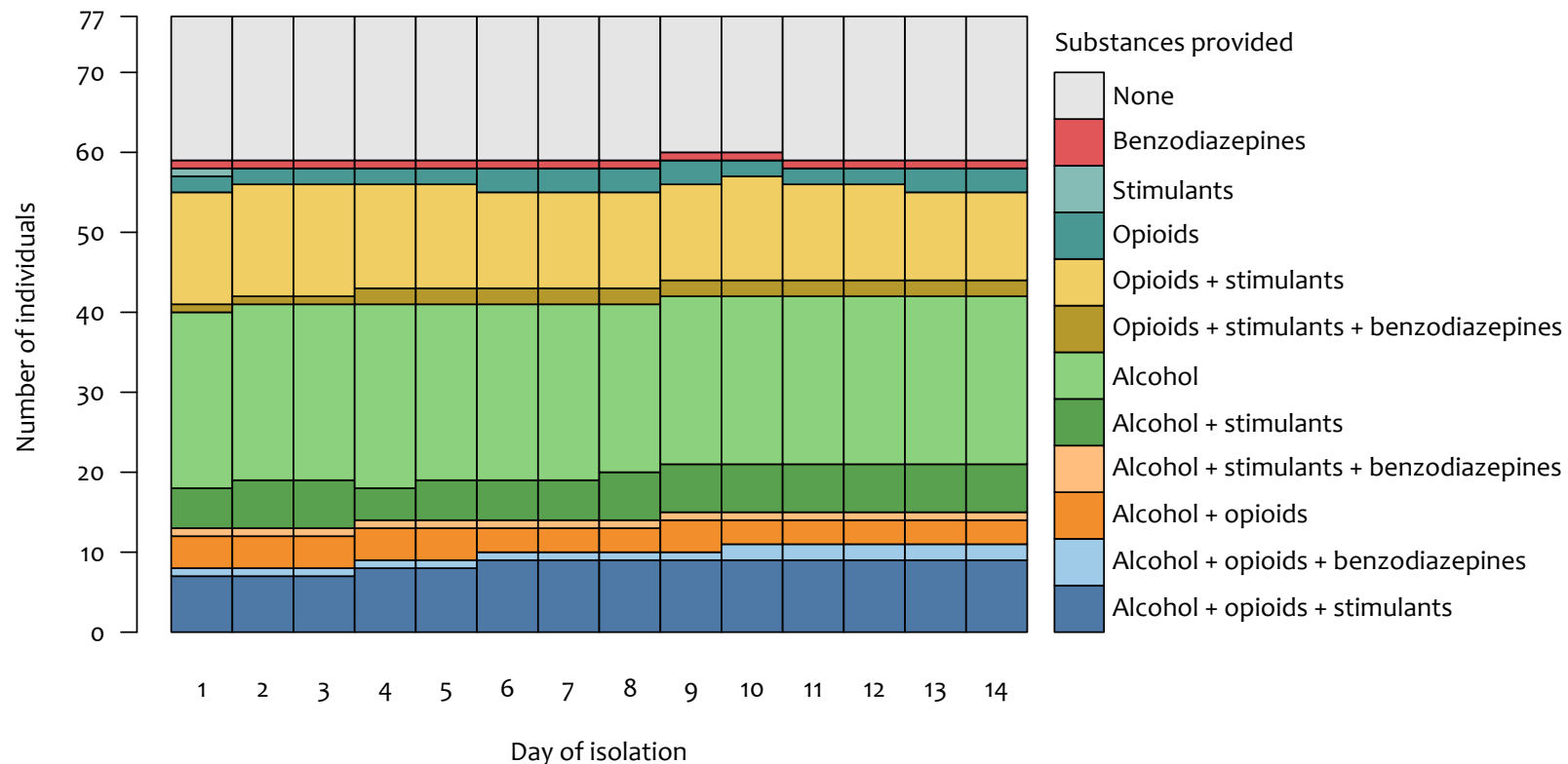
685 **Figure captions**

686 **Figure 1. Number of COVID-19 isolation hotel shelter residents receiving each category of safe supply**  
687 **medications or managed alcohol during 14 days of isolation.** Benzodiazepines include clonazepam and  
688 lorazepam. Stimulants include methylphenidate, dextroamphetamine, and lisdexamfetamine. Opioids  
689 include opioid agonist treatment medications (methadone, buprenorphine, or slow-release morphine)  
690 and hydromorphone. Alcohol includes strong beer, wine, or hard liquor.  
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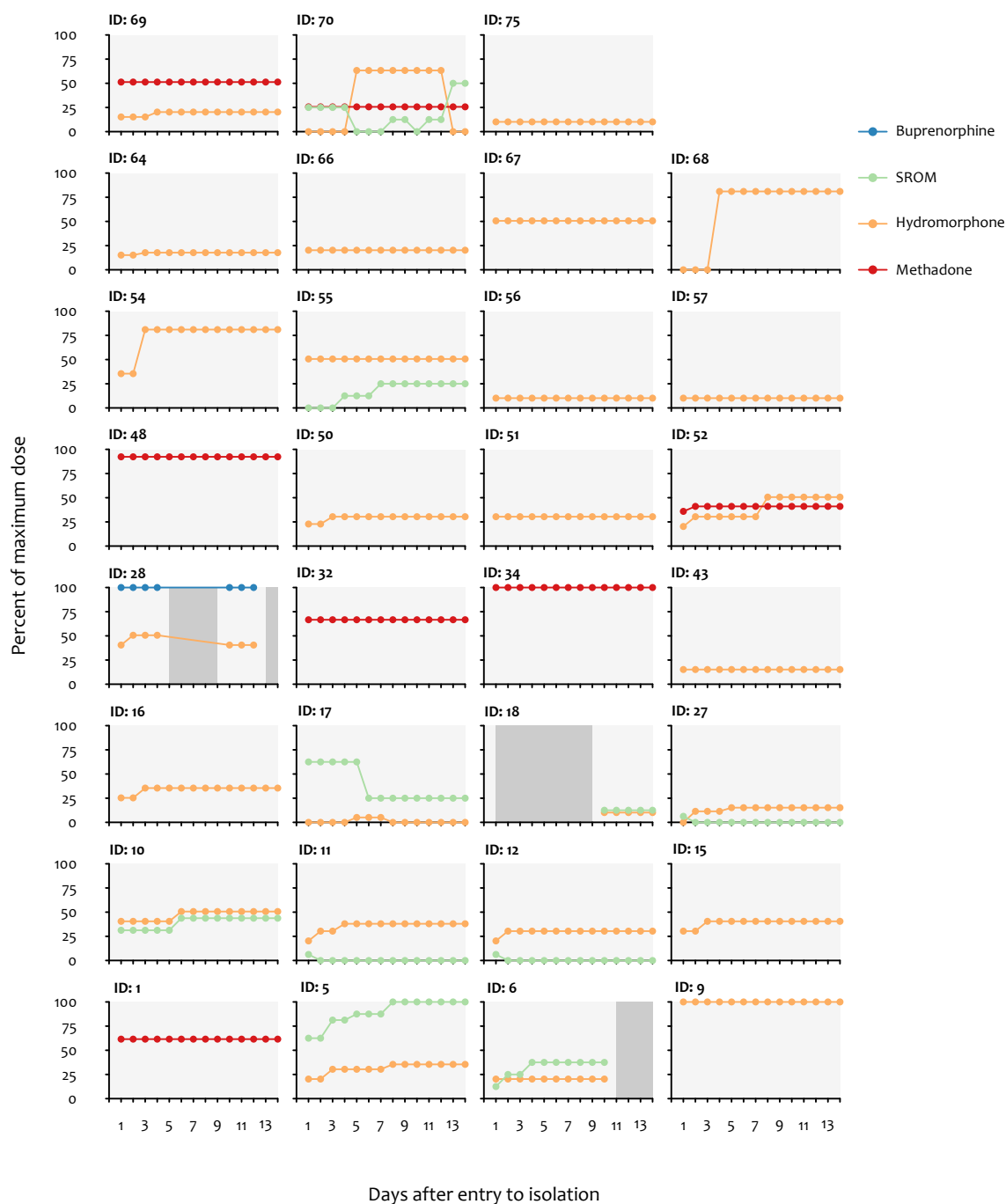
692 **Figure 2. COVID-19 isolation hotel shelter residents' daily dosage trajectories for safe supply**  
693 **hydromorphone and opioid agonist treatment medications.** Individual daily medication dosages are  
694 plotted as percentages of the maximum daily dosages of each substance across the whole sample (i.e.,  
695 methadone 195mg; buprenorphine 12mg; SROM 800mg; hydromorphone 158mg). Dark grey boxes  
696 represent days where substances could not be provided, either because resident was away from  
697 isolation or because of delayed medical assessment. SROM: slow-release oral morphine.  
698

699 **Figure 3. COVID-19 isolation hotel shelter residents' daily dosage trajectories for safe supply stimulant**  
700 **medications.** Individual daily medication dosages are plotted as percentages of the maximum daily  
701 dosages of each substance across the whole sample (i.e., methylphenidate 160mg; dextroamphetamine  
702 80mg; lisdexamfetamine 60mg). Dark grey boxes represent days where substances could not be  
703 provided, either because resident was away from isolation or because of delayed medical assessment.  
704

705 **Figure 4. COVID-19 isolation hotel shelter residents' daily dosage trajectories for managed alcohol.**  
706 Individual daily standard drink dosages are plotted as percentages of the maximum daily dosage of  
707 alcohol across the whole sample (i.e., 37.5 standard drinks). Dark grey boxes represent days where  
708 substances could not be provided, either because resident was away from isolation or because of  
709 delayed medical assessment.  
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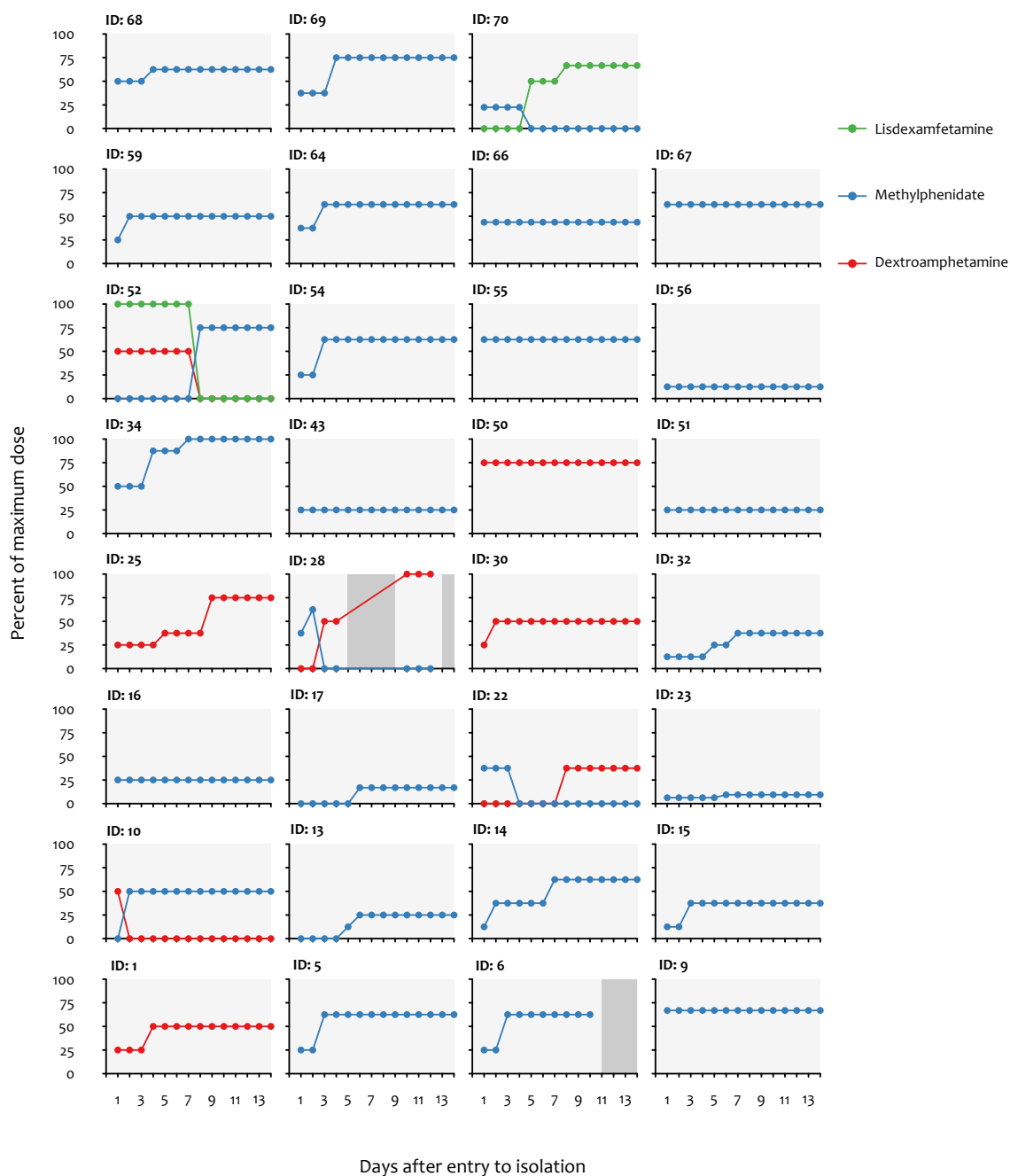


**Figure 1. Number of COVID-19 isolation hotel shelter residents receiving each category of safe supply medications or managed alcohol during 14 days of isolation.** Benzodiazepines include clonazepam and lorazepam. Stimulants include methylphenidate, dextroamphetamine, and lisdexamfetamine. Opioids include opioid agonist treatment medications (methadone, buprenorphine, or slow-release morphine) and hydromorphone. Alcohol includes strong beer, wine, or hard liquor.

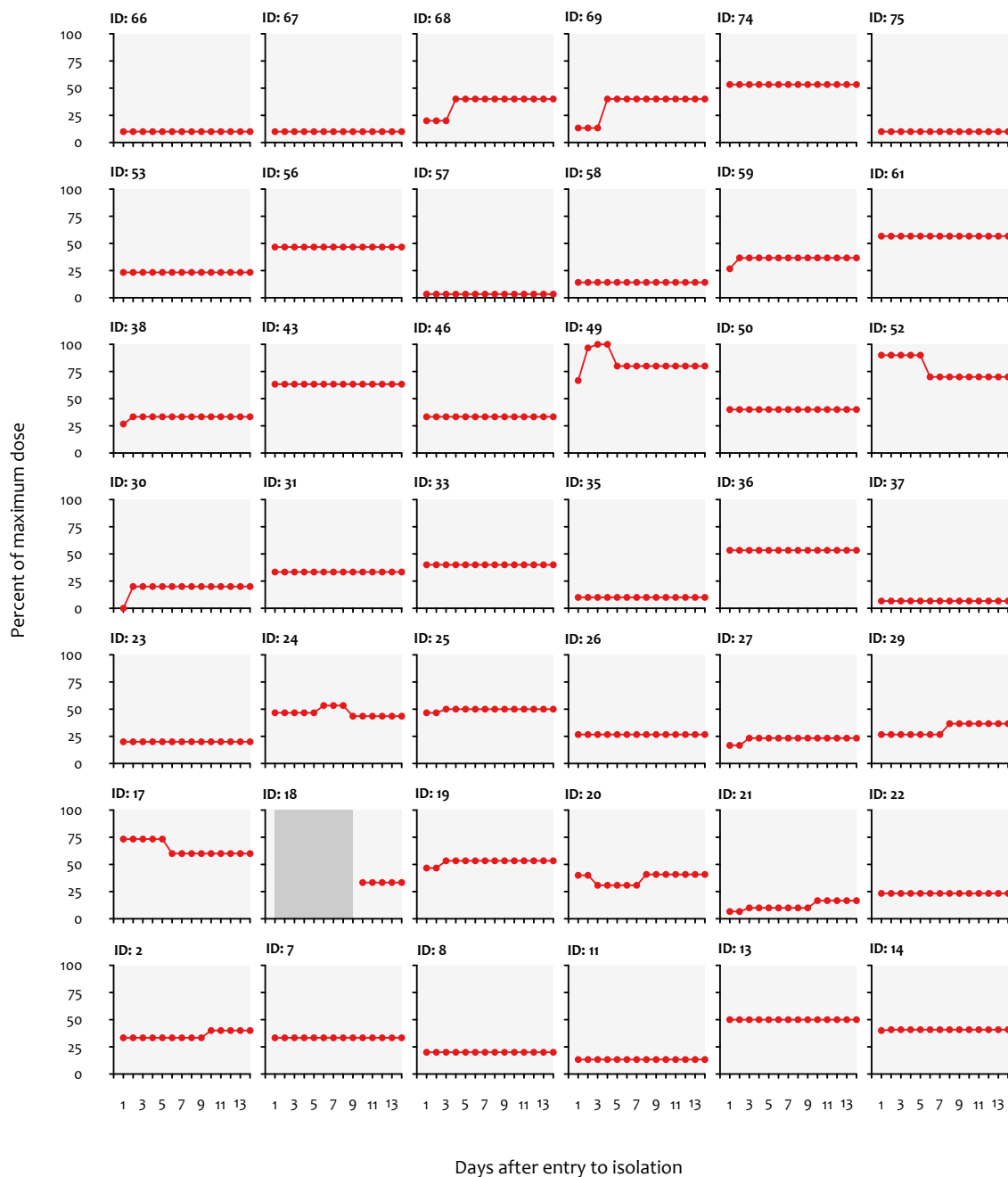


**Figure 2. COVID-19 isolation hotel shelter residents' daily dosage trajectories for safe supply hydromorphone and opioid agonist treatment medications.** Individual daily medication dosages are plotted as percentages of the maximum daily dosages of each substance across the whole sample (i.e., methadone 195mg; buprenorphine 12mg; SROM 800mg; hydromorphone 158mg). Dark grey boxes represent days where substances could not be provided, either because resident was away from isolation or because of delayed medical assessment. SROM: slow-release oral morphine.





**Figure 3. COVID-19 isolation hotel shelter residents' daily dosage trajectories for safe supply stimulant medications.** Individual daily medication dosages are plotted as percentages of the maximum daily dosages of each substance across the whole sample (i.e., methylphenidate 160mg; dextroamphetamine 80mg; lisdexamfetamine 60mg). Dark grey boxes represent days where substances could not be provided, either because resident was away from isolation or because of delayed medical assessment.



**Figure 4. COVID-19 isolation hotel shelter residents' daily dosage trajectories for managed alcohol.** Individual daily standard drink dosages are plotted as percentages of the maximum daily dosage of alcohol across the whole sample (i.e., 37.5 standard drinks). Dark grey boxes represent days where substances could not be provided, either because resident was away from isolation or because of delayed medical assessment.