



Research Article

Police use of CS smoke at outbreaks of serious public disorder in Great Britain

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Abstract:

This paper presents a contentious possibility to minimise close proximity injuries sustained between the public and police resources including horses and dogs during outbreaks of serious public disorder in Great Britain. The use of standard police shield tactics could be supplemented or even replaced with the use of CS smoke which is already a tactical option for the police service within the United Kingdom. CS smoke is used throughout the world to quell outbreaks of serious disorder although the tactic is controversial. Whether or not this tactical option is suitable for use in Great Britain is considered, outlining a suggested implementation model for analysis of the success, or otherwise, of its use.

Keywords: CS Smoke, public disorder, police, United Kingdom



Introduction

With the 2024 spate of rioting across the United Kingdom, police methods for dealing with such criminality relied on the operational use of shield tactics by officers, horses and dogs to quell the troubles.¹ When serious public disorder occurs, physical injuries to the public, police officers and police animals are a common occurrence due to the close proximity of rioters and police.² For context, the disorder that occurred in Bristol over three nights in March 2021 saw a total of 62 public and 46 police injuries reported from an estimated total turnout of around 5,000 public and police combined.³ The rioting that occurred across the United Kingdom in August 2011 saw 16 public and 189 police injuries from an estimated total turnout of around 10,000 public and police combined.⁴ In the rioting during the first week of August 2024, the number of documented injuries around the United Kingdom did not detail all occurrences with data being skewed to police only injuries where in excess of 60 police officers and three police dogs suffered injury between July 30th and August 5th.⁵

There are other operational tactical alternatives that are available to the police which could reduce the number of close proximity injuries to those rioting, the police and their animals. Keeping The Peace (KtP), the United Kingdom police manual that provides tactical options to quell public disorder, lists all tactics that can be deployed.⁶ Many of these have been aired on nightly news bulletins where those intent on serious public disorder, and police officers with riot shields, clash in close proximity. KtP also contains interventions that geographically distances the public and police. These higher-level tactics of baton rounds (sometimes referred to as rubber or plastic bullets), water cannon or CS smoke (also referred to as CS gas or tear gas) have not been seen on the streets of Great Britain any time recently. Baton rounds, water cannon and CS smoke are in use in Northern Ireland.⁷ When Boris Johnson was Mayor of London, he purchased two water cannons from Germany.⁸ Due to various issues, these are no longer operationally in service and have been sold.⁹ Although, via existing mutual aid arrangements, water cannon and its operators could be 'borrowed' from the Police Service of Northern Ireland for mainland use.¹⁰ Police in Great Britain train to use baton rounds in situations of serious

public disorder however to date, although their use has been authorised, they have not been deployed.

¹¹ The other tactical option, that of CS smoke, has previously been used in the United Kingdom, both in Northern Ireland and in Great Britain. We have to return to the serious disorder that took place at Toxteth in 1981 for its use on the mainland and no study on its effectiveness or otherwise was undertaken. ¹² Therefore, the theoretical research question that I pose is would the deployment of CS smoke during serious public disorder in Great Britain reduce close-proximity injuries to rioters, police officers and police animals? As there is currently no empirical research evaluating CS smoke's effectiveness in reducing close proximity injuries during outbreaks of serious public disorder in Great Britain, addressing this question contributes to filling this void in the literature.

Background - Operational deployment of CS smoke

CS smoke causes the eyes to water heavily and the mucous membrane to run uncontrollably. This results in serious discomfort that can only be alleviated with fresh air away from the scene of CS exposure, over a 20 minute or so timescale to enable the individual to begin the return to some state of physical normality. When CS is deployed, rioters aim to leave the contaminated area so geographical distance between the public and police is achieved, thereby diminishing the possibility of close proximity injuries. This is evidenced anecdotally by looking at uses of CS smoke elsewhere in the world with close proximity injuries that we currently see when shield tactics alone are used, being greatly reduced. CS smoke use, due to its noxious effect, does not prevent all injuries and if shield tactics are used before or after the deployment of CS smoke, the close proximity injury potential would still apply. However, CS smoke disperses most individuals so the opportunity for close proximity injuries is reduced.

There is also another dimension to the deployment of CS as it affects those that may happen to be transiting through the area undertaking their normal business and not be connected in anyway with the serious disorder. Whilst this is acknowledged and there are studies that detail such contamination, this paper focuses solely on the possibility of reducing close proximity injuries between rioters and police officers and their animals. ¹³

With the concept of 'policing by consent' in the United Kingdom, this has always set them apart from

how most other nations undertake policing. Canada, Australia and New Zealand are the only other realms to use this policing style. Elsewhere, policing by force is the standard *modus operandi*. Consequently, international policing tactics to deal with outbreaks of serious disorder divaricate from standardisation. Baton rounds, water cannon and CS smoke are part of the main arsenal of tactical options that most non-United Kingdom police rely on to control such situations. However, as already mentioned above, Northern Ireland, a part of the United Kingdom, is familiar with the use of water cannon, baton rounds and CS smoke. With its historical legacy, this section of the United Kingdom is separated from the mainland for many purposes, policing being just one of them. Although, mutual aid deployments of police officers from across mainland Great Britain to Northern Ireland has recently altered this trend.¹⁴

From media reports we know that CS smoke is used around the world as a crowd dispersal tactic in situations of serious public disorder.¹⁵ Therefore, the decision has already been taken in numerous locations to intervene with this tactic. Now that the United Kingdom is separate from the European Union, they can still learn from how their neighbours undertake policing. Historically, the European nations have used CS smoke to quell disturbances in their colonies.¹⁶ Realising the success it achieved, they brought it back to their parent states. Contemporary deployment of CS smoke is now seen in at least half of European Union member states. Looking further afield, the Americas, continental Africa, the Gulf regions and Asian countries all use CS smoke to quell serious public disorder.¹⁷

Literature Review

It is important to note that no previous empirical work focusing on the reduction of close proximity injuries by the use of CS smoke in Great Britain has been undertaken. Therefore, to undertake a literature review, the area of geographical coverage needs to be widened to consider prior empirical work from other countries that have relied on the tactical use of deploying CS smoke.

I analysed previous empirical research examining the use of CS smoke as a tactic in situations of serious public disorder anywhere in the world. I searched the four databases of ProQuest Social Sciences Premium Collection, International Bibliography of the Social Sciences, Scopus and Social Science Research Network as well as Google Scholar for articles referencing CS smoke, CS gas and tear

gas in the published and grey literature. Whilst all four databases and Google Scholar do contain articles relating to those search terms, empiricist literature within the context of the use of CS smoke as a tactic in situations of serious public disorder to reduce close proximity injuries is scarce. The most frequent results related to medical issues caused to those exposed to CS smoke.¹⁸

The worldwide police use of CS smoke is a widely debated topic, with arguments both in favour of and against its deployment.¹⁹ Advocates contend that CS smoke serves as an effective and non-lethal approach to regain crowd control during outbreaks of serious public disorder. Its use provides the police with a means to disperse large groups of rioters with minimal harm compared to other physical force methods.²⁰ Research indicates that, when used properly, it can reduce the need for direct physical confrontations between police and protesters, lowering the risk of injuries on both sides.²¹ Other academic work on serious outbreaks of public disorder have shown that CS smoke used by the police can quickly disperse rioters, thereby preventing damage to property and ensuring public safety.²² The police often deploy CS smoke as a last resort when other crowd control measures have failed. Without CS smoke, officers may be required to use alternative methods to control serious public disorder, which could result in greater harm.²³ Other empirical work drawing from reported events has indicated that CS smoke deployed in controlled environments creates space between the public and the police and therefore the potential for instances of direct contact between opposing sides is minimal.²⁴ In support of the above, Peter Waddington states:

*'CS smoke [is]...more consistent with the doctrine of 'minimum use of force' than relying on traditional methods, such as the baton or mounted charge. Those who oppose the introduction of these weapons do so, not only because they are allegedly more injurious, but also because they are more effective than their alternatives in suppressing riot.'*²⁵

International law permits the use of CS smoke for domestic policing purposes, differentiating it from chemical weapons banned in warfare and it is argued that CS smoke should only be deployed in situations where other tactics have failed and where alternative measures are insufficient.²⁶ Ethical arguments in favour of CS smoke deployment emphasise its role in preventing greater violence and maintaining public order without the need for lethal force.²⁷

While some critics highlight the potential health risks associated with CS smoke exposure, research

suggests that these effects are generally temporary and less severe than injuries caused by baton rounds and physical confrontations.²⁸ Medical assessments show that the adverse health effects of CS smoke are mostly limited and recoverable with almost three quarters of those exposed suffering only minor injuries.²⁹ Furthermore, continued advancements in tear gas formulation are focused on reducing its toxicity while maintaining its effectiveness.³⁰

However, not all prior work contends with such positivity of the use of CS smoke. David Waddington posits 'creeping police militarisation of its strategies, tactics and equipment has been seen as a sinister development'.³¹ Building on this comment, there are other factors that would require careful consideration before CS smoke deployment. Whilst the use of CS smoke to distance rioters and the police relies on the documented physiological reactions, which should decrease upon exit from the geographical area of use, concerns have been expressed about longer term health issues, both physiological and psychological.³² Furthermore, studies have identified greater effects of CS smoke exposure on vulnerable populations and those with pre-existing health conditions.³³ Issues including exacerbating existing respiratory concerns and chronic health conditions have been subject to scholarly enquiry with recommendations posited that frequently call for cessation of CS smoke deployment.³⁴ In addition to concerns related to individuals, issues such as environmental impact where CS smoke has been used relating to urban ecosystems and soil degradation has also been studied.³⁵ Also, concerns regarding community tensions vis a vis economic implications and criminality have been the subject of academic study.³⁶ Finally, the potential for legal and financial redress by the police for the above issues of personal health and environmental factors should be navigated prior to CS smoke deployment as litigation in this area is the subject of contested activity.³⁷

Success on deploying CS smoke is geopolitically context based. Authorities that use it see the benefits of reducing serious public disorder and with it the reduction of close proximity injuries. Members of the public that become entangled in a CS smoke onslaught oft quote chemical weapons treaties and how, what they term, a weapon of war can be banned on the battlefield yet deployed against a civilian population. The deployment of CS smoke can work as a tactical option however it does come with backlash from populations of more liberal democracies. The UK, being such a democracy, would be

headline news around the world if CS smoke were deployed within its policing by consent ethos.

Although, of the other nations that police by consent, both Canada and Australia use CS smoke.

The use of CS smoke remains a crucial tool in modern policing, providing those responsible for

upholding the law with a means to de-escalate potentially violent situations while minimising harm.

Research supports its effectiveness in crowd control, its necessity in maintaining public order, and its

advantages over more aggressive policing tactics. While ethical, medical and environmental concerns

persist, stringent legal regulations and advancements in chemical formulations continue to refine its

use, ensuring that it remains a vital component of responsible policing strategies.

Deployment of CS smoke within Great Britain

Just because CS smoke is used in both a Northern Irish and international perspective, the crucial

question would be, is it appropriate to use it within the geographical boundaries of Great Britain? I

suggest that there are two areas to consider when answering this question:

(i) Does political appetite exist for CS deployment and use?

In the United Kingdom, the governing Labour party manifesto discussing policing states they will

'ensure the service is organised so as to enable investment in specialist capabilities'.³⁸ It goes on to

say that 'we will equip officers with the powers they need' and that they have 'credible plans to take

back our streets'. The CS smoke tactical option fits within these statements. Speaking about the August

2024 United Kingdom disorder the Prime Minister has vowed to 'do whatever it takes'.³⁹

(ii) Have previous enquiries considered the use of CS?

In relation to Public Enquiries following outbreaks of serious public disorder, the Scarman report

mentioned the need for CS agents being available for use if necessary.⁴⁰ Other Public Enquiries have

been held following outbreaks of serious disorder in the United Kingdom however these have not

mentioned CS smoke.

Methodology

Intervention Design

On first glance it may seem problematic to even consider approaching such a study however there are

intervention design methods that could be applied. Whilst the gold standard of any intervention would

be a randomised control trial, undertaking such an approach on both ethical and legal grounds could be problematic. That being stated, whilst traditional randomised control trials would be challenging in situations of serious public disorder, pragmatic trial designs or cluster randomised trials may be one method to overcome these difficulties. As an example, randomising at the level of geographic regions or operational clusters as opposed to individuals could address both ethical and logistical concerns whilst still preserving the benefits of random assignment. Therefore, groups or clusters of rioters could be randomly allocated to control and treatment conditions.⁴¹ Additionally, quasi-experimental designs could also be considered. Methods such as difference in differences and synthetic control approaches when carefully implemented and applied rigorously, can offer control over confounding factors as well as approximate the causal inference benefits of randomisation, leading to reliable estimates of intervention effects.⁴² Craig et al.'s work on difference in differences is suited to this intervention as rates of close proximity injuries at situations of serious public disorder when CS smoke has not been deployed already exist and I expand on this in the documentary analysis data collection discussion below.⁴³

Of course, critics of such methods would argue that the possibility of reduced statistical efficiency in cluster randomised trials, or the need to guard against common shocks and parallel trends when using difference in differences or even restriction of donor pool control units when selecting synthetic control parameters all need to be factored into the research design.⁴⁴

One research design that seeks to overcome such difficulties is that of a mixed method approach where the combination of quantitative designs such as those outlined above with qualitative research (see for example Manning's police specific research approaches in this area) would strengthen the interpretability of the findings as well as capture the nuanced realities of policing in situations of serious public disorder whilst assisting with the explanations of why certain effects are observed.⁴⁵ Specific methods such as participant observation of rioters during outbreaks of serious public disorder would provide rigour.⁴⁶ Care though would need to be taken in such an approach to ensure that both epistemological and technical concerns are addressed appropriately.⁴⁷

Therefore, this study suggests employing a mixed methods intervention design to evaluate the

potential effectiveness of CS smoke deployment in reducing close proximity injuries between police officers and rioters during serious public disorder events in Great Britain. Due to the ethical, legal, and logistical constraints associated with conducting such an intervention in public order policing, the methods within the overall mixed methods approach that captures such intervention effects in real world conditions could be undertaken by using cluster randomised trials supported by participant observation and subsequent documentary analysis.

Documentary analysis data collection

Data for this study could be drawn from multiple sources. Data on injuries sustained by police officers and police animals could be obtained from individual police services that deployed officers to the outbreaks of serious public disorder.⁴⁸ National Health Service's Digital (NHS) Emergency Care Dataset (ECDS) could be interrogated for injuries to members of the public.⁴⁹ Given the nature of serious public disorder events, media coverage and independent reports could provide supplementary data on injury rates, tactical responses, and public sentiment regarding CS smoke deployment.⁵⁰ Prior incidents of serious public disorder in which CS smoke was or was not deployed could be examined for comparative analysis. This could include reviewing serious public disorder events in Great Britain and international cases where CS smoke has been used as a public order tactic. In addition, a review of any publicly available video footage to assess the tactical effectiveness and injury outcomes associated with CS smoke use could prove beneficial.

Analytical Approach

The cluster randomisation could be applied to assess changes in close proximity injury rates with and without CS smoke deployment in relevant serious public disorder events. It is important to note that the unit of allocation is the group of individuals, and not the individuals themselves. Adherence to this point will assist in avoiding any miscalculation in the unit of analysis.⁵¹ Such an approach could encompass pre-intervention analysis where injury data from past public disorder incidents could serve as a baseline for comparison. During the intervention phase, if CS smoke is deployed during a serious public disorder event, real time injury data could be collected. If the serious disorder continues over several dates and the decision is made to deploy CS smoke, similar data collection methods can be utilised to ascertain

injuries sustained to both the public and police resources. As this would be within the same geographical area and continuing timeframe, validity of data is fulfilled. If the serious public order continued and CS smoke was not deployed, data collected could act as a control group. Once CS smoke was used, post-intervention data collection would be available. Then, post-intervention analysis could compare injury trends and evaluate whether CS smoke deployment correlates with a statistically significant reduction in close-proximity injuries. To enhance validity, findings from the participant observation and documentary analysis will be triangulated with the cluster randomised trials.

These recognise that 'studies may be single arm...or multiple arms, where this is a comparison between groups'.⁵² Aggarwal and Ranganathan see such interventions as a 'temporal relationship of the measurements to the intervention [as] such studies...lack a comparator arm'.⁵³ Both can be identified as correct as it depends on the volume of serious public disorder and would be context dependant. Indeed, as Craig et al. recognises, this data collection method 'may be the only option when it is impossible to manipulate exposure to the intervention'.⁵⁴ Petticrew et al. goes further and posits such data collection 'can assist in the identification of effective interventions, an area where it is widely acknowledged that the evidence base is currently sparsely populated'.⁵⁵

Evaluation plan for the intervention

To evaluate the intervention, outcome and process evaluations would need to be analysed. The outcome evaluation would assess the effectiveness of deploying CS smoke to reduce close proximity injuries. The process evaluation would examine how the use of CS smoke to reduce close proximity injuries was achieved.

Outcome evaluation

The key is to, as much as possible, eliminate bias from the intervention. Therefore, revisiting Thiese's

work discussing 'multiple arms...comparison between groups' alongside Craig et al.'s work discussing 'unobservables' and 'observables', the method of difference in differences approach within the context of the intervention is how the outcome evaluation could be undertaken.⁵⁶ This would provide accounts from the groups of those that have been exposed to CS smoke and the groups that have not. To build a strong evidence base, evaluations would need to be undertaken across multiple outbreaks of serious public disorder where CS smoke has been deployed. As such deployment would probably not be undertaken before close proximity tactics had been undertaken, exposed and unexposed groups should be present in all environments. Moore et al.'s proposition of a systems lens to 'drive the focus of evaluation' would also be helpful.⁵⁷ The reading of outcomes with subtleties and refinements measured over time would give a balanced indication of the effectiveness or otherwise of the intervention.

Process evaluation

The intervention, its implementation and expected outcomes could be examined to ascertain if the intervention was undertaken as planned and to ascertain if there were any differences with the expected and actual outcomes. Moore et al.'s paper on 'Process evaluations on Complex Interventions' would be instrumental in designing the process evaluation ensuring the four stages of planning, design and conduct, analysis and reporting are adhered to.⁵⁸ In addition a 'key functions' schematic is presented that will aid this process. The process evaluation could be undertaken after cessation of each outbreak of public disorder where CS smoke has been deployed to build a picture of overall results and to demonstrate assurance and conviction with the validity of the intervention.

Of course, I have sidestepped the inherent volatile nature of serious public disorder and the multiple possibilities that such an intervention may introduce.

Following completion of this intervention framework, results would be available to judge the effectiveness or otherwise of CS smoke use during times of serious public disorder within Great Britain to reduce close proximity injuries between public and police resources.

Ethical Considerations

Given the sensitive nature of policing tactics and public disorder management, this study should adhere to ethical guidelines for research involving public safety. Data confidentiality should be maintained, and no personally identifiable information should be collected. Ethical approval should be sought covering all elements of the proposed intervention.

Limitations

It would be prudent to identify potential limitations of the proposed intervention. When considering data availability and accuracy, it is noted that injury data could be underreported or subject to bias in official records and media sources. Confounding variables such as changes in policing tactics, crowd behaviour, and situational context, could also influence findings.

Also, results may not be fully generalisable beyond the specific cases examined, necessitating further research in different contexts and geographical areas within Great Britain.

Despite these limitations, the intervention aims to introduce a platform for an evidence-based assessment of CS smoke as a tactical option for reducing close proximity injuries during serious public disorder policing in Great Britain.

Discussion

This study demonstrates the potential use of CS smoke as a tactical option for reducing close proximity injuries during serious public disorder in Great Britain. The primary argument in favour of its use is its capacity to create physical distance between rioters, police, and their animals, thereby reducing the

likelihood of close proximity injuries. This aligns with international evidence, where CS smoke has been successfully deployed to disperse crowds and mitigate direct physical confrontations. However, the absence of empirical studies specifically examining its effectiveness in Great Britain necessitates a critical evaluation of its applicability within this unique policing context.

A key consideration in the debate over CS smoke deployment is the principle of policing by consent, which is foundational to British policing. Unlike many other policing jurisdictions that employ more forceful crowd control measures as a matter of course, the UK police are expected to engage with the public in a manner that maintains legitimacy and public trust. The use of CS smoke, while potentially effective in reducing injuries, may be perceived as a shift towards a more militarised style of policing, raising ethical and societal concerns. Public perception and political will are thus integral factors in determining whether CS smoke can be operationally viable in the long term.

International comparisons provide insight into both the benefits and challenges of CS smoke deployment. The Americas and European nations frequently use CS smoke as a means of riot control, with visible success in dispersing violent crowds. However, the tactic has also led to significant public backlash, particularly in liberal democracies where concerns about excessive force and civil liberties are prominent. The experience in Northern Ireland, where CS smoke has been used more regularly than on the British mainland, provides a domestic reference point. While its effectiveness in managing serious public disorder is recognised, its deployment has not been without controversy, particularly in light of historical tensions and human rights debates.

The proposed intervention model outlined in this paper seeks to bridge the gap between theoretical assumptions and empirical validation by implementing a structured assessment of CS smoke's impact on close proximity injuries. By employing mixed methods, including cluster randomised trials and

qualitative assessments, the study would generate evidence-based insights into the efficacy and potential drawbacks of this approach. A key challenge in this research design, however, is the unpredictability and dynamic nature of serious public disorder events, which may complicate the controlled implementation of interventions.

Ethical considerations also play a critical role in determining the appropriateness of CS smoke deployment. While it is classified as a non-lethal force option, concerns persist regarding its health implications, both physiological and psychological, particularly for vulnerable populations. Studies have indicated that while the effects of CS smoke exposure are generally temporary, there is potential for adverse reactions in individuals with some pre-existing medical conditions. Secondary impacts, such as environmental contamination, must also be factored into any decision-making process regarding its use.

Additionally, legal, and by extension, financial compensation dimensions cannot be overlooked. The introduction of CS smoke as a mainstream crowd control tactic in Great Britain would require political level endorsements and rigorous oversight mechanisms to ensure compliance with human rights obligations. Both existing legal and operational frameworks allow for its use under certain conditions, but historical reluctance to deploy it on the mainland anytime recently, suggests that significant barriers remain. The extent to which political leaders and police crime commissioners are willing to endorse such measures will ultimately shape the feasibility of its implementation.

The limitations of this theoretical paper must also be acknowledged. Firstly, the lack of prior empirical research on CS smoke's effectiveness in reducing close proximity injuries within the British context necessitates reliance on international and historical precedents. Secondly, while the proposed intervention model aims to control for confounding variables, factors such as police training and crowd

dynamics may introduce complexities that are difficult to fully account for. Additionally, data availability and accuracy may pose challenges, particularly in relation to injury reporting, as discrepancies often exist between official police records and independent sources.

Despite these challenges, this paper contributes to an important debate on the evolution of public order policing in Great Britain. As public disorder incidents continue to pose significant challenges to policing, exploring alternative strategies that balance operational effectiveness with ethical and legal considerations is imperative. If CS smoke can be shown to meaningfully reduce close proximity injuries while minimising broader risks, it may offer a viable addition to the tactical repertoire of British policing. However, any decision to deploy it must be informed by robust empirical evidence and a thorough assessment of its societal implications.

Future research could conduct pilot studies under controlled conditions, assessing public and officer perceptions of CS smoke use, and evaluating long term outcomes associated with its deployment. Additionally, comparative studies with jurisdictions that have integrated CS smoke into their policing frameworks could provide valuable insights into best practices and potential pitfalls.

Ultimately, the decision to implement CS smoke as a crowd control measure in Great Britain is not merely a tactical consideration but a broader question of policing philosophy. As public expectations of policing continue to evolve, maintaining a balance between effectiveness and legitimacy will be crucial in shaping the future of public order policing.

Conclusion

I have introduced and discussed a contentious and controversial policing tactic of using the higher-level public order operational deployment of CS smoke at times of serious public disorder within Great Britain. I have documented worldwide deployment of this tactic and detailed two key areas to analyse

for geographical appropriateness. I have suggested an intervention framework for analysis to ascertain if the use of CS smoke is effective in reducing close proximity injuries between the public and police. As the tactical option of CS smoke is already available to the police, it remains to be seen if the operational and political appetite for deployment and use exists.

End notes

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