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# Taser use on individuals experiencing mental distress: an integrative literature review

Running title: Taser use and mental illness

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## Taser use on individuals experiencing mental distress: an integrative literature review

Abstract

Introduction

Conducted electrical weapons, or 'Tasers', are currently used by over 15,000 law enforcement and military agencies worldwide. There are concerns regarding the effectiveness, potential for harm, and overuse with people experiencing mental distress.

Aim

To explore the literature about police use of Tasers with people experiencing mental distress.

Method

An integrative review was undertaken and qualitative and quantitative analytical approaches were used.

## Results

Thirty-one studies were included. Of all recorded usage, overall prevalence of Taser use on people experiencing mental distress was 28%. This population may require a greater number of shocks to subdue them than other people.

## Discussion

There are substantial gaps in the research literature particularly with respect to the decision-making processes involved in deploying Tasers on this population and the physical and psychological consequences of Taser use in this context.

## Implications for practice

Police use of Tasers in mental health crises is relatively common, and occurs in a variety of environments including mental health settings. Mental health professionals need to work with police towards greater understanding of the needs of people with mental illness, and to promote the use of non-coercive interventions in mental health crisis events.

## Relevance statement

The lack of service user / consumer / survivor voice in the literature about police use of Tasers is concerning, especially considering the wide range of mental health settings that Taser use occurs in. Without evidence of the experiences of people who are Tasered whilst experiencing mental distress, decision-making around Taser use and police involvement cannot be evidence based, because an important element of the evidence is missing. This gap needs to be highlighted before efforts will be made to fill it.

## Accessible summary

### What is known about the subject?

People experiencing mental distress have a high rate of contact with police in community crisis events.

Police use a continuum of responses when managing situations involving agitation, aggression and behavioural problems.

People experiencing mental distress have been subjected to Tasers as part of the police response.

Following a number of deaths and numerous reports of injuries, concerns have been raised about the safety of Tasers.

### What this paper adds

Police use of Tasers in mental health crises is relatively common.

Tasers are used in a range of settings including public places, private residences and health care facilities.

People experiencing mental distress may be subjected to more use of Tasers if initial attempts to gain compliance are not successful.

### What are the implications for practice?

Mental health professionals need to work with police towards greater understanding of the needs of people experiencing mental distress, and to promote the use of non-coercive interventions in mental health crisis events.

Mental health researchers need to explore the qualitative experiences of people who are Tasered, to provide an evidence base for Taser use with people experiencing mental distress.

### Introduction

The primary role of the police is to deal with crime, but their remit extends far beyond; as Bittner (2005, p.161) notes the police are expected to address situations where 'something-that-ought-not-to-be-happening-and-about-which-someone-had-better-do-something-now' are occurring. Bittner (1970) further argues that the police are unique in their ability to enforce the law with the use of force. Mental health professionals could argue that they are in a similar position of using force within a legal framework. What is similar in both professions is that use of force may be disproportionately used with some population groups. Police are more likely to use force in situations with people who are experiencing

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mental distress or symptoms of mental illness, than those who aren't (Rossler & Terrill, 2017). Furthermore, ethnicity may be a factor in whether inpatients are restrained (Stewart, Bowers, Simpson, Ryan & Tziggili, 2009; McLeod, King, Stanley, Lacey & Cunningham, 2017), and whether police use force in an encounter (Klahm & Tillyer, 2010). Police have a variety of use of force methods from no force (e.g. officer present), to less-lethal force (baton, pepper spray, Taser), to lethal force (e.g. firearms) (National Institute of Justice, 2009). Tasers are described as safer than firearms (MacDonald, Kaminiski & Smith, 2009) but there have been some high profile cases of deaths following police Taser use, for example in the United Kingdom (UK; BBC, 2019) and Canada (The Guardian, 2015).

The 'Taser' (Thomas A. Swift's Electric Rifle) is a well-known brand name for an electronic shock device used by police. Tasers, or conducted electrical weapons (CEWs) / conducted electrical devices (CEDs), are devices that discharge high voltage with low current to cause involuntary neuromuscular stimulation (Kunz, Grove, & Fischer, 2012). Due to its acceptance in common parlance, the term 'Taser' will be used in this article to mean any form of conducted electrical device, electronic control device, electroshock device, electromuscular incapacitation device or 'stun gun'. Tasers can be used in several different ways, generally to deter or to incapacitate a person. Uses that may be classified as deterrent include presenting the Taser, aiming the Taser, 'laser painting' i.e. using the laser target light so that a red dot appears on a person, or arcing the Taser (where the electric current arcs between the two contact points on the Taser itself). However, the Taser may also be used with the intention of incapacitating the person temporarily by being fired or in drive stun mode. The former causes incapacitation, whilst the latter causes intense localised pain but not more general neuromuscular incapacitation (Independent Police Complaints Commission [IPCC], 2014). How Tasers are used varies depending on the situation presented to the individual police officer.

Tasers were introduced to the police in North America in 1999, and in 2003 to the UK (Bleetman, Steyn, & Lee, 2004), despite concerns about their safety (Soleimanirahbar & Lee, 2011). Currently over 15,000 law enforcement and military agencies use Tasers worldwide (Holder, Robinson, & Laub, 2011). Within the UK, Tasers are used by the police as a non-lethal force alternative under Section 3 Criminal Law Act 1967, which provides that 'A person may use such force as is reasonable in the circumstances in the prevention of crime,

or in effecting or assisting the lawful arrest of offenders or suspected offenders or of persons unlawfully at large'. The minimum time for police officer training on the use of Tasers in the UK is 18 hours, with a minimum of 6 hours refresher training per year (IPCC, 2014). Between April 2017 and April 2018, there were over 17,000 reported Taser uses by police in England and Wales, up from 11,300 the year before. Of these, 85% were non-discharges (i.e. either drawn, aimed, arced or laser painted) (Home Office, 2018). In response to campaigning from the Police Federation of England and Wales, the Home Office funded Taser initiatives will extend this technology to a further 10,000 officers (Deardon, 2019).

Since the introduction of Tasers to law enforcement officials, there have been concerns over not only the effectiveness of using such devices but also the potential for harm to the individual who is Tasered (Pasquier, Carron, Vallotton, & Yersin, 2011; Sprague, 2007). These concerns are exacerbated when Tasers are used on people experiencing mental distress (O'Brien & Thom, 2014; White & Ready, 2007). Responding to people experiencing mental distress is an important part of policing; up to 40% of police time is spent responding to incidents relation to mental health issues in the UK (Quinn, Laville, & Duncan, 2016). When presented with these types of callouts, the police have the option to use a Taser if an individual is presenting as a danger to themselves, others or the arresting officers (O'Brien & Thom, 2014). However, the judgement that police officers make could be affected by the presenting symptoms of mental illness, particularly if officers have had little training around their responses to mental illness and distress (Ruiz & Miller, 2004). If people with a suspected mental illness are perceived as dangerous this could potentially mean that Tasers are more likely to be used when an individual is experiencing a mental health crisis than in a criminal arrest (O'Brien & Thom, 2014). Furthermore, a number of Taser deaths have been attributed to 'excited delirium', a contentious concept (Baker, 2017) which refers to a state of intense autonomic arousal occurring in situations of conflict (Gerold, Gibbons, Fisette, & Alves, 2015). Excited delirium typically occurs in males with a history of mental illness, acute-on-chronic drug abuse or a combination of both (Vilke et al., 2012).

Current research findings suggest that people experiencing mental distress may be over represented in Taser statistics. However, little research has specifically been conducted on police callouts that involve Taser deployment with these people (O'Brien & Thom, 2014).



The use of Tasers among people experiencing mental distress should be of concern to service users, practitioners and academics alike. This review aims to conduct an in depth exploration of the research looking at use of Tasers within this population to provide greater understanding of this issue, enhancing knowledge at a researcher and practitioner level. As far as we are aware no research using a review methodology has been conducted in this area.

The focus of this review is mental distress; in their interactions with the public, police rarely have the knowledge of whether a person has a diagnosable mental illness, but they should be able to recognise the signs of mental distress whatever the cause.

## Method

An integrative review of the research literature was conducted using Whitemore and Knafli's (2005) framework comprising five stages: problem identification (described in the introduction), literature search, data evaluation, data analysis and presentation. This framework promotes the inclusion of studies using a variety of methodologies and includes grey literature, theoretical literature and other sources. Qualitative (framework analysis) and quantitative (meta-analysis) analytical approaches were used.

Because of the exploratory nature of the review, the research questions to be answered by the review were based on 'who, what, why and where' to provide an overview of police use of Tasers on people who are experiencing mental distress:

- Who is Tasered, i.e. the characteristics of the people who are Tasered whilst experiencing mental distress?
- What are the effects of being Tasered?
- Where do police use Tasers with people experiencing mental distress?
- Why do police use Tasers with people experiencing mental distress?
- What is the prevalence of police use of Tasers on people experiencing mental distress?

## Literature search

The databases searched were ASSIA, CINAHL, Embase, LexisLibrary, Medline, Proquest, PsycARTICLES, PsycINFO, PubMed, Science Direct, Web of Science and Westlaw. Search terms were developed using an amended Population, Intervention, Context, Outcome (PICO) framework, excluding outcome (Table 1). MeSH headings and truncations were used. Database searching was conducted in April 2019. Records identified through the search process were screened using the inclusion and exclusion criteria shown in Table 2, first by title and abstract, then by full text. All screening was conducted by two authors; conflicts were resolved by discussion with a third author. Reference lists of included papers were reviewed to identify further relevant studies.

<Table 1 about here>

<Table 2 about here>

## Data evaluation

To assess study quality rating, instruments provided by the Joanna Briggs Institute (JBI) for Evidence Based Nursing were used. JBI rating instruments are well accepted and widely used (Buccheri & Sharifi, 2017). Each study was independently rated by two researchers. Ratings were referred to a third reviewer in cases of disagreement. Studies were rated as good (meeting criteria on more than 75% of the items on appropriate instrument), moderate (50-75%) or poor (<50%).

## Data analysis

For this review a narrative approach was taken; specifically a framework synthesis was conducted (Carroll et al., 2011), to answer the initial 'who, what, where, why' research questions (Straus et al., 2019). This method of analysis allows the synthesis of 'thin' research findings along with alternative types of literature (Snilstviet et al., 2012). The papers were independently read by members of the research team and data pertinent to Taser use in people experiencing mental distress were extracted. Data on the characteristics of people who are Tasered, effects of Taser use, settings in which Tasers were used, and reasons for Taser use were extracted and textually synthesised. Preliminary results from this analysis were discussed within the research team before the findings were written up.

In addition, a meta-analysis of prevalence rates was conducted. The rate of Taser use against people experiencing mental distress was operationalised as the percentage of the sample that were reported or recorded as having a mental illness / experiencing mental distress. Meta-analyses were conducted with MetaXL version 5.3 using the process for meta-analysis of prevalence studies described by Barendregdt et al. (2013). Heterogeneity of the samples was assessed using the  $I^2$  statistic, calculated in Excel using the chi-square statistic (Q) and degrees of freedom; an  $I^2 < 50\%$  suggests possible heterogeneity and  $< 75\%$  is considerable. There was considerable heterogeneity ( $I^2 = 84.8\%$ ), therefore random effects models were calculated. Forest plots were created in Microsoft Excel using the guidelines described by Neyeloff et al. (2012).

## Results

### Study selection

Through database searching, 915 papers were identified and hand searching provided 11 more results (Figure 1). After removing duplicates, titles and abstracts of 641 papers were screened against the inclusion/exclusion criteria, which resulted in 86 full text papers being accessed and screened. Of these, 53 were excluded, leaving 33 papers included in this review.

<Figure 1 about here>

### Quality of studies

On ratings of quality, 3 studies were rated as good, 21 were rated as moderate, and the remaining studies were rated as poor, see Table 3. Common issues with quality were small sample size, incomplete demographic characteristics, unsystematic data collection, non-standardised definition of key variables and unreliable measures of outcomes.

### Study characteristics

Of the thirty-one included studies, two were international reviews, eighteen were from the US, four from the UK, three were from Canada, three from New Zealand, and one was from the US and Canada combined (Table 3). Most studies used data drawn from administrative databases maintained by police, coroner's services or from health service records. Four

studies drew on secondary analysis of news media and police reports. Two studies used data from the same researcher-maintained database. There were two literature reviews and one study used a survey. All but one of the studies were conducted from 2006 onwards; Ordog et al. (1987) conducted their case review almost two decades earlier.

<Table 3 about here>

## Findings

### *Characteristics of people who experience Taser deployment*

Only four out of the thirty-one papers included in this review reported data about the demographic characteristics of people who experience Taser deployment (Ajilore, 2017; Holman, O'Brien, & Thom, 2018; New Zealand Police, 2008; O'Brien et al., 2011). Ethnicity was identified in three of the New Zealand studies; of eighty-six use of force events identified by Holman et al. (2018) eight were 'Taser shown' (displayed), and of these, four were to Maori people, four to European New Zealanders. The New Zealand Police (2008) identified twenty-seven individuals who experienced Taser deployment and where mental health issues were indicated; eighteen were European, six Maori and two Pacific Island people. However, O'Brien et al. (2011) found that Maori and Pacific Island people were less likely to experience Taser deployment in a mental health crisis than in a criminal arrest. In the US, according to Ajilore (2017), unarmed African American people with a diagnosis of mental illness, when compared with other individuals, are more likely to be the victim of an officer involved shooting; this effect is stronger when the cause of death includes Tasers.

The gender of people who are Tasered was only explored in one study, which found that females are more likely to experience Taser deployment in a mental health crisis than during criminal arrest (O'Brien et al., 2011). There are 11 papers in this review that include case studies; Kroll (2016) is the only one that includes a female, being one out of 24 cases described. All other case studies where gender was stated were male (Bozeman et al., 2009; Hall et al., 2015; Kroll, Lakkireddy, Stone, & Luceri, 2014; Kroll et al., 2017; Little & Burt, 2013; Michaud, 2016; Parent, 2007). Similarly only one study explored age, finding that most of the 27 Taser incidents were with people aged 30-34 (n=6), followed by 25-29 and 35-39 (each n=5) (New Zealand Police, 2008). Kroll et al. (2016) identified three out of 24 cases of men aged over 60 years who were subject to Taser use.

## *Effects of Taser use*

The most commonly reported effect of Taser use was death; many of the reviewed papers focused specifically on Taser-related deaths. Two Amnesty International reports of deaths following Taser use document 159 deaths between 2001 and 2006 in the US and Canada (Amnesty International 2004, 2006). The 2004 report identifies five cases involving people described as having a mental illness, with one police department reporting that 65% of 428 Taser discharges were on people with mental illness. A further 13 of 84 Taser related deaths occurring between 2004 and 2006 involved people reported to have a mental illness (Amnesty International, 2006). The Amnesty International (2004, 2006) reports document several cases of multiple use of Tasers with individuals who are not compliant with police, with mental illness being one factor contributing to non-compliance. A further review covering the period 2001 to 2008 identified 334 Taser related deaths including 15 of people with a reported mental illness (Amnesty International, 2008), however it should be noted some of these deaths will be included in the earlier reports. In the cases investigated by the IPCC in the UK (2016), 19 (41%) of people with a reported mental illness died following Taser use, compared with 21 (11%) people without. Of 37 cases of law enforcement Taser-related deaths identified in news reports in the US between 2001 and 2005, toxicology screens were positive for antidepressants in 4 (10.8%) people, antipsychotics in 3 (8.1%) and benzodiazepines in 1 (2.7%) (Strote & Hutson, 2006). Further case studies where mental illness was a reported factor in deaths following Taser use were identified (Bozeman et al., 2009; Hall et al., 2015). Bozeman et al. (2009) described an agitated and violent person, with a history of mental illness, who died following pepper spray and two Taser discharges and restraint in prone position. In this case, Taser use was not determined to be a causal or contributing factor in the death. In the cohort described by Hall et al. (2015) the person who died following Taser use was displaying signs of drug intoxication and mental distress, and demonstrated all the features of excited delirium.

Several studies suggest that people experiencing mental distress may require a greater number of shocks to subdue them than other people. Bailey et al. (2016, p. 214) found that, 'Individuals with mental illness received shocks significantly more times than those without mental illness' and that this variance was exacerbated in individuals with mental illness who were also using stimulants. White and Ready (2009) used multivariate analysis on news

articles describing Taser incidents to identify predictors of Taser-related death. They found that being mentally ill and receiving more than one Taser shock was a predictor of Taser-related death and they conjectured that 'those who are mentally ill and in crisis might be less likely to acquiesce to police authority (i.e., continued resistance) because of their emotional state. Continued physical resistance might then prompt the police to apply more cycles from the Taser.' (White and Ready, 2009, p. 884). O'Brien, McKenna and Simpson (2007) also suggest that multiple use or prolonged shocks may be a factor more generally in Taser-related deaths. The Amnesty International reports cited above also describe deaths among people with a reported mental illness who had been subjected to multiple uses of a Taser. Furthermore, cases of fatal police shootings often describe ineffective Taser deployment prior to the shootings (Parent, 2007).

The risks of disruption to cardiac functioning may be low following Taser use, but the risks are increased when combined with underlying heart conditions, psychotropic medication, or features of excited delirium (O'Brien & Thom, 2014). Michaud et al. (2016 p.32) describe an incident involving 'an aggressive schizophrenic' who went into cardiorespiratory arrest immediately after Taser deployment, whilst Kroll et al. (2014 p.95) report the case of an adolescent 'psychiatric subject' who experienced ventricular fibrillation after being subdued with a Taser gun.

Injuries secondary to Taser deployment have also been reported. Falls caused by Taser deployment can be fatal; Kroll et al. (2016) detail two such cases involving people with mental illness. The first was a man with bipolar disorder who was Tasered by officers, fell face-first onto a curb and died due to the head injuries sustained. The second was a man experiencing a mental health crisis who was threatening to jump off a billboard, was Tasered and fell, missing the airbag that had been placed by the rescue team; he also died of head injuries. Another case of death by injuries secondary to Taser use was a man who was inside his house threatening suicide. Officers attended the scene and when the individual resisted, deployed their Taser. The house exploded into flames as the man had turned on the gas prior to the officers attending. The person and one of the officers died from burn injuries (Kroll, Ritter, & Williams, 2017).

None of the studies explored the psychological effects of Taser deployment on people experiencing mental distress. Taser use may negatively affect engagement with mental

health services due to an increased perception of coercion (O'Brien, McKenna, & Simpson, 2007). However, the patient in a low secure mental health facility who was Tasered had little recollection of the event, and was therefore unlikely to have experienced psychological effects (Little & Burt, 2013).

#### *Setting of Taser deployment*

A third of the studies (n=10) identified the physical environments within which Tasers were deployed, particularly in relation to use on those experiencing mental distress. Only two studies identified police custody as the setting of Taser deployment, both describing case studies where the person died (Bozeman et al., 2009; Hall et al., 2015). Taser use on individuals with a reported mental illness in correctional facilities is reported by Amnesty International (2004) and Kroll (2016). Mental health hospitals / services, residential homes, and other healthcare facilities were identified as a common setting for Taser deployment (Little & Burt, 2013; Marsh, 2018; New Zealand Police, 2008; O'Brien et al., 2007). In the UK, Marsh (2018) focused specifically on Taser deployment in mental health settings, identifying 96 cases over a one year period (2017-2018), while the case study from Little and Burt (2013) described Taser use in a low secure mental health unit.

Taser deployment occurred in a variety of public settings, including public roads and roadsides (Kroll, Adamec, Wetli, & Williams, 2016; New Zealand Police, 2008; Parent, 2011), and commercial properties, e.g. restaurants, petrol stations etc. (Kroll et al., 2016; New Zealand Police, 2008; Parent, 2011). Finally, Taser deployment occurred in residential properties (New Zealand Police, 2008; O'Brien, McKenna, Thom, Diesfeld, & Simpson, 2011; Parent, 2011). Residential homes were the most common site in two of the studies from New Zealand, accounting for 57% of police reported cases identified by O'Brien et al. (2011) and 70% of cases identified by the New Zealand Police (2008).

#### *Reasons for use of Taser*

In the studies that examined reasons for Taser deployment, the most commonly cited reason was where signs of mental distress were combined with violence (Independent Police Complaints Commission, 2016; Kroll et al., 2014; Little & Burt, 2013; Michaud, 2016; Munetz et al., 2006; New Zealand Police, 2008; Parent, 2011; Skeem, Bibeau, Skeem, & Bibeau, 2008). In the earliest study, in 40% of emergency department admissions following

Taser deployment, the reason was stated as 'bizarre and extremely combative behaviour (with directed violence)' (Ordog, 1987 p.4). The presence of weapons is also a factor. Of 27 incidents where mental health was indicated as a reason for Taser deployment by New Zealand Police (2008), there was a weapon (gun, knife, or improvised weapon) present in 23 cases. Also in New Zealand, Tasers were used in 83% of mental health emergencies where police believed there was a weapon present, compared to 45% of criminal arrests involving weapons (O'Brien et al., 2011). In two cases of police shootings in British Columbia, individuals exhibiting behaviour indicative of psychosis and brandishing knives had Tasers unsuccessfully deployed before being shot and killed by police (Parent, 2011).

From a 72-month period of a self-reporting database for Taser use, there were 2452 cases of Taser deployment with people who were experiencing mental distress, and of these 22% were in situations where lethal force was justified (Ho, Dawes, Johnson, Lundin, & Miner, 2007). In most of the Taser complaints investigated by the IPCC (2014) involving people with mental health vulnerabilities, officers were aware of the mental health issues, but did not have the opportunity to take professional advice. Tasers are also frequently deployed when there is imminent danger to self (Kroll et al., 2016; Kroll et al., 2017; Munetz et al., 2006; New Zealand Police, 2008; O'Brien et al., 2011; White & Ready, 2007). In a US study, of 560 cases of suicidal behaviour where Tasers were deployed, 59% presented as an imminent danger to self (Ho et al., 2007). Of 243 Taser incidents recorded by personnel at one US police department over a three-year period, 22% involved a suspect who was violent towards self (White & Ready, 2007).

Whilst two studies indicate that people displaying 'agitation' is a reason for Taser deployment (O'Brien et al., 2011; Strote & Hutson, 2006), many highlight that the interaction between drug use and mental distress increases the likelihood of a Taser being used (Morabito, Socia, Wik, & Fisher, 2017; O'Brien et al., 2011; Parent, 2011; Strote & Hutson, 2006; White & Ready, 2009). Morabito et al (2017 p.35) identify that people 'with comorbid disorders [mental health and substance use] are perceived to be the most physically and aggressively resistant' by the police when compared with people with no apparent disorder or only mental health issues or substance use. They found that Tasers were least frequently used on those with no perceived disorders (12%) and most frequently on individuals with a comorbid disorder (40%). Kroll et al. (2016) reported that of 24 Taser



related deaths 5 cases (21%) involved individuals who were intoxicated or had used psychoactive substances.

Six of the studies describe Tasers being deployed with the intention of incapacitating the people (Kroll et al., 2016; Kroll et al., 2014; Kroll et al., 2017; Michaud, 2016; O'Brien et al., 2011; Parent, 2007). In two of these, the researchers identified case studies involving people with a reported mental illness who were not incapacitated by the initial Taser deployment (Kroll et al., 2016; Parent, 2007).

#### *Rates of Taser use on people experiencing mental distress*

Prevalence data could be extracted from 11 papers with 13 datasets, covering 13,584 people experiencing mental distress. Of all recorded usage, overall prevalence of Taser use on people experiencing mental distress was 28.13% (95%CI 23.4-33.1) (Figure 2). The reports by the IPCC (2014; 2016) each included two prevalence figures, each for different time periods, and all shown in Figure 2. As most of the studies were from the UK (n=4) or the US (n=5), overall UK and US prevalence rates were also calculated: 35.81% (95%CI 23.8-34.3) and 25.83% (95%CI 19.0-31.5) respectively.

<Figure 2 about here>

#### Discussion

This integrative literature review was undertaken to provide a narrative synthesis of research findings to assess the use of Tasers on individuals experiencing mental distress. A limited number of studies were available, and in general the quality of available evidence is moderate or poor, with no controlled studies and most data extracted from police officer reports in administrative databases. Comprehensive summaries such as those provided by Amnesty International (2004, 2006, 2008) are valuable in identifying individual cases, but are dependent on police departments to provide data and on media reports. Taser use on people experiencing mental distress appears to be relatively common, with one US police department reporting 65% of 428 uses of Tasers involving people experiencing mental distress. Our comparison of prevalence rates across nine studies showed a pooled prevalence of 28.13%. Despite concerns about the prevalence of Taser use on people

experiencing mental distress, and the potential effects, there are few studies that specifically address this issue.

Studies reviewing health effects of Tasers (e.g. Pasquier et al. 2011) typically do not analyse their data for specific effects on people experiencing mental distress. In most of the papers reviewed in this report, data related to people experiencing mental distress needed to be extracted from broader studies. Apart from a small number of case reports, most data reported is on the incidence of Taser use with a small number of studies reporting deaths of mentally distressed people following Taser use. There is insufficient data to compare the risk of death of people with mental illness with those subject to criminal arrest. This lack of focus on mental distress is concerning because of the consistent reports that people experiencing mental distress are more likely to be subject to Taser use compared to people subject to those without (Ho et al., 2007; O'Brien et al., 2011) and are subject to more Taser shocks than other police detainees (Bailey, Smock, Melendez, & El-Mallakh, 2016). As use of Tasers appears to be proliferating internationally (Peters & Silverstri, 2016) there is an increasing need to monitor the use of Tasers on people experiencing mental distress. Furthermore, there was only limited information on the interplay between ethnicity, mental distress and Taser use. No studies were identified that examined the psychological or emotional effects of being Tasered whilst experiencing mental distress, from the perspective of the people affected.

There is cause for concern arising from the suggestion that people at the point of mental health crises or suffering mental health vulnerabilities are less likely to comply with initial commands from the police (Ruiz & Miller, 2004), and are thus more likely to be Tasered than other individuals (O'Brien et al., 2007). It is speculated that people suffering with paranoia, psychotic episodes or delusions may find it less easy to assimilate information and comply with commands in a high adrenaline context. In addition to this, it is suggested that the issue is exacerbated by continuing non-compliance, potentially perceived by the police as further resistance. This can lead to additional and longer-lasting discharges for this group (O'Brien et al., 2007; White & Ready, 2009). Another compounding factor highlighted in the literature is that this population may already be taking antipsychotic or antidepressant medication. These medications can cause alterations to cardiac functioning such as prolonged QT interval (Hasnain & Vieweg, 2014) making this population potentially more

prone to injury and/or death (O'Brien et al., 2007; White & Ready, 2009). These findings identify an important need for further research into the contexts of Taser use and the specific physical effects on those who are taking psychotropic medication.

This review was able to provide some clarification of the environments in which Tasers are used on people experiencing mental distress. Although the majority of incidents are reported to have occurred within public spaces (Kroll et al., 2016), there are also incidents within domestic spaces (Kroll et al., 2017; O'Brien et al., 2011), health settings (Little & Burt, 2013; Marsh, 2018; O'Brien et al., 2011) and correctional settings (Kroll et al., 2016). In many of these incidents the police already knew that the person had a diagnosed mental illness; in other cases this would have been a reasonable conclusion based on the person's presenting behaviour. In some cases knowledge of the person's mental illness would not have become known until the aftermath.

It is of particular concern that there is evidence of Taser use within inpatient and community residential mental health settings (Little & Burt, 2013; Marsh, 2018; O'Brien et al., 2011), environments in which consumers expect to feel safe, and in which police are already aware that individuals have mental health disorders. We were not able to determine whether there has been any increase in calls for police assistance to mental health services, although researchers associated with Taser International Inc have advocated for their use in healthcare settings (Ho, Williams & Coplen, 2014). Any such increase may be a response to under-resourcing in mental health service providers, necessitating more frequent recourse to police calls for assistance. Alternatively, any increase in calls to police may represent a change in service culture and greater readiness to involve police. Police presence in inpatient services runs counter to initiatives to reduce use of restraint and coercion in these settings (Duxbury et al., 2019; Wilson, Rouse, Rae, & Kar Ray, 2018).

When Tasers were first introduced, it was argued that they would be a 'non-lethal' or 'less-lethal' alternative for law enforcement officers in managing potentially dangerous incidents, where officers would otherwise have been justified in using lethal force e.g. firearms (White & Ready, 2007). However, there is insufficient evidence to determine whether the pattern of Taser use against individuals with mental health disorders is as an alternative to lethal force (Ho et al., 2007) or as an alternative to other means of preventing and/or resolving conflict situations e.g. improving therapeutic environments and relationships; talking de-

escalation strategies (Canada, Angell, & Watson, 2012). In their 2008 report Amnesty International noted that in 80% of over 300 Taser related deaths the person was unarmed and not offering resistance. Further research is needed to give a clearer picture.

The literature reviewed reveals very little research into the decision-making process leading to Taser deployment. It would be invaluable to see further research on police decision-making in the context of managing people in mental health crises or people displaying symptoms of mental health disorders, and whether training the police in mental health awareness and crisis intervention techniques is effective in reducing the use of Tasers. Canada, Angell and Watson (2012) suggest that this may be the case i.e. that CIT (Crisis Intervention Team)-trained officers are more likely to prioritise de-escalation approaches over use of force techniques (including Taser deployment) and to be equipped with the skills to support effective use of such de-escalation techniques. However, it would also be interesting to consider the extent to which police resourcing issues lead officers to prioritise a quick resolution of conflict (through use of force techniques including Taser) over more traditional but more time-consuming de-escalation techniques.

Another aspect of the decision-making process that could benefit from focused research is the justification for Taser use in a given context. Although it is generally accepted that Taser use may be justified in a situation where the individual, the police officer or third parties are at risk, deployment of a Taser in the absence of immediate danger is difficult to justify. For example in a case investigated by the New Zealand Independent Police Conduct Authority involving a man believed by police to be mentally, use of a Taser was found to constitute unjustifiable use of force (Independent Police Conduct Authority, 2017).

The literature reviewed represents research on Taser use within a relatively narrow range of developed countries. However, this is probably not reflective of the true extent of Taser use against the mental health population across the world. In 2016, Tasers were used by police forces in 18,000 law enforcement agencies across 107 countries (Peters & Silverstri, 2016). Further research is needed in a wider spectrum of nations and contexts to give a more accurate overview of the use of Tasers on people experiencing mental distress.

Qualitative exploration of the psychological impact of Taser use on people experiencing mental distress is needed as this group is arguably more vulnerable than others to both

short term and long term psychological harm following Taser deployment. Thus far this issue has not been addressed in research. This is particularly pertinent when Tasers are used in domestic spaces such as homes and gardens, or in psychiatric in-patient or community mental health facilities (Kroll et al., 2017; Marsh, 2018; O'Brien et al., 2011).

The broader picture reveals that Taser use is not restricted to law enforcement agencies. Our review identified reports of Taser use by hospital security staff (Gramling, McGovern, Church, Nachreiner, & Gaugler, 2018; Ho et al., 2011) and by prison officers (Kroll et al., 2016). Wider use of Tasers will likely expose more people experiencing mental distress to this intervention, as people with mental illness are overrepresented in prisons (Fazel, Hayes, Bartellas, Clerici, & Trestman, 2016). Hospital security staff are also likely to replicate police practice of high prevalence Taser deployment on people experiencing mental distress.

### Strengths and limitations

The integrative approach taken in this literature review has strengths in that it has allowed synthesis of research findings from a range of different methodologies, and is the first review of its kind to be undertaken. Furthermore, it included a meta-analysis of prevalence, providing prevalence estimates for use of Tasers. Although the predominance of the research is quantitative, there was inclusion of mixed methods research (IPCC, 2016) and literature reviews (O'Brien et al., 2007; O'Brien & Thom, 2014). The comprehensive approach to database searching, including use of PICO, together with the inclusion of a wide range of databases, retrieved articles from a broad range of sources, representing research undertaken in a number of countries and contexts across the world. The use of narrow search terms provided results that gave a specific focus on the interrelationship between Taser use and the mental health population.

However, there are also limitations to this review. Firstly, the data for the meta-analysis came from a heterogeneous sample, and few studies explicitly identified rates of Taser use on people experiencing mental distress. Furthermore, there may be some overlap in the UK samples, and therefore the prevalence rates should be treated with caution. However, the most significant limitation is that only three articles focus specifically on the nexus between Taser use and the mental health population (Bailey et al., 2016; Ho et al., 2007; O'Brien et al., 2011). Despite the breadth of databases searched, there are a limited number of

journals represented by the articles included in the review. A separate limitation is that the focus on the use of Tasers meant that the review did not consider police use of force more broadly, where use of Tasers represents just one strategy within a range of others e.g. pepper spray, physical restraint, firearms etc. Although some of the papers included in the review mentioned Taser use within this broader use of force context, the search terms did not gather a comprehensive body of literature relating to this, so it was not possible to undertake a full analysis of the use of Tasers within the wider use of force continuum. Another limitation was that the terminology used in the literature to describe the mental health population was quite varied. This is indicative of the different ways in which police forces define and categorise individuals displaying signs of mental health crisis, mental disorders, mental vulnerabilities, emotional disturbance or emotional distress. This issue is exacerbated by the reality that decisions to use a Taser are often made by police officers in potentially dangerous encounters where access to information about the mental state or history of the individual is limited, and time may be of the essence to prevent harm to self or others.

## Conclusion

This integrative literature review represents a narrative synthesis of the use of Tasers on the mental health population, alongside a meta-analysis of prevalence. Taser use with people experiencing mental distress appears to be a prevalent practice, but one that is poorly researched. The review found that Tasers are used with mental health consumers in a variety of settings, including community settings, clinical services and care facilities. The review supports previous reports that Tasers are more likely to be used on people experiencing mental distress than in cases of criminal arrest, and that these people are subject to a greater number of Taser shocks. There are substantial gaps in the research literature particularly with respect to the decision-making processes involved in deploying Tasers on this population; the physical and psychological consequences of Taser use in this context; and the extent to which Tasers are being used as a genuine alternative to lethal force. Planned increases in Taser availability to police adds urgency to the need for further research.

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## Tables

Table 1 Search terms

Population	Intervention	Context
Mental*	Taser	Polic*
Psych*	Conducted electrical weapon	Law enforcement
Disturb*	CEW	Crisis intervention team
Deliri*	Stun gun	Cops
Crisis	Non-lethal weapon	Officers
Agitat*	Less lethal weapon	
	Less lethal force	
	Use of force	
	Conducted energy device	
	CED	
	Electrical weapons	
	Electronic control device	
	ECD	

Table 2 Eligibility criteria

	Inclusion criteria	Exclusion criteria
<b>Population</b>	Incidents involving individuals displaying characteristics of mental distress	Unrelated to incidents involving individuals displaying characteristics of mental distress
<b>Intervention</b>	Taser use	Other restraints or use of force
<b>Context</b>	Taser deployment by police	Taser deployment by security guards, public etc.
<b>Type of study</b>	Quantitative, qualitative, mixed methods, literature reviews, case reviews, official reports	Editorials, letters, policy documents, book chapters, theoretical literature
<b>Language</b>	English	Other languages
<b>Country</b>	Any country	

Table 3 Summary of Studies

Author (year) Country	Aim	Design	Setting & participants	Key findings	Appraisal grading
Ajilore (2017) USA	To investigate the effect of suspected mental illness on the likelihood of involvement in fatal officer-involved shootings.	Retrospective cohort design. Analysis of fatal encounters database	Data from independent databases 2013 to 2017	Taser-related deaths about 4% of dataset. The results regarding interaction effects showed that, relative to other individuals, unarmed African Americans with mental illness were more likely to be victims of fatal officer involved shootings. The magnitude of the effects, while statistically significant, was low until Taser-related deaths were included.	Moderate
Amnesty International (2004) USA and Canada	To review cases of Taser-involved deaths.	Case review	Review of 74 Taser-involved deaths between 2001 and 2004	Numerous reports of death following Taser use, where mental illness was reported as an underlying condition or contributory factor.	Poor
Amnesty International (2006) USA	To review cases of Taser-involved deaths.	Case review	Review of 85 Taser-involved deaths between November 2004 and February 2006	Numerous reports of death following Taser use, where mental illness was reported as an underlying condition or contributory factor.	Poor
Amnesty International (2008) USA	To review cases of Taser-involved deaths.	Case review	Review of 334 Taser-involved deaths between June 2001 and 31 August 2008	Numerous reports of death following Taser use, where mental illness was reported as an underlying condition or contributory factor.	Poor
Bailey et al. (2016) USA	To examine the differences in the use of CEDs (Conducted-Energy Devices) in populations with and without a mental illness.	Case review of two years' data from 2008-2009	Louisville, USA. 238 individuals who has less than lethal weapons used against them by the police.	16.3% of all Tasered people had a history of mental illness (38/233), and those people received significantly more shocks.	Moderate
Bozeman et al. (2009) USA	To determine the safety and injury profile of conducted electrical weapons used against criminal suspects in a field setting.	Case review	Law enforcement agencies that used Tasers	Case study of a person with a history of mental illness, died after struggle and CED discharge, CED use not determined to be causal or contributory to death.	Moderate

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Dymond (2018) UK	To identify factors associated with Taser use.	Case review	All use of force recorded by officers on an internal use of force database between 1 January 2007 and 1 January 2015; 23,556 incidents.	Significant association between mental health, gender and Taser firing, but not between ethnicity and Taser firing. Possession of a weapon increases the risk of Taser firing.	Moderate
Hall et al. (2015) Canada	To understand the relationship between sudden death and subject positioning.	Case review	4828 events in 7 Canadian police agencies between August 2006 and March 2013.	One person that died was assessed by officers on the scene as displaying both drug intoxication and mental distress, had undergone a contact stun exposure with a CEW to the lower body, and who demonstrate features of "excited delirium".	Moderate
Ho et al. (2007) USA	To examine the effect of CEW use on the mentally ill and suicidal population, after an agitated/potentially violent interaction with law enforcement.	Case review	72 months of data from the CEW database (1999-2005).	10608 episodes of CEW use reported. Of these, 2452 were categorized as uses on mentally ill people and of these, 1111 (45.3%) were in situations where lethal force would have been justified or where the person was suicidal and represented an imminent life threat to self.	Moderate
Holman et al. (2018) New Zealand	To describe the nature of police involvement in mental health crises within the Waikato region of New Zealand.	Quantitative descriptive cross sectional survey	96 service users across three sites (Crisis Assessment and Home Treatment team; police liaison hub; rural health centre).	Taser was displayed 8 times (out of 86); 4 to European and 4 to Maori people.	Poor
Home Office (2018) UK	To report incidents of police use of force.	Official report	All recorded police use of force incidents between 1 April 2017 and 31 March 2018; 313,00 incidents.	There were 12,755 reported incidents of Taser use; there was a 'perceived mental disability' in 2,331 cases and a perceived physical and mental disability in 74 cases.	Moderate
IPCC (2014) UK	To review Taser complaints and incidents 2004-2013	Case review	Taser complaints and incidents 2004-2013 - Taser use in incidents referred to IPCC	2004-2007 approximately 17 instances of Taser use due to self-harm / mental health; 2008-2013 approximately 48 instances of Taser use due to self-harm / mental health	Moderate

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IPCC (2016) UK	To develop an understanding of when and how police use force. To consider factors that influence the definitions of reasonable and excessive force.	Mixed methods	General population, people who had experienced the use of force, IPCC stakeholders.	A third of people (10) who had Taser used against them had a mental health concern, and six of them experienced multiple uses.	Moderate
Kroll et al. (2014) USA	To explore cases where a link has been made between the use of electronic control devices (ECD) and cardiac arrest.	Case review	12 published case studies reporting cardiac arrest after ECD application. Taken from a database of worldwide CEW proximate arrest related deaths.	One case study report of a 'violent psychiatric subject' who had a psychotic episode, injured himself, refused medical care and jumped at a police officer. An ECD was deployed to control him.	Moderate
Kroll et al. (2016) USA	To analyse the risks of falls as a result of Taser deployment.	Case review	19 case summaries of forced falls after Taser deployment. Taken from a database of worldwide CEW proximate arrest related deaths.	One report of a mentally ill man on the roof of a building, climbing a ladder to a billboard. CEW deployed and the man fell headfirst onto the sidewalk, missing the airbag placed by rescue teams. He died in hospital.	Moderate
Kroll et al. (2017) USA	To summarise the mechanisms and risks of fires and explosions as a result of Taser deployment.	Case review	10 cases of fatal and non-fatal burns after Taser deployment. Taken from a database of worldwide CEW proximate arrest related deaths.	Report of depressed and actively suicidal man, police called to house where there was a strong odour of natural gas. Suspect resisted officers; CEW deployed, causing the house to explode into flames and the roof to collapse. Suspect died in hospital from serious burns.	Moderate
Little and Burt (2013) UK	To describe use of a Taser on an low secure unit (LSU),	Case study	Description of a single case.	58-year-old man, Tasered by police in seclusion. Man has little memory of incident.	Moderate
Marsh (2018) UK	To report Freedom of Information requests relating to police use of Tasers on people in mental health settings.	Freedom of Information request report	Response from 28 police forces, about half of the total in the UK.	Police used CEWs 96 times on people in mental health settings in one year. Avon and Somerset, and Greater Manchester, reported the greatest use, 18 times each.	Poor



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Michaud (2016) Canada	To re-examine deaths in custody, that were related to restraint.	Case review	Ontario 1988-1995. Verdicts and recommendations from the office of the chief coroner of Ontario.	Case of an individual with a diagnosis of schizophrenia, died after CEW deployment. Most clinical features of excited delirium absent, but blood results suggestive of excited delirium.	Poor
Morabito et al. (2017) USA	To examine how the use of force varies across encounters with individuals affected with behavioural health disorders and those with no apparent behavioural health issues.	Case review	7327 use of force cases between 2008 and 2011. Data from the Portland Police Bureau on the use of force.	A Taser was used least frequently on those with no perceived disorders 266 (12.01%), and most frequently on individuals with comorbid disorders 113 (39.51%). Use on people with mental illness 89 times (29.97%), and substance use 314 times (22.21%).	Good
Munetz et al. (2006) USA	To examine the experience of Taser usage in one police department.	Observational	35 incidents of CEW used documented by CIT officers in the first 18 months of CEW use.	No incident resulted in serious harm to the individuals in crisis or officers. Twenty-seven of the 35 individuals (77%) were judged to have a mental illness.	Moderate
New Zealand Police (2008) New Zealand	To assess the use of Tasers in an operational environment.	Mixed methods evaluation	127 incident reports of Taser use.	Mental health issues were indicated for 27 individuals (21%) involved in Taser incidents.	Moderate
O'Brien and Thom (2014)	To review the literature on the police use of Tasers in mental health emergencies.	Narrative review	n/a	Taser use more likely in response to mental health emergency.	Moderate
O'Brien et al. (2007)	To review the existing literature on the use of Tasers.	Narrative review	Research papers and reports from a series of five databases.	In addition to any traumatising effect of Tasers, their use in mental health emergencies is likely to have a deleterious effect on subsequent engagement with mental healthcare owing to an increased perception of coercion.	Poor
O'Brien et al. (2011) New Zealand	To provide a descriptive analysis of the use of Tasers and to identify incidents that involved mental health emergencies, comparing them to incidents of criminal arrest	Case review	New Zealand Police cases over a period of 1 year.	Tasers were deployed on 141 people; of these 21% involved people in mental health emergencies. Tasers were more than twice as likely to be discharged at mental health emergencies than at criminal arrests	Moderate



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Ordog et al. (1987) USA	To compare injuries between patients shot with a Taser and those shot by police .38 special handguns	Case review	All patients in one ED shot with a Taser between July 1980 and December 1985 (218)	68% of those who had been Tasered were put on 72-hour psychiatric hold; half of them were later released from the ED to go home. 29.7% had a psychiatric admission.	Moderate
Parent (2007) Canada	To conduct an analysis of coroner data surrounding police deadly incidents.	Case review	30 incidents of police use of deadly force. Police personnel in British Columbia	Two incidences of people with a history of mental illness, both Tasered and both subsequently shot and killed.	Moderate
Skeem et al. (2008) USA	To assess the nature of events to which Crisis Intervention Team (CIT) officers were called to respond	Case review	Analysis of 655 after-action reports between March 2003 to May 2005	Taser most common type of force for events posing extreme risk of violence.	Poor
Strote and Hütson (2006) USA	To examine autopsy reports of patients who died after application of a Taser in high-risk interactions.	Case review	Taser related deaths occurring in the United States between January 2001 and January 2005.75 cases of law enforcement Taser related deaths.	Toxicology of people who died after application of Taser: 8.1% antipsychotics, 10.8% antidepressants, 2.7% benzos, 78.3% illegal substances.	Moderate
Strote et al. (2010) USA	To evaluate one police department's experience with CEW use from its inception during a 5-year period.	Case review	Subjects associated with 655 after action reports between March 2003 and May 2005	Characteristics of people experiencing CEW use: 46.8% psychiatric history, 72.9% drug/alcohol history, 93.9% psych or d/a history, 37.4% psych and d/a history.	Moderate
White and Ready (2007) USA	To provide a descriptive investigation of one large metropolitan police agency's use of Taser focusing on use, prevalence and effectiveness.	Case review	243 Taser incidents between 2002 and 2004.	Suspect emotionally disturbed (94.7%); suspect violent toward self (23.1%); suspect intoxicated drugs (7.6%), alcohol (4.7%), both (1.7%).	Good
White and Ready (2009) USA	To examine all media reports of Taser incidents from 2002-2006.	Case review	521 media reports of police use of Taser from 2002 to 2006.	Suspect characteristics: Emotionally disturbed or mentally ill, nonfatal (22.9%), fatal (36.2%).	Good

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White et al. (2012) USA	To enhance understanding of Taser device use in arrest related deaths.	Case review	392 arrest related deaths from media reports, medical examiner (ME) or autopsy reports (2001-2008)	Media reports: suspect described as mentally ill (14.0%).	Poor

Figures

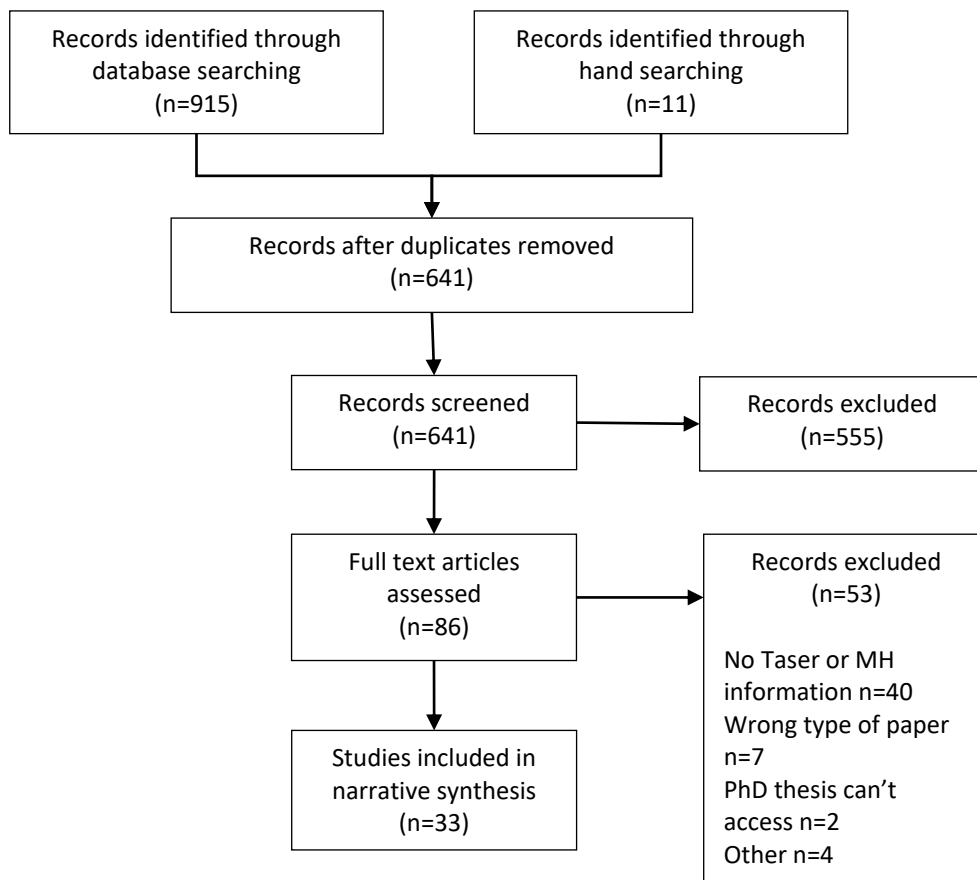


Figure 1 Outcome of literature search

Reference	Rate (95% CI)
IPCC 2014 <sup>1</sup>	35.42 (18.6-52.3)
IPCC 2014 <sup>2</sup>	37.50 (26.9-48.1)
IPCC 2016 <sup>3</sup>	31.25 (11.9-50.6)
IPCC 2016 <sup>4</sup>	51.92 (32.3-71.5)
Dymond 2018	44.49 (36.4-52.5)
Home Office 2018	18.86 (18.1-19.6)
<i>Random Effect UK studies</i>	35.81 (23.8-34.3)
Ho et al 2007	23.11 (22.2-24.0)
White and Ready 2009	22.89 (17.7-28.0)
Strote et al 2010	37.69 (34.1-41.3)
Bailey et al 2016	16.31 (11.1-21.5)
Morabito et al 2017	25.83 (22.3-29.4)
<i>Random Effect US studies</i>	25.02 (19.0-31.5)
NZ Police 2008	21.26 (13.2-29.3)
O'Brien et al. 2011	21.28 (13.7-28.9)
<i>Random Effect Total</i>	28.30 (24.5-34.3)

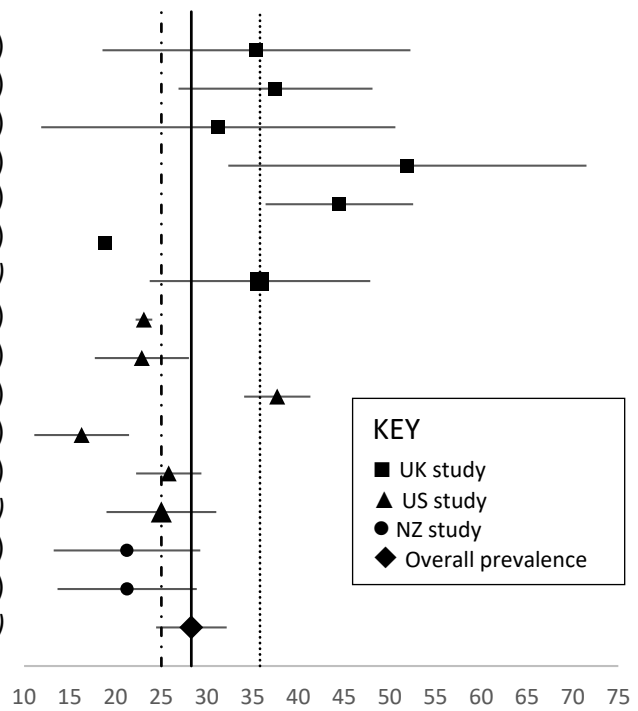


Figure 2. Forest plot of the prevalence of Taser use on people experiencing mental distress

<sup>1</sup>2004-2007; <sup>2</sup>2007-2013; <sup>3</sup>2009/10-2013/14; <sup>4</sup>April 2014-July 2014