

A Conceptual Framework for the Management of a COVID-19 Outbreak on a Secure Forensic Inpatient Unit

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Responses to outbreaks of the novel coronavirus SARS-CoV-2 (COVID-19) in secure forensic settings have included several interventions, such as cohorting, assertive testing, isolation units, and infection control practices. The design of forensic facilities and the psychiatric impairment inherent to the patient population can make compliance with pandemic protocols challenging. In this study, we report on a COVID-19 outbreak on a low secure forensic inpatient unit in a large mental health hospital. For the 17 patients on the unit, we compared data from the 22-day COVID-19 outbreak period with the 30 days before the outbreak. We developed patient profiles that informed decision-making in COVID-19 outbreak management and developed a conceptual framework to identify interventions to effectively respond to and manage the outbreak. Patients had a decrease in as-needed nicotine replacement therapy during the outbreak. The average Dynamic Appraisal of Situational Aggression score increased slightly across all patients during the outbreak, though these differences were not statistically significant. Although forensic settings present challenges in outbreak management, leveraging therapeutic alliance, highlighting the importance of working together, communicating the rationale for measures, and providing staff information and tools such as a conceptual framework can support patients' following protocols and effective management of an outbreak.

Keywords: COVID-19, outbreak, forensic secure inpatient unit, patient profiles

Health-care systems worldwide face unprecedented challenges due to the novel coronavirus SARS-CoV-2 (COVID-19). Particularly problematic are secure forensic settings, where early discharge for patients is not feasible due to risk to public safety (Simpson, Chatterjee, et al., 2020).

Concerns have been raised about how to protect patients in these unique settings that place them at elevated risk of infection (Kinner et al., 2020; Simpson, Chatterjee, et al., 2020). Response to COVID-19 outbreaks in forensic settings has documented assertive testing, cohorting, isolation units, and infection control practices, including physical distancing and isolation measures (Simpson,

Chatterjee, et al., 2020). Depending on facility design, these settings can present challenges in the implementation of measures necessary to contain the transmission of disease (Simpson, Chatterjee, et al., 2020). Further, patients with severe mental illness who are detained in secure forensic hospitals often have significant medical comorbidity, putting them at increased risk of poor outcomes from COVID-19 (Basrak et al., 2021). In these settings, it may be particularly challenging for patients to follow protocols, such as masking, hand hygiene, and isolation practices, due to the significant burden of psychiatric illness (London, 2020; Simpson, Chatterjee, et al., 2020; Wasser et al., 2020).

Literature shows the psychological impact of isolation is wide-ranging, substantial, and long-lasting, and thus needs to be handled carefully and informed by best practices (Brooks et al., 2020). The experience is often not easy, involving social isolation, reduction in freedom, loss of one's usual routine, frustration and boredom, and fear about possible disease or infecting others (Brooks et al., 2020; Cava et al., 2005; Hawryluck et al., 2004; Jeong et al., 2016; Maunder et al., 2003; Robertson et al., 2004). Suicide and anger have been documented following isolation measures in past outbreaks (Barbisch et al., 2015). For patients with major mental illnesses, such as schizophrenia, social isolation may increase the risk of suicide (Kozloff et al., 2020).

In light of the challenges inherent to secure forensic settings, effective and rapid management of COVID-19 outbreaks is essential to ensure adherence to protocols, prevent disease transmission, and reduce the psychological impact of isolation measures on patients. Health-care staff in these settings are key to successful containment. Support in the form of tools and frameworks can also be beneficial in effective outbreak management. Frameworks have been developed in non-mental health settings (Adiukwu et al., 2020; Quidley-Rodriguez & de Tantillo, 2020). However, to our knowledge, a conceptual framework for COVID-19 outbreak response has not been published that focuses on tailored interventions to support patient well-being in the face of isolation measures in a forensic mental health setting. The objective of our study was to develop a conceptual framework to identify interventions to effectively respond to and manage the COVID-19 outbreak in a secure forensic mental health setting.

Methods

The Setting

The Centre for Addiction and Mental Health is located in Toronto, Canada, and is the largest provider of forensic services at a mental health and addictions hospital in Ontario. The forensic service provides care to about 180 inpatients and 250 outpatients. Most patients are detained under the auspices of the Ontario Review Board (ORB), having been found not criminally responsible on account of mental disorder (NCRMD).

Six confirmed outbreaks of COVID-19 were reported on forensic units at CAMH, leading to the development of admission and isolation units, the use of cohorting practices, the enhancement of infection prevention and control (IPAC) protocols,

and the use of videoconferencing technology to supplement team practices to support social distancing protocols (Simpson, Chatterjee, et al., 2020).

Participants and COVID-19 Outbreak Unit

The unit is a mixed-gender, low secure forensic rehabilitation unit with a high staff-to-patient ratio providing care to 17 patients with complex diagnostic or behavioural presentations. When fully staffed, the unit has a robust allied health complement, including behaviour therapy, occupational therapy, recreational therapy, and social work. Staff also include an advanced practice clinician, clinical manager, dietician, nurse educator, nursing staff, peer support, psychiatry, and pharmacy.

The unit provides intensive intervention to promote engagement in a rehabilitation and risk management plan to support reintegration into the community. This includes individual and group therapies, recreational and therapeutic activities, and comprehensive behavioural plans.

COVID-19 Outbreak Management and Interventions

Our paper focuses on the COVID-19 outbreak that was declared on October 22 and ended on November 11, 2020. All patients were subject to droplet and contact (D&C) precautions during this time, which followed provincial guidance (via Public Health Ontario, Provincial Infectious Diseases Advisory Committee, and the Ministry of Health), and institutional guidelines (Ontario Agency for Health Protection and Promotion, 2014). Although initially anticipated to last 14 days, the outbreak was extended due to an incident that breached IPAC protocols and needed further D&C precautions.

At the onset of the outbreak, protocols were rapidly implemented to prevent further transmission of suspected or confirmed infections. Protocols included education on the use of personal protective equipment, restriction of movement on the unit, changes in care delivery from group to individual programming, and new interventions that could be safely provided following IPAC requirements. All patients and staff were tested for COVID-19. Patients with a positive test result were cohorted or moved to an isolation unit. Enhanced cleaning and disinfection of the unit were done following hospital protocol and provincial guidelines. Transfers and new admissions were halted throughout the outbreak period. Any patient who received a confirmed diagnosis of COVID-19 was transferred to the forensic COVID-19 isolation unit.

Measures

We reviewed the electronic medical records for all patients for Dynamic Appraisal of Situational Aggression (DASA) scores (Daffern & Ogloff, 2019), use of as-needed (PRN) nicotine replacement therapy (NRT), descriptions of symptoms of mental illness and mental status examinations, and participation in activities and interventions for the 30 days before the outbreak and the 21-day outbreak period. Approval was obtained by the Quality Program Ethical Review.

Patient profiles were developed to inform clinical practice and decision-making around the management of D&C precautions. To do this, T. Wilkie, P. Socha, C. Sims and S. Darani independently reviewed available clinical information in the medical records. We settled the overall patient responses to the restrictions by:

- their statements to staff,
- documentation of their mental state and psychiatric symptoms,
- engagement in available activities,
- interventions deemed necessary by the clinical team to maintain adherence to IPAC protocols, and
- their understanding of the processes.

We then discussed the main factors identified and agreed on four distinct profiles of responses to the D&C precautions. We used thematic analysis to identify themes and patterns in each patient profile. Patients were grouped into four categories:

- Content
- Coping
- Deterioration
- Chronic Instability

During the outbreak, 15 psychosocial interventions were offered to patients. These interventions could be categorized into five groups:

- physical activity (e.g., walking, stretching)
- engagement with technology (e.g., tablet use)
- engagement with other people (e.g., calling family)
- structured activity (e.g., Halloween event) or
- independent activity (e.g., reading a book, writing in a journal).

To collect this information, the medical records were analyzed for documentation on when interventions were used. Many of these interventions were not available to patients before the COVID-19 outbreak. Usage of different activities was not recorded.

Data Analysis

Following data collection, DASA Scores and PRN NRT usage were analyzed using IBM SPSS

(Version 27.0) predictive analytics software. To better understand the data distribution characteristics, descriptive statistics were reported for the whole sample ($n = 17$) and the four patient profile types. Interventions offered during the outbreak were categorized into subtypes of physical activity, engagement with technology, engagement with other people, structured activity, or independent activity. Usage was summarized. Due to the small sample size and distribution of data, non-parametric tests (Wilcoxon signed-rank test) were used to explore differences in the DASA scores and PRN NRT usage for the whole sample before and during the outbreak (Table 1). All analyses were two-tailed with the conventional significance threshold of $\alpha = .05$.

Results

Participant Demographics

Table 1 summarizes client demographics, mean DASA scores and PRN NRT usage before and during the outbreak. At the onset of the COVID-19 outbreak, the unit had 17 patients, 11 males (64.7%) and six females (35.3%). Patients ranged in age from 23 to 55 years, with a mean age of 41 years. On admission, five patients had a diagnosis of psychosis only (29.4%), six patients had a diagnosis of psychosis and substance use (35.3%), and six patients had a diagnosis of psychosis, substance use, and personality disorder (35.3%).

The patient profiles are described below (see Table 2).

Content

The four patients in this category preferred the relative isolation of the D&C precautions. This group had a history of spending prolonged periods in their rooms, and they were known to experience staff interactions as intrusive or aversive. These patients had a good understanding of the reasons for the precautions, and they generally declined activities and contact with staff. The main intervention was for staff to continue regular check-ins as these patients did not generally initiate contact with staff. The staff offered activities on a predictable schedule and supported patients to maintain their general routine (i.e., eating, sleeping, spending time out of bed). The patients maintained contact with external supports through phone calls and videoconferencing.

Coping

This group of six patients had a higher level of engagement and overall functioning before the D&C precautions. They were frustrated and bored with

Table 1
Demographic Characteristics, DASA Score, and PRN NRT Usage of Patients 30 Days Before (September 22 to October 21, 2020) and 21 Days During (October 22 to November 11, 2020) the COVID-19 Outbreak

Table 1a
Demographic Characteristics

Demographic or diagnosis	n (%)
Male	11 (64.7)
Female	6 (35.3)
Mean age	41 years
Psychosis	5 (29.4)
Psychosis and substance use	6 (35.3)
Psychosis, substance use and personality disorder	6 (35.3)

Table 1b
DASA Scores

Grouping and when	n	Median	IQR	M (SD)
Total before the outbreak ^a	17	.50	.00	.09 (.11)
Total during	17	.50	.03	.06 (.08)
Content before	4	.00	.00	.00 (.00)
Content during	4	.00	.03	.01 (.11)
Coping before	6	.06	.10	.07 (.36)
Coping during	6	.05	.11	.06 (.27)
Deterioration before	3	.28	^b	.23 (.66)
Deterioration during	3	.05	^b	.11 (.40)
Chronic Instability before	4	.17	1.12	.48 (1.06)
Chronic Instability during	4	.09	1.69	.63 (1.25)

Table 1c
PRN NRT Usage

Grouping and when	n	Median	IQR	M (SD)
Total before the outbreak ^a	9	2.21	6.50	3.40 (.48)
Total during	9	1.75	5.70	2.81 (.75)
Content before	1	.03	^b	.03 (.18)
Content during	1	.05	^b	.05 (.21)
Coping before	4	4.35	8.73	4.92 (4.35)
Coping during	4	5.50	5.39	4.47 (4.11)
Deterioration before	2	1.97	^b	2.06 (2.25)
Deterioration during	2	1.00	^b	.95 (1.03)
Chronic Instability before	2	3.55	^b	3.56 (3.54)
Chronic Instability during	2	2.68	^b	2.73 (3.05)

Note. We used paired sample *t*-tests to compare total DASA scores before and during the outbreak and total PRN NRT scores before and during the outbreak. DASA = Dynamic Appraisal of Situational Aggression; PRN NRT = nicotine replacement therapy as needed. ^a*p* > .05. ^b Sample size not large enough for the IQR calculation, therefore not available.

the loss of activity, off-unit privileges, and social interaction with others. During the COVID-19 outbreak, they readily accepted activities or opportunities for interaction and tended to use any opportunity to leave their room or interact with staff (e.g., using the bathroom or showering at a high frequency, engaging staff in more lengthy discussions during check-ins). They had a fair understanding of the reasons for the precautions and that all patients on the unit were affected in the same manner, thus legitimizing the fairness of the restrictions from their perspective. Interventions included frequent staff check-ins and various activities, such as distanced walks on the unit. Staff acknowledged the frustration and boredom experienced by these patients and reviewed coping strategies (e.g., mindfulness). Opportunities to talk with staff and other supports were offered on a regular basis.

Deterioration

The three patients in this group showed more irritability and, for some, an exacerbation of residual psychotic symptoms of their mental disorders. They reported being bored and frustrated but generally declined activities or opportunities to interact with staff. This was consistent with their presentation before the D&C precautions, as they were more likely to have a history of requiring a high level of prompting to engage in activities and had residual psychotic symptoms that affected their overall functioning. The patients in this group had a limited understanding of the reasons for the D&C precautions and some did not have a factual understanding of the pandemic more broadly. Staff interventions included educating patients about the reasons for the precautions and monitoring their mental state and symptoms. Optimizing pharmacological and psychosocial interventions were also considered. Activities were encouraged and patients were offered opportunities for communication and other supports.

Chronic Instability

This group of four patients were agitated, significantly withdrawn, or both throughout the D&C precautions. As a group, they had a history of cognitive,

Table 2
Description of Client Profiles Before and During the COVID-19 Outbreak and Potential Interventions

Variable	Content	Coping	Deteriorating	Chronic Instability
Before the outbreak	History of isolating to room and experiencing staff interactions as invasive or aversive	History of higher levels of engagement with programs and activities and interactions with staff and other patients	History of residual psychotic symptoms, requiring a high level of prompting to engage in activities, or both	History of cognitive, affective or behavioural instability
During the outbreak	Appeared to prefer isolation as part of D&C precautions Generally declined activities and contact with staff	Experienced boredom and frustration with the loss of activity and interaction with others More likely to accept activities and opportunities for staff interactions Tended to use opportunities to leave their room or interact with staff	Experienced boredom and frustration Showed more irritability and some exacerbation of residual psychotic symptoms Generally declined activities or opportunities for interaction with staff	Appeared agitated, significantly withdrawal, or both D&C precautions seemingly exacerbated instability Often required external controls to manage adherence to IPAC protocols
Understanding of precautions	Good	Fair	Limited	Poor
Potential interventions	Availability of tablets Offer any in-room intervention or unit walks (though they may be satisfied without) Attempt to maintain a daily routine with regular meals, time out of bed, and engagement in modified activities	Check-in frequently and offer all interventions Offer PRN NRT frequently, if appropriate Provide information and positive reinforcement for coping efforts Facilitate connection with family and other supports	Closely monitor MSE. Frequent one-on-one check-ins Continue to offer interventions frequently to promote engagement with staff Create customized interventions as needed	Implement potential interventions for deteriorating profile Consider use of external controls (per institutional policy with patient/SDM consent) Attempt to modify behavioural plan (if present) to adhere to activity schedule while on D&C precautions

Note. D&C = droplet and contact; IPAC = infection prevention and control; PRN NRT = nicotine replacement therapy as needed; MSE = mental status exam; SDM = substitute decision maker.

affective, or behavioural instability that appeared exacerbated with less staff intervention and activities and more isolation. They tended to have a limited understanding of the reasons for the precautions and required intermittent use of external controls to follow IPAC protocols. For this group of patients, staff monitored their mental state closely with appropriate pharmacological and psychosocial interventions, encouraged activities and opportunities for communication with other supports, and had enhanced support for modified behavioural plans.

DASA Scores

The DASA: Inpatient Version is a structured professional judgement tool that is designed for short-term prediction of aggression (over a 24-hour period) (Daffern et al, 2019) There were 17 occurrences of a DASA score of 1 or greater before and during the COVID-19 outbreak across all patients. The DASA scores before and during the outbreak varied across the four patient groups. The DASA scores before the D&C precautions were higher than during the precautions for the Coping and Deterioration groups. Among patients in the

Content and Chronic Instability groups, the DASA scores before the outbreak were lower than during the outbreak. The Chronic Instability group had the highest overall DASA scores, and the Content group had the lowest DASA scores during both periods (Figure 1). Overall, there were no statistically significant differences in the DASA scores between the two periods. Moreover, the sample size of each group was small and not sufficiently powered to statistically compare the groups.

PRN NRT Use

Patients on the unit may access PRN NRT in the form of lozenges, inhalers, or gum when prescribed and indicated. Typically, a patient attends the care station to request PRN NRT. However, during the COVID-19 outbreak, patients were not able to regularly leave their rooms; therefore, they depended on predetermined contact with nursing staff to obtain PRN NRT. The amount of PRN NRT used by patients was analyzed from before and during the outbreak.

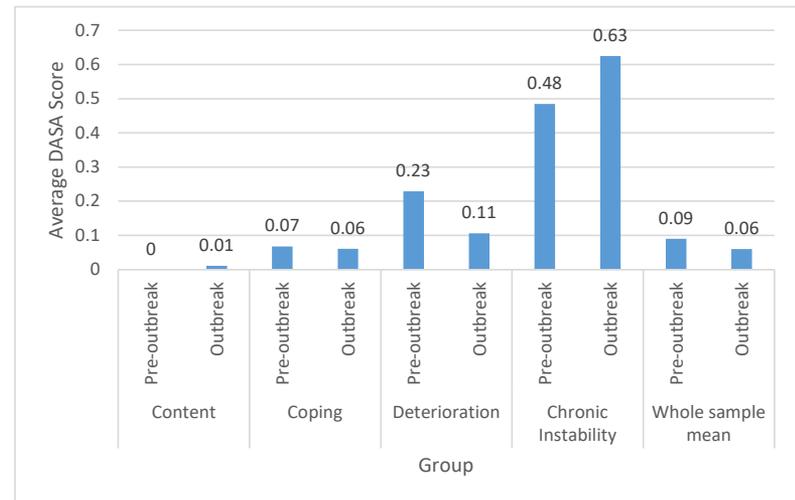
Nine of the 17 patients used PRN NRT. Figure 2 shows the mean daily PRN NRT usage before and during the outbreak. Overall, there was a marked decrease in PRN NRT usage during the outbreak compared with the other days. Figure 3 shows the average PRN NRT use for each group and the overall unit for both periods. The mean amount of PRN NRT used decreased from before the outbreak. However, this finding was not statistically significant ($p > .05$). By grouping, it appears PRN NRT usage decreased during the outbreak compared with before for the Coping, Deterioration, and Chronic Instability groups. The Coping group had the highest, and the Content group had the lowest PRN NRT usage during both periods. Overall, there were no statistically significant differences in the PRN NRT usage before and during the outbreak. Moreover, the sample size of each group was small and not sufficiently powered to statistically compare the groups.

Psychosocial Intervention Summaries

During the outbreak, 15 psychosocial interventions were offered to patients. These interventions could be categorized into five groups:

- physical activity (e.g., walking, stretching)
- engagement with technology (e.g., tablet use)
- engagement with other people (e.g., calling family)
- structured activity (e.g., Halloween event) or

Figure 1
Average Dynamic Appraisal of Situational Aggression (DASA) Score of Patients per Grouping Before and During the COVID-19 Outbreak



- independent activity (e.g., reading a book, writing in a journal).

To collect this information, the medical records were analyzed for documentation on when interventions were used. Many of these interventions were not available to patients before the COVID-19 outbreak. Usage of different activities was not recorded.

The frequency of use for each of the interventions for all patients during the outbreak was as follows:

- physical activity (52 events)
- engagement with technology (30 events)
- engagement with other people (13 events)
- structured activity (13 events)
- independent activity (six events).

In addition, there were 22 recorded events of patients declining activities offered during the outbreak.

Discussion

COVID-19 outbreaks are challenging on secure inpatient units, particularly in forensic services where there is already heightened awareness of patient perceptions about coercive practices (Simpson, Boldt, et al., 2020).

The expectations of following D&C precautions were related to IPAC protocols, which were consistent for all staff and patients. Therefore, there was a sense of patients and staff working together, highlighting the importance of sharing information and the rationale for the IPAC protocols.

Understanding different patient coping styles and responses to D&C precautions and

targeting interventions helped support the patients to follow IPAC protocols. The four patient groups were useful to identify therapeutic goals during the D&C precautions and to offer individualized intervention plans. Psychosocial interventions were tailored to help reduce the psychological impact for patients who were bored and frustrated. Additional pharmacological and environmental interventions were useful for patients who were destabilized during the COVID-19 outbreak. Notably, maintaining communication with patients and providing them with information was a useful intervention, as was facilitating communication with family or other supports. The patient groupings and associated interventions informed the development of an inpatient outbreak resource for clinicians to support their clients during outbreaks. The resource includes feedback from clients about what helps, links to resources related to COVID-19 protocols, and information on where clinicians can seek support (Brennan et al, 2021).

There was an overall decrease in the amount of PRN NRT dispensed during the outbreak. Patients in the Coping group used the most PRN NRT during this period, which may suggest PRN NRT was one strategy used to facilitate contact with staff, in addition to being a coping strategy in itself. Given the usual means of obtaining PRN NRT on the unit involves patients physically attending the care station, the decrease in PRN NRT use during the outbreak may be a reflection of diminished access. Therefore, ensuring a strategy for staff to offer PRN NRT and other PRN medications on a routine basis may be useful.

The average DASA score increased slightly among the Content and Chronic Instability groups and decreased among the Coping and Deterioration groups from before the COVID-19 outbreak to during. However, the rate of change was minimal given that most patients had a DASA of 0. The average DASA score decreased for the whole sample between the two periods. As expected, the Chronic Instability group had the highest overall DASA scores and the Content group had the lowest during both periods, although the groups could not be compared. Overall, there were very

Figure 2
Average Nicotine Replacement Therapy (NRT) Use of Patients Before and During the Outbreak

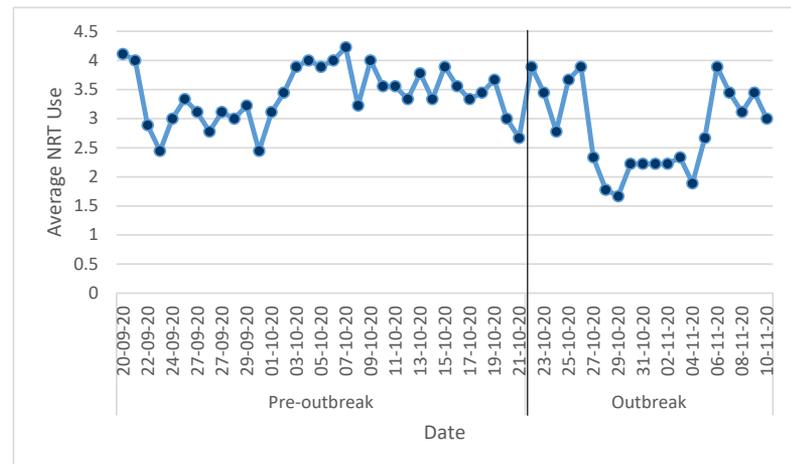
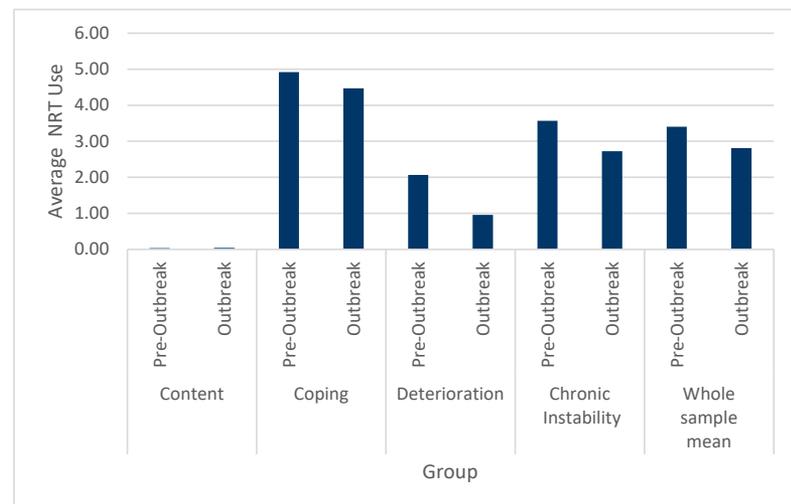


Figure 3
Average Nicotine Replacement Therapy (NRT) Use of Patients per Grouping Before and During the Outbreak



few instances of behavioural dyscontrol, as demonstrated in the low DASA scores. This was likely a reflection of the high level of staff intervention as is typical of the unit and early intervention in instances of behavioural disturbance. The increased physical distancing between patients may have also been a factor.

Limitations of this study include the relatively small size of the patient cohort on the unit. Additionally, this unit is unique given the enhanced staff-to-patient ratio, which allowed for a rapid pivot of care practices and a significant enhancement of activities and interventions offered during the COVID-19 outbreak. It is not clear whether these practices would be available on other units that do

not have the same staff complement. Further, the availability of tablets for all patients was useful to increase engagement with staff and families; however, this may not be an option in other settings. Finally, because these interventions were not made available to patients before the outbreak and usage of different activities was not recorded, this could not be analyzed.

The conceptual framework described in our study contributes to the emerging literature about COVID-19 outbreak management by focusing on a practical approach to matching patient profiles to interventions that enhance support in a secure forensic setting. Future opportunities will include reflecting on and learning from interventions implemented during the COVID-19 pandemic on a forensic inpatient unit and studying them for efficacy and impact on patients' well-being.

Conflict of Interest: none

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