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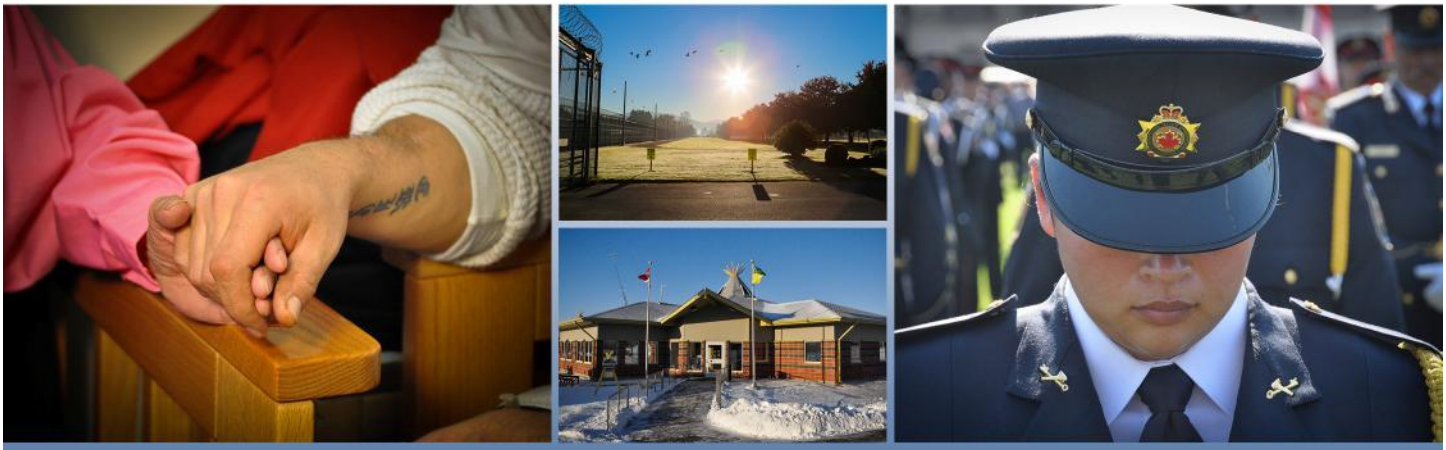

RESEARCH REPORT

Inflammatory Agents and Use of Force: Prevalence amongst Self-Injurious Behaviour Incidents

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Inflammatory Agents and Use of Force: Prevalence amongst Self-Injurious Behaviour Incidents

Tara Beauchamp

Sarah Cram

Angela Smeth

&

Shanna Farrell MacDonald

Correctional Service of Canada

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Executive Summary

Key words: *inflammatory agents, inflammatory spray, use of force, self-harm, suicide, self-injurious behaviour*

The Correctional Service of Canada (CSC) has a responsibility to ensure offenders and correctional staff are safe from harm. However, the CSC is equally accountable for their responses to incidents where individuals' safety is compromised. While there are policies and principles to ensure that the use of force is limited, there are some situations where it is required to mitigate the risk to the individual, bystanders, and/or staff, including to stop self-injurious behaviour (SIB) or prevent suicide. This research examined the application of inflammatory agents as a use of force measure when responding to incidents where individuals were self-harming or suicidal.

The study sample consisted of all (N = 3,332) SIB incidents that occurred between April 1, 2018 to March 15, 2020. Of the SIB incidents, 14.1% (n = 471) had an accompanying use of force and 7.1% (n = 235) had an identified use of inflammatory agents. Physical handling, inflammatory agents, and restraint equipment were the force options most often employed in SIB incidents. The most common types of SIB's reported were slashing and head banging, whereas strangulation and opening existing wounds had the highest proportion with an associated use of inflammatory agents. The Prairie region had the largest proportion of SIB incidents overall; however, the Quebec region had the highest proportion of SIB incidents with an identified use of inflammatory agents. The greatest number of SIB incidents occurred in maximum security settings. This group of incidents also had the highest proportion with an associated use of inflammatory agent. Over one-third of SIB incidents occurred in women's institutions, though the number of SIB incidents with a use of inflammatory agent in women's institutions was much smaller than in men's.

In total, 69 SIB incidents were identified as having multiple use of force options employed in conjunction with inflammatory agents. Of these, 78% had inflammatory agents as the first force option used. The use of inflammatory agents was most often combined with physical handling and/or restraint equipment regardless of when the inflammatory agent was deployed (i.e., first, intermediate, or final force option). When assessing whether the force option(s) was limited to what was necessary and proportionate in order to manage the risk associated with the incident, there was concordance in almost all (95.1%) of the reviews completed by both the Institution and Region.

The current study provides a descriptive overview of when the use of force and in particular, inflammatory agents are used as a response to SIB incidents. Although not conclusive, findings suggest that policy and principles are being considered when deciding whether a use of force should be employed. However, a deeper qualitative review of SIB incidents with an identified use of inflammatory agents is needed to truly understand the nature of the behaviour and the circumstances of the event in order to determine if policy and principles are being applied as specified.

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Introduction

The Correctional Service of Canada (CSC) has a responsibility to ensure offenders and correctional staff are safe from harm. CSC has numerous security and operational policies and procedures to safeguard against risk, including the use of force. The use of force may be an appropriate intervention strategy when verbal intervention, conflict management and/or negotiation have proven ineffective or assessed as inappropriate based on the individual, situational factors, and corresponding assessment of risk (CSC, 2018a). Use of force may be required in a variety of situations to mitigate the risk to the individual, bystanders, and/or staff, including to stop self-injurious behaviour (SIB) or prevent suicide. In response to an Office of the Correctional Investigator (OCI) recommendation (OCI, 2021), this research will examine the application of inflammatory agents as a use of force measure when responding to individuals who are self-harming or suicidal.[1]

Use of Force in a CSC Context

Before describing use of force, it is important to understand how situations are managed more broadly within CSC. In January 2018, the Engagement and Intervention Model (EIM) was developed to emphasize the importance of non-physical and de-escalation responses to incidents, and to clearly distinguish response protocols for situations involving physical or mental health distress. The EIM involves an integrated security and health response approach and guides staff in preventing, responding, and resolving incidents with the most reasonable intervention (CSC, 2018a). This includes ensuring that interventions used to manage incidents take into consideration the offender's mental and/or physical health and well-being, promote a peaceful resolution using verbal intervention and/or negotiations when possible, limit response to only what is necessary and proportionate, and consider changes in the situation by using continuous assessment and reassessment (CSC, 2018a).

When verbal intervention, conflict management, and/or negotiations have proven ineffective or have been assessed as inappropriate, a use of force may be required (CSC, 2018a). CSC (2018) defines use of force as any action taken by staff, on or off institutional property,

[1] The OCI recommended CSC review and revise its policy and practice regarding use of inflammatory sprays when responding to incidents involving individuals who are self-harming or suicidal, with a view to reducing their use when responding to individuals who are experiencing mental health crises (OCI, 2021).

which is intended to obtain the cooperation and control of an offender. Use of force can occur for various reasons, including self-defence, in defence of staff or other offender(s), protection of property, to maintain compliance with institutional rules and regulations, and/or to maintain institutional safety and security (CSC, 2022). The force option(s) applied must always be limited to what is necessary and proportionate to manage the incident (CSC, 2018a; CSC, 2018b). A necessary and proportionate intervention considers the reasonable need for maintaining certain operational routines. If the threat may be safely managed without a use of force, then force is unnecessary. The amount of force used must also be the minimal amount necessary (proportionate) to safely manage the threat (CSC, 2018a; CSC, 2018b). There are several use of force measures that may be employed as part of a security response. These include non-routine use of restraint equipment, physical handling, chemical agents, inflammatory agents, use of batons, impact munitions or other intermediary weapons, and the display or use of firearms (CSC, 2018a).

Inflammatory Agents

Inflammatory agents are one of several use of force measures. Inflammatory agents are designed to cause a temporary burning sensation and inflammation of mucous membranes and eyes leading to involuntary closure (CSC, 2016). Oleoresin capsicum (OC) is an organic agent derived from hot peppers (CSC, 2016). The active ingredient in inflammatory agents used within CSC is OC (CSC, 2016). OC is one of the most commonly used inflammatory agents; however, the chemical agents CN (2-Chloroacetophenone) and CS (o-chlorobenzylidene malonitrile) tear gas have also been used as a use of force method, most often for riot control (Schep, Slaughter, & McBride, 2015). CSC classifies CS as a chemical agent designed to debilitate and incapacitate an individual(s) and causes burning sensation in the eyes, throat, nose, and moist skin (CSC, 2016). CN and CS are more likely to cause painful tearing and respiratory discomfort but they do not have the same inflammation and swelling effect as OC (National Institute of Justice, 1994).

CSC uses inflammatory agents, specifically OC, which are deployed through several methods and with varying levels of concentration (from 0.2% to 1.3%; CSC, 2021). OC comes in the forms of a liquid based spray, vapour, foam, smoke, and micro-pulverized powder, which may be deployed through hand-held projectors, hand-thrown devices, gas launchers, and shotguns (CSC, 2021). OC spray primarily targets the individual's eyes, followed by their mouth and nose (CSC, 2021). CSC deems a use of force as having occurred when an inflammatory

agent is either intentionally aimed at an individual or dispensed to gain compliance (CSC, 2016).

Previous CSC Research

While previous CSC research has explored use of force incidents generally and examined inflammatory agents as a force option, it has not addressed inflammatory agents as a response to specific incident types. For instance, in 2011, CSC examined incidents that involved a use of force. The study explored how use of force was deployed, the circumstances that initiated the use of force, the characteristics of offenders involved in the incidents, as well as how well staff complied with use of force policies (Varrette & Archambault, 2011). Physical handling, restraint equipment, and inflammatory spray were the most common force options used in incidents with an associated use of force (Varrette & Archambault, 2011). The findings also indicated that spontaneous use of force was more likely to occur than planned use of force (Varrette & Archambault, 2011). In treatment centres and men's institutions, the most common reasons for CSC staff to use force were offenders refusing direct orders and/or becoming aggressive or threatening, whereas in women's institutions, the use of force was most often in response to an offender refusing direct orders and/or self-injurious behaviour (SIB) (Varrette & Archambault, 2011).

Prior CSC research has also examined the effectiveness of inflammatory agents as a use of force measure (Semple & Bennell, 2018). The results of this literature review demonstrated that the use of inflammatory agents in appropriate situations is often effective and typically linked with decreased odds of both subject and deployer injury (Semple & Bennell, 2018). This finding was consistent across jurisdictions and conditions, and while there were exceptions, inflammatory agent-associated injuries appeared to be relatively minor (Semple & Bennell, 2018).

In 2010, CSC evaluated the effectiveness of the inflammatory spray pilot project in the Ontario region.[2] Two-thirds of staff respondents felt the use of inflammatory spray was 'considerably' effective (CSC, 2010). Interestingly, participants also reported that offenders often modified their behaviour in response to staff simply displaying the canister of inflammatory spray (i.e., its presence alone acted as a deterrent; CSC, 2010). Generally,

[2] In November 16, 2009, CSC's Ontario Region commenced the Oleoresin Capsicum Inflammatory Spray Project pilot in three institutions – Kingston Penitentiary, Collins Bay Institution and Fenbrook Institution. The pilot was intended to examine the effectiveness of OC spray in responding to and resolving security incidents in a timely manner.

"effectiveness" is based on the incapacitating effects to subdue the individual and resolve the incident (CSC, 2010). There were reported instances in which the inflammatory spray did not incapacitate the individual immediately and, therefore, may not be effective in all situations. The evaluation report did not elaborate on why it may be more or less effective; however, some commonly cited reasons include environmental (e.g., deployment method and range) and individual factors (e.g., tolerance levels and evasion tactics) (CSC, 2021; Semple, Jenkins, & Bennell, 2021; Stroshine & Brandl, 2020).

Effectiveness and Operational Use of Inflammatory Agents

Generally, the literature regarding inflammatory agents is focused on OC spray. Overall, OC spray has been described as an effective use of force tool (Adang & Mensink, 2004; Kaminski, Edwards, & Johnson, 1999). However, Adang and Mensink (2004) suggested that effectiveness in previous studies was not consistently defined and some incidents were labelled in studies as effective despite not incapacitating the individual. On the other hand, Lumb and Friday (1997) stated effectiveness is justified if it prevents the escalation of force. Moreover, Lumb and Friday (1997) highlighted that the time to use OC spray was largely based on the staff member's previous experiences and judgement regarding the individual's level of aggression and/or risk.

According to Semple and colleagues (2021), effectiveness and consequences of inflammatory agents use depended on a variety of environmental factors, such as level of concentration, other substances in the spray, deployment methods, and subject factors. For example, the level of effectiveness tended to decrease as the distance between deployer and subject increased (Semple et al., 2021). However, in their review of the literature, Semple et al. (2021) found that studies reported inconsistent findings. For instance, some research indicated intoxicated (drugs and/or alcohol) individuals were more susceptible to the effects of inflammatory spray, whereas other studies suggested the opposite (Semple et al., 2021).

Much of the broader literature discussing the operational use of inflammatory agents has focused on attempting to control an individual or group, such as crowd management or riot control. Lumb and Friday (1997) described the use of inflammatory spray as an effective force method to prevent escalation to batons or firearms by police officers to control aggressive or threatening individuals. Moreover, they described inflammatory spray as the intermediate stage between verbal communication and more aggressive/assaultive use of force measures (Lumb &

Friday, 1997).

Few sources have focused on the use of inflammatory spray in mental health settings, specifically in self-harm and suicide prevention incidents. Kesic, Thomas, and Ogloff (2013) examined use of non-fatal force towards people presenting mental distress or mental health concerns. Overall, their findings demonstrated that inflammatory spray was disproportionately used among people with mental health issues, including instances of self-harm and suicide (Kesic et al., 2013). This finding supports previous research, which found high proportions of use of force by police towards this sub-population (Kesic et al., 2013). This study did not however, examine the effectiveness of inflammatory spray as a use of force method among this group.

Safety Profile of Inflammatory Agents

The final theme addresses health and safety concerns, particularly those that cause injuries and death. The most common symptoms associated with exposure to inflammatory agents are irritation, such as burning and redness to the eyes, skin, and, mucous membrane (Semple et al., 2021). Compared to chemical agents, OC has a stronger initial effect but a shorter lasting impact (thirty to forty-five minutes with residual effects lasting several hours; Bertilsson et al., 2017). Adang and Mensink (2004) found that following after-care/decontamination procedures, the symptoms of exposure subsided within two to twenty-four hours.

The main injuries identified within research are corneal abrasions, respiratory symptoms, such as asthma, and altered vision (Semple & Bennell, 2018). While injuries and/or death have been studied, research has not established a causal link between injury/death and inflammatory spray (Semple et al., 2021). For example, Haar et al. (2017) found that the chemical agent, CS, and inflammatory agent, OC, could cause significant injuries and permanent disabilities. However, the health-related impacts may be due to the exposure dose, deployment technique, and/or how the weapons were used (Haar et al., 2017). Moreover, the literature has not clearly indicated long-term health effects related to inflammatory spray exposure (Semple et al., 2021).

The research has also discussed death following exposure to inflammatory agents. Semple et al. (2021) found in their review of the literature that OC was rarely associated with serious harm/injuries or death. There were, however, a number of common themes identified in the majority of cases where OC was proximate to the individual's death, including drugs or alcohol intoxication, the prone maximal restraint position, and/or pre-existing health conditions

(i.e., asthma, obesity, and/or cardiovascular disease; Semple et al., 2021). Medical examiners often emphasized the combination of the pre-existing factors; OC was very rarely deemed to be a contributing or the only cause of death (Semple et al., 2021).

The Current Study

The purpose of this study is to help inform CSC's review of Commissioner's Directive 567-4, *Use of Chemical and Inflammatory Agents* (CSC, 2016), and ensure consistency with the overall intent of the EIM. In order to provide a comprehensive analysis, this study will examine the following research questions:

1. How often are use of force measures used as a response to suicide and self-harm incidents?
2. How often are inflammatory agents used as a response to suicide and self-harm incidents?
3. Was the use of inflammatory agents the initial, intermediate, or final response option to suicide and self-harm incidents?
4. Were the force option(s) limited to what was necessary and proportionate in order to manage the risk associated with the suicide/self-harm incident?

Method

Sample

The study sample included all SIB incidents from April 1, 2018 to March 15, 2020.[3-4] For the purpose of this study, SIB incidents included self-injury/self-injurious behaviour, suicide attempt, and suicide events as defined in Commissioner's Directive 843 (CSC, 2017).[5-6] The study sample consisted of 3,332 SIB incidents occurring during the study timeframe. Of the SIB incidents, 14.1% (n = 471) had an accompanying use of force and 7.1% (n = 235) had an identified use of inflammatory agents. The research questions lend themselves best to a prevalence approach.[7] The data, therefore, reported on the frequency of SIB incidents with an identified use of inflammatory agents during the timeframe.[8]

Although the focus of this study is SIB incidents, Table 1 presents the total number of incidents (N = 47,504),[4] the proportion of each incident type with an identified use of force, and the proportion of each incident type with an inflammatory agent used during the study timeframe. All incident types have been included in order to establish context and ultimately strengthen our understanding of the results reported for SIB incidents. Incident types are unique and so are the responses required to safely manage them. However, incident types do not always occur in isolation from one another; one event may include multiple incident types. For example, an incident that began as behaviour or assault related, may evolve to SIB as the event unfolds. Where there were multiple incident types associated with an event, the SIB incident was retained. If all the incident types were outside the study criteria, the last incident type in the dataset was retained.

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[3] March 15, 2020 cut off was selected in order to account for COVID-19 related impacts on operations.
[4] Incidents with at least one of the following criteria were excluded from the study: (a) occurred in a community site; (b) occurred while the offender was on release; (c) could not be linked to at least one offender; and (d) was considered to be a draft incident report (i.e., it was not finalized).
[5] Self-injury/self-injurious behaviour was defined as the intentional, direct injuring of body tissue without suicidal intent; suicide attempts were defined as behaviour that intentionally puts one's life at risk and may result in death, done with the intention to end life; and, suicide was defined as an intentional act to end one's life that results in death (CSC, 2017).
[6] The incident sub-types hunger strike, suspected overdose interrupted, and overdose are categorized as SIB incidents in OMS, however, they fall outside the parameters of this study. In Table 1 they are captured as Other Self-Injurious Behaviour.
[7] Measuring a condition (the use of inflammatory agents in response to SIB incidents) over a specified period of time (April 1, 2018-March 15, 2020).
[8] The data were event level and therefore individual offenders were represented multiple times within the data if they were involved in more than one incident between April 1, 2018 and March 15, 2020.

Table 1

Use of Force and Inflammatory Agents by Incident Type

Incident Type	Total Number of Incidents (N = 47,504)	Percentages across Incident Types	
		Incidents with an Identified Use of Force	Incidents with an Identified Use of Inflammatory Agent
	% (n)	% (n)	% (n)
Behaviour Related	32.1 (15,233)	8.8 (1,339)	3.4 (524)
Contraband Related	30.2 (14,326)	1.2 (175)	0.2 (32)
Miscellaneous	18.7 (8,891)	0.6 (52)	0.1 (8)
Assault Related	9.4 (4,491)	26.9 (1,207)	17.3 (776)
Self-Injurious Behaviour	7.0 (3,332)	14.1 (471)	7.1 (235)
Property Related	1.8 (835)	6.1 (51)	2.8 (23)
Other Self-Injurious Behaviour	0.6 (280)	2.5 (7)	† †
Death Related[b]	0.2 (93)	† †	0 (0)
Escape Related /UAL	0.0 (23)	† †	0 (0)

Note. Percent values for the Incidents with an Identified Use of Force and Incidents with an Identified Use of Inflammatory Agent were based on the total number of each incident type (i.e., row totals). [b] Death related included all death related incidents with the exception of suicide.
†Information suppressed due to frequencies fewer than 5 in one category.

Data Sources

Data were extracted from the Offender Management System (OMS), an electronic administrative and operational database used by CSC to maintain all offender records from sentencing commencement to end. Information contained in the OMS is used by front-line staff for decision-making and tracking of offender information and movement, as well as by CSC for corporate reporting. The Corporate Reporting System – Modernized (CRS-M) is a corporate reporting tool that contains high quality offender statistical related data on a variety of topics, including incidents. The CRS-M incident data module was examined in order to validate the data extracted from OMS.

Data Verification/Coding

Qualitative verification was completed in order to ensure that all self-inflicted injuries and suicide related incidents were accurately identified through the data extraction. Each incident

type has several sub-types that fall within the broader category. For example, the incident type *Self-Injurious Behaviour* contains the following incident sub-types: *Self-Inflicted Injuries, Attempted Suicide, Overdose Interrupted, Suspected Overdose Interrupted,* and *Hunger Strike*. In order to mitigate data entry errors and ensure SIB incidents reflect the definition operationalized for this study, all incident subtypes were reviewed to determine which categories were most likely to contain discrepancies related to SIB incidents.

The following incident sub-types for the incident categories *Self-Injurious Behaviour* and *Death Related*, were included without further verification: *Self-Inflicted Injuries, Attempted Suicide,* and *Suicide*. However, cases that were categorized as *Self-Injurious Behaviour*, as their incident type, and *Overdose Interrupted, Suspected Overdose Interrupted,* or *Hunger Strike* as their incident sub-type, were reviewed to ensure data entry accuracy. Cases that were categorized as *Death Related* or *Miscellaneous* as their incident type, and *Death Overdose, Intervention for Medical Purposes,* or *Medical Emergency - Not Attributable to Assaultive Behaviour* as their incident sub-type, were also reviewed to ensure data entry accuracy.

A combination of synopsis and full incident reports were examined depending on the need for clarification and certainty. In order to ensure consistency and mitigate data bias, 20% of randomly selected cases were reviewed by a second coder and discrepancies or diverging opinions were discussed and reconciled. In addition, challenging files were highlighted and read by the coding team to come to a consensus on if the circumstance presented in the file qualified as a SIB incident. In total, 2,352 cases were reviewed. Of those, 2% (n = 49) were re-coded as SIB incidents.[9]

In order to explore the timeline associated with force option(s) employed in SIB incidents where inflammatory agents were used, qualitative coding of all SIB incidents where inflammatory agents were used in conjunction with other force option(s) was also completed. Seventy-eight cases were identified through the initial OMS data extraction. Upon qualitative examination, nine were removed because they did not meet the criteria for inclusion, or the information in the incident report was not sufficient to determine when the inflammatory agent was used during the incident.[10] The final sample consisted of 69 cases. Institutional incident

[9] Encouragingly, 98.6% (n = 3,283) of all self-injurious incidents were correctly recorded in OMS.
[10] Reasons for removal: inflammatory agent was used in response to an incident that occurred prior to the SIB incident; inflammatory agent was the only use of force related to the SIB incident (other force options used in response to another incident in the incident report); physical handling was the only use of force related to the SIB

reports were systematically examined for relevant information concerning the timing of force option(s) used. Consistent with the qualitative verification, a random selection (20%) of cases were reviewed by a second coder in order to ensure consistency and mitigate data bias.

Analytic Approach

Once SIB incidents were verified, the data were quantitatively analysed through a series of frequency distributions and cross tabulations. Descriptive values for total number of SIB incidents, total number of SIB incidents with an identified use of force, and total number of SIB incidents with an identified use of inflammatory agents were calculated for SIB sub-types, number of incident types, SIB behaviour, region, security level, and facility type.[11-12] Counts were also completed for the number of force options employed in SIB incidents, as well as the types of use of force measures used by operational staff in SIB incidents. Information related to final level of review and review assessments for SIB incidents with an identified use of inflammatory agent was also analysed using the same approach. In addition, qualitative analysis of all SIB incidents that involved inflammatory agents was undertaken in order to determine whether the use of inflammatory agents was the initial, intermediate, or final response option in these incidents.

incident (other force options used in response to another incident in the incident report); the narratives did not provide enough information to determine when the inflammatory agent was used; and, the use of inflammatory agent was authorized but never displayed or dispensed.

[11] Offender security level was used as a proxy for institutional security level for incidents occurring at women's sites, clustered sites, and regional treatment centres (RTCs) which are classified as multi-level sites.

[12] Incidents that occurred at the Regional Psychiatric Centre may have involved offenders typically housed at men's or women's institutions, therefore the offender biological sex was used to classify those events into either a men's or women's institution.

Results

The results are presented in four parts. The first section focuses on the prevalence of use of force and more specifically, the use of inflammatory agents in response to SIB incidents. In order to provide a comprehensive description of SIB incidents that involve inflammatory agents, descriptive analysis of incident sub-types, number and type of force options employed, number of incident types, as well as the nature of the SIB are explored. The second section provides an overview of the distribution of SIB incidents, use of force measures, and inflammatory agents. Regional variation, security level, and men's and women's institutions[13] are reported separately. The third section examines more closely the use of inflammatory agents as a response to SIB incidents; reporting whether the inflammatory agent was the first, intermediate, or final response to the SIB incident when multiple force option(s) were employed. The final section aims to address whether the force option(s) utilized were limited to what was necessary and proportionate in order to manage the SIB incident. The final level of review, whether the force option(s) were considered necessary and proportionate, as well as where there are discrepancies in the assessments between levels of review are included.

Use of Force Measures and Inflammatory Agents as a Response to SIB Incidents

There are three incident sub-types that fall under the broader category of SIB: self-inflicted injuries, suicide attempts, and suicide. Table 2 presents the total number of incidents (N = 3,332), the proportion of all SIB subtypes with an identified use of force (N = 471), and the proportion of all SIB subtypes with an inflammatory agent (N = 235) used. The majority (92.0%) of SIB incidents were identified as self-inflicted injuries. Self-inflicted injuries and suicide attempts had similar rates of use of force (14.3% versus 13.5%, respectively); however, the proportion of self-inflicted injuries with an associated use of inflammatory agents was twice that of suicide attempts (7.4% versus 3.2%, respectively).

[13] Comparisons were completed using institution type in consideration of gender diverse offenders.

Table 2

Self-Injurious Behaviour Incidents by Sub-type

SIB Subtype	Total Number of Incidents (N = 3,332)	Percentages across SIB subtype	
		Incidents with an Identified Use of Force	Incidents with an Identified Use of Inflammatory Agent
	% (n)	% (n)	% (n)
Self-Inflicted injuries	92.0 (3,066)	14.3 (437)	7.4 (227)
Suicide attempts	7.6 (252)	13.5 (34)	3.2 (8)
Suicides	0.4 (14)	0 (0)	0 (0)

Note. Percent values for the Incidents with an Identified Use of Force and Incidents with an Identified Use of Inflammatory Agent were based on the total number of each incident sub-type (i.e., row totals).

In some SIB incidents, multiple force options were employed. Table 3 presents the distribution of the number of force options used in all SIB incidents.[14] Almost three-quarters (72.6%) of SIB incidents have only one associated use of force measure and the remaining quarter have two or more.

Table 3

Self-Injurious Behaviour Incidents Use of Force Count

Number of Force Options Employed	SIB Incidents with an Identified Use of Force (N = 471)
	% (n)
One	72.6 (342)
Two	21.0 (99)
Three-Four	6.4 (30)

Table 4 shows the use of force measures employed for all SIB incidents with an identified use of force. Physical handling (50.3%) and inflammatory agents (49.9%) were the

[14] Of note, the number of force options employed included inflammatory agents, in addition to physical handling, firearms, restraint equipment etc.

force options used to respond to about half of all the SIB incidents with an identified use of force. Restraint equipment was also common and employed in almost one-third (30.1%) of all SIB incidents with an identified use of force. The remaining force options (chemical agents, distraction devices, other intermediary weapon, and shield) were only occasionally used as a response to SIB incidents.

The deployment methods of inflammatory agents were also examined. In almost all incidents (97.0%) an inflammatory agent was deployed through a liquid based spray. Considerably fewer incidents (4.7%) had an inflammatory agent deployed by powder.[15] When reviewing the types of inflammatory agents, the most commonly used product in SIB incidents was MK IV (56.2%, *n* = 132) followed by MK IX (37.4 %, *n* = 88).

[15] Base rates were too low to report for all other deployment methods.

Table 4

Self-Injurious Behaviour Incidents with an Identified Use of Force by Force Option Employed

Use of Force Measure	SIB Incidents with an Identified Use of Force (*N* = 471)
	% (*n*)
Physical Handling	50.3 (237)
Inflammatory Agent [a]	49.9 (235)
MK IV	56.2 (132)
MK IX	37.4 (88)
MK 9 1.33	7.7 (18)
MK-46	3.8 (9)
MUZZLE BLAST 37mm	3.0 (7)
MK III	††
MK IV (Foam)	† †
T-16 FLAMELESS EXPULSION GRENADE	† †
ISPRA-OC	† †
Other	††
Restraint Equipment	30.1 (142)
Shield	1.9 (9)
Distraction Devices	† †
Chemical Agents	††
Other Intermediary Weapon	† †

Note. Percent values for use of force options do not equal 100. Where multiple force options were used in one incident event, each unique force option was counted. The same incident event could therefore be counted in more than one category. [a] Not all inflammatory types were represented in the table; only those with a count were included. Percent values for inflammatory agent types do not equal 100. In some instances, more than one inflammatory agent was used. In addition, percent values for inflammatory agent types were based on total number of inflammatory agents (n = 235).
†Information suppressed due to frequencies fewer than 5 in one category.

There were some SIB incidents that occurred alongside other incidents and were captured as one event.[16] Table 5 reports on the number of distinct incident types that occurred for each event involving SIB. The majority (93.0%) of SIB incidents occurred independent of other incident types; however, there were instances where multiple incident types occurred during the same timeframe. In 5.7% of SIB incidents there are two incident types linked to the event, and in 1.2% of SIB incidents there were three incident types linked to the event. As the number of incident types increased, so did the proportion with an identified use of force and an identified use of inflammatory agent. For instance, when the SIB incident included only one incident type, use of force was used in 12.1% of incidents and inflammatory agents were used in 6.6% of incidents. In comparison, when three or more incident types were involved in a SIB incident, use of force was used in 78.0% of incidents and inflammatory agents were used in 26.8% of incidents.

Table 5

Self-Injurious Behaviour Incidents by Number of Incident Types

Number of Incident Type	Total Number of SIB Incidents (N = 3,332)	Percentages across Number of SIB Incidents	
		SIB Incidents with an Identified Use of Force	SIB Incidents with an Identified Use of Inflammatory Agent
	% (n)	% (n)	% (n)
One	93.0 (3,100)	12.1 (376)	6.6 (206)
Two	5.7 (191)	33.0 (63)	9.4 (18)
Three-Four	1.2 (41)	78.0 (32)	26.8 (11)

Note. Percent values for the Incidents with an Identified Use of Force and Incidents with an Identified Use of Inflammatory Agent were based on the total number of SIB incident types (i.e., row totals).

SIB behaviours can vary from one incident to another. Table 6 presents the nature of the SIB behaviours identified for all SIB incidents (N = 3,251).[17] The most commonly cited behaviour types among all SIB incidents were slashing (38.3%) and head banging (35.7%).

[16] When there were multiple incident types, the SIB/attempted suicide/suicide incident was retained.
[17] Eighty-one SIB incidents did not have information related to the nature of the SIB behaviours.

Among SIB incidents that included strangulation and opening existing wounds, use of force was used most frequently (28.7% and 22.8%, respectively). Similarly, when SIB incidents included strangulation and opening existing wounds, use of inflammatory agents were also used most frequently (13.5% and 10.2%, respectively).

Table 6

Nature of Self-Inflicted Injurious Behaviour

Self-Inflicted Injury Behaviour	Total Number of Incidents (N = 3,251)	Percentages across Self-Inflicted Injury Behaviour	
		Incidents with an Identified Use of Force[a]	Incidents with an Identified Use of Inflammatory Agent[a]
	% (n)	% (n)	% (n)
Slashing	38.3 (1,246)	12.8 (159)	8.3 (103)
Head banging	35.7 (1,161)	19.5 (226)	9.0 (104)
Strangulation	7.3 (237)	28.7 (68)	13.5 (32)
Ingestion	5.7 (186)	12.9 (24)	2.7 (5)
Opening existing wounds	3.9 (127)	22.8 (29)	10.2 (13)
Insertion of foreign object	1.3 (43)	† †	0 (0)
Branding	0.3 (11)	† †	† †
Jumping from height	0.2 (7)	† †	† †
Other	13.9 (453)	7.9 (36)	2.9 (13)

Note. Incidents that did not have SIB behaviour information (n = 81) were excluded from the table (i.e., suicides and incidents that were recoded during data verification). Totals do not equal 100% because some incidents may include multiple behaviour types. [a] Percent values for the Incidents with an Identified Use of Force and Incidents with an Identified Use of Inflammatory Agent were based on the total number of incidents within each type of SIB behaviour (i.e., row totals).
†Information suppressed due to frequencies fewer than 5 in one category.

Distribution of SIB Incidents, Use of Force Measures, and Inflammatory Agents

Table 7 presents the distribution of SIB incidents by region. The Prairie region had the largest proportion of SIB incidents overall, with almost half (44.5%) of all SIB incidents occurring within that region. Use of force was used in 24.8% of all SIB incidents that occurred in

the Quebec region and 24.2% of all SIB incidents that occurred in the Ontario region. Interestingly, one-fifth of all SIB incidents that occurred in the Quebec region had an associated use of inflammatory agent, a proportion that far outweighed the other regions.

Table 7

Self-Injurious Behaviour Incidents by Region

Region	Total Number of SIB Incidents (N = 3,332)	Percentages across Region	
		SIB Incidents with an Identified Use of Force	SIB Incidents with an Identified Use of Inflammatory Agent
	% (n)	% (n)	% (n)
Atlantic	22.8 (760)	11.6 (88)	3.4 (26)
Quebec	13.9 (464)	24.8 (115)	20.3 (94)
Ontario	11.6 (385)	24.2 (93)	5.5 (21)
Prairies	44.5 (1484)	8.8 (130)	4.2 (62)
Pacific	7.2 (239)	18.8 (45)	13.4 (32)

Note. Percent values for the Incidents with an Identified Use of Force and Incidents with an Identified Use of Inflammatory Agent were based on the total number of SIB incidents within each region (i.e., row totals).

Table 8 displays the distribution of SIB incidents by security level. Offender security level was used as a proxy for institutional security level at women's sites, clustered sites, and regional treatment centres (RTCs) which are classified as multi-level sites. Incidents that occurred while offenders were in a reception/assessment centre prior to the offenders' security classification were excluded (n = 21). Almost three quarters (71.0%) of all SIB incidents were associated with a maximum security level. When SIB incidents occurred in maximum security levels, use of force was used in 16.5% of incidents and inflammatory agents were used in 8.3% of incidents.

Table 8

Self-Injurious Behaviour Incidents across Security Level

Security Level	Total Number of SIB Incidents (N = 3,311)	Percentages across Security Level	
		SIB Incidents with an Identified Use of Force[a]	SIB Incidents with an Identified Use of Inflammatory Agent[a]
	% (n)	% (n)	% (n)
Maximum	71.0 (2,352)	16.5 (389)	8.3 (195)
Medium	28.0 (926)	8.7 (81)	4.3 (40)
Minimum	1.0 (33)	0 (0)	0 (0)

Note. Security classification of the offenders involved in the incidents was used a proxy for security level when incidents occurred at multi-level facilities (women's, clustered, or RTCs); however all data reported were still at the incident event level. Incidents involving offenders that had not yet been assigned a security level were excluded from the table (n = 21). [a] Percent values for the Incidents with an Identified Use of Force and Incidents with an Identified Use of Inflammatory Agent were based on the total number of SIB incidents within each security level (i.e., row totals).

Table 9 shows the distribution of SIB incidents for men's and women's institutions as well as for RTCs and non-RTCs. Almost two-thirds of all SIB incidents occurred in a men's institution (61.1%). Of those SIB incidents that occurred in a men's institution, use of force was used in 16.7% of incidents and inflammatory agents were used in 10.1% of the incidents. Among SIB incidents that occurred in women's facilities, use of force was used in 10.0% of incidents and inflammatory agents were used in 2.2% of the incidents. RTCs were also studied separately. Over one-third (36.8%) of all SIB incidents occurred in an RTC. Of those SIB incidents that occurred in an RTC, use of force was used in 12.3% of incidents and inflammatory agents were used in 5.9% of incidents. It is important to note that a greater proportion (63.2%) of all SIB incidents occurred in a non-RTC and when an SIB incident occurred in a non-RTC, use of force was used in 15.2% of incidents and inflammatory agents were used in 7.7% of incidents.

Table 9

Self-Injurious Behaviour Incidents by Institution Type

Institution Information	Total Number of SIB Incidents (N = 3,332)	Percentages across Institution Information	
		SIB Incidents with an Identified Use of Force	SIB Incidents with an Identified Use of Inflammatory Agent
	% (n)	% (n)	% (n)
Institution Type[a]			
Men's	61.1 (2.037)	16.7 (341)	10.1 (206)
Women's	38.9 (1,295)	10.0 (130)	2.2(29)
Institutional Designation			
RTCs	36.8 (1,225)	12.3 (151)	5.9 (72)
Non-RTCs	63.2 (2,107)	15.2 (320)	7.7 (163)

Note. Percent values for the Incidents with an Identified Use of Force and Incidents with an Identified Use of Inflammatory Agent were based on the total number of SIB incidents within each institution type and institutional designation (i.e., row totals). [a] Includes Regional Treatment Centres (RTCs). Incidents that occurred at the Regional Psychiatric Centre may have involved offenders typically housed at men's or women's institutions, therefore the offender biological sex was used to classify those events into either a men's or women's institution.

Use of Inflammatory Agents Combined with Other Force Options as a Response to SIB Incidents

In cases where more than one use of force option was employed and one of the force options was an inflammatory agent, it was examined whether the inflammatory agent was the first, intermediate, or final response to the SIB incident. In total, 69 SIB incidents[18] where inflammatory agents were used in conjunction with other force option(s) were identified and examined.[19] Among those SIB incidents, almost three-quarters (73.9%, n = 51) occurred in men's institutions and just over one-quarter (26.1%, n = 18) occurred in women's institutions. In addition, they were more likely to occur in maximum security facilities (85.5%, n = 59) than in medium security facilities (14.5%, n = 10) and more likely to occur in the Prairie region (31.9%, n = 22) than in the other regions.[20] In just over three-quarters (78.3%, n = 54) of the incidents, inflammatory agents were the first force option used. Inflammatory agents were the intermediate

[18] SIB sub-types included self-inflicted injuries (n = 63) and attempted suicide (n = 6).
[19] The analysis of these incidents is at the event level. As a result, there are some individuals (n = 10) who are represented multiple times within this sub-set of data.
[20] Atlantic region: 7.2%, n = 5; Quebec, Ontario, and Pacific regions had the same proportion: 20.3%, n = 14.

(14.5%, *n* = 10) and final (10.1%, *n* = 7) response option used in considerably fewer cases.[21] In 87.0% (*n* = 60) of the cases examined, an inflammatory agent was deployed, whereas in 15.9% (*n* = 11) of the cases, an inflammatory agent was only displayed or pointed at the individual.[22]

The use of inflammatory agents was most often combined with physical handling and/or restraint equipment regardless of when the inflammatory agent was deployed (i.e., first, intermediate, or final force option). Follow-up actions are often required after inflammatory agents have been deployed. For example, the use of physical handling to gain control of the offender and/or the application of restraint equipment to address any further risk while the offender is being escorted for decontamination (i.e., after care procedures). Further analyses demonstrated that when the inflammatory agent was the first force option employed, physical handling (63.0%, *n* = 34) and restraint equipment (63.0%, *n* = 34) were also used in almost two-thirds of the incidents. When the inflammatory agent was the intermediate response option, physical handling (90.0%, *n* = 9) and restraint equipment (60.0%, *n* = 6) were also used in the majority of incidents. When the inflammatory agent was used as the final response option, physical handling was used in all cases (100%, *n* = 7) whereas restraint equipment was used in almost half of the incidents (42.9%, less than 5).

In terms of the nature of SIB incidents, slashing (46.3%, *n* = 25) and head banging (42.6%, *n* = 23) were most common when the inflammatory agent was the first response option. When the inflammatory agent was the intermediate response option, head banging (50.0%, *n* = 5) and strangulation (30.0%, less than 5) were the most common SIB incidents. When the inflammatory agent was the final force option employed, strangulation (42.9%), head banging (28.6%), and slashing (28.6)[23] were the most common SIB incidents.

One noteworthy finding was that discrepancies were identified in about one-third (36.2%, *n* = 25) of the incidents coded related to how use of force incidents were recorded. The most common inconsistencies observed included: (a) restraint equipment force option (e.g., handcuffs, spit guards, pinel restraints, etc.) was frequently discussed in the incident report but not always presented in the data; (b) physical handing and shield force options were inconsistently recorded

[21] Values do not equal 100% because in some instances the inflammatory agent was used as a force option more than once during the event.
[22] Values do not equal 100% because in some instances the inflammatory agent was displayed and deployed at distinctly different times during the event.
[23] Strangulation, head banging and slashing all had frequencies less than 5.

in both the incident report and the data; and (c) the methods used for inflammatory agents (i.e., methods of pointing, displaying, discharging inflammatory agents, and deliberately aimed shot) were not always recorded precisely in the incident reports and as such, the specific method used for the inflammatory agent was not always distinguished.

Review Assessments of SIB Incidents Involving Inflammatory Agents

Following any incident with a use of force, a review process was completed to assess all incident-related information against law and policy. Level one reviews are completed and finalized at the Institutional level. The display or intentional aim (without dispensing) of inflammatory agents would result in a level one review, whereas any deployment/actual use of inflammatory agents would result in a level two review. In most circumstances, a portion of level two reviews are completed by Regional Headquarters (RHQ; 25.0%) and National Headquarters (NHQ; 5.0%). However, the use of force related to suicide and/or SIB incidents are an exception. All SIB incidents with a use of force are subject to RHQ review, regardless of the force level applied. In addition, a NHQ review occurs for a greater proportion (20.0%) of these types of cases (CSC, 2018b).[24-25]

Table 10 describes the final level of review for SIB incidents with an identified use of inflammatory agent. Of the 234 incidents,[26] 3.0% did not have any further review completed following the Institution review (i.e., the review was closed or the regional review was still in progress). RHQ was the final level of review in 68.8% of all incidents reviewed. The proportion of incidents reviewed by NHQ was 15.8%, while the Women Offender Sector (WOS) was responsible for the final review of 12.4% of cases.

[24] The Women Offender Sector is responsible for reviewing use of force incidents that occur at women institutions at the national level.
[25] If an Emergency Response Team intervention is required due to self-injurious behaviours, 100% of those incidents will be reviewed at the national level.
[26] One review had missing information and was removed from the analysis.

Table 10

Self-Injurious Behaviour Incidents that Involved Inflammatory Agents by Final Level of Review

Level of Final Review Completed	SIB Incidents with an Identified Use of Inflammatory Agent (N = 234)[a]
	% (n)
Institution[b]	3.0 (7)
Regional Headquarters	68.8 (161)
National Headquarters	15.8 (37)
Women Offender Sector	12.4 (29)

Note. [a] One incident had missing data and was removed.
[b] Includes cases where the review has been closed and cases where the regional review is still in progress.

Review assessments are presented in Table 11. Institution and RHQ review indicators identify whether the force option(s) used were considered limited to what was necessary and proportionate in order to bring the situation under control.[27] Unfortunately, these indicators were not available for NHQ or WOS reviews during the study timeframe.[28] The closest proxy variable allows us to report on whether or not the NHQ/WOS review concurs with the Institution and RHQ reviews. It is important to note that discordance does not simply reflect the concepts necessary and proportionate but may also be in reference to policy deficiencies or other concerns. Of the reviews completed by the Institution, 93.2% were considered necessary, 91.5% were considered proportionate, and 90.6% were deemed both necessary and proportionate. Of the reviews completed by RHQ, 91.1% were considered necessary, 88.0% were considered proportionate, and 86.2% were deemed both necessary and proportionate. In almost all instances (95.1%, n = 225) where both Institution and RHQ reviews were completed, the review assessments aligned.

[27] Necessary and proportionate intervention: taking into account the reasonable need for maintaining certain operational routines, if the threat may be safely managed without a use of force, then force is unnecessary. The amount of force used must also be the minimally necessary force (proportionate) to safely manage the threat. The concept of necessary and proportionate also applies to health interventions (CSC, 2018a).
[28] Indicator questions "was the use of force necessary?" and "was the amount of force used proportionate to the situation?" were added to the NHQ/WOS, Security Branch tab in the 2021-03-27 OMS-R release (OMSR-Release-Notes-IR_1.18_UFR_1.21).

All of the NHQ reviews concurred, or concurred in part, with the reviews completed by the Institution and the vast majority of NHQ reviews concurred, or concurred in part, with the reviews completed by RHQ (94.6%). Only a small proportion (5.4%) of NHQ reviews did not concur with reviews completed by RHQ. In 96.6% of the cases, WOS concurred, or concurred in part, with the Institution review whereas in only 3.4% of the cases, WOS did not concur with the Institution review. All of the WOS reviews concurred, or concurred in part, with reviews completed by RHQ. It is important to highlight that NHQ and WOS review assessments represent an overall review of the incident and are not specifically related to whether the use of force was appropriate (i.e., was necessary or proportionate).

Table 11

Self-Injurious Behaviour Incidents that Involved Inflammatory Agents by Review Assessment

Review Level and Findings	SIB Incidents with an Identified Use of Inflammatory Agent
	% (*n*)
Institution (*n* = 234)[a]	
Necessary	93.2 (218)
Proportionate	91.5 (214)
Necessary and Proportionate	90.6 (212)
Regional Headquarters (*n* = 225)[a]	
Necessary	91.1 (205)
Proportionate	88.0 (198)
Necessary and Proportionate	86.2 (194)
Review assessment aligns with Institution	95.1 (214)
National Headquarters (*n* = 37)[a]	
Concur with Institution[b]	100 (37)
Concur with RHQ[b]	94.6 (35)
Women Offender Sector (*n* = 29)[a]	
Concur with Institution[b]	96.6 (28)
Concur with RHQ[b]	100 (29)

Note. Percent values reflect the number of incidents that were reviewed at each level (i.e., row totals). [a] Missing data has been removed. [b] Reviews fully concurred or concurred in part. .

Discussion

This study was undertaken in response to an OCI recommendation, and aimed to identify how often the use of force and, more specifically, the use of inflammatory agents were being used in response to self-harm and suicide incidents. CSC has a responsibility to ensure offenders and correctional staff are safe from harm; however, they are equally accountable for their responses to incidents where individuals' safety is compromised. The findings from this study will help to inform CSC's review of CD 567-4, *Use of Chemical and Inflammatory Agents*, and ensure consistency with the overall intent of the EIM.

In the current study, SIB incidents represented 7.0% of all incidents, with inflammatory agents used in 7.1% of those cases. The identified use of inflammatory agents in response to SIB incidents fell only behind assault related incidents when comparing all incident types. These findings mirror what has recently been reported by the OCI (OCI, 2021).[29] A review of SIB incident sub-types demonstrates that self-inflicted injuries had a higher proportion of incidents with an identified use of inflammatory agents than both suicide and suicide attempts (7.4% vs. 0.0% and 3.2%).

Physical handling, inflammatory agents, and restraint equipment were the force options most often employed in SIB incidents. The literature describes these force options as intermediary measures when verbal and more passive strategies are not working (Lumb & Friday, 1997); similarly, in accordance with EIM, they should be used when the level of risk is deemed to be moderate to high (CSC, 2022). Physical handling, inflammatory agents, and restraint equipment are less restrictive in nature than some of the other force options available (e.g., distraction devices, firearms, batons, other intermediary weapons, etc.).

MK IV is the product that is issued and carried by correctional officers (CSC, 2016) and was the most frequently used inflammatory agent in response to SIB incidents. MK IV is also one of the less potent inflammatory agents, which is encouraging when reflecting on the intent of the EIM (i.e., restricting incident response to only what is necessary and proportionate; CSC, 2018a). MK IX on the other hand, is intended for instances when MK IV has proven ineffective or is not appropriate given situational factors (i.e., too great of a distance, larger area, safety

[29] Small differences in values are attributable to operational definitions and how incident types were being retained in events with multiple incident types.

considerations, and inmate attempts to counter OC, such as covering eyes; CSC, 2021). Results also showed that as the number of incident types increased, so did the responses with an identified use of force and an identified use of inflammatory agents. These results suggest that as an event becomes more complex (i.e., involves more than one incident type), the response required to manage the event also intensifies (i.e., a greater need for force options to be employed).

The nature of SIB incidents are wide-ranging, with some greater in risk or more dangerous than others. In addition to differences between types of SIB, there may also be variation within one type (e.g., not all slashing incidents are the same in severity). Use of force was used most often among SIB incidents involving strangulation and opening existing wounds. Likewise, when SIB incidents included strangulation and opening existing wounds, use of inflammatory agents were also used most frequently. It is likely that some SIB incidents require more urgent and forceful responses than others. Further qualitative research would be needed to explore the impact of situational factors on the level of force required.

One of the most noteworthy findings was the discordance across regions. Overall, the Prairie region had the largest proportion of SIB incidents, as nearly half (44.5%) of all SIB incidents occurred in that region. Use of force was deployed in nearly a quarter of SIB incidents that occurred in the Quebec region (24.8%) and Ontario region (24.2%). The use of inflammatory agents in SIB incidents was highest in the Quebec region and considerably exceeded the other regions (20.3% compared to Atlantic 3.4%; Ontario 5.5%; Prairies 4.2%; Pacific 13.4%). Future research could explore the reasons for the differences across the regions (e.g., population characteristics, institutional culture, etc.).

Seventy-one percent of all SIB incidents were associated with a maximum security level. Use of force was used in 16.5% of incidents and inflammatory agents were used in 8.3% of incidents when SIB incidents occurred in maximum security levels. An offender's security level is based on the assessment of the individual's institutional adjustment, escape risk and risk to public safety (CSC, 2018c). Moreover, those with a higher security classification are more likely to be a challenging population overall.

While the majority of federal offenders are men (CSC, 2019), 39% of SIB incidents occurred in women's institutions. Previous research has indicated that more than a third of women federal offenders reported engaging in SIB at some point in their lives (Power & Usher,

2011a; Power & Usher, 2011b). The results also demonstrated that 11% of women reported SIB while in a CSC institution (Power & Usher, 2011b). Additionally, the literature suggests that women with a history of SIB are more likely to have experienced trauma, such as emotional and sexual abuse in their childhood (Power & Usher, 2011a; Gómez et al., 2015). Use of force and use of inflammatory agents as a response to SIB incidents were less common in women's institutions (10.0% vs. 2.2%, respectively) compared to men's (16.7% vs. 10.1%). The principles that govern programs, interventions, and services for men and women differ, with women's facilities being guided by the *Creating Choices* report (CSC, 1990). The Creating Choices principles centre on empowerment, nurturing meaningful and responsible choices, fostering respect and dignity, creating a supportive environment, and promoting shared responsibility, and as such, a greater emphasis may be placed on resolving incidents without the use of force in women's institutions.

In addition, over one-third (36.8%) of all SIB incidents occurred in an RTC, consistent with current research demonstrating a correlation between mental health and SIB (Favril et al., 2020; Fliege et al., 2009). Among SIB incidents that occurred in an RTC, use of force was used in 12.3% of incidents and inflammatory agents were used in 5.9% of incidents. On the other hand, 63.2% of all SIB incidents occurred at non-RTCs. Of SIB incidents that occurred in a non-RTC, use of force was used in 15.2% of incidents and inflammatory agents were used in 7.7% of incidents. While the literature suggests a correlation between mental health and SIB, there does not seem to be a greater use of force or inflammatory agents in response to SIB incidents in RTCs.

Less than one-third of SIB incidents where inflammatory agents were used had additional force options employed. In over three-quarters (78.3%) of these incidents, the inflammatory agent was the first force option employed. Though beyond the scope of the current study, it would be valuable to review these cases further to examine if other force options were considered first and if so, explore why they were not implemented prior to the use of the inflammatory agent. The use of inflammatory agents was most often combined with physical handling and/or restraint equipment regardless of when the inflammatory agent was deployed (i.e., first, intermediate, or final force option). It is positive to find that when multiple force options were employed in SIB incidents, less restrictive options were being utilised in combination with one another. This finding is also supported by CSC's *Chemical and*

Inflammatory Agent Guide, which states that inflammatory agents do not restrain on their own and need to be used in combination with other force options, specifically physical handling and restraint equipment (CSC, 2021).

In the majority of SIB incidents (68.8%) with an identified use of inflammatory agent, a RHQ review was completed. Further review was completed by NHQ for 15.8% of all SIB incidents with an identified use of force, while WOS was responsible for reviewing 12.4%. Generally, the results of reviews mirrored what is outlined as required in policy. There was concordance in 95.1% of the reviews that were completed by both the Institution and RHQ. This suggests that most of the responses to SIB incidents limited the use of force methods to what was necessary and proportionate to resolve the incident. It is important to note that the discrepancies could be due to a number of factors (e.g., policy deficiencies), and not just whether the review considered the use of inflammatory agents necessary and proportionate. Although not available during the study time frame, new indicators for NHQ and WOS reviews that measure whether the use of force was necessary and appropriate (proportionate) were added to the OMS in the spring of 2021. While further examination is required, these results in conjunction with the finding that the majority of SIB incidents had only one force option employed could be an indication that the principles of EIM are being considered and that correctional officers are assessing and limiting use of force to what is reasonable to resolve the incident (CSC, 2018a; CSC, 2018b).

Limitations and Future Directions

The current study provides a high-level descriptive overview of when the use of force and in particular, inflammatory agents were used as a response to self-harm and suicide. Although not conclusive, findings suggest that policy and the EIM were being considered when deciding whether a use of force should be employed. For example, the majority of SIB incidents only had one force option employed, and the force options that were applied are considered the least restrictive force measures. In addition, reviews completed at the Institution and RHQ level suggest that in the majority of cases, the force option was limited to what was necessary and proportionate to manage the risk associated with the SIB incident. A deeper qualitative review of SIB incidents with an identified use of inflammatory agents is needed however, to truly understand the nature of the behaviour and the circumstances of the event in order to determine if EIM principles are being adequately applied. A qualitative review would also aid in uncovering

the reasons why there is such variation in the use of an inflammatory agent in response to SIB incidents between regions.

As with all research, the current study had the following limitations. First, data quality issues were identified related to the administrative data used for this study. For instance, there were inconsistencies in reporting and the information was not always presented in a systematic manner. For example, in some reports it was unclear if the use of restraint equipment was considered routine use, which is not considered use of force, or non-routine use, which is a use of force option. Similarly, multiple methods of use of force were being recorded and used interchangeably for incidents that involved inflammatory agents. Enhanced training on the application of policy and reporting of incidents could improve the quality of the data. In addition, the implementation of indicators in 2021 that assess whether the use of force was necessary or proportionate at the NHQ and WOS levels will be valuable for future analysis but were not available during the study period.

Although demographic characteristics were not reported in this study given the prevalence approach, the OCI annual report (2021) also included an investigation into uses of force involving federally incarcerated Black, Indigenous, Peoples of Colour (BIPOC) and other vulnerable populations. The findings of the OCI's investigation suggested that being Indigenous or Black was associated with increased odds of being involved in a use of force incident (after controlling for age, risk, security level, gender, and sentence length). In order to support evidence-based actions to address this over-representation, future research should further examine the profile of offenders involved in use of force incidents, the institutional experience of offenders involved in use of force incidents, and if there are differences in the profile or institutional behaviour of the offenders where the use of force was deemed to be necessary and proportionate.

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