

Police use of force: Tactics, assaults and safety

Exploratory analysis of police recorded data 2017/18

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Executive summary

Analysis of police data from 2017/18 identified factors that increased or decreased the likelihood of officers recording that they had used particular tactics or been assaulted and injured, or that the person subjected to force had been injured and hospitalised. These outcomes were most strongly associated with factors to do with the interaction between the police and public. They were generally more likely when officers reported dealing with active or aggressive resistance or needing to use force for protection. The relationship between outcomes and the characteristics of those subjected to force were more complex. While perceived mental ill-health tended to be associated with negative outcomes, the effects of ethnicity and age were less consistent. Officer deployment, in terms of Taser and being single-crewed, seemed connected to outcomes, although causal relationships should not be assumed.

This report presents results from analysis of 45,661 use-of-force records made during 2017/18 in 16 police forces. The analysis aimed to identify whether there were any patterns in the data that might warrant more in-depth investigation using a range of research methods and data sources. Specifically, the analysis looked for factors that were associated with officers being more or less likely to report:

- using particular tactics during incidents where they used force
- being assaulted and injured during those incidents
- that citizens were injured and then hospitalised as a result of the force they used

Use of force other than just hand-cuffs¹, assaults on and injuries to officers, and injuries to and hospitalisation of members of the public were all associated with reports of officers facing active or aggressive resistance or needing to use force for protection. In other words, these outcomes were more likely when incident were perceived as high risk. However, we could not tell much about the nature and dynamics of these incidents from the data. We did not know what caused them to be seen as risky, how events unfolded or what might have reduced the risks. Other research – perhaps drawing on body worn video footage or interviews, or testing new approaches to conflict management – are needed to answer these questions. Given the risks to safety, supporting officers to anticipate, prevent and

¹ Drawing weapons or equipment, physically using them and using unarmed force.

respond to these situations whenever they occur needs to be a priority.

There were also patterns in the data related to the characteristics of the people subjected to force. Perceived mental health had a consistent relationship with outcomes. It was associated with an increase in the likelihood of particular tactics being used, officers being assaulted and citizens being hospitalised. Age and ethnicity were often associated with outcomes as well, but not in a consistent direction. These variations suggest relationships between age, ethnicity, mental health and use of force that were complex and multifaceted, and potentially affected by other issues. Unpicking this complexity and developing a much better understanding of whether, how and why socio-demographic characteristics affect use-of-force incidents requires urgent attention. The current analysis cannot tell us whether a particular social or ethnic group was, overall, more or less likely than any other group to have force used on them. It can, however, point to important patterns in the way force was reportedly used between groups. Conclusions about disproportionate treatment would require data on incidents where force was not used to be examined, comparisons to be made with population data and clearer explanations as to why any differences might exist.

Lastly, officer deployment seemed to be connected to outcomes. There was tentative evidence to suggest Taser could act as a deterrent. Drawing Taser was associated with a reduction in likelihood of officers being assaulted. It is not known, however, whether Taser caused this reduction as opposed to something else (eg, the distance between officer and citizen). Single-crewed officers were also more likely to use particular tactics and be assaulted than those who deployed with officers who did not use force. Causal relationships should not automatically be assumed. It maybe that other factors, such as the types of incident to which officers were deployed, had more of a direct effect. Formal evaluations are required to determine whether deployment practices have the impact provisionally hinted at by the analysis.

This study cannot hope to tell the whole story. The provisional nature of its insights should not, however, deter policymakers, senior police leaders and the frontline from thinking about how they might be used to help officers manage conflict and improve safety for all. The study also underlines how the recording of use-of-force incidents has afforded new opportunities for the police to take an evidence-based approach to one of its defining, necessary and most challenging roles.

Introduction

The ability to use force, when required, is a defining feature of the police and a necessary part of the police role. However, little empirical research on this topic has been carried out in England and Wales. This report presents findings from exploratory analysis of police use-of-force data, and was made possible by the national approach to recording introduced in April 2017. The analysis aimed to identify factors that – independent of all other factors – were associated with:

- officers² using different tactics during use-of-force incidents
- officers drawing or discharging Taser (a type of conducted energy device or CED)
- officers being assaulted or injured
- the people subjected to police force being injured or hospitalised

By identifying these factors, the research hopes to inform policy, guidance, training and other interventions designed to help officers manage conflict and improve safety for all.

The analysis focused on incidents where only one officer used force on a person, and was based on 45,661 records made during 2017/18 in 16 police forces. Linked records – where two or more officers used force on the same person – were excluded to minimise the risk of ‘double-counting’. Otherwise, for example, if a person was admitted to hospital during an incident in which two officers used force on that person, ‘hospitalisation’ would have appeared twice in the data.

Summary results

What factors were associated with an increase or decrease in the odds of officers using different use-of-force tactics?

During the 45,611 recorded incidents, a total of 61,214 tactics were reportedly used by officers. Officers recorded having used only handcuffs in around half of all incidents (52%) and only physical skills in just over a quarter (29%). It was much less common for officers to physically use or only draw equipment or weapons (13% and

² Use-of-force recording covered force used by any role in the police (eg, police officers, police staff – such as police community support officers, and custody and detention officers – special constables and other volunteers, and other employees). For ease of reporting, ‘officer’ refers to all these roles.

7% respectively).

The common factors that were consistently associated with officers drawing equipment or weapons, officers physically using them, and officers using unarmed force (relative to using only handcuffs) are shown in Table 1. The factors that were associated with increased or decreased odds of just one or two of these outcomes are presented in the main report.

Table 1. Common factors associated with: officers drawing equipment or weapons, officers physically using equipment or weapons, and officers using unarmed force

Characteristics of the...	Increased odds of all three outcomes	Decreased odds of all three outcomes
Officer	<ul style="list-style-type: none"> • Gender: male • Service length: more than five years • Main duties: armed response or other 	–
Person subjected to force	–	–
Situation	<ul style="list-style-type: none"> • Impact factors: mental health • Officer single-crewed at the time³ 	–
Interaction	<ul style="list-style-type: none"> • Officer faced: active resistance • Officer used force to: protect self or others 	–

The reported behaviour of the members of the public subjected to force was most strongly associated with the three outcomes. The odds of these outcomes increased the most when the person was reported to have been actively or aggressively resisting the police.

What factors were associated with an increase or decrease in the odds of CED-carrying officers drawing and discharging their CEDs?

To explore the circumstances when CEDs were more or less likely to be ‘drawn’⁴ or ‘discharged’⁵, the analysis focused on a subsample of 11,176 incidents where officers indicated they had been carrying CEDs. Among these cases, CEDs were not used in 74% of incidents, drawn but not discharged in 22% of incidents, and discharged in 3% of incidents.

³ Relative to those deployed with other officers who did not use force during an incident. Comparisons with officers who deployed with colleagues who also used force during an incident were not possible.

⁴ CED being drawn, aimed or arced, or red-dotted (but not being discharged).

⁵ CED being used in probe-firing, drive-stun or angled drive-stun modes.

The common factors that were associated with the likelihood of CEDs being drawn and being discharged (relative to CEDs not being used at all) are shown in Table 2. The factors associated with either outcome are presented in the main report.

Table 2. Common factors associated with: CED-carrying officers drawing their CEDs, and discharging their CEDs

Characteristics of the...	Increased odds of both outcomes	Decreased odds of both outcomes
Officer	–	–
Person subjected to force	<ul style="list-style-type: none"> Perceived gender: male 	<ul style="list-style-type: none"> Perceived age: under 18 years Perceived ethnicity: Asian or Asian British⁶
Situation	<ul style="list-style-type: none"> Incident location: dwelling Impact factors: mental health 	<ul style="list-style-type: none"> Incident location: police or medical setting Impact factors: alcohol, crowd
Interaction	<ul style="list-style-type: none"> Officer faced: active resistance Officer used force to: protect self or others 	–
Organisation	–	<ul style="list-style-type: none"> Increased proportion of use-of-force incidents where officers reported carrying CEDs

Again, the nature of the interactions between officers and the people on whom they used force – and in particular the perceived level of threat in those interactions – was most strongly associated with outcomes. The factor with the strongest association with:

- CED being discharged was the officer reporting that they faced active or aggressive resistance from the member of the public
- CED being drawn (but not discharged) was officer reporting that they used force to protect themselves or other people

What factors were associated with an increase or decrease in the odds of officers being assaulted or injured?

Officers reported that they had been assaulted in 5% of all incidents (n=2,187). They sustained injuries in a similar proportion (n=2,131), though some injuries will not have been a result of assaults. However, the number of assaults and injuries are very likely to be underestimates. It is also not known whether officers were assaulted and/or injured before they used force, while they did so, or afterwards.

The common factors associated with increased or decreased odds of officers being

⁶ Relative to people perceived by officers to be 'White'.

assaulted and officers being injured (relative to neither) are shown in Table 3. The factors associated with either outcome are presented in the main report. The factor that had the strongest association with:

- officer assault was the police use of unarmed force⁷
- officer injury was the member of the public reportedly actively or aggressively resisting the officer

Table 3. Common factors associated with: officers being assaulted, and officers being injured

Characteristics of the...	Increased odds of both outcomes	Decreased odds of both outcomes
Officer		<ul style="list-style-type: none"> • Main duties: armed response
Person subjected to force	<ul style="list-style-type: none"> • Perceived ethnicity: Black or Black British⁸ 	<ul style="list-style-type: none"> • Perceived gender: male
Situation	<ul style="list-style-type: none"> • Officer single-crewed at the time⁹ 	–
Interaction	<ul style="list-style-type: none"> • Officer used force to: protect self or others 	–
Force used	<ul style="list-style-type: none"> • Officer drew but did not use: irritant spray • Officer physically used: baton, irritant spray, limb restraints, CED (discharged), or unarmed force 	–

What factors were associated with an increase or decrease in the odds of the people subjected to police force being injured or hospitalised?

There were 2,522 cases in the sample where people were reportedly injured as a result of the force used on them (6% of the total). These included 290 people who were reported to have been hospitalised because of the injuries resulting from police use of force (<1% of the total). These figures should, therefore, not include incidents where people were injured and/or hospitalised for other reasons (eg, because they fell over or were intoxicated).

The common factors that were significantly associated with the odds of the people subjected to police force being injured and of them being hospitalised (relative to neither) are shown in Table 4. The factors that associated with an increase or decrease in the odds of either are presented in the main report. The physical use of

⁷ It was not known whether the assault happened before or after the use of police force.

⁸ Relative to people perceived by officers to be 'White'.

⁹ Relative to those deployed with other officers who did not use force during an incident. Comparisons with officers who deployed with colleagues who also used force during an incident were not possible.

dogs (ie, dog bites) was the factor most strongly associated increased odds of hospitalisation and of injury (with or without hospitalisation).

Table 4. Common factors associated with: members of the public being injured as a result of police force, and members of the public being hospitalised following injuries due to police force

Characteristics of the...	Increased odds of both outcomes	Decreased odds of both outcomes
Officer	–	–
Person subjected to force	<ul style="list-style-type: none"> Perceived gender: male 	<ul style="list-style-type: none"> Perceived ethnicity: Black or Black British¹⁰
Situation	–	<ul style="list-style-type: none"> Impact factors: crowd
Interaction	<ul style="list-style-type: none"> Officers faced: active resistance 	–
Force used	<ul style="list-style-type: none"> Officers drew but did not use: dog (deployed) Officers physically used: baton, dog (bite), limb restraints, CED (discharged), or unarmed force 	–

Conclusions

This report describes the results of statistical analyses exploring what force officers used, on whom, and under what circumstances – as well as associated assaults and injuries – across a large sample of police forces. The analysis is the first of its kind to be carried out in England and Wales, and was only possible thanks to the new recording requirement introduced in 2017/18.

Many of the results are broadly in keeping with the existing literature, even though most prior studies were carried out in the US. The current analysis, for example, re-emphasises the importance of:

- **Interactional characteristics** – particularly the officer facing active or aggressive resistance from the member of the public, and using force for protection.
- **Situational characteristics** – particularly the officer being single-crewed at the time of the incident,¹¹ and identifying ‘mental health’ as an impact factor.
- **Citizen characteristics** – particularly the perceived age, ethnicity and mental health of the person subjected to police force.

These factors are notable for being significantly associated with most and, in some cases, all of the outcomes in the various regression models. Of these, the

¹⁰ Relative to people perceived by officers to be ‘White’.

¹¹ Relative to those who deployed with colleagues who did not use force during an incident. Comparisons with officers deploying with colleagues who also used force during an incident are not known.

interactional characteristics tended to be most strongly associated with officers using particular tactics, with them being assaulted and injured, and with members of the public being injured and hospitalised. As with previous research, the analysis also highlights the potential deterrent effect of drawing CEDs on assaults against the police (see also Home Office 2018), and the much higher likelihood of public injury when police dogs were used (Smith and others 2010).

There are a number of caveats and limitations with the study that mean the results do not tell the whole story and should not be used to make strong statements about the police use of force. Data came from 16 forces and reflected only officer perceptions of what happened. Use-of-force incidents were very likely under-recorded during the first year of the new recording requirement, and some cases had to be excluded to prevent 'double-counting'. Also, the analysis of the kind presented in this report can only point to statistical relationships in the data, rather than causal explanations.

Despite the limitations, the study offers a range of unique – if tentative – conclusions about officer and staff safety, and the police use of force more broadly. Further work is required to tease out the implications of the research. But this should not deter policymakers, senior police leaders and the frontline from thinking about how they might be used to help officers manage conflict and improve safety for all.

There remains a need for further research – using a mix of different methods and data sources – to understand the issues better and to evaluate the impact of changes to policy and practice (eg, personal safety training). The data resulting from the new recording requirement affords new opportunities for the police to take an evidence-based approach in relation to one of its defining, necessary and most challenging roles. By understanding when force is most likely to be used and what the risks are to police and public safety, changes to policy and practice aimed at reducing these risks and improving outcomes can be developed and tested.

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1. Introduction

Background

The ability to use force, when required, is a defining feature of the police and a necessary part of the police role (Bittner 1975). Despite the significance of force to the police role, little is known about its use, particularly in England and Wales (Buttle 2007).¹² Limited empirical research has been carried out that explores what force is used, when, how often, why, by whom, on whom, and to what effect. These are crucial questions because the police's use of force goes to the heart of the relationship between the police and the public. While the police's use of force tends to have wide public support, it affects some people much more than others, and can have life-changing consequences for all involved (Gerber and Jackson 2016, Bradford and others 2017, Yesberg and others 2019).

Much of the research to date is from the US and has relied on a small number of datasets (Neuscheler and Freidlin 2015). Research is needed in other contexts, particularly the UK because the police – unlike in almost all other countries – do not routinely carry firearms. Most officers in England and Wales are required to enforce the law, keep order and protect themselves and other people, armed with nothing more than their verbal and physical skills, irritant spray, a baton and, increasingly, Taser (a type of conducted energy device or CED). They sometimes perform these duties in complex and fast-moving situations, and – with assaults against the police having gone up in recent years¹³ – in an increasingly dangerous environment.

This report starts to address some of these gaps in knowledge. It presents findings from exploratory statistical analysis of police recorded use-of-force data gathered by 16 police forces across England and Wales during 2017/18. The analysis aimed to provide provisional insights about what might be associated with the likelihood of:

- officers using different tactics during use-of-force incidents
- officers and the people subjected to police force experiencing adverse outcomes

As such, the study has practical application. By highlighting potential risks to officer

¹² There are, however, some notable exceptions (eg, Payne-James et al 2013, Jenkinson 2006).

¹³ Police recorded data has shown that, between 2017/18 and 2018/19, assaults without injury increased by 13% and assaults with injury by 15% (Home Office 2019a).

and public safety, the research can inform policy, guidance, training and other interventions designed to help officers manage conflict and improve safety for all.

Police recording practices

The analysis presented in this report was only made possible by the National Police Chiefs' Council (NPCC) agreeing to introduce a national approach to the recording of use-of-force incidents. This agreement followed a review of recording practices (Shaw 2015, Dymond 2016), which recommended that forces:

- adopt a standardised monitoring form (NPCC 2017 and 2018)
- release summary data on their websites on a quarterly basis for transparency purposes
- return data to the Home Office for inclusion in an annual statistics publication (Home Office 2018 and 2019b¹⁴)

Before the introduction of this standardised approach from April 2017, there was only a national requirement for officers to complete use-of-force forms for certain types of force (eg, firearms, attenuating energy projectiles and CED). Some police forces also required officers to complete forms for other types of force (eg, batons, irritant spray or unarmed tactics), but there were marked differences in what was recorded and how (Dymond 2016).

In addition, there was a legal requirement for officers to provide written accounts of their decisions to use force, usually in their pocket notebooks. These accounts were for officers to detail their 'honestly held beliefs' at the time of incidents, and how the force they used was necessary and proportionate (College of Policing 2013). While necessary records, these free-text entries did not allow an overall picture of the police use of force to be developed.

¹⁴ Home Office (2018) has been cited throughout as it covered the same time period as the analysis presented in this report (2017/18).

The current study

Aims

With the support of the NPCC's use-of-force recording programme board¹⁵, the University of Exeter and the College of Policing teamed up to carry out statistical analysis of the first data to be recorded under the new standardised approach.

Rather than simply describe the extent and nature of the police use of force¹⁶, the research aimed to be more exploratory in nature.

This report summarises the results of this analysis in respect of four research questions. During recorded use-of-force incidents:

- What factors were associated with officers using different use-of-force tactics?
- What factors were associated with CED-carrying officers discharging CEDs or using them in some other way?
- What factors were associated with officers being assaulted or injured?
- What factors were associated with the people subjected to police force being injured or hospitalised?

Method

The analysis focused on incidents where only one officer used force on a person. It was based on 45,661 use-of-force records made during the first year of recording (2017/18) that were shared with the research team by 16 police forces. Extensive cleaning and recoding was required to merge the force datasets and to make the data suitable for analysis. Regression models were developed to identify factors that – independent of other factors – were associated with increased or decreased odds of a particular outcome being recorded (eg, an officer being assaulted). Data collection, preparation and analysis are described in more detail in the appendix.

¹⁵ Members of this board included, for example, representatives from forces and external stakeholder groups, Her Majesty's Inspectorate of Constabulary and Fire & Rescue Services, the Home Office, and the Police Federation of England and Wales.

¹⁶ See Home Office (2018, 2019b) for such analysis.

Interpreting the results

The regression analysis that was carried out highlighted 'relative risk' rather than 'absolute risk'.¹⁷ In other words, the analysis showed the chances of something happening in one set of circumstances compared to another set of circumstances.¹⁸ In some cases, while one factor may have been associated with increased odds of an outcome compared to another factor, the likelihood of that outcome may still have been low overall.¹⁹ This is important as some use-of-force outcomes were likely to be rare.

Limitations and caveats

There were a number of limitations and caveats with the data and its analysis that have relevance to how the results in Chapter 2 should be interpreted:

- **Recording issues** – Use-of-force incidents were very likely under-recorded during the first year of the new approach to recording. The resulting data were also likely to have been affected in unknown ways by non-response bias. Coupled with the fact that the analysis was based on data from only 16 police forces, the results should not be seen as representative of all police uses of force in 2017/18. There were also inconsistencies in the way some information (eg, type of force used and injury) was captured between – and sometimes within – datasets.
- **Officer perceptions** – Unlike other sources (eg, body-worn video footage), the records made by officers are likely to reflect their knowledge, perceptions and memories of what happened during use-of-force incidents. For example:
 - Officers could have experienced perceptual distortions due to the stress induced by the high-risk situation (eg, Alpert and others 2012, Klinger and Brunson 2009).
 - Other people might recall events differently.
 - Officers may not have been aware of relevant information when they recorded

¹⁷ An assessment of absolute risk was not possible because no data were not available on incidents and other encounters where no force was used.

¹⁸ For example: absolute risk = one in 100 coffee-drinkers and one in 200 tea-drinkers are likely to have a bad night's sleep; relative risk = coffee-drinkers are twice as likely as tea-drinkers to have a bad night's sleep.

¹⁹ For example, coffee-drinkers would still be twice as likely as tea-drinkers to have a bad night's sleep, even if one in one million coffee-drinkers and one in two million tea-drinkers had a bad night's sleep.

the incidents (eg, if the person subjected to force was admitted to hospital afterwards).

For these reasons, the results should not be seen as providing an objective picture.

- **Excluded cases** – As each record provided an account of an individual officer's own use of force, there was a risk that some data would be duplicated in records related to the same incident. If, for example, two officers used force on the same person, both would have been required to complete a record. The inevitable 'double-counting' (eg, of civilian characteristics and incident outcomes), would have biased the results had steps not been taken to identify related records and exclude them from the analysis (see appendix for details). As a result of this decision, the analysis focused on incidents in which only one officer used force on a person (regardless of whether that officer was single-crewed or deployed with other officers). The decision to restrict the analysis in this way may have excluded some of the most serious incidents (ie, those that required multiple officers to use force on the same person). It also meant that no comparisons were possible between officers who were single-crewed and those who deployed with colleagues who used force during an incident. In addition, records not containing data that was essential to develop the regression models also had to be excluded from the analysis.
- **Correlation not causation** – The analysis was able to identify statistically significant associations in the data, but provided no explanation as to why these might have occurred. It cannot be assumed that a factor caused an outcome just because that factor was found to increase the outcome's likelihood. It might have been that these factors were proxies for things that were not recorded, or that the relationship was due to some other confounding factor or was spurious.

Previous research

A brief review of relevant literature follows, but it is not possible to reach any strong conclusions from this review because of a relative lack of empirical research, particularly from England and Wales. Concerns have also been raised about research on the police use of force, overall, because of the lack of data, quality of the data that do exist, and limitations with the statistical models (eg, Neuscheler and

Friedlin 2015, Rojek and others 2010, Root and others 2013, Terrill and Paoline III 2012).

Officers using force

A rapid evidence assessment (REA) by Dryer-Beers and others (2020) has identified factors that tended to be associated with the use of force in 65 studies. Differences in how 'force' was defined and measured meant direct comparisons were problematic, however. Also, the REA did not report the relationship between these factors and different types of force, which is the focus of the analysis presented in this report. Furthermore, most of the studies included in the REA (54) were carried out in the US, so it cannot be assumed their findings are applicable elsewhere.

The REA grouped the factors potentially associated with the police use of force into a series of broad categories. To enable comparisons, the same categories have been used – as far as possible – to present the results of the current study. Overall, the REA found that interactional characteristics were the most consistently associated with use-of-force decisions.²⁰

- **Officer characteristics** – The personal qualities of the officers involved in incidents (eg, their gender, age, ethnicity, length of service and educational attainment) were not consistently found to predict use-of-force decisions.
- **Citizen characteristics** – The personal attributes of the person subjected to force were found to have some bearing on use of force.²¹
 - Gender was the most consistent factor, with force more likely to have been used on males.
 - The relationships with the age and ethnicity of the person subjected to force were much less consistent. Those studies that did find an association, however, found that force was more likely when people were younger and from a minority ethnic background.
 - Around half of the studies included in the REA that looked at mental health found an association between perceived mental ill-health and the use of force.

²⁰ A meta-analysis of 19 US studies, which was included in the REA, found that force was more likely in incidents involving serious offences (Bolger 2015).

²¹ Bolger's (2015) meta-analysis of 19 US studies also suggest force was more likely on people from lower social classes.

- **Situational characteristics** – Of the factors related to the context of the incident (eg, time of day and number of bystanders), the presence of a greater number of officers was the only factor that was consistently associated with an increased likelihood of force having been used. It was not clear, though, whether their presence was due to the risks involved in those incidents or the point at which they were present.
- **Interactional characteristics** – As mentioned, aspects of the encounters between officers and members of the public were most consistently associated with police decisions to use force. Officers were more likely to use force on people who were being disrespectful or abusive, resisting arrest, intoxicated or had a weapon.
- **Neighbourhood characteristics** – Some studies looked at whether overall levels of force were related to local area attributes (eg, deprivation, population density, ethnic composition). The only neighbourhood characteristic that was consistently found to increase the likelihood of force was the violent crime rate.
- **Organisational characteristics** – Too few studies examined the relationship between aspects of the police organisation and officers' use of force for the REA to draw out any overall patterns. Other studies have suggested force was more likely in police departments with longer annual in-service training (Lee and others 2010) and with more permissive use-of-force policies (Terrill and Paoline III 2017).

Officers using conducted energy devices

Similar patterns are found in studies that have looked specifically at officer decisions to use CEDs. Interactional and civilian characteristics were, again, found to be important predictors:

- **Interactional characteristics** – Research in England and Wales has found that the odds of CEDs being fired were significantly higher in incidents involving the presence or use of a weapon, when the person subjected to force posed a risk to self or others, and when mental health was perceived to be a factor (Dymond 2018).

These findings stand in contrast to US research carried out in one police department, which found that officers were more likely to use CEDs than other

types of force in cases of relatively low level resistance (for example, verbal resistance). They were 'considerably less likely to use [CEDs] when faced with physical resistance or when faced with a suspect wielding a weapon' (Crow and Adrion 2011, p. 380; see also Ba and Grogger 2018, Gau and others 2010, Lin and Jones 2010). Finding similar results, Gau and others (2010, p. 37) felt that 'police are substituting [CED] for verbal de-escalation and other skilled ways of calming suspects down without hurting them'.

- **Citizen characteristics** – US research has often pointed to ethnicity being significant. People from non-White background have typically been found to be more likely to be subjected to CEDs or have CEDs used on them as the first type of force used (Crow and Adrion 2011, Lin and Jones 2010, Terrill and Paoline III 2017, Gau and others 2010).

A recent experiment carried out in the City of London found that officers were more likely to use force when they carried CEDs (Ariel and others 2018).

Officers being assaulted

The number and severity of assaults against officers and staff are of growing concern in the police service (NPCC and College of Policing 2020). Data published by the Home Office (2019a) have shown that 30,977 assaults against the police were recorded in 2018/19, up 18% on the previous year. This figure is very likely to be an underestimate (Clark-Darby and Quinton 2020), and not all of these offences will have been committed during use-of-force incidents.

The evidence base on the reasons for officers being assaulted is relatively limited. The REA by Dryer-Beers and others (2020) identified 18 studies that looked at the factors associated with assaults against the police. Like the police use of force, assaults were most consistently predicted by the nature of the interaction between officers and suspects. The chance of officers being assaulted were increased when the member of the public was being hostile towards the officer, resisting arrest or intoxicated. There was also some evidence to suggest assaults were more likely in higher crime areas. This general picture finds support in analysis carried out by Hampshire Constabulary, which pointed to alcohol and poor communication skills on the part of officers as potential contributory factors (Payne 2017).

Other studies have pointed to crewing and the carrying of CEDs as being important, though the evidence of their impact is mixed overall:

- Survey research by the Police Federation of England and Wales showed that the odds of officers reporting that had been assaulted or injured were significantly higher when they reported that they were 'always singled-crewed' (Houdmont and others 2018). Older research has also suggested that officers were more likely to be injured when they were on their own, once they experienced resistance (Brown 1994), but that double-crewed officers were more likely to face resistance (McKenzie and Whitehouse 1995).
- A review of US studies reported that CEDs might have reduced officer injuries, though the effect on the frequency of assaults was found to vary (Neuscheler and Freidlin 2015). In contrast, Ariel and others' (2018) randomised controlled trial in the City of London found that assaults on the police doubled when officers carried CEDs compared to 'business-as-usual' conditions.

People subjected to police force being injured

Comparatively little is known about injuries to the people who have been subjected to police force. Studies have generally found that injuries to the public are fairly common, but that most are fairly minor (Stroshine and Brandl 2012).

Studies on injuries to members of the public resulting from the police use of force are relatively rare, although some have been carried out on mental health and the odds of injury. Studies have indicated that, after controlling for the level of force used, people with reported 'mental health illnesses' were no more likely to be injured than people where none was reported (eg, Rossler and Terrill 2017, Morabito and Socia 2015).

Much of the empirical work on public injuries that does exist has focused on the use of less lethal weapons, including CEDs. Studies have used widely different definitions and measures for injuries (eg, rate, severity), which makes it difficult to draw any strong overall conclusions. However, research from the US has tended to show a link between CEDs and reduced injuries (Alpert and Dunham 2010, Taylor and Woods 2010, Kaminski and others 2013, MacDonald and others 2009, Neuscheler and Freidlin 2015, and Smith and others 2007). Other studies have cast

doubt on the relationship, with a key issue being whether puncture wounds from CED barbs were measured as injuries.

Looking more broadly at the effect of CEDs on human health, a systematic review by the Netherlands Institute for Health Services Research (Dückers and others 2019) found that the existing evidence base pointed to CEDs being low risk and having few acute health effects (see also DOMILL 2012, SACMILL 2016). It was not possible, however, for the review to reach any conclusions about the effects on chronic health, some specific health measures, and vulnerable people or high-risks groups, because of a general lack of empirical research. In addition, many of the studies included in the review involved fit, healthy volunteers and/or were funded by, or carried out in association with CED manufacturers.²²

²² Azadani et al. (2011) have suggested that the funding source and author affiliation in CED studies are strongly associated with study conclusions.

2. Results

Introduction

This chapter presents the findings of analysis carried out using data from a sample of 45,661 use-of-force incidents, in which only one officer used force on a person, that were recorded in 16 police forces during 2017/18. The chapter is divided into four sections, each seeking to answer a different research question, namely what factors were associated with an increase or decrease in the odds of:

- officers using different use-of-force tactics?
- CED-carrying officers using or discharging their CEDs?
- officers being assaulted or injured?
- the people subjected to police force being injured or hospitalised?

Each section begins with a brief overview of the national data published by the Home Office (2018). Then follows a description of the factors that were found to be associated with the outcome in question. Summary results tables use arrows to convey whether a factor was significantly associated with an increase (↑) or decrease (↓) in the likelihood of an outcome being recorded, relative to a reference category.²³ Due to limited space, not all of the significant findings included in the tables are discussed in the text.

For ease of reporting and in line with previous research (see Dryer-Beers and others 2020), the factors have been grouped according to whether they referred to characteristics of the officer, the person subjected to force, the context of the incident, the nature of the interaction, or the police force where the officer worked. Some factors could have been placed in more than one group. For example, some ‘impact factors’²⁴ could be categorised as interactional characteristics’ (eg, ‘alcohol’ or ‘mental health’).

²³ Full results are available on request from the College and are planned to be presented in future publications. Footnotes describe the reference category for each factor. If not listed, the reference category was the absence of that factor (eg, people who drink coffee compared to those who do not drink coffee). Significance: $p < 0.05$.

²⁴ The NPCC (2017) guidance described these as factors believed by officers to apply to the people on whom they used force, which they thought affected their decisions to use force.

What factors were associated with an increase or decrease in the odds of officers using different use-of-force tactics?

The data on the police use of force showed that 313,137 incidents were recorded during 2017/18 in England and Wales (Home Office 2018). A total of 468,875 physical tactics were reported as having been used during these incidents, as some officers will have used more than one type of force (eg, restraining and handcuffing someone to make an arrest).

The profile of the tactics used by officers in the sample of recorded incidents from the 16 police forces was similar to the national profile (see Home Office 2018). As Table 5 shows, around half of recorded incidents involved officers using only handcuffs (52%²⁵). Officers reported using just physical skills in over a quarter of incidents (29%²⁶). It was much less common for officers to physically use or only draw items of equipment or weapons (13%²⁷ and 7%²⁸ respectively). Handcuffs and unarmed force were by far the most frequent of all the specific tactics used (77% and 35% respectively).

Analysis was carried out to explore what factors were associated with a significant increase or decrease in the likelihood during recorded use-of-force incidents of officers:

- drawing but not physically using items of police equipment or weapons
- drawing and physically using equipment or weapons on the people subjected to force²⁹
- using unarmed force on the people subjected to force

²⁵ This figure ranged between 11% and 75% for individual forces, after rounding. The reasons for this and other ranges being so wide are not known, but may have to do with compliance with the new recording requirement.

²⁶ This figure ranged between 17% and 57% for individual forces, after rounding.

²⁷ This figure ranged between 5% and 36% for individual forces, after rounding.

²⁸ This figure ranged between 3% and 11% for individual forces, after rounding.

²⁹ 'Equipment and/or weapon' refers to the reported use of one or more of the following: baton, irritant spray, dog, spit guard, limb restraint, attenuating energy projectile, CED, shield, or 'other' items. Officers will have used multiple items in some incidents.

Table 5. The profile of the type of force and specific tactics used by officers

Force used			Recorded incidents	
			Number	% of total
Type of force used	Handcuffs (only)		23,614	51.7
	Any equipment and/or weapon drawn (only)		2,980	6.5
	Any equipment and/or weapon physically used		5,834	12.8
	Unarmed force (only)		13,233	29.0
	Total		45,661	100.0
Specific tactic used	Handcuffs		34,916	76.5
	Equipment and/or weapon drawn but not used	Baton	427	0.9
		Irritant spray	520	1.1
		Dog (deployed)	190	0.4
		Attenuating energy projectile	90	0.2
		CED	2,507	5.5
	Equipment and/or weapon physically used	Baton	221	0.5
		Irritant spray	764	1.7
		Dog (bite)	112	0.2
		Spit guard	277	0.2
		Limb restraint	2,795	6.1
		Attenuating energy projectile	15	0.0
		CED	384	0.8
	Unarmed force ^d		16,000	35.0
	Shield drawn or used		91	0.2
	Firearms drawn or used		310	0.7
	Other force		1,595	3.5
	Total		61,214	n/a

Notes: Figures from 45,661 records (16 police forces, 2017/18). ^aAttenuating energy projectiles, shields and firearms were not included as independent variables in the regression models because of low numbers and/or their unspecified use. ^bCED drawn, aimed or arced, or red-dotted, but not discharged. ^cCED used in probe-firing, drive-stun or angled drive-stun modes. ^dIncludes use of unarmed skills or ground restraint. ^eType of use unspecified. ^fAs multiple tactics could have been used in the same incident, the total number of specific tactics exceeded the total number of incidents (n=45,661) and the total percentage would have exceeded 100%.

Comparisons were made to the likelihood of officers just using handcuffs. The results, summarised in Table 6, showed that the following factors were associated with the types of force used. The reported behaviour of the member of the public subjected to force was most strongly associated with each of the three outcomes. The odds of these outcomes increased the most when that person was reported to have been actively or aggressively resisting the police.

Table 6. Factors associated with officers using different types of force

Characteristic	Factor		Odds of the officer...		
			Drawing equipment or weapon ⁱ	Using equipment or weapon ^j	Using unarmed force ^k
Officer	Gender ^a	Male	↑	↑	↑
	Length of service ^b	6 to 10 years	↑	↑	↑
		11 to 15 years	↑	↑	↑
		More than 15 years	↑	↑	↑
	Main duties ^c	Armed response	↑	↑	↑
		Other	↑	↑	↑
Citizen	Perceived age ^d	Under 18 years	–	↑	↑
	Perceived gender ^a	Male	↑	–	↓
	Perceived ethnicity ^e	Asian or Asian British	–	↓	–
		Black or Black British	↑	–	↑
		Mixed or Other	↓	–	–
	Perceived as 'mentally disabled'		↑	↑	–
Situational	Location	Public place ^l	–	–	↓
		Police or medical setting ^m	↓	↑	↑
		Dwelling	↑	–	↓
	Impact factors	Alcohol	↓	↑	↑
		Drugs	↓	–	–
		Mental health	↑	↑	↑
		Prior knowledge	↑	–	↓
		Crowd	–	↑	↑
	Officer single-crewed at the time ^f		↑	↑	↑
Interactional	Citizen behaviour ^g	Active resistance ⁿ	↑	↑	↑
	Reason for force ^h	Protect self or others ^o	↑	↑	↑

Note: Analysis based on 45,661 records (16 police forces, 2017/18).

Odds relative to: ^afemale or any other gender; ^bless than six years; ^cresponse; ^d18 years or over; ^eWhite or White British; ^fcrewed with another officer who did not use force; ^gcompliant or verbal or passive resistance; ^hprevent offence, secure evidence, effect search or arrest, method of entry, remove handcuffs, prevent harm or escape or other.

Includes: ⁱdrawing but not physically using baton, irritant spray, dog, attenuating energy projectile, CED and/or a firearm; ^jdrawing and physically using baton, irritant spray, dog, spit guard, limb restraints, shield, attenuating energy projectile and/or CED; ^kunarmed skills and ground restraint; ^lstreet or highway, public transport, retail premises, open ground, licensed premises, or sports or event stadia; ^mhospital, mental health setting, ambulance, police vehicle, custody block or police station; ⁿactive, aggressive and serious or aggravated resistance; ^oprotect self, public, subject or other officers.

Officer characteristics

Officer characteristics were highly consistent in their associations with officers drawing equipment or weapons, physically using them, and using unarmed force.

- All three outcomes were more likely when the officer in the incident identified as male compared to when the officer identified as female or another gender.
- Compared to officers with five years' service or less, officers with more experience were significantly more likely to use force other than just handcuffs.
- The odds of officers drawing and physically using equipment or weapons, and

going 'hands-on', were higher for armed response officers compared to response colleagues.

Citizen characteristics

Perceived characteristics of the person subjected to police force were significantly associated with the tactics used by officers, but the nature of these associations varied:

- People perceived to be less than 18 years old were more likely than older people to have items of equipment or weapons, and unarmed tactics, used on them. There was no difference for officers drawing equipment or weapons during incidents.
- Officers were more likely to draw equipment or weapons and less likely to use unarmed tactics or ground restraint on males than they were on females or other genders.
- The perceived ethnicity of the member of the public was associated with the tactics used by the police. The odds of officers using equipment or weapons during incidents involving people perceived to be 'Asian or Asian British' were lower than those involving people perceived to be 'White'. Conversely, the likelihood of officers drawing equipment or weapons and using unarmed force (but not physically using equipment or weapons) was higher when the person was identified as 'Black or Black British'.
- People subjected to police force were more likely to have equipment or weapons drawn and physically used on them (but not unarmed tactics) when officers perceived them to be 'mentally disabled'³⁰.

³⁰ This term was used on the monitoring form, and is to be changed to a more appropriate term from 2020/21. The NPCC (2017) guidance on recording stated that the term referred to any perceived sensory impairment, fluctuating or recurring impairment (eg, epilepsy), developmental impairment (eg, autistic spectrum disorders), learning disabilities, or mental health condition or mental illness. This category was separate from, and not highly correlated with, 'mental health' as an identified impact factor (see footnote 17).

Situational characteristics

The context of use-of-force incidents appeared to have some influence on the likelihood of different tactics being used by officers. The associations in the data were numerous, but fairly inconsistent. The most consistent were as follows:

- Officers were more likely to manage encounters by drawing and using equipment, and using unarmed tactics, when ‘mental health’ was considered to be an impact factor.
- The use of equipment, and unarmed force, were also more common in incidents where ‘crowds’ was a perceived impact factor. No relationship was found with the drawing of equipment.
- The odds of officers physically using equipment or weapons, and using unarmed tactics were higher when incidents took place in police and medical settings³¹ or involved ‘alcohol’. Conversely, the odds of officers drawing equipment or weapons but not using them were lower in these situations.
- The odds of officers drawing and physically using equipment or weapons, and going ‘hands-on’, were increased when officers were single-crewed compared to incidents where they were crewed with another officer who did not use force.³²

Interactional characteristics

The associations between aspects of the interaction and the types of force used during incidents were consistent:

- The odds of officers drawing equipment or weapons, physically using them, and using unarmed force were all increased when members of the public were actively or aggressively resisting, or when force was reportedly used to protect officers or others.

³¹ ‘Police and medical settings’ refer to institutional locations where people may be formally detained, deprived of their liberty, or have restrictions placed on their movement (eg, hospital, mental health setting, ambulance, police vehicle, custody block or police station).

³² As incidents where two or more officers used force on the same person were excluded from the analysis to prevent ‘double-counting’, it was only possible to compare incidents where officers were single-crewed with those where officers deployed with colleagues who did not use force during an incident.

What factors were associated with an increase or decrease in the odds of CED-carrying officers using or discharging their CEDs?

The Home Office (2018) reported that, in 2017/18, officers drew their CEDs 17,616 times during use-of-force incidents in England and Wales. Of those, CEDs were reportedly fired or used in drive-stun or angled drive-stun modes during 2,004 incidents.³³

In the sample of 45,661 recorded incidents from 16 police forces used in the analysis, CEDs were reportedly drawn in 5% of incidents, and discharged in approximately 1% of incidents. In order to explore the circumstances when CEDs were more or less likely to be used and discharged by officers, the analysis focused on a subsample of 11,176 cases where officers had indicated they were carrying CEDs regardless of whether they actually used or discharged them (Table 7). For clarity, 'drawn' refers to a CED being drawn, aimed, arced or red-dotted (but not being discharged), while 'discharged' refers to a CED being used in probe-firing, drive-stun or angled drive-stun modes.

Table 7. The profile of CED use in incidents recorded by CED-carrying officers

Force used		Recorded incidents	
		Number	% of total
Type of CED use	Carried but not used	8,285	74.1
	Drawn but not discharged ^a	2,507	22.4
	Discharged ^b	384	3.4
	Total	11,176	100.0

Notes: Figures from 11,176 records (16 police forces, 2017/18). ^aCED drawn, aimed or arced, or red-dotted, but not discharged. ^bCED used in probe-firing, drive-stun or angled drive-stun modes.

The likelihood of CED-carrying officers not using their CEDs in any way (74% of incidents³⁴) was compared to the likelihood of them reporting they had:

- drawn but not discharged their CEDs (22% of incidents³⁵)
- discharged their CEDs (3% of incidents³⁶)

The results, summarised in Table 8, showed that the following factors were associated with officers drawing or discharging their CEDs. Again, the nature of the

³³ See NPCC (2020) for descriptions of 'drive-stun' and 'angled drive-stun'.

³⁴ This figure ranged between 0% and 92% for individual forces, after rounding.

³⁵ This figure ranged between 7% and 84% for individual forces, after rounding.

³⁶ This figure ranged between 1% and 18% for individual forces, after rounding.

interactions between officers and the people on whom they used force – and in particular the perceived level of threat in those interactions – were most strongly associated with outcomes.

Table 8. Factors associated with CED-carrying officers drawing or discharging their CEDs

Characteristic	Factor		Odds of the officer...	
			Drawing but not discharging CED ⁱ	Discharging CED ^j
Officer	Gender ^a	Male	↑	–
	Length of service ^b	6 to 10 years	–	–
		11 to 15 years	–	–
		More than 15 years	↓	–
	Main duties ^c	Armed response	–	↑
		Other	↓	–
Citizen	Perceived age ^d	Under 18 years	↓	↓
	Perceived gender ^a	Male	↑	↑
	Perceived ethnicity ^e	Asian or Asian British	↓	↓
		Black or Black British	↑	–
		Mixed or Other	–	–
	Perceived as ‘mentally disabled’		↑	–
Situational	Location	Public place ^k	–	–
		Police or medical setting ^l	↓	↓
		Dwelling	↑	↑
	Impact factors	Alcohol	↓	↓
		Drugs	↓	–
		Mental health	↑	↑
		Prior knowledge	↑	–
		Crowd	↓	↓
	Officer single-crewed at the time ^f		–	↑
Interactional	Citizen behaviour ^g	Active resistance ^m	↑	↑
	Reason for force ^h	Protect self or others ⁿ	↑	↑
Organisational	Increased proportion of use-of-force incidents where officers reported carrying CEDs		↓	↓

Note: Analysis based on 11,176 records (16 police forces, 2017/18).

Odds relative to: ^afemale or any other gender; ^bless than six years; ^cresponse; ^d18 years or over; ^eWhite or White British; ^fcrewed with another officer who did not use force; ^gcompliant or verbal or passive resistance; ^hprevent offence, secure evidence, effect search or arrest, method of entry, remove handcuffs, prevent harm or escape or other..

Includes: ⁱCED drawn, aimed or arced, or red-dotted, but not discharged; ^jCED used in probe-firing, drive-stun or angled drive-stun modes; ^kstreet or highway, public transport, retail premises, open ground, licensed premises, or sports or event stadia; ^lhospital, mental health setting, ambulance, police vehicle, custody block or police station; ^mactive, aggressive and serious or aggravated resistance; ⁿprotect self, public, subject or other officers.

The factor with the strongest association with:

- CED being fired was the officer reporting that they faced active or aggressive resistance from the member of the public
- CED being drawn, but not fired, was the officer reporting that they used force to protect themselves or other people

Officer characteristics

The characteristics of CED-carrying officers were inconsistent in their associations with whether the officers drew or discharged their CEDs.

- Male officers were more likely to draw their CEDs than officers of other genders, but no more or less likely to discharge them.
- With length of service, the only association that was found was between officers with more than 15 years' service and being less likely to use CEDs.
- The odds of officers discharging CEDs (but not using them in other ways) were higher during armed response duties, compared to during routine response duties.

Citizen characteristics

The relationships between the characteristics of the person and CED use were largely mixed. Two consistent associations were found, however.

- CEDs were significantly more likely to be drawn and discharged when the member of the public was male than when they were another gender.
- The odds of a CED being drawn and discharged were also lower when the person in the incident was described as 'Asian or Asian British' or under 18 years old, compared to when they were identified as 'White' or 18 years or over.

Other personal factors were more inconsistent in their relationships with officers drawing or discharging their CEDs.

- Officers were significantly more likely to have drawn CEDs (but not discharged them) when incidents involved someone they identified as 'Black or Black British' or 'mentally disabled', compared to when they involved people perceived to be 'White' or as not being 'mentally disabled'.

Situational characteristics

The associations between different contextual factors and CEDs were mixed overall, but the individual factors tended to be consistent in terms of whether they were associated with increased or decreased odds of officers drawing and discharging CEDs.

- The location of the incident was often statistically significant. Officers were more likely draw and discharge CEDs in dwellings, and less likely to do so in police or medical settings.
- The chances of officers drawing and discharging their CEDs were lower when 'alcohol' or 'crowds' were reported impact factors, and higher when 'mental health' was listed as an impact factor.
- The odds of officers discharging CEDs (but not using them in other ways) were higher when they were single-crewed, compared to when they were crewed with other officers who did not use force during the incident.³⁷

Interactional characteristics

The nature of the interactions between officers and the people subjected to police force had a consistent and strong relationship with CED usage.

- Officers were more likely to have drawn CEDs and discharged them when the person was resisting actively or aggressively compared to when they were resisting passively, verbally or not at all.
- Both outcomes were also more likely when officers reported using force to protect themselves or someone else, rather than for another reason.

Organisational characteristics

Factors about police forces where incidents took place were included in all statistical models, but were only found to be significant in relation to CED use. As the proportion of use-of force-incidents where officers reported carrying CEDs increased, the odds of CEDs being drawn or discharged decreased.

³⁷ Comparisons with those deployed with colleagues who also used force were not possible.

What factors were associated with an increase or decrease in the odds of officers being assaulted or injured?

National data (Home Office 2018) has shown that, in 2017/18, officers reported that they had been assaulted during 7,728 use-of-force incidents (2% of the total). Most, but not all, of these officers reported injuries too. Officers also reported sustaining injuries during other incidents that were not a direct result of an assault. Overall, injuries were reported in 18,142 incidents (6% of the total). Injuries were described as 'severe' in 254 cases.

There are reasons to be cautious about the data. The number of assaults and injuries are very likely to underestimate the scale of the problem. The National Police Safety Survey (Clark-Darby and Quinton 2020) found that around two-thirds of officers and staff who responded and had been assaulted said they had reported their assaults. It is also not possible to determine from police data the precise point during an incident at which an officer was assaulted and/or injured. In some cases, assaults may have prompted officers to use force (eg, officers restraining offenders who had assaulted them). In other cases, assaults could have happened at the same time or after officers used force (eg, offenders assaulting officers who had restrained them). As each record provided a subjective account of an incident, there were very likely to have been differences between officers and incidents in what was perceived, thought relevant and recorded (eg, threats, assaults and injuries).

In the data from 16 police forces used in the analysis, assaults were reported in 5% of all incidents³⁸ (n=2,187). Injuries were also sustained in 5% of incidents³⁹ (n=2,131), though some injuries will have been for reasons other than an assault.⁴⁰ The analysis compared incidents that involved reported assaults or injuries to officers with those that did not. The results, summarised in Table 9, showed that the following factors were associated with officers being assaulted or injured during use-of-force incidents.⁴¹

³⁸ The figure ranged between 2% and 11% for individual forces, after rounding.

³⁹ The figure ranged between 3% and 11% for individual forces, after rounding.

⁴⁰ Assaults and injuries were not highly correlated in the data.

⁴¹ Analysis was also carried out in which the specific tactics used were combined into three categories, as per the outcomes in table 6. The results were very similar to those presented in this report, though a small number of associations changed in their significance. In the alternative model for officer injury, 'carrying CED' became

Table 9. Factors associated with officers being assaulted or injured

Characteristic	Factor		Odds of the officer...	
			Being assaulted	Being injured
Officer	Gender ^a	Male	–	↓
	Length of service ^b	6 to 10 years	–	↑
		11 to 15 years	–	↑
		More than 15 years	–	↑
	Main duties ^c	Armed response	↓	↓
		Other	↓	–
Citizen	Perceived age ^d	Under 18 years	↑	–
	Perceived gender ^a	Male	↓	↓
	Perceived ethnicity ^e	Asian or Asian British	–	–
		Black or Black British	↑	↑
		Mixed or Other	–	–
	Perceived as 'mentally disabled'		↑	–
Situational	Location	Public place ^j	–	–
		Police or medical setting ^k	–	↓
		Dwelling	–	–
	Impact factors	Alcohol	↑	–
		Drugs	–	–
		Mental health	–	–
		Prior knowledge	↓	–
		Crowd	↑	–
	Officer single-crewed at the time ^f		↑	↑
	Officer carried CED at the time		–	–
Interactional	Citizen behaviour ^g	Active resistance ^l	n/a ^q	↑
	Reason for force ^h	Protect self or others ^m	↑	↑
Use of force	Equipment or weapon drawn ⁱ	Baton	–	–
		Irritant spray	↑	↑
		Dog (deployed)	–	–
		CED ⁿ	↓	–
	Equipment or weapon used ⁱ	Baton	↑	↑
		Irritant spray	↑	↑
		Dog (bite)	–	–
		Spit guard	↑	–
		Limb restraints	↑	↑
		CED ^o	↑	↑
	Unarmed force ^p		↑	↑

Note: Analysis based on 45,661 records (16 police forces, 2017/18).

Odds relative to: ^afemale or any other gender; ^bless than six years; ^cresponse; ^d18 years or over; ^eWhite or White British; ^fcrewed with another officer who did not use force; ^gcompliant or verbal or passive resistance; ^hprevent offence, secure evidence, effect search or arrest, method of entry, remove handcuffs, prevent harm or escape or other; ⁱusing only handcuffs.

Includes: ^jstreet or highway, public transport, retail premises, open ground, licensed premises, or sports or event stadia; ^khospital, mental health setting, ambulance, police vehicle, custody block or police station; ^lactive, aggressive and serious or aggravated resistance; ^mprotect self, public, subject or other officers; ⁿCED drawn, aimed or arced, or red-dotted, but not discharged; ^oCED used in probe-firing, drive-stun or angled drive-stun modes; ^punarmed skills or ground restraint. ^qNot included as variable too highly correlated with reported assaults to enable analysis.

associated with decreased odds of injury, while 'citizen gender' ceased to be significant. In the alternative assault model, 'civilian age' was no longer significant. These results are available on request from the College.

Overall, the factor that had the strongest association with:

- officer assault was the police use of unarmed force⁴²
- officer injury was the member of the public reportedly actively or aggressively resisting the officer

Officer characteristics

The nature of officer deployment appeared to have consistent effects on the chances of officers reporting assaults or injuries during use-of-force incidents.

- Those carrying out armed response duties were less likely to report having been assaulted and injured than those in routine response roles.

Personal factors related to the officer were less consistent in their associations.

- Male officers were less likely to report injuries than officers of other genders. No difference was found for assaults.
- Similarly, older in service officers were more likely to report injuries than those with five years or less service. Again, there was no difference in odds for reported assaults.

Citizen characteristics

Consistent relationships were identified between the perceived gender and ethnicity of the person subjected to force, and the officer being assaulted and injured. As with all factors in the regression models, gender and ethnicity cannot be assumed to have a causal effect as they might, for example, have indirectly influenced the flow of the interaction or the nature of the threat perceived by officers.

- The odds of assault and injury were both significantly lower in incidents involving males compared to those involving females or other genders.
- Officers were more likely to report having been assaulted and injured when incidents involved people they identified as 'Black or Black British' compared to people perceived as 'White'.

Assaults (but not injuries) were more likely to be reported in use-of-force incidents involving people under 18 years of age compared to adults.

⁴² It was not known whether the assault happened before or after the use of police force.

Situational characteristics

With the exception of crewing, situational factors were generally inconsistent in their associations with what happened to the officer during use-of-force incidents.

- The odds of assault and injury were greater when officers were single-crewed at the time of the incident compared to when officers deployed with colleagues who did not use force.⁴³
- The odds of assault were increased when 'alcohol' and 'crowds' were identified by officers as impact factors, and reduced when they had 'prior knowledge' of the person.
- Reported injuries were less likely in police and medical settings than elsewhere.

Interactional characteristics

The ways the officer and the person subjected to force interacted with one another were consistently and strongly associated with assaults and injuries. These aspects of the interaction appeared to reflect the nature of the threat faced by officers.

- The factor found to be associated with an increase in the odds of officer injury the most was the perceived behaviour of the person subjected to force, with active or aggressive resistance increasing the odds of officer injury.
- Assault and injury were both more likely to be reported when the officer said they used force for protection rather than some other reason (eg, to make an arrest).

Use of force characteristics

The type of force used by officers was consistently associated with the odds of them being assaulted and injured. However, strong conclusions cannot be made from these findings because multiple tactics will have been used in some incidents and there is no way of knowing the order of events from the data.

- In most cases, officers were no more or less likely to have been assaulted or injured when they drew any item of equipment and/or weapon (relative to handcuffs). There were two exceptions. Drawing, but not physically using, irritant spray was associated with increased odds of reported injuries and assaults. The drawing of CEDs was associated with reduced odds of assaults but not with the odds of injury.

⁴³ Comparisons with those deployed with other officers who also used force were not possible.

- Assaults and injuries were both more likely when officers used unarmed force or almost any type of equipment or weapon, compared to when they used only handcuffs. Unarmed force was mostly strongly associated with the odds of officers being assaulted.

What factors were associated with an increase or decrease in the odds of the people subjected to police force being injured or hospitalised?

In 2017/18, officers reported that the people subjected to police force had been injured in 19,565 incidents (6% of the total) (Home Office 2018). Hospitalisation was reported in 11,277 incidents (4% of the total). Some, but not all, of these reported injuries or hospital admissions will have been a result of officers using force. The people subjected to police force may have hurt themselves and/or required medical attention for a range of possible reasons (eg, intoxication or falling over). Injuries and hospital admissions are also likely to be under-represented in police data, as officers will not necessarily know about or record any injuries that presented afterwards or delayed admissions to hospitals.

In the data from 16 police forces used in the current analysis, there were:

- 2,522 cases where the people subjected to police force were reportedly injured (6% of all incidents⁴⁴).
- 290 where hospitalisation followed injuries resulting from police force (<1% of all incidents⁴⁵), rather than for other reasons (eg, intoxication or falling over).⁴⁶

Incidents in which the person was injured as a result of police force, or hospitalised due to injuries resulting from police force, were compared to incidents where those outcomes were not recorded. The results, summarised in Table 10, are described below.⁴⁷ The physical use of police dogs – where the dogs bit the member of the public – was the factor that was most strongly associated with increased odds of injury and of hospitalisation.

⁴⁴ This figure ranged between 3% and 14% for individual forces, after rounding.

⁴⁵ This figure ranged between 0% and 2% for individual forces, after rounding.

⁴⁶ The proportion of incidents involving hospitalisation was much higher in the published Home Office statistics (2018 and 2019b), because they included hospitalisation due to other reasons.

⁴⁷ Analysis was also carried out in which the specific tactics used were combined into three categories, as per the outcomes in table 6. The results were very similar to those presented in this report, though a small number of associations changed in their significance.

Table 10. Factors associated with members of the public being injured as a result of police force, or hospitalised due to injuries resulting from police force

Characteristic	Factor		The odds of the citizen...	
			Being injured	Being hospitalised following injury
Officer	Gender ^a	Male	↑	–
	Length of service ^b	6 to 10 years	↑	↓
		11 to 15 years	↑	–
		More than 15 years	↑	–
	Main duties ^c	Armed response	–	–
		Other	↓	–
Citizen	Perceived gender ^a	Male	↑	↑
	Perceived age ^d	Under 18 years	–	–
	Perceived ethnicity ^e	Asian or Asian British	–	–
		Black or Black British	↓	↓
		Mixed or Other	–	–
	Perceived as 'mentally disabled'		–	↑
Situational	Location	Public place ^j	↑	–
		Police or medical setting ^k	↓	–
		Dwelling	–	–
	Impact factors	Alcohol	–	–
		Drugs	–	↑
		Mental health	–	↑
		Prior knowledge	–	–
		Crowd	↓	↓
	Officer single-crewed at the time ^f		–	–
	Officer carried CED at the time		–	–
Interactional	Citizen behaviour ^g	Active resistance ^l	↑	↑
	Reason for force ^h	Protect self or others ^m	–	–
Use of force	Equipment or weapon drawn ⁱ	Baton	–	–
		Irritant spray	–	–
		Dog (deployed)	↑	↑
		CED ⁿ	↓	–
	Equipment or weapon used ⁱ	Baton	↑	↑
		Irritant spray	↑	–
		Dog (bite)	↑	↑
		Spit guard	–	–
		Limb restraints	↑	↑
		CED ^o	↑	↑
	Unarmed force ^p		↑	↑

Note: Analysis based on 45,661 records (16 police forces, 2017/18).

Odds relative to: ^afemale or any other gender; ^bless than six years; ^cresponse; ^d18 years or over; ^eWhite or White British; ^fcrewed with another officer who did not use force; ^gcompliant or verbal or passive resistance; ^hprevent offence, secure evidence, effect search or arrest, method of entry, remove handcuffs, prevent harm or escape or other; ⁱusing only handcuffs.

Includes: ^jstreet or highway, public transport, retail premises, open ground, licensed premises, or sports or event stadia; ^khospital, mental health setting, ambulance, police vehicle, custody block or police station; ^lactive, aggressive and serious or aggravated resistance; ^mprotect self, public, subject or other officers; ⁿCED drawn, aimed or arced, or red-dotted, but not discharged; ^oCED used in probe-firing, drive-stun or angled drive-stun modes; ^punarmed skills or ground restraint.

Officer characteristics

Overall, the relationships between officer characteristics and whether the person subjected to force was reportedly injured or injured and then hospitalised were found to be inconsistent.

- Reports of injury were more likely when officers were male than when they were of another gender.
- The odds of injury were also increased in incidents involving officers with more than five years' experience compared to those with less.

Citizen characteristics

Some consistent relationships were identified between the personal characteristics of the citizen and whether they were reported as having been injured as a result of being subjected to police force, or similarly injured and subsequently admitted to hospital.

- Reports of injury and subsequent hospitalisation were both significantly more likely when the member of the public was described as male rather than female or any other gender.
- The odds of injury, and hospitalisation following injury, were both lower for people identified by the police as 'Black or Black British' compared to those perceived as 'White'.

In addition, there was a greater chance of people thought to be 'mentally disabled' being admitted to hospital following use-of-force injuries compared to other people. This association was not present with the other injury outcome.

Interactional characteristics

Both injury and hospitalisation outcomes were more likely when officers faced active or aggressive resistance, rather than when they did not.

Use of force characteristics

The tactics used by officers were consistently associated with injury and hospitalisation outcomes.

- The application of most types of physical force was generally associated with

increased odds of reported injury, and hospitalisation following injury, compared to the use of handcuffs (although they did so at different rates). These included use of unarmed force, batons, dogs, limb restraints and CED. Of all the factors, the physical use of dogs was most strongly associated an increase in the odds of both outcomes.

- In contrast, when officers drew equipment or weapons but did not use them, both injury and hospitalisation outcomes were generally no more or less likely than when they used handcuffs.

Some inconsistent associations were also found.

- The use of irritant spray by officers during incidents was associated with increased odds of reported injury (but not hospitalisation following injury) compared to handcuffs. The use of spit guards was not related to either outcome.
- The deployment (but not physical use) of dogs was associated with increased odds of injury and hospitalisation.
- Reports of public injury (but not hospitalisation following injury) were significantly less likely in incidents where officers drew, but did not discharge, CEDs, compared to when they used handcuffs.

3. Conclusions

This report describes the results of statistical analysis exploring what force officers used, on whom, and under what circumstances – as well as associated assaults and injuries – across a large sample of police forces. The analysis is the first of its kind to be carried out in England and Wales, and was only possible thanks to the new recording requirement introduced in 2017/18. The introduction of this recording requirement represents a crucial step towards greater transparency and a better understanding of the police use of force.

Many of the results are broadly in keeping with the existing literature, even though most prior studies were carried out in the US. The current analysis, for example, re-emphasises the importance of:

- **Interactional characteristics** – particularly the officer facing active or aggressive resistance from the member of the public, and using force for protection
- **Situational characteristics** – particularly the officer being single-crewed at the time of the incident,⁴⁸ and identifying ‘mental health’ as an impact factor
- **Citizen characteristics** – particularly the perceived age, ethnicity and mental health of the person subjected to police force

These factors are notable for being significantly associated with most and, in some cases, all, of the outcomes in the various regression models. Of these, the interactional characteristics tended to be most strongly associated with officers using particular tactics, with them being assaulted and injured, and with members of the public being injured and with being admitted to hospital.

As with previous research, the analysis also highlights the potential deterrent effect of drawing CEDs on assaults against the police, and the much higher odds of public injury when police dogs were used (Smith and others 2010).

Some other findings might appear – at least at first sight – to diverge from the existing evidence base. The analysis showed, for example, that the people subjected to police force were at an increased risk of injury (with or without hospitalisation) when officers reportedly discharged their CEDs or used unarmed force, batons or

⁴⁸ Relative to those who deployed with colleagues who did not use force during an incident. Comparisons with officers deploying with colleagues who also used force during an incident are not known.

limb restraints. However, comparisons were made to incidents where handcuffing was the only force used.

The data resulting from the new recording requirement affords new opportunities for the police to take an evidence-based approach in relation to one of its defining, necessary and most challenging roles. Taking such an approach is all the more important because conflict situations can be high risk to both the police and the public. Force might be required because officers are attacked or threatened, and they could hurt themselves inadvertently while using it. Their uses of force can lead to members of the public being killed or seriously injured. Questions may also be asked about the necessity, proportionality and fairness of police actions – in general and in specific incidents – that could affect public trust and/or result in officers being disciplined. By understanding when force is most likely and what the risks are to police and public safety, changes to policy and practice aimed at reducing these risks and improving outcomes can be developed and tested.

Some aspects of the data recorded by the police have been particularly valuable. The analysis benefitted from datasets including a wide range of use-of-force tactics. The inclusion, for example, of cases when officers used only handcuffs, or drew weapons but did not use them, enabled the comparisons that were central to the analysis. As with any analysis, however, there are a number of caveats and limitations that affect how much weight should be attached to the results and how they should be interpreted. Overall, the analysis provides provisional insights about certain use-of-force incidents. The analysis was limited to incidents involving one officer using force on one member of the public, so more serious incidents may have been excluded. It was highly likely that incidents were under-recorded. Those incidents that were recorded only ever provided an account of what happened from the officer perspective. Moreover, as individual records did not clearly set out the order of events, but included all the different tactics that were reportedly used, it cannot be assumed that use of specific types of force caused or prevented particular outcomes. Indeed, analysis of the kind presented in this report can only point to statistical relationships in the data, rather than causal explanations.

These issues mean the results do not tell the whole story and should not be used to make strong statements about the police use of force or police and public safety. There is a need for further research – using a mix of different methods – to

understand the issues better and to evaluate the impact of changes to policy and practice (eg, personal safety training). Improvements to the data that are collected would also support more comprehensive analysis. It would be useful for individual use of force records, for example, to:

- clarify whether an assault and/or injury occurred before, after or while a particular tactic was used
- specify how many officers were thought to have also used force on the member of the public
- be linked when they related to the same incident

There would be added value in officers recording the precise personal safety training techniques they used during incidents to inform the development, design and delivery of national curriculum. To minimise the burden on officers and forces, these additional data could be recorded by officers from a sample of forces for a defined period of time.

Despite the limitations with the data and the analysis, the current study offers a range of unique – if tentative – conclusions about officer and staff safety, and the police use of force more broadly. Further work is required to tease out the implications of the research. But this should not deter policymakers, senior police leaders and the frontline from thinking about how they might be used to help officers manage conflict and improve safety for all.

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Appendix

Methods

In spring 2018, Deputy Assistant Commissioner Matt Twist⁴⁹ wrote to the 43 forces in England & Wales and the British Transport Police. He requested they share their anonymised 2017/18 use-of-force datasets with the research team for inclusion in national analysis. The research team received datasets from 32 forces, containing details from 266,954 records entered on use-of-force forms.

The research team checked, cleaned and merged the data. The first steps involved excluding:

- Datasets and individual records containing missing information that was essential for the analysis (which reduced the number of datasets from 32 to 16)
- Datasets and individual records containing information stored in incompatible formats that could not be recoded or rendered compatible
- Individual records that did not cover the period 1 April 2017 to 31 March 2018.
- Records where force had not been used, the force used had not been specified or where force was used for 'method of entry' only (ie, force used to gain entry into a building rather than on a person)

Next, records related to the same use-of-force incident had to be identified and excluded from the data. This step was necessary because each record provided an account of an individual officer's use of force against one person (see Table A1 below). When multiple officers used force on the same person during the same incident, multiple records should have been completed, which would have risked 'double-counting' outcomes. For example, 'hospitalisation' would have appeared twice in the data if a person was sent to hospital during an incident in which two officers used force on that person.

⁴⁹ NPCC lead for self-defence, arrest and restraint, and chair of the NPCC's use-of-force recording board.

Table A1. The number of records to be completed according to the number of officers and people subjected to police force involved in each use-of-force incident

Number of officers who used force during incident	Number of people subjected to force during incident	Number of use-of-force records required	Account provided by use-of-force records
One	One	One	The officer provided an account for the person on whom he or she used force
One	Multiple	Multiple	The officer provided separate accounts for the individual people on whom he or she used force
Multiple	One	Multiple	Each officer provided separate accounts for the person on whom they all used force
Multiple	Multiple	Multiple	Each officer provided separate accounts for the individual people on whom he or she used force

There was no variable that allowed for the straightforward identification of related cases. Incident numbers could not be used because they were either not recorded or too unreliable. Instead, records were considered as potentially relating to the same incident using a combination of date, time and location variables.⁵⁰ This conservative approach had limitations in that it would have resulted in some ‘false-positives’ – records being excluded that did not, in fact, relate to the same incident. This risk was considered preferable to ‘double-counting’ outcomes and biasing the results in unknown ways. The duplication of information across related records has been identified as a problem in previous US research (eg, Macdonald and others 2009) and the approach taken by the research team in the current study was in keeping with how others have sought to address this issue (eg, Mesloh and others 2008). After the data had been cleaned and cases involving multiple officers been removed, a total of 45,661 use-of-force records from 16 police forces were contained in the final dataset (see Table A2). These data were analysed using binary logistic and multi-nominal regression. Only statistically significant results ($p < 0.05$) are reported in the main body of the report.

⁵⁰ Records were excluded if they were on the same date, at the same location and within an hour of each other.

Table A2: Count of use-of-force records used in the analysis, 16 police forces 2017/18a

Police force	Recorded incidents	
	Number	% of total
Bedfordshire	631	1.4
British Transport Police	1,817	4.0
Cambridgeshire	768	1.7
Cleveland	2,923	6.4
Derbyshire	341	0.7
Essex ^b	2,258	4.9
Greater Manchester	2,817	6.2
Hertfordshire	1,238	2.7
Humberside	2,447	5.4
Lincolnshire	1,907	4.2
Metropolitan	19,621	43.0
North Yorkshire	1,180	2.6
Staffordshire	1,852	4.1
South Yorkshire	3,200	7.0
Thames Valley	1,795	3.9
Wiltshire	866	1.9
Total	45,661	100.0

Notes: ^aThese figures represent the number of use-of-force records from each police force used in the analysis, rather than all use-of-force incidents in those areas, for the reasons outlined in the appendix and main body of this report. ^bThese figures are from mid-July due to the force changing in the way incidents were recorded locally.

Multi-level regression models were developed, with an error term at the force level, because the data were ‘nested’. Put simply, the individual use-of-force records (Level 1) were grouped by force area (Level 2), and so might have shared similar qualities and been associated with factors at that organisational level.⁵¹ For the hospitalisation model (table 10), the adaptive Gaussian quadrature method was used as it was designed for outcomes that are rare events.⁵²

The frequency of the outcomes and Level 1 variables included in the regression models are presented in Table A3.

⁵¹ Several Level 2 measures were included in the models. These failed to reach significance and, for simplicity, have not been reported. The only exception was with the CED models (Table 8), where a Level 2 association was found to be significant and has been reported.

⁵² In addition to the models reported here, a range of other models were run (as detailed in the footnotes above) and robustness checks were carried out. This included running the models with and without data from the Metropolitan Police. These models produced broadly similar results, but are not reported for reason of space. Results from these additional models are available from the College on request.

Table A3: Count of outcomes and Level 1 variables from the use-of-force records used in the analysis, 16 police forces 2017/18

Characteristic	Factor		Recorded incidents	
			Number	% of total
Outcome	Officer	Assaulted	2,187	4.8
		Injured	2,131	4.7
	Member of public	Injured as a result of force	2,522	5.5
		Hospitalised following injury	290	0.6
Officer	Gender	Male	38,364	86.0
		Female	6,036	14.0
	Length of service	5 years or less	23,858	52.3
		6 to 10 years	8,679	19.0
		11 to 15 years	6,770	14.8
		More than 15 years	6,354	13.9
	Main duties	Response	36,358	79.6
		Armed response	1,589	3.5
		Other	7,714	16.9
Citizen	Perceived age	Under 18 years	4,847	10.6
	Perceived gender	Male	38,909	85.2
	Perceived ethnicity	White	31,420	68.8
		Asian or Asian British	3,334	7.3
		Black or Black British	8,486	18.6
		Mixed or Other	2,421	5.3
	Perceived as 'mentally disabled'		5,371	11.8
Situation	Location	Public place	26,774	58.6
		Police or medical setting	7,872	17.2
		Dwelling	10,613	23.2
	Impact factors	Alcohol	16,198	35.5
		Drugs	13,294	29.1
		Mental health	10,001	21.9
		Prior knowledge	11,998	26.3
		Crowd	4,006	8.8
	Officer single-crewed at the time		5,465	12.0
	Officer carried CED at the time		11,176	24.5
Interaction	Citizen behaviour	Active resistance	19,689	43.1
	Reason for force	Protect self or others	39,616	86.8

Includes: ^jstreet or highway, public transport, retail premises, open ground, licensed premises, or sports or event stadia; ^khospital, mental health setting, ambulance, police vehicle, custody block or police station; ^lactive, aggressive and serious or aggravated resistance; ^mprotect self, public, subject or other officers; ⁿCED drawn, aimed or arced, or red-dotted, but not discharged; ^oCED used in probe-firing, drive-stun or angled drive-stun modes; ^punarmed skills or ground restraint.

Numerous issues were identified with the police data. For example, despite the standardised monitoring form (NPCC 2017 and 2018), there were inconsistencies in the way information was captured between – and sometimes within – datasets. Datasets variously contained the order in which different tactics were used or binary measures as to whether particular tactics were used. Some datasets contained both, while others changed the way in which force was recorded mid-year. Similarly, with

CED use, datasets variously contained only the 'highest' use of CED or all uses. The number of CED uses that could be recorded also varied. The individual cases in the datasets also contained contradictory or inconsistent information (eg, an indication of CED having been used or of an injury having occurred, but no further details). In addition, in some datasets, there was a high rate of CED use whenever officers reportedly carried CEDs, which might suggest officers did not report carrying CEDs if they did not use them.

These limitations are by no means an exhaustive list (see also Home Office 2018), but underline the need for the analysis to be interpreted with caution. The results should not be considered a comprehensive, definitive record of use of force, or other outcomes of interest, in participating forces. They should not be seen as representative of all police uses of force in 2017/18.

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