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Prevalence and correlates of spitting on police officers: New risks in the COVID era

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1. Introduction

Police officers experience significant risk of on-the-job injury. Law enforcement ranks 18th among all professions in fatalities [1] and has a nonfatal injury rate three times higher than other US workers. [2] The large subset of these injuries that arise from assault may be on the rise. [2].

Among the situations with the highest risk of officer injury is subject apprehension and restraint. Resistance during these circumstances can range broadly: from verbal insults or fleeing, which pose little or no direct danger, to various forms of assault, which can be life threatening. [3].

Falling somewhere in the middle is spitting. Most jurisdictions categorize intentionally spitting on another person as a simple assault or misdemeanor assault. While spitting can be a crime, police officers who are spat upon are less likely to refer charges than if they were assaulted by hands, feet or a weapon. Spitting is generally considered more of a nuisance than a truly violent act. Exceptions to this are when spitting either intentionally or unintentionally exposes an officer to an infectious disease, which became a major concern during the HIV pandemic in the late 20th century. [4].

Risks of transmission of HIV or hepatitis from spitting are close to zero. [4,5] But the current COVID-19 outbreak, which is the first major droplet-transmitted risk in the United States for some time, has brought spitting back into consideration as a potentially life-threatening assault. [6].

Despite references to spitting on the police as a form of protest dating back well more than a century, [7] there are no published data on this type of assault. Our goal was to describe the prevalence of such reported assaults on police officers and the circumstances surrounding such events.

2. Methods

2.1. Study design, setting, and participants

2.1.1. The study used a retrospective cohort design

Data were collected from police use-of-force incident report data fields and narratives, drawn from 81 law enforcement agencies across eight states. The sample is non-probability based but does incorporate a diverse range of agency types and sizes, jurisdiction sizes, and geographic variation. Similar to prior research with this data, [8] agency records in this study spanned varying time periods...
(from 2009 to 2018) and include from one to six years of data, with the vast majority coming from the period 2014–2018. All data available at the time of data collection were utilized.

Agencies included in the study require all officers who use force to complete a narrative detailing what occurred, but there is some variation among agencies in whether lower levels of force must be reported (such as grabbing or holding a suspect, with no other force used).

All incidents reported by these agencies were included and there were no exclusion criteria.

The majority of the agencies included in this study are municipal police departments (61 agencies), followed by county sheriff’s offices (12 agencies), university police departments (5 agencies), and state law enforcement special jurisdiction agencies (3 agencies). In terms of size, most of the agencies fell into the category of 10–49 officers (54 agencies), followed by 50–99 officers (14 agencies), and those with 100 or more officers (13 agencies). Jurisdiction sizes ranged from less than 10,000 persons (22 agencies), 10,000–50,000 persons (40 agencies), 50,000–100,000 persons (9 agencies), to greater than 100,000 persons (9 agencies).

About two-thirds of the agencies are from Washington state (55 agencies), and another one-fifth are from Wisconsin (16 agencies). Five agencies are from California, and the remainder are from other states (we do not report those here in order to avoid statistical disclosure of individual agency data). Approximately 94% of the force records come from agencies in three of the eight states: Washington (45%), California (32%), and Wisconsin (17%).

The study was approved by the senior author’s Institutional Review Board.

2.2. Data collection

Data were compiled by Police Strategies LLC using a database entry system called the Police Force Analysis System (PFAS). PFAS is a relational database that contains 150 fields of information extracted from law enforcement agencies’ existing incident reports and officer narratives.

Trained coders read the police reports and extract information based upon a standardized coding scheme. The data are then entered into a relational database for analysis. All coding is reviewed as part of an ongoing quality assurance process in order to ensure complete, accurate and consistent data entry.

Variables describing the recipients of police use of force included subject gender, age, and race as well as officers’ perception of whether the subject was under the influence of mind altering substances or demonstrating evidence of mental illness.

Variables describing the police-subject interaction included the number of sequential uses of force, whether or not the subject tried to escape, threats posed by the subject, use of handcuffing or hobble restraints. Sequential force iterations and their timing was determined by the coders, using the narratives accounts contained in the use of force forms. Force sequences began with initiation of force by either party: for officers this includes any verbal orders, physical contact or use of a weapon; for suspects, this includes any assault or attempted assault, pointing of a firearm, or attempted use of a weapon. An additional sequence was recorded for each back-and-forth exchange that is different from the prior sequence, up to a maximum of six.

In addition to basic demographic and other descriptive analysis, PFAS calculates a force factor analysis, [9–14] wherein the levels of officer force and subject resistance are recorded in dyadic exchanges throughout the incident, combined with legal analysis using the criteria established in Graham v. Connor, [15] which is the seminal case in which the supreme court articulated a four-pronged test for reasonableness of use of force.

2.3. Data analysis

All data were analysed using the Statistical Package for Social Sciences (SPSS), Version 26 (Armonk, NY).

Initial descriptive statistics of the study population were calculated. Bivariate descriptive statistics were then performed, examining the prevalence of spitting across a variety of subject demographics and event characteristics.

In order to evaluate specific events that might predict spitting on an officer, multivariate logistic regression was performed. Odds ratios (ORs) and confidence intervals (CIs) were calculated with associated p values as well as Nagelkerke’s pseudo-$R^2$.

3. Results

Data from 9326 police – suspect use of force incidents were collected.

Descriptive statistics are shown in Table 1.

Subjects were reported to have spit on officers in 3.6% (338) of these cases. Females comprised 18.1% of subjects, and had a spitting rate of 6.0%, compared to 3.1% for males. Those who spat had a slightly lower average age (29.5 years) compared to those who didn’t (32.0 years).
White subjects comprised 44% of the sample and had the highest spitting rate, 3.9%, contrasted with black subjects who comprised 25% of the sample and had the lowest spitting rate of 3.1%. Subjects thought to be under the influence of mind-altering substances or suffering from mental illness had higher rates of spitting (4.7% and 5.2% respectively) compared to those who weren’t (2.6% and 3.2% respectively).

Spitting was more common with longer force interactions (increasing from 1.7% for incidents having one or two sequences, up to 7.4% for incidents having six sequences; see Fig. 1), but also an overall lower level of force relative to suspect resistance. Spitting was less likely when subjects fled and spitting rates varied with the level of threat posed by the subject, with those engaged in assaultive or self-harm behaviors having the highest spitting rate, 8.3%, while presence of weapons was associated with the lowest spitting rates (0.6–2.1%). Spitting was more likely when subjects were restrained with handcuffs (3.7% vs. 1.6% without) or hobble restraints (15.4% vs. 2.3% without).

Table 2 describes the results of the logistic regression analysis.

Female subjects had an odds ratio of 1.4 for spitting compared to males (CI 1.1–1.8). As subject age increases, the odds of spitting decrease approximately 1% for each additional year of age. (OR = 0.987, CI 0.977–0.998). When a concern for the use of drugs or alcohol existed, the odds of spitting was more likely (OR = 1.5; CI 1.1–1.9).

As the number of force sequences increases, the odds of spitting increase approximately 31% with each additional sequence (OR = 1.3; CI 1.2–1.4). As the average force factor increases (indicating a greater level of officer force relative to suspect resistance), the odds of spitting decrease approximately 66% with each one-unit change (OR = 0.34; CI 0.28–0.42). Spitting was almost twice as likely when subjects did not flee from officers (OR = 2.0; CI 1.5–2.6). Subjects who had assaulted another person or engaged in self-harm, had a similarly high likelihood of spitting (OR = 2.2; 1.5–3.0). When subjects possessed or used a lethal weapon the odds of spitting was much less likely (OR = 0.13; CI 0.03–0.55). Finally, handcuffed suspects had an odds ratio of 2.4 for spitting (CI 1.1–5.1) and hobbled suspects 4.7 (CI 3.7–6.1).

Nagelkerke’s pseudo-$R^2$ is equal to .22, suggesting that about 22% of the variation in spitting is explained by this model.

### Table 2

| Variables                              | OR     | 95% CI for OR | p     |
|----------------------------------------|--------|---------------|-------|
| Female                                 | 1.41   | 1.07–1.85     | *     |
| Age                                    | 0.99   | 0.98–0.998    | *     |
| Race (reference: White)                |        |               |       |
| Black                                  | 0.84   | 0.61–1.15     | NS    |
| Hispanic                               | 0.95   | 0.70–1.29     | NS    |
| Other                                  | 1.01   | 0.62–1.66     | NS    |
| Possible influence of drugs / alcohol  | 1.46   | 1.11–1.89     | NS    |
| Possible mental illness                | 1.02   | 0.78–1.34     | NS    |
| Number of Force Sequences              | 1.31   | 1.19–1.43     | **    |
| Average Force Factor                   | 0.34   | 0.28–0.42     | ***   |
| No Flight                              | 1.97   | 1.47–2.64     | ***   |
| Threat (reference: None)               |        |               |       |
| Verbal Threat                          | 1.57   | 0.98–2.52     | NS    |
| Furtive / Posture / Move               | 1.36   | 0.99–1.86     | NS    |
| Attempt Assault or Harm                | 1.35   | 0.84–2.19     | NS    |
| Assault or Self-Harm                   | 2.17   | 1.54–3.05     | ***   |
| Less Lethal Weapon                    | 0.35   | 0.10–1.19     | NS    |
| Deadly Weapon                          | 0.13   | 0.03–0.55     | **    |
| Handcuffed                             | 2.41   | 1.13–5.31     | *     |
| Hobbled                                | 4.74   | 3.67–6.14     | ***   |
| Nagelkerke pseudo-$R^2$                | 0.22   |               |       |

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Fig. 1. Percent of subjects spitting by number of force sequences.

4. Discussion

Spitting is a common form of assault on police officers. Our data show spitting occurring approximately 1 out of every 28 encounters where force is used by police. Spitting was more common among younger subjects and females when police used less proportional force.

To our knowledge, this is the first study to document these types of assault, adding an important dataset to the literature on occupational risk of law enforcement. Identifying higher risk situations could aid in mitigating some of the bodily risk officers face. With that in mind, there are many limitations to this study. The data comprise a
limited subset of police departments within the United States which may have skewed experiences with spitting, limiting generalizability. Furthermore, all data are based on reports by police which may introduce an additional bias; what constituted spitting by an officer may have varied and officers may have chosen not to report spitting incidents, considering them inconsequential in certain encounters. Such under-reporting could have significantly impacted the data collected and introduced bias in many different ways.

The actual risk of injury to an officer from spitting has been historically difficult to assess. Although a broad range of pathogens can be found in saliva, including life-threatening ones like tuberculosis, HIV, and viral hepatitis, [16] no formal studies have been done to assess transmission rates from spitting. But notably, there have been no clear documented cases of disease transmission through this route. [17]

There is a clear theoretical risk of COVID transmission from spitting which has led to new rules in diverse settings: from outlawing spitting during Major League Baseball games [18] to recently passed fines for intentionally spitting on a healthcare worker or police officer. [19] We note that although officers self-reported being injured in 16% of use of force events overall, less than two percent of reported injuries were being spat on; this number will surely rise as an appreciation of the potential risk from spitting increases.

The association with handcuffing, and especially holstered restraints, might suggest that spitting is occurring more from a sense of helplessness or from sense of perceived inappropriate treatment. Contrary to this, however, spitting appears to have occurred when officers use less proportional force as suggested by the significantly lower force factor and reflected in a significantly higher number of force iterations by police.

Historically, spitting on police officers has been considered to be a minor offense and assault charges are rarely filed by prosecutors but this is likely to change, similar to what occurred when concerns for HIV transmission were high. Clearly the intent to injure and even potentially kill someone through a newly emerged risk from spitting should carry severe penalties and the law should reflect that. Given the high prevalence of spitting in police encounters prior to the current pandemic, the association found with altered mental status in our study, and the lack of any studies of risk, caution should be exercised in the use of such laws as there is a risk of inappropriate prosecution for such behavior.

In addition to legal protections, risks to officers should be mitigated through the use of masks and face shields that appear to be effective reducing risk in less direct forms of exposure. The application of spit hoods to individuals who are thought likely to assault others by spitting may also reduce risk. Spit hoods are mesh hoods that significantly decrease the amount of saliva reaching others when spitting occurs.

Prior to the COVID pandemic, the use of such tools was increasing and creating controversy both in terms of safety and potential for misuse. [20,21] There have been very few studies looking at spit hood safety, but rare deaths temporally associated with their use have been described. Limited studies assessing physiologic changes during spit hood use have not found clinically significant effects. [21,22] Given the broad concern about droplet transmission, use will likely continue to increase.

Such use will need to be weighed against the recent rise in concern for inappropriate use of force. Spit hoods are considered by some to be an inhumane, unnecessary form of restraint. [23,24] Spitting may represent an act of resistance for restrained individuals who often feel that force is being used inappropriately and disproportionately with different populations; as such behaviors suddenly represent a much more potentially serious assault than in years past, a new consideration for how to balance the risks involved is necessary.

Our data may also provide some help in risk mitigation. In our dataset, higher risk encounters for spitting involved smaller, younger females, often acting erratically. Such individuals who might be considered less likely to provide significant or dangerous physical resistance may need to be appraised differently given the current public health crisis.

Clearly more research on this topic is needed. But given the likely substantial risk of COVID transmission from spitting, the balance of risks and benefits to spitting for an individual and efforts to discourage spitting for the justice system is very different in the current environment.

Although spitting has been considered by police and like subjects as well as a once-benefit form of protesting perceived inappropriate use of force or fighting back, during a respiratory pandemic, such behaviors and the calculations of risk and benefit should be perceived differently.

5. Conclusions

Spitting on law enforcement officers is common and may now constitute an increased and significant work and public health hazard. Efforts should be made in risk mitigation including both identifying high-risk encounters and taking precautions for decreasing the chance of spitting and exposure to occur.

CRediT authorship contribution statement

Dr. Strote designed, edited, and wrote the paper. Mr. Werner performed a literature review, edited, and assisted with writing. Mr. Scales helped with design, writing, editing, and data collection/analysis. Dr. Hickman performed design, data analysis, writing, and editing.

Conflict of interest

Joey Warner and Jared Strote declare no conflict of interest.

Both Matthew Hickman and Robert Scales are financially connected to Police Strategies LLC (Mr. Scales is the owner). This company contracts with police agencies to help them code and analyze their use of force data. Although there is no benefit we are aware of to Dr. Hickman or Mr. Scales that could come from this paper, this connection to the company that provided the data could be seen as a conflict of interest.

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