Correctional Officer Safety and Use of Safety Equipment in Correctional Facilities

Zoë Thorkildsen, Emma Wohl, Lily Robin, James R. "Chip" Coldren, Jr.

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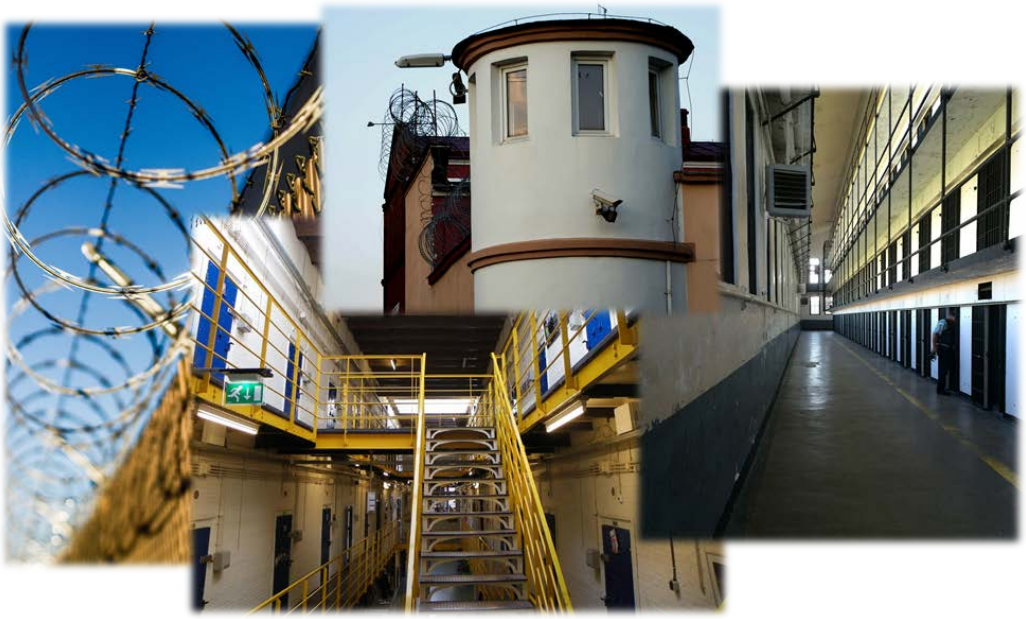

CNA

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James R. Coldren, Jr., Managing Director
Safety and Security
Institute for Public Research

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Executive Summary

Correctional officers work in dangerous environments that increase their risk of injury. Their rates of nonfatal injuries are among the highest across all occupations (Bureau of Labor Statistics 2016). In recent decades, technology in correctional settings has advanced significantly, and new equipment and devices to improve correctional officer safety have become increasingly prevalent. However, equipment deployment across facilities varies. In addition, little is known about the specific equipment modalities used in different facilities, the effectiveness of this technology, or how correctional officers and other facility personnel perceive safety equipment.

In 2010, the Government Accountability Office (GAO) (2011) surveyed the Federal Bureau of Prisons (BOP) and correctional departments in 14 states to document available correctional officer safety equipment, review the policies governing the use of these technologies, and assess perceptions of their effectiveness among correctional officers, management personnel, and union members. The GAO identified a variety of safety equipment types used in federal prisons. Correctional officers working within the secure perimeter of BOP institutions are generally required to carry a radio, body alarm, and keys while on duty. BOP policy also gives correctional officers the option to carry a flashlight, latex or leather gloves, and stab-resistant vests. Handcuffs are also generally optional, unless the correctional officer works in certain posts, such as controlling offender movement. Other types of safety equipment not routinely carried by federal correctional officers include pepper spray, batons, and conducted energy devices.

However, the data collection and analysis methods used in the GAO study had two limitations. First, the 14 state departments of corrections the GAO surveyed were selected non-randomly. As such, their findings regarding state facilities are not generalizable. Second, although they sought officials' opinions about the effectiveness of the safety equipment, the GAO report did not present an objective empirical assessment to substantiate the officials' views. As described in detail below, CNA's proposed study builds on the GAO study. We propose conducting a further exploratory study to objectively determine the effectiveness of safety equipment in a sample of correctional facilities, along with a content analysis of policies and procedures related to correctional officer safety equipment.

As noted in the 2011 GAO report, the field requires more research on the use and effects of safety equipment by correctional officers. CNA's study addresses this gap by analyzing safety equipment use in a sample of seven adult correctional facilities in the United States in depth. We provide preliminary evidence about the association between the use of safety equipment and correctional officer safety, as measured by on-the-job assaults and injuries. In addition, we summarize how safety equipment is

used situationally, as well as the policies and procedures that guide the use of this equipment across the eight study sites. Our research improves the evidence base related to safety equipment efficacy and will guide future research and technical assistance opportunities.

Our study had four primary goals:

1. Describe what safety equipment modalities are currently used in a sample of state-level adult correctional institutions in the United States.
2. Highlight the rationale for using these modalities.
3. Describe the policy attributes and training associated with these modalities.
4. Lay groundwork for future work regarding the effectiveness of the modalities currently used.

To accomplish these goals, CNA conducted a mixed methods study of correctional officer safety and safety equipment, involving qualitative and quantitative methods and four individual research protocols. We used a multi-case study framework, working with seven correctional facilities chosen to be representative across the Northeast, South, Midwest, and West regions of the United States.

We used a case study approach with four embedded data collection and analysis approaches due to the exploratory nature of this study. This design included four research tasks:

1. Collecting and reviewing relevant policies and procedures
2. Convening officer injury incident review panels, and analyzing injury case data
3. Conducting and analyzing interviews with facility personnel
4. Conducting and analyzing direct observations of on-post and command center personnel

Our research found that the safety equipment available to correctional officers, and the training and policies regarding the use of this equipment, was distinctly different across correctional facilities. While we do not suggest a “one-size-fits-all” approach to equipment modalities in correctional facilities, we suggest that the correctional field re-examine the differences and consider consolidating and coordinating policies and practices.

We also identified situations in which equipment malfunctions or misuse increased the risk of (or in fact increased) officer injuries. This, too, suggests that the correctional field should more intensely examine the current equipment modalities and the training on the use of protective equipment. This may also suggest additional efforts to

convince equipment manufacturers to adjust the protective safety products they develop.

Based on our research, enhancing correctional officer safety is a matter of training, attitude, the purchase and maintenance of personal safety equipment, as well as the purchase and maintenance of other safety equipment (e.g., surveillance systems, radio systems, detection systems). In the future, research on correctional officer safety and equipment modalities should consider a broader range of equipment types, and should employ more detailed and involved local data collection efforts to identify specific effects of equipment usage and officer safety issues.

Contents

Introduction

Correctional officers work in dangerous environments that increase their risk of injury. Their rates of nonfatal injuries are among the highest across all occupations (Bureau of Labor Statistics 2016). In recent decades, technology in correctional settings has advanced significantly and new equipment and devices to improve correctional officer safety have become increasingly prevalent. However, equipment deployment across facilities varies. In addition, little is known about the specific equipment modalities used in different facilities, the effectiveness of this technology, or how correctional officers and other facility personnel perceive the effectiveness of safety equipment.

This study addresses this gap through intensive case studies of a sample of adult correctional facilities in the United States. In partnership with the Association of State Correctional Administrators, CNA collaborated with seven facilities to gather information about officer injuries, the use of safety equipment, and policies and procedures related to safety and safety equipment. Using robust qualitative analysis, we derived themes and findings from interviews, incident review panels, and observations of facility operations. This report summarizes our methods, analysis, and findings.

We begin by reviewing the literature on correctional officer safety and describing the goals of our study. Next, we present the methods associated with the seven facility case studies, including the specific methodology for each of the four primary data collection and analysis efforts within each case study. This is followed by the results from each of the four individual analyses. We conclude the report by synthesizing the findings across analyses and discussing avenues for future inquiry and technical assistance.

Review of the literature

Due to the technological advances of the past two decades, new equipment and devices have proliferated throughout correctional institutions—many of which have implications for correctional officer safety. Some technologies focus on perimeter security, such as the electronic perimeter security system, which detects movement (Travis, Latessa, and Oldendick 1989). Other technologies, such as metal detectors, magnetic scanners, and x-ray equipment, focus on internal security, detecting and limiting weapons and other contraband inside correctional facility walls (Travis et al.).

Technologies for internal surveillance are frequently integrated into the correctional facility setting. Institutions often use closed-circuit televisions and listening devices at their main entrance as well as in visiting and common areas (Travis et al.). Other internal security surveillance technologies, including radio frequency identification (RFID), biometric technologies (e.g., fingerprint readers, facial recognition systems, hand geometry scanners), and other novel systems, are used throughout correctional facilities to identify individuals and behavioral characteristics (National Law Enforcement and Corrections Technology Center 2005).

Collectively, these technologies have the potential to improve correctional facility safety by controlling and monitoring exit and entry points and the movement of individuals within the institution, along with identifying weapons and other dangerous contraband. However, other technologies—specifically safety equipment worn or used by correctional officers—have received considerably less attention from a research perspective. This is unfortunate because at higher-level security facilities, the correctional officer is often the only person who interacts regularly with the offender. Thus, if offenders become violent, the officer is the most likely target (Lahm 2009). Indeed, past research has shown that more than 80 percent of all offender-on-staff assaults occur in maximum-security facilities (Light, 1991; Ross, 1985). Considering that these facilities already have technologies to enhance external and internal security and surveillance, technologies specifically designed for correctional officers warrant attention.

The vast majority of research on correctional officer safety equipment lacks an empirical, evaluative component. For example, Schiffner (2012) described some of the latest advancements in equipment showcased in the annual Mock Prison Riot event. These ranged from protective apparel (e.g., protective helmets and hard-shell crowd control protection suits) to tactical gear (e.g., blast dispersion grenades and extended range munitions). However, the article focused primarily on how the latest advancements improve on older technologies, instead of the practical considerations and efficacy of these new technologies.

In a project funded by the NIJ, the Navy's Space and Naval Warfare (SPAWAR) Systems Center published information regarding the three types of correctional officer safety equipment known as duress systems (SPAWAR 2003). Duress systems include technologies that allow officers to signal (typically remotely) duress, such as panic button alarms, identification alarms, and alarms that combine identification and location features. Similar to Schiffner's work, SPAWAR discussed the available duress systems and detailed how duress systems work. Unlike Schiffner, however, SPAWAR included detailed information about the advantages and disadvantages of each type of duress system, and it discussed information related to cost, scalability, installation and integration, reliability, operator usage, and coverage for each type of duress system. In this way, SPAWAR serves as a useful guide for correctional administrators considering integrating a duress system into their facility.

Current economic realities, concerns about correctional expenditures, and an increased emphasis on evidence-based practices make more rigorous assessments of officer safety equipment imperative (Government Accountability Office 2011). Remarkably, there have been only two systematic assessments of such equipment. In the late 1980s, Travis et al. (1989) conducted the first systematic study to evaluate the effects of technology in correctional facilities. They collected detailed information from more than 130 state and federal jails and correctional facilities that had opened or had been substantially renovated in the 10 years prior to data collection, and from more than 350 correctional officers who worked in those facilities. Based on their results, the researchers concluded that a variety of technologies enhanced safety in correctional facilities, including perimeter security, locking systems, internal surveillance, internal security, and management information. Only a small portion of institutions used nonlethal weaponry or infrared scopes, even though correctional officers who used this equipment reported high levels of satisfaction and asserted that the equipment made them feel safer on the job. However, the effect of this equipment on assaults or injuries was not explored in this study. This seminal study provided much-needed information, but many technological advancements and changes in correctional facilities occurred after it.

More recently, the Government Accountability Office (GAO) conducted the most current and thorough evaluation of safety equipment used by correctional officers. In 2010, the GAO (2011) surveyed the Federal Bureau of Prisons (BOP) and correctional departments in 14 states to document available correctional officer safety equipment, review the policies governing the use of these technologies, and assess perceptions of effectiveness from correctional officers, management personnel, and union members. The GAO identified a variety of safety equipment used in federal prisons. Correctional officers working within the secure perimeter of BOP institutions are generally required to carry a radio, body alarm, and keys while on duty. In addition, BOP policy gives correctional officers the option to carry a flashlight, latex or leather gloves, and stab-resistant vests. Handcuffs are also generally optional unless the correctional officer works at certain posts, such as controlling offender movement. Other types of safety equipment not routinely carried by federal correctional officers include pepper spray, batons, and conducted energy devices.

Although these policies are generally consistent across all BOP institutions, the GAO (2011) study noted that some variation exists. For example, federal correctional officers assigned to armed posts (e.g., buses, towers, mobile patrol, fog patrol, hospital escorts) carry a lethal weapon and have the option to wear a ballistic vest. Furthermore, if institutions can demonstrate a unique need to deviate from BOP policy, they can be granted a waiver to carry additional safety equipment. For example, officers working in the BOP's Administrative Maximum Facility in Colorado and in Special Management Units have permission to carry batons.

The availability of—and policies governing—safety equipment in state facilities is typically determined by each state's department of corrections. Similar to federal facilities, state correctional officers routinely carry a radio, body alarm, stab-resistant vest, and gloves. However, state correctional officers are permitted to carry additional safety equipment not routinely carried by federal correctional officers. In the majority of states surveyed, correctional officers are permitted to carry pepper spray, and half of the states' correctional officers routinely carry batons. Additionally, state protective gear includes ballistic vests, face and mouth shields, and gas or CPR masks (GAO 2011).

State and federal facilities maintain a similar variety of less-than-lethal weapons, protective gear, and lethal weapons in specific locations throughout the facility for emergencies, such as offender riots or attacks (GAO 2011). Devices that deploy less-than-lethal munitions, such as launchers to shoot canisters of pepper spray, tear gas grenades, and impact munitions (e.g., rubber bullets), are also available. The specific equipment available varies by state.

The GAO (2011) study is the most comprehensive to date on the use of correctional officer safety equipment in correctional facilities. However, the data collection and analysis of the study had two limitations. First, GAO surveyed 14 state departments of corrections that were selected non-randomly. As such, the findings about state facilities are not generalizable. Second, although the researchers sought officials' opinions about the effectiveness of the safety equipment, the report did not present an objective empirical assessment to substantiate the officials' views. As described in detail below, CNA's proposed study builds on the GAO study. We propose conducting a further exploratory study focused on objectively determining the effectiveness of safety equipment in a sample of correctional facilities and adding a content analysis of policies and procedures related to correctional officer safety equipment.

Study goals

Previous research highlighted the variety of safety equipment that correctional facility administrators can implement in their facility to enhance officer safety (Schiffner 2012; Tewksbury 2010) and reduce overall correctional costs (Stone and Scharf 2011). Research has also suggested differences in corrections agencies' policies and practices regarding what safety equipment is available and when it can be used to respond to disruptive offender behaviors and to protect officers from assaults and injuries (GAO 2011; Tewksbury 2010; Travis et al. 1989). However, research has neither clearly articulated the types of safety equipment that are used across facilities nor delineated the policies and training requirements for such equipment. Furthermore, although there is consensus among correctional officers that safety equipment enhances their safety (GAO 2011; Travis et al. 1989), this assumption has not been tested empirically.

As noted in the 2011 GAO report, the field requires more research on the use and effects of safety equipment by correctional officers. CNA's study addresses this gap by analyzing safety equipment use in a sample of seven adult correctional facilities in the United States in-depth. We summarize how safety equipment is used, when it may be used, and the policies and procedures that guide the use of this equipment across the seven study sites. Our research improves the evidence base related to safety equipment efficacy and will guide future research and technical assistance opportunities.

Our study addressed four primary goals:

1. Describe what safety equipment modalities are currently used in a sample of state-level adult correctional institutions in the United States.
2. Highlight the rationale for using these modalities.
3. Describe the policy attributes and training associated with these modalities.
4. Lay groundwork for future work regarding the effectiveness of the modalities currently used.

Due to the descriptive and qualitative nature of the study, we do not make any specific hypotheses about likely findings or themes.

Methods

CNA conducted a mixed methods study of correctional officer safety and safety equipment, involving qualitative and quantitative methods and four individual research protocols. We used a multi-case study framework, working with seven correctional facilities chosen to represent the Northeast, South, Midwest, and West regions of the United States.

The CNA research team grounded our approach in canonical methods for case study research (Yin 2014). We chose a case study approach with four embedded data collection and analysis approaches due to the exploratory nature of this study. Understanding of the current state of the correctional safety equipment technology field is limited. A case study approach allows for exploratory data collection and analysis, resulting in deep understanding of the topics included in the study. This approach builds a foundation for future research using methods that are more expansive (such as surveys or experiments).

Within each case study, CNA employed four specific methodologies, described in more detail below.[1] These include:

1. Collecting and reviewing relevant policies and procedures
2. Convening and analyzing officer injury incident review panels
3. Conducting and analyzing interviews with facility personnel
4. Conducting and analyzing direct observations of on-post and control center personnel

Case study research has certain limitations. The primary limitation is the threat to external validity, or the inability to generalize findings. Because this study is exploratory and descriptive in nature, rather than intended to uncover correlational or causational relationships, this limitation is acceptable. In addition, we selected case study facilities that represent diverse geographic locations, as well as diversity in equipment types. These choices improve the variability in our findings, but they do not ensure true generalizability.

[1] CNA originally planned to include quantitative analysis of historical administrative data, but we were not able to collect all the necessary data from any of the participating facilities, thus this analysis has been omitted from the report.

Case study facilities

We used a purposive sampling approach to identify seven case study facilities to participate in the research study. CNA selected these facilities in collaboration with the Association of State Correctional Administrators (ASCA), benefitting from their subject matter expertise regarding correctional facilities open to research participation, as well as data from their Performance Based Measures System (PBMS). We chose facilities based on several factors. First, our team considered only agencies with large inmate populations to ensure that a sufficient number of cases would be available for analysis. All of the facilities have average daily or current inmate populations of more than 1,000 inmates. Second, we chose agencies that we evaluated as likely to be able to participate in the data collection associated with the research study, based on their PBMS reporting history and on ASCA's experience working with the facility in the past. Third, we selected agencies to represent a geographically diverse sample, including facilities in each of the four census regions, as well as facilities in states with large and small populations. Finally, we included only facilities that had at least one maximum security housing unit, and we did not include any minimum security facilities.

To conduct the case studies, our team used two approaches. For all case study facilities, we requested electronic copies of policies and procedures pertaining to equipment purchase, equipment usage, and officer safety. For six of the facilities, we conducted on-site visits including incident reviews, interviews, and direct observations of officers on post and in control center operations. For the other facility, we conducted interviews via phone and did not conduct the on-site data collection activities.

Case study methods

In this section, we present the data collection methods as well as the analysis methods we used for each of the four core research activities.

Policies and procedures

The CNA research team requested copies of policies, standard operating procedures, post orders, training manuals, and training session materials and curricula (hereafter "documents") related to correctional officer safety, the purchase and maintenance of safety equipment, the use of safety equipment, and training relative to safety generally and to safety equipment specifically. Our team broadly requested all documents pertaining to safety, safety equipment, and related topics. We prompted facilities with a list of possible topics (such as armories, control center operations, equipment

deployment and training, incident response, investigations, personal safety equipment, chemical agents, use of force, and others), but we also encouraged facility points-of-contact to provide any documents they felt might be pertinent.

Upon receipt of the documents, we cataloged each document by type and topic. All participating facilities provided operational policies and procedures (including general and post orders), and some facilities also provided training documents. We classified documents into policies or training documentation, and we further classified them by topic. Finally, we conducted contextual comparisons of the content of commonly addressed policy topics.

Incident reviews

During the on-site visits, our team conducted incident review panels for incidents involving officer injuries. We requested that each of the six on-site case study facilities identify approximately 10 incidents involving intentional (as opposed to accidental) officer injury[2] that recently occurred at the facility. Our research team requested de-identified incident summaries in advance of the site visit to review. During the site visit, we convened relevant facility stakeholders such as the warden, deputy wardens, safety officers, training coordinators, and armorers to review the incidents. We used a structured incident review protocol, presented in Appendix A.

The research team used NVivo qualitative analysis software to code the incidents into themes, including correctional facility staff morale, equipment used, staffing needs, and injuries sustained. The research team also summarized each incident and coded a database of the characteristics of the incident in a systematic manner. This database included the following data: equipment used, injuries sustained, issues with chemical agent deployment, issues with restraints, mentions of staffing concerns, if an inmate used a weapon, if drugs or alcohol factored into the incident, and if the inmate had a mental health issue. Due to the structured nature of the reviews, the incident review analysis incorporated a mixture of descriptive and quantitative analysis of the incidents as well as qualitative analysis of themes, using a basic interpretative framework.

[2] For the purposes of this study, our team defines "injury" as including serious injuries as defined in the ASCA PMBS counting rules: "[requiring] urgent and immediate medical treatment and restricts the officer's usual activity. Medical treatment should be more extensive than mere first aid, such as the application of bandages to wounds; it might include stitches, setting of broken bones, treatment of concussion, loss of consciousness, etc."

Interviews

CNA interviewed senior corrections managers and administrators in the seven case study sites. Questions addressed how the correctional facility responds to and manages instances of non-accidental officer injury, including injuries related to prisoner conflict or contact. The research team also collected information about issues related to equipment purchasing, maintenance, breakage, and repair. We requested interviews with wardens or superintendents, deputy wardens or superintendents, medical unit staff, armory officers, facility safety officers, and personnel involved in purchasing and budgeting. We recorded the interviews and had recordings transcribed by an external service to allow for thematic content analysis.[3] We interviewed between 6 and 13 individuals at each facility, for a total of 58 interviews. Our interview protocol was semi-structured, covering topics such as the individual's responsibilities relevant to staff safety and safety equipment, equipment administration, equipment use, and administrative procedures. Appendix B presents our interview protocol.

We analyzed the interview transcripts using a thematic interpretative qualitative analysis approach facilitated by NVivo. We coded text into six main themes: equipment maintenance, equipment use, policy, purchasing equipment, safety, and training and other officer skills. We also coded sub-themes, but our analysis and findings were primarily drawn from the main themes.

Direct observations

The on-site research teams conducted two types of direct observation data collection: observations of on-post correctional officers and observations of control center operations. For on-post observations, a research team member accompanied uniformed staff members during a portion of their shift during normal facility operation. These uniformed staff "on-post" observations included demonstrations of the safety equipment available to and used by the officer. The research team member followed the uniformed staff members for a pre-established period (typically half an hour) through their daily activities. During the observation period, research team members engaged the personnel in informal conversations about their use of personal safety and facility security equipment. Team members took handwritten notes, which

[3] One facility did not consent to recorded interviews; for these interviews, our research team took detailed notes. We reviewed these notes after completing a content analysis of the transcripts, and we incorporated findings from the notes into the themes we identified during the content analysis.

they expanded into a more detailed "thick description" within 24 hours of completing the site visit.[4]

During the on-site visit, members of the research team also observed control center activities. For control center observations, the control center staff would first provide an overview of the surveillance and security equipment in the center. The research team members observed control center operations, as well as facility operations through the surveillance capabilities of the control center, for 30 minutes to an hour. When possible, our team conducted control center observations during shift changes, to observe equipment check-in and check-out procedures. During control center observations, research team members engaged the control center personnel in informal conversations about the use of personal safety and security equipment in and around the facility.

Appendix C presents the sample questions associated with each of the direct observation data collection activities.

We reviewed the notes from the direct observations to identify findings using a basic interpretative framework, without using formal thematic coding methods.

[4] Thick description involves taking notes and creating a narrative out of them, including objective observations as well as interpretations and analysis. According to Ponterotto (2006), thick description goes beyond surface observations to include the following: context, detail, emotion, significance of observations, actions, and meanings.

Results

Policies and procedures

Five facilities submitted documents for review and analysis. The documents included policies and procedures from all five facilities (including general and post orders, as well as addenda to existing documents), and training documents from three of the five facilities. We coded each document in terms of its topic or topics. Per the original request, facilities submitted a wide range of policies, procedures, and training materials. Of the 157 documents, 70 were omitted from this analysis because they covered topics outside the scope of this study. These topics included wellness programs, policies related to avoiding accidental injuries, environmental health and safety, disciplinary procedures, and hazardous materials procedures. Of the remaining 87 documents, we coded 70 as related to policies and procedures and 17 as related to training. We further coded each document by the specific topic addressed. The results from this coding are displayed in Table 1.

Table 1. Topics covered by policies, procedures, and training documents

Topic	Policies and procedures	Training documents
Armory or arsenal (general)	4	0
Body alarms and radio	2	0
Chemical agents	1	1
Emergency management and response	9	3
Firearms	2	0
Incident reporting and notification	13	0
Inmate searches and contraband	7	0
Restraints	5	1
Special teams	3	2
Specific posts (post orders)	14	0
General safety and training requirements	2	1
Use of force (including cell extractions)	10	4
Vests	3	0

The most common documents were post orders for specific positions within the facility, followed by policies related to incident reporting and notifications. The next most common were use of force policies, emergency management and response policies and procedures, and procedures and policies related to inmate searches and contraband. There were relatively few training documents, but use of force and emergency management and response documents were also relatively more common.

We also considered the presence or absence of policy and procedures topics covered by facilities. Because only three facilities submitted training documents, this analysis includes only the policies and procedures documents. We also omit the specific positions (post orders) category because not all facilities submitted these documents. Table 2 presents the results from this analysis. The results parallel the findings on policy counts, with incident reporting and notification, emergency management and response, and use of force being present in all facilities.

Table 2. Presence or absence of policy topic coverage across five facilities

Topic	Number of facilities with policies or procedures (%)
Armory or arsenal (general)	4/5 (80%)
Body alarms and radio	2/5 (40%)
Chemical agents	1/5 (20%)
Emergency management and response	5/5 (100%)
Firearms	2/5 (40%)
Incident reporting and notification	5/5 (100%)
Inmate searches and contraband	3/5 (60%)
Restraints	3/5 (60%)
Special teams	2/5 (40%)
General safety and training requirements	2/5 (40%)
Use of force (including cell extractions)	5/5 (100%)
Vests	1/5 (20%)

Incident reviews

Our team conducted incident reviews at six facilities, covering 61 officer injury incidents (between 8 and 12 for each facility). This section presents findings from both quantitative and qualitative analyses of these incident reviews.

At a high level, almost 80 percent of incidents mentioned the use of restraints, and almost half mentioned the use of chemical agents. A third of incidents mentioned the use of communication devices. Over a third resulted in face or head injuries to correctional facility staff. Approximately 20 percent of incidents explicitly mentioned inmates with mental health issues, and approximately 20 percent involved an inmate using some form of weapon. Themes that emerged across incident reviews included staffing concerns, infrastructure issues, and impractical safety equipment.

Equipment types

Restraints, chemical agents, and communication devices came up the most frequently in these incident review interviews as participants discussed correctional officer safety equipment used during incidents. Of 61 incidents, 20 (33 percent) explicitly mentioned the use of a communication device such as a radio or alarm. Many incidents occurred when only one or two correctional officers were present. In these incidents, officers used radios, body alarms, room alarms, and other communication devices to alert other staff to the problem and request assistance. At least 48 of the 61 (almost 80 percent) incidents involved the use of restraints; 29 incidents (almost 50 percent) involved the use of chemical agents. Restraints were frequently used in tandem with physical force or chemical agents: 24 (39 percent) incident review interviews mentioned the use of both chemical agents and restraints.

Equipment failures related to restraints and chemical agents were mentioned multiple times during the incident review interviews. In three correctional facilities, participants described problems with chemical agents. In 7 of the 29 incidents (24 percent) involving chemical agents, there were problems deploying the agent. In some of these incidents, the incident review participants noted that officers deployed oleoresin capsicum (OC) spray, but it did not have the desired effect. According to one participant, inmates can use wet towels to combat the effects of chemical agents. Additionally, chemical agents may not always work if an inmate's back is facing the correctional officer. In one incident, an inmate sprayed with a chemical agent in his cell combatted the effects by splashing his face with water. Using chemical agents outdoors is also problematic because the agent can be spread by wind, inadvertently affecting other inmates or officers.

Three correctional facilities reported problems with restraints. Of the 48 incidents involving restraints, 5 (10 percent) also mentioned problems with restraints. For example, inmates can break out of restraints by force or with small makeshift tools such as paperclips. Inmates can also take advantage of the correctional officer putting on or taking off restraints to pull the officer, resulting in minor injuries. One incident involved an inmate with an arm amputation. Although the inmate was put in restraints, the arm with the amputation was free, and the inmate used it as a weapon. The correctional facility mentioned that they may need restraints specially designed for such situations.

Other correctional officer safety equipment mentioned included spit masks, universal precaution safety veils, batons, stun guns and electronic conduct devices, shot guns for deployment of less-lethal munitions, long range projectiles, gas cartridges, dogs, shields, and other protective apparel. In these interviews, protective apparel was almost never mentioned as safety equipment used. Some of the interviews indicated that protective apparel was available, but correctional officers chose not to use it because it was impractical or uncomfortable. For example, an officer was pricked with

a needle while frisking an inmate. The department has frisk gloves, but correctional officers report that they do not wear them because they are bulky and officers cannot feel things well when they use them.

The incident review interviews demonstrated that correctional officers rely heavily on chemical agents and restraints when dealing with violent incidents. Although this approach was successful in most incidents, officers experienced a noticeable amount of problems with both safety tools. Multiple departments reported inmates being able to get out of restraints, and incident information described inmates using restraints to injure officers. Officer safety might be positively affected by improved restraints that are harder to break out of, along with other tools like restraint leads to avoid inmates pulling and injuring officers. Multiple correctional facilities also report that chemical agents do not always work and that inmates have methods of avoiding their effects. In some facilities, personnel adapted equipment to address these concerns; for example, in one facility, staff modified restraints to reduce the possibility of inmates breaking free of them.

Correctional facility staff injuries

Out of 61 incidents, 21 (30 percent) resulted in head or face injuries to correctional facility staff. Some of these incidents were minor, but about half were more serious and resulted in time off from work for injuries such as traumatic brain injury, concussion, broken jaw, and broken cheekbone. Four of these incidents involved staff being hit in the head with some kind of weapon ranging from a food tray to a bag of rocks. Other injuries that correctional facility staff sustained include injuries to neck, arm, shoulder, hand, back, and groin. There were eight instances of injuries from bodily fluid exposure reported in the 61 incidents (13 percent). Of the 61 incidents, 3 (5 percent) involved a sexual assault, and 1 incident (2 percent) resulted in a diagnosis of post-traumatic stress disorder (PTSD).

Many of the incidents included in the incident review interviews resulted in injuries to officers' heads or faces. Many of these head injuries were serious. Despite this, helmets and facemasks were rarely mentioned as safety equipment used by correctional facility staff. In one incident, a facemask was available, but staff reported that they do not wear them. Safety equipment such as helmets, facemasks, pads, and frisk gloves could serve a vital role in correctional officer safety. However, if correctional officers feel that this protective apparel is uncomfortable or inhibits their ability to perform tasks, they might not use it. For protective apparel to be effective, officers must understand the importance of using the equipment, which can be reinforced through policy and training. When possible, manufacturers should also prioritize the needs and comfort of correctional officers when designing equipment.

Inmate behavior

Major injuries usually resulted from inmates possessing some kind of weapon. Of the 61 incidents, 13 (21 percent) involved an inmate with a weapon, and 6 of these incidents resulted in injuries to a correctional facility staff member's face or head. Another 2 incidents involved a makeshift stabbing implement, 1 involved a bag of rocks, 1 involved a pail, 1 involved a correctional facility provided cane, 1 involved a correctional officer's baton, 1 involved a computer monitor in a medical area, and a few involved materials available in facilities, such as cups and trays.

Of the 61 incidents, 14 (23 percent) involved an inmate with a mental health condition. Of these incidents, 6 involved inmates with weapons, 4 resulted in correctional facility staff sustaining injuries to their head or face, and 4 resulted in bodily fluid exposure affecting staff. Of the 61 incidents, 5 (8 percent) involved inmates reportedly under the influence of drugs or alcohol, and 4 of those 5 incidents resulted in injuries to a staff member's head or face. In 10 of the incidents, an inmate became agitated over an issue that may seem minor outside of a correctional setting, but are sensitive for inmates because they lack control of their environment. These issues included a damaged Gameboy, wanting to use a kiosk, wanting to take a shower, and wanting to take a cup outside. Three of these incidents involved inmates with mental health problems. In some of these instances, staff did not provide the inmate with specific attention or explanation regarding the issue at hand, and the problem quickly escalated into something dangerous.

Additional concerns

Inadequate staffing was explicitly mentioned five times in the incident review interviews. Many incidents occurred when staff were alone or had only one other staff member with them. In some instances, staffing policy changes resulted from an incident. For example, one correctional facility now requires at least two staff members to perform extractions after an incident with a cell extraction. Another correctional facility had an incident with an inmate with mental health problems who was upset about a medication change. The correctional facility now has a policy that staff are notified of medication changes so that staff can deter incidents. One correctional facility mentioned that staffing constraints inhibited them from using some safety equipment; some policies required at least two officers to use the equipment, and they do not always have the required number of staff available.

Interviews

During the study, our team conducted 61 interviews across seven facilities. Interviews lasted from 15 minutes to over an hour, with most lasting approximately 30 minutes. This section presents findings from coded thematic analysis of the interview transcripts, with additional insights from notes from the non-transcribed interviews.

Figure 1. Word cloud from interview transcripts

Equipment types

The equipment types used across the facilities in the study varied considerably. In all the facilities, officers regularly carried basic restraint devices (typically handcuffs) and radios, but no other equipment type was universal across the facilities. Chemical agents (e.g., OC spray and OC grenades) were available in all facilities, but were not standard issue in all facilities. In some facilities, OC spray was issued only to officers with specific training, while in others it was issued by rank (lieutenants or above) or post (posted in control centers versus housing units). When we asked about effective and frequently used equipment, OC spray was among the top responses. Some of the facilities used other basic equipment, including batons.

Participants also discussed equipment types not currently in use and assessed how they might be incorporated. A number of participants desired more protective safety equipment, such as vests or upgraded vests (i.e., stab resistant) and stab-resistant gloves. According to many of these participants, budgetary concerns were the main

barrier to standardizing these equipment types. Electroshock weapons (i.e., TASERs) were also commonly mentioned. Participants had mixed responses about implementing electroshock weapons. Many noted that they were aware of discussion in the field at large, as well as at their specific facility, about the potential application of this equipment in correctional facilities. Some participants pointed out that the ability to use electroshock weapons from further distances (relative to batons or OC spray) would provide a benefit for officer safety. Others, though, noted that electroshock weapons can be unreliable, especially for officers without sufficient training on the equipment (this remark was made by an individual who had worked at a facility that briefly implemented electroshock weapons). Another participant described electroshock weapons as a "double-edged sword," noting that "anything you have on your person can be taken away from you" and expressing concern about the increased risk to officers if inmates were able to obtain an electroshock weapon. This facility ultimately took electroshock weapons out of use, in part due to misconduct by officers but also due to concerns about their effectiveness and reliability.

Equipment procurement and upkeep

Participants also discussed how their facilities obtain and maintain equipment. The facilities involved in the study varied in procurement processes. For example, some are restricted to department of corrections-approved equipment lists, while others are limited to particular department-approved vendors but have flexibility in the equipment they can procure. Still others can procure openly using a competitive process. The personnel involved directly in the procurement process generally noted that it operated as expected, but personnel further removed from the process sometimes indicated that procurement was difficult or took a long time.

All facilities described having a robust system for tracking and maintaining equipment once obtained. Armorers and other personnel that were closely engaged in equipment upkeep described inventory procedures that allowed them to identify expired and faulty equipment on a day-to-day basis. The facilities maintained equipment using a combination of replacements, in-house repair, and repair through manufacturers. Participants noted that safety was the primary consideration when determining how to address damaged or faulty equipment. Participants explained that irreparable equipment would always be replaced (e.g., OC spray, severely damaged items). Facilities conducted repairs in-house when possible, but outsourced it to manufacturers if in-house repairs were impractical or the equipment required specific expertise to repair.

Non-equipment findings

Many participants discussed the importance of training and de-escalation skills, particularly when we asked them to provide any additional thoughts or insights at the

end of each interview. Many participants emphasized the importance of officer decision-making, as well as training to support it. When asked "what type of equipment do you think is the most helpful to protect correctional officers?" one participant responded, "The brain." Some participants noted that on-the-job training in the form of "apprenticeship" periods or mentoring from experienced officers were particularly valuable for officer safety. Others noted that findings from incident reviews were important for identifying training needs and gaps related to officer safety. One officer involved in training noted that he reviewed all officer injury reports to identify areas in which officers needed refresher training. Many participants noted, in terms of training, that officer safety and use of force training are complementary and both contribute to improved safety outcomes for officers and inmates. Participants from multiple facilities noted that resource limitations (both time and appropriate training spaces) made it difficult to keep staff fully and appropriately trained.

Direct Observations

During the study, our team conducted direct observations at six facilities. We completed a total of 5 observation periods at control centers and 28 observation periods on-post with correctional officers and other facility staff. This section summarizes the findings from those observations.

Control centers

Control centers play a central role in officer safety, specifically as repositories of safety equipment. During direct observations in control centers, as well as during on-post discussions, officers and other staff described the equipment check-in procedures for shift changes. Facilities typically handle equipment deployment for shifts through collaboration between control center personnel and the on-post officers. Several personnel noted that having two sets of eyes on equipment increased the chance that personnel would identify defective equipment before an officer began his or her shift. Control centers, especially those in housing units, also serve as the repository for equipment that facilities deploy to officers only during critical incidents. These control centers can serve as storage points for additional and higher-capacity OC spray canisters, as well as restraint devices and other special use equipment. However, some facilities only store supplementary equipment in a main control center or a central armory. In these facilities, officers noted that officer safety would be improved by decentralized storage.

Equipment types

Based on findings from the incident reviews and interviews, as discussed above, OC spray is a critical element of officer safety equipment in all the facilities we studied. During direct observations, however, officers shared information about drawbacks of the spray with our research team. Officers noted that, particularly in chaotic incidents involving multiple parties, OC spray often affects officers as well as inmates. Some facilities provide officers with goggles to help ameliorate this concern. However, officers noted that during close physical encounters, these goggles can easily be knocked loose. In spite of these drawbacks, officers discussed the value of OC spray, which allows them to subdue inmates without physical confrontation. Personnel during the direct observations noted that any equipment that increases physical distance between officers and inmates increases officer safety.

During the direct observations, officers and other personnel discussed the role of body alarms. According to staff members, a major limitation of body alarms is that some models do not provide location information. Personnel who did not have assigned duty locations, including non-correctional officer staff such as counselors and medical staff, noted that response to active body alarms can be delayed if someone's location is not known. These concerns were echoed in the personnel interviews.

The implementation of new or additional pieces of equipment came up during many of the direct observation activities, paralleling findings in the personnel interviews. Correctional officers and their supervisors often commented about the possibility of new equipment being used by inmates against an officer. This concern was particularly salient for items such as electroshock weapons and batons. Officers also noted that new equipment comes with increased responsibility, including the need for additional training and procedures to ensure proper use. This concern was particularly salient for electroshock weapons.

Non-equipment findings

Also paralleling discussions from the interviews, many of the personnel interviewed during direct observations discussed de-escalation techniques and the importance of an officer's verbal skills during interactions with inmates. Supervisors and officers described the importance of "talk down before takedown." Another noted that "rapport gets you 90 percent of the way there" when discussing the importance of staff interactions with inmates.

While not directly relevant to this study on equipment, many participants in the direct observations also noted other threats to officer safety, including overcapacity in many housing units, the importance of searches to uncover contraband, and features of inmate holding cells designed to minimize places to hide contraband. Many officers

also commented on how the general attitude or atmosphere of a specific housing unit results in different levels of risk for officers (officers described certain units as “more stubborn” or “quieter”).

Conclusion

Several important themes and findings resulted from this research into the effects of correctional safety equipment on correctional officer safety. Perhaps most notable is that, while correctional agencies in this country have made significant strides in their record-keeping and performance monitoring and measurement, they still do not have sufficient data resources to support longitudinal research on the effects of corrections equipment on incidences of officer injury. Most of the agencies in our study sample could not provide the data required to conduct such an analysis. Interestingly, the agencies we studied did not evidence significant changes in equipment modalities over the course of 5 to 10 years that would make such an analysis feasible. Thus, we will have to reconsider our analytic approach to studying this issue, in addition to shoring up agency data resources.

Correctional facilities are distinctly different in the equipment they make available to correctional officers and the policies and training they provide regarding the use of this equipment. While we do not suggest a "one-size-fits-all" approach to equipment modalities in correctional facilities, we suggest that the correctional field re-examine the differences and consider whether consolidation and coordination of policies and practices are appropriate.

We also identified situations in which either equipment malfunction or misuse increased the risk of (or in fact increased) officer injuries. This, too, suggests that the correctional field should more intensely examine the current equipment modalities, and the training provided on using protective equipment. This may also suggest additional efforts to convince equipment manufacturers to make adjustments to the protective safety products they develop.

Outside of the realm of safety equipment, a major theme our team identified across all facilities was the importance of staffing and staff development through training to support officer safety. Correctional facility staff believe that increasing the number of staff increases safety, but many are constrained in the number of staff they can hire and deploy (Richardson and Coldren 2018). Technology solutions may be considered force multipliers, making up in part for staffing deficiencies through more efficient operations. However, the types of protective technology examined in this research project are not likely to make up for severe staff shortages.

During the incident reviews, participants noted that many incidents involved inmates with mental health needs and about 20 percent of incidents resulted from an inmate becoming agitated over something small that escalated into a major incident. During direct observations and interviews, facility personnel discussed the needs for officers to use effective de-escalation and inmate management techniques. Training for

correctional officers in how to deal with agitated inmates and manage conflict, especially involving inmates with mental health issues, would positively affect correctional officer safety. In this area, correctional facility personnel might benefit from work currently underway in law enforcement agencies to address similar issues.

When originally conceiving this study, our team explicitly omitted radios and other communication equipment from our definition of safety equipment. However, during the course of data collection and site visits, we had to revisit this decision. Repeatedly, when we asked wardens, supervisors, officers, and other facility personnel what was the most useful or important piece of safety equipment in use in the facility, they answered "our radios." Future work exploring the importance of safety equipment in correctional facilities should incorporate a broader definition of safety equipment that includes communications equipment.

In sum, based on the research we conducted, enhancing correctional officer safety is a matter of training, attitude, the purchase and maintenance of personal safety equipment, as well as the purchase and maintenance of other safety equipment (e.g., surveillance systems, radio systems, and detection systems). In the future, research on correctional officer safety and equipment modalities should broaden the range of equipment types considered, and should employ more detailed and involved local data collection efforts to identify specific effects of equipment usage and officer safety issues.

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Appendix A: Incident Review Protocol

I. Brief overview of the incident (two to three minutes)

- **a.** Provided by a facility representative(s)
- **b.** Questions from the study team and others present

II. Incident details

- **a.** Person(s) involved
- **b.** Place, date, time
- **c.** Shift

III. Precursor events

- **a.** Events, issues, incidents that led up to this particular incident (these could be minutes, hours, days, weeks, or months prior)
- **b.** Specific officer, supervisor, or prisoner actions that either contributed to the injury(ies), or prevented or lessened injury(ies); how the incident unfolded
- **c.** Was there a relationship between this incident and other incidents at the facility?

IV. Incident details

- **a.** Extent of injury(ies) to officer(s) and prisoner(s), initially and in the aftermath
- **b.** How injuries were inflicted (e.g., intentionally, accidentally, or because of a malfunction)
- **c.** The role of safety equipment in this incident:
  - **i.** Which equipment was used?
  - **ii.** Was it used appropriately?
  - **iii.** Was it readily available?

iv. Was any necessary equipment not available?

v. Was the equipment functioning properly? If not, why not?

vi. Did the equipment figure into the injury?

vii. Should other equipment (that the facility does not have) have been available?

viii. Was the injury(ies) more attributable to equipment or to procedure (or faulty procedure)?

V. Post-incident questions

a. Was the investigation of this incident used to inform training?

b. Did the investigation of this incident result in any counseling, retraining, or disciplining of a correctional officer(s)?

c. Did the investigation of this incident involve the disciplining of a prisoner or lead to criminal charges being filed against the offender?

d. Did this incident affect officer morale or perceptions of safety in any way? If yes, was there a response to this issue?

e. Did the investigation of this incident result in any modifications to policy?

f. Did this incident result in any addition or removal of safety equipment?

VI. Other suggestions or comments [final question after all reviews are completed]

a. Would the facility representatives present like to offer any other comments or suggestions about the relationship between correctional officer safety and correctional equipment based on the review of these incidents?

Appendix B: Interview Protocol

I. Participant involvement with correctional facility safety equipment

a. Please begin by explaining your position here at (name of facility)

   i. Title

   ii. Primary responsibilities

b. How long have you worked at this facility?

c. How long have you been in this position?

d. What work did you do before you took your current position at the facility?

e. Please describe the ways that you are involved with the following matters pertaining to safety equipment:

   i. Purchase or replacement

   ii. Maintenance and repair, inspection

   iii. Training and utilization

f. Please describe the ways that you are involved with the following matters pertaining either to officer injuries at the facility or to your general work for the facility:

   i. Diagnosis and treatment

   ii. Investigation (of the incident or of injury claims)

   iii. Incident review and training implications

   iv. Documentation and reporting

g. For e and f above, how long (years, months) have you been involved in these different aspects of equipment and injuries?

II. Equipment administration (for correctional staff with decision-making authority or broad oversight of equipment use)

a. [If applicable] Please explain how the general equipment purchase process works for this facility. (Note that we are talking only about protective and related equipment, not all types of equipment.)

    i. What are the different processes (if any) by type of equipment?

    ii. What are the different processes (if any) by cost of equipment?

    iii. Is there a purchasing guide or manual?

    iv. Are different types of equipment purchased by different units within the facility?

b. How is equipment maintenance and repair handled at this facility?

    i. Is it handled in-house?

    ii. Is it done by manufacturer under contract or warranty?

    iii. How is equipment that is past warranty handled?

c. How would you describe the lifecycle of different equipment types?

    i. Are some types of equipment more durable and longer lasting than others?

    ii. Do some types of equipment go out of style? If yes, please explain.

    iii. Do some types of equipment fall into disrepair?

d. How is the size and security level of this facility related to the safety equipment used here? Are there any unique or specific characteristics of this facility that affect equipment purchasing and use?

III. **Equipment utilization (for all participants)**

a. Where officer safety is concerned, what types of equipment do you think are most utilized?

b. What types of equipment do you think are most helpful regarding officer safety?

c. Can you provide any examples of situations in which equipment was used and was helpful regarding officer safety?

d. Can you provide any examples of situations in which equipment was used and was not helpful regarding officer safety?

e. Do you think there are equipment types that are needed at this facility regarding officer safety? If yes, why? What is needed and why does the facility not have it?

IV. **Administrative procedures (for all participants)**

a. Do you think improvements are needed in the administrative policies at this facility regarding the purchase, maintenance, and repair of correctional equipment pertaining to officer safety? If yes, please explain.

b. Do you think improvements are needed in the administrative policies at this facility regarding the follow-up and investigation of officer injuries? If yes, please explain.

V. Other questions or comments (for all participants)

a. Is there anything else you would like to bring up regarding correctional equipment and officer safety, or regarding officer injuries at this facility?

Appendix C: Direct Observation Sample Questions

Sample Questions for On-Post Observations

1. What safety equipment do you use most often?
    a. How often do you use this equipment?
2. What piece(s) of safety equipment do you think is most useful to you or most effective in keeping you safe?
3. Do you think you have sufficient safety equipment to protect yourself?
4. Do you think you have enough safety training or equipment training?
5. Would you expand the range of safety equipment available to corrections officers at your institution?
    a. If so, what would you add?
    b. Would the additional equipment be in the area of protective apparel or weapons (lethal or non-lethal)?
6. Have you had an occasion to use or deploy safety equipment on this post(s)?
    a. If yes, please provide details about a recent incident requiring deployment of equipment.
7. Is there anything else you would like to add about improving officer safety, preventing injury, or utilizing safety equipment?

Sample Questions for Control Center Observations

1. What role does the control center play in the utilization of safety equipment and prevention of officer injury? (This question is likely to be answered in the briefing.)

2. What role does the control center play in the adoption and deployment of new safety equipment?

3. How can officers work with or utilize the control center to improve safety (through equipment use)?

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