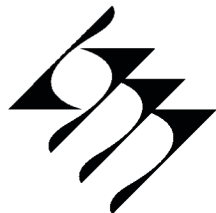


# OC Spray



**Oleoresin capsicum (OC) spray use by Queensland police**

CRIME AND  
MISCONDUCT  
COMMISSION



QUEENSLAND



**October 2005**

# OC spray

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CRIME AND  
MISCONDUCT  
COMMISSION



QUEENSLAND

**CMC vision:**

To be a powerful agent for protecting Queenslanders from major crime and promoting a trustworthy public sector.

**CMC mission:**

To combat crime and improve public sector integrity.

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Crime and Misconduct Commission  
140 Creek Street, Brisbane, Queensland, Australia 4000

GPO Box 3123  
Brisbane Qld 4001

Tel.: (07) 3360 6060  
Fax: (07) 3360 6333  
Email: [mailbox@cmc.qld.gov.au](mailto:mailbox@cmc.qld.gov.au)

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# Abbreviations

CMC	Crime and Misconduct Commission
COMPASS	Complaints and Operations Management Processing and Statistical System
CRISP	Crime Reporting Information System for Police
MO	modus operandi
OC	oleoresin capsicum
OPM	Operational Procedures Manual
NTA	notice to appear
POST	Police Operational Skills and Tactics training
QPS	Queensland Police Service
SUFM	Situational Use-of-Force Model



# Preface

Police officers have a difficult job. It is one of the few occupations that deliver services to the community whenever and wherever they are needed and often under the most hazardous of circumstances. Occasionally, these officers will be asked to deal with volatile and aggressive people. Until recently, the options available to police to deal with conflict were very limited or were likely to result in serious injury.

This report focuses on a relatively new use-of-force option for police called OC spray (also known as capsicum spray or pepper spray). In recent years, the use of OC spray by police has become common. Despite widespread acceptance, surprisingly few evaluations have ever been undertaken to formally assess the risk of using OC spray or to determine its effectiveness as a use-of-force option for police.

This report is the culmination of an extensive research project examining the use of OC spray by Queensland police. The research was undertaken by a number of staff from the Crime and Misconduct Commission (CMC). In particular, the CMC would like to thank Gabi Hoffmann and Matt Vance, who were responsible for the collection, collation and analysis of the data used during the evaluation. The Commission would also like to acknowledge Dennis Budz, who prepared the final report, based on an earlier draft written by Gabi Hoffmann and Matt Vance. In addition to the efforts of the research team, several others contributed to the project, including Kim Adams and Jennifer Epps from Research and Prevention. The report was prepared for publication by the CMC Communications Unit.

The project has also benefited greatly from the interest and cooperation of the Queensland Police Service. In particular, the CMC would like to thank Diana Beere and Inspector Gerry McKendry from the Ethical Standards Command. Inspector Bill Turner and other Police Operational Skills and Tactics instructors from the Human Resources Development Branch (the Police Academy) provided important advice to the research team at all stages of the project. The CMC also appreciates the assistance of staff from Expert Services, Statistical Services and the Health and Safety Section for access to QPS data.

Although this review concludes that OC spray is an effective and relatively safe use-of-force option for police, the use of OC spray is not risk free. Like all other types of force used by police officers, OC spray needs to be properly managed if the QPS is to retain the already very high levels of community trust and confidence.

**Susan Johnson**  
**Director, Research and Prevention**





# Summary

Police officers deal with volatile situations and aggressive people throughout their careers. Using force in these situations dramatically increases the potential for injury, both to officers and to others. In 2000, following a one-year trial, the Queensland Police Service (QPS) introduced oleoresin capsicum (OC) spray as an option for dealing with violence safely and more effectively.

OC spray is an organically based inflammatory agent derived from red (cayenne) peppers. It is made by mixing the active ingredient of OC — capsaicin — with a propellant such as nitrogen or carbon dioxide. The spray is then aimed in the direction of the target and discharged.

The spray's effects, while relatively short-term (usually less than an hour), are both rapid and debilitating. OC causes an immediate sensation of intense pain and tearing in the eyes, and inflames the respiratory tract, resulting in uncontrollable fits of coughing and breathing difficulties. Despite the strong initial effect, decontamination involves simply washing the face with cool water for 10–45 minutes.

Since its introduction, there have been strong competing views about the use of OC spray. Those in favour argue that it enables police to quickly gain control of people without physically engaging them, which reduces injuries and leads to fewer excessive force complaints.

However, there is also concern about the safety and potential misuse of OC spray. In particular, there is a feeling that police are becoming over-reliant in their use of the spray, and that not enough is known about its adverse health effects.

To test these assumptions, we conducted a comprehensive review into the use of OC spray by Queensland police. Data were sourced from QPS crime reports, an officer survey and QPS and CMC complaints files over a two-year period (2001–02). Additional information from later years (2003–04) was also examined to reveal the longer trend in usage rates.

In particular, answers were sought for six key questions:

- How often and under what circumstances is OC spray used?
- Has the use of OC spray been appropriate?
- Is OC spray an effective use-of-force option for police?
- Has the use of OC spray led to a decrease in assaults or injuries?
- Has the use of OC spray decreased complaints of excessive use of force?
- Is OC spray safe?

## Findings

### How often and under what circumstances is OC spray used?

On average, OC spray is deployed two or three times per day by police in Queensland. This equates to each operational officer spraying someone once every three years. Although there was a sharp increase in the use of OC spray immediately after its introduction, when the figures are viewed over a four-year period ending in 2004 and controlled for the growth of the police service, the rate of OC spray use has actually declined slightly.

There is considerable variation in OC usage rates across police regions. Over a two-year period, officers in Far Northern Region have the highest rate of OC spray use, while officers in Metropolitan South and North Regions have the lowest rate. It seems likely that OC spray rates will have also declined across regions when viewed over a longer (four-year) period.

The majority of OC spray discharges (83%) are against people. Nine per cent of uses are against animals and 8 per cent of incidents involve only the presentation of (i.e. threat to use) the OC spray canister.

Most incidents take place:

- 'on the street' or in a private residence
- usually at night on weekends
- during the summer months
- in response to an assault, domestic violence or a disturbance.

### Has the use of OC spray been appropriate?

Police tend to consider other alternatives before using OC spray, and reserve it for dealing with high-risk situations. In over 80 per cent of cases, OC spray was used when an officer was under direct threat of attack or already in the process of being assaulted.

In the majority of cases, OC spray is being used appropriately by officers. However, there are a small number of cases where the officer's use of OC spray is of concern. These included the use of OC spray on handcuffed suspects or on seemingly passive individuals. There is also an unusually high rate of use against people who are Aboriginal, Torres Strait Islander or Pacific Islander in appearance.

Overall, officers act responsibly after using OC spray. Aftercare is given to help subjects overcome the effects of the spray in more than 90 per cent of cases. Most often, this care is provided at the scene, but in some cases (21% of all deployments) aftercare is delayed until the person is transported elsewhere.

### Is OC spray an effective use-of-force option for police?

Results show clearly that OC spray is effective. In 83 per cent of cases it helps police officers control a situation. However, it does not have an effect in 10 per cent of cases, and in 1 per cent of cases it makes the subject's behaviour worse.

Some factors compromise the effectiveness of the spray, such as using it from too close a distance. Gender does not have an impact on the effectiveness of the spray, but police perceive that ethnicity does, with people of Aboriginal, Torres Strait Islander and Pacific Islander appearance found to be statistically less likely to be affected by the spray. It is important to note that this finding is based on the officer's perception of the effectiveness of the spray, which, according to Adang, Kaminski and Howell (2004), may be influenced by a person's racial characteristics.

### Has the use of OC spray led to a decrease in assaults or injuries?

Our research shows that there has been no change in the number of assaults on officers in Queensland since the introduction of OC spray.

Evidence is mixed on whether the spray has reduced injuries to officers and subjects. The overwhelming majority of confrontations involving OC spray are resolved without injury. Of the 15 per cent of cases in which injuries occurred, most happened before OC spray was deployed and many were comparatively minor, such as bruising. It is impossible to determine whether there would have been a higher or lower injury rate if OC spray had not been available.

Despite the lack of statistical evidence to suggest that the use of OC spray has reduced injuries, it is important to note that officers believe that it has. In particular, officers feel that the use of OC spray is substantially less likely to result in injuries compared with other use-of-force options (such as hands or batons).

### Has the use of OC spray decreased complaints of excessive use of force?

Complaints about the use of OC spray make up 6 per cent of all excessive force complaints, which equates to one complaint for every 25 discharges of the spray. This rate did not change over the course of this study. However, there has been a gradual decrease in the overall rate of excessive force complaints over the past 10 years. For example, in 1995 there were 90 complaints per 1000 officers, whereas in 2003 there were only 74 complaints per 1000 officers. While this decrease is a welcome finding for the QPS, the downward trend began well before the introduction of OC spray and is likely to be due to a number of factors, including improved QPS training and equipment and new complaints-handling processes.

### Is OC spray safe?

To date, more than 5000 people (police officers and subjects) in Queensland have been exposed to the effects of OC spray, with almost no resultant health problems. Despite this, there have been two recent investigations involving a death and a serious injury in Queensland following OC spray use by police. The first matter is being investigated by the State Coroner. However, in the second matter, a CMC investigation in August 2005 concluded that OC spray was unlikely to have caused the injury, but might have contributed to it.

An expert opinion on the health outcomes of OC spray use was commissioned by the CMC from University of Queensland pharmacologist Dr Lindsay Brown (see Appendix, p. 63). He concluded that:

Oleoresin capsicum spray produces acute respiratory and ocular symptoms but there is little evidence that the capsaicins cause long-term damage, although some carriers may be more toxic.

Although the results of this study suggest that OC spray is a relatively safe use-of-force option for police, the Commission considers that any type of force used by police, including OC spray, is not risk free and needs to be managed appropriately by the QPS.

## Recommendations

Although this report concludes that OC spray is an effective and relatively safe use-of-force option for police, the review also identifies a number of areas of concern. In the main, these relate to:

- high rates of use of OC spray on people who are Indigenous in appearance (Chapter 4)

- use of OC spray on individuals who are passive but generally non-responsive to a police direction or questioning (Chapter 4)
- use of OC spray on subjects who are restrained by handcuffs or otherwise in police custody (Chapter 4)
- high rates of secondary exposure to OC spray for police and others (Chapter 8)
- delay in the provision of aftercare (Chapter 5).

To respond to these concerns and contribute to the continuous improvement of the police service, the Commission makes five recommendations in the following areas:

- Recording and monitoring the use of force
- Overseeing the use of OC spray
- Reviewing OC spray training scenarios
- Aftercare

### Recording and monitoring the use of force

It was obvious at the start of this review that it would not be possible to test whether the number of police use-of-force incidents had increased or decreased since the introduction of OC spray. This is mainly because the QPS does not routinely collect general use-of-force data, apart from firearm discharges and police pursuits.

We believe that access to detailed and timely information about the frequency and nature of force by police would be an important step forward for the QPS in terms of managing the use of force generally, and the use of OC spray in particular.

#### **Recommendation 1**

**That the Queensland Police Service develop the capacity to record and monitor the use of force by police, including the use of OC spray.**

### Overseeing the use of OC spray

While police officers used OC spray appropriately in the vast majority of cases, there were a small number of incidents where the use of OC spray was questionable. In particular, the CMC is concerned about the high rate of use of OC spray on Indigenous people, and any use on passive or restrained subjects.

We believe that any use of OC spray should continue to be overseen by an officer in charge. Where practicable, this should include a face-to-face debriefing with the officer who deployed the spray to enable a judgment to be made about whether the OC spray was used appropriately and in accordance with existing policy.

#### **Recommendation 2**

**That the QPS review the processes for overseeing the use of OC spray and develop appropriate strategies to enhance the effectiveness of that process.**

In addition, we believe that the current instruction in the Operational Procedures Manual about determining whether the use of OC spray was in accordance with service policies and procedures should be expanded to make it explicitly clear that any misuse of the spray will be dealt with under the *Police Service Administration Act 1990*, and could constitute misconduct or breach of discipline.

### **Recommendation 3**

**That during any review of section 14.21.4 of the Operational Procedures Manual (Reporting the use of OC spray) the QPS consider including a statement reminding the officer overseeing each use of OC spray of their obligations under section 7.2 of the *Police Service Administration Act 1990*.**

### Reviewing OC spray training scenarios

Current QPS training presents OC spray as a stand-off weapon. However, our research revealed that in a quarter of cases (where the distance between the officer and subject was known), OC spray was used while the officer was grappling with the subject or within striking distance. About half of all spray deployments involved some sort of secondary exposure to police officers.

We believe that the QPS should develop training scenarios that more accurately reflect the nature of encounters between police and suspects, with particular emphasis on the risks of using the spray at close quarters.

### **Recommendation 4**

**That the Queensland Police Service develop training scenarios for the deployment of OC spray that more accurately reflect the use of OC spray under field conditions. These scenarios should place a particular emphasis on the risks associated with deploying OC spray at close quarters and on measures designed to reduce the risk of secondary exposure.**

### Aftercare

Police officers have a duty of care to all people who have been contaminated by OC spray and must assist in their recovery. While our research revealed that more than 90 per cent of people sprayed with OC received aftercare to help them overcome the effects, in about 20 per cent of cases this was delayed until the subject was transported elsewhere.

Given the considerable pain that OC spray can cause, it is a concern that such a large number of people do not receive immediate assistance. We believe that, unless there is a valid operational reason, aftercare should be given as soon as practicable.

### **Recommendation 5**

**That the instruction contained in section 8B of the Queensland Police Service *Oleoresin Capsicum (OC) Spray: Good Practice Guide 2000* be amended to make it explicitly clear to police that individuals should receive immediate assistance to overcome the effects of OC spray unless there is a valid operational reason for delaying the provision of aftercare.**



# 1

## Introduction

**This chapter provides a background to the report by outlining why OC spray was first introduced by the Queensland Police Service (QPS), and the current policies and practices that relate to its use. It then summarises findings of national and international research, before identifying the key questions that need to be answered in order to determine whether OC spray is an effective and safe option for police in Queensland.**

### About OC spray

Oleoresin capsicum (OC) spray is an organically based inflammatory agent derived from red (cayenne) peppers. After the peppers have been dried and ground into a fine powder, the oleoresin is extracted using an organic solvent. Once the extraction is complete, the solvent is removed via evaporation or distillation, leaving an oily substance called oleoresin capsicum (CJC–QPS 1999).

OC has many applications — it is widely used by the food industry to make hot sauces and by the pharmaceutical industry as a topical cream for relieving arthritic pain and some skin diseases (Ireland 2002; QPS 2000). OC is also effective as a self-defence weapon. The most common form is an aerosol spray used to ward off an attacker or animal.

OC is combined with other products in suspension and mixed with a propellant such as nitrogen or carbon dioxide. The spray is aimed in the general direction of a target and vaporises shortly after discharge. Depending upon wind and weather conditions, OC spray has an effective range of between one and three metres (QPS 2000).

The spray's effects, while relatively short-term (usually less than an hour), are both rapid and debilitating. Once a person comes into contact with OC spray, there is an immediate sensation of intense pain and tearing in the eyes, causing the eyes to shut tightly or blink excessively. The respiratory tract becomes inflamed, resulting in uncontrollable fits of coughing and breathing difficulties. Decontamination involves simply washing the face with cool water for 10–45 minutes. Without water, decontamination occurs naturally in about two hours (QPS 2000).

### OC spray use by the Queensland Police Service

In September 1994, the QPS undertook a major review of police use of force and operational safety. Called 'Project Lighthouse', the review sought to identify, analyse and recommend appropriate action for potential risks. Areas covered included the use of lethal force and firearms training, the use of non-lethal force and operational skills training, and response to high-risk situations (QPS 1996).

The final report, released in June 1996, contained five major recommendations that formed the basis of eight separate programs of reform dealing with use-of-force policy, training, equipment and operational resources. The programs were designed to be implemented over a period of four years, ending in 2000.

Program Three, arising out of Recommendation 4 (the development and implementation of a statewide use-of-force training structure), was in part set up to



identify, evaluate and make recommendations for acquiring operational equipment and accoutrements. Specifically, it dealt with the need to replace the current issue revolver, long baton and physical restraint devices. Of particular interest was the proposal that OC spray be introduced as a standard accoutrement for all operational police.

In 1998, OC spray was trialled in two police regions in Queensland and subsequently evaluated by the QPS and the Criminal Justice Commission (CJC). The areas chosen were the QPS District of Logan in the South Eastern Region and the Divisions of Brisbane City and Fortitude Valley in the Metropolitan North Region.

The trial was conducted in two six-month phases. The first phase began in March 1998 and involved only operational supervisors (sergeant rank). Phase 2 began in September and included all other operational officers (constable and senior constable ranks). The full trial came to a conclusion in March 1999.

The evaluation found that OC spray was effective in disabling or aiding in the apprehension of aggressive subjects, as well as being of use against attacking dogs (CJC–QPS 1999). The report subsequently recommended that OC spray be issued to all operational police in Queensland and that a further evaluation be undertaken following its statewide introduction. This report is, in part, a direct result of that recommendation.

The statewide roll-out of OC spray took place in 2000. Following completion of a mandatory training course, all operational police were issued with the spray.

### Legal and policy framework governing the use of OC spray

The use of force by Queensland police is governed by both statute and police operational procedures. Legislation is contained in sections 375, 376 and 377 of the *Police Powers and Responsibilities Act 2000*.

Generally, police officers in Queensland can use ‘reasonably necessary force’ in the exercise of any powers under the Act (s. 375). Officers may also use reasonably necessary force (but not force likely to cause grievous bodily harm or death) against individuals to prevent them from escaping from custody (s. 376). In ‘critical situations’, the power of police extends to the right to use force likely to cause grievous bodily harm or death (s. 377). These situations are where a police officer reasonably suspects a person:

- of committing or being about to commit an offence punishable by life imprisonment
- of committing an offence punishable by life imprisonment and of attempting to escape
- is escaping from arrest or custody
- is causing or is about to cause grievous bodily harm to or the death of another and cannot prevent the harm or death other than by using the force authorised.

In such situations, the officer may use force reasonably necessary to:

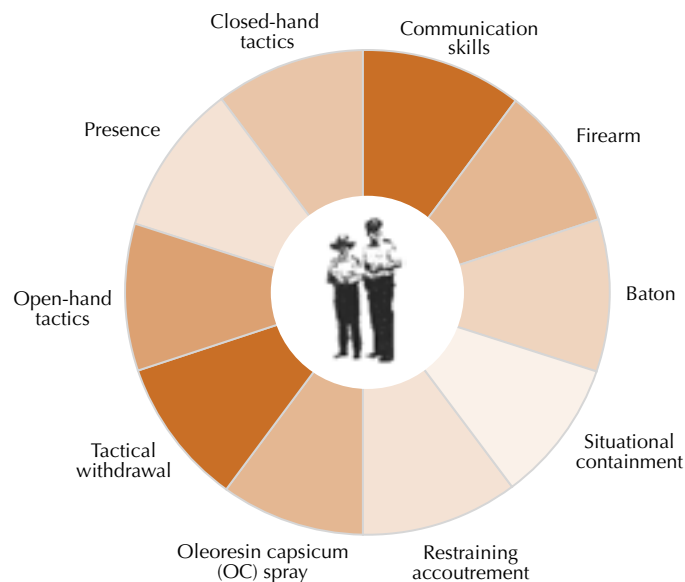
- prevent the commission, continuation or repetition of an offence punishable by life imprisonment
- apprehend the person
- prevent the escape of a person
- prevent an act causing grievous bodily harm to, or the death of, a third person.

In addition to statute, there are also several key QPS operational procedures and policies that are directly relevant to any discussion of the use of force. Section 14.3 of the Operational Procedures Manual (OPM) reinforces the importance of police using the minimum level of force by directing that:

Officers should only use the minimum amount of force necessary to resolve an incident. Officers are reminded that it is lawful to use such force as may be reasonably necessary to overcome any force used in resisting the execution of any lawful process or arrest. However it is unlawful to use more force than is justified by law to effect a lawful purpose.

Section 14.3.3 of the OPM outlines the Situational Use-of-Force Model (SUFM), which has been adopted by the QPS to assist officers in the use of force. The SUFM depicts police officers surrounded by various use-of-force options, including presence, situational containment, restraint, communication skills, open-hand tactics, closed-hand tactics,<sup>1</sup> tactical withdrawal, OC spray and use of a firearm. The model is not restrictive and officers may select any particular use-of-force option (or combination) as necessary.

**Figure 1.1: Situational Use-of-Force Model**



**Source: Queensland Police Service**

The OPM emphasises to officers that the use of force must be authorised, justified, reasonable, proportionate, appropriate, legally defensible, and tactically sound and effective. The OPM also asks officers to consider a number of factors when deciding on the type of force to use in the circumstances, such as:

- the physical attributes of the person concerned (as opposed to the officer)
- the circumstances and location of the incident
- the possibility that the officer may be required to increase or decrease the initial use-of-force option as the situation changes
- the possibility of injury to the officer
- the possibility of injury to the person concerned
- the possibility of injury to other people
- the requirement for police to act quickly and professionally to prevent an escalation of an incident.

<sup>1</sup> Open- and closed-hand tactics cover several specific techniques including the use of a lateral vascular neck restraint and pressure point control tactics.

The OPM (s. 14.21) states that the use of OC spray will be determined by the circumstances existing at the time. Some examples of appropriate use of OC spray are:

- incidents where police officers are required to defend themselves or other people if they fear physical injury to themselves or others and they cannot reasonably protect themselves or others less forcefully
- arrest situations, if they believe on reasonable grounds that the offender poses a threat of physical injury and the arrest cannot be effected less forcefully
- incidents where a person is acting in a manner likely to seriously injure themselves and the incident cannot be resolved less forcefully
- to deter attacking dogs (QPS 2000, p. 8).

The OPM strongly discourages the use of OC spray in certain circumstances. These include:

- against people offering passive resistance (e.g. sitting down and refusing to comply with instructions)
- as a crowd-control measure (e.g. for crowd dispersal at a demonstration or industrial dispute)
- against the driver or occupants of a vehicle where there is a danger of the vehicle going out of control and injuring the occupants or other people
- against juveniles, except in extreme circumstances where there is no other reasonable option to avoid the imminent risk of injury.

This final circumstance, which limits the use of OC spray on juveniles, was added to the policy as a result of an incident in March 2003 when a 14-year-old boy was sprayed when he was in custody in a police vehicle. However, it should be noted that much of the data used in this report were collected prior to the Commissioner's direction to limit the use of OC spray on juveniles in most circumstances.

The policy also states that 'before using OC spray, officers should verbally warn the subject person(s) where practicable', and that 'officers have a duty of care regarding all persons who have been contaminated by OC spray and are to assist in their recovery'.

QPS policy requires that a written report of each deployment of OC spray (including when the canister is pointed at a person but not discharged) must be recorded on CRISP (Crime Reporting Information System for Police). Mandatory reporting of each OC spray use is also required in other Australian states.

## QPS training

QPS OC spray training for recruits includes classroom instruction and a practical session. The classroom instruction covers what OC spray is, when to use it and when not to, the spray's tactical advantages, its limitations, aftercare treatment, secondary exposure risks, and how to report its use.

This instruction is followed by practical training, using inert units. Recruits are then given voluntary direct exposure to actual OC spray. This is done by spraying OC onto the recruit's forehead and then spraying the OC with water so that it runs into the person's eyes and mouth. Recruits are encouraged to attempt to fight a would-be assailant by executing as many baton strikes as possible on a target until they

are overcome by the effects of the spray, at which point other recruits administer aftercare.

First-hand experience with the pain and burning sensations from OC spray is considered beneficial for several reasons. Firstly, recruits will feel more in control and be less likely to panic if they suffer secondary exposure on the street. Secondly, recruits will appreciate the pain and discomfort involved in being sprayed and will therefore not use this option lightly. Thirdly, recruits will be experienced in giving aftercare.

Following the OC spray training, recruits must complete a computer-based training (CBT) module, after which they are deemed competent in OC spray use.

### Effectiveness of OC spray

Research shows some variability in the effectiveness of OC spray as a use-of-force option for police. For example, a 1989 FBI study on the effects of OC spray on more than 800 people found it was extremely effective in 90 per cent of cases and that there were no long-term health effects (Weaver & Jett 1989). This study has been widely cited in the literature and by police departments as convincing evidence of the spray's effectiveness and safety (Reynolds & Burke 1994). However, there has been some concern expressed about the validity of this study as the FBI agent in charge subsequently pleaded guilty to a felony violation of federal conflict-of-interest law, due to having received US\$57 000 from the makers of an OC spray product (Rappert 2002; Smith & Stopford 1999). Perhaps not surprisingly, the highest effectiveness rating of OC spray (90%) was reported in the FBI's study. Such a rate has never been replicated in any other study of the spray's effectiveness to date (Morabito & Doerner 1997; Rappert 2002).

The lowest effectiveness rate of OC spray was reported by the Berkeley Police Review Commission (1997), which found that it was effective or partially effective in only 34 per cent of cases. Morabito and Doerner (1997) found the spray to be effective in 73 per cent of cases. Most studies have reported effectiveness ratings of somewhere between 75 and 90 per cent (Adang & Mensink 2004; Edwards, Granfield & Onnen 1997; Fourkiller, Holsapple & Marsh 1999; Gauvin 1995; Kaminski, Edwards & Johnson 1998; NYC CCRB 2000).

In Queensland, an evaluation of the initial implementation of OC spray found that it was 'totally effective' 68 per cent of the time and 'partially effective' 32 per cent of the time (CJC-QPS 1999). A recent QPS (2002) evaluation found 'full effectiveness' 41 per cent of the time and 'partial effectiveness' 32 per cent of the time, with 'no effect' in 20 per cent of cases. In the remaining 5 per cent of cases, the effect was unknown.

A number of variables may influence the effectiveness of OC spray. These include the following:

#### Mindset of subject

One of the most important variables that can influence OC spray effectiveness is the mindset of the person who is sprayed. For example, Truncala and Messina (1994) reported on trials of OC spray which found that individuals who were sufficiently motivated (i.e. goal directed) were able to continue to function despite being subjected to OC spray. Similarly, Gauvin (1995) reported that some individuals who had been incapacitated the first time they were sprayed were not always incapacitated when sprayed again. In other words, some individuals were eventually able to overcome the effects of OC through repeated exposure. Thus, determined, aggressive subjects who have been sprayed on previous occasions may overcome the effects of OC spray and continue to be a threat to police or others.

### Distance between subject and officer

The distance between the subject and the officer can also have an impact on the effectiveness of OC spray. Clearly, if the officer is too far away, the spray may not reach the subject or the aim may be inaccurate, thereby minimising the effects on the subject. For example, Kaminski, Edwards and Johnson (1999) found that OC was less likely to work if the officer sprayed from longer distances (5–20 feet). Some research suggests that OC spray effectiveness may also be compromised if the officer is too close to the subject (Edwards, Granfield and Onnen 1997; Morabito & Doerner 1997). Chan et al. (2001, p. 5) observed that ‘spraying from less than 5 feet away does not allow for adequate aerosolization of OC and is likely to reduce the amount of inhalation exposure’.

### Alcohol/drugs/mentally disturbed

The effects of OC spray on intoxicated or mentally unstable people is variable. For example, Edwards, Granfield and Onnen (1997) suggest that people who are heavily drugged, intoxicated or mentally unstable may be resistant to OC. In contrast, Morabito and Doerner (1997) found no difference in effectiveness with intoxicated and mentally disturbed subjects compared with other subjects. Adang and Mensink (2004) concluded that previous use of alcohol did not have an impact on OC spray effectiveness. However, Kaminski, Edwards and Johnson (1999) found that OC spray was more effective on alcohol-intoxicated subjects, but less effective on subjects who were on drugs.

### Age, gender, size

A person’s age and physical size can affect the success of OC spray. For instance, Kaminski, Edwards and Johnson (1999) found that OC spray was more likely to fail with heavier subjects, and that it was more effective on younger and older persons than on those of middle age ranges (22–37). None of the studies examined during the course of this research uncovered effectiveness differences that specifically related to gender.

### Race/ethnicity

Recent unpublished research by Adang, Kaminski and Howell (2004) found that OC spray was rated as being less effective at incapacitating minority suspects.<sup>2</sup> While the reasons for this are uncertain, some possible suggestions offered by the authors are that confrontations between police and minorities may be antagonistic or violent, which could lead to heightened levels of goal-directed behaviour. Another possibility suggested is that the encounter with a non-white suspect may influence the officer’s assessments of the effectiveness of OC spray.

### Product variability

There are a number of OC spray products on the market and they differ in product strength and delivery system (e.g. streamer, foam). A recent study found that some OC spray products varied in strength — by up to 100-fold — in the amount of capsaicinoids (the active ingredient in OC spray) that they contained, the marked concentration (the percentage of OC) and the ‘heat’ rating (measured in Scoville Heat Units, SHU) listed on the canister (Reilly 2003). Reilly concluded that the potency for pepper spray products, as represented by percentages of OC and SHU values, rarely represents the true strength of the product and ‘may be a major contributing factor for the variability in performance and safety of these products’ (p. 126).

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2 In this study, minority suspects were simply defined as being ‘non white’.

## Benefits of OC spray

In addition to its role in resolving volatile situations, OC spray has other potential benefits. These include decreases in injuries (both to officers and to suspects), decreases in assaults on officers, and decreases in use-of-force complaints.

### Decrease in injuries

Injuries are a potential result of any physical interaction where force is used by or on police. Results from numerous studies suggest that OC spray can, and often does, lead to a decrease in officer and suspect injuries (e.g. Gauvin 1995; Granfield, Onnen & Petty 1994; Kaminski, Edwards & Johnson 1998; NIJ 2003; Rogers & Johnson 2000).

While none of these studies gives convincing evidence on its own, the fact that there is an increasing amount of research that has found this link suggests that the introduction of OC spray may be contributing to a decrease in the number of injuries sustained during conflicts.

### Decrease in assaults on police officers

Officers often risk being assaulted when in conflict situations with resisting suspects. Some studies, such as those of Edwards, Granfield and Onnen (1997) and Kaminski, Edwards and Johnson (1999), have suggested that OC spray could deter violence against officers. However, the findings are difficult to interpret as there is evidence that assaults against officers were already declining before the introduction of OC spray. Even so, the Police Complaints Authority (2000) in the United Kingdom noted a significant fall in assaults on police since the introduction of CS gas,<sup>3</sup> and a rise in assaults in those areas where CS gas had yet to be introduced.

### Decrease in complaints against police

Some studies have tried to measure the impact of OC spray on the number of use-of-force complaints against officers. For example, Edwards, Granfield and Onnen (1997) found a substantial decrease in use-of-force complaints following the introduction of OC spray. However, in this study use-of-force complaints were decreasing before the implementation of OC spray, so a continuing decrease could not simply be attributed to OC spray.

A nationwide use-of-force survey in the USA found that, while chemical force was used 7 per cent of the time, it accounted for only 4 per cent of use-of-force complaints (Sanow 2001). In contrast, impact weapons (e.g. batons) were used 1 per cent of the time, yet resulted in 11 per cent of the complaints, and electronic weapons (e.g. TASER) were used 0.2 per cent of the time, yet made up 7 per cent of all complaints. These results suggest that OC spray is less likely to result in a complaint than other types of force.

By contrast, Rogers and Johnson (2000) reported that chemical spray used in 11 per cent of cases by officers in the Buffalo New York Police Department made up 56 per cent of use-of-force complaints for that jurisdiction. Similarly, Lumb and Friday (1997) found a 33 per cent increase in use-of-force reports during OC trials compared with the pre-OC period. After OC spray was withdrawn due to a related death in custody there was a 57 per cent decrease in use-of-force reports that could not be explained by trends in arrests or other factors.

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3 CS gas (ortho-chlorobenzal-malononitrile) is a chemical irritant that provokes a severe irritation to an individual's respiratory passages and causes a person's eyes to water profusely (i.e. 'tear gas').

While there is some evidence to suggest that OC spray may lead to decreases in excessive force complaints, Smith and Alpert (2000) warn that there is the potential for more, as ‘emboldened with the knowledge that this new weapon is “safe”, police may ... use it indiscriminately’ (p. 242).

## Concerns with OC spray use

There are three general concerns about police using OC spray:

- the potential health effects on the subject or officer
- police becoming too reliant on the spray and using it in circumstances where it is unwarranted or excessive
- secondary exposure of officers and bystanders, which could place them in a dangerous situation where they are unable to defend themselves.

## Health effects

A major concern expressed by many critics of OC spray is the potential for it to cause illness or serious injury, including death. However, the evidence that lends any support to these concerns is far from conclusive. For example, a review of 22 in-custody ‘OC-related’ deaths concluded that none of the deaths could be directly attributed to OC spray (Granfield, Onnen & Petty 1994). Instead, the review concluded that positional asphyxia<sup>4</sup> was the main cause of death, usually aggravated by drugs, disease and/or obesity (Granfield, Onnen & Petty 1994). Another study reporting on 63 cases found that two of the deaths were due to asthma precipitated by OC spray, with the remainder involving drugs, positional asphyxia, disease or a combination of these factors (NIJ 2003).

In a closely monitored six-month trial of OC spray use within four jurisdictions of the Netherlands, Adang and Mensink (2004) found that 60 per cent of suspects experienced minor effects after one to two hours but required no further aftercare, and that 17 per cent experienced severe effects and needed more aftercare. There were also reports of the effects of the spray lasting for more than 24 hours. There were some instances of breathing difficulties, but no medical emergencies arose.

Despite this, several studies have warned that the assumption that OC spray is completely safe is not supported by scientific data (Broadstock 2002; Smith & Stopford 1999). However, these reports acknowledge that, although there are some risks (which may be serious), they need to be balanced against the options available to police officers and the alternatives if a potentially dangerous situation is not brought under control quickly. The Canadian Police Research Centre (CPRC 1997) also concluded that OC spray was a useful tool that gave officers an alternative to physical and lethal force in certain situations, but acknowledged that officers should be made aware of the risks associated with using OC spray. Such concerns have prompted at least one police department (the New York Police Department) to caution against using the spray on people who appear to be in frail health, young children, women believed to be pregnant, or persons with known respiratory conditions (NYC CCRB 2000).

Smith and Stopford (1999) argue that OC spray is a viable option for police officers, despite the fact that the North Carolina Department of Health and Human Services concluded that direct ‘exposure to OC spray during training constituted an unacceptable health risk’. Specifically, they report that 1 per cent of police officers who were directly sprayed in training required medical attention (e.g. eye

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4 Positional asphyxia occurs when body position interferes with respiration, resulting in asphyxia.



irritations, asthma attack, severe headache, chest pain and loss of consciousness). As a result, it was recommended that officer training be amended to include only secondary exposure, and to exempt employees who had health conditions that might be exacerbated by OC spray (Smith & Stopford 1999).

Preliminary results of a New South Wales study surveying 1800 officers after secondary exposure found that, over 24 hours, any effects, such as headache, nausea or conjunctivitis, were very mild (Ray, McMahon & Enders 1999).

For this project, the CMC sought an independent expert opinion on the possible effects of OC spray from a pharmacologist (Dr Lindsay Brown) at the University of Queensland. Dr Brown's opinion is attached as the Appendix to this report.

### Overuse of OC spray

Another concern about OC spray is that officers may begin using the spray when it is not really necessary. For example, Rappert (2002) observed that the availability of chemical sprays might encourage officers to resort to force more quickly; officers could use spray at a distance, with minimal threat of personal harm. Lumb and Friday (1997) theorised that chemical sprays gave officers a perception of more control over situations, which led to an increased willingness to use force.

Truncale and Messina (1994) argued that some officers thought OC spray was a panacea for all situations and became over-reliant on it. This is a problem not only because the spray could be used in situations where it might not be necessary but also because officers might be taken by surprise, and therefore tactically disadvantaged, when OC did not work the way they expected.

Some legal advocacy, community and civil liberties groups, such as the American Civil Liberties Union,<sup>5</sup> the Queensland Council for Civil Liberties<sup>6</sup> and the Hobart Community Legal Service (1999) have expressed concern about OC spray. In the main, these relate to the possible negative health effects of OC spray, as well as the risk of officers becoming over-reliant on it instead of using their verbal skills as a more appropriate strategy for de-escalating a potentially violent situation.

### Secondary exposure of police officers

A number of studies have found that the rate of secondary exposure to OC spray of police officers is high — about 20–33 per cent of all deployments can involve secondary exposure (Adang & Mensink 2004; Berkeley Police Review Commission 1997; QPS 2002; Ray, McMahon & Enders 1999; Williams 1994). The original trial of OC spray in Queensland found a 43 per cent rate of secondary exposure (CJC–QPS 1999). Secondary exposure is of concern for two reasons. Firstly, officers can be in high-risk situations where being partially debilitated by OC spray could be very dangerous. Secondly, any concerns regarding adverse health effects of OC spray are compounded for police officers as they may experience multiple exposures (Smith & Stopford 1999).

### The CMC's research focus

To test the findings of overseas and national research and other assumptions, this report identifies six key areas that need to be studied in order to determine whether OC spray use by Queensland police is effective and safe.

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5 The ACLU website <[www.aclu.org](http://www.aclu.org)> contains links to several documents raising concerns about the use of OC spray.

6 *Courier-Mail*, 'Cops are spray happy', 13 March 2005.



These areas are:

- How often and under what circumstances is OC spray used?
- Has the use of OC spray been appropriate?
- Is OC spray an effective use-of-force option for police?
- Has the use of OC spray led to a decrease in assaults on officers, and fewer injuries to officers or subjects?
- Has OC spray decreased complaints of excessive use of force?
- Is OC spray safe?

## Chapter overview

OC spray is an organically based inflammatory agent derived from red (cayenne) peppers which is useful as a self-defence weapon. The spray's effects are relatively short-term (usually less than an hour) and decontamination involves simply washing with cool water.

In 2000, OC spray was issued to all operational police in Queensland once they had completed a mandatory training course. As in other Australian states and territories, current QPS policy allows OC spray to be used in situations where there is a 'threat of injury' to officers or others and the situation cannot be resolved less forcefully.

While original estimates of OC spray effectiveness may have been exaggerated, other research has found the spray to be an important addition to use-of-force options aimed at handling aggressive and resistant suspects. Results from numerous studies also suggest that OC spray has the potential to reduce injuries, assaults on officers and use-of-force complaints. However, there are still some concerns about OC spray's health effects, and the spray has been a contributing factor in a small number of recorded in-custody deaths. Other issues are the potential overuse of OC spray and the high rate of secondary exposure of police officers.

# 2

## Data sources

**This report analyses datasets from three separate sources — the Crime Reporting Information System for Police (CRISP), the CMC’s complaints database (COMPASS) and a QPS officer survey. This enables a comprehensive overview of OC spray use in Queensland, establishing patterns of use, trends in complaints, and the views of operational police officers.**

### CRISP data

In Queensland, a police officer must report each use of OC spray to the CRISP system. Any threat to use OC spray should also be recorded in CRISP. However, the recording of threatened uses of OC spray is rarely done.

All CRISP reports bearing the incident classification of ‘Police Use of Force (Oleoresin Capsicum Spray — 9100)’ and covering the period from 1 January 2001 to 31 December 2002 were obtained from the QPS. These reports contained the following information:

- incident details (e.g. date, time, geographic location, organisational unit involved, associated crime classes)
- modus operandi details (i.e. text description of the incident provided by the reporting officer)
- reporting officer and partner details (e.g. rank, gender, duty assignment and station location)<sup>7</sup>
- suspect person or subject details (e.g. date of birth, gender, racial appearance).

In all, 2283 CRISP records were obtained. After 57 cases (duplications or cancellations) were removed from the dataset, the total sample was 2226.

### CRISP — modus operandi analysis

When an officer records an incident involving OC spray use in CRISP, a modus operandi (MO) text field, which is a brief description of what happened, must be filled in. From the original sample of 2226 incidents, 500 were randomly selected for a detailed analysis of the events surrounding OC spray use.

The information gathered from the MOs included the events leading to the use of OC spray; where and under what circumstances OC spray was used; and what happened immediately afterwards, in terms of effectiveness, secondary exposure and aftercare. Officer and subject injuries unrelated to OC spray were also studied. An injury was considered to have occurred if there was said to be pain, bruising or something more serious.

There were limitations to the CRISP MO data that should be noted. Firstly, it is possible that some OC uses may not have been reported. In particular, threatened

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<sup>7</sup> This information was extracted from the QPS Human Resources Information System and matched to a relevant CRISP report.

uses of OC spray — where a canister was presented at a person but no spray was actually discharged — may not have been reported. Secondly, the amount of information available in the MO varied considerably, but most contained a very limited description of the events. Therefore, at times it was not possible to code a number of variables and, in numerous cases, variables of interest were missing.

### CRISP — analysis of assaults on officers

To test whether assaults on police officers had declined since the introduction of OC spray, CRISP reports for the period January 1999 to June 2003 were analysed. These included matters where ‘police officer’ was listed as the victim in the occupational field, and covered crime classifications including assault occasioning grievous bodily harm, wounding, assault occasioning bodily harm, assault serious (other), assault aggravated (non-sexual) and minor assault.

Once again, there were some limitations and constraints. In particular, information was extracted from the occupation field within CRISP, which is neither mandatory nor validated. The data also did not provide a unique victim count, as one person might be counted several times if they were the victim of more than one offence.

### COMPASS data

The CMC records all complaints it receives against police in a database (the Complaints and Operations Management Processing and Statistical System, or COMPASS). Between January 2001 and December 2002, 3682 complaints were recorded. Only 73 (2%) of these involved an allegation of inappropriate discharge of OC spray against a person.

### Police officer survey

Police officers’ attitudes and experiences may have a considerable influence on whether OC spray is used or not. A detailed survey was developed to obtain information from officers. The survey was sent to 800 randomly selected operational police officers, at the rank of constable, senior constable or sergeant, on 20 February 2004.<sup>8</sup> Operational officers were targeted because they are most likely to make use of, or have experience with, OC spray. The survey included questions on the officer’s most recent usage of OC spray and what occurred at that incident, general attitudes towards the spray, circumstances in which officers would be more or less likely to use spray, comparisons between OC spray and other use-of-force options, and training in using OC spray.

In total, 483 completed surveys were returned and analysed. The response rate of 60 per cent indicates strong interest by officers in the issue.

### Officer demographics

Overall, the profile of officers responding to the survey reflects the demographics of operational officers in the QPS generally (see Table 2.1). For example, 19 per cent of respondents were female and 81 per cent were male, similar to the

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<sup>8</sup> An unforeseen event occurred during the data collection phase of the project. On the day the surveys were sent to officers, the media in Queensland reported that someone had died after being sprayed by capsicum spray. While it is possible that this had an impact on respondents’ answers, or even on the response rate itself, it is not possible to ascertain the extent. Some officers may have been more likely to answer favourably to present the spray in a positive light, and some officers may have been more likely to report negatively on its use due to the reported death.

proportion of males and females in the QPS generally (80% and 20%).<sup>9</sup> Fifty-five per cent of the officers were constables, 27 per cent were senior constables and 18 per cent were at the rank of sergeant. The average age of officers was 34 years, with more than a third being 30 years old or younger.

The average number of years of service was nine. However, 11 per cent were first-year constables, and half (49 per cent) of the respondents had five years of service or less. This reflects the fact that officers of junior rank, some of whom are relatively inexperienced, provide the majority of frontline policing services.

**Table 2.1: Demographics of officers who responded to the survey**

		Number	Per cent
<b>Rank</b>	Constable	263	55
	Senior constable	132	27
	Sergeant	88	18
<b>Age</b>	Up to 25 years	44	9
	26–30 years	127	27
	31–35 years	127	27
	36–40 years	82	17
	41–45 years	56	12
	46 years or more	43	9
	<b>Years of service</b>	One year or less	53
	2–5 years	180	38
	6–10 years	74	16
	11–15 years	67	14
	16–20 years	39	8
	20 years or more	59	13

Source: CMC OC Spray Survey 2004.

Note: Four respondents did not state their age and 11 did not indicate length of service.

## Chapter overview

The analysis of three datasets, combining administrative and survey information, enabled a comprehensive and multi-tiered view of the use of OC spray by police officers in Queensland.

<sup>9</sup> QPS Annual Statistical Review 2001/2002.

# 3

## Trends

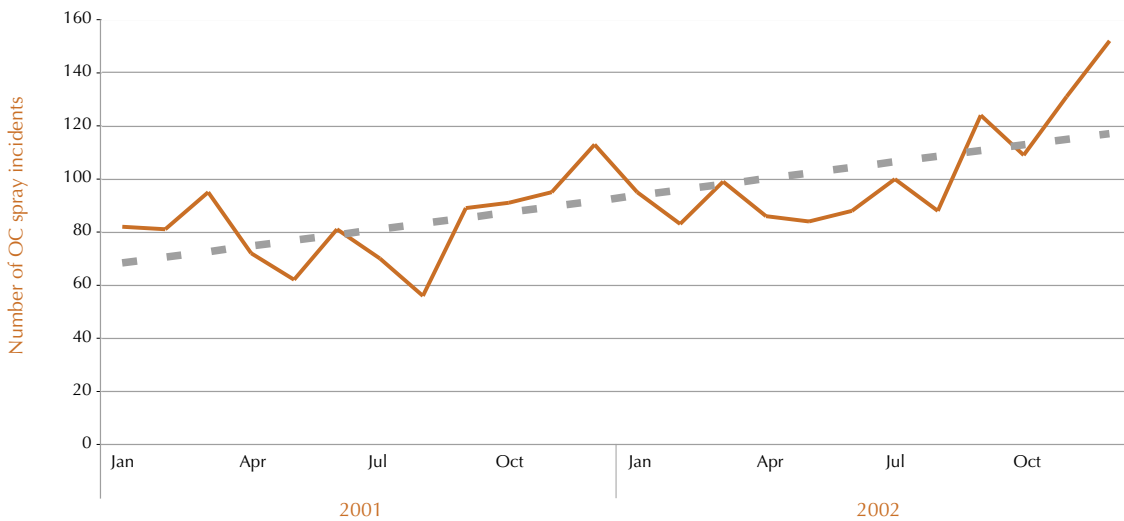
This chapter presents data on OC spray use by QPS officers, with a particular focus on the two-year period between 2001 and 2002. Some information from later years (2003–04) is also examined to reveal trends. Rates of usage across the QPS's eight regions are then compared.

### Total number of OC spray incidents

The number of OC spray incidents between January 2001 and December 2002 is reported in Figure 3.1. Over the two-year period, OC spray was used 2226 times. During this period, use increased 26 per cent, which is statistically significant ( $t = -2.697, p < .05$ ).

The average number of discharges against people per month ranged from 58 to 100. This equates to about two to three discharges of OC spray per day in Queensland.

Figure 3.1: Number of OC spray incidents in Queensland (2001–02)



Source: CRISP data 2004.

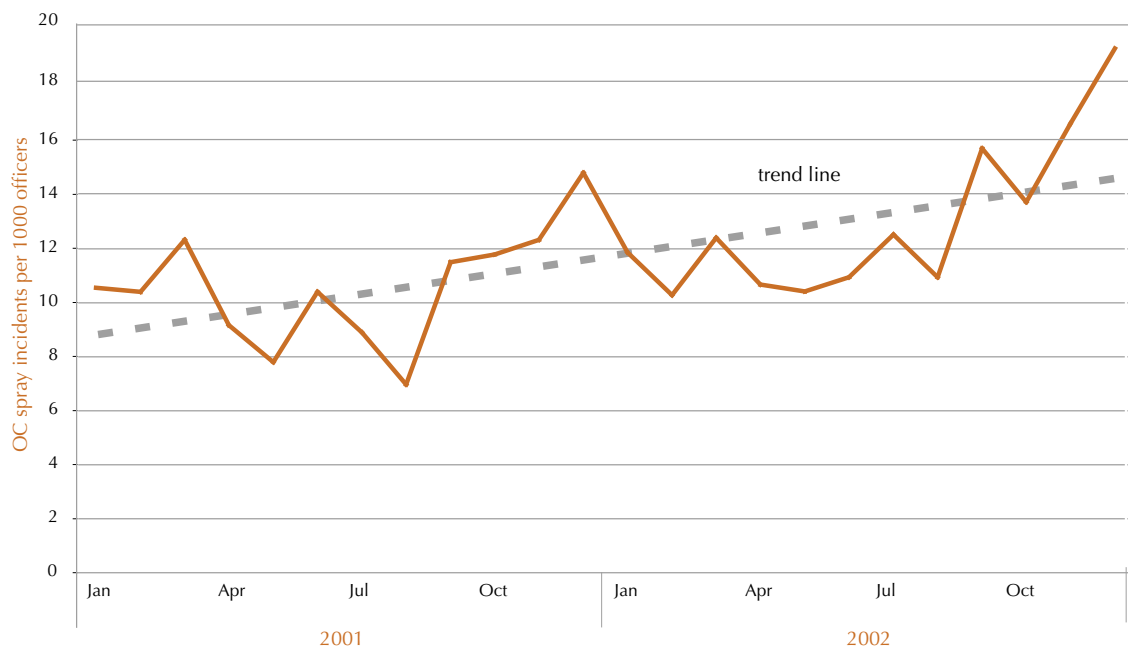
Note: Earliest committed date is used rather than date reported by police officer. For example, if an incident occurred on 31 December, yet was reported on 1 January, this incident was counted in the December statistics. Officer numbers for Metropolitan North include sworn officers at the Brisbane Watch-house.

## Rates of OC spray incidents per 1000 officers

To test whether the increase in OC spray incidents was the result of an increase in officer numbers, the data were analysed to identify the rates per 1000 officers (see Figure 3.2).

In general, the trend in the rate of usage (a 21% increase) over the two-year period was similar to the trend in the overall number of incidents. This illustrates that the increase in incidents was probably due to a real increase in the frequency with which the spray was used, rather than simply a reflection in the growth of police in service between 2001 and 2002.

**Figure 3.2: Rate of OC spray incidents in Queensland per 1000 officers (2001–02)**



**Source: CRISP data 2004.**

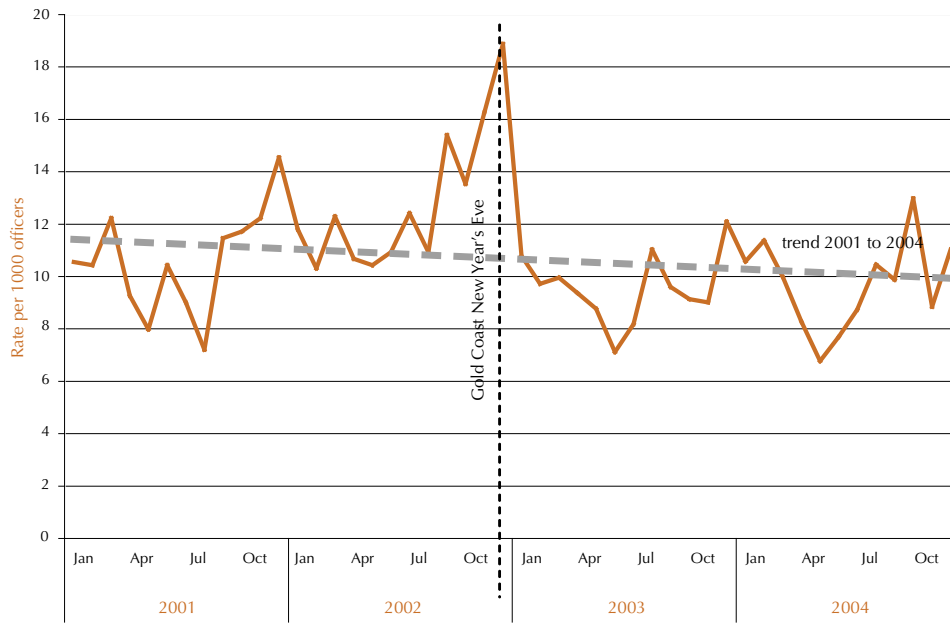
**Note: Earliest committed date is used rather than date reported by police officer. Officer numbers were taken from regional actual strength numbers for sworn officers as at June for 2001 and 2002 from the 2000/2001 and 2001/2002 QPS Statistical Reports respectively.**

## OC spray use since 2002

Figure 3.3 presents a graph of OC spray incidents expressed as a rate per 1000 officers, including additional data showing the rate of OC spray use to the end of 2004. The extra information was obtained to test if the trend in OC spray use had changed since the beginning of this research. It was not included in any further analyses (i.e. CRISP MO analyses), as the sampling had already been completed.

The figure shows that there was a sharp decrease in OC spray use in January 2003 which continued through to June 2003. This coincides with a highly publicised incident on the Gold Coast where a controversial discharge was captured by a television news cameraman, and suggests that officers were far less inclined to use the spray for a period of some months. When viewed over the four-year period between 2001 and 2004, the rate of OC spray use has actually decreased over time.

**Figure 3.3: Rate of OC spray incidents per 1000 officers per month (Jan. 2001 to Dec. 2004)**

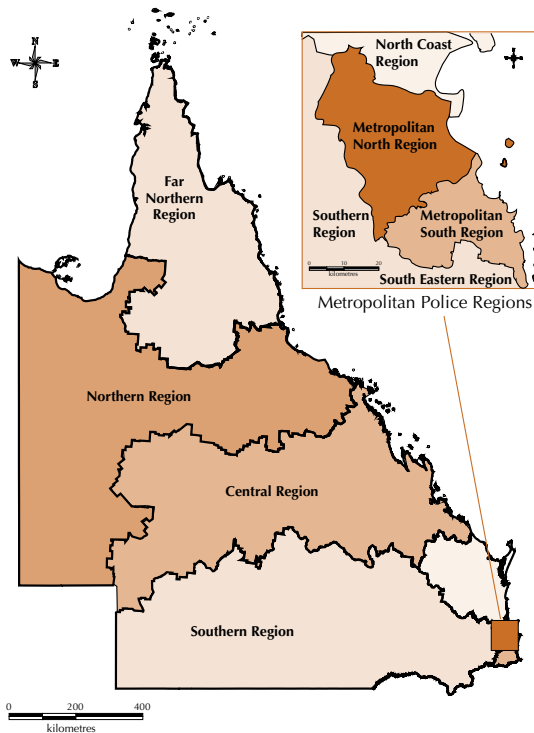


Source: CRISP data 2004.

### OC spray use by police region

To facilitate the delivery of policing services at a local level, Queensland has been divided into eight 'police regions' (see Figure 3.4). In addition to the eight regions, three police commands are located in Brisbane and provide specialist support and assistance to the regions as required.

**Figure 3.4: Map of QPS regions**



In terms of population, the smallest police region is the Far Northern Region headquartered at Cairns, with the South Eastern Region located in and around the Gold Coast being the largest. Table 3.1 also shows that the size of the regions varies greatly, with Metropolitan South Region the smallest (1007 km<sup>2</sup>) and the Northern Region the largest (548 943 km<sup>2</sup>). The number of police officers assigned to each of these regions ranges from just over 600 officers in the Northern Region to nearly 1200 officers assigned to South Eastern Region.

**Table 3.1: Police regions in Queensland (2003–04)**

Police region	Population	Area (square km)	Number of police officers
Far Northern Region	235 102	289 382	572
Northern Region	247 734	548 943	612
Central Region	333 303	401 794	691
North Coast Region	702 068	55 925	1125
Southern Region	440 467	431 504	840
South Eastern Region	702 278	4494	1180
Metropolitan North Region	578 848	1267	1039
Metropolitan South Region	642 778	1007	939

Source: Queensland Police Service 2004, *Annual Report 2003–04*.

OC spray usage patterns for each QPS region are reported in Table 3.2. In 2001, Far Northern (271 per 1000 sworn officers), North Coast (240) and Southern (196) regions had the highest usage rates. In 2002, the highest usage rates occurred in Far Northern (292), Southern (291) and South Eastern (241) regions. Conversely, Metropolitan South and Metropolitan North had the lowest usage rates of all the regions across both years. Metropolitan South recorded a rate of 68 and 105 incidents per 1000 officers in 2001 and 2002 respectively, and Metropolitan North recorded a rate of 79 and 83 incidents per 1000 officers in 2001 and 2002 respectively.

In 2001, Far Northern officers used OC spray at more than three times the rate of Metropolitan South officers (271 compared with 68 per 1000). In 2002, Far Northern and Southern officers used OC spray at three times the rate of Metropolitan North officers (292 and 291 compared with 83 per 1000).

**Table 3.2: OC spray use patterns by QPS region (2001–02)**

Police region	Incident number			Rate per 1000 officers		
	2001	2002	% change	2001	2002	% change
North Coast	227	213	-6	240	214	-11
South Eastern	182	246	35	180	241	34
Far Northern	148	163	10	271	292	8
Southern	140	224	60	196	291	48
Central	80	104	30	132	165	25
Metropolitan North	77	86	12	79	83	5
Northern	74	112	51	128	204	59
Metropolitan South	59	91	54	68	105	54
<b>TOTAL QLD</b>	<b>987</b>	<b>1239</b>	<b>26</b>	<b>127</b>	<b>154</b>	<b>21</b>

Source: CRISP data 2004.

All regions apart from North Coast recorded an increase in usage per 1000 officers from 2001 to 2002. The rates of increase varied among regions, with the highest recorded in the Northern (59%), Metropolitan South (54%) and Southern (48%) regions. However, while OC spray usage increased in most regions over a two-year period, it seems likely that it would have decreased over a longer period, similar to the pattern shown in Figure 3.3.

It is difficult to interpret the considerable difference in usage rates across regions. One possible explanation is that officers and/or their supervisors in different regions have contrasting views about the acceptability of using OC spray. Another possible reason is that the emphasis placed on the use of OC spray by officers who conduct training varies across regions.



## Other uses of OC spray

A random sample of 500 CRISP MO reports was coded on a number of key variables of interest. These included whether the OC spray involved an actual discharge or whether it was merely presented as a form of threat. Another variable was whether OC spray was used against an attacking animal or a person. As Table 3.3 reveals, the spray was discharged against a person in the majority of incidents (83%). Nine per cent of discharges were against animals and the proportion of presentation-only (no actual discharge) incidents was 8 per cent.

**Table 3.3: Uses of OC spray (2001–02)**

Uses of OC spray	Number	Per cent
Discharge of spray at person	414	83
Use against animals*	43	9
Presentation only of canister	42	8
Unknown	1	<1
<b>TOTAL</b>	<b>500</b>	<b>100</b>

Source: CMC MO analysis of CRISP data 2004.

\*All these uses involved dogs except for one incident involving a snake.

The data were then analysed to test whether dog-use and presentation-only incidents had changed over time. Neither of these analyses was significant, revealing that the overall increase in OC spray use between 2001 and 2002 cannot be attributed to an increase in the proportion of these types of incident.

This also indicates that presentation-only of the spray has not become an increasing deterrent to subjects, as has been hypothesised (Kaminski, Edwards & Johnson 1998). However, it must be remembered that officers are required to report only when OC spray canisters are pointed at someone, not simply when they are removed from the holster. Warning people that they may be sprayed before removing the canister from the pouch, or removing the canister but not yet pointing it at someone, could have had (unrecorded) deterrent effects.

## Chapter overview

Although police used OC spray at an increasing rate in the first two years following its introduction, the trend in OC deployments over a four-year period ending in 2004 is relatively stable. When figures are controlled for the growth of the police service over that period, the rate of OC spray use has actually declined slightly.

Rates of OC usage vary considerably across police regions. Far Northern has the highest usage rate, with Metropolitan South and North regions the lowest.

The total use of OC spray equates to between two and three discharges per day. Most discharges are against people. This study did not find any clear evidence that the presence of OC spray has deterred conflict or violence directed at police.



# Context

**This chapter describes where, when and why OC spray is used by police, and the key characteristics of people involved. The main sources of data are CRISP and the CMC’s survey of police officers.**

## Location of incidents

The number of OC spray incidents by location is reported in Table 4.1. The location is defined by the CRISP ‘scene keyword’. This is a mandatory field where the reporting officer selects from a range of categories (e.g. street, licensed venue, dwelling) to describe the general setting of the incident.

Incidents classified as occurring on the ‘street’ comprised 43 per cent of all deployments across the two-year period. A combined category of ‘residence’ (dwellings, units, caravan parks) accounted for 17 per cent and ‘private grounds’ for another 16 per cent. Ten per cent occurred at a police station/watch-house or while the suspect was otherwise in the custody of police. Only 3 per cent of OC spray incidents occurred in licensed venues.

**Table 4.1: Location of OC spray incidents (2001–02)**

Location of incident	Number	Per cent
Street	952	43
Residence	384	17
Private grounds	350	16
Police station/watch-house/custody	223	10
Recreational	62	3
Licensed	59	3
Shopping area	54	2
Railway	17	1
Hospital/hospital grounds	20	1
Garage	14	1
Other	91	4
<b>TOTAL</b>	<b>2226</b>	<b>100</b>

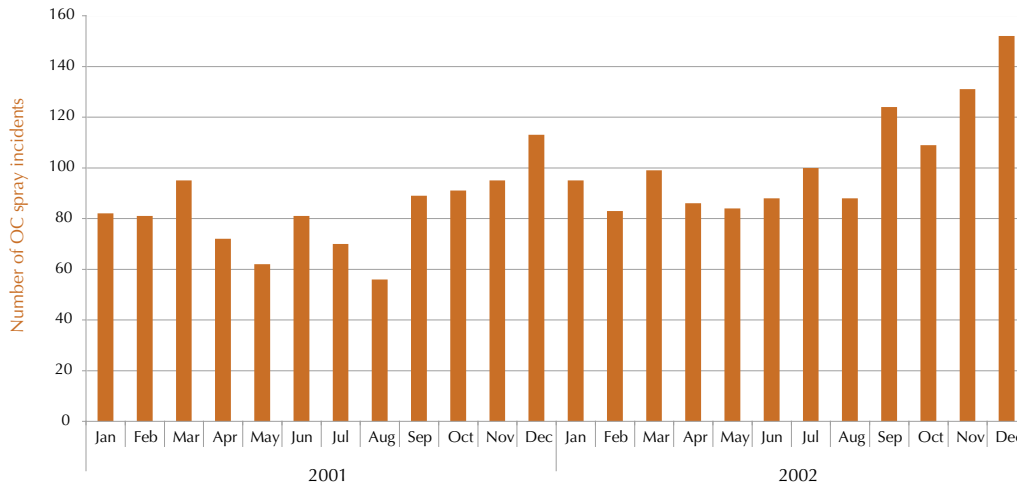
**Source: CRISP data 2004.**

A more detailed study of 500 cases as part of the MO analysis of CRISP data reveals a slightly different picture. Specifically, findings reveal that 9 per cent of all OC spray discharges against people took place in a police station or watch-house. Ten per cent of cases took place in a QPS vehicle, usually when someone then behaved aggressively, punching or kicking out at officers or the vehicle itself. Although most of these deployments were justified, using OC spray within the confines of a building or police vehicle increases the risk of secondary exposure of others, while at the same time potentially making the building or vehicle unusable until decontaminated. There were no statistically significant changes in the proportion of these incidents across the two years (in either 12-monthly or 6-monthly periods).

## Time of incidents

Conflict between police officers and members of the public varies according to time and place. Figure 4.1 shows that the highest use of OC spray occurs during the summer period.

**Figure 4.1: Number of OC spray incidents by month (2001–02)**

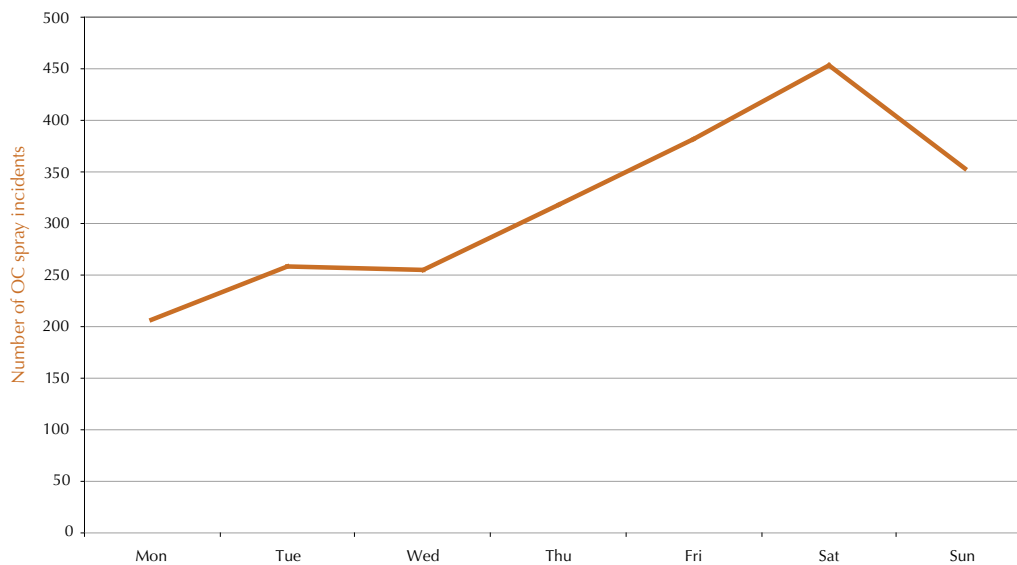


Source: CRISP data 2004.

*Note: The earliest committed date is used rather than date reported by police officer. For example, if an incident occurred on 31 December, yet was reported on 1 January, this incident was counted in the December statistics.*

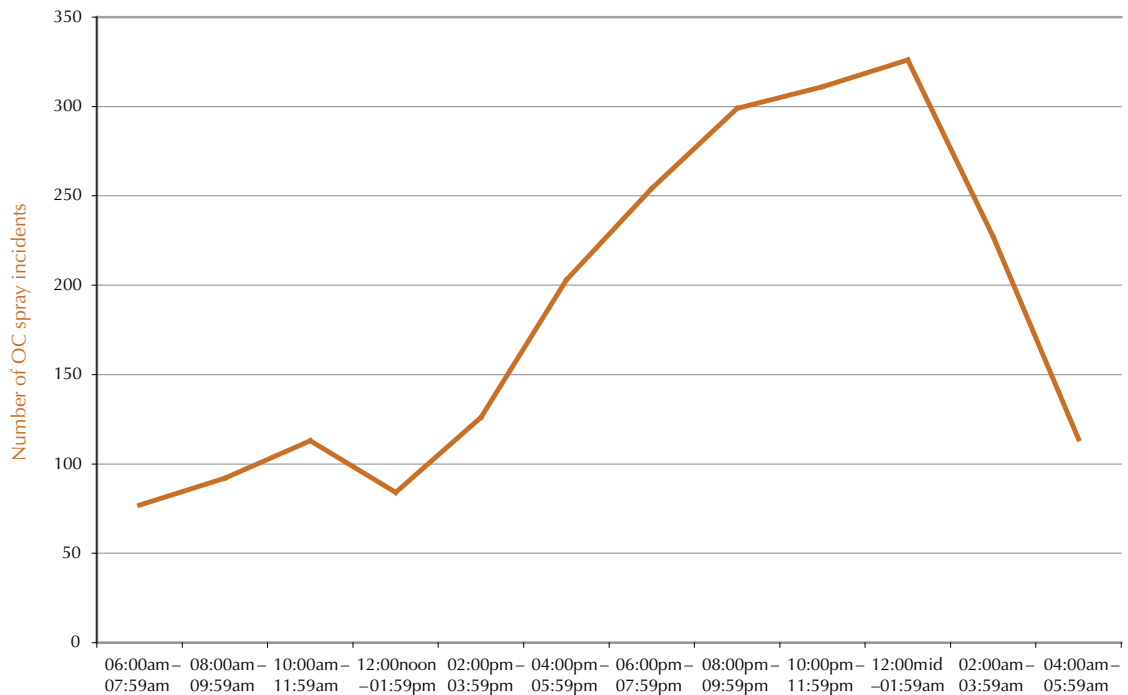
The distribution of the number of OC spray incidents from CRISP across day of the week and time of day are presented in Figures 4.2 and 4.3 respectively. As expected, the highest number of uses occurred at the end of the week, particularly Saturdays, and between 8 pm and 2 am, the busiest period for police generally.

**Figure 4.2: Number of OC spray incidents by day of week (2001–02)**



Source: CRISP data 2004.

Figure 4.3: Number of OC spray incidents by time of day (2001–02)



Source: CRISP data 2004.

## People involved in the incidents

This section describes the officers and subjects who were involved in OC spray incidents, based on reporting officer details and subject details drawn from CRISP data.

### Officer characteristics

The majority of officers were classified as general duties (over 65%), with the remaining identified as officers-in-charge, shift supervisors, detectives and officers in specialty squads.

The breakdown according to gender, rank, length of service and officer age is shown in Table 4.2. Most officers were male, of constable or senior constable rank, with up to 10 years of service, and between 26 and 35 years of age. This profile is similar to the profile of the typical general duties officer. However, there appears to be an over-representation of male officers who have used OC spray. The results in Table 4.2 reveal that females accounted for only 13 per cent of officers who reported OC spray use. At June 2002 the total proportion of females in the QPS was 20 per cent.<sup>10</sup> However, if only constables and senior constables (the rank most likely to be operational) are considered, then the proportion of females would be 26 per cent. Therefore, male officers are over-represented in the CRISP data analysis, which may suggest that female officers are less likely to use OC spray, or are involved in incidents where OC spray is less likely to be discharged.

<sup>10</sup> QPS Annual Statistical Review 2001/2002.

**Table 4.2: Characteristics of officers reporting the use of OC spray (2001–02)**

Officer characteristics		Number	Per cent
Gender	Male	1914	87
	Female	286	13
<b>TOTAL</b>		<b>2200</b>	<b>100</b>
Rank	Constable	1147	52
	Senior constable	730	33
	Sergeant	304	14
	Senior sergeant	15	1
<b>TOTAL</b>		<b>2196</b>	<b>100</b>
Length of service	Less than 1 year	82	4
	1 to 5 years	903	41
	6 to 10 years	482	22
	11 to 15 years	425	19
	16 to 20 years	163	7
	Greater than 20 years	145	7
<b>TOTAL</b>		<b>2200</b>	<b>100</b>
Age	21 to 25	308	14
	26 to 30	774	35
	31 to 35	548	25
	36 to 40	322	15
	41 to 54	248	11
<b>TOTAL</b>		<b>2200</b>	<b>100</b>

Sources: CRISP data 2004, QPS Human Resource Information System (HRIS) 2004.

*Note: Some officer details may relate to reporting officers. The rank of the officer is based on the date of the data download in May 2003 from the Human Resources Information System and may differ in some instances from the actual rank at the time of spraying.*

Of the 8053 sworn police officers in the QPS as at June 2002, 1382 reporting officers accounted for all 2226 uses of OC spray recorded in CRISP for the years 2001 and 2002 (see Table 4.3). The majority of officers reported one or two OC spray deployments. However, 38 police officers (3%) reported the use of OC spray five or more times. This accounted for 270 reported spraying incidents or 12 per cent of the total incident distribution. Six of these officers (less than 1%) reported the use of OC spray 10 or more times, which accounted for 3.5 per cent of the total incident distribution, with the highest being 25 reports by one officer. It must be remembered, though, that these high-incident reporting officers might not be the officers who used the spray, but the officers who were tasked with reporting the events on CRISP or members of specialist squads. However, this was not a particularly common occurrence.

The officer survey also revealed OC spray usage patterns. Of the 483 officers who responded to the survey, 43 per cent had discharged OC spray at a person while 57 per cent had not. As Table 4.3 illustrates, one-half (50%) of officers who had used OC spray had done so only once. An additional quarter (25%) had discharged OC spray on two occasions. Thus, three-quarters of officers who had discharged spray at a person had done so only once or twice.

**Table 4.3: Frequency of OC spray use by officers**

Frequency of use	CRISP data		Officer survey	
	Number	Per cent	Number	Per cent
One	924	67	103	50
Two	274	20	53	25
Three	100	7	16	8
Four	46	3	7	3
Five	16	1	10	5
Six to nine	16	1	13	6
Ten or more	6	<1	6	3
<b>TOTAL</b>	<b>1382</b>	<b>100</b>	<b>208*</b>	<b>100</b>

Sources: CRISP data 2004 and CMC Officer Survey 2004.

\*483 police officers responded to the survey with 208 (43%) reporting that they had used OC spray.

Length of service contributes to the number of people sprayed by an officer. For example, an officer who has had three years of service after the implementation of OC spray will have had more opportunity to use the spray than a first-year constable (FYC). To take this into consideration, the total number of people sprayed by an officer was divided by their years of service since the implementation of OC spray. This revealed that the average rate of discharge was 0.36 per year, translating to one person being sprayed every three years by each officer.<sup>11</sup>

The breakdown of usage rates is shown in Table 4.4. In all, 92 per cent of officers discharged OC spray against a person once a year or less, 5 per cent of officers discharged spray twice a year or more, and 2 per cent of officers used OC spray three times a year or more. Of the eight officers who had discharged spray three times a year or more, seven of these were males and one was a female. For a random sample of officers, the rate of usage seems relatively low. The breakdown of age, rank and years of service in this group was similar to the general sample.

**Table 4.4: Rate of OC spray discharge against a person per year (2001–02)**

Rate of discharge per year	Number	Per cent
Nil	274	57
0.33	84	18
0.50	16	3
0.67	45	9
1.00	22	5
1.33	6	1
1.50	1	<1
1.67	10	2
2.00	13	3
2.67	2	<1
3.00 or more	8	2
<b>TOTAL</b>	<b>481</b>	<b>100</b>

Source: CMC Officer Survey, 2004.

<sup>11</sup> One extreme outlier was deleted from the analyses. This officer reported that he had sprayed more than 50 people; however, most of these occurred during his time in another police service, where OC spray was used 'constantly'.

Based on an analysis of survey responses from officers, the overall rate of OC spray usage was tested for the effects of gender. This revealed a significantly higher rate of usage for males (0.40) than females (0.24). It translates to females spraying one person every four years on average, and males spraying one person every two-and-a-half years on average ( $t = -2.04, p < .05$ ).

The rate of OC spray usage was then analysed to test for the effects of age, rank and years of service. None of these comparisons was significant. An analysis was also conducted to test whether experiencing OC spray exposure during training affected the frequency of spraying. This also was not significant.

### Subject characteristics

Of the 2226 OC spray incidents recorded in CRISP, 1514 contained details of 1681 subjects. This translates to an average of just over one (1.11) subject per reported incident. Consistent with this, the CRISP MO analysis found that 98 per cent of OC spray incidents involved discharges against one person, with the remainder against two or more people.

CRISP information in Table 4.5 shows that 93 per cent of subjects involved in OC spray incidents were males. This was the same percentage revealed in the MO analysis. Nearly half of all subjects (48%) were under 25, and about two-thirds were of Caucasian appearance.

**Table 4.5: Characteristics of subjects involved in OC spray incidents (2001–02)**

Subject characteristics		Number	Per cent
Gender	Male	1565	93
	Female	115	7
<b>TOTAL</b>		<b>1680</b>	<b>100</b>
Racial appearance	Caucasian	1052	65
	Australian Aboriginal/Torres Strait Islander/Pacific Islander	531	33
	Other*	38	2
<b>TOTAL</b>		<b>1621</b>	<b>100</b>
Age (years)	12–16	75	5
	17–25	677	43
	26–35	539	34
	36–45	225	14
	46–65	70	4
<b>TOTAL</b>		<b>1593</b>	<b>100</b>

Source: CRISP data 2004.

\*'Other' category includes European/Latin, Indian, Middle Eastern/Arab, Oriental Asian, South-East Asian.

About 5 per cent of people sprayed were juveniles. At the time, the QPS OC spray policy did not prohibit the use of OC spray on juveniles. A recent amendment to the QPS policy now prohibits this, except in extreme circumstances. The CMC, in partnership with the University of Queensland and the Queensland University of Technology, has recently commenced a project that examines interactions between young people and the police. One key aspect of this project will be the causes of (and possible solutions to) conflict between police and young people.

One-third (33%) of subjects were described as being of Indigenous appearance, with most of the rest being Caucasian.<sup>12</sup> (It must be understood that this is a combined category of appearance used by the QPS and includes 23 per cent Aboriginal and 10 per cent Pacific Islander racial appearance codes. The reason for combining these codes for this study is that CRISP uses Torres Strait Islanders as example categories for both codes.) The high proportion of Indigenous subjects is difficult to interpret, but is consistent with disproportionately high rates of arrest. Although Aboriginal and Torres Strait Islander peoples comprise 2–3 per cent of the Queensland population, they represent 24 per cent of the population in custody (Turgeon 2001). These figures are directly comparable with OC spray usage rates — 23 per cent of subjects were described as having an Aboriginal appearance.

The MO analysis in Table 4.6 examined 414 randomly selected CRISP reports for more detailed information, including the events leading to the use of OC spray, where and under what circumstances OC spray was used, and what happened immediately after, in terms of effectiveness, secondary exposure and aftercare.

Table 4.6 also provides some insight into other factors that seem to play a part in OC spray incidents. For example, nearly 24 per cent of subjects were affected by alcohol and 5 per cent were affected by drugs at the time of the incident. In addition, nearly 8 per cent were described in the CRISP report as being a mental health patient.

**Table 4.6: Details of subjects involved in OC spray incidents (2001–02)**

Subject details		Number	Per cent
Gender of person sprayed	Male	367	88.6
	Female	26	6.3
	Unknown	21	5.1
More than one subject sprayed	Yes	8	1.9
	No	406	98.1
Subject affected by alcohol	Yes	98	23.7
	No	8	1.9
	Unknown	308	74.4
Subject affected by drugs	Yes	21	5.1
	No	6	1.4
	Unknown	387	93.5
Subject possibly affected by mental illness	Yes	32	7.7
	No	2	0.5
	Unknown	380	91.8

Source: CMC MO analysis of CRISP data 2004.

## Reason for police attendance at the incident

Differences in the circumstances leading to police attendance also influence the use of OC spray. This was explored using CRISP MOs and the police officer survey.

According to the CRISP reports (see Table 4.7), in 40 per cent of cases it was unknown what had led police to attend an incident where OC spray was used. In 15 per cent of cases the initial reason was generally described as a disturbance (8%) or some sort of disorderly behaviour (7%). Nine per cent of cases were incidents of domestic violence. Traffic breaches or accidents were the initial reason

<sup>12</sup> The QPS now has an Indigenous identification forced entry field within CRISP that is separate from the racial appearance field, but this was not in use for the entire data-collection period of 2001 and 2002.



in 5 per cent of cases, whereas fights and assaults/threats of assault each comprised 4 per cent of all cases (total 8%). Attempted suicides/self-harm incidents made up 3 per cent and an additional 6 per cent of incidents involved a mental health patient or warrant. Given the fact that there was a large proportion of missing data, these estimates are conservative.

An analysis of responses to the officer survey provides additional insights. For example, Table 4.7 shows that the most common (25%) reason for attendance at an incident where OC spray was discharged was in relation to a fight or an assault. An additional 18 per cent of incidents specifically involved domestic violence. As indicated by the results, the survey shows a much higher percentage for domestic violence than does the MO analysis. This may be due to the officer reflecting on the incident with the benefit of hindsight, rather than stating the initial reason given by the Police Communications Centre. Nine per cent of discharges occurred where the reason for attendance was an armed person. Therefore, about half of OC spray discharges (52%) occurred when police were responding to situations where people were fighting with each other (either domestic violence or non-domestic violence) or where someone was armed.

**Table 4.7: Reason for police attendance at an incident involving the use of OC spray**

Reason for police attendance	Crisp MO analysis		Officer survey	
	Number	Per cent	Number	Per cent
Unknown	164	40	—	—
Other	64	15	14	4
Domestic violence	37	9	60	18
Disturbance	33	8	40	12
Fight/assault/threat of assault	32	8	85	25
Disorderly behaviour	28	7	41	12
Traffic breach/accident	20	5	10	3
Attempt suicide/self-harm	12	3	15	4
Mental health warrant/person	11	3	—	—
Armed person	8	2	32	9
Warrant/NTA	5	1	5	2
At watch-house/station	—	—	15	4
Robbery/stealing	—	—	11	3
Break and enter	—	—	8	2
Party/noise	—	—	4	1
TOTAL	414	100	340	100*

Sources: CRISP data 2004 and CMC Officer Survey 2004.

\*Percentages may add up to more or less than 100 due to rounding.

In the majority (61%) of cases, OC spray was deployed during the detention or arrest of a person who resisted police in some way. This finding is consistent with previous research that found that use of force typically occurred when police were attempting to arrest a resisting suspect (Adams 2004).

## Subject behaviour

Table 4.8 presents the events immediately preceding police use of OC spray, based on findings from the CRISP MO analysis and the CMC's officer survey. It should be noted that the categories used to describe the subject's behaviour were created from the officer's own language and description in the MO and are not all clearly separated. For example, some officers might have recorded that the subject

struggled, but not have specified that the subject punched an officer. Similarly, the categories of ‘violent/aggressive’ versus ‘struggle/resist’ could reflect differences in various officers’ language rather than specific differences in the situation. In the survey, officers were asked to pick just one of these alternatives, but sometimes they ticked more than one option. In these cases, the most serious response was the one that was coded. For example, if an officer ticked both ‘threat to fight with police’ and ‘would not comply with police direction’, only the ‘threat to fight’ option was coded.

**Table 4.8: Subject behaviour before OC spray use**

Subject behaviour	CRISP MO analysis		Officer survey	
	Number	Per cent	Number	Per cent
Punch/push/grab/kick officer (some during general struggle)	92	22	80	24
Would not drop weapon/reach for weapon (incl. officer’s weapons)	68	16	53	16
Advance toward officer aggressively/rush at officer	47	11	86	25
Threat to fight officer/shape up/fighting stance	40	10	57	17
Struggle/resist (not specified)	37	9	—	—
Aggressive/violent (not specified)	22	5	—	—
Subject kicking/hitting window inside police car	22	5	10	3
People fighting each other/about to attack third party	13	3	11	3
Try to run away/pull away/run away	9	2	10	3
Spit at police/spit blood	9	2	4	1
Not comply with police directions	8	2	8	2
Wave arms/swing arms	8	2	6	2
Assault police/attempt to attack police (not specified)	5	1	—	—
Interfere with other’s arrest (not specified)	3	1	1	<1
Try to drive crashed car away (car currently stationary)	2	1	—	—
Subject injecting drugs (syringe in arm)	2	1	—	—
Refusing to get out of car	—	—	4	1
Attempt suicide/self-harm	—	—	6	2
Other	12	3	3	1
Unknown	15	4	—	—
Total	414	100	339*	100*

Sources: CRISP data 2004 and CMC Officer Survey 2004.

\*One case was missing.

According to the CRISP MO analysis, in 16 per cent of cases OC spray was used because the subject was reaching for or would not drop a potential weapon. In 44 per cent of cases the subject was sprayed as they were attacking or threatening to attack an officer. Thus, over 60 per cent of incidents involved an extremely aggressive person threatening to assault the officer. A further 14 per cent of cases involved a subject being generally ‘aggressive/violent’ (5%) or struggling and resisting the officer (9%). While ‘struggling/resisting’ may appear relatively benign it is not possible to gauge exactly how strongly or violently the person may have been resisting in these situations.

These findings are entirely consistent with the results from the officer survey. For example, in 82 per cent of cases, the officer was under direct threat of being attacked or already in the process of being assaulted when OC spray was used.

The survey also examined whether or not an officer’s decision to deploy OC spray was influenced by any previous experience they had using OC spray. The analysis

showed that officers who had used OC spray were more likely to use it again. Despite an increased willingness to use OC spray, the situations in which they would choose to do so were still the same. That is, officers tended to reserve the use of OC spray for dealing with potentially violent subjects.

While the majority of uses appear justified, there are some OC spray deployments that give rise for concern. In particular, eight respondents (2%) to the officer survey said that OC spray was used when the subject did not comply with police directions, 10 (3%) said OC use occurred when the subject was trying to run away, and four (1%) said it occurred when the subject refused to get out of a car. As a case in point, one respondent wrote the following at the end of the survey (when asked to make any other comment about OC spray use):

... a male person would not get out of an uncaged police vehicle and rather than contaminating the car as it is a small enclosed space, I sprayed the OC into my hand and wiped above the eyes of the subject. This worked extremely effectively ... (ID 32)

This is of concern because the police officer clearly was not at risk; otherwise he would not have deliberately come into physical contact with the subject (reaching out to wipe OC on his forehead). It appears that the use of OC spray in this situation was simply to enforce compliance with a direction rather than to control a violent or aggressive person and to prevent injury in a defensive manner. Further examples of the subject not complying with the directions of police are provided in Box 4.1.

#### **Box 4.1: Cases where OC spray was used**

Case 71: The perpetrator of a domestic violence incident was in a darkened room and would not respond to any police directions. Presumably (although this was not stated in the MO) the officers did not want to approach the subject when they were unsure what level of threat he posed.

Case 98: The MO stated that two subjects had assaulted someone. '... The subjects were apprehended by police. Subject 1 was not complying with police direction ... was given a warning ... did not comply and was sprayed.'

Case 159: Police attended the scene and located the subject (offence not specified in CRISP). The subject was directed to place his hands on the car, spread his legs and not move. The subject did not spread his legs and when redirected to do so '... the subject commenced to move away from the rear of the vehicle. Constable X then applied the OC spray.'

Case 168: Police were at a location due to unspecified matters. The subject ran into his house. 'Police then entered the dwelling and asked him to come outside and be spoken to. The subject refused and then police stated he would be sprayed if he did not go outside. The subject stated he didn't care.' The subject was sprayed.

Case 276: The female suspect was in the watch-house and had attempted to place items around her neck (blanket, shirt). Three officers 'entered the cell to place a smock (a tear-proof shirt) on the subject. The subject refused to comply and was warned. The subject was subsequently sprayed'.

Case 303: The subject was driving while under the influence (0.204%). '... the suspect was being obnoxious and offensive. The suspect refused to get into the police vehicle. The subject was extremely intoxicated. A verbal warning was given prior to the use of the OC spray.'

Case 305: The subject was chased by police after he was informed he was going to be involuntarily admitted to the mental health unit. '... the subject was warned he would be sprayed with OC spray and once again did not comply and was sprayed.'

Some cases do not appear to warrant the use of OC spray. While it is understandable that a perpetrator in a darkened room presenting an unknown risk to officers is sprayed (case 71), in other instances (cases 159, 168) OC spray is seemingly used as a compliance tool. However, these cases make up only a small proportion of the total number of incidents and are based on an officer's brief account of the incident, which may not accurately reflect the full situation.

### Presence of a weapon

This evidence suggests that OC spray is more likely to be used in incidents where weapons are involved. According to the MO analysis, the subject was armed or had immediate access to a weapon in 17 per cent ( $n = 69$ ) of cases. The breakdown of the types of weapon is shown in Table 4.9. The most common sort was a knife or other bladed weapon (51%).

**Table 4.9: Type of weapon involved in OC spray incident (2001–02)**

Weapon type	Number	Per cent
Gun	2	3
Knife/other bladed	35	51
Stick/club type	24	35
Other	7	10
Unknown	1	1
TOTAL	69	100

Source: CMC MO analysis of CRISP data 2004.

Weapons were more likely to be involved in domestic violence incidents than non-domestic violence cases, a statistically significant ( $\chi^2 = 15.3, p < .001$ ) difference. Weapons were present in 40 per cent of domestic violence incidents and in only 15 per cent of other sorts of incidents. This suggests that domestic violence cases present a potentially high risk for police, and could account for a disproportionate OC spray deployment rate.

### Distance between officer and subject

In 43 per cent of cases, the distance between the officer and the subject was unknown. However, in 75 per cent of cases where the distance was known, the officer was 'standing back' (Table 4.10). One of the main tactical advantages of OC spray is that the officer can remain at a safe distance from the suspect when discharging the spray. In 25 per cent of cases where the distance was known, the officer was either grappling with the suspect or within striking range. This is a concern for three reasons. Firstly, the QPS Good Practice Guide for OC spray requires that a minimum distance of 60 centimetres be maintained between the OC spray canister and the subject, in order to avoid any possible damage to the subject's eyes from the propellant (QPS 2000). Secondly, as previously mentioned, the effects of the spray may be compromised if sprayed from too close a distance (Edwards, Granfield & Onnen 1997; Morabito & Doerner 1997). Thirdly, deploying OC spray while grappling or struggling with a person may increase the risk of the officer also being affected by the spray.

**Table 4.10: Distance between officer and subject during OC spray incident (2001–02)**

Distance between officer and subject	Number	Per cent
Standing back	177	43
In range to be hit	26	6
Grappling/struggling	34	8
Unknown	177	43
TOTAL	414	100

Source: CMC MO analysis of CRISP data 2004.

## Warnings given

Warnings of the potential use of OC spray were given to the subjects in 78 per cent of incidents (see Table 4.11). In 6 per cent of cases, no warning was given. Reasons were that the officer did not think there was time or that it had not been tactically appropriate to issue a warning. In 16 per cent of cases it was not recorded whether a warning was given or not.

**Table 4.11: Warnings given before OC spray deployed (2001–02)**

Warnings given	Number	Per cent
Yes	324	78
No	26	6
Unknown	64	16
TOTAL	414	100

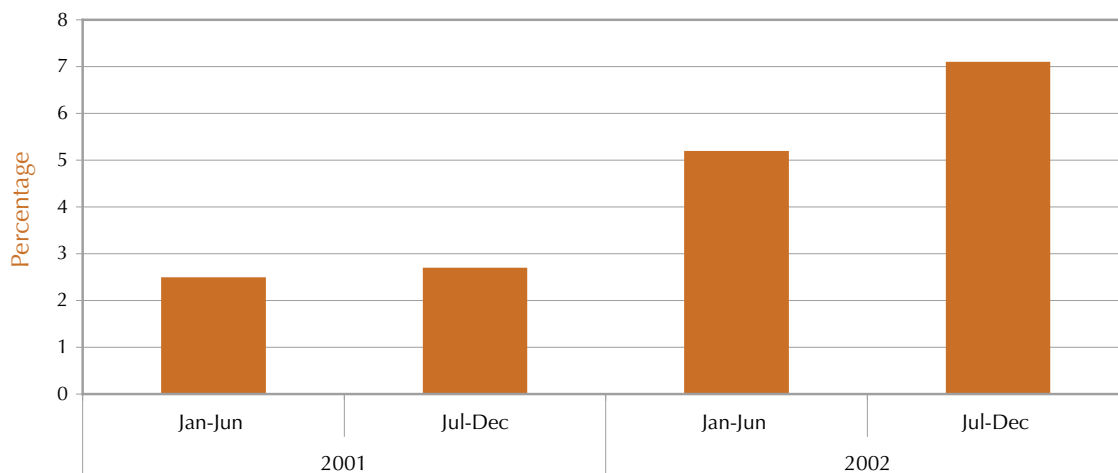
Source: CMC MO analysis of CRISP data 2004.

## Use of OC spray on handcuffed subjects

In 5 per cent ( $n = 20$ ) of all cases, according to the MO analysis, OC spray was discharged after the subject had been handcuffed and was continuing to struggle. In most of these cases (65%) the subject had already been placed in a police vehicle.

There was an apparent increase in using OC spray on handcuffed subjects across the two years (see Figure 4.4). This suggests that a lowering of the threshold at which officers are prepared to use OC spray may have occurred. It must be noted, though, that this apparent increase was not statistically significant, perhaps due to the small size of the sample ( $n = 20$ ).

**Figure 4.4: OC spray use on handcuffed subjects (2001–02)**



Source: CMC MO analysis of CRISP data 2004.

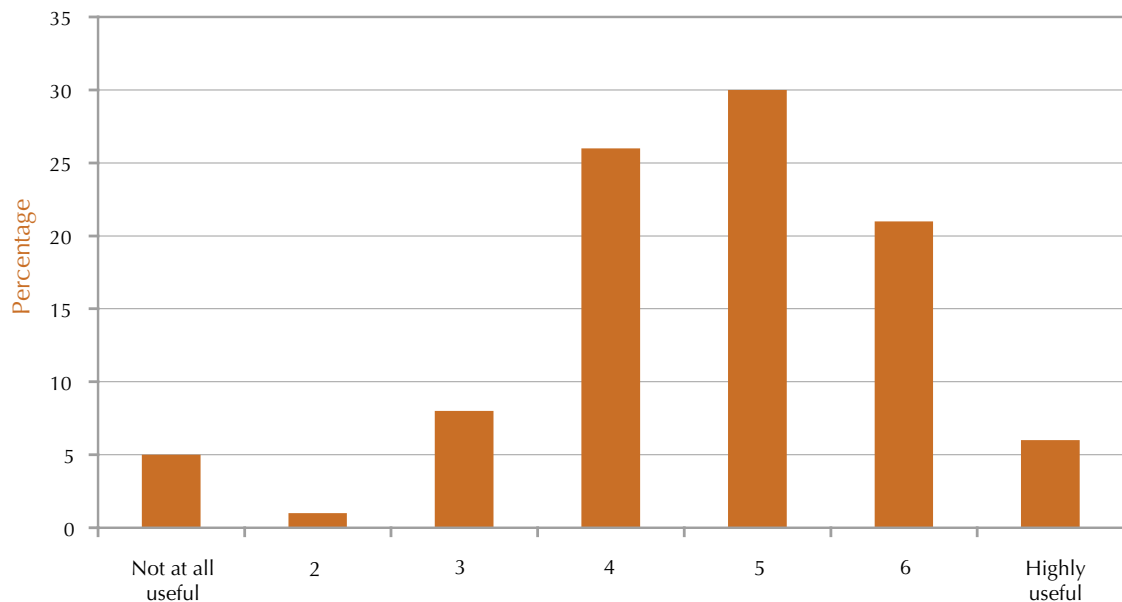
While the use of OC spray on a handcuffed subject appears to be excessive, it is also possible that the person was kicking, hitting, smashing car windows or otherwise being extremely violent. The subject and the officers might have suffered more serious injuries if OC spray had not been used. Obviously, these can be difficult situations for officers to deal with. However, it could also be argued that officers should be able to control handcuffed subjects further without using OC spray. Deploying OC spray on handcuffed suspects needs to be closely examined as it does suggest some possible instances of inappropriate use.

## Supervisor's review of the use of OC spray

Currently, QPS policy requires that 'the officer in charge where the officer using OC spray is stationed, is to overview the incident to determine whether the use of OC spray was in accordance with Service policy and procedures and where necessary forward recommendations to the district officer' (Operational Skills and Practices, s. 14.21.4). The policy does not appear to advocate examining the incident to determine if the situation could have been handled differently.

Although it was not possible to determine how frequently these overviews occurred, in about half (47%) of the incidents of OC spray discharge, survey respondents said that their supervisor discussed the circumstances surrounding the use of OC spray. These officers were then asked to rate the usefulness of that discussion on a 7-point scale. As Figure 4.5 shows, most officers (85%) rated this discussion as 4 or higher. The average rating was 4.7, which suggests that a formal debrief after an OC spray incident is considered useful by officers.

**Figure 4.5: Usefulness of supervisor's overview**



Source: CMC Officer Survey 2004.

Those officers who had used OC spray were asked to indicate, on a 7-point scale, how much support they received from other officers afterwards. Table 4.12 shows that, overall, the level of support across all three categories (partner, supervisor, other officers) was high. The rating from the officer's partner was the highest (6.0), followed by other officers (5.8) and, lastly, the officer's supervisor (5.3).

**Table 4.12: Average ratings of support for the use of OC spray**

Support for OC spray use	Average rating
Partner	6.0
Other officers	5.8
Supervisor	5.3

Source: CMC Officer Survey 2004.

## Chapter overview

This chapter presented an analysis of when, where and why OC spray was used by police, and identified some of the key characteristics of individuals involved.

According to CRISP figures, the majority of OC spray incidents take place on the street or in a private residence. In most cases, they occur on weekends (Friday, Saturday or Sunday), and between the hours of 8 pm and 2 am. OC spray is used more often by police during the summer period, which is consistent with other seasonally related patterns that drive police activity.

Perhaps not surprisingly, most officers who use OC spray are assigned to general duties (i.e. frontline police). Typically, the officer is male, aged between 25 and 30 years, with between one and 10 years of experience. Although females comprise 20 per cent of all sworn police, they account for only 13 per cent of those officers who have used OC spray. Overall, the use of OC spray by police officers is relatively uncommon, with just 17 per cent of QPS officers reporting spray discharge during the two-year study period. In most cases, officers who had used OC spray had done so only once or twice. However, a small number of officers had discharged the spray 10 or more times.

The vast majority of subjects involved in OC spray incidents are males between the ages of 17 and 35 years. According to CRISP, one-third of subjects who were sprayed by police in 2001–02 were described by the officer as being Aboriginal, Torres Strait Islander or Pacific Islander in appearance. In addition, nearly 25 per cent of subjects were affected by alcohol.

The police officer survey reveals that police most commonly used OC spray at incidents involving an assault, domestic violence or a disturbance. In the vast majority of cases (more than 80%) OC spray was used while detaining or arresting someone who was struggling or violent. In some cases, the subject was armed and presented a significant and immediate threat to the officer's personal safety. Although most uses of OC spray were entirely justified, there were a small number of cases where the officer seems to have sprayed a subject simply because they did not comply with a police direction or where they were already being restrained by handcuffs.

In a number of cases, the officers deployed OC spray while they were grappling or struggling with a person. This is particularly concerning as it compromises the effects of the spray on the subject, while at the same time potentially exposing the officer to the secondary effects of the spray. This could create a dangerous situation, especially if the officer is debilitated to such an extent that they can no longer defend themselves, or others, or retain control of their baton or firearm.

In a small number of cases, OC spray was discharged after the subject had already been placed in handcuffs. Although restraining a person can sometimes be difficult for officers, the use of OC spray on handcuffed subjects needs to be carefully scrutinised and treated very seriously by the QPS.

Respondents to the officer survey stated that their use of OC spray was discussed by their supervisor in less than half (47%) of incidents. In most cases, these officers (85%) considered those discussions to be useful.

# 5

## Effectiveness

**This chapter assesses the effectiveness of OC spray by examining the subject's perceived immediate reaction to the spray and the eventual outcome of the incident. A number of other factors, such as gender, ethnicity and the use of alcohol and drugs, are studied to determine any impact on the spray's efficacy.**

**The main sources of data used were CRISP reports and the police officer survey.**

### Effectiveness of OC spray

When officers record each use of OC spray in CRISP, they can describe the spray's effects in the MO field. In order to analyse the spray's effectiveness, these descriptions were rated on a three-point scale — strong effect (if the subject became completely compliant or debilitated), some effect and no effect. In 53 per cent of cases where effectiveness was recorded, the subject was strongly affected and, in an additional 30 per cent of cases, there was some effect. In the remaining 17 per cent of cases there was no apparent effect (and this included a couple of cases where the reporting officer said the OC spray made the suspect's behaviour worse). The results are reported in Table 5.1.

Overall, in 83 per cent of cases OC spray was effective in helping the officer gain control of a suspect. This is similar to results from other studies (Edwards, Granfield & Onnen 1997; Gauvin 1995; Kaminski, Edwards & Johnson 1999; NYC CCRB 2000).

**Table 5.1: OC spray effectiveness according to MO analysis (2001–02)**

Effectiveness of OC spray	Number	Per cent
Strong effect	178	53
Some effect	99	30
No effect	58	17
TOTAL	335	100

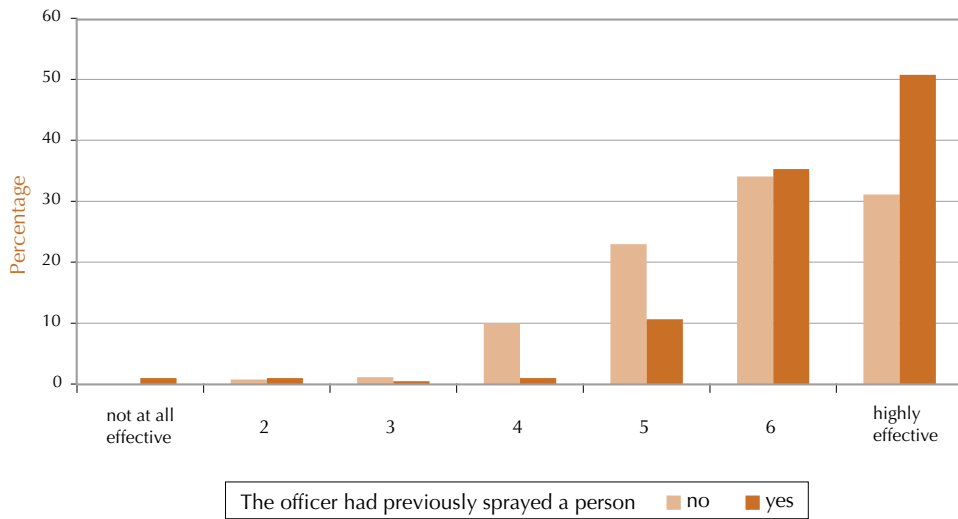
**Source: CMC MO analysis of CRISP data 2004.**

The officer survey also examined whether OC spray was effective. Respondents were asked to rate how well the spray worked, on a 7-point scale from 'not at all effective = 1' to 'highly effective = 7'. The average rating was 6. Our analysis revealed that gender, age, rank and years of service did not affect this rating. Factors that did affect the rating were whether the officers had themselves been exposed to OC spray during training, and whether they had previously sprayed a person. That is, if officers had experienced OC spray exposure in training, they rated OC spray as significantly more effective than did those officers who had not been exposed (6.1 versus 5.8;  $t = 2.32$ ,  $p < .05$ ); nevertheless, both these ratings are very high. Similarly, as shown in Figure 5.1, officers who had previously discharged spray against a person rated OC spray as significantly more effective than did those



officers who had never sprayed a person (6.3 versus 5.8;  $t = -4.80, p < .01$ ); again, both ratings are very high.

**Figure 5.1: General effectiveness rating by previous spraying of a person (yes/no)**



Source: CMC Officer Survey 2004.

## Effectiveness at the most recent incident

Survey respondents were asked about the spray’s effectiveness at the most recent incident in which they were involved. This revealed that in 89 per cent of incidents the subject was either strongly affected to the point of being debilitated or compliant, or affected to an extent that aided the officer in gaining control (Table 5.2). In 10 per cent of cases the subject was either not affected or affected to a point that did not assist in officer control, and in 1 per cent OC spray made the subject’s behaviour worse. In the vast majority (89%) of incidents OC spray was effective in gaining control of the subject. This is similar to the result (83%) of the CRISP MO analysis, and the findings of other studies (Edwards, Granfield & Onnen 1997; Gauvin 1995; Kaminski, Edwards & Johnson 1999; NYC CCRB 2000).

**Table 5.2: Subject reaction to OC spray**

Subject reaction to OC spray	Number	Per cent
Subject debilitated and/or compliant	159	47
Subject affected to some extent, which aided in control	142	42
Subject affected to some extent, which did NOT aid in control	17	5
Subject did not appear to be affected	18	5
Subject became MORE aggressive/difficult to handle	3	1
TOTAL	339*	100

Source: CMC Officer Survey 2004.

\*One case was missing.

## Other factors influencing OC spray effectiveness

This section considers the impact of variables such as the subject's use of alcohol or drugs or the distance between the officer and suspect on the effectiveness of OC spray.

### Drugs, alcohol or mental illness

An analysis of CRISP MO reports found no statistical differences in the effect of OC spray on people affected by alcohol, drugs or a mental illness (Table 5.3). However, this may have been because very few CRISP reports made mention of the subject's mental state or their use of drugs and alcohol.

**Table 5.3: Impact of alcohol, drugs and mental illness on the effectiveness of OC spray (2001–02)**

Effectiveness of OC spray	Alcohol affected (n)	Drug affected (n)	Mentally ill affected (n)
Strong effect	45% (44)	33% (7)	38% (12)
Some effect	24% (24)	19% (4)	25% (8)
No effect	14% (14)	33% (7)	16% (5)
Unknown effect	16% (16)	14% (3)	22% (7)
TOTAL*	100% (98)	100% (21)	100% (32)

Source: CMC MO analysis of CRISP data 2004.

\*Percentages may add up to more or less than 100 due to rounding.

### Gender

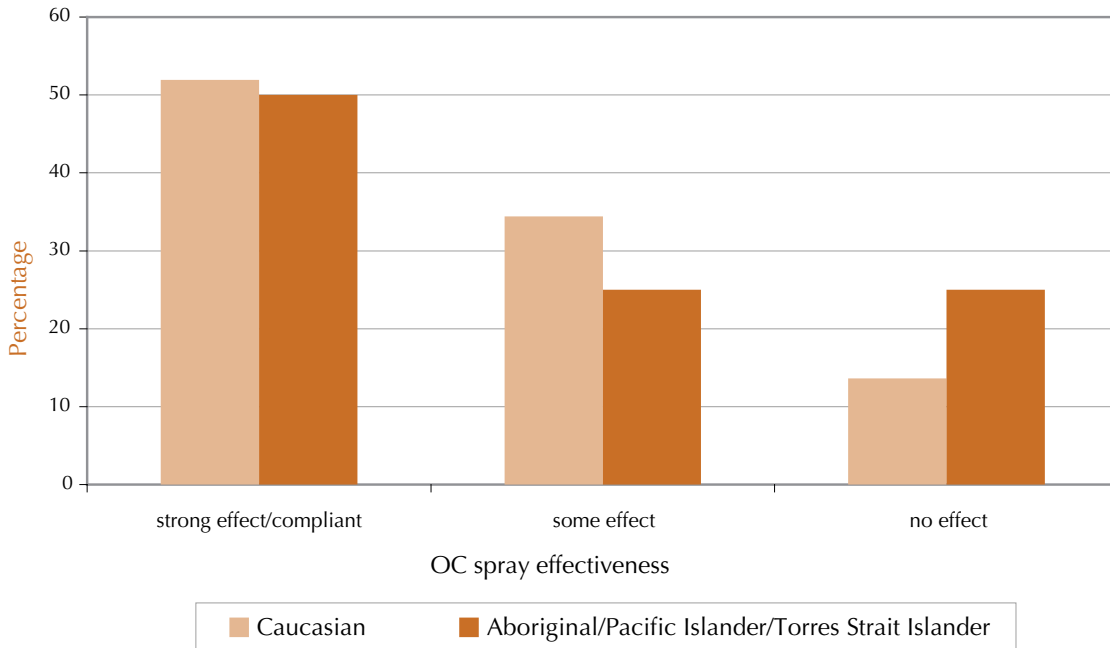
Analysis revealed that gender did not affect how well the spray worked. That is, males and females were equally affected by OC spray.

### Ethnicity

An analysis of MO data was conducted to determine if a person's ethnicity had an impact on the effectiveness of OC spray. The sample linked only single subject MOs with valid CRISP ethnic appearance descriptions. This linking of subject details to the MO analysis was conducted after coding of the MO was completed by the researcher and therefore in the majority of cases the coder was 'blind' to the race of the subject. The sample examined included 192 cases where the person subjected to the spray was described by police as Caucasian and 82 cases where the person was described as Aboriginal, Pacific Islander or Torres Strait Islander in appearance.

As Figure 5.2 shows, Aboriginal, Pacific Islander or Torres Strait Islander people were statistically more likely to be described as experiencing 'no effect' from OC spray than were Caucasians ( $t = 2.08, p < .05$ ). The reason for this difference has not been established. Adang, Kaminski and Howell (2004), however, identify some possible reasons. They suggest that confrontations between police and minority groups could be particularly violent or antagonistic and therefore result in the subject being more goal-directed. There is also said to be a likelihood that an interaction with a minority person may influence an officer's assessment of the effectiveness of OC spray. This could possibly result in either a misinterpretation of the event itself or an altered memory of the event when describing the occurrence in an MO. There might also be protective behaviour on the part of the officer completing the MO, which might lead to downgrading the effectiveness of OC spray to enable a valid reason for other use-of-force options.

**Figure 5.2: Effectiveness coding from MO analysis by ethnicity (2001–02)**



Source: CMC MO analysis of CRISP data 2004.

### Distance between the officer and the subject

There was a statistically significant association between the OC spray effectiveness rating and the distance between the subject and officer ( $\chi^2 = 8.02$ ,  $p = .018$ ). That is, OC spray worked better if the officer was standing back, rather than close up or grappling with the subject (see Figure 5.3). The spray had a strong effect (61 per cent) if the officer was standing back, but had no effect in almost a third (31%) of the cases where the officer was close to the subject.

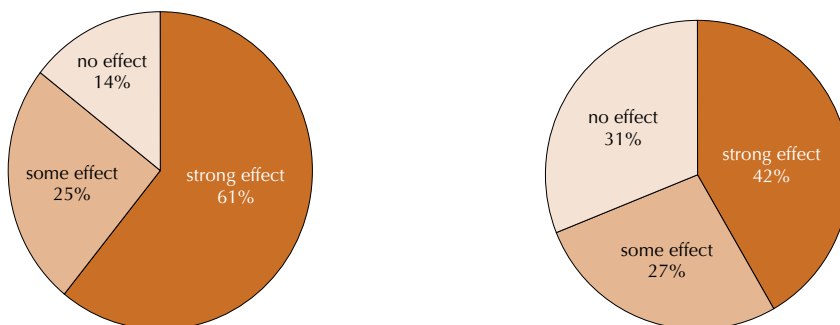
As reported by Truncale and Messina (1994) and Gauvin (1995), it is possible that a subject could feel highly agitated if they were grappling with an officer, and this state might make them more resistant to OC spray effects. The officer might also be more likely to feel that the OC spray was not effective or only minimally helpful in such scenarios if it did not immediately stop the subject’s behaviour.

The question exists, though, as to whether OC spray was ever intended to be used in such cases (close grappling with subjects). There is no relevant discussion or guidance in the QPS OC Spray Good Practice Guide, which presents OC spray use only in terms of a stand-off defensive weapon.

**Figure 5.3: OC effectiveness by distance between subject and officer (2001–02)**

Standing back ( $n = 146$ )

Grappling/in range to be hit ( $n = 48$ )



Source: CMC MO analysis of CRISP data 2004.

## Time to take effect

In about half of cases, the time taken for OC spray to have an impact was not mentioned in the MO. Where time was mentioned, the spray took effect almost immediately in two-thirds (65%) of the cases (Table 5.4).

**Table 5.4: Time for OC spray to take effect (2001–02)**

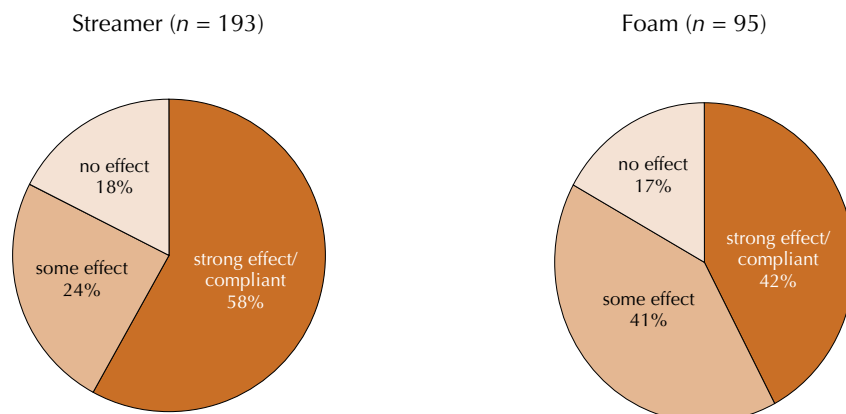
Time to take effect	Number	Per cent	Total per cent known
Unknown	230	56	—
Known	184	44	100
No effect	35	8	19
Within 5 secs	106	26	58
6–10 secs	13	3	7
11–30 secs	8	2	4
More than 30 secs	22	5	12

Source: CMC MO analysis of CRISP data 2004.

## OC spray delivery systems

OC spray is contained in a pressurised metal container that contains the oleoresin capsicum suspended in either water or oil along with a nitrogen gas propellant. The OC spray can be dispensed as foam or as a liquid. The liquid ‘streamer’ unit is the most common type of unit used by the QPS and is considered ‘general issue’. The foam unit is best suited for use in confined areas such as a watch-house. There was a statistically significant association between the OC spray effectiveness rating and the delivery system (streamer versus foam), as shown in Figure 5.4. That is, streamer canisters were more effective than foam ( $\chi^2 = 9.03$ ,  $p = .011$ ), with spray from a streamer causing a strong reaction in 58 per cent of cases, and foam causing a strong reaction in 42 per cent of cases. The ‘no effect’ category was similar (17–18%) for both types of canisters. Similarly, there was no difference in the time taken for the systems to cause an effect.

**Figure 5.4: Effectiveness and canister type (2001–02)**



Source: CMC MO analysis of CRISP data 2004.

Canisters malfunctioned in 1 per cent of cases, so the spray was unable to be used against four subjects. Another canister malfunctioned in an attempted use against a dog. Four of these incidents involved streamer canisters and the fifth was unknown.

## Aftercare

According to the MO analysis, aftercare was given in 92 per cent of cases. No aftercare was given in 3 per cent of cases and in 5 per cent of cases it was unknown or not stated whether or not aftercare was given (see Table 5.5).

**Table 5.5: Aftercare**

Aftercare	CRISP MO analysis		Officer survey	
	Number	Per cent	Number	Per cent
Yes	382	92	335**	98
No	13	3	5	2
Unknown	17	4	–	–
Not applicable	2	<1	–	–
TOTAL	414	100*	340	100*

Sources: CMC MO analysis of CRISP data 2004, and CMC Officer Survey 2004.

\*Percentages may add up to more or less than 100 due to rounding.

\*\*265 at scene; 70 transported elsewhere

In four cases where aftercare was not provided, the subject decamped or was unapproachable. In three cases, aftercare was refused even though it was offered by police. In six cases, no aftercare was given because the officer stated there was no effect of the spray on the subject or the spray had missed the subject. In one case, the subject sprayed with OC appeared to have difficulty breathing so officers called for an ambulance. However, the paramedics said that the subject's reaction was anxiety in response to the spray, and not a physiological reaction that required any additional care.

Respondents to the officer survey indicated that almost all subjects (98%) were given aftercare in the most recent incident (Table 5.5). This is slightly higher than observed in the CRISP MO analysis (92%). In about one in five deployments (21%), aftercare was delayed until the subject was transported elsewhere. In some cases, removing the subject from a volatile situation before commencing aftercare could be a necessary tactical decision. However, given the considerable pain that OC spray can cause, it is of concern that such a large number of subjects are transported elsewhere before aftercare is given. Current QPS guidelines do not specify where aftercare is to be given.

## Chapter overview

In the vast majority of cases, OC spray helped officers gain control of suspects. Many of these situations involved extremely aggressive people, including some armed with dangerous weapons. Three-quarters of subjects were overcome within a few seconds of the spray being deployed. In 10 per cent of cases, OC spray did not aid in controlling subjects. In 1 per cent of cases, it made the subject's behaviour worse.

The evaluation found no statistical difference in the effect of OC spray on subjects who were affected by alcohol or drugs, or mentally ill. Males and females were also found to react equally to the spray. In contrast, Aboriginal, Pacific Islander and Torres Strait Islander people were statistically less likely to be perceived by police to be affected by OC spray than were Caucasian subjects. The reason for this difference has not been established.

In more than 90 per cent of cases, the subject was given aftercare to help overcome the effects of the spray. Most often, this care was provided at the scene. However, in some cases (21% of all deployments) aftercare was given after the suspect was transported elsewhere. While delays in giving aftercare could be necessary tactical decisions (i.e. removing the subject from a volatile situation), given the considerable pain that OC spray can cause it is of concern that current QPS guidelines do not specify that aftercare should be given at the scene of the event.

# 6

## Assaults and injuries

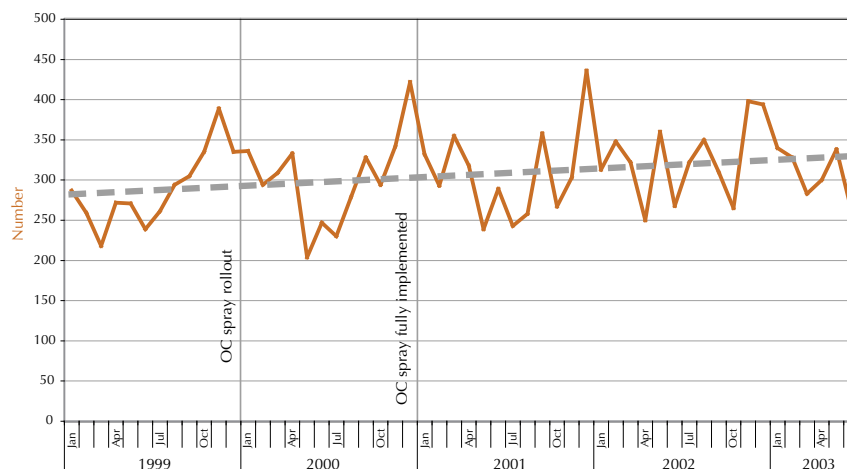
The use of OC spray is thought to reduce or defuse physical confrontations between officers and suspects, reducing the risk of injury to both. This chapter assesses the impact of the use of OC spray on assaults and injuries.

The datasets used in this section of the report come from three main sources. CRISP data are examined to test whether there has been a change in the number of assaults on police officers since the introduction of OC spray. Information relating to any injuries suffered by police officers during an OC spray-related incident comes from the CRISP MOs and the officer survey. CMC complaints data (COMPASS) are used to determine the nature and frequency of injuries to subjects as a result of a confrontation involving the use of OC spray.

### Impact of OC spray on assaults

Figure 6.1 shows that, despite the introduction of OC spray, the number of assaults on police officers from January 1999 to June 2003 has gradually increased.

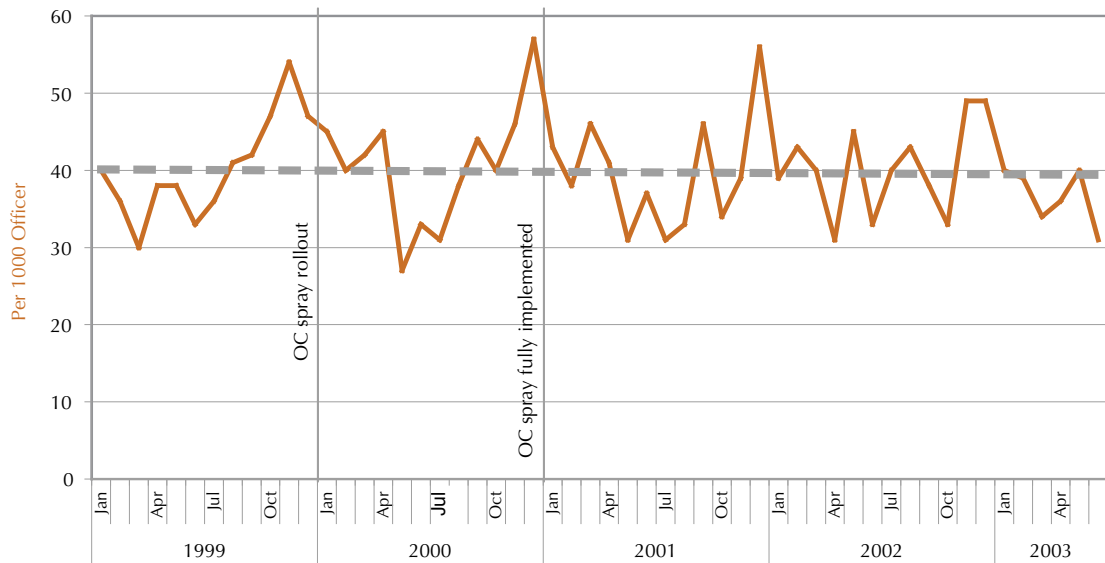
**Figure 6.1: Number of assaults on officers (January 1999–June 2003)**



Source: CRISP data 2004.

To determine if the increase in the number of assaults on police was due to an increase in the growth of operational police over the same period, the number of assaults was divided into the number of police and expressed as a rate of assaults per 1000 officers. This analysis revealed that there had been no real change in the rate of assaults on officers since 1999 (Figure 6.2) and therefore does not support a finding that OC spray use has led to either an increase or a decrease in assaults on police officers.

Figure 6.2: Assaults per 1000 officers (January 1999–June 2003)



Source: CRISP data 2004.

### Impact of OC spray on injuries

This analysis considered the impact of OC spray on injuries and excludes any effects of the spray itself. To examine officer and suspect injuries, CRISP MOs and the QPS officer survey were used.<sup>13</sup> The CRISP MOs were checked for any records of officer or suspect injuries. The QPS requires that all injuries be reported, although this might not be followed in all cases. The officer survey asked respondents about the last incident in which OC spray was discharged against a person (either by themselves or through witnessing another officer use the spray). Officers were then asked to indicate whether or not the officers and subjects sustained any injuries and, if so, whether this occurred before or after the discharge of OC spray.

In the majority of cases (63%) there was no mention in CRISP of whether injuries had occurred. Overall, 15 per cent ( $n = 61$ ) of the 414 incidents from the MO analysis resulted in recorded injuries to either an officer ( $n = 38$ , 9% overall) or a suspect ( $n = 27$ , 7% overall). In 22 per cent ( $n = 92$ ) of incidents there were no injuries to either officers or suspects and, in the remainder ( $n = 261$ , 63%), there was no mention in the MO as to whether injuries had occurred or not (Table 6.1). It could be assumed that, as the OPM requires injuries to be recorded, the absence of any mention of injuries means that none had occurred. If this is so, 85 per cent of confrontations were resolved without injury to either party.

Table 6.1: OC spray use and injuries

Injuries	Number	Per cent
Injuries to officer and/or subject	61	15
No injuries	92	22
Unknown	261	63
TOTAL	414	100

Source: CMC MO analysis of CRISP data 2004.

13 Originally an attempt was made to obtain relevant information stored in a database maintained by the QPS Health and Safety Section. However, due to the introduction of a new database it was not possible to obtain all of the relevant data needed to complete the analysis.



Of the injuries that did occur, many were comparatively minor, such as bruising that generally occurred when grappling with the subject. The majority of injuries occurred before OC spray was used. It is not possible to determine whether there would have been a higher or lower injury rate if OC spray had not been available. However, when considering confrontations involving subjects who were armed with weapons it could be assumed that the potential for injuries to both officers and suspects would be relatively high.

Data analysis from the officer survey reveals injuries to an officer, a suspect or both in a quarter (24%) of cases. In 17 per cent of incidents there was injury to an officer and in 14 per cent there was injury to the subject (some incidents involved injury to both suspect and officer, hence the total of 17% and 14% adds to more than 24%). The types of injuries are not known. This shows a higher proportion of injuries than that found from the CRISP MO data. A reason for this could be that not all injuries were recorded in the CRISP report, which relies on a brief summary of events (i.e. MO).

According to the officer survey data, more than half the injuries to suspects (57%) and officers (61%) occurred before the discharge of OC spray. The high rate of injuries is somewhat surprising considering that one of the purported benefits of OC spray use is the prevention of injury to the officer (and suspect). However, the mere use of OC spray does not necessarily mean that the officer will not have to engage the subject physically, especially since not all subjects who are sprayed become compliant. The fact that injuries can and do occur does not necessarily negate the benefit of using OC spray, especially since it is unknown what injuries might have occurred if the police officer had to use some other type of force to gain control of the situation.

Comments from respondents to the officer survey were overwhelmingly favourable about the effectiveness of OC spray as a use-of-force option. About one-third (31%) of these comments referred to the importance of OC spray in preventing injury to officers and suspects. Some of these are reproduced below.

I have noted a marked decrease in sustaining minor injuries (sprains, bruises, grazes etc.) since the introduction of OC spray. I have found OC spray to be an extremely useful policing tool. I have seen several (and heard of many more) subjects sprayed. All have been quickly subdued and none have suffered any injuries.

... The use of OC spray has reduced the use of batons and therefore the incidence of injury.

... OC spray has reduced the potential for officers to be injured and subjects and other persons to be injured in many situations ...

The survey also presented a brief scenario of a confrontation between officers and an aggressive individual. It asked officers to consider the use of three different types of use-of-force options (OC spray, baton, open/closed-hand tactics)<sup>14</sup> on a number of outcome variables, such as the likelihood of injury to an officer and the likelihood of injury to the suspect. Respondents were asked to rate these outcomes on a 7-point scale for each of the use-of-force options.

The results showed that OC spray was rated as significantly different from both batons and open/closed hands on all these variables (see Table 6.2). That is, OC spray was considered to be significantly less likely to lead to injury to both officers and the suspect, when compared with baton use and open/closed-hand tactics. In addition, officers believed that OC spray was less likely to result in a complaint,

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<sup>14</sup> 'Open/closed-hand tactics' refers to police officers gaining control of a situation by using their hands to deflect, block, take down or restrain a suspect.

while at the same time allowing for more effective management of a policing situation.

**Table 6.2: Likelihood of injury from different use-of-force options**

Likelihood of injury*	Open/closed hand tactics	Baton	OC spray
To officers**	5.3	3.9	2.5
To subjects***	5.2	6.2	2.5

Source: CMC Officer Survey, 2004.

\* The scale is from 1 (not at all likely) to 7 (extremely likely).

\*\* All comparisons were statistically significant (Open/closed hands/holds and OC Spray (t = 2.79, p<.01); Baton and OC Spray (t = 1.48, p<.01); Open/closed hands/holds and Baton (t = 1.32, p<.01)).

\*\*\*All comparisons were statistically significant (Open/closed hands/holds and OC Spray (t = 2.64, p<.01); Baton and OC Spray (t = 3.68, p<.01); Open/closed hands/holds and Baton (t = -1.05, p<.01)).

## Chapter overview

Results from a number of overseas studies suggest that the introduction of OC spray may be associated with a decrease in the number of assaults on police. However, this evaluation found that assaults against police officers in Queensland do not appear to have decreased since the introduction of OC spray.

With regard to the impact of OC spray on injuries, it is not possible to know with certainty whether or not officer or subject injuries have decreased since the introduction of OC spray. However, it is important to note that police officers strongly believe that injuries have decreased. Furthermore, these officers consider that the use of OC spray, compared to other use-of-force options, is less likely to result in injuries against both officers and suspects. In any event, the level of physical injury to the officer or the subjects during an encounter where OC spray is used appears to be relatively low. Of the cases that did result in some injury, many of the injuries were comparatively minor, such as bruising, which occurred when grappling with the subject. As well, the majority of injuries occurred before OC spray was used. It was not possible to determine whether there would have been a higher or lower injury rate if OC spray had not been available.

# 7

## Complaints

**Being sprayed with OC spray can be a confronting and painful experience. Occasionally an individual feels its use is unwarranted or excessive and consequently makes an official complaint to the QPS or the CMC. However, previous research suggests that the introduction of OC spray may actually lead to an overall reduction in use-of-force complaints. This chapter examines whether or not this has occurred here in Queensland by reporting on the trend in excessive force complaints since its introduction in 2001.**

**The data used in this chapter have been drawn from the CMC's COMPASS database, which contains details of all official misconduct and police misconduct complaints relating to excessive force and the subset that relates to OC spray.**

### Trends in OC spray complaints

During 2001 and 2002 there were 2226 reported uses of OC spray (987 in 2001; 1239 in 2002). The MO analysis found that 83 per cent of all uses involved spray discharge at a person (as opposed to spray discharge at a dog, or threatened use only without discharge of spray at a person). In 2001 there were 819 discharges at a person and in 2002 there were 1028.

The number of OC spray complaints totalled 38 in 2001 (4.6% of all spray discharges) and 35 in 2002 (3.4%). Overall, for the two-year study period,

#### **Box 7.1: Background to the analysis of complaints**

The *Crime and Misconduct Act 2001* gives the CMC responsibility for dealing with complaints of official misconduct, and where possible refers such matters to the QPS. Official misconduct by a police officer is defined as conduct relating to the officer's duties that is serious enough to warrant dismissal or is a criminal offence.

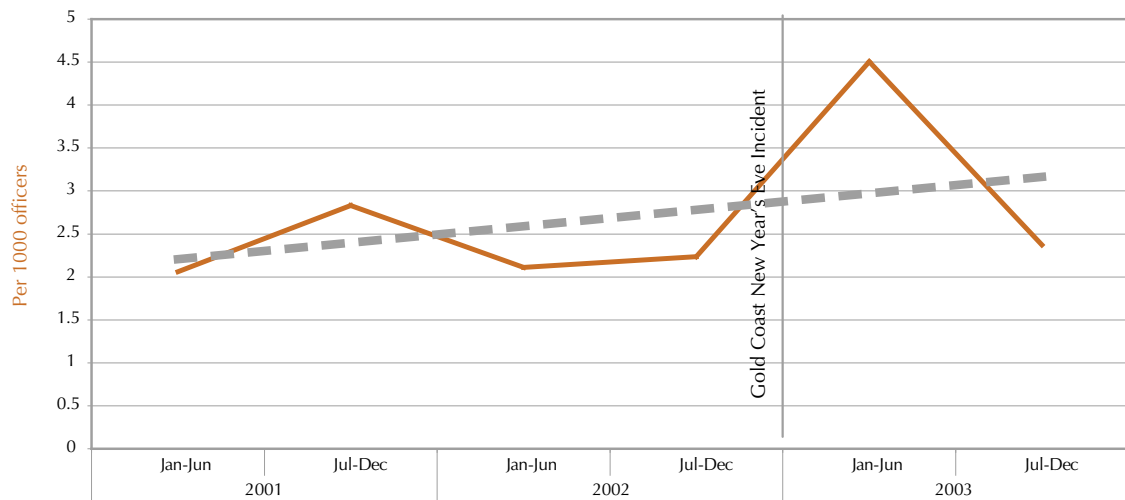
The Act also gives QPS primary responsibility for dealing with police misconduct and breaches of discipline. Police misconduct is defined in the *Police Service Administration Act 1990* as conduct that is disgraceful, improper or unbecoming of an officer, that shows unfitness to be an officer, or does not meet the standard of conduct the community reasonably expects of an officer. These can include failure to comply with policies and procedures, serious incivility; or serious non-service conduct such as a committing a criminal act while off-duty. Less serious matters are categorised as 'breaches of discipline' and can include an officer who is slow to respond to a call, or has been rude. The Act gives the CMC a monitoring role for police misconduct, however the handling of breaches of discipline is done exclusively by the QPS.

All allegations of inappropriate use of OC spray that are considered to be either official misconduct or police misconduct must be referred to the CMC. The CMC will then determine whether it will deal with the matter or refer it to the QPS for investigation, which it can oversee or monitor. If the matter is referred to the QPS, the CMC must be informed of all outcomes of official misconduct and police misconduct complaints.

4 per cent of all OC spray discharges resulted in a complaint. This equates to one complaint for every 25 uses of OC spray by police.

When the number of OC spray complaints is converted and expressed as a rate per 1000 officers, the trend in OC spray-related complaints is relatively flat (see Figure 7.1). However, when comparative 2003 data are included, a sharp increase in OC spray-related complaints is observed for the six-month period immediately following a highly publicised discharge of OC spray on New Year's Eve 2002. In these six months alone there were 38 complaints, which is double the number in the previous six-monthly periods, and translates to a complaint rate of 9.8 per cent (the proportion of the total uses against a person which resulted in a complaint).

**Figure 7.1: OC spray complaints per 1000 officers (January 2001–December 2003)**



Source: CMC COMPASS database 2004.

It is not possible to compare the OC complaint rate against other use-of-force options (e.g. baton, restraining holds) as the QPS does not maintain data on such specific categories. Some jurisdictions, such as the Victoria Police and overseas agencies, do keep records of all use-of-force incidents, thus enabling trends and comparisons to be evaluated.

Data were also examined to assess the proportion of all excessive force complaints due to OC spray (see Table 7.1). For 2001 and 2002 combined, OC spray complaints made up 6.3 per cent of all excessive force complaints. There was no statistically significant change between 2001 and 2002. However, in the first half of 2003, the proportion of OC spray complaints increased to 12 per cent of all

**Table 7.1: Numbers of OC spray and other excessive force complaints (2001–03)**

Time of year	Matters involving an allegation of excessive use of force	Matters involving an allegation of discharge of OC spray
Jan.–June 2001	289	16 (5.5%)
July–Dec. 2001	308	22 (7.1%)
Jan.–June 2002	260	17 (6.5%)
July–Dec. 2002	316	18 (6.0%)
Jan.–June 2003	308	38 (12.3%)
July–Dec. 2003	317	20 (6.3%)

Source: CMC COMPASS database 2004.

excessive force complaints. In the second half of 2003, the proportion decreased again to 6.3 per cent, which was the exactly the same as for 2001–02.

## Outcomes of OC spray complaints

The outcomes of OC spray complaints are shown in Table 7.2. The results show that in the majority of cases there was no disciplinary action taken, suggesting that most OC spray deployments were within current policy guidelines. However, 8 per cent ( $n = 6$ ) of the cases resulted in recommendations for disciplinary action for misconduct or breach of discipline (5.5%) or some sort of managerial intervention (2.7%). Slightly over 1 per cent (1.4%) resulted in informal resolution.

**Table 7.2: Outcomes of OC spray complaints 2001–02**

Outcome of OC spray complaint 2001–2002	Per cent
Disciplinary action for misconduct	4.1
Disciplinary action for breach of discipline	1.4
Managerial guidance/correction	2.7
Recommend informal resolution	1.4
Not substantiated/no further action	74.0
Sent to QPS with no outcome advice necessary	4.1
Withdrawn	2.7
Not finalised	9.6
TOTAL	100

Source: CMC COMPASS database 2004.

## Impact of OC spray on the number of excessive force complaints

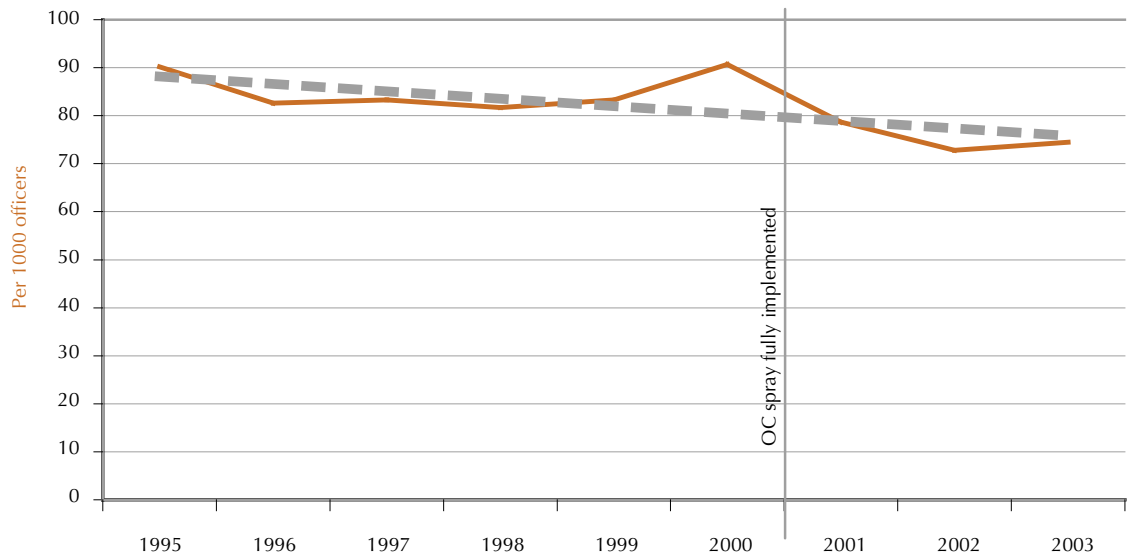
One of the possible anticipated benefits of the introduction of OC spray is a decrease in the number of excessive force complaints. Although there has been an overall increase in complaints from 568 in 1995 to 628 in 2003, this trend reverses when the information is controlled for the growth of the police service and expressed in terms of the number of complaints per 1000 officers (see Figure 7.2). There has thus been an overall decrease in the rate of excessive force complaints since 1995.<sup>15</sup>

Although the reduction is a welcome finding for the QPS, the decrease cannot simply be attributed to the introduction of OC spray. In fact, the downward trend in excessive force complaints started in 1995, well before OC spray was introduced.

The large decline in complaints starting in 2000 may be the result of an unusually high number of complaints to begin with. Several other studies (Edwards, Granfield & Onnen 1997; NIJ 2003), which found that there was a decrease in excessive force complaints following the introduction of OC spray, can also be explained by either the fact that trends were evaluated from an unusually high starting point or simply a continuation of a downward trend. However, in the CMC's view the decrease in the number of excessive use-of-force complaints is more likely due to a combination of factors including POST training and the introduction of new equipment such as hinged handcuffs and OC spray. It is likely that the efforts being made by both the QPS and CMC to reduce complaints of this kind through the introduction of a new complaints handling system that focuses on managerial resolution may also be important factors contributing to the decline in complaints.

15 When comparing the periods pre (1995 – 2000) and post (2001–03) OC implementation, there was a significant change in the mean, with pre at 85.29 (SD = 4.04) and post at 75.29 (SD = 3.04) ( $t = 3.74$ ,  $p < .01$ ). In 2000 there was a peak of 91 complaints per 1000 officers, which is essentially the same as the 1995 rate.

Figure 7.2: Excessive force complaints per 1000 officers 1995–2003

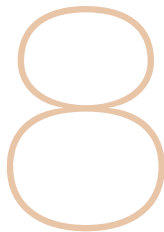


Source: CMC COMPASS database 2004.

## Chapter overview

There has been a general decrease in the rate of excessive force complaints against police since 1995, an extremely encouraging finding for the QPS. However, the introduction of OC spray cannot be solely responsible for this as the downward trend started in 1995, five years before OC spray was implemented as a use-of-force option.

Only about one in every 25 uses of OC spray by police results in a complaint of excessive force to the CMC or QPS. In most cases, these complaints do not result in any disciplinary action being taken, suggesting that most OC spray deployments are within current policy guidelines. About 8 per cent of complaints resulted in recommendations for disciplinary action or some sort of managerial intervention. It seems likely that the decrease is due to a number of factors including improved training equipment and complaints-handling procedures.



## Health

**This chapter draws together information from CRISP reports, CMC complaints files and officer survey responses to determine the health risks for suspects who are sprayed with OC. It then examines the implications for police officers who are exposed to OC spray during training or through secondary contact.**

### Health implications for subjects

A crime report (CRISP) would be expected to include a record of anything unusual occurring at an incident, such as a person requiring immediate medical treatment or hospitalisation. As CRISP reports are filled out within a short time of the incident they will not include information on whether the subject experienced long-term effects. According to a sample of CRISP MO reports examined during the course of this research, there has been no incident of OC spray use which led to the subject suffering more than transient pain. There was only one CRISP MO report (out of the 414 examined in detail involving a discharge against a person) where the subject complained of shortness of breath and the officers called an ambulance. However, the paramedics found the subject to be having an anxiety attack which did not require any medical treatment.

There were only three complaints made to the CMC between January 2001 and December 2002 that included mention of possible effects of OC spray apart from transitory pain. One case was a complaint of OC spray deployment where the complainant was subsequently treated for conjunctivitis, corneal ulcers and blurred vision for more than a week after the incident. The other two cases were reports of a police pursuit that resulted in the use of OC spray when the fleeing driver was apprehended after the car was stopped. In one of these cases, the subject was sprayed, arrested and conveyed to the police station. The person then 'appeared to suffer from short breath and was examined by the GMO (Government Medical Officer). As a result he was conveyed to hospital where he became extremely violent and required sedating by hospital staff'. There was no further comment regarding any detrimental effects of the spray. In the other incident, a subject who was affected by drugs was arrested after a violent struggle with police where OC spray was deployed. The subject was believed to have stopped breathing but quickly recovered. Thus, the event may very well have been coincidental to the use of OC spray. Overall, very few potential health effects were revealed from these files.

Similarly, the results of the police officer survey show very few harmful health effects. For instance, officers were asked whether the subject experienced any other effects of the OC spray apart from short-term pain or a burning sensation. In six cases (2%) officers reported that the subject had experienced other effects. Four of these cases referred to the subject experiencing 'shortness of breath' or 'difficulty breathing'. One case referred to a subject having a noticeable skin irritation and the sixth case stated that the subject, who had a pre-existing eye condition, suffered from painful eyes for longer than normal.

Table 8.1 shows the proportion of people who received secondary exposure from OC spray deployment (i.e. third parties). In 5 per cent of all cases it was recorded

that a third party received secondary exposure. In one-third (32%) of all MOs it was recorded that there was no secondary exposure of a third party. However, in most MOs (63%) this was not mentioned either way, which could be assumed to mean that it did not occur as the OPM requires that secondary exposure effects are recorded.

**Table 8.1: Secondary exposure to third parties**

Secondary exposure (3rd parties)	Number	Per cent
Yes	19	5
No	133	32
Unknown	262	63
TOTAL	414	100

Source: CMC MO analysis of CRISP data 2004

## Health implications for police officers

The proportion of police officers who received secondary exposure from OC spray deployments is shown in Table 8.2. In about half of the MOs it was not specifically mentioned whether any officer received secondary exposure. In 22 per cent of cases it was recorded that police officers did experience secondary exposure. This high rate (about one in five incidents) is of concern and is potentially dangerous from a tactical perspective if, during a volatile situation, the officer is debilitated to some extent by the spray.

**Table 8.2: Secondary exposure to police officers**

Secondary exposure	Number	Per cent
Yes	92	22
No	112	27
Unknown	210	51
TOTAL	414	100

Source: CMC MO analysis of CRISP data 2004

### Box 8.1: Monitoring investigations into OC spray use

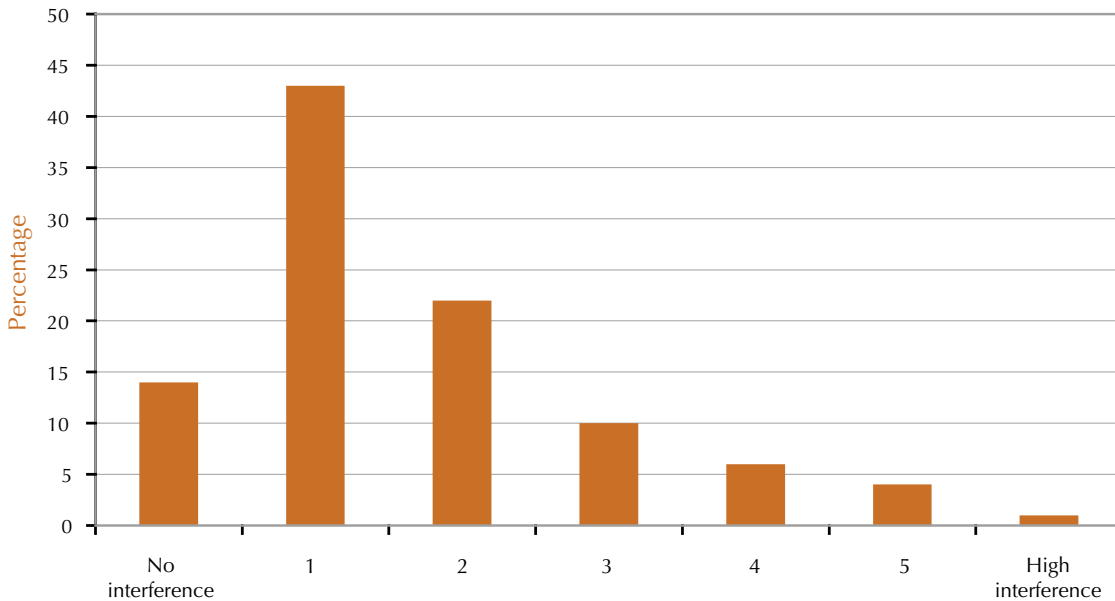
Although no deaths or serious injuries were reported during the two-year period of this study (Jan. 2001–Dec. 2002) there have been two recent incidents involving a death and serious injury following OC spray use by police.

The first matter is currently the subject of a Coronial Inquest. However, in the second case, involving the arrest of a 20-year-old man in the grip of a psychotic episode, the CMC made two observations, which are relevant to this study. Firstly, the capsicum spray deployed on the young man was unlikely to have caused his injury, although it could not be absolutely ruled out as a contributing factor. Secondly, a lateral vascular neck restraint applied by the arresting officer was more likely to have caused, or contributed to, his injury than the spray (CMC 2005, p. 5). Further details are available in the CMC's report on the matter, *The arrest of Samuel Hogan: a CMC investigation*, available on the CMC's website <[www.cmc.qld.gov.au](http://www.cmc.qld.gov.au)>.



Analysis of the officer survey revealed even higher levels of secondary exposure. In more than half of the incidents (56%), one or more police officers received secondary exposure to the spray. Respondents were asked (on a 7-point scale) the extent to which this interfered with their ability to deal with the subject. Results are shown in Figure 8.1. In the majority (79%) of cases the level of interference was very low (rating of 1–3). However, this still left one in five cases (21%) where secondary exposure to OC spray had a substantial impact on the officer at the scene. As previously stated, this is clearly an area of concern as it has significant implications for officer safety.

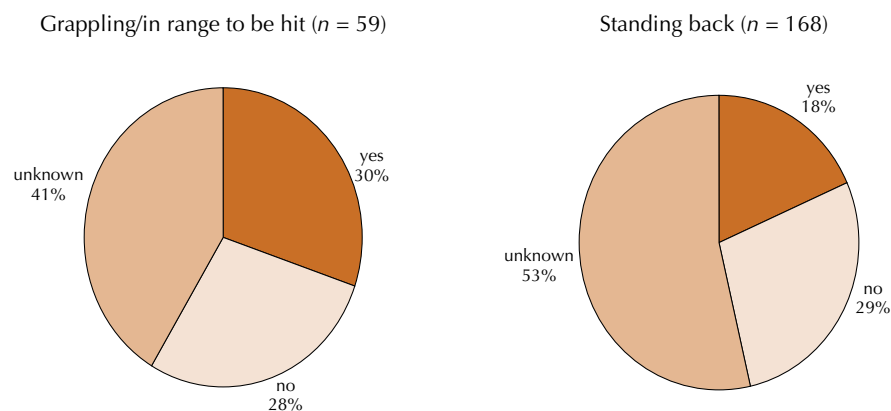
**Figure 8.1: Level of interference of secondary exposure**



Source: CMC Officer Survey 2004.

An analysis was conducted to test for any association between secondary exposure and the distance between the officer and suspect. While it appears more likely that secondary exposure will occur if OC spray is used when an officer is grappling with or close to a subject (see Figure 8.2), this difference was not statistically significant.

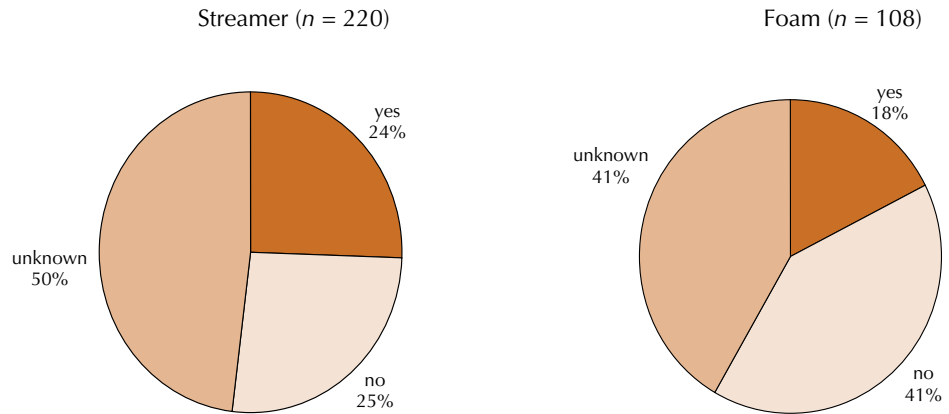
**Figure 8.2: Secondary exposure and distance between subject and officer**



Source: CMC MO analysis of CRISP data 2004

A further analysis was conducted to determine whether the type of OC spray used had an impact of the likelihood of an officer receiving secondary exposure. As Figure 8.3 shows, secondary exposure was less likely to occur if the officer used a foam-based spray rather than the streamer type ( $\chi^2 = 7.26$ ,  $p < .05$ ). However, the foam-based dispenser has limited application in the field as it is less accurate and has a shorter range than the streamer-based canisters.

**Figure 8.3: Secondary exposure to officer and canister type**



Source: CMC MO analysis of CRISP data 2004

## Police recruit exposure to OC spray in training

All QPS recruits (an average of 500 per year) are encouraged to experience first-hand the effects of OC spray. It is not mandatory, but most recruits do participate in this aspect of their training. A considerable amount of OC is sprayed onto their forehead and is then allowed to wash down over their eyes and mouth.

The benefits of exposing recruits to OC spray are considered to be two-fold. The first is that the recruits will feel familiar with the effects of the spray and therefore not panic if they experience secondary exposure on the street. The second benefit is that recruits will appreciate the pain and discomfort of OC spray and not use it lightly.

According to the QPS, since 1999 almost all operational officers, recruits and Academy instructors have experienced the effects of OC spray as part of their routine training, with no adverse health effects. In the officer survey, 81 per cent of respondents had experienced OC spray exposure in their training. QPS Academy instructors report that the most severe effects (beyond the transitory pain) have consisted of some recruits still feeling some discomfort a day or so after the event and receiving eye drops as treatment. They were not aware of any adverse health effects suffered by officers on the street as a result of exposure to OC spray. It must be remembered, of course, that police officers are a population that is generally healthy and not under the influence of drugs and alcohol when being sprayed.

## Expert opinion

In order to consider the scientific evidence related to the health effects of OC spray use, an independent expert was sought to provide a report. Dr Lindsay Brown, a pharmacologist at the University of Queensland Medical School, was contracted to provide comment on the risk of adverse health outcomes for people under the influence of drugs generally, as well as when combined with restraint and/or OC spray. The entire written opinion of Dr Brown, as well as a brief summary of his qualifications, is presented in the Appendix to this report.

Dr Brown's report discussed some of the acute health effects following drug intoxication, such as cardiovascular problems with cocaine and/or amphetamine intoxication, or respiratory depression from opioids and benzodiazepines. The report also included some studies covering restraint-related deaths in police custody. In many of these cases restraint-related positional asphyxia was the cause of death, although other factors such as pre-existing disease and drug intoxication were involved.

Dr Brown's report examines OC spray-related health issues. He writes that while:

...the active ingredients of oleoresin capsicum can cause acute respiratory symptoms, this does not mean that capsicum changes pulmonary function. ... Nor does it mean that a single dose of oleoresin capsicum spray causes or worsens pulmonary disease such as asthma ...It is worthwhile mentioning that an asthmatic attack may be precipitated by factors such as physical exertion, confrontation or flight, independent of the use of capsicum spray.

In relation to possible allergic reactions, Dr Brown writes:

Almost all compounds may cause allergic responses in some individuals. Capsicum spray and the active ingredients, capsaicin and the capsaicinoids, as well as the carriers may induce an allergic response. The incidence of these responses is unknown but probably quite rare. These responses are unpredictable and independent of dose of the compound. Thus, it is impossible to define the risk or magnitude in any individual of an allergic response to oleoresin capsicum spray.

With regard to risk of damage to the eyes from being sprayed with OC spray, Dr Brown states:

Thus, oleoresin capsicum spray causes transient pain and irritation but appears to cause little structural damage to the eyes of exposed individuals. Any damage may be due to the carrier rather than to the capsaicin.

Dr Brown's summary concludes:

This opinion has reviewed the responses to the most commonly used intoxicating drugs and the acute health effects that may occur. Drug intoxication may lead to death, independent of whether oleoresin capsicum spray was used or whether restraint was necessary. Restraint may increase the risk of death, especially in cocaine- or amphetamine-intoxicated individuals. Some of these individuals were also sprayed with oleoresin capsicum spray but this appears casual rather than causal to the deaths in custody. Oleoresin capsicum spray produces acute respiratory and ocular symptoms but there is little evidence that the capsaicins cause long-term damage, although some carriers may be more toxic. Thus, there are risks associated with the use of oleoresin capsicum spray and this spray could cause a potentially lethal response. However, my review of the peer-reviewed literature on adverse effects of oleoresin capsicum spray suggests that there are very few, if any, deaths that can be convincingly shown to be caused by oleoresin capsicum spray.

## Chapter overview

During the period of this study (January 2001 to December 2002) there were no records of any incidents involving the use of OC spray that resulted in an individual suffering anything more than transitory pain. Although a small number of complaints were made to the CMC during this time that mentioned some possible OC spray-related health effects, these also appeared to be minor or short-term conditions (e.g. blurred vision and breathing problems). The notion that OC spray is a relatively safe use-of-force option is also supported by expert opinion. In particular, Dr Lindsay Brown, a pharmacologist from the University of Queensland, concludes that there is little evidence that the spray causes long-term damage, although there is always the small possibility of a potentially lethal response.

Despite the suggestion that very few incidents of OC spray use during the study period resulted in effects other than short-term pain or a burning sensation, there have been two recent cases in Queensland involving a death and a serious injury following OC spray use by police. The first matter is the subject of a Coronial Inquest. However, in the second case, the use of OC spray by police was found to be unlikely to have caused the injury, but could not be ruled out as a contributing factor.

Although the health risks associated with OC spray appear to be relatively low, the proportion of officers receiving a secondary exposure during the deployment of OC spray is high (22%). This has significant implications in terms of both officer and public safety.

# 9

## Conclusions and recommendations

**This research project reviewed the use of OC spray by Queensland police over a two-year period following its introduction in 2000. In particular, it sought the answers to six key questions. This final chapter summarises these findings and considers some of the implications. It then presents and discusses five recommendations for enhancing QPS policies and practices relating to the use of OC spray.**

### Key findings

This research sought the answers to six key questions:

- How often and under what circumstances is OC spray used?
- Has the use of OC spray been appropriate?
- Is OC spray an effective use-of-force option for police?
- Has the use of OC spray led to a decrease in assaults on officers, and fewer injuries to officers or subjects?
- Has OC spray decreased complaints of excessive use of force?
- Is OC spray safe?

#### How often and under what circumstances is OC spray used?

On average, OC spray is deployed two or three times per day by police in Queensland. In the first two years of use, the number of OC spray incidents increased sharply (26 per cent). However, when viewed over a four-year period, ending in 2004, the use of OC spray by police has actually declined.

Considerable variation in OC spray usage rates was observed across police regions. Far Northern Region had the highest usage rate, with Metropolitan South and North Regions having the lowest. One explanation for the variation is that there may be some areas where the deployment of OC spray is considered more acceptable by officers and/or their supervisors than others. It seems likely that the trend in the use of OC spray across regions will also have declined when viewed over a longer (four-year) period.

Results from the officer survey revealed the average rate of OC spray discharge against a person was 0.36 incidents per year per officer. This translates to each operational officer spraying someone once every three years. These numbers support the view that, in general, officers are not using the spray excessively. However, there was a small sample of individual officers who reported spraying people at a rate of three times a year or more, which is nine times more than average.

The majority of OC spray incidents (83%) involved the discharge of spray against a person. Nine per cent of uses were against animals and 8 per cent of incidents involved only the presentation of the OC spray canister (i.e. threat to use).

According to the crime reporting information system for police (CRISP), the largest percentage of OC spray incidents take place on the 'street' (43%) or in a private

residence (17%). In most cases, OC spray incidents occur on weekends (Friday, Saturday or Sunday), and between the hours of 8 pm and 2 am. Police use OC spray more in summer, which is consistent with crime patterns and other demands for policing services generally. The spray was most commonly used at incidents involving an assault (25%), domestic violence (18%) or a disturbance (12%).

### Has the use of OC spray been appropriate?

Essentially, QPS policy outlines that there are two conditions that must be met in order for officers to use OC spray: the threat of injury to themselves or others and a belief that the situation cannot be resolved less forcefully. Our analysis of police data revealed that, in the majority of cases (61%) OC spray was used during the process of detaining/arresting someone who was struggling or violent towards police. In some cases (24% in 2001 and 16% in 2002), the subject was in the process of reaching for, or would not drop, a potential weapon which presented a significant and immediate threat to the officer's personal safety. A further 14 per cent of cases involved a subject being generally 'aggressive/violent' (5%) or struggling/resisting against the officer (9%). Therefore, in 85 per cent of cases the officer was under direct threat of attack or already in the process of being assaulted when OC spray was used.

Findings from the police officer survey also provided evidence that police do consider other alternatives before using OC spray. Perhaps not surprisingly, high-risk situations, such as when a subject is armed or the officer is outnumbered or outsized, were rated as much more likely to warrant the deployment of spray.

While OC spray was used appropriately in the majority of cases, there were a small number of deployments that gave rise for concern. For example, eight survey respondents said that OC spray was used when the subject did not comply with police directions, 10 said OC use occurred when the subject was trying to run away, and four said it occurred when the subject refused to get out of a car. In addition, in a number of incidents revealed during the course of this research it is unclear as to why OC spray would have been used at all. For instance, OC spray was used on a handcuffed subject. While it is possible that someone could still be violent or aggressive when restrained, it could also be expected that officers (assuming there is more than one) would be capable of handling this situation without using OC spray.

Another issue of concern to the CMC is the high level of spray use on people who are Aboriginal, Torres Strait Islander and Pacific Islander in appearance. For example, people from these communities represent one-third (33%) of subjects sprayed with OC, yet make up only about 3 per cent of Queensland's population. While these communities are similarly over-represented in prison custody, further research is needed to find out why police are using spray so often against them.

Overall, officers act responsibly after using OC spray. Aftercare, to help the person overcome the effects of the spray, is given in more than 90 per cent of cases. However, in about one in five deployments aftercare is delayed until the person is transported away from the scene.

### Is OC spray an effective use-of-force option for police?

One of the most important questions examined during this review was whether or not OC spray was effective. The results show clearly that it is. For example, analysis of CRISP MOs revealed that police officers considered OC spray to be effective in 83 per cent of situations. Despite this, in 10 per cent of cases, police officers reported that the use of OC did not aid in the control of the subject. In 1 per cent

of cases, the officer actually reported that the application of OC spray made the subject's behaviour worse.

Some factors were found to impinge on the spray's effectiveness. For example, numerous articles on OC spray have commented that the spray's effectiveness may be compromised if it is used from too close a distance (Chan et al. 2001; Edwards, Granfield and Onnen 1997; Morabito & Doerner 1997; Orrick 2004). This may be because 'spraying from less than 5 feet away does not allow for adequate aerosolization of OC and is likely to reduce the amount of inhalation exposure' (Chan et al. 2001, p. 5). The fact that OC spray is most effective when deployed from a safe distance means that officers do not necessarily need to physically engage a suspect until after the person has been affected by the spray. However, CRISP data analysis undertaken for this study revealed many incidents where the officer was already physically engaging the suspect when the OC spray was deployed. In fact, where the distance between suspect and officer was mentioned, a quarter of all OC spray incidents involved an officer being within striking range or actually grappling with the subject when the spray was deployed.

While gender does not alter the effectiveness of OC spray, police perceptions about ethnicity may influence their perceptions of the spray's effectiveness. Specifically, people who were described by police as being Aboriginal, Pacific Islander and Torres Strait Islander in appearance were found to be statistically less likely to be affected by OC spray than were Caucasian subjects. According to Adang, Kaminski and Howell (2004), there may be several reasons for this, including an officer downgrading the effectiveness of the spray to validate a reason for using other types of force.

### Has the use of OC spray led to a decrease in assaults or injuries?

There is some evidence in the research literature to suggest that the introduction of OC spray was followed by a decrease in assaults on officers and a reduction in the number of injuries to police and subjects. Our research shows that there has been no change in the number of assaults on officers since the introduction of OC spray.

In terms of the impact that the introduction of OC spray has had on injuries to officers and subjects, the evidence is somewhat mixed. The analysis of CRISP MOs and the QPS officer survey data revealed that an overwhelming majority of confrontations where OC spray was used were resolved without injury to either party. Of the 15 per cent of cases that resulted in some type of injury, many were comparatively minor, such as bruising. As well, the majority of injuries were described as occurring prior to OC spray being used. It is not possible to determine whether there would have been a higher or lower injury rate if there had been no OC spray available. When considering confrontations involving subjects who were armed with weapons it can be assumed that the potential for injuries for both officers and suspects would have been high. However, it must be remembered that the number of cases included in the analysis was small, so care must be taken when interpreting this finding.

Although it is not possible to know with certainty whether officer or subject injuries decreased with the introduction of OC spray, it is important to note that police officers believe that they have. The officer survey data showed that officers felt that OC spray was significantly less likely to result in injuries against both officers and suspects compared to other use-of-force options (hands, batons). As well, when asked to make any additional comments on OC spray, about a third of respondents commented that OC spray was important in preventing injury to officers and suspects.

The Victoria Police found that from January 1997 to June 2001 there was an increase in OC spray use and a concomitant decrease in baton use, as well as a decrease in baton-related injuries. In support of this finding, many respondents in the QPS officer survey commented that OC spray had replaced the baton to a great extent, which had led to a decrease in baton-related injuries. Unfortunately, information on the use of particular types of force, other than the use of a firearm and police pursuits, is not routinely collected by the QPS. Therefore, these officers' perceptions cannot be confirmed.

### Has the use of OC spray decreased complaints of excessive use of force?

Complaints about the use of OC spray make up 6 per cent of all excessive force complaints, which equates to one complaint for every 25 uses of OC spray. The rate of OC spray complaints did not change over the course of the two years of this study.

There has been a gradual decrease in the rate of excessive force complaints over the past 10 years. For example, in 1995 there were 90 complaints per 1000 officers, whereas in 2003 there were only 74 complaints per 1000 officers. This decrease is an extremely welcome finding for the QPS. Although the introduction of OC spray may have made some contribution, the downward trend in excessive use-of-force complaints against police started well before the introduction of OC spray. Therefore, it is not possible to conclude that the introduction of OC spray alone has led to a decrease in the number or rate of excessive force complaints in Queensland.

### Is OC spray safe?

One of the biggest concerns and potential criticisms of the use of OC spray is that it may lead to health problems of varying seriousness. An expert opinion commissioned by the CMC from University of Queensland pharmacologist Dr Lindsay Brown concluded that:

Oleoresin capsicum spray produces acute respiratory and ocular symptoms but there is little evidence that the capsaicins cause long-term damage, although some carriers may be more toxic. (Appendix 1)

According to the CRISP MO analysis, there was no incident of OC spray use that led to the subject suffering more than transient pain. Similarly, an analysis of complaints files from 2001 and 2002 showed that only a small number of complaints recorded the subject as suffering from something more severe than transitory pain. Results from the officer survey also found very few reports of negative health effects and no reports of subjects or police officers requiring medical attention.

To date, more than 5000 people (police officers and subjects) have been sprayed with OC in Queensland alone, with almost no resulting health problems. Despite this, the CMC is currently monitoring two separate investigations involving a death and a serious injury following OC spray use by police. The first matter is being investigated by the State Coroner. However, in the second matter, a recent CMC investigation concluded that OC spray was unlikely to have caused the injury, but might have contributed to it.

Despite the fact that our knowledge of OC spray effects may be imperfect, the results at this point support the conclusion that OC spray is a relatively safe use-of-force option which needs to be managed appropriately by police. This does not mean that the Commission considers the use of OC spray to be absolutely risk free. In fact, the Commission considers that any use of physical force by police has its dangers. For example, a violent struggle with police, even without the use



of OC spray, may cause an asthma or heart attack, particularly if the subject has consumed various drugs or alcohol.

## Recommendations

Although this report concludes that OC spray is an effective and relatively safe use-of-force option for police, the review also identifies a number of concerns. In the main, these relate to:

- high rates of use of OC spray on people who are Indigenous in appearance (Chapter 4)
- use of OC spray on individuals who are passive but generally non-responsive to a police direction or questioning (Chapter )
- use of OC spray on subjects who are restrained by handcuffs or otherwise in police custody (Chapter )
- high rates of secondary exposure from OC spray to police and others (Chapter 8)
- delay in the provision of aftercare (Chapter 4).

To address these issues and contribute to the continuous improvement of the police service, the Commission makes five recommendations in the following areas:

- Recording and monitoring the use of force
- Overseeing the use of OC spray
- Reviewing OC spray training scenarios
- Aftercare

### Recording and monitoring the use of force

It became clear at the start of this review that it would not be possible to test whether the number of police use-of-force incidents had increased or decreased since the introduction of OC spray. This is mainly because the QPS does not systematically collect general use-of-force data, apart from firearm discharges and police pursuits.

Some information about the use of OC spray is recorded on CRISP under the crime classification '9100'. However, there are a number of shortcomings with this approach. In particular, much of the information about the use of OC spray is entered as 'free text' in the 'Modus Operandi Details' field. This makes the extraction of specific variables of interest (e.g. whether an offender was affected by drugs or alcohol) very difficult. In addition, the information is often very brief and therefore insufficient to conduct an analysis of anything other than the most basic details relating to the use of OC spray.

In 1998, the National Police Research Unit (now called the Australasian Centre for Police Research or ACPR) released a report entitled 'National Minimum Guidelines for Incident Management, Conflict Resolution and Use of Force' (Hamdorf et al. 1998). One of the report's main recommendations was the establishment of a nationally compatible use-of-force database based on the 'use-of-force register' operated by the Victoria Police. Similarly, the QPS's own report on the use of force had also recommended the establishment of a use-of-force register (QPS 1996). To date, these recommendations have not been implemented by the QPS.

A use-of-force register records information about situations where force is used by or against police. The register, typically a computer-based system, allows police to identify any emerging trends or issues. In addition, a use-of-force register can

be used to answer questions about the application of different types of force and their consequences or benefits. For example, during this review the CMC found that a large number of OC spray incidents involving Indigenous people. Until then, very little was known about the types of people involved in these incidents. The CMC believes that the QPS should develop the capacity to record the use of force by police. Access to timely and accurate information about the nature, type, frequency and eventual outcomes of the use of force by police would enable the QPS to identify trends in use, and reveal any potential gaps in policy and respond with initiatives (e.g. changes in policy, improvements in training, etc.) which are suited to local conditions and evidence-based.

The CMC believes that access to detailed and timely information about the frequency and nature of force used by police would be an important step forward for the QPS to manage the use of force generally, and the use of OC spray in particular.

### **Recommendation 1**

**That the Queensland Police Service develop the capacity to record and monitor the use of force by police, including the use of OC spray.**

#### Overseeing the use of OC spray

While police officers used OC spray appropriately in the vast majority of cases, there were a small number of incidents where the use of OC spray was questionable. In particular, the Commission is concerned about the high rate of use of OC spray on Indigenous people and any use of OC spray on passive or restrained (i.e. handcuffed) subjects. The Commission is also concerned about the practice of delaying aftercare until the subject is transported elsewhere.

To ensure that the use of OC spray is fully justified and reasonable, a number of police agencies in other Australian states (and some overseas) require that each spray deployment be investigated or reviewed by a supervisor or training instructor. For example, Tasmania Police conduct an investigation into the circumstances of each use of OC spray. Similarly, Victoria Police supervisors review each use of OC spray to determine whether the deployment was within policy. Australian Federal Police instructors write a report on the appropriateness of each OC spray incident.

Currently, QPS policy states that 'the officer in charge where the officer using OC spray is stationed, is to overview the incident to determine whether the use of OC spray was in accordance with Service policy and procedures and where necessary forward recommendations to the district officer' (s. 14.21.4, Operational Procedures Manual). As this information is not routinely collected by the QPS, it was not possible during the course of this research to determine how frequently OC spray reviews occurred. However, our analysis of the officer's survey did revealed that these 'overviews' do not commonly involve discussions with the officer who deployed the spray, nor do they appear to be aimed at determining if the use of force was excessive or if the situation could have been handled differently.

The Commission believes that the QPS should review its current policy of overseeing the use of OC spray, and develop strategies to enhance the effectiveness of that process. In particular, the Commission suggests that, where practicable, the overview should include a face-to-face debrief with the officer who deployed the OC spray. This would give the officer-in-charge additional information to determine whether the use of OC spray was appropriate and in accordance with existing policy.

### Recommendation 2

**That the QPS review the processes for overseeing the use of OC spray and develop appropriate strategies to enhance the effectiveness of that process.**

In addition, the Commission believes that the current instruction in section 14.21.4 of the OPM requiring that the officer in charge ‘determine whether the use of OC spray was in accordance with Service policy and procedures’ should be expanded to make it explicit that if the use of OC spray constitutes possible misconduct or a breach of discipline, the matter would need to be dealt with under section 7.2 of the *Police Service Administration Act 1990*. For misconduct or a breach of discipline, the officer would need to take all action prescribed by the regulations. The officer would have a further responsibility to report misconduct to the Commissioner and to the Chairperson of the Crime and Misconduct Commission.

### Recommendation 3

**That during any review of section 14.21.4 of the Operational Procedures Manual (Reporting the use of OC spray) the QPS consider including a statement reminding the officer overseeing each use of OC spray of their obligations under section 7.2 of the *Police Service Administration Act 1990*.**

## Reviewing OC spray training scenarios

In 25 per cent of cases where the distance between the officer and the subject was known, OC spray was deployed while the officer was grappling with the subject or within striking distance. Using OC spray at close quarters not only potentially compromises the effectiveness of the spray, but also increases the risk of the officer receiving a secondary exposure.

According to the officer survey, more than half of all deployments involved some sort of secondary exposure to police officers (although in most cases this was to a minor extent). However, in about 20 per cent of cases, the officers said that their exposure to OC spray substantially interfered with their ability to perform their duty at the scene.

Currently, QPS training and the Good Practice Guide presents OC spray as a stand-off weapon, but our research reveals that the spray is used in many other circumstances and situations. Therefore, we believe that the QPS should develop training scenarios that more accurately reflect the dynamic and often chaotic nature of encounters between police and offenders, with a particular emphasis on using the spray at an effective distance, and on minimising the significant risk of secondary exposure.

### Recommendation 4

**That the QPS develop training scenarios for the deployment of OC spray that more accurately reflect the use of OC spray under field conditions. These scenarios should place a particular emphasis on highlighting the risks associated with deploying OC spray at close quarters and on measures designed to reduce the risk of secondary exposure.**

## Aftercare

Current QPS policy states that officers have a duty of care to all people who have been contaminated by OC spray and are to assist in their recovery (s. 14.21.2, OPM). In addition, the policy directs that officers in charge should ensure that appropriate OC spray decontamination equipment, sufficient to assist in the aftercare of an affected person, is carried in operational vehicles under their control.

According to our research, aftercare was given in 92 per cent of cases. No aftercare was given in 3 per cent of cases and in 5 per cent it was unknown if the affected person received aftercare. However, officers responding to the survey indicated that in about one in five deployments (21%), aftercare was delayed until the subject was transported elsewhere.

In some cases, removing the subject from a volatile situation before commencing aftercare might be an appropriate tactical decision. The CMC also accepts that if the police were to remain at the scene to administer aftercare, it might aggravate the situation further. However, given the considerable pain that OC spray can cause, it is of concern that such a large number of subjects are not receiving some kind of immediate assistance to overcome the effects of the spray. In the Commission's view, unless there is a valid operational reason, aftercare should commence as soon as practicable.

#### **Recommendation 5**

**That the instruction contained in section 8B of the QPS 'Oleoresin Capsicum (OC) Spray Good Practice Guide 2000' be amended to make it explicitly clear to police that individuals should receive immediate assistance to overcome the effects of OC spray unless there is a valid operational reason for delaying the provision of aftercare.**

## Conclusion

This study presented a comprehensive review of OC spray use in the QPS. Our results show that OC spray is, on the whole, a useful and effective use-of-force option. We conclude that OC spray is generally safe, although it is not possible to guarantee perfect safety with any use-of-force option. In our view, officers have been using the spray appropriately, although the use of OC spray in some situations is a source of some concern. Further consideration of the use of OC spray in relation to Indigenous people and on individuals who are passive or handcuffed is a high priority for us, and we encourage the QPS to also keep a close watch on these issues.



# Appendix

A/Prof Lindsay Brown  
Department of Physiology  
and Pharmacology  
School of Biomedical Sciences  
The University of Queensland.

Dr Gabi Hoffmann  
Research Officer, Crime and Misconduct Commission  
GPO Box 3123  
Brisbane 4001.

21st June, 2004.

Dear Dr Hoffmann,

**Re: Some issues surrounding oleoresin capsicum spray, negative health effects and/or in-custody deaths**

Thank you for your telephone discussions and the email message of Friday, May 28th, 2004, requesting a written opinion on the above issues, particularly as they may affect intoxicated individuals. This opinion includes a description of my qualifications and current position and then discusses the following four issues:

1. the physiological and pharmacological effects of intoxicating drugs such as ethanol, the benzodiazepines, barbiturates, opioids, amphetamines, cannabinoids, cocaine and gamma-hydroxybutyrate;
2. some of the acute health effects that may arise as a consequence of drug intoxication;
3. any increased risk if the drug-intoxicated individual is engaged in a violent struggle or restrained; and
4. any increased risks if the individual has been sprayed with oleoresin capsicum spray.

My academic qualifications are a Bachelor of Pharmacy with First Class Honours obtained from The University of Queensland in 1974 and a Doctor of Philosophy from The University of Sydney in 1981. I worked as a Postdoctoral Research Fellow at the Ludwig-Maximilians Universität, Munich, Germany, from 1980 to 1986 before taking up a position as a lecturer in the Department of Physiology and Pharmacology at The University of Queensland. I am now an Associate Professor in the same Department, now part of the School of Biomedical Sciences of this University.

At The University of Queensland, my major areas of interest have been teaching and research in pharmacology. The Department of Physiology and Pharmacology in the School of Biomedical Sciences teaches pharmacology, defined as the science of drug actions, to students in Medicine, Pharmacy, Veterinary Science, Dentistry, Human Movement Studies and Science. Since 1986, I have taught in courses to all these groups across all the major areas of the discipline and prepared extensive teaching

materials, especially for the Graduate Medical Course. In addition, I am the President of the Australasian section of the International Society for Heart Research, a registered pharmacist in Queensland and a member of the Australasian Society for Clinical and Experimental Pharmacologists and Toxicologists (ASCEPT).

### **The physiological and pharmacological effects of common intoxicating drugs**

Intoxicating drugs are widely used in the community, both legally and illegally. The range of compounds is shown in a recent study of 3398 drivers killed in road traffic crashes in NSW, Victoria and Western Australia between 1990 and 1999 (Drummond et al. 2003). Ethanol (alcohol) at over 0.05% was present in 29.1% of drivers; drugs other than alcohol were present in 26.7% and psychotropic drugs (mood-altering drugs) in 23.5% of these fatalities. The most commonly used drugs after ethanol were cannabis (13.5%), opioids such as morphine, codeine and methadone (4.9%), benzodiazepines (4.1%) and stimulants such as methamphetamine, MDMA, cocaine and the ephedrine (4.1%). Almost 10% of cases involved both ethanol and drugs.

In a study in the US, ElSohly and Salamone (1999) assessed the prevalence of drug use in 1179 urine samples of victims of alleged sexual assault. 468 samples were negative for all drugs; 451 were positive for ethanol, 218 for cannabinoids, 97 for benzoylecgonine (cocaine metabolite), 97 for benzodiazepines, 51 for amphetamines, 48 for GHB (gamma-hydroxybutyrate), 25 for opiates, 17 for propoxyphene and 12 for barbiturates. In this study, about 35% of drug-containing samples contained multiple drugs.

Although the incidence of drug use in individuals engaged in violent struggles or requiring restraint is not known, this report has assumed that the following drugs may be involved: ethanol, benzodiazepines such as diazepam and temazepam, opioids such as morphine, heroin and methadone, cannabinoids, barbiturates, amphetamines, cocaine and gamma-hydroxybutyrate.

#### *Ethanol (alcohol)*

Harrison's Principles of Internal Medicine is probably the most respected text-book of the practice of medicine. The following paragraph is taken from a recent edition of this text-book (I have added the text inside square brackets):

"A scale relating the various degrees of clinical intoxication to the blood alcohol levels in nonhabituated persons has been constructed by Miles [Miles WR: The comparative concentrations of alcohol in human blood and urine at intervals after ingestion. J Pharmacol Exp Ther 20:265, 1922]. At blood alcohol levels of 30 mg/dl [1 decilitre, abbreviated dl, is 100 ml] (30 mg/dl = 0.03 percent) a mild euphoria is detectable, and at 50 mg/dl, a mild incoordination. At 100 mg/dl, ataxia [disturbances in coordination of muscle movements] is obvious; at 200 mg/dl, the subjects are drowsy and confused; at 300 mg/dl, they are stuporous [a coma-like state]; and a level of 400 mg/dl is accompanied by deep anaesthesia and may prove fatal. ...Such a scale has little relevance to the chronic alcoholic patient since it does not take into account the adaptive changes that the organism makes to alcohol, which are an increased rate of alcohol metabolism by the liver and particularly the development of tolerance. These phenomena account for the large amounts of alcohol that can be consumed by the chronic drinker without significant signs of intoxication. In the chronic alcoholic, the ingestion of a given amount of alcohol will result in a lower blood level than in a non-alcoholic individual; furthermore, for a given blood alcohol level one will observe lesser degrees of intoxication."

Blood alcohol concentrations decline at a fixed rate since the body removes 15±5 mg/dl/hour with zero order kinetics. Thus, a blood concentration of 0.10% (100 mg/dl) causing mild muscle incoordination would be completely eliminated within 7 hours although observable effects may be present for 2-3 hours only.

### *Benzodiazepines such as diazepam, flunitrazepam and temazepam*

Diazepam, flunitrazepam and temazepam are members of a chemical class of compounds known as the benzodiazepines because they share a common basic chemical structure. Other members of this class in therapeutic use in Australia include oxazepam and clonazepam.

The benzodiazepines share five pharmacological effects:

- a. reduction of anxiety and aggression;
- b. sedation and induction of sleep;
- c. reduction of muscle tone and coordination;
- d. anterograde amnesia (loss of memory following ingestion of drug);  
and
- e. anticonvulsant effects.

These properties are the basis for their therapeutic effects to relieve anxiety, induce sedation and sleep, relieve muscle spasm and prevent or treat convulsions. In addition, their amnesic effects means that patients have minimal or no memories following premedication with these drugs for procedures such as gastroscopy or colonoscopy.

Flunitrazepam has achieved notoriety as it has been used to facilitate date- or acquaintance rape. When dissolved in an alcoholic drink, flunitrazepam is reported to be both odourless and tasteless. Further, victims given flunitrazepam cannot resist due to the reduction of muscle tone and probably have no memory of the incident due to amnesia (see <http://www.health.org.govpubs/prevalert/v3i26.aspx>, from the US Department of Health and Human Services).

Diazepam, temazepam and flunitrazepam are almost completely absorbed with sedative effects occurring 1-3 hours after ingestion. Diazepam has a very long half-life (time taken to eliminate half of the drug from the body) of around 43 hours in younger patients increasing to around 75 hours in elderly patients. Diazepam is extensively metabolised with one metabolite, nor-diazepam, having a half-life of approximately 73 hours. The half-life of flunitrazepam is about 12-20 hours, but its metabolites such as 7-aminoflunitrazepam have longer half-lives of around 30 hours. Temazepam shows an elimination half-life of around 11 hours. These relatively long half-lives mean that diazepam, nor-diazepam, flunitrazepam, 7-aminoflunitrazepam and temazepam can be detected in the blood for several days following a single oral ingestion. The clinical effect of the compound is much shorter, usually 6-8 hours, as the drug is extensively distributed away from its site of action in the brain by the blood and into the body tissues.

The benzodiazepines have been widely used because of their wide safety margin and are considerably less toxic than other sedatives. The major adverse effects of the benzodiazepines are an extension of their pharmacological effects causing drowsiness, confusion, amnesia and impaired co-ordination. The other major chronic effects are the development of tolerance and dependence. Tolerance, defined as an increasing dose to produce required effects such as relief of anxiety or sedation, occurs with all benzodiazepines. Dependence is also an important aspect of chronic treatment with the benzodiazepines and the physical withdrawal symptoms make it difficult for patients to stop taking the drugs.

The wide safety margin is important in situations of attempted suicide with benzodiazepines alone, when patients are usually left to sleep off the effects. In combination with other drugs, serious additive adverse reactions may occur. As an example, administration of benzodiazepines with a high dose of ethanol may cause coma and death.

### *Opiates (especially heroin and morphine) and the opioid, methadone*

Opium, an extract of the juice of the poppy *Papaverum somniferum*, contains many alkaloids related to morphine. Heroin is a semisynthetic derivate, the diacetate, of



morphine. The term “opiate” is restricted to compounds with morphine-like structures. Methadone is a synthetic compound with a very different chemical structure from morphine yet it produces morphine-like effects. All compounds, whether synthetic or naturally occurring, which produce morphine-like effects are known as “opioids”. This term, which includes morphine, heroin and methadone, will be used throughout this report.

Morphine is a very effective analgesic used for the relief of moderate to severe pain. In addition, morphine produces a strong sense of contentment and well-being which, if given intravenously, is interpreted as a sudden “high”. Tolerance (an increase in the required dose) and dependence (often expressed as a craving for the drug) develop rapidly following morphine administration. The most troublesome unwanted effect of morphine is respiratory depression and this is the commonest cause of death in acute overdosage. Heroin is rapidly deacetylated in the body to morphine and produces the same effects as morphine. Methadone produces morphine-like effects but has a longer half-life than morphine and heroin and is therefore used for the maintenance of heroin addicts.

Morphine has low oral bioavailability of about 24% (this means that 24 % of an oral dose will be absorbed) although slow-release formulations will increase this bioavailability. Thus, morphine is usually given intravenously. Morphine has a half-life of 3-4 hours. Heroin is usually detected only as morphine. Methadone is well-absorbed orally (bioavailability of about 92%) and is available as tablets and injection. Methadone has a very variable half-life which is reported as about 15 hours in naïve patients and up to 50-70 hours in chronic users.

#### *Cannabinoids such as $\Delta^9$ -tetrahydrocannabinol*

Cannabis or marijuana is probably the most commonly used illicit drug in Australia. The responses to cannabinoids are described in Goodman & Gilman (1998), the standard text-book of pharmacology, as follows. “Smoking of cigarettes containing  $\Delta^9$ -tetrahydrocannabinol, the major psychoactive component of cannabis, produces an increased sense of well-being and, where users can interact socially, often spontaneous laughter. The effects of tetrahydrocannabinol parallel the initial distribution phase, rather than the elimination times of the major metabolites. Short-term memory is impaired and the capacity to carry out tasks requiring multiple mental steps deteriorates. Complex procedures involved in driving, such as perception, attention and information processing, are impaired by doses equivalent to 1 to 2 cigarettes. This impairment last for 4-8 hours, longer than the subjective effects of the drugs. Balance and stability of stance are affected even at low doses. 60% of users were reported to have failed a roadside sobriety test 150 minutes after smoking marijuana. Marijuana also produces a marked reddening of the conjunctivae. Inactive derivatives of these cannabinoids can be detected in blood for several days following a single intake.”

#### *Barbiturates such as phenobarbitone (US phenobarbital)*

The barbiturates are orally active and effective sedatives that are sometimes used for the treatment of epilepsy. Their usage as sedatives has been obsolete for at least 20 years as they have been replaced by the much safer benzodiazepines. Phenobarbitone has a very long half-life of around  $99 \pm 18$  hours.

#### *Amphetamine and methylamphetamine (methamphetamine)*

Amphetamines as a group including methamphetamine (or methylamphetamine, “speed”) and amphetamine are general stimulants of the central nervous system that induce alertness, euphoria, increased confidence with enhanced mental and physical activity. These pharmacological effects are likely to be evident for several hours only. Fatigue is reduced by amphetamines and many studies have shown improvement of physical and mental performance in fatigued, though not in well-rested, subjects. Mental performance is improved for simple, tedious tasks much more than for difficult tasks such as driving. Hunger seems to be ignored although metabolic rate is unchanged.

Since amphetamines are stimulants, they will not cause sedation or grogginess. Toxic effects are shown as confusion, apprehensiveness, volubility, hyperactive reflexes, excessive sweating, tremor, suspiciousness, fear of being watched, hallucinations, paranoia and excitement. When the drug is stopped, there is usually a period of deep sleep, and on awakening, the subject feels extremely lethargic, depressed and anxious. Even a single dose of amphetamine causing euphoria may leave a subject later feeling tired and depressed.

Methamphetamine remains in the body for a considerable period after administration. An average elimination half-life for methamphetamine of 10.1 hours (range 6.4-15.1 hours) has been reported in human male volunteers given the S-isomer (Cook et al. 1992).

#### *Cocaine and metabolites such as benzoylecgonine*

Cocaine is administered by inhalation (smoking) or intravenously to give a rapid euphoria ("high"). Its duration of action is short, about 30 minutes when given intravenously, and the half-life in blood is reported as  $0.8 \pm 0.2$  hours. However, cocaine is extensively metabolised with the major metabolite being benzoylecgonine with a much longer half-life of about 6.6 hours (Moolchan et al. 2000).

#### *GHB (gamma-hydroxybutyrate)*

GHB is a relatively recently introduced recreational drug of abuse in Australia, with Degenhardt et al. (2003) citing the *Australian Illicit Drug Report 1998-99* as the earliest reference in this country. GHB, a metabolite of the inhibitory neurotransmitter GABA (gamma-aminobutyric acid) and GBL (gamma butyrolactone), causes sedation and anaesthesia as a typical CNS depressant similar to the benzodiazepines. Small doses are reported to lower inhibition and instill feelings of calmness and euphoria. Higher doses produce drowsiness, dizziness, amnesia, confusion, hallucinations, nausea and vomiting. Symptoms appear within 15 minutes of dosing. The effects are reported to be additive with ethanol. Ingestion of 2g results in a deep sleep while 4g results in a coma. Overdosage was reported in 53% of users (Degenhardt et al. 2003). Bodybuilders have been reported to use GHB to stimulate muscle growth while sports drinks in some countries may contain GHB as a relaxing agent. GHB is colourless and odourless but may have a distinct salty taste. The half-life of GHB is very short (27 minutes) so that no compound would be expected to be in urine or blood samples several hours after ingestion.

#### *Acute negative health effects following drug intoxication*

The acute toxicity of amphetamines and cocaine is very similar. The syndrome includes dizziness, tremor, irritability, confusion, hallucinations, chest pain, palpitations, hypertension, sweating and cardiac arrhythmias. Death is usually preceded by hyperpyrexia (increased body temperature), convulsions and shock (Goodman & Gilman, 1998). Acute toxicity with cocaine has been described as "excited delirium" with acute onset of bizarre and violent behaviour with aggression, hyperactivity, extreme paranoia, demonstration of unexpected strength, hyperthermia or incoherent shouting (Wetli and Fishbain, 1985). The incident was followed by fatal cardiorespiratory arrest. A further series of 58 deaths from cocaine-induced excited delirium in Dade County, Florida between 1979 and 1990, has been reported by Rutenber et al. (1997). 22 of these deaths (38%) occurred in police custody compared with 3 of 125 (2%) other accidental cocaine toxicity deaths also investigated by these authors.

Cocaine causes a wide range of vascular toxicity in the brain and heart. Su et al. (2003) have listed references for clinical reports on cocaine-induced cerebral vasculitis, intracranial haemorrhage, cerebral infarction and subarachnoid haemorrhages leading to strokes or sudden death. Cardiovascular complications causing sudden death include myocardial infarction, arrhythmias (Taylor et al. 2004), cardiomyopathies and aortic dissection (Palmiere et al. 2004).

Extreme agitation also occurs with amphetamine toxicity. In a study to determine optimal treatment of patients with acute agitation, Richards et al. (1998) attributed the extreme agitation to methamphetamine (72%), cocaine (14%), psychiatric illness (10%) and ethanol withdrawal (4%); ethanol intoxication was present in 49%. Sudden death can occur in these patients, for example from cardiovascular abnormalities in a case report by Nishida et al. (2003a).

Death following large doses of morphine and other opioids is usually due to respiratory depression leading to failure. Large doses also cause hypertension leading to circulatory failure and deepening coma.

The benzodiazepines cause some respiratory depression but markedly less than the opioids. These compounds rarely cause death on their own, but may do so in combination with other psychotropic drugs, in particular ethanol.

Ethanol intoxication may be associated with extreme agitation or aggressiveness. Sudden death may also occur in these patients, for example from cardiovascular abnormalities (Nishida et al. 2003b) or oesophageal haemorrhage (Tsokos and Turk, 2002).

#### *Adverse health effects in violent or restrained drug-affected individuals*

Several studies have investigated restraint-related deaths. The only drugs consistently reported as being involved in these deaths are cocaine and, to a markedly lesser extent, the amphetamines. Pollanen et al. (1998) report on 21 restraint-related deaths in people with excited delirium mainly from pre-existing psychiatric illness (57%) or cocaine (38%) in Ontario from 1988 to 1995. All of the deaths were associated with restraint. 18 (86%) died in police custody, 4 (19%) had heart disease and 4 (19%) were subdued with oleoresin capsicum spray. The most likely cause of death was restraint-related asphyxia; other factors include pre-existing heart disease, obesity leading to restricted respiration in the prone position, and exposure to oleoresin capsicum spray.

Stratton et al. (2001) examined 18 cases of sudden deaths in individuals requiring restraint for excited delirium and compared this with results from 196 surviving excited delirium victims. All 214 were restrained with wrists and ankles bound and attached behind the back. In all deaths, struggle with restraint was followed by laboured breathing before cardiopulmonary arrest; risk factors included stimulant drug use (78%), chronic cardiovascular disease (56%) and obesity (56%). Of the 18 deaths, autopsy findings were positive for cocaine in 10 cases and amphetamine in 7 cases; 3 cases showed both drugs while 4 cases showed neither drug.

An earlier report of 11 cases of sudden death in men restrained in a prone position included 6 patients acutely delirious from cocaine and 1 from methamphetamine; two were shocked with stun guns shortly before death (O'Halloran and Lewman, 1993). However, this article is not available for me to evaluate.

The majority of deaths were in people who had not apparently been subdued with oleoresin capsicum spray, suggesting that oleoresin capsicum spray use is casual rather than causal of the sudden deaths.

#### *Risks following oleoresin capsicum spray*

The application of capsaicin (8-methyl-vanillyl-6-nonenamide), the major active ingredient induces extreme local pain by activation of vanilloid receptors on the sensory nerves that conduct pain signals. Recer et al. (2002) have provided a detailed review of potential public health concerns for oleoresin capsicum, o-chlorobenzylidene malononitrile and 2-chloroacetophenone as self-defense sprays. This evaluation led the New York State Department of Health to determine that oleoresin capsicum spray posed the lowest public health concern and thus oleoresin capsicum is the only active ingredient to be used in self-defense sprays for sale and use in New York State. These authors describe the very high concentrations of oleoresin capsicum needed to cause death in laboratory animals, acute respiratory toxicity, dermal toxicity or genetic toxicity. However, they discuss the use of injected capsaicin, the active ingredient, in

animal experiments to cause degeneration of some sensory nerves but there are no reports of these effects in victims sprayed with oleoresin capsicum sprays.

Watson et al. (1996) investigated 81 patients presenting to an emergency department following oleoresin capsicum spray exposure, approximately 10% of all individuals sprayed by police officers in this area of the USA. Corneal abrasions and respiratory symptoms occurred in 7 and 6 patients, respectively. No patients required hospitalisation.

### *Respiratory responses*

Respiratory effects of oleoresin capsicum have been widely discussed but are not easy to reconcile. Recer et al. (2002) cite many references that acute treatment with oleoresin capsicum or capsaicin may cause nasal, throat or lung pain, irritation, laboured breathing or shortness of breath, cough and increased nasal secretions in humans and laboratory animals. Morice and Geppetti (2004) conclude from a review of the literature that the type 1 vanilloid receptor (which capsaicin activates) is the first characterised cough receptor. The group of compounds related to capsaicin, the capsaicinoids, produced airway inflammation in rats and death of human respiratory epithelial cells in culture (Reilly et al. 2003). The mechanisms of these two responses proceeded via different pathways, but both pathways were initiated by the type 1 vanilloid receptor. Thus, it is clear that the active ingredients of oleoresin capsicum can cause acute respiratory symptoms via activation of vanilloid receptors. However, this does not mean that capsaicin changes pulmonary function as Chan et al. (2002) found no effects on pulmonary function either sitting in under restraint. It should be noted that these tests were carried out under controlled conditions, not in asthmatics, nor in those with excited delirium or during violent struggles.

Further, these results do not mean that a single dose of oleoresin capsicum spray causes or worsens pulmonary disease such as asthma. Doherty et al. (2000) studied the cough response to capsaicin in 53 asthmatic patients, 56 patients with chronic obstructive pulmonary disease (COPD) and 96 healthy individuals. Asthmatic and COPD patients were much more sensitive to capsaicin than healthy individuals (meaning that cough was induced at lower doses of capsaicin). However, capsaicin sensitivity was independent of the degree of airways obstruction as a measure of the severity of the asthma or COPD. Thus, asthmatics are more likely to cough following capsaicin but this appears to be independent of the severity of asthma. There does not appear to be any studies specifically testing the pulmonary function of asthmatics after oleoresin capsicum spray. However, 12 of the 81 patients reviewed by Watson et al. (1996) had a history of asthma but their respiratory symptoms after oleoresin capsicum spray were similar to the other 69 patients.

Positional asphyxia following restraint has been considered as a contributing cause of in-custody deaths (Stratton et al. 2001). However, the incidence of asthma and possible causal relationship does not appear to have been recorded in this case series.

It is worthwhile mentioning that an asthmatic attack may be precipitated by factors such as physical exertion, confrontation or flight, independent of the use of capsaicin spray.

These issues have also been discussed in a report on health hazards of pepper spray (<http://www.geocities.com/CapitolHill/6416/smith-ok.html>) that I assume is a copy of Smith and Stopford (1999). The original article is not available at The University of Queensland.

### *Ocular responses*

Oleoresin capsicum spray is likely to cause acute ocular symptoms such as redness, swelling, burning pain, stinging, conjunctival inflammation and lacrimation (tear formation). These responses usually disappear with prolonged washing with water.

Several studies of corneal changes following oleoresin capsicum in an isopropyl alcohol or water carrier have been reported (Vesaluomo et al. 2000; Zollman et al. 2000). Both studies showed symptoms of loss of visual acuity for a few hours only but these studies were in control situations with a fixed spraying distance and time.

The carrier may have a profound effect on toxicity. Holopainen et al. (2003) reported on corneal erosions in 4 patients with pepper spray containing toxic carriers (trichlorethylene or dichloromethane in 3 of the 4 cases). The corneal erosions were long-lasting, deep corneal and conjunctival erosions which only partly resolved with therapy over weeks or months.

Thus, oleoresin capsicum spray causes transient pain and irritation but appears to cause little structural damage to the eyes of exposed individual. Any damage may be due to the carrier rather than to the capsaicin.

Almost all compounds may cause allergic responses in some individuals. Capsicum spray and the active ingredients, capsaicin and the capsaicinoids, as well as the carriers may induce an allergic response. The incidence of these responses is unknown but probably quite rare. These responses are unpredictable and independent of dose of the compound. Thus, it is impossible to define the risk or magnitude in any individual of an allergic response to oleoresin capsicum spray.

### Summary

This is not the first report to look at the literature on adverse effects from the use of oleoresin capsicum spray. My comments are in broad agreement with the following comments by Jeremy Brown in a report for the Canadian Police Research Centre on the use of capsaicin spray (<http://www.cprc.org/tm/1998/01/tm-01-98.pdf>):

“The assertion that pepper spray is potentially lethal for some subjects is probably true. ... It is important to maintain the context. Physical contact with a police officer is potentially lethal for some subjects also, as might be the very act of fleeing from a police officer in a severe asthmatic or someone with severe coronary disease. A baton can cause death or severe injury also and so can a firearm. Education and common sense are required. ... The supporters of pepper spray insist it is completely harmless; the opponents characterize it as lethal, blinding and cancer causing. It is neither. It is a tool in police work which offers an alternative to lethal force and to physical confrontation. Like all such tools, there are risks associated with the use of this tool.”

This opinion has reviewed the responses to the most commonly used intoxicating drugs and the acute health effects that may occur. Drug intoxication may lead to death, independent of whether oleoresin capsicum spray was used or whether restraint was necessary. Restraint may increase the risk of death, especially in cocaine- or amphetamine-intoxicated individuals. Some of these individuals were also sprayed with oleoresin capsicum spray but this appears casual rather than causal to the deaths in custody. Oleoresin capsicum spray produces acute respiratory and ocular symptoms but there is little evidence that the capsaicins cause long-term damage, although some carriers may be more toxic. Thus, there are risks associated with the use of oleoresin capsicum spray and this spray could cause a potentially lethal response. However, my review of the peer-reviewed literature on adverse effects of oleoresin capsicum spray suggests that there are very few, if any, deaths that can be convincingly shown to be caused by oleoresin capsicum spray.

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Further information on the opioids, benzodiazepines and amphetamines is available in standard pharmacological text-books, especially Hardman et al.: Goodman and Gilman's *The Pharmacological Basis of Therapeutics* (9th edition, 1998 or 10th edition, McGraw Hill, 2001) and Rang, Dale and Ritter: *Pharmacology* (5th edition, Churchill Livingstone, 2003).

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Please contact me if there are further queries.

Yours faithfully

Dr Lindsay Brown  
Associate Professor, Department of Physiology and Pharmacology,  
School of Biomedical Sciences, The University of Queensland.



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