This thesis has been submitted in fulfilment of the requirements for a postgraduate degree (e.g. PhD, MPhil, DClinPsychol) at the University of Edinburgh. Please note the following terms and conditions of use:

This work is protected by copyright and other intellectual property rights, which are retained by the thesis author, unless otherwise stated.

A copy can be downloaded for personal non-commercial research or study, without prior permission or charge.

This thesis cannot be reproduced or quoted extensively from without first obtaining permission in writing from the author.

The content must not be changed in any way or sold commercially in any format or medium without the form permission of the author.

When referring to this work, full bibliographic details including the author, title, awarding institution and date of the thesis must be given.
Childhood maltreatment and the risk of institutional violence in forensic settings: A systematic review

&

The relationship between adverse childhood experiences, violence, empathy and psychosis within forensic settings

Leanne Banks

Doctorate in Clinical Psychology

University of Edinburgh

September 2021
Acknowledgements

I would first like to acknowledge my supervisor’s Dr Suzanne O’Rourke and Professor Gary Macpherson for all of their guidance and support throughout this project. It would not have been possible without them. I would also like to acknowledge each of the site contacts for taking the time out their already busy jobs to support me in what was undoubtedly a difficult to navigate multi-site study. Additionally, the support from risk departments, research and development departments and a multitude of other NHS staff was instrumental in the completion of this doctoral thesis. Thank you all.

To my friend Natalie, thank you for being a rock over the past four years. The course and my life would not have been the same had we not crossed paths again.

Lastly, I would like to dedicate this thesis to family, thank you for your unwavering support throughout the doctoral programme and my life. I have seen the sacrifices you have all made for me to get here and there are no words that can express the gratitude that I feel about having you all in my life. Andrew and Evie, you are everything to me, and I would be nothing without you both.
# Table of Contents

Thesis Portfolio Abstract...........................................................................................................................................4

**Systematic Review**

Title........................................................................................................................................................................5
Abstract.....................................................................................................................................................................6
Introduction...............................................................................................................................................................7
Methods..................................................................................................................................................................11
Results....................................................................................................................................................................14
Discussion...............................................................................................................................................................32
Limitations..............................................................................................................................................................37
Clinical Implications...............................................................................................................................................38
Future Research.......................................................................................................................................................38
Conclusion...............................................................................................................................................................39
References...............................................................................................................................................................41
Appendix A: Instructions for Authors from Child Maltreatment.................................................................56

**Empirical Project**

Title........................................................................................................................................................................57
Abstract.....................................................................................................................................................................58
Introduction...............................................................................................................................................................59
Methods..................................................................................................................................................................67
Results....................................................................................................................................................................74
Discussion...............................................................................................................................................................89
Limitations..............................................................................................................................................................94
Clinical Implications...............................................................................................................................................96
Future Research.......................................................................................................................................................97
Conclusion...............................................................................................................................................................97
References...............................................................................................................................................................99
Appendix 1. Instructions for Authors from the International Journal of Forensic Mental Health..........................121
Appendices 2-12. Ethical Approval Letters.........................................................................................................126 - 157
Appendix 13. Full List of Diagnostic Criteria ......................................................................................................158
Thesis Portfolio Abstract

Background: The experience of childhood trauma has been linked with several negative health and behavioural outcomes, one of which is the perpetration of violence. Despite high levels of violence within forensic inpatient services, research within this population is limited. This thesis portfolio aimed to add to the evidence base in this area by conducting a systematic review of the literature exploring the experience of childhood maltreatment as a risk factor for perpetration of institutional violence in forensic settings. Relatedly, a research project was conducted exploring the relationship between adverse childhood experiences (ACEs) and violence whilst examining empathy and symptoms of psychosis as potential mediating factors.

Method: A systematic review of studies investigating the relationship between childhood maltreatment and institutional violence in forensic settings was carried out. Comprehensive searches were carried out of relevant databases. Using pre-defined inclusion and exclusion criteria 10 studies were selected for review and quality assessment and relevant data extracted and synthesised. In the empirical project case-note and database searches were utilised to extract data for N = 343 participants across 10 sites in the Scottish Forensic Network to examine if total ACE score and each of the six included ACE categories predicted inpatient violence whilst controlling for potential covariates. Subsample analyses were conducted to explore positive symptoms, insight, and empathy as potential mediators. Data relating to violent incidents were extracted pseudo-prospectively via the NHS DATIX system.

Results: The systematic review found four studies which demonstrated an increased risk of institutional violence following exposure to childhood maltreatment and six studies which did not find this. Studies conducted in prisons were more likely to demonstrate an association than those in forensic mental health settings. There were significant methodological limitations across studies; including smaller sample sizes in some studies which did not demonstrate a positive relationship. Findings of the empirical project demonstrated high rates of ACEs within forensic mental health populations and indicated a significant association between total ACE score and both, any violence and verbal aggression. Total ACE score was found to be significantly associated with an increase in verbal aggression and history of sexual abuse was significantly associated with an increase in violence. Previously completed psychological interventions were associated with a decrease in violence and verbal aggression. Positive symptoms, insight and empathy did not mediate the relationship between ACEs and violence but did predict all types of violence.

Discussion: Both the systematic review and the empirical project highlight extremely high rates of childhood trauma experienced by individuals within the forensic mental health system, reinforcing the importance of trauma-informed services. Findings of the systematic review partially support the hypothesis that childhood maltreatment increases the risk of institutional violence perpetration although any potential to draw definitive conclusions is limited by methodological issues and further high-quality research would be of benefit. Similarly, findings from the empirical project partially support the hypothesis that ACEs predict increased violence and indicate a predictive relationship between empathy, positive symptoms of psychosis, insight and all types of violence. Consideration of these key variables in treatment is key in reducing the likelihood of violence perpetration within forensic inpatient services. Limitations of both papers are discussed and recommendations for future research provided.

Total word count: 19,281
Childhood maltreatment and the risk of institutional violence in forensic settings: A systematic review

Leanne Banks¹; Dr Suzanne O’Rourke¹,²; Professor Gary Macpherson²

¹School of Health in Social Science, University of Edinburgh, Doorway 6, Old Medical Building, Teviot Place, Edinburgh, Scotland, United Kingdom, EH8 9AG.

²Psychology Department, The State Hospital, Carstairs, Lanarkshire, ML11 8RP.
Abstract

Objectives: The experience of childhood maltreatment has been linked with several negative health and behavioural outcomes, one of which is the perpetration of violence. We sought to systematically review the literature relating to childhood maltreatment and institutional violence in forensic settings.

Methods: Database searches were carried out using pre-defined inclusion and inclusion criteria and 10 studies were selected for review and quality assessment.

Results: Four studies indicated an increased risk of institutional violence following exposure to childhood maltreatment and 6 studies did not find this. Studies conducted in prisons were more likely to demonstrate an association than those in forensic mental health settings. There were significant methodological limitations across studies; including smaller sample sizes in some studies which did not demonstrate a positive relationship. Lack of inclusion of confounding factors and problems with measurement of variables were the most prevalent methodological limitations.

Discussion: Findings partially support the hypothesis although any potential to draw definitive conclusions is limited by methodological issues and observed effect sizes were small. There appear to be differences in the impact of childhood maltreatment between forensic mental health and prison settings.

Keywords: Childhood maltreatment, institutional violence, forensic, aggression
Introduction

The reported prevalence of childhood trauma is a major public health problem contributing significantly to the global disease burden (World Health Organisation, 2020). It is estimated that one in eight adults report experience of sexual abuse in childhood and one in four have experienced physical abuse before the age of eighteen (Sara & Lappin, 2017). In a survey of UK adults, the most common childhood experiences of adversity are that of witnessing domestic violence (9.8%), neglect/emotional abuse (9.3%), physical abuse (7.6%), and sexual abuse (7.5%) (ONS, 2019). An increase in the reporting of these experiences has led to more awareness of the need to be ‘trauma-informed’ within healthcare services to meet the individual needs of service users (Cleary et al., 2020; Hamberger, Barry & Franco, 2019; Sweeney et al., 2016; Sweeney et al., 2018; Tomaz & Castro-Vale, 2020). This shift has resulted in a significant increase in trauma research and trauma-informed service delivery over recent years that has significantly improved knowledge and understanding relating to the impact of traumatic experiences on an individual’s functioning and the physiological and psychological consequences of trauma. Despite this, the forensic population have remained relatively neglected and the evidence base continues to be lacking. This means less is known about the impact and subsequent consequences of experiencing childhood maltreatment within this group (Stinson, Quinn & Levenson, 2016).

The cycle of violence

Maltreatment during childhood is associated with a number of negative health and lifestyle outcomes such as: the development of mental health disorders including depression (Mandelli, Petrelli, & Serretti, 2015) and psychosis (Stanton et al., 2020), the development of chronic physical health problems (Heim et al., 2009; Irish, Kobayashi, & Delahanty, 2010), obesity (Gunstad et al, 2006), marital difficulties (DiLillo, 2009) and risk of suicide (Dube et al, 2001). Individuals who have experienced childhood maltreatment are also more likely to spend time in prison than those who have not (Roos et al., 2016). This relationship between childhood trauma and offending and more specifically the relationship between the
experience of trauma in childhood and the later perpetration of violence has been a somewhat contentious topic, with some disagreement in the literature. The ‘cycle of violence’ suggests that individuals who had been subject to abuse during their childhood are at an increased risk of perpetrating violence later in their lives (Widom, 1989). This may be considered in relation to social learning theory and use of violence learned from observing a caregiver’s violent acts (Dodge, Bates & Pettit, 1990), and by attachment theory suggesting that violence may result from insecure attachment styles and maladaptive coping (Mitchell & Beech, 2011). There is significant empirical support for the ‘cycle of violence’, including several well conducted longitudinal studies such as that by Mersky and Reynolds (2007) who found that maltreated children demonstrated higher rates of violent delinquency than non-maltreated children when controlling for known correlates of violence and maltreatment. Similar findings are evident across the literature (Bevilacqua et al., 2012; Fagan, 2005, Smith et al., 2005; Widom, 1989; although not universal (Derzon, 2010; Eriksson & Mazerolle, 2015) making it difficult to draw definitive conclusions. A recent meta-analytic review of prospective studies found a moderate increase in risk of violence in individuals with a history of childhood maltreatment (Fitton, Yu & Fazel, 2020), although it is important to note that their definition of violence was limited and excluded incidents of aggression. Other reviews have been conducted exploring offending more generally and its relationship with childhood trauma, however findings have indicated significant variability in relation to methodological issues (Malvaso et al., 2018). Another important point to note is that it is clear the majority of individuals who have experienced traumatic events during their childhood do not go on to engage in violence and there appears to be groups of individuals who are resilient to the negative outcomes associated with childhood trauma (DuMont, Widom & Czaja, 2007); therefore exploring the mechanisms that underpin the relationship and additional factors which increase the risk of perpetration of violence is integral to manage and minimise risk.
Forensic Populations

The Forensic Mental Health (FMH) and prison populations, although different from one another, have significant overlap in the complexity of presentations found in service users with high prevalence of both mental illness and violence (Livingston et al., 2012; Lloyd et al., 2007). Violence within these settings is complex and multi-faceted and contributing factors to its perpetration appear to be even more varied than in non-forensic populations (Dickens, Piccirillo, & Alderman, 2013). Incidents of institutional violence in these settings have been found to be relatively common. In 2019, 15% of all NHS staff experienced physical violence from members of the public (BMA, 2020). Recent research indicates that these rates are highest in mental health settings with over 55% of mental health staff having been exposed to physical violence at work (Niu et al., 2019). Incidents such as this have been found to have a negative impact on staff wellbeing (Woodrow & Guest, 2012) and patient care (Arnetz & Arnetz, 2001), as well as contributing to high staff turnover and absences (Lanctot & Guay, 2014).

There is strong evidence to suggest the prevalence of childhood trauma and maltreatment is significantly higher within Forensic Mental Health (FMH) and prison settings than in the general population (Stinson, Quinn & Levenson, 2016; Stensrud, Gilbride & Bruinekool, 2019). Austin (2011) found that 14% of forensic mental health patients endorsed at least one domain of traumatic experience in childhood, 20% endorsed two domains, 7% endorsed three domains, 11% endorsed four domains and 23% endorsed five domains. Similar rates have been found in other studies which have suggested that 75-78% of forensic mental health patients and 75% percent of prisoners have experienced at least one type of trauma during childhood (McKenna, Jackson & Browne, 2019; Timmerman & Emmelkamp, 2001), although slight variations in the definitions of childhood trauma used may influence comparability. The experience of childhood maltreatment has been linked to difficulties in treatment adherence and engagement which has repercussions on individual recovery and rehabilitation (Lecomte et al., 2008). However, there are also factors which vary within the
forensic system which are important to consider such as the proportion of individuals who have previously experienced, or are currently experiencing, symptoms of psychosis (Karatzias et al., 2019). Although rates of psychosis in the prison and FMH systems vary, there is evidence to suggest that there are high levels of psychosis present in both (Franke et al., 2019; Otte et al., 2017) and that these rates are significantly higher than in the general population (Brugha et al., 2005). Evidence suggests a significant association between childhood maltreatment and the development of psychosis (Varese et al, 2012) and there is some evidence of a causal relationship in which the experience of childhood trauma leads to the development of psychosis (Read et al., 2014). Additionally, the relationship between psychosis and violence is complex and widely debated in the literature. Meta-analyses have demonstrated an elevated risk of perpetration of violence in individuals with a diagnosis of schizophrenia (Fazel et al., 2009), and the findings of others have indicated that positive symptoms of psychosis increase the risk of violence whilst negative symptoms reduced the risk (Swanson et al., 2006; Witt et al., 2013). It is important to note that most individuals who experience, or have experienced, symptoms of psychosis will not display violent behaviours (Witt, Van Dorm & Fazel, 2013), and full exploration of the underlying mechanisms and additional factors is integral in identifying and minimising risk without contributing to the already significant stigma experienced by individuals who have experienced psychosis.

Due to the variable rates of individuals experiencing psychosis in prison and FMH settings, and the complexity of the relationship between psychosis and violence, it may be that there are significant differences in the relationship between childhood maltreatment and violence between the settings, therefore it is important to consider findings from both prison and FMH populations independently.

There are many factors related to forensic settings which may influence the relationship between childhood maltreatment and institutional violence. Restrictions on liberty and freedom are likely to result in reduced contact with support systems and reduced access to alternative coping strategies. Additionally, contact with specially trained and highly skilled
staff and trauma informed services may contribute to differences in the relationship between childhood maltreatment and perpetration of violence whilst in forensic settings. Therefore, independent exploration within this population would be of benefit. There are currently no published systematic reviews exploring the relationship between childhood maltreatment and the perpetration of institutional violence in forensic populations.

**Aims of this systematic review**

This review aims to identify research studies relating to childhood maltreatment and institutional violence in forensic settings, synthesise the findings and assess quality. The review will seek to examine whether the experience of maltreatment during childhood increases the risk of perpetrating institutional violence in adulthood. Building on previous reviews a range of traumatic experiences will be included such as: physical, sexual, and emotional abuse, neglect and witnessing domestic violence (Fitton, Vu & Fazel, 2018).

**Methods**

**Literature search strategy**

Literature searches were conducted in January 2021 on the following electronic databases: Cochrane Library, Embase, MedLine, CINAHL, PsycInfo and ProQuest Theses and Dissertation to identify published peer reviewed articles and grey literature. There were no limitations on publishing date. The following search terms were used: trauma* OR "child* advers*" OR "advers* child*" OR posttrauma* AND violen* OR aggress* OR assault* AND forensic* OR correction* OR inmate* OR prison* OR criminal* OR offend* OR jail* OR "forensic psychiatry" OR “forensic psychiatrist” OR “forensic psychology” OR “forensic psychologist” OR “forensic mental health” OR "high secure" OR "medium secure" OR "low secure" OR "mentally disordered offender" OR "secure hospital" OR secure OR “forensic psychiatric patient” OR “forensic psychiatric inpatient” OR “forensic patient” OR “forensic inpatient” OR forensic OR detained. Additional papers were identified by searching reference lists of studies which met the inclusion criteria.
Inclusion criteria

All observational studies investigating the relationship between childhood maltreatment and institutional violence within adult forensic populations were eligible for inclusion. Forensic settings included FMH hospitals (low, medium, and high securities) and prisons of all levels of security. Childhood maltreatment was defined as emotional, physical, or sexual abuse, neglect or witnessing domestic violence prior to the age of 18 (Fitton, Yu & Fazel, 2020). Institutional violence was defined as “the actual, attempted or threatened infliction of bodily harm on another person” whilst in an institutional setting (Douglas et al., 2013). Studies which also included sample groups and/or additional variables out with these criteria were considered for inclusion if they conducted separate analyses allowing for extraction of relevant data. Unpublished dissertations or theses were eligible for inclusion. Studies must have conducted analyses aiming to explore the relationship between childhood maltreatment and institutional violence, however there was no restriction on the form of this analysis.

Exclusion criteria

Studies not written in English, intervention and cases studies were excluded. Studies which considered only self-directed violence were excluded, as were those only sampling individuals with intellectual disabilities or children and adolescents. Qualitative studies, conference proceedings, book chapters and reviews were also excluded.

Search and selection strategy

Results of all searches were screened, and 2,563 duplicates removed. 6,112 titles and abstracts of remaining articles were reviewed and screened for relevance to the research question, with 5,969 irrelevant articles being excluded at this stage. Two articles were obtained through searching of reference lists. Full texts were then obtained of all 145 remaining articles. Each article was reviewed in full and those ten which met inclusion criteria were included. The resulting numbers of papers at each stage are represented in
Figure 1 as set out in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

**Figure 1. Search and Selection Strategy**

Records identified from database searching (n = 8675) → Duplicate records removed (n = 2563)

Records identified from other sources (n = 2) → Records excluded (n = 5969)

Records screened (n = 6112) → Records excluded:
- No measurement of institutional violence (n = 83)
- No measurement of childhood trauma (n = 19)
- Non forensic setting (n = 14)
- Case study (n = 5)
- Did not explore relationship of interest = (n = 10)
- Multiple papers using same dataset condensed/excluded = (n = 4)

Reports assessed for eligibility (n = 145) → Studies included in review (n = 10)
Risk of bias and quality assessment

Joanna Briggs Critical Appraisal tools for cross-sectional and cohort designs were used to assess methodological quality (Moola et al., 2017). These critical appraisal tools were created by the Joanna Briggs Research Institute and have been subject to peer approval. The Cohort tool rates studies across eleven items: comparability of groups, consistency of measurement across groups, measurement of exposure validity, confounding factor identification, confounding factor management, temporal sequence of exposure, group measurement of outcomes, follow up length, follow up completion, incomplete follow up management, statistical analysis. The cross-sectional tool rates studies across eight items: inclusion criteria, subject and setting description, measurement of exposure, group allocation, confounding variable identification, confounding variable management, measurement of outcomes, and statistical analysis. Each item is scored Yes, No, or Not Applicable/Unclear/Partial. These tools have been widely used and referenced throughout the literature and are suggested as being clear and accessible for use in assessing study quality (Quigley et al., 2019).

All papers were rated by two independent raters, blind to each other’s ratings. Inter-rater reliability was good with over 80% agreement and no variation of more than one point on all other items. All disagreements were resolved by discussing until reaching consensus.

Results

Excluded studies

During full text review, studies were examined against the inclusion and exclusion criteria and all applicable were excluded. In keeping with recommended guidelines, studies which met inclusion criteria were examined to identify any potential overlap between datasets and to ensure multiple reports derived from the same studies were collated to reduce bias (Lefebvre et al., 2021). Attempts were made to contact relevant authors to obtain
confirmation of overlap in datasets, although these were unsuccessful. Table 1 provides an overview of studies identified and inclusion/exclusion justification.

### Table 1. Summary of studies utilising the same datasets

<table>
<thead>
<tr>
<th>Study</th>
<th>Action</th>
<th>Inclusion/Exclusion decision and justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jackson et al, 2017</td>
<td>Explored methods in detail. Identical participant numbers, mean age and some overlap in authorship with Komarovskaya (2009).</td>
<td>Included based on being the only peer reviewed paper using this dataset and the most recent.</td>
</tr>
<tr>
<td>Gorodetsky et al, 2014</td>
<td>Explored methodology in detail. Contacted author to request further information.</td>
<td>Included due to largest sample size and most recent study using this dataset as recommended in guidelines (Cochrane Handbook, 2021).</td>
</tr>
</tbody>
</table>

**Characteristics of included studies**

A total of 7020 participants were included from 10 studies published between 1999 and 2019 with sample sizes ranging from 50 to 5154 (Table 2). This included 6453 males and 567 females with a mean age of 36.97 (range 17-81). Included studies were conducted in a range of countries including five from the United States, two from Canada, and one each from the United Kingdom, Italy, and the Netherlands. Five studies were cross-sectional in design and five employed a cohort design. Studies recruited across a range of forensic settings including high secure mental health hospitals (Macinnes et al., 2016), forensic mental health hospitals with no specified security level (Beck et al., 2017; Campbell, 1999; De Vogel and Ruiter, 2006; Green et al., 2016; Hoptman et al., 1999) and prisons.
(Gorodetsky et al., 2014; Hilton, Ham & Green, 2019; Jackson et al., 2017; Martin et al., 2015). One study was an unpublished doctoral thesis (Campbell, 1999). One study included only females and five studies included only men. Characteristics of included studies are shown in Table 2.
### Table 2.

*Summary of Included Studies*

<table>
<thead>
<tr>
<th>Study number, Authors and year</th>
<th>Country</th>
<th>Setting</th>
<th>Sample</th>
<th>Childhood Maltreatment Measure</th>
<th>Violence Measure</th>
<th>Mean Age (SD)</th>
<th>Relevant Findings</th>
<th>Additional Variables Controlled for in Analysis</th>
<th>Effect size</th>
<th>Prevalence of Childhood trauma</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, Beck et al., 2017</td>
<td>United States</td>
<td>Inpatient FMH – no security level defined</td>
<td>N=86 All female</td>
<td>Childhood physical and sexual abuse - identified through case file review using check list</td>
<td>Aggression – incidents (low, medium, and high groups)</td>
<td>M=33.5 (SD=10.46)</td>
<td>Kruskal-Wallis test of CT variable failed to reach significance (p = .142).</td>
<td></td>
<td>N/A</td>
<td>SA - 78% high, 47% medium, 51% low, PA - 56% high, 3% medium, 45% low</td>
</tr>
<tr>
<td>2, Bevilacqua et al., 2012</td>
<td>Italy</td>
<td>Prison – high and low security</td>
<td>N=583 All male</td>
<td>CTQ</td>
<td>Violent incidents</td>
<td>M=40.6 (SD=11)</td>
<td>Those who had experienced childhood trauma were more likely to act violently in jail ($\chi^2 = 7.9, P = .005**$) compared with those who had no history of abuse and/or neglect. There was a main effect of the CTQ total score on violent behaviour, and the strongest signal came from exposure to PA.</td>
<td>FKB5 diplotypes, age, and axis I diagnosis</td>
<td>r = .186</td>
<td>PN - 47% EN - 24% PA - 23% SA - 21% EA – 16%</td>
</tr>
<tr>
<td>Gorodetsky et al., 2014</td>
<td></td>
<td></td>
<td>N=693 All male</td>
<td></td>
<td>Violent behaviour (M = 44.1, SD = 16.2) vs. none: CTQ (M= 38.6, SD = 12.6; F(1,690) = 20.9, p &lt; .0001***.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Country</td>
<td>Setting</td>
<td>N</td>
<td>Sex</td>
<td>Childhood Abuse</td>
<td>Aggression</td>
<td>Aggression During Hospitalisation</td>
<td>Predictor Variables</td>
<td>ES</td>
<td>Effect Size Calculation</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------</td>
<td>------------------------------</td>
<td>---</td>
<td>-----</td>
<td>-----------------</td>
<td>------------</td>
<td>----------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Sarchiapone et al., 2009</td>
<td>United States</td>
<td>Inpatient FMH - no security level defined</td>
<td>540</td>
<td>Male</td>
<td></td>
<td>M = 40.03 (SD = 10.36)</td>
<td>The CTQ had a significant main effect in the logistic regression model (p &lt; .001***). Higher CTQ total scores were significantly and independently related to violent behaviour in prison.</td>
<td>N/A</td>
<td>No data available to calculate ES</td>
<td></td>
</tr>
<tr>
<td>3, Campbell, 1999</td>
<td>United States</td>
<td>Inpatient FMH - no security level defined</td>
<td>50</td>
<td>Male</td>
<td>Childhood abuse (verbal, physical and sexual) as assessed via interview</td>
<td>M = 33 SD = unavailable</td>
<td>Aggression during hospitalisation showed no significant relationship to the childhood abuse variables.</td>
<td>N/A</td>
<td>No data available to calculate ES</td>
<td></td>
</tr>
<tr>
<td>4, De Vogel and Ruiter, 2006</td>
<td>Netherlands</td>
<td>Inpatient FMH - no security level defined</td>
<td>127</td>
<td>Male</td>
<td>H8 factor on HCR20</td>
<td>M = 32.9 (SD = 9.6)</td>
<td>In the final model, HCR20 item 2 (Young age at first violent incident) 15 (unresponsive to treatment) and 17 (exposure to destabilisers) were significant predictors of incidents of physical violence. Item 8 (traumatic experiences) was not significant.</td>
<td>N/A</td>
<td>r = .11 Data not available</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Country</td>
<td>Setting</td>
<td>Sample Size</td>
<td>Reference</td>
<td>Description</td>
<td>n</td>
<td>Methodology</td>
<td>Findings</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>---------</td>
<td>---------</td>
<td>-------------</td>
<td>-----------</td>
<td>-------------</td>
<td>---</td>
<td>-------------</td>
<td>----------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>5, Green et al., 2016</td>
<td>United States</td>
<td>Inpatient FMH - no security level defined</td>
<td>N=124 F=24 M=100</td>
<td>United States Inpatient FMH - no security level defined</td>
<td></td>
<td>H8 factor on HCR20</td>
<td>Violent incidents – measured via case note review using the SOS</td>
<td>Females scored significantly higher than men with regards to Problems in Relationships (H3) and Problems with traumatic experiences (H8). H8 not significantly associated with violent outcome for males (p = .16) or females (p = .29).</td>
<td>Each of the HCR-20 V3 scales, and gender. No data available to calculate ES</td>
<td>H8 presence for females = 83.3% Data not available for males or whole sample</td>
</tr>
<tr>
<td>6, Hilton, Ham &amp; Green, 2019</td>
<td>Canada</td>
<td>Prison</td>
<td>N=273 All male</td>
<td></td>
<td></td>
<td></td>
<td>Higher ACE scores were associated with more criminal propensity on all measures except institutional assaults (p = .106) No association with ACEs was found among IPV offenders for assaults, F(1, 42) = 2.41, r(43) = .23, p = .128.</td>
<td></td>
<td>N/A</td>
<td>r = .03 Data not available</td>
</tr>
<tr>
<td>7, Hoptman et al., 1999</td>
<td>United States</td>
<td>Inpatient FMH - no security level defined</td>
<td>N=183 All male</td>
<td></td>
<td></td>
<td>Number of violent incidents recorded by staff over 12 week follow up using the &quot;Aggressiv e and</td>
<td>Patients predicted to be assaultive had higher rates of childhood physical abuse compared with those who were not. The two groups did not differ in variables related to the family</td>
<td></td>
<td>N/A</td>
<td>r = .15 PA=44.8%</td>
</tr>
<tr>
<td>Study</td>
<td>Location</td>
<td>Setting</td>
<td>N</td>
<td>Sex</td>
<td>Minority</td>
<td>Age</td>
<td>Incarceration</td>
<td>Demographic Variables</td>
<td>Model</td>
<td>Effect Size</td>
</tr>
<tr>
<td>-------</td>
<td>----------</td>
<td>---------</td>
<td>---</td>
<td>-----</td>
<td>----------</td>
<td>-----</td>
<td>--------------</td>
<td>-----------------------</td>
<td>-------</td>
<td>-------------</td>
</tr>
<tr>
<td>8, Jackson et al., 2017</td>
<td>United States</td>
<td>Prison</td>
<td>266</td>
<td>141 (Female)</td>
<td>125 (Male)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Agitated Behaviours instrument. rearing environment, or history of childhood sexual abuse or neglect.
<table>
<thead>
<tr>
<th>Study (year)</th>
<th>Location</th>
<th>Setting</th>
<th>Sample Size</th>
<th>CTQ</th>
<th>Verbal and Physical Aggression - DATIX</th>
<th>Number of Years Since First Contact with Mental Health Services</th>
<th>Number of Years Since Participants' First Contact with Mental Health Services, and the Preoccupied Attachment RSQ Category Scores</th>
<th>Effect Size/Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>9, MacInnes et al., 2016.</td>
<td>United Kingdom</td>
<td>High secure FMH</td>
<td>N=64 F=2 M=62</td>
<td>CTQ</td>
<td>M=42.3 (SD=11.9)</td>
<td>Number of years since first contact with mental health services significantly predicted the classification into the hospital violence group (DATIX), OR = 1.06, Wald = 4.07, p = 0.041*. Preoccupied attachment was a significant predictor of hospital violence, OR = 1.74, Wald = 4.70, p = 0.037*. Childhood trauma as measured by the CTQ total was not a significant predictor.</td>
<td></td>
<td>r = .003</td>
</tr>
<tr>
<td>10, Martin et al, 2015</td>
<td>Canada</td>
<td>Prison</td>
<td>N=515 F=314 M=484</td>
<td>Childhood trauma - measured by Offender Intake Assessment - victim of child abuse or witnessed family violence during childhood</td>
<td>Violent incidents in prison - data retrieved from the Offender Management System</td>
<td>M=34.9 (SD=11.8)</td>
<td>After accounting for distress, substance abuse, and youth criminal charges, individuals with trauma had a small but significantly increased risk of violence (RR = 1.38, 95% CI [1.07, 1.78]). Distress, substance abuse, and youth criminal charges.</td>
<td>RR=1.76</td>
</tr>
</tbody>
</table>

Key: FMH – Forensic Mental Health, CTQ – Childhood Trauma Questionnaire, CTS – Conflict Tactic Scale, THQ – The Trauma History Questionnaire, PVI – Prison Violence Inventory, SOS – START Outcome Scale, SA – Sexual abuse, PA – Physical abuse, EA – Emotional abuse, PN – Physical neglect, EN – Emotional neglect, CT – Childhood trauma. ES=Effect Size, M=Mean, SD=Standard Deviation, OR=odds ratio, RR=risk ratio, d=Cohen’s d (standardised mean difference effect size) r=correlation coefficient effect size. Effect size interpretations are in line with those suggested by Cohen (1988) whereby 0.1 = small, 0.3 = medium, 0.5 = large.

*=significant at the 0.05 level, **=significant at the 0.01 level, ***=significant at the 0.001 level
**Study designs**

All included studies were observational, with most studies employing retrospective cohort or cross-sectional designs (Beck et al., 2017; Campbell, 1999; Gorodetsky et al., 2014; Green et al., 2016; Jackson et al., 2017; MacInnes et al., 2016; Martin et al., 2015) in which data relating to childhood maltreatment and violence were measured at a historical time point and collected retrospectively for the purposes of research. This methodology is widely used but is likely to have introduced information bias related to retrospective recall and/or potential missing information in case notes. Steps were taken to reduce bias in some studies by using blinded/independent raters (Beck et al., 2017) and using multiple sources of data (Green et al., 2016; MacInnes et al., 2016), however this is unlikely to have been sufficient to overcome the bias introduced by utilising this study design and other studies failed to introduce these measures and were flawed in their design.

Three studies employed a retrospective prospective cohort design in which childhood maltreatment was measured and then a follow up period utilised to measure any occurrence of violence over this period. This methodology is less vulnerable to bias and therefore preferable in observational studies. All three studies employed case-note reviews to obtain information relating to childhood maltreatment, which as previously discussed, is likely to introduce some bias. Methods to reduce this were employed by De Vogel and Ruiter (2006) in utilising multiple independent raters and Hoptman (1999) who also used additional sources of data.

A proportion of studies included in this review were not designed for the purposes of directly examining the relationship between childhood maltreatment and institutional violence, and instead included measurements of institutional violence as part of a wider battery of violence measurements or traumatic childhood experiences as part of wider studies exploring multiple variables. This meant that details relating to the definition, measurement and/or analysis of the variables of interest were not always available and that study designs were not always the most appropriate for exploration of the relationship of interest.
Definitions

The included papers varied significantly regarding how clearly or well-defined childhood maltreatment and institutional violence were. One study provided no clear definition of either variable (Beck et al., 2017), however the majority were lacking in their definition of childhood maltreatment (DeVogel & Ruiter, 2006; Green et al., 2016; Gorodetsky et al., 2014; Hoptman, 1999; Jackson et al., 2017). Some of these studies provided detailed information relating to their measurement of childhood maltreatment (Hoptman, 1999; Jackson et al., 2017; MacInnes et al., 2016) which allowed deduction of the definition used, however best practice would be to provide definitions linked to the theoretical rationale. One study by Hilton, Ham and Green (2019) used the definition of adverse childhood experiences (ACES) which differs from a more general 'childhood trauma' definition in that it includes factors which may not be experienced as traumatic. This study was retained due to its inclusion of childhood maltreatment experiences within the ACEs construct (Dye, 2018; Merrick et al., 2017). However, when considering the findings of this study, it was essential to reflect on the potential impact of the childhood adversity variables which were not explored in other included studies to determine if these varied significantly.

Definitions of institutional violence were more common within the papers with only one study failing to provide a clear definition (MacInnes et al., 2016). However, significant variation across the definitions and constructs was still evident. Studies conducted by DeVogel and Ruiter (2006) and Green et al (2016) used the widely accepted definition of: “actual, attempted, or threatened infliction of bodily harm of another person” by Douglas et al (2013). This definition was like that cited by Martin et al (2015), however a few other studies excluded verbal aggression (Gorodetsky et al., 2014; Hoptman, 1999; Jackson et al., 2017) and one study included self-directed aggression as well as aggression towards others (Campbell, 1999) introducing significant variation between the constructs being measured.
Childhood maltreatment measurement

In addition to a lack of clear definition in many studies relating to the construct of childhood maltreatment, the measurement of this item was indicated by the quality assessment as an area of relative weakness. Eight studies received a rating of ‘Unclear’ or ‘Partial’ on this item (Beck et al., 2017; Campbell, 1999; De Vogel and Ruiter, 2006; Green et al., 2016; Hilton, Ham & Green, 2019; Hoptman et al., 1999; Jackson et al., 2017; Martin et al., 2015). A large proportion of these were rated partial based on their use of a self-report measure in the absence of additional data sources (Campbell, 1999; Gorodesky et al., 2014; Hoptman, 1999; Jackson et al., 2017; MacInnes et al., 2016). Other studies relied on case-note reviews to obtain childhood maltreatment measurement (Beck et al, 2017; DeVogel & Ruiter, 2006; Green et al., 2016; Hilton, Ham & Green, 2019; Martin et al., 2015). Both self-report and case-note reviews have limitations methodologically. There is some evidence of poor reliability of retrospective reports of childhood trauma (Everson et al., 2008). The ability to recall may be negatively impacted by temporal recall and forgetting (Piolino et al., 2002), or difficulty associated with disclosing traumatic experiences (Bedard-Gilligan et al., 2012) which may be further reinforced in forensic settings where services may have difficulty in implementing ‘trauma-informed’ practices (Miller & Najavits, 2012). Under-reporting may lead to an underestimation of rates of traumatic experiences within these services and introduce further bias into those studies employing only self-report methods. Studies relying on case-note reviews are likely to be exposed to similar bias due to the likelihood of large proportions of case-note information being obtained through self-report. Case-notes which include multiple sources of data including clinician reports, police reports, childhood social work reports and third-party information may help mitigate this; however, unfortunately some included studies which used case-note reviews did not sufficiently report their methods for data collection including definitions for the childhood maltreatment construct (Beck et al., 2017; Martin et al., 2015).
Two included studies utilised the HCR20’s (Douglas et al, 2013) ‘Traumatic Experiences’ (H8) factor as the only measurement of childhood maltreatment in the studies (Green et al., 2016; DeVogel & Ruiter, 2006). Although the HCR20 itself is validated and has significant evidence for its use as a structured professional judgement violence risk assessment tool, this factor is clinician rated and was not designed to be used independently as a measure of traumatic childhood experiences and the primary aim of these studies was not focused on exploring this relationship. However, there is a wealth of research exploring the HCR 20 and H8 has been demonstrated to have good-excellent inter-rater reliability for presence and relevance ratings (Douglas & Belfrage, 2014; Telles, Folino & Taborda, 2009). It is important to consider the validity of the use of H8 as a measure for childhood maltreatment and interesting to note that both studies employing this method found that it did not predict institutional violence.

*Institutional violence measurement*

Similarly, measurement of outcome was found to be an area of weakness across many studies. Five studies scored ‘Partial’ or ‘Unclear’ on this item (De Vogel & Ruiter, 2006; Gorodetsky et al., 2014; Hilton, Ham & Green, 2019; Hoptman et al., 1999; Jackson et al., 2017) and one study received a rating of ‘No’ (Beck et al., 2017). Beck et al (2017) used cluster analysis to categorise participants into one of three ‘aggression trajectories’, however the criteria used were unclear and it appeared to relate to use of incidents requiring seclusion and/or restraint. Although incidents of institutional violence/aggression often require these measures to be employed, it is likely this does not capture all incidents which may increase bias in findings. Many of the unclear/partial ratings on this item were received due to a lack of clarity in outcome measurement (De Vogel & Ruiter, 2006; Hilton, Ham and Green, 2019; Hoptman et al., 1999). Unclear or incomplete descriptions of how outcomes were extracted or defined prevents full scrutiny of decision-making processes and limits ability to replicate findings. Some studies extracted data through systems designed to routinely monitor incidents within the setting (De Vogel & Ruiter, 2006; Gorodetsky et al.,
This may have helped reduce bias due to clear definitions and descriptions of processes, a reduction in the likelihood of missed incidents and sometimes the use of inter-rater reliability measurements (De Vogel & Ruiter, 2006; MacInnes et al., 2017; Martin et al., 2015). However, in some cases incidents were recorded and reported by clinical or prison staff involved in working with participants (Campbell, 1999; Gorodetsky et al., 2014). Although this has the benefit of avoiding research bias, it may also lead to under- and/or over-reporting. Staff may be influenced by their interpersonal relationships, personal views and/or time pressures (Gifford & Anderson, 2010). Jackson et al (2017) used a self-report measure of institutional assaults named the Prison Violence Inventory (PVI) (Warren et al, 2002). The PVI has demonstrated moderate correlations with case-note review incidents and has been shown to have good inter-rater reliability, however it is important to consider the impact of bias on self-report measures and the lack of collateral information utilised within this study and how this may impact review findings.

Interestingly, only two studies in this review used a structured tool for measurement of institutional violence. Green et al (2016) utilised relevant items of the START outcome scale (Nicholls et al, 2007) which has demonstrated good inter-rater reliability and internal-consistency and has moderate correlations with other widely accepted structured violence tools within the literature such as the OAS (Braithwaite et al., 2010). Hoptman et al (1999) used a modified version of the scale for Aggressive and Agitated behaviours which also is reported to have demonstrated high inter-rater reliability (Convit et al., 1988) although using a small sample size. As well as this, further details on this scale and the process by which it was utilised was not provided by the authors, which is likely to mitigate the benefits of its use to reduce bias. The lack of use of structured violence tools is a significant weakness across the other studies and is likely to have increased bias within this review. Use of tools such as the OAS would have increased validity of this measurement within these studies and ensured consistent consideration of all violent behaviours.
Methodological quality assessment

In line with previous studies, summary ratings were created for the purposes of grouping included studies within this review to compare overall performance (Chemelo et al., 2020; Jeffs et al., 2018). Individual ‘no’ ratings were scored two, ‘unclear’ and ‘partial’ ratings were scored one and ‘yes’ ratings were scored zero. This allowed a cumulative score to be obtained which was then grouped into three categories: ‘poor’ scoring six or above, ‘adequate’ scoring five or below, and ‘good’ scoring two or less. Using this system, three papers were rated as ‘poor’ (Campbell, 1999; Hilton, Ham & Green, 2019; Hoptman et al., 1999), six were rated as ‘adequate’ (Beck et al., 2017; De Vogel and Ruiter, 2006; Gorodetsky et al., 2014; Green et al., 2016; Jackson et al., 2017; Martin et al., 2015) and one was rated as ‘good’ (MacInnes et al., 2016) as demonstrated in Table 3 and 4. As the three studies utilising the same dataset were combined into one record, the quality rating was taken from the most recent study with the largest sample size.
### Table 3.

**Summary of Quality Assessment; Cross-sectional studies**

<table>
<thead>
<tr>
<th>Study No.</th>
<th>Inclusion criteria</th>
<th>Subjects and setting description</th>
<th>Measurement of exposure</th>
<th>Condition group allocation</th>
<th>Confounding factors</th>
<th>Confound management</th>
<th>Measurement of outcome</th>
<th>Analysis</th>
<th>Overall rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>Yes</td>
<td>Partial</td>
<td>Yes</td>
<td>Unclear</td>
<td>No</td>
<td>No</td>
<td>Partial</td>
<td>Adequate</td>
</tr>
<tr>
<td>2</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Partial</td>
<td>Partial</td>
<td>Partial</td>
<td>Partial</td>
<td>Adequate</td>
</tr>
<tr>
<td>3</td>
<td>Yes</td>
<td>Yes</td>
<td>Unclear</td>
<td>Unclear</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Partial</td>
<td>Poor</td>
</tr>
<tr>
<td>8</td>
<td>No</td>
<td>Yes</td>
<td>Partial</td>
<td>Partial</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Partial</td>
<td>Adequate</td>
</tr>
<tr>
<td>9</td>
<td>Yes</td>
<td>Yes</td>
<td>Partial</td>
<td>Yes</td>
<td>Yes</td>
<td>Partial</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
</tr>
</tbody>
</table>

### Table 4.

**Summary of Quality Assessment; Cohort studies**

<table>
<thead>
<tr>
<th>No.</th>
<th>Group comparability</th>
<th>Measure consistency</th>
<th>Measure of exposure</th>
<th>Confound factors</th>
<th>Confound manage</th>
<th>Temporal sequence</th>
<th>Outcome measure</th>
<th>Follow up length</th>
<th>Follow up completion</th>
<th>Follow manage</th>
<th>Analysis</th>
<th>Overall Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Yes</td>
<td>Yes</td>
<td>Partial</td>
<td>Partial</td>
<td>No</td>
<td>Yes</td>
<td>Partial</td>
<td>Yes</td>
<td>Yes</td>
<td>N/A</td>
<td>Partial</td>
<td>Adequate</td>
</tr>
<tr>
<td>5</td>
<td>Yes</td>
<td>Yes</td>
<td>Partial</td>
<td>Partial</td>
<td>Partial</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>N/A</td>
<td>Partial</td>
<td>Adequate</td>
</tr>
<tr>
<td>6</td>
<td>Yes</td>
<td>Yes</td>
<td>Partial</td>
<td>Yes</td>
<td>Partial</td>
<td>Yes</td>
<td>Unclear/P</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Partial</td>
<td>Poor</td>
</tr>
<tr>
<td>7</td>
<td>Yes</td>
<td>Yes</td>
<td>Partial</td>
<td>Unclear</td>
<td>No</td>
<td>Yes</td>
<td>Partial</td>
<td>Unclear/P</td>
<td>Unclear/Parti</td>
<td>Unclear/P</td>
<td>Partial</td>
<td>Poor</td>
</tr>
<tr>
<td>10</td>
<td>Yes</td>
<td>Unclear/P</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Unclear</td>
<td>Partial</td>
<td>Yes</td>
<td>Adequate</td>
<td>Adequate</td>
</tr>
</tbody>
</table>
Study Findings

Four of the ten studies found a significant positive relationship between childhood maltreatment and perpetration of institutional violence, all with small effect sizes. Six studies found no significant relationship, highlighting some disagreement within the literature. There appears to be a reasonably balanced split of quality across the groups of papers which did find a significant relationship and those that did not, and no clear pattern for which type of study design tended to find positive versus negative results. Studies which found a significant relationship were no more likely to have valid and reliable measurement of the childhood maltreatment or violence variables and appeared not to differ on their identification of confounding factors. However, they did appear to manage to control for confounding factors more often. Interestingly, out of the four studies which found significant positive relationships between childhood maltreatment and institutional violence, three of those were conducted within prison settings. Only one out of a total of four included prison studies failed to find a significant relationship. Two studies reported statistical power and of these both stated that some analyses in their studies were underpowered. Other studies did not provide a power calculation, however mentioned small sample sizes limiting their analyses. It is of interest that the studies conducted within FMH services tended to have smaller sample sizes in comparison to prison studies and that these studies were more likely to fail to find significant results. This may be indicative of insufficient power in these studies.

Prisons

Three studies (75%) conducted in prison settings conducted regression analyses which found evidence of a positive relationship between experiencing childhood maltreatment and institutional violence (Gorodetsky et al., 2014; Jackson et al., 2017; Martin et al., 2015). Gorodetsky et al (2014) explored this using the CTQ and prison reported incidents of institutional violence and aggression and was strengthened by controlling for substance misuse in their analyses but limited by their reliance on self-reported data relating to childhood experience. Controlling for additional confounding factors would have been
beneficial, and this is true for a significant proportion of studies included in this review. Inclusion and management of confounding factors was an area of significant weakness with seven studies receiving an ‘unclear/partial’ or ‘no’ rating on this item. Interestingly, studies by Martin et al (2015) and Jackson et al (2017) in which a positive relationship was found, demonstrated good management of confounding factors. Martin et al (2015) included psychological distress, substance use and youth arrests in analyses as well as considering the impact of gender, ethnicity, and culture; and Jackson et al (2015) controlled for gender, age, years of incarceration and minority status. However, both relied on self-report measures of childhood maltreatment and Martin et al (2015)’s measurement was completed by prison staff which may have increased bias in the form of under reporting. The sample sizes are a relative strength in all of the above studies as is the good management of missing follow up data in the one included prospective study, although more clarity on this would have been beneficial. One included prison study failed to find a positive relationship between childhood maltreatment and institutional violence. Hilton, Ham and Green (2019) also conducted regression analysis focused on ACEs in groups of different types of offenders (violent, nonviolent, and intimate partner violence). Dependent variables included several measures which they defined as measures of ‘criminal propensity’, one of which was institutional assaults. Interestingly, findings suggested a positive relationship between ACEs and all other measures of criminal propensity included in the study, however the same was not found in relation to institutional assaults. This study received a global rating of ‘poor’, primarily relating to poor management of follow up data. Authors reported only 13% follow up completion and lack of clarity around follow up procedures and missing data, furthermore the measure of institutional assaults was only collected for a proportion of the total sample, which may indicate lack of power when compared with the positive results for all other measures of criminal propensity for whom data was available for a larger number of participants. Additionally, ‘partial’ ratings on the measurement of variables due to reliance on case-note reviews and an unclear definition of institutional violence, which excludes verbal aggression, also reduce confidence in these findings.
Forensic Mental Health Settings

Only one study (16.7%) conducted in a FMH setting found a positive relationship between childhood maltreatment and institutional violence. The remaining FMH studies (83.3%) did not find a significant relationship. Hoptman (1999) found a significant relationship and explored group differences between patients who were assaultive during admission and patients who were not. They found a higher prevalence of physical abuse amongst patients who were assaultive. Of note, this was not replicated with other forms of childhood maltreatment such as sexual abuse or neglect. This study demonstrated significant weaknesses across a range of quality assessment criteria including, a lack of clarity relating to the measurement of childhood maltreatment and incidents of violence, a reliance on self-report methods for collection of data relating to childhood experiences, incomplete and unclear identification and management of confounding factors, a reasonably short follow up period and a lack of clarity relating to the processes for follow up and dealing with missing data. The author’s use of a structured tool to measure incidents of violence was a strength of this study, however again this would have benefitted from more clarity to allow proper scrutiny.

All other included FMH studies found a null relationship and were of varying qualities. Beck et al (2017) used similar between group comparisons, although was limited by their lack of clarity relating to what criteria was used in the measurement of childhood maltreatment and their identification and management of confounding factors. Interestingly, the majority of the described FMH studies which failed to find a significant positive relationship (Beck et al., 2017; Campbell, 1999; De Vogel & Ruiter, 2006; Green et al., 2016) were rated as ‘unclear/partial’ or ‘no’ on identification of confounding factors, with only MacInnes et al (2016) receiving a rating of ‘yes’ on this item. Additionally, all of these studies, including MacInnes et al (2016), received ratings of ‘unclear/partial’ or ‘no’ on the management of confounding factors variable, indicating an area of significant weakness and raising some interesting questions about the reliability of these findings. Other similar weaknesses exist.
across multiple studies. In contrast to Beck et al (2017), the study by Campbell (1999) relied entirely on self-report for childhood maltreatment data, obtained through patient interview. This may have led to under reporting and lower estimated prevalence. Additionally, lack of information relating to the process by which the interviews were conducted (questions, interviewer etc.) reduced the overall rating of this study. Similar problems relating to the validity of measurement of childhood maltreatment has been discussed previously in relation to two other FMH studies (Green et al., 2016; De Vogel & Ruiter, 2006), which may have led to increased bias. Lastly, the study by MacInnes et al (2016) used regression analysis to explore the relationship between the CTQ and institutional violence incidents and found that CTQ did not predict incidents of violence. This study received a global rating of 'good' and was strengthened by using multiple data sources and consideration of confounding variables such as length of stay in hospital and level of psychological distress. Despite this, like many other included studies, reliance on only self-report methods of data collection for the childhood maltreatment measure is likely to have led to under reporting and a small sample size prevented full exploration of the subcategories of the CTQ suggesting the study may have been underpowered.

Discussion

The World Health Organisation estimate that 12% of children are physically abused each year and have declared this as a public health emergency due to a wealth of research highlighting the associated negative physical and psychological outcomes (WHO, 2020). The findings of this review suggest a higher prevalence of all categories of abuse within the forensic population, highlighting the need for a trauma-informed model of care in these settings. Included studies suggest rates of physical abuse ranging from 16% to 44% in comparison to rates of 5-12% which have been found in the general population (Koenen et al., 2010; WHO, 2020). Similarly experience of any childhood maltreatment rates were found to be between 43% to 95% in the included studies which is in line with previous findings in the literature relating to forensic populations (Austin, 2011; McKenna, Jackson & Browne,
2019; Timmerman & Emmelkamp, 2001), but higher than those suggested in the literature for the general population (Christofferson et al, 2013; Koenen et al., 2010). There was significant variation in the constructs and means of measurement of childhood maltreatment employed across the studies which makes direct comparison of prevalence rates difficult, however all studies clearly highlighted that this population is one at increased risk for maltreatment during the developmental years and therefore at increased risk of developing associated difficulties in adulthood.

This review aimed to contribute to the ‘cycle of violence’ evidence base and further explore the impact of experiencing childhood maltreatment on risk of perpetrating institutional violence in forensic populations specifically. The inclusion of only 10 studies demonstrates the low number of research studies conducted in this area and combined with the high prevalence of childhood maltreatment within this population, this highlights a potentially unmet research need which requires further exploration. Of the included studies four provided evidence that childhood maltreatment increased the risk of institutional violence and six failed to find evidence of this, potentially supporting the null hypothesis and indicating no or minimal increase in risk of perpetrating institutional violence following exposure to childhood maltreatment. Additionally, of note, effect sizes were small in all studies which did find a positive relationship potentially. However, this is further confounded by significant methodological limitations across all included studies which may have introduced bias and confounded results. The most common methodological limitations were poor or lacking identification and management of potential confounding factors and lack of validity in the measurement of childhood maltreatment and incidents of institutional violence. However, these appeared to be evenly split across studies which did and those that did not support a positive association between childhood maltreatment and institutional violence.

Is it important to consider the level of bias introduced to this review by the methods of data collection employed in the included studies and how this may impact its findings. The definitions of the construct of childhood maltreatment varied across studies and many
studies failed to provide a clear definition linked to a theoretical rationale. The variation in
types of traumatic experience included make direct comparison or exploration of the impact
of different types of trauma impossible within the scope of this review, however previous
findings would suggest that this is an important consideration for future research (Huang et
al., 2012; Infurna et al., 2016). Similarly, the measurement of the childhood maltreatment
variable was an area of significant weakness across the studies and an important
consideration when drawing conclusions for this review. Many studies relied heavily on self-
reported data only and those which utilised case note reviews often did not provide sufficient
detail of processes and procedures to allow for full scrutiny of quality. Two studies used the
‘traumatic experiences’ factor on the HCR20 as an independent measure of childhood
maltreatment which is not the purpose for which this factor was designed and is likely to
have introduced significant bias. Interestingly, both studies did not find a positive relationship
between childhood maltreatment and institutional violence which may support the poor
validity of this as a measurement tool.

The definitions of institutional violence similarly varied across included studies. Some studies
appeared to use similar or identical constructs, however some of these were limited by their
measurement of childhood maltreatment which may have confounded their findings. Of note,
three of the four studies which found a significant relationship between childhood
maltreatment and institutional violence, utilised definitions of institutional violence which
excluded verbal aggression. The remaining study which adopted this approach did not find a
positive relationship therefore it is important to consider possible reasons for this. Although
there is strong evidence of a global negative impact of childhood trauma, there is some
evidence that physical abuse specifically is more harmful for those children who experience
it than other types of trauma (Hauser et al., 2011; Lo & Cheng, 2007; Treuer et al., 2005). If
the hypothesised aetiology of this violent institutional behaviour is related to social learning
theory, it may be that individuals who have experienced physical abuse during childhood are
more likely to display physical and not verbal aggression when in forensic settings. This is
supported by Hoptman (1999) whose findings in this review indicate an increased risk of institutional violence only for those who had experienced physical abuse and failed to find this for any other categories of abuse. Furthermore, Jackson et al (2017) found that of the three trauma variables utilised only interpersonal non-sexual trauma was associated with institutional violence, however this construct was not fully described and therefore it is difficult to know if this relates to physical abuse only. Gorodetsky et al (2014) also found a significant positive relationship, however, did not fully explore the subscales of the CTQ in analyses preventing full exploration of the impact of each type of trauma. However, as described previously, studies conducted by Bevilaqua et al (2012) and Sarchiapone et al (2009) were collated with Gorodetsky et al (2014) to create one record to reduce bias associated with overlapping datasets. In the study conducted by Bevilacqua et al (2012) further analyses were conducted including the CTQ subscales and findings suggested that there was a main effect of trauma but that the strongest indicator of this came from the physical abuse subscale. Taken together this highlights that physical abuse specifically, rather than childhood maltreatment more generally, may increase the risk of perpetrating institutional physical violence.

Another important consideration of this review was the comparison of prison and FMH settings and exploration of any potential impact of this. Interestingly, in three out of four prison studies (75%) experiencing childhood maltreatment increased the risk of perpetrating institutional violence, whereas only one out of six of the FMH studies (16.7%) found similar results. It is important to consider the reasons for this difference, and one may be the methodological limitations of the included studies. Although generally the sample sizes were sufficient across the studies, those studies conducted within prisons had significantly higher sample sizes (range from N=266 to N=5154) than the FMH studies (range from N=50 to N=183). Only two included studies reported power calculations, and both reported some underpowered analyses. Other studies did not report a power calculation but referred to their use of small sample sizes limiting analysis. Together this may indicate that the studies with
smaller samples had less statistical power available to identify true, small effects and that this happened to often be in FMH settings due to difficulties in conducting research in these settings (Appelbaum, 2008). In support of this, the one FMH study which did find a significant positive relationship also had the highest sample size of the included FMH studies. It may be that further exploration of this relationship in FMH settings using larger sample sizes would alter the findings of this review, therefore more research would be of benefit. However, the alternative is that there is a material difference in the impact of childhood maltreatment on risk of institutional violence between the two settings which must be considered. Although rates of diagnosed mental disorder, including psychosis are higher than the general populations in all forensic settings; it may be that the higher prevalence in FMH settings is impacting on this relationship due to more patients in active psychological and pharmacological treatment which may reduce the likelihood of violence perpetration. The impact of psychosis on perpetration of violence remains complex and this may add an additional complexity to the FMH studies which influence the findings. Additionally, staffing ratio and staff training/roles vary between prison and FMH settings and patients in FMH settings are more likely to be receiving various multi-disciplinary interventions, running concurrently, aimed at reducing distress and minimising risk (Sharfstein, 2009) thus reducing the risk of violence or aggression. The concept of ‘trauma-informed care’ has been implemented and integrated into many healthcare systems across the world and this also may be contributing to reducing the impact of childhood maltreatment (Dawson et al, 2021). This is also the case for prison systems, however due to high levels of stigma, bias, and reduced funding of prison systems it may be that the same impact has not been achieved yet leading to a reduced impact on the effects of childhood maltreatment in these settings. It is possible that all of these factors are interacting to reduce the risk of institutional violence within FMH settings and that by implementing a similar model in the prison system, the risk of institutional violence could be mitigated, however further research is needed to draw definitive conclusions.
Limitations

This review had several limitations which are important to note. Firstly, systematic reviews may be influenced by publication bias. Publication bias, where studies which find non-significant results are less likely to be published, is widespread within all areas of research (Ferguson & Brannick, 2012; Van Aert et al., 2019) and this may have led to an overestimation of the positive relationship between childhood maltreatment and institutional violence in this review. To compensate for this, this review included unpublished dissertations and theses, however this introduced its own bias in that these papers had not been peer reviewed although there was no evidence that these studies were more likely to demonstrate significant findings or differed from the other included papers. Secondly, this review included only studies which were published in English due to limitations on resources. Although studies published in a wide range of countries were included, these were all from relatively high-income countries and this may have further confounded the results. Studies which included participants with intellectual disabilities were excluded from this review due to a hypothesised alternative aetiology and prevalence of violence within this population (Taylor & Novaco, 2013). Another limitation was the unclear overlap of datasets. Bevilacqua et al (2014), Gorodetsky et al (2016) and Sarchiaphone et al (2009), were combined into one record in an attempt to avoid over-representation of an overlapping dataset introducing bias, however this may have led to an underestimation and loss of additional participants from the excluded datasets. Therefore, it is important to consider the impact of the combining of these three studies in this review as a limitation.

A meta-analysis may have been of benefit in providing clarity of the strength of the relationship between childhood maltreatment and institutional violence, however the varied definitions, constructs, and methods of measurement of these variables was thought to be too heterogeneous to allow analyses and a narrative synthesis was deemed more appropriate at this time.
Clinical implications

Clinically, the findings of this review highlight the extremely high prevalence and potential impact of childhood maltreatment within forensic populations and support the implementation of a ‘trauma-informed’ system in all forensic settings. As highlighted previously, this need has already been widely accepted within the healthcare system internationally. In Scotland, NHS Education for Scotland have implemented the National Trauma Training Framework which identifies the level of expertise all healthcare workers should be trained to depending on their likelihood of encountering individuals who have experienced trauma in their role and provides training for all identified levels (NES, 2017). However, evidence suggests that despite similar rates of childhood trauma, the prison system is yet to prioritise this as effectively as FMH settings (McKenna, Jackson & Browne, 2019; Timmerman & Emmelkamp, 2001); therefore, focus on improving the treatment of trauma within this system is essential to reduce its impact on negative outcomes such as institutional violence which is a significant burden on staff wellbeing and has practical and financial implications (Brophy, Keith & Hurley, 2018; Needham et al, 2005). Additionally, due to the high prevalence of institutional violence in forensic settings (Verstegan et al., 2017; MacPherson & Kevan, 2004), consideration must be taken to ensure trauma informed practices in the management of these incidents. Seclusion and restraint procedures are used often in forensic settings to minimise and manage the risk of institutional violence, however, use of these practices comes with a risk of re-traumatisation of individuals and therefore care must be taken to mitigate this risk.

Future research

Future research exploring the differences in care and treatment within prison and FMH services would be of benefit to examine potential differences in trauma care and treatment and how this may relate to the perpetration of institutional violence in these settings. Alongside this, studies utilising larger sample sizes and with sufficient power conducted
within FMH services would allow definitive conclusions to be drawn from the findings of this review in relation to the differences in findings between the types of forensic settings.

The findings of this review highlight a potential difference in the impact childhood maltreatment has on violence perpetration related to type of traumatic experience. Despite inclusion of studies which measured a range of categories of traumatic experience, data on each category was inconsistent within the review and therefore it was not possible to explore this further. Further research exploring the impact of different types of traumatic experience on violence perpetration would be of benefit in clarifying these findings; with a focus on the impact of experiencing physical abuse, as initial findings highlight this as having the strongest relationship with perpetration of institutional violence (Bevilaqua et al., 2012; Hoptman et al., 1999; Jackson et al., 2017).

The identification and management of confounding factors was the most prevalent methodological limitation within the included studies. Future research exploring the relationship between childhood maltreatment and institutional violence should consider the potential impact of important confounding factors such as use of substances or experience of psychosis as these have been demonstrated in the literature to be associated with violence (Duke et al., 2018; Green, Browne and Chou, 2019).

Lastly, any future research in this area would benefit from utilising standardised and validated measurement tools for the constructs of childhood maltreatment and institutional violence and inclusion of full descriptions of procedures will allow for adequate scrutiny in assessing quality and ensure findings that are not related to methodological issues.

**Conclusion**

The relationship between childhood maltreatment and institutional violence within forensic settings is complex and is influenced by a multitude of factors such as use of substances, level of distress and type of trauma experienced. This review partially supports the hypothesis that experiencing childhood maltreatment increases the risk of perpetrating
institutional violence, however these findings were not consistent across both FMH and prison settings with this finding more prevalent within prisons and measured effect sizes were small in studies which supported this hypothesis. This may indicate a difference in the impact of childhood maltreatment in prison settings due to more progress in the identification and treatment of trauma in healthcare services including more advanced staff training. However, due to significant methodological limitations across many studies within the review including significantly smaller samples in many of the FMH studies, it may be that these findings are related to a lack of power and methodological flaws confounding the results. It is extremely difficult to draw definitive conclusions due to this, therefore further research exploring the differences between the prison and FMH systems and their identification and treatment of childhood maltreatment would be of benefit. Similarly, this review highlights interesting differences in the impact of types of traumatic experience and how this may impact on risk of institutional violence, with initial findings suggesting exposure to physical abuse may increase risk of perpetrating physical institutional violence specifically. Full exploration of each category of traumatic experience was beyond the scope of this review but further research in this area would be of benefit in obtaining clarification of these findings. Additionally, future research which focuses on improving methodological quality including full consideration of possible confounding factors and which utilises standardised and validated measurement of childhood maltreatment and institutional violence would be beneficial in understanding the complexities in this relationship.
Systematic Review References


Offending Association: A Systematic Review of the Methodological Features of Prospective
and Longitudinal Studies. Trauma, Violence, & Abuse, 19(1), 20-34.

depression: a meta-analysis of published literature. Childhood trauma and adult
depression. European psychiatry, 30(6), 665-680.

with childhood trauma and mental health needs. Law and human behavior, 39(6), 614

Merrick, M. T., Ports, K. A., Ford, D. C., Afifi, T. O., Gershoff, E. T., & Grogan-Kaylor, A.
(2017). Unpacking the impact of adverse childhood experiences on adult mental

McKenna, G., Jackson, N., & Browne, C. (2019). Trauma history in a high secure male
forensic inpatient population. International journal of law and psychiatry, 66, 101475.

Delinquency: Disentangling Main Effects and Subgroup Effects. Child Maltreatment, 12(3),
246-258.

of goals and environment. European journal of psychotraumatology, 3(1), 17246.

psychology review, 31(5), 872-882.

Moola S, Munn Z, Tufanaru C, Aromataris E, Sears K, Sfetcu R, Currie M, Qureshi R, Mattis
P, Lisy K, Mu P-F. Chapter 7: Systematic reviews of etiology and risk In: Aromataris E, Munn
Available from https://reviewersmanual.joannabriggs.org/


O’Rourke, S., Whalley, H., Janes, S., MacSweeney, N., Skrenes, A., Crowson, S., ... & Schwannauer, M. (2020). The development of cognitive and emotional maturity in adolescents and its relevance in judicial contexts.


Sweeney, A., Clement, S., Filson, B., & Kennedy, A. (2016). Trauma-informed mental healthcare in the UK: what is it and how can we further its development?. *Mental Health Review Journal*.


Appendix A: Instructions for Authors from Child Maltreatment (CM)

Manuscript Submission Guidelines:

Child Maltreatment (CM) is the official journal of the American Professional Society on the Abuse of Children (APSAC) and primarily publishes work on samples from North America. CM welcomes manuscripts addressing timely and important topics in practice, policy, and theory, including empirical research articles, systematic review articles, and program evaluations that illustrate theoretical issues or new phenomena.

Submissions should be prepared according to the guidelines in the Publication Manual of the American Psychological Association (7th edition).

Regular articles should be no more than 30 double-spaced pages, inclusive of tables, figures, and references. Brief reports will also be accepted, limited to no more than 12 double-spaced pages including tables, figures, and references. Reviews of the literature should be no more than 50 double-spaced pages. Include an abstract of approximately 150 words. The authors’ name and affiliation must be listed on a separate Title Page for anonymous review. Submission to Child Maltreatment implies that the manuscript has not been published elsewhere, and is not under consideration by any other journal; a statement to this effect should be included with the all submissions.
The relationship between adverse childhood experiences, violence, empathy and psychosis within forensic settings

Leanne Banks¹; Dr Suzanne O'Rourke¹;²; Professor Gary Macpherson²;

¹ School of Health in Social Science, University of Edinburgh, Doorway 6, Old Medical Building, Teviot Place, Edinburgh, Scotland, United Kingdom, EH8 9AG.

² Psychology Department, The State Hospital, Carstairs, Lanarkshire, ML11 8RP.
Abstract

Objectives: Adverse Childhood Experiences (ACEs) have been linked to a range of negative outcomes, one being violence perpetration. Psychosis and empathy are strongly associated with both ACEs and violence perpetration and rates of all three variables are extremely high in inpatient forensic mental health services.

Methods: Case-note and database searches were utilised to extract data for N=343 participants across 10 sites in the Scottish Forensic Network to examine the hypothesis that total ACE score and each of the six included ACE categories would predict inpatient violence whilst controlling for potential covariates. Subsample analyses were conducted to explore secondary hypotheses suggesting that positive symptoms, insight, and empathy would mediate the relationship between total ACE score and violence. Data relating to violent incidents were extracted pseudo-prospectively via the NHS DATIX system.

Results: Findings demonstrate high rates of ACEs within FMH populations and suggest a significant association between total ACE score and both, any violence ($r = .15$) and verbal aggression ($r = .16$). Total ACE score was significantly associated with an increase in verbal aggression ($\Delta R^2 = .03$) and history of sexual abuse was significantly associated with an increase in violence ($\Delta R^2 = .04$). Previously completed psychological interventions were associated with a decrease in violence ($\Delta R^2 = .04$) and verbal aggression ($\Delta R^2 = .03$). Positive symptoms, insight and empathy did not mediate the relationship between ACEs and violence but did predict all types of violence.

Discussion: Findings partially support the hypothesis that ACEs predict increased violence, although it is difficult to draw definitive conclusions. Potential explanations for findings are discussed in detail with consideration of limitations such as the exclusion of additional ACE categories and some missing data points.

Keywords: adverse childhood experiences, forensic mental health, psychosis, empathy, violence
Introduction

Adverse Childhood Experiences

Adverse childhood experiences (ACEs) refer to a range of negative life experiences including: abuse (physical, sexual, and emotional), neglect (physical and emotional) and household dysfunction (parental mental illness, parental separation or absence, domestic violence or substance misuse within the household) which occur during early childhood (Kelly-Irving et al, 2013). This differs from a standard definition of trauma as it excludes adverse events which take place in adulthood and differs from the definition of childhood trauma in including indirectly harmful events which may not be traumatic. There has been significant interest and research focused on ACEs and their impact. Initial studies began in the 1990s and used large scale population studies. These provided strong evidence of links between ACEs and various physical and mental health conditions and health risk behaviours (Anda, Butchart, Felitti, & Brown, 2010: Felitti et al., 1998; Felitti, 2002). Significant support for these findings has continued throughout the literature and many studies have replicated and expanded on them (e.g., Holman et al., 2016; Kajeepeta et al., 2015; Sahle et al., 2021; Wiss & Brewerton, 2020). Additionally, evidence has been found linking ACEs with a range of criminal behaviours (Levenson et al., 2016: Reavis et al., 2013) including perpetration of interpersonal violence (Duke et al., 2010; Hughes et al., 2017). There is also evidence of a cumulative impact of ACEs with individuals experiencing a higher proportion of ACEs more likely to have negative outcomes. Hughes et al (2017) found that individuals that experienced four ACEs were at an increased risk for all negative health and behavioural outcomes explored. This was most pronounced for sexual risk taking, mental ill health, problematic alcohol and drug use and interpersonal and self-directed violence. However, despite widespread support there are some methodological limitations which may confound findings. It is possible that due to the difficulties associated with disclosure of traumatic experiences (Alaggia, 2005), and the impact of temporal distance on the accuracy of recalled events (Hardt & Rutter, 2004), that studies have been limited by their reliance on
retrospective self-report data. It is also possible that due to recruitment bias, a true representation of some populations has not been obtained. As well as evidence highlighting a relationship between ACEs and criminal behaviour, further evidence suggests higher ACE scores are associated with risk of recidivism in sexual offending (Levenson et al., 2016). Similar research on current risk is not yet available in relation to physical violence risk within populations of forensic mental health patients, however some studies indicate extremely high levels of ACEs within these populations (Austin, 2011).

_The impact of trauma_

One hypothesised pathway between the experience of trauma and future outcomes is the impact of these experiences on the development and function of the brain. Human brain development begins around two weeks after conception and continues until adulthood; however, infanthood and childhood are when much of the formative brain development occurs (Thompson & Nelson, 2001). Although parts of this process are under genetic control, proportions are reliant on, or heavily influenced by, environmental factors. There is strong evidence that the experience of traumatic events during this critical period can lead to significant changes in the structure of the brain. Neuro-imaging studies show a significant reduction in the frontal-occipital circumference in children that experience neglect in the first three years of life, suggesting a reduction in growth relating to sensory deprivation (Perry & Pollard, 1997). As well as this, research demonstrates a reduction in grey matter in the hippocampus and amygdala in individuals who have experienced childhood trauma (Paquola, Bennett, & Lagopoulos, 2016), both of which are associated with threat and emotion regulation. Factors such as age of occurrence, frequency and severity are thought to have a significant impact, with suggestion that the younger an individual experiences a traumatic event, the more significant the impact on brain development (Twardosz & Lutzker 2010).

Another important consideration is the impact of exposure to high levels of stress during periods of critical brain development. Stress is defined as a negative emotional reaction
caused by a stimulus or experience (Glaser, 2000). This includes traumatic experiences such as that of child abuse or neglect, but additionally experiences such as witnessing domestic abuse or parental substance use, fitting with the wider definition of ACEs. The human stress response is multi-faceted and includes activation of the hypothalamic-pituitary-adrenal axis, the sympathetic nervous system and the immune system which results in increased levels of cortisol in the body (Glaser, 2000). Whilst this has a clear adaptive, evolutionary function, prolonged elevation of these hormones in the body has negative consequences such as impairing the ability of the hippocampus to process and integrate memories (Sapolsky, 2003). There is also evidence of changes in the reactivity of the amygdala in individuals who have experienced childhood trauma (Cross et al., 2017). The amygdala is responsible for the ‘fight or flight’ system; therefore, this can be thought of as an adaptive response to an abusive environment, however prolonged activation of this system has been shown to have a sensitising effect on it (Read et al., 2001). Over responsivity in this system is associated with higher rates of psychopathology and increased risk of physical health complications (Curtis & O'Keefe, 2002; Raymond et al., 2018).

**Psychosis**

Another factor which is critical to consider when exploring the impact of trauma is presence and impact of psychosis. Psychosis is a term used to describe a range of experiences including abnormalities in thinking, perception, emotions, and behaviours (Hayes & Kyriakopoulos, 2018). Symptoms experienced are hallucinations, delusional beliefs and disorganised thinking or speech, abnormal motor behaviour and negative symptoms (Heckers et al., 2013) and can often result in a loss of insight into the experience of these symptoms, believing them to be reality and not illness, which can lead to poor treatment adherence, distress and aggression (Calatayud et al., 2012). Psychosis is a defining feature of several psychiatric diagnostic categories such as schizophrenia and persistent delusional disorder (APA, 2013). Historically these ‘mental disorders’, have been viewed through the lens of the medical model leading many to explain the development of psychosis through
primarily biological or genetic pathways (Chen et al., 2015; Torrey, Bowler & Taylor, 1994; Walker & Diforio, 1997). However, this paradigm has shifted significantly in line with the evidence base, which supports the perspective that environmental factors have a significant impact on the risk of psychosis (Read et al., 2001; Read, Bentall & Fosse, 2009). In this perspective psychosis is viewed on a continuum with typical mental states (DeRosse & Karlsgodt, 2015).

Approximately 1% of the population have a diagnosis of ‘schizophrenia’ and psychosis has been shown to be associated with an increased risk of poor outcomes such as obesity (Strassnig et al., 2017), physical health conditions (Moreno et al., 2013) and premature death (Hjorthøj et al., 2017). There is a strong evidence base suggesting that adverse experiences in childhood can be associated with psychosis, as demonstrated in a meta-analysis in which findings suggest individuals with psychosis were 2.72 times more likely to have experienced childhood adversity than the control group (Varese et al., 2012). A cumulative effect was also found suggesting a dose-response relationship. Prevalence studies exploring rates of childhood trauma in psychiatric services provide additional support for this. Karatzias et al (2019) found that 90% of forensic mental health patients in Scotland had a psychotic disorder, and of these 79.2% had experienced at least one form of childhood adversity, potentially indicating a pathway by which the experience of childhood trauma may lead to negative outcomes through the development of psychosis.

The ‘Traumagenic Neurodevelopmental’ (TN) model of psychosis (Read et al., 2001) supports this hypothesis and highlights similarities between structural and functional brain abnormalities found in children who have experienced childhood adversity and adults with a diagnosis of schizophrenia. In contrast to the diathesis-stress model (Walker & Diforio, 1997) the TN model suggests that the experience of trauma during childhood has a direct causal effect on the development of psychosis through altering brain structure and functioning. There is significant evidence supporting claims in the TN model such as a heightened response to stress in individuals with psychosis (Lardinois et al., 2011; Myin-Germeyns et al.,
A recent review identified over 100 papers which provided indirect or direct support for this model (Read et al., 2014).

Empathy

Leading theoretical models of empathy suggest that it is multidimensional and integrative, consisting of both cognitive and emotional components (Davis 1983; Rankin et al., 2005). The neural network associated with empathy supports this model and includes cognitive, memory, and affective systems (Eslinger, 1998; Farrow et al., 2001; Vollm et al, 2006; Shamay-Tsoory, 2011). Alterations may be experienced in these neural networks following exposure to trauma, resulting in problems with cognition, memory, and affective processes which are integral essential for empathy (Etkin & Wager, 2007; Jelinek et al., 2008; Koso and Hansen, 2006; Moores et al., 2008; Vasterling et al., 2002). There is some evidence supporting this which suggests that individuals who have experienced trauma in childhood have reduced capacity for empathic responding (Locher et al., 2014; Parlar et al., 2014); however, findings of other papers contradict this and suggest that childhood trauma may in fact increase empathy (Greenberg et al., 2018).

As well as a link between childhood adversity and empathy, there is evidence that the experience of psychosis alters the ability to empathise, although the mechanisms of this relationship are less clear. Derntl et al (2009) found that individuals with a diagnosis of schizophrenia demonstrated deficits in empathic responding when compared with the general population, however other research has indicated impairment only in specific aspects of empathy such as identification of emotions (Edwards, Jackson & Pattison, 2002). Findings are inconsistent across the literature in relation to cognitive empathy and psychosis, with some evidence of a general deficit in theory of mind (Achim et al., 2011), and other evidence indicating individuals with psychosis may be impaired on only higher order theory of mind tasks (Abu-Akel & Abushua'leh, 2004; Pickup & Frith, 2001).
The cycle of violence

Widom (1989) proposed the ‘cycle of violence’ suggesting that individuals who had experienced abuse during childhood were at increased risk of perpetrating violence later in their lives. Several theoretical pathways have been proposed to explain this, such as social learning theory explaining use of violence learned from observing a caregiver’s violent acts (Dodge, Bates & Pettit, 1990), and by attachment theory explaining violence resulting from insecure attachment styles and maladaptive coping (Mitchell & Beech, 2011). There is significant empirical support for the ‘cycle of violence’ (e.g., Bevilacqua et al., 2012; Fagan, 2005; Smith et al., 2005; Widom, 1989) although not all studies agree (Derzon, 2010; Eriksson & Mazerolle, 2015). There also appears to be a proportion of individuals who are resilient to the negative outcomes associated with childhood trauma (DuMont, Widom & Czaja, 2007) as most individuals who have these experiences during their childhood do not go on to engage in violence. Mersky et al (2007) found that maltreated children demonstrated higher rates of violent delinquency than non-maltreated children when controlling for known correlates of violence and maltreatment. A recent review found a moderate increase in risk of violence in individuals with a history of childhood maltreatment (Fitton, Yu & Fazel, 2020). Other reviews have been conducted exploring offending more generally and its relationship with childhood trauma, however findings have indicated significant variability related to methodological issues (Malvaso et al., 2018).

Psychosis and Violence

While only a very small number of those experiencing psychosis will exhibit violence (Schwartz & Bhattacharya, 2017), understanding the relationship between these constructs is essential to help dispel myths and provide education. Past research findings are mixed and appear to depend on various moderators such as symptom experience and setting (Douglas et al, 2009). Despite these discrepancies, there is evidence to suggest that current experience of positive symptoms and lack of insight into the experience of psychosis are both related to perpetration of violence (Calatayud et al., 2012; Douglas et al, 2009; Witt et
al., 2013). Meta-analyses have demonstrated an elevated risk of perpetration of violence in individuals with a diagnosis of schizophrenia (Fazel et al., 2009), and others indicate that positive symptoms of psychosis increase the risk of violence whilst negative symptoms reduce risk (Swanson et al., 2006; Witt et al., 2013). Whilst this supports a link between psychosis and violence it is important to consider the risk of increasing stigma for those experiencing mental illness by linking this with violence (Phelan & Link, 1998). One hypothesis suggested to explain this is that the experience of childhood trauma may increase the likelihood of experiencing psychotic symptoms which are derogatory in nature and a sense of being persecuted, which in itself may lead to an increased violence risk (Cheung et al., 1997), however more research is required within this area.

**Empathy and Violence**

The relationship between empathy and violence has been explored in offending populations with evidence suggesting empathy may mediate the relationship between adverse experiences and sexual offending (Simon, Wurtele & Heil, 2002). There is some evidence that cognitive empathy is related to offending, and this appears to be more pronounced for violent offending, but emotional empathy is only weakly related (Jolliffe and Farrington, 2004). Other reviews in populations of forensic mental health patients have failed to replicate these results (Harris & Picchioni, 2013) suggesting further exploration is required. Other findings have suggested that men who have perpetrated intimate partner violence exhibit poor empathic accuracy when attempting to understand their female partner’s thoughts (Clements et al., 2007) and there is evidence that high levels of childhood adversity are associated with low levels of empathy at time of admission to prison and are predictive of recidivism (Narvey et al., 2021). Again, some of these findings are limited by use of self-report data and a lack of exploration of other potential confounding variables.
Rationale and Aim of Current Study

Throughout the literature there has been a focus on the use of self-report data in relation to childhood experiences and perpetration of violence which may contribute to limited accuracy. Furthermore, to date it appears that the relationship between all of the variables of interest has not been explored in a forensic mental health setting, limiting the generalisability of previous findings. There is evidence of a relationship between trauma and violence (Neller et al., 2006; Song et al., 1998; Wolfe et al., 2004), childhood trauma and both symptoms of psychosis (positive symptoms and insight) and empathy (Parlar et al., 2014; Varese et al., 2012) and all of these factors and the perpetration of violence (Calatayud et al., 2012; Clements et al., 2007; Douglas et al., 2009; Witt et al., 2013); however, the relationship between all of these variables has not yet been investigated and there is significantly less exploration of this within the forensic mental health population. Another factor which is essential to consider when exploring these relationships is the impact of undertaking psychological therapy on these variables. Increasing insight and knowledge relating to the experience of mental illness, reducing distress associated with the experience of positive symptoms and increasing levels of empathy are all key treatment goals of psychological therapy within forensic mental health services (de Wied et al., 2020; Williams et al., 2013) and therefore participating in psychology work in likely to be a confounding factor in these relationships.

To address some of the limitations of previous research and further develop the evidence base for the impact of ACEs and violence, the current study will examine whether ACEs predict inpatient violent incidents in a clinical sample of individuals who have been detained in forensic inpatient services (low, medium, and high secure) using a mix of data extracted from case-notes, pre-collected data, and the NHS Datix system. Although it is likely that a proportion of the data within case-notes will also be self-report, data will also include clinician report and third-party information. The study aims to explore whether this relationship is mediated by positive symptoms of psychosis, insight and empathy and will examine the impact of specific
types of ACEs on types of violent incidents. The following hypotheses were proposed; 1) experience of ACEs predicts violent incidents in forensic inpatient settings; 2) Empathy, positive symptoms of psychosis and insight mediate the relationship between ACEs and inpatient violence; 3) different categories of ACEs vary in how predictive they are of violent incidents; 4) specific ACEs are related to specific types of violent incidents.

**Methodology**

*Design and Setting*

A retrospective prospective design was employed which included additional cross-sectional analyses and a follow up period of five years. A population cohort of adult inpatient forensic mental health patients was identified across Scotland’s forensic estate, through ‘The Scottish Forensic Network Inpatient Census’.

The Scottish Forensic Network Inpatient Census commenced in 2013 as an annual Scotland wide census relating to all forensic inpatients. Data were collected from case-notes from sites across Scotland and the ongoing Forensic Network inpatient database receive annual updates from participating sites.

Participants that were included in the census were: all inpatients within high and medium secure units across the Forensic Managed Care Network. Forensic inpatients were also identified from low secure units, rehab units, and intensive psychiatric care units (IPCUs) using the following definition of mentally disordered offenders:

“…suffer from a mental disorder… and come to the attention of the criminal justice system or whose behaviour poses a risk of such contact” (Scottish Office, 1999 – with update for 2003 Act).

Thirteen NHS sites whose patient group met study inclusion criteria and who had participated in ‘The Scottish Forensic Network Inpatient Census’ were approached for inclusion within this study. Specialist intellectual disability sites and non-NHS sites were
excluded. A total of ten sites agreed to participate. The study sampled from one high secure hospital (The State Hospital), two medium secure units (Rowanbank Clinic and The Orchard Clinic) and seven lower security units (Leverndale Hospital, Midpark Hospital, New Craigs Hospital, Royal Cornhill Hospital, Bellsdyke Hospital, Stratheden Hospital and Woodlands Hospital).

All patients resident within the participating units are detained under the Mental Health (Care and Treatment) (Scotland) Act 2003 or the Criminal Procedure (Scotland) Act 1995 due to being deemed to have a mental disorder and pose a risk of harm to others.

Participants

The study employed opportunity sampling whereby data were extracted for all participants who had been included in ‘The Scottish Forensic Inpatient Census’. The inclusion criteria required that participants must be adults, aged 18 or over and have been detained in a forensic mental health setting. Participants who had a diagnosis of an intellectual disability were excluded from the study due to the hypothesised difference in aetiology and rates of violence (Dickens, Picchioni, & Long, 2013).

Measures

1. Demographic Data

Data including age, ethnicity, diagnosis, index offence, history of violence, and diagnosis were collected through extraction of the pre-collected data from the Scottish Forensic Network Census.

2. Adverse Childhood Experiences

In the original ACE study (Felitti et al., 1998) the Adverse Childhood Experience Questionnaire (ACE-Q) was designed using adapted questions from the Conflicts Tactic Scale (Straus & Gelles, 1998) and the Childhood Trauma Questionnaire (CTQ; Bernstein, et al, 1994). This included 27 questions about informant’s experience of childhood abuse, neglect, and household dysfunction over their first 18 years of life. Respondents were
defined as exposed to a category if they responded ‘yes’, ‘often’ or ‘sometimes true’ to one or more of the questions in that category. The total number of these exposures (range: 0-10) was summed to create an ACE score. The 10-item ACE score has been widely used to assess the impact of adverse events on physical and psychological wellbeing, however critics of this approach suggest that this summed score prevents assessment of the psychological impact of each individual event, therefore this study will aim to explore each ACE individually in addition to a total score. Other criticisms of the ACE score include the variation in categories between screening tools and in ways of obtaining the score throughout the literature (Finklehor, 2018). Additionally these screening tools are still in the early stages of development and evaluation.

Throughout the literature there are several methods used to obtain ACE scores. However, as the current study will use extracted data from case-notes it is likely that using a standard ACE measure would lead to missing data specific to some questions and may lead to an under-reporting of ACEs.

One method that has been used to obtain a total ACE score has been use of the wider categories of ACEs within the original study (physical abuse, parental separation etc.) (Barra et al., 2018; Bejan et al., 2017; Drury et al., 2017; Rocca et al., 2017). However, one difficulty in utilising this method, is a lack of clear definition for each category of ACEs. As the primary method of data collection for this study was case-note extraction, this appeared to be the most appropriate method. Categories of ACEs which were explored are: ‘physical abuse’, ‘sexual abuse’, ‘household substance abuse’, ‘household mental illness’, ‘domestic violence’ and ‘parental divorce or separation’ as questions directly relating to each of these categories were included in the census questionnaire (E.g., ‘Is there a history of physical abuse? Victim of abuse, witnessed abuse, or both?’). Therefore ‘total ACE score’ ranged from 0-6. If data were missing for one category of ACE, a total score was calculated based on the assumption that the missing ACE was not present acknowledging that this may result
in an underestimation of ACEs. Participants missing data relating to two or more ACEs were excluded from analyses involving ‘total ACE score’.

3. **Psychosis Evaluation tool for Common use by Caregivers (PECC)**

The PECC is an evaluation and follow-up tool for individuals with psychosis which combines different functional and symptomatic outcome measures. It evaluates 20 symptom items on a 7-point scale and 2 additional items on a 4-point scale. It comprises of five domains of four symptoms including: positive (hallucinations, delusions, grandiosity, unusual thought content), negative (motor retardation, blunted affect, passive/apathetic withdrawal, poor rapport), depressive (anxiety, depression, guilt feelings, somatic concern), excitatory (excitement, poor impulse control, hostility, lack of co-operation) and cognitive (difficulty in abstract thinking, disorientation, conceptual disorganization, poor attention). Two additional items are included which evaluate the risk of self harm/suicide and level of insight into the experience of having a mental illness using a 4-point scale. The scores for each factor range from 4 to 28. It has good inter-rater reliability.

A revised version (PECC-R) is used within the forensic network. In this version the positive symptoms subscale and insight items are retained in full. As it is hypothesised that these factors are associated with increased violence risk in psychosis (Buckley et al., 2004; Calatayud et al., 2012; Smith et al., 2020; Swanson et al., 2006; Witt et al., 2013), data relating to both subscales were extracted for each participant. Research demonstrates good inter-rater reliability across both included subscales and concurrent validity with the PANSS was found to be good (Hert et al., 2002). All available PECC data were extracted from the 2013 census database and those administered for five years subsequently extracted from case-notes.

4. **The Behavioural Status Index (BEST)**

The BEST Index is a systematic clinical assessment which evaluates life skills, social risk, and related daily behaviour. It examines a range of normal behaviours to determine the extent to which each patient has reduced skills in specific social behaviours, insights, and
personal skills (Woods, Reed & Robinson, 2000; Woods, Reed, & Collins, 2001; Woods, Reed, & Robinson, 1999). It consists of six subscales (Social Risk, Insight, Communication and Social Skills, Work and Recreational Activities, Self and Family Care, and Empathy). There is evidence for the validity of the BEST Index’s structure and evidence that it is a clinically sensitive instrument useful in assessing behavioural change with forensic psychiatric patients (Ross et al., 2008).

The focus within this study is the Empathy subscale which is designed to assess the capacity of patients to empathise with others. It consists of 30 questions rated on a scale of 1-5. Data was obtained for all patients for whom a BEST was completed in the 2013 census and those administered for five years subsequently were extracted from case-notes.

5. **DATIX**

Inpatient violence was defined as “the actual, attempted or threatened infliction of bodily harm on another person” (Douglas et al., 2013). The DATIX system is electronic patient-safety software used within the NHS in which incidents are reported and recorded by reporters using forms available through local health board intranet servers (Irwin et al, 2011). Forms vary between health boards and sites, as do severity ratings. This variation in entry and ratings between different sites was overcome by use of the Overt Aggression Scale (OAS) (Yudofsky et al., 1986) to ensure a consistent definition of violent incident is applied across the forensic network incidents and to re-rate incidents on severity. Within the OAS, aggression is divided into 4 categories: verbal aggression, physical aggression against objects, physical aggression against self, and physical aggression against others. This method has been used in this way in previous research and has been found to have good inter-rater reliability (Smith et al., 2020).

Details of violent incidents relating to participants were extracted for a pseudo-prospective follow up period of five years from November 2013 to November 2018. Participants were followed up across the Forensic Network throughout this time, therefore data were obtained across multiple sites for participants who moved site. All participants who were discharged
from low secure services before the follow up period ended were included in the analysis, but length of stay during the follow up period, for which data was available, was controlled for.

**Ethical Approval**

Ethical Approval was granted by The State Hospital Research Committee and Scotland A Research and Ethics Committee. As the study used only archival data, approval to access this without obtaining participant consent was obtained by the Public Benefit Privacy Panel (PBPP). This ensured minimal disruption to patient care and treatment. Research and Development departments for all participating health boards also granted approval for the study.

**Procedure**

The data controller for ‘The Scottish Forensic Network Inpatient Census’ provided the following data which was sourced from the existing database and sent this via email:

- Demographic data: age, ethnicity, diagnosis, index offence, history of violence, and diagnosis.
- ACEs data: history of physical abuse, history of sexual abuse, history of household substance abuse, family history of mental illness, history of witnessing domestic violence, details relating to parental divorce or separation.
- Substance use history and psychological therapy input data
- PECC data
- BEST data
- Follow up data: information relating to patients who had been discharged annually between 2013-2018.

All participants were followed across the five-year period using the information provided to ensure full extraction of violent incidents from all relevant sites across this period. Discharge dates were obtained for those discharged into community settings or non-participating sites to allow calculation of the length of stay during follow up period for which data was available.
Relevant risk department or risk management staff at each site provided DATIX reports of violent incidents for all participants who had been resident there across the follow up period. These DATIX reports consisted of a narrative account of the incident, therefore the OAS was utilised to standardise the incidents.

IT analysts at The State Hospital provided a database of PECC and BEST data completed over the follow up period as this was the only site routinely administering both measures. Participants for whom scores on the BEST empathy and the PECC insight and positive subscales remained stable during the follow up period were eligible for inclusion. Stability was defined as deviating by less than 1 standard deviation from an individual’s mean score between their baseline measure and those during follow up.

All data was coded and entered into a central pseudo-anonymised database.

*Power calculation*

Following previous studies that have tested for mediation effects of symptoms of psychosis and/or empathy, a medium effect size was predicted. Fritz and MacKinnon (2007) provide guidelines for estimating required sample sizes necessary for detecting mediation effects and suggest that for a medium effect size a minimum sample size of 90 is required to achieve a power of .80 for most types of mediation analyses (Fritz & MacKinnon, 2007).

Use of non-parametric methods to detect mediation effects that do not require specific sample sizes such as the bootstrapping method have been recommended (Preacher & Hayes, 2004), therefore an estimated sample size of at least 71 participants is suggested (Fritz and MacKinnon, 2007).

For regression analyses, G*Power (Faul, Erdfelder, Lang, and Buchner, 2007) calculations suggested that for a multiple regression analysis, with an alpha level of 0.05, 8 predictor variables, a medium effect size, and a statistical power level of 0.80 would require a minimum of 108 participants.
**Statistical Analysis**

All data was analysed using SPSS version 24. Bivariate correlational analyses were conducted to explore the relationship between all predictor variables, potential covariates, and all dependent variables. Correlation matrix was inclusive for the purpose of determining variables best controlled for during regression analyses and understanding of shared variance but were not used to inform regression models which were led by a priori hypotheses. Violence categories were coded as ‘verbal aggression’, ‘physical aggression’ and ‘total violence’, where the ‘total violence’ comprised of a sum of both other categories. Hierarchical multiple regression analyses were utilised to predict the total number of violent incidents, number of incidents of verbal aggression and incidents of physical aggression. Regression analyses including each individual category of ACE were conducted using pairwise deletion to reduce loss of data. Mediation analyses were conducted to investigate the impact on symptoms of psychosis (measured by the insight and positive symptoms subscales within the PECC-R) and empathy (measured by the BEST empathy subscale) on the relationship between total number of ACEs and total number of violent incidents.

**Results**

**Participant characteristics**

The mean age of participants was 47.43 years (range = 23 - 81, SD = 11.79). There were a greater number of males than females (N = 316, 92.1%). The mean length of stay during the follow up period for which data was available was 1161.38 days (range = 7 – 1825, SD = 698.7). The mean number of protocol led psychological interventions completed prior to inclusion was 1.91 (range = 0 – 11, SD = 2.09). Further demographic information is provided in Table 1.
Table 1. Demographic and clinical characteristics of participants

<table>
<thead>
<tr>
<th>Demographics (N=343)</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>316</td>
<td>92.1</td>
</tr>
<tr>
<td>Female</td>
<td>26</td>
<td>7.6</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/White British</td>
<td>319</td>
<td>93</td>
</tr>
<tr>
<td>Mixed Race</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Asian/Asian British</td>
<td>6</td>
<td>1.8</td>
</tr>
<tr>
<td>Other ethnic group</td>
<td>6</td>
<td>1.8</td>
</tr>
<tr>
<td>Black/Black British</td>
<td>5</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Primary diagnosis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychotic Disorders</td>
<td>287</td>
<td>83.7</td>
</tr>
<tr>
<td>Personality Disorders</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>Bipolar Affective Disorder</td>
<td>15</td>
<td>4.4</td>
</tr>
<tr>
<td>Unknown</td>
<td>7</td>
<td>2.1</td>
</tr>
<tr>
<td>Intellectual Disability</td>
<td>4</td>
<td>1.2</td>
</tr>
<tr>
<td>Acquired Brain Injury</td>
<td>3</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Depressive Episode</td>
<td>3</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Substance Use</td>
<td>3</td>
<td>&lt;1</td>
</tr>
<tr>
<td>PTSD</td>
<td>2</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Dementia</td>
<td>2</td>
<td>&lt;1</td>
</tr>
<tr>
<td><strong>Level of security</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>120</td>
<td>35</td>
</tr>
<tr>
<td>Medium</td>
<td>75</td>
<td>21.9</td>
</tr>
<tr>
<td>High</td>
<td>148</td>
<td>43.1</td>
</tr>
<tr>
<td><strong>Substance use history</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Recreational</td>
<td>6</td>
<td>1.7</td>
</tr>
<tr>
<td>Dependence</td>
<td>337</td>
<td>98.3</td>
</tr>
<tr>
<td><strong>Number of psychological interventions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>115</td>
<td>33.5</td>
</tr>
<tr>
<td>1</td>
<td>64</td>
<td>18.7</td>
</tr>
<tr>
<td>2</td>
<td>58</td>
<td>16.9</td>
</tr>
<tr>
<td>3</td>
<td>41</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>28</td>
<td>8.2</td>
</tr>
<tr>
<td>5</td>
<td>11</td>
<td>3.2</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>13</td>
<td>3.8</td>
</tr>
<tr>
<td>8+</td>
<td>6</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Note. Diagnostic categories have been collapsed into conceptual groups however a full list of all diagnostic categories used is available in appendix 13.

Prevalence of ACEs

Details relating to prevalence of ACEs is presented in Table 2. A total ACE score was calculated and participants with missing data in two or more ACE categories were excluded from all analyses including total ACE score. In cases of missing data for one ACE category this was coded as ‘no’ and participants remained included in analyses using total ACE score.
Table 2. Prevalence of Adverse Childhood Experiences (ACEs)

<table>
<thead>
<tr>
<th>ACE category</th>
<th>Frequency</th>
<th>Percentage (%)</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household mental illness</td>
<td>198</td>
<td>72.3</td>
<td>69</td>
</tr>
<tr>
<td>Physical abuse</td>
<td>120</td>
<td>41</td>
<td>48</td>
</tr>
<tr>
<td>Parental divorce or separation</td>
<td>102</td>
<td>29.7</td>
<td>0</td>
</tr>
<tr>
<td>Household substance use</td>
<td>89</td>
<td>25.9</td>
<td>0</td>
</tr>
<tr>
<td>Witnessing domestic violence</td>
<td>69</td>
<td>20.4</td>
<td>5</td>
</tr>
<tr>
<td>Sexual abuse</td>
<td>64</td>
<td>21.9</td>
<td>51</td>
</tr>
</tbody>
</table>

Note. Percentages are calculated from total number of participants for whom data were available and exclude missing data.

The number of ACEs experienced ranged from zero to six, with 80.7% experiencing at least one. The distribution of total scores is summarised in Table 3. Individuals for whom ACE categories were missing are included only where data is available for them and no assumption on the presence or absence of ACEs was made in calculating prevalence. Forty-three participants (12.5%) were excluded from calculating a total ACE score due to data missing from more than one ACE category.

Table 3. Distribution of ACEs across the sample (N=300)

<table>
<thead>
<tr>
<th>Number of ACEs</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>58</td>
<td>19.3</td>
</tr>
<tr>
<td>1</td>
<td>76</td>
<td>25.3</td>
</tr>
<tr>
<td>2</td>
<td>56</td>
<td>18.7</td>
</tr>
<tr>
<td>3</td>
<td>55</td>
<td>18.3</td>
</tr>
<tr>
<td>4</td>
<td>33</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>19</td>
<td>6.3</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

Prevalence of violent incidents

Across the follow up period there were a total of 2,728 total incidents of violence. This included 1,560 (57.2%) incidents of verbal aggression and 1,168 (42.8%) incidents of physical aggression. 147 participants (42.9%) were recorded as engaging in no incidents of any type of violence during the follow up period and 192 (56%) participants were recorded as engaging in no incidents of physical aggression. Violence category scores and other variables of interest are summarised further in Table 4.
Table 4. Summary of study variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total violence</td>
<td>7.94</td>
<td>20.89</td>
<td>0 – 258</td>
</tr>
<tr>
<td>Verbal aggression</td>
<td>4.56</td>
<td>12.77</td>
<td>0 – 152</td>
</tr>
<tr>
<td>Physical aggression</td>
<td>3.38</td>
<td>9.47</td>
<td>0 – 106</td>
</tr>
<tr>
<td>PECC positive symptoms</td>
<td>8.87</td>
<td>5.49</td>
<td>4 - 24</td>
</tr>
<tr>
<td>PECC insight</td>
<td>2.21</td>
<td>0.99</td>
<td>0.71 – 4</td>
</tr>
<tr>
<td>BEST empathy</td>
<td>104.36</td>
<td>24.96</td>
<td>45.25 – 153.80</td>
</tr>
<tr>
<td>Length of stay</td>
<td>1161.35</td>
<td>698.67</td>
<td>7 – 1825</td>
</tr>
</tbody>
</table>

- a Range from 4 to 28 with higher scores indicating increased symptoms
- b Range from 1 to 4 with higher scores indicating reduced insight
- c Range from 30 to 150 with higher scores indicating increased empathy
- d Measured in days

Correlations

Variables were checked for normality visually and using the Kolmogorov-Smirnov test. All variables other than age were found to differ from a normal distribution (p < .05). Therefore, data were examined using Spearman Correlations for continuous variables and biserial correlations for dichotomous variables. Findings are summarised in Table 5.

Of note, significant positive associations were found between total ACE score and both total violence ($r (298) = .15$, $p = .009$) and verbal aggression ($r (298) = .16$, $p = .006$). Additionally, total violence was positively associated with PECC positive symptoms ($r (84) = .37$, $p < .001$), PECC insight ($r (81) = .33$, $p = .001$) and length of stay during follow up ($r (341) = .11$, $p = .018$) and negatively associated with empathy ($r (95) = -.49$, $p < .001$). These significant associations were replicated with the verbal aggression and physical aggression variables.

PECC positive symptoms was found to be associated with length of stay during follow up ($r (341) = .21$, $p = .39$), whilst PECC insight was negatively associated with completion of psychological interventions ($r (91) = -.32$, $p = .002$).
In terms of the categorical ACEs variables, physical abuse was positively associated with empathy ($r (91) = .31, p = .002$). Witnessing violence as a child was positively associated with empathy ($r (102) = .35, p < .001$), length of stay during follow up ($r (310) = .16, p = .006$), and negatively associated with PECC insight ($r (89) = -.21, p = .047$).

Due to significant associations with several outcome and hypothesised mediating variables completion of psychological interventions were controlled for in all further analyses. The substance use variable was not correlated with any predictor or mediating variables, and it lacked variance, with most participants (98.3%) recorded as having a historical dependence on substances. In consideration of this in addition to the lack of access to illegal substances within forensic inpatient services, it was deemed unnecessary to control for this variable in further analyses.
Table 5. Spearman’s Rho and Biserial Correlations

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Total ACEs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Physical abuse</td>
<td>.736**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Sexual abuse</td>
<td>.501**</td>
<td>.437**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Witnessing violence</td>
<td>.647**</td>
<td>.684**</td>
<td>.173**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Household substance use</td>
<td>.580**</td>
<td>.212**</td>
<td>.153**</td>
<td>.147**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Household mental illness</td>
<td>.520**</td>
<td>.244</td>
<td>.080</td>
<td>.183**</td>
<td>.170**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Parental separation</td>
<td>.519**</td>
<td>.108</td>
<td>.072</td>
<td>.183**</td>
<td>.313**</td>
<td>.129*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Total violence</td>
<td>.150**</td>
<td>.057</td>
<td>.109</td>
<td>.007</td>
<td>.009</td>
<td>.018</td>
<td>.018</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Verbal aggression</td>
<td>.159**</td>
<td>.080</td>
<td>.126*</td>
<td>.008</td>
<td>.010</td>
<td>.044</td>
<td>.008</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Physical aggression</td>
<td>.095</td>
<td>.017</td>
<td>.071</td>
<td>.027</td>
<td>.033</td>
<td>.019</td>
<td>.050</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Positive symptoms</td>
<td>-.033</td>
<td>-.066</td>
<td>-.093</td>
<td>-.151</td>
<td>.076</td>
<td>-.081</td>
<td>.065</td>
<td>.372**</td>
<td>.329**</td>
<td>.367*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Insight</td>
<td>-.053</td>
<td>-.131</td>
<td>.028</td>
<td>-.209*</td>
<td>.073</td>
<td>-.194</td>
<td>.129</td>
<td>.341**</td>
<td>.341**</td>
<td>.309**</td>
<td>.437**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Empathy</td>
<td>.198</td>
<td>.313**</td>
<td>.599</td>
<td>.346**</td>
<td>-.095</td>
<td>.005</td>
<td>-.025</td>
<td>-.489*</td>
<td>-.455**</td>
<td>-.414**</td>
<td>-.466**</td>
<td>-.504**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Substance use</td>
<td>-.057</td>
<td>-.003</td>
<td>.058</td>
<td>-.068</td>
<td>-.028</td>
<td>-.061</td>
<td>.010</td>
<td>.041</td>
<td>.012</td>
<td>.075</td>
<td>.163</td>
<td>.024</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Length of stay</td>
<td>.008</td>
<td>.059</td>
<td>.959</td>
<td>.157**</td>
<td>.058</td>
<td>-.053</td>
<td>.045</td>
<td>.157**</td>
<td>.166**</td>
<td>.111*</td>
<td>.214*</td>
<td>.120</td>
<td>.001</td>
<td>.863</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Age</td>
<td>-.058</td>
<td>-.014</td>
<td>.132</td>
<td>-.027</td>
<td>-.083</td>
<td>-.137*</td>
<td>.073</td>
<td>.004</td>
<td>.039</td>
<td>-.064</td>
<td>-.071</td>
<td>.191</td>
<td>-.071</td>
<td>.120*</td>
<td>.079</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Psychological Interventions</td>
<td>.046</td>
<td>-.028</td>
<td>.105</td>
<td>.043</td>
<td>.069</td>
<td>-.014</td>
<td>.018</td>
<td>-.051</td>
<td>-.023</td>
<td>-.086</td>
<td>-.112</td>
<td>-.317**</td>
<td>.117</td>
<td>-.049</td>
<td>.144*</td>
<td>.057</td>
<td></td>
</tr>
</tbody>
</table>
**Multiple regression analyses**

To investigate the hypothesis that ACEs predict inpatient violence, hierarchical multiple regression analyses were conducted. The multiple regression model was tested separately for all three categories of violence (total, verbal, physical) whilst controlling for length of stay which data were available for during the examined period and psychological interventions.

Data were screened to ensure regression assumptions were met. The assumption of homoscedasticity was assessed by visual inspection of a plot of studentized residuals versus unstandardised predicted values and found to be violated. Log transformations were used on the total violence, verbal aggression and physical aggression variables and a constant of 1 added to each value to ensure inclusion of zero values as recommended (Osborne, 2002; Field, 2013). Although there appeared to be outliers from visual inspection examination of Cook’s distance confirmed no points exceeded the respective critical values. Variation inflation factors were below 10 (Bowerman & O’connell, 1990), tolerance values were found to be more than 0.2 (Menard, 1995). The assumption of normality of residuals was found to be violated for the total violence, verbal aggression, and physical aggression analyses, therefore a bootstrapping method of sampling (1000 samples) was to increase the robustness of the regression model (Field, 2013).

Hierarchical multiple regressions were run to determine if the addition of total ACE score improved the prediction of total violence, verbal aggression, and physical aggression over length of stay during the follow up period and previous psychological intervention. See Table 6 for full details on regression models exploring total ACE scores. Length of stay during the follow up period and previous psychological interventions were entered at step one in all models to control for their effect as potential covariates and Total ACE score was added at step two.

A similar procedure was employed to determine if the addition of each of the six ACE categories (physical abuse, sexual abuse, witnessing violence, household substance use,
household mental illness and parental separation) improved the prediction of total violence, verbal aggression, and physical aggression over length of stay and previous psychological intervention (Table 7). Length of stay during the follow up period for which data was available and previous psychological interventions were entered at step one in all models to control for their effect as potential covariates and each of the ACE categories were added at step two.

Multiple regression 1: Total ACES predicting total violence

Model one (covariates) was found to be significant $R^2 = .03$, $F(2, 278) = 4.31$, $p = .01)$. The full model of previous psychological interventions, length of stay during follow up and total ACEs to predict total violence reached statistical significance $R^2 = .04$, $F(3, 277) = 3.77$, $p = .01$). When examining the bootstrapped coefficients length of stay during follow up was found to be the only significant predictor of total violence ($B < .001$, $p = .006$) with longer lengths of stay predicting higher levels of total violence.

Multiple regression 2: Total ACEs predicting verbal aggression

Model one (covariates) was found to be significant $R^2 = .03$, $F(2, 278) = 4.02$, $p = .02)$. The full model of previous psychological interventions, length of stay during follow up and total ACEs to predict total violence reached statistical significance $R^2 = .04$, $F(3, 277) = 3.87$, $p = .01)$. When examining the bootstrapped coefficients length of stay during follow up was found to be a significant predictor of verbal aggression ($B < .001$, $p = .01$) with longer lengths of stay predicting higher levels. Total ACE score was also found to be a significant positive predictor of verbal aggression ($B = .04$, $p = .03$) with higher ACE scores predicting verbal aggression.

Multiple regression 3: Total ACEs predicting physical aggression

The full model of previous psychological interventions, length of stay during follow up and total ACEs to predict physical aggression did not reach statistical significance $R^2 = .02$, $F (3, 277) = 1.48$, $p = .22)$. 81
Multiple regression 4: Individual ACE categories predicting total violence score

Model one (covariates) was found to be significant $R^2 = .03$, $F(2, 221) = 3.85$, $p = .02$. The full model of previous psychological interventions, length of stay during follow up, physical abuse, sexual abuse, witnessing violence, household substance use, household mental illness and parental separation to predict total violence was significant $R^2 = .07$, $F(8, 215) = 2.02$, $p = .045$). When examining the bootstrapped coefficients previous psychological input was a significant negative predictor of total violence score ($B = -.04$, $p = .02$) with fewer psychological interventions predicting higher levels of violence. Length of stay during follow up was a significant positive predictor of total violence ($B < .001$, $p = .02$) with a longer length of stay predicting higher violence scores. Experience of sexual abuse was the only ACE which was found to be a significant predictor of total violence ($B = .24$, $p = .01$).

Multiple regression 5: Individual ACE categories predicting verbal aggression

Model one (covariates) was found to be significant $R^2 = .03$, $F(2, 221) = 3.07$, $p = .048$). The full model of previous psychological interventions, length of stay during follow up, physical abuse, sexual abuse, witnessing violence, household substance use, household mental illness and parental separation to predict verbal aggression did not reach statistical significance $R^2 = .06$, $F(8, 215) = 1.88$, $p = 0.06$). When examining the bootstrapped coefficients psychological intervention was found to be the only significant predictor of verbal aggression ($B = -0.05$, $p = 0.006$).

Multiple regression 6: Individual ACE categories predicting physical aggression

The full model of previous psychological interventions, length of stay during follow up, physical abuse, sexual abuse, witnessing violence, household substance use, household mental illness and parental separation to predict physical aggression did not reach statistical significance $R^2 = .05$, $F(8, 215) = 1.27$, $p = .26$).
Table 6. Bootstrap hierarchical multiple regression analyses summary statistics: Predicting total violence, verbal aggression and physical aggression with total ACE score, length of stay during follow up and previous psychological intervention.

<table>
<thead>
<tr>
<th>Step</th>
<th>Predictor Variables</th>
<th>B</th>
<th>Bias</th>
<th>Std. Error</th>
<th>p value</th>
<th>95% CI - Lower</th>
<th>95% CI - Upper</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Total Violence</strong></td>
<td><strong>.039</strong></td>
<td><strong>.029</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td>Constant</td>
<td>.394</td>
<td>-.001</td>
<td>.066</td>
<td>.001</td>
<td>.260</td>
<td>.523</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Length of stay</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.000</td>
<td>.004**</td>
<td>&lt;.001</td>
<td>&lt;.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychological Interventions</td>
<td>-.025</td>
<td>.001</td>
<td>.014</td>
<td>.087</td>
<td>-.050</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>Constant</td>
<td>.326</td>
<td>-.001</td>
<td>.080</td>
<td>.001</td>
<td>.171</td>
<td>.494</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Length of stay</td>
<td>&lt;.000</td>
<td>&lt;.001</td>
<td>&lt;.000</td>
<td>.006**</td>
<td>&lt;.001</td>
<td>&lt;.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychological Interventions</td>
<td>-.025</td>
<td>.001</td>
<td>.014</td>
<td>.080</td>
<td>-.050</td>
<td>.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total ACE score</td>
<td>.035</td>
<td>&lt;.001</td>
<td>.018</td>
<td>.060</td>
<td>-.002</td>
<td>.070</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Verbal Aggression</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td>Constant</td>
<td>.273</td>
<td>-.004</td>
<td>.055</td>
<td>.001</td>
<td>.171</td>
<td>.387</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Length of stay</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>.011*</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychological Interventions</td>
<td>-.019</td>
<td>.001</td>
<td>.012</td>
<td>.102</td>
<td>-.040</td>
<td>.007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>Constant</td>
<td>.204</td>
<td>-.005</td>
<td>.066</td>
<td>.001</td>
<td>.069</td>
<td>.329</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Length of stay</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>.010*</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychological Interventions</td>
<td>-.019</td>
<td>.001</td>
<td>.012</td>
<td>.100</td>
<td>-.040</td>
<td>.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total ACE score</td>
<td>.035</td>
<td>&lt;.001</td>
<td>.016</td>
<td>.034*</td>
<td>.005</td>
<td>.069</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Physical Aggression</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td>Constant</td>
<td>.247</td>
<td>&lt;.001</td>
<td>.051</td>
<td>.001</td>
<td>.150</td>
<td>.353</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Length of stay</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>.063</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychological Interventions</td>
<td>-.014</td>
<td>.001</td>
<td>.011</td>
<td>.231</td>
<td>-.035</td>
<td>.010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>Constant</td>
<td>.231</td>
<td>.001</td>
<td>.061</td>
<td>.001</td>
<td>.120</td>
<td>.349</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Length of stay</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>.066</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychological Interventions</td>
<td>-.014</td>
<td>.001</td>
<td>.011</td>
<td>.220</td>
<td>-.035</td>
<td>.010</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total ACE score</td>
<td>.008</td>
<td>&lt;.001</td>
<td>.014</td>
<td>.591</td>
<td>-.020</td>
<td>.034</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the p<0.05 level **significant at the p<0.01 level
Table 7. Bootstrap hierarchical multiple regression analyses summary statistics: Predicting total violence, verbal aggression, and physical aggression with each individual ACE category, controlling for length of stay during follow up and previous psychological intervention.

<table>
<thead>
<tr>
<th>Step</th>
<th>Predictor Variables</th>
<th>B</th>
<th>Bias</th>
<th>Std. Error</th>
<th>p value</th>
<th>95% CI Lower</th>
<th>95% CI Upper</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Violence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.070</td>
<td>.035</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>Constant</td>
<td>.444</td>
<td>.004</td>
<td>.073</td>
<td>.001</td>
<td>.310</td>
<td>.592</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td>Length of stay</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>.031*</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychological Interventions</td>
<td>-.034</td>
<td>-0.01</td>
<td>.015</td>
<td>.030*</td>
<td>-.063</td>
<td>-.003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>Constant</td>
<td>.329</td>
<td>-.002</td>
<td>.097</td>
<td>.002</td>
<td>.138</td>
<td>.522</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Length of stay</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>.018*</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychological Interventions</td>
<td>-.037</td>
<td>-.001</td>
<td>.015</td>
<td>.015*</td>
<td>-.066</td>
<td>-.008</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Physical abuse</td>
<td>-.078</td>
<td>-.003</td>
<td>.120</td>
<td>.509</td>
<td>-.304</td>
<td>.156</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sexual abuse</td>
<td>.241</td>
<td>.001</td>
<td>.098</td>
<td>.014*</td>
<td>.056</td>
<td>.449</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Witnessing violence</td>
<td>-.039</td>
<td>-.001</td>
<td>.131</td>
<td>.741</td>
<td>-.308</td>
<td>.220</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Household substance use</td>
<td>.033</td>
<td>.002</td>
<td>.089</td>
<td>.070</td>
<td>-.129</td>
<td>.212</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Household mental illness</td>
<td>.108</td>
<td>.011</td>
<td>.092</td>
<td>.237</td>
<td>-.072</td>
<td>.306</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parental separation</td>
<td>.033</td>
<td>-.004</td>
<td>.078</td>
<td>.658</td>
<td>-.128</td>
<td>.187</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>Verbal Aggression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.063</td>
<td>.028</td>
</tr>
<tr>
<td>Step 1</td>
<td>Constant</td>
<td>.302</td>
<td>.003</td>
<td>.057</td>
<td>.001</td>
<td>.196</td>
<td>.421</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Length of stay</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>.099</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychological Interventions</td>
<td>-.042</td>
<td>-.001</td>
<td>.015</td>
<td>.006**</td>
<td>-.073</td>
<td>-.013</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>Constant</td>
<td>.207</td>
<td>.002</td>
<td>.077</td>
<td>.009</td>
<td>.067</td>
<td>.361</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Length of stay</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>.050</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychological Interventions</td>
<td>-.046</td>
<td>-.001</td>
<td>.016</td>
<td>.003**</td>
<td>-.079</td>
<td>-.016</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Physical abuse</td>
<td>-.109</td>
<td>-.003</td>
<td>.114</td>
<td>.342</td>
<td>-.321</td>
<td>.131</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sexual abuse</td>
<td>.160</td>
<td>.002</td>
<td>.096</td>
<td>.098</td>
<td>-.009</td>
<td>.360</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Witnessing violence</td>
<td>.011</td>
<td>-.004</td>
<td>.117</td>
<td>.934</td>
<td>-.213</td>
<td>.237</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Household substance use</td>
<td>.060</td>
<td>.005</td>
<td>.082</td>
<td>.474</td>
<td>-.095</td>
<td>.220</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Household mental illness</td>
<td>.060</td>
<td>.005</td>
<td>.076</td>
<td>.431</td>
<td>-.085</td>
<td>.216</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parental separation</td>
<td>.102</td>
<td>-.003</td>
<td>.068</td>
<td>.136</td>
<td>-.035</td>
<td>.238</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>Physical Aggression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.045</td>
<td>.009</td>
</tr>
<tr>
<td>Step 1</td>
<td>Constant</td>
<td>.287</td>
<td>.002</td>
<td>.059</td>
<td>.001</td>
<td>.172</td>
<td>.414</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Length of stay</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>.127</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychological Interventions</td>
<td>-.022</td>
<td>-.001</td>
<td>.012</td>
<td>.077</td>
<td>-.047</td>
<td>.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>Constant</td>
<td>.223</td>
<td>-.001</td>
<td>.080</td>
<td>.005</td>
<td>.076</td>
<td>.381</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Length of stay</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>.086</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychological Interventions</td>
<td>-.023</td>
<td>-.001</td>
<td>.012</td>
<td>.063</td>
<td>-.048</td>
<td>-.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Physical abuse</td>
<td>-.042</td>
<td>-.001</td>
<td>.092</td>
<td>.645</td>
<td>-.216</td>
<td>.146</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sexual abuse</td>
<td>-.140</td>
<td>-.001</td>
<td>.080</td>
<td>.078</td>
<td>-.017</td>
<td>.306</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Witnessing violence</td>
<td>-.045</td>
<td>.006</td>
<td>.102</td>
<td>.635</td>
<td>-.274</td>
<td>.141</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Household substance use</td>
<td>-.031</td>
<td>.001</td>
<td>.068</td>
<td>.663</td>
<td>-.166</td>
<td>.110</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Household mental illness</td>
<td>.102</td>
<td>.004</td>
<td>.070</td>
<td>.148</td>
<td>-.034</td>
<td>.244</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parental separation</td>
<td>-.037</td>
<td>.002</td>
<td>.063</td>
<td>.549</td>
<td>-.161</td>
<td>.081</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the p<0.05 level **significant at the p<0.01 level
**Mediation analyses**

To investigate the hypothesis that symptoms of psychosis and level of empathy mediate the relationship between ACEs and inpatient violence mediation analyses were conducted in a subsample analysis. Hayes (2017) suggests that when no correlation is found between the independent variable and the dependent variable, mediation analysis can still be conducted, therefore all violence categories were included. The mediation model proposed that empathy, insight, and positive symptoms would mediate the relationship between total ACE score and violence whilst controlling for length of stay during the period examined and number of psychological interventions. The mediation model was tested separately for all three categories of violence (total, verbal, physical) and each mediating variable was tested separately to reduce loss of data. Overall, indirect, and direct effects were computed with 95% confidence intervals and p-values. A bias corrected bootstrap method of mediation was applied which does not assume normal distribution and corrects for skew in the population (Manly, 2018). Effects were deemed to be statistically significant at the .05 level of the bias-corrected 95% confidence interval (CI) when the CI does not include zero.

**Mediation analyses for ‘total incidents of violence’**

Mediation model 1: Total ACEs, positive symptoms, and total incidents of violence (N = 86)

Results demonstrated a 95% CI of -0.06 to 0.02. As the CI interval includes zero, this indicates that positive symptoms of psychosis did not mediate the relationship between total ACEs and total incidents of violence. The model explained 23.1% of the variance in total incidents of violence when controlling for covariates.

\[
\begin{align*}
    a &= -0.31 \\
    b &= 0.05^{***} \\
    c' &= 0.11
\end{align*}
\]

**Note.** *p<0.05 **p<0.01 ***p<0.001*
Mediation model 2: Total ACEs, insight, and total incidents of violence (N = 83)

Results demonstrated a 95% CI of -0.05 to 0.02 indicating that insight did not significantly mediate the relationship between total ACEs and total incidents of violence. The model explained 14% of the variance in total incidents of violence when controlling for covariates.

\[ a = -0.06 \]
\[ b = 0.2^{**} \]
\[ c' = -0.006 \]

Note. *p<0.05 **p<0.01 ***p<0.001

Mediation model 3: Total ACEs, empathy, and total incidents of violence (N = 97)

Results demonstrated a 95% CI of -0.09 to <0.001 indicating that empathy did not significantly mediate the relationship between total ACEs and total incidents of violence. The model explained 24.8% of the variance in total incidents of violence when controlling for covariates.

\[ a = 2.95 \]
\[ b = -0.01^{***} \]
\[ c' = 0.03 \]

Note. *p<0.05 **p<0.01 ***p<0.001

Mediation analyses for ‘verbal aggression’

Mediation model 4: Total ACEs, positive symptoms, and verbal aggression (N = 86)

Results demonstrated a 95% CI of -0.06 to 0.02 indicating that positive symptoms did not significantly mediate the relationship between total ACEs and verbal aggression. The model
explained 19.5% of the variance in total incidents of verbal aggression when controlling for covariates.

\[ a = -0.31 \]
\[ b = 0.05^{***} \]
\[ c' = 0.01 \]

Note. *p<0.05  **p<0.01  ***p<0.001

Mediation model 5: Total ACEs, insight, and verbal aggression (N = 83)

Results demonstrated a 95% CI of -0.01 to 0.014 indicating that insight did not significantly mediate the relationship between total ACEs and verbal aggression. The model explained 12.2% of the variance in total incidents of violence when controlling for covariates.

\[ a = -0.06 \]
\[ b = 0.18^{**} \]
\[ c' < 0.001 \]

Note. *p<0.05  **p<0.01  ***p<0.001

Mediation model 6: Total ACEs, empathy, and verbal aggression (N = 97)

Results demonstrated a 95% CI of -0.08 to <0.001 indicating that empathy did not significantly mediate the relationship between total ACEs and verbal aggression. The model explained 26.4% of the variance in total incidents of violence when controlling for covariates.

\[ a = 2.95 \]
\[ b = -0.01^{***} \]
\[ c' = 0.04 \]

Note. *p<0.05  **p<0.01  ***p<0.001

87
Mediation analyses for ‘physical aggression’

Mediation model 7: Total ACEs, positive symptoms, and physical aggression against others (N = 86)

Results demonstrated a 95% CI of -0.05 to 0.02. Positive symptoms did not significantly mediate the relationship between total ACEs and physical aggression. The model explained 23.7% of the variance in total incidents of violence when controlling for covariates.

\[ a = -0.31 \]
\[ b = 0.04^{***} \]
\[ c' = 0.01 \]

Note. *p<0.05 **p<0.01 ***p<0.001

Mediation model 8: Total ACEs, insight, and physical aggression (N = 83)

Results of the mediation model demonstrated a 95% CI of -0.03 to 0.009. Insight did not significantly mediate the relationship between total ACEs and physical aggression. The model explained 12.2% of the variance in total incidents of violence when controlling for covariates.

\[ a = -0.06 \]
\[ b = 0.14^{**} \]
\[ c' = -0.01 \]

Note. *p<0.05 **p<0.01 ***p<0.001

Mediation model 9: Total ACEs, empathy, and physical aggression (N = 96)

Results demonstrated a 95% CI of -0.05 to <0.001. Empathy did not significantly mediate the relationship between total ACEs and physical aggression. The model explained 12.7% of the variance in total incidents of violence when controlling for covariates.
Table 8 summarises the indirect effects of positive symptoms, insight, and empathy and demonstrates no mediating relationships between hypothesised mediators (positive symptoms, insight, and empathy) and total ACE scores and violence (total, verbal aggression and physical aggression).

Discussion

This study aimed to explore the relationship between ACEs and violence within forensic inpatient settings whilst considering symptoms of psychosis and empathy as potential mediators of this relationship. Length of stay during the follow up period for which data were available and previously completed psychological interventions were examined as potential covariates in line with previous findings (Boles & Miotto, 2003; Papalia et al., 2019) and theoretical rationale.

Findings are in partial support of first hypothesis, that the experience of ACEs predicts violent incidents, with significant associations being found between total ACE score and both, total violence, and verbal aggression. However, the same was not found in relation to...
the physical violence only measure. Total ACE score was found to significantly predict verbal aggression but not total violence or physical violence.

The second hypothesis suggested that empathy, positive symptoms of psychosis and insight would mediate the relationship between ACEs and inpatient violence. Findings did not support this, with no evidence of mediation found. However, all three hypothesised mediating variables were found to significantly predict all types of violence in line with the literature (Calatayud, 2012; Douglas et al., 2009; Smith et al., 2020; Swanson et al., 2006; Witt et al., 2013).

Hypothesis 3 and 4 explored if different categories of ACEs vary in how predictive they are of different types of violent incidents and findings suggest only one of the six ACE categories (sexual abuse) significantly predicted total violence, whilst none of the six categories of ACE were predictive of verbal aggression or physical violence. In addition to this, care should be taken when interpreting all positive findings as all observed effect sizes were small.

A total of 80.7% of participants experienced at least one ACE which is in line with previous findings of 84.2% in groups of prisoners (Ford et al, 2019) and 79.4% found by Stinson et al (2021) in a forensic inpatient sample. A cumulative effect of ACEs has been suggested and several studies have identified four or more ACEs as being associated with poorer outcomes (Anda et al, 2006; Chapman, Dube & Anda, 2007; Mersky, Topitzes & Reynolds, 2013). 18.3% of participants had experienced four or more ACEs in the current study. Although this remains higher than the 5-12% found in the general population (Ujhelyi Nagy et al, 2019; Ford et al, 2019), this finding is lower than that found in similar population studies. For example, Stinson et al (2021) found that 32.2% of FMH inpatients had experienced four or more ACES and Ford et al (2019) found that 46% of UK prisoners had similarly. This discrepancy may have resulted from the current study’s inclusion of only six categories of adverse childhood experience which is less than the 9 categories utilised by Stinson et al (2021) and the typical 8-11 defined in the literature (Brown et al., 2010; Dube et al., 2003; Ford et al., 2019). Additionally, participants for whom data from one ACE category was
missing were coded as this being not present, to reduce loss of data. It is therefore likely that prevalence rates in this sample are underestimated.

Household mental illness was the most experienced ACE with nearly 75% of participants for whom data was available having experienced this. Interestingly this was also the ACE category for which there was the largest proportion of missing data, indicating this may be underestimated. However, this is higher than previous rates in forensic mental health populations, which have suggested rates of around 42% (Stinson et al., 2021), therefore missing data in the current study may indicate lack of presence instead. These rates are important when considering the link between ACEs and mental illness (Ranu et al., 2020; Zarse et al., 2019). Findings suggest that ACEs do not predict positive symptoms of psychosis, lack of insight and lack of empathy despite the high prevalence of both. This appears to contradict the traumagenic neurodevelopmental model of psychosis (Read et al., 2001) and suggests that there may be alternative factors influencing the development and severity of psychotic symptoms, perhaps stressors or genetic factors. Family history of mental illness has been found to be one of the strongest predictors of the development of psychosis (Mortensen, Pedersen & Pedersen, 2010) and the high rates in this sample of household mental illness may be indicative of this as 83.7% of the sample had a psychotic disorder. However, it is important to consider additional factors contributing to the difference in findings. One factor which may have limited analyses including symptoms of psychosis and empathy was the reduced size of subsample analyses. Data related to symptoms of psychosis and empathy were only available from one site and therefore were significantly smaller. Additionally, participants were only included if their scores on these measures remained stable across the follow up period, which contributed to loss of data and may have introduced bias. Consideration of the difference in constructs between the current study and previous research is also essential in interpreting findings. Literature relating to the traumagenic neurodevelopmental model has focused on a more specific definition of ‘childhood abuse’ than that of ACEs used in the current study, with most supportive research focused on physical, sexual, and emotional abuse and neglect (Read et al., 2001). In this sample 41% of participants had experienced physical abuse and 21.9% had experienced
sexual abuse which is lower than similar rates found in FMH populations. Stinson et al (2021) found that 58.9 % of patients had experienced physical abuse and 33.3% had experienced sexual abuse in line with previous studies (Spidel et al., 2010). In this study, the physical and sexual abuse categories were the 2nd and 3rd highest for missing data points, therefore the rates may have been underestimated making it harder to identify a significant relationship between these ACE categories and psychosis. Lastly, the exclusion of additional ACE categories which fall within the definition of child abuse, such as neglect and emotional abuse, may also be contributing to differences in the findings.

The relationship between ACEs and violence was the primary focus of the current study, however findings only partially support the hypothesis that ACEs predict violence. A significant association was found between total ACE score and both total violence and verbal aggression, however in regression analyses ACE score only significantly predicted verbal aggression suggesting other factors contribute to the perpetration of incidents of physical aggression over and above trauma history. This may also have been related to controlling for relevant factors such as length of stay during the follow up period for which data were available and completed psychological interventions. Previous research by Dudeck et al (2016) exploring ACEs and violence in a FMH setting have found similarly non-significant relationships between ACEs and total violence, with ACEs predictive only of suicide attempts. Similarly, MacInnes et al (2016) explored childhood trauma, rather than ACEs, and inpatient violence and found no significant relationship. However, research exploring this relationship in prison populations (De Ravello, Abeita & Brown, 2008; Wang et al., 2012) and young offender institutions (Fox et al., 2015) has found contrasting results. Additionally, studies exploring maltreatment and violence more generally in reviews with a range of population groups have found evidence of a significant relationship (Fitton, Yu & Fazel, 2020). There is only one known study which found a significant relationship between experiencing physical abuse and assultive behaviour in an inpatient FMH population (Hoptman et al, 1999), however this is of poor quality due to lack of consideration for effective follow up and a high level of dropout, which limit the validity of its findings. This is in line with findings within the previously discussed review, and suggestive of a difference in
the impact of trauma and ACEs in FMH settings. Additionally, findings indicate that only one category of ACE (sexual abuse) is predictive of violence. This finding mirrors those found with adolescents (Duke et al., 2010; Miller et al., 2011) and in non-forensic adult populations (Goodman et al., 2020; Milaniak & Widom, 2015) although much of the previous research has focused on the relationship between sexual abuse and perpetration of sexual violence (Jespersen, Lalumière & Seto, 2009; Levenson, Willis & Prescott, 2016). This finding is important in consideration of treatment planning, as it may contribute to wider risk assessment. Additionally, further exploration of the pathway by which sexual abuse predicts violent incidents is important as this appears to contradict previous hypotheses informed by social learning theory suggesting that physical abuse is the most important predictor of physical violence (Banducci et al., 2014). It may be that dysregulation related to the experience of sexual abuse is a more likely explanation (Dvir et al., 2014). It is clear that there are a range of outcomes across the literature which are dependent on factors such as the definition of childhood adversity and the population group/setting.

FMH services differ from other settings in a few key ways which may also influence the relationship between ACEs and violence. They tend to have highly specialised staff and use of multidisciplinary treatment plans to assess and manage risk (O'Sullivan et al., 2020) which may result in differing violence rates. Rates of violence are difficult to compare across settings due to variable definitions and measurement, however a total of 57.1% of participants in the current study engaged in at least one act of violence or aggression across the follow up period. This is in line with similar rates in other FMH studies which range from 31-58% (Broderick et al., 2015; Verstegen et al., 2017) and significantly higher than those found in non-forensic psychiatric settings (Iozzino et al., 2015) and prisons (HM Prison and Probation Digest, 2021). Further exploration of the differing rates between settings may aid further understanding of the relationships between key variables and how these may vary.

Another significant consideration in FMH settings, is the detaining of patients for treatment for mental illness and the additional impact of both symptoms of mental illness and any form of treatment. Secondary hypotheses in the study explored symptoms of psychosis and
empathy, which have been shown to be related to increased violence risk (Buckley et al., 2004; Calatayud et al., 2012; Jolliffe & Farrington, 2004; Smith et al., 2020; Swanson et al., 2006; Witt et al., 2013), as potential mediators in the relationship between ACEs and violence. Findings do not support this hypothesis; however, all three variables (empathy, positive symptoms, and insight) were found to significantly predict all types of violence. This suggests that increased positive symptoms of psychosis, reduced insight and reduced empathy are predictive of increased violence in FMH services. This is in line with previous research and an important consideration in risk assessment and management within specialist FMH settings, suggesting there is a significant difference in this population group which contributes towards violence risk.

In addition to the impact of symptoms, treatment is an important consideration. In the current study previously completed psychological interventions were found to be negatively associated with insight. As higher insight scores indicate lower levels of insight this appears to be suggestive of an improvement in insight as psychological interventions are undertaken. As discussed, insight was found to predict all types of violence, therefore an increase in psychological interventions undertaken may indirectly result in reduced violence. In support of this, the multiple regression analyses indicate completion of psychological interventions significantly negatively predicted total violence and verbal aggression. This is indicative of a reduction in violent and verbally aggressive incidents as the number of completed psychological interventions increases. It is likely that the high numbers of patients in FMH settings receiving these kinds of interventions may lead to a reduction in incidents of violence and aggression and findings which differ from other populations. This is a positive finding which supports the efficacy of psychological interventions in reducing violence within FMH inpatient settings, although as this was not the primary focus of the current study, further exploration would be merited.

Limitations

Use of only six categories of ACEs within the current study is a significant limitation. Across the literature there are a range of defined categories used which range from 8 to 12 (Brown
et al., 2010; Brown et al., 2009; Dube et al., 2003; Ford et al., 2019). The exclusion of neglect in the present study— one of the primary ACEs defined in the original study (Felitti et al., 1998)— significantly limits our findings given the strong evidence base supporting its impact (Bland, Lambie & Best, 2018; Hildyard & Wolfe, 2002; Teicher et al., 2004). Due to use of an existing database, in addition to the large sample size and geographical area covered, it was not possible to fully review each participant’s case notes to extract data relating to their experience of neglect. Instead, the study relied on pre-extracted data relating to the experience of ACEs which did not include neglect. Relatedly, data for different categories of ACEs had high rates of missing data points, and these were highest for physical abuse, sexual abuse, and household mental illness. This may be indicative of difficulties in disclosing this information, reluctance of clinicians to ask questions or a lack of use of structured screening tools and means any new findings should be interpreted tentatively.

Unfortunately, two sites opted out of participation in the current study, which meant that a proportion of participants who met inclusion criteria were excluded. This reduced the sample size, but also prevented larger subsample analyses due to loss of additional participants for whom the PECC and BEST would have been routinely completed. This resulted in being powered to detect a medium effect size. An additional consequence of two non-participating sites was a reduction in the proportion of follow up period for which data were available for participants who remained eligible but had been admitted to one or both of those sites.

Related to this, follow up periods during which violence incidents were measured varied significantly across the sample due to participant movement within the forensic system and being lost to follow up. Attempts were made to minimise the impact of this by controlling for the number of days during the follow up for which data were available for each participant in analyses.

Additionally, limited PECC-R and BEST data meant it was not possible to control for the impact of symptoms of mental illness on the whole sample analysis.
Lastly, a significant limitation was the lack of diversity. The sample was primarily male (92.1%), and most participants were white (93%), which prevents exploration of potential impacts of gender and ethnicity. There is evidence of an impact of race and gender on experience of ACEs (Leban & Gibson, 2020; Maguire-Jack, Lanier & Lombardi, 2020; Sacks & Murphey, 2018; Zettler et al., 2018); as well as evidence of racial bias in the forensic mental health system (Schwartz & Blankenship, 2014; Perry, Neltner & Allen, 2013) therefore increasing diversity in research is important to ensure accurate, generalisable findings and reduce bias.

**Clinical Implications**

The high prevalence rates of all ACEs within the current study are a significant finding which supports a trauma-informed model of service delivery. This is now widely accepted within the field (Hamberger, Barry & Franco, 2019; Sweeney et al, 2016; Tomaz & Castro-Vale, 2020), however measurement of this is difficult and continued effort to use a ‘trauma-informed lens’ from which forensic mental health services can be viewed will continue to be of benefit for a population whose rates of trauma experiences are higher than the general population (Stinson et al., 2021). Findings suggesting that total ACEs and sexual abuse are related to, and predictive of, violence and aggression support this and demonstrate the serious impact of traumatic experiences on outcomes such as staff and patient safety, within forensic mental health services. However care should be taken when interpreting these findings clinically as observed effect sizes in the current study were small. Despite this, this study highlights the importance of trauma-focused treatment not only to benefit the individual but also to benefit the staff and service supporting them and reinforces the importance of ensuring risk assessment considers the impact of ACEs and trauma more generally. More widely available trauma-focused psychological interventions for all patients may be of benefit in increasing awareness and knowledge through psychoeducation and reducing the likelihood of negative outcomes such as violence by increasing emotion regulation skills.

Positive symptoms, insight and empathy have also been shown to be significant predictors of violence and are also extremely important to consider clinically in risk management.
Robust assessment and treatment of these clinical factors is essential for services and treatment which aims at improving these for individuals is key in reducing their risk of violence during admissions.

**Future Research**

Future research would be of benefit which includes additional ACEs which were not explored in the current study. Neglect would be key due to the significant evidence base for its impact (Bland, Lambie & Best, 2018; Hildyard & Wolfe, 2002; Teicher et al., 2004), however more recent research has included additional ACEs such as bullying (Karcher, Niendam & Barch, 2020) and exposure to community violence (Hoover & Kaufman, 2018), which could also be examined. Additionally, further exploration of the pathway by which sexual abuse predicts violent incidents would be of benefit.

The current study was limited in its exploration of symptoms of psychosis and empathy due to a limited subsample for whom this data were available, therefore future research on a larger scale which explores this would be of benefit in confirming the findings of the current study. Similarly, research with a more diverse sample would be of benefit to explore any additional impact of gender and ethnicity on the relationship between ACEs, symptoms of psychosis, empathy, and violence.

Lastly, findings in the current study suggest that as psychological interventions completed increases, insight increases and that psychological interventions help reduce the likelihood of violence. More exploration of this would be of benefit to further understand the impact of additional factors such as modality of intervention (group, 1:1), therapeutic model and focus of intervention on the perpetration of violence in FMH settings.

**Conclusions**

In conclusion this study found that total ACE score is associated with total violence and predicts verbal aggression in inpatient FMH settings. Sexual abuse was the only ACE category out of a total of six which was found to predict violence. In a subsample of participants positive symptoms of psychosis, lack of insight and lack of empathy were found
to predict violence but did not mediate the relationship between ACEs and any type of violence. Encouragingly, completed psychological interventions were found to negatively predict violence, as was length of stay during the follow up period. All observed effect sizes were small. This is in support of a trauma-informed model of care in FMH services and recommendations were made for more readily available trauma-focused psychological treatment for all patients in these settings, taking into consideration the high prevalence rates of ACEs and associations with negative outcomes found. Limitations such as exclusion of certain ACE categories and lack of diversity in the sample are discussed and further research in this area recommended to expand the current evidence base.


neutral information in post-traumatic stress disorder. *Psychiatry Research*:  
*Neuroimaging*, 163(2), 156-170.


efficacy of psychological treatments for violent offenders in correctional and forensic mental
health settings. *Clinical Psychology: Science and Practice, 26*(2), e12282.

Parlar, M., Frewen, P., Nazarov, A., Oremus, C., MacQueen, G., Lanius, R., & McKinnon, M.

matter research of adults with childhood maltreatment—A meta-analysis and

neglect in early childhood. In Society for Neuroscience: Proceedings from Annual Meeting,
*New Orleans*.

psychiatric diagnosis and determinations of criminal responsibility. *Race and social
problems, 5*(4), 239-249.

Phelan, J., & Link, B. (1998). The growing belief that people with mental illness are violent: The role of the dangerousness criterion for civil commitment. *Social Psychiatry and
Psychiatric Epidemiology, 33*, 7-12

in schizophrenia: symptomatology, severity and specificity. *Psychological medicine, 31*(2), 207.


Sweeney, A., Clement, S., Filson, B., & Kennedy, A. (2016). Trauma-informed mental healthcare in the UK: what is it and how can we further its development?. *Mental Health Review Journal*.


International Journal of Forensic Mental Health – Instructions for Authors

Thank you for choosing to submit your paper to the International Journal of Forensic Mental Health. These instructions will ensure our editorial team has everything required so your paper can move smoothly through peer review, production, and publication. Please take the time to read and follow them as closely as possible, as doing so will ensure your paper matches the journal’s requirements. For general guidance on the publication process at Taylor & Francis please visit our Author Services website.

Submission Portal. The International Journal of Forensic Mental Health uses the ScholarOne Manuscripts (previously Manuscript Central) submission portal to peer review submissions. Please read the guide for ScholarOne authors before making a submission. Complete guidelines for preparing and submitting your manuscript to this journal are provided below.

For ScholarOne Manuscripts technical support: http://scholarone.com/services/support/.

For any other requests:
- Dr. Tonia L. Nicholls, Editor-in-Chief
  Associate Professor, University of British Columbia
  Distinguished Scientist, Forensic Psychiatric Services Commission, BC Mental Health and
  Substance Use Services
tnicholls@forensic.bc.ca

Plagiarism. Please note that the International Journal of Forensic Mental Health uses CrossCheck™ software to screen papers for unoriginal material, simultaneous submission and multiple publication. By submitting your paper to the International Journal of Forensic Mental Health, you are agreeing to any necessary originality checks your paper may have to undergo during the peer review and production processes.

MANUSCRIPT PREPARATION

Prepare your manuscript according to the Publication Manual of the American Psychological Association (6th Edition). Manuscripts should be copyedited in accordance with Chapter 3 of the Publication Manual relating to unbiased language. We recommend the use of the APA Checklist for Manuscript Submission to help you prepare and review prior to submission.

Each manuscript must be accompanied by a statement that it has not been published elsewhere and that it has not been submitted simultaneously for publication elsewhere.
Authors are additionally responsible for obtaining the relevant ethical approvals from relevant institutions, or should be able to provide us with an ethics waiver from their institution (i.e., in case the project is exempt from full ethics review). Authors are responsible for obtaining permission to reproduce copyrighted material from other sources and are required to sign an agreement for the transfer of copyright to the publisher. As an author, you are required to secure permissions if you want to reproduce any figure, table, or extract from the text of another source. This applies to direct reproduction as well as "derivative reproduction" (where you have created a new figure or table which derives substantially from a copyrighted source). All accepted manuscripts, artwork, and photographs become the property of the publisher.

Types of Submissions
The *IJFMH* accepts a variety of submissions, relevant to the field of forensic mental health (e.g., criminal responsibility, competency or fitness to stand trial, risk assessment, family violence, and treatment of forensic clients, diversion, correctional mental health, mental health tribunals, intellectual disabilities and violence). Examples: Original experiments (qualitative and quantitative), systematic reviews and meta-analyses, narrative reviews, case studies, program evaluations.

Formatting
- All parts of the manuscript should be typewritten (Times New Roman, 12 pt.), double spaced, with margins of at least one inch on all sides.
- Pages should be numbered consecutively throughout the paper.
- Authors should also supply a shortened version of the title suitable for the running head, not exceeding 50 character spaces.

Abstract
Each article should be summarized in an abstract of not more than 150 words. Avoid abbreviations, diagrams, and reference to the text in the abstract.

Authorship Affiliations
Each author should be listed with his or her primary departmental affiliation and institution name, and city/state/country (where applicable). The corresponding author(s) should be clearly noted.

No authorship or otherwise identifying information should be included in the abstract, body of the manuscript, or reference list. Rather authorship can be conveyed on a separate title page (consistent with the APA Publication Manual 6th Ed.) and (if applicable) in an accompanying cover letter.

Additional Considerations
Funding. All sources of funding and potential conflicts of interest should be noted in the admission portal and (if applicable) in an accompanying cover letter.

Keywords. A maximum of 5 keywords, relevant to your manuscript, will also be required. References. References, citations, and general style of manuscripts should be prepared in accordance with the *APA Publication Manual, 6th Edition*. Cite in the text by author and
date (Smith, 1983) and include an alphabetical list at the end of the article. Each in-text reference should be included in the reference list; each reference in the reference list should appear in the text of the manuscript. Please also be sure to include DOIs.

Examples:

- Journal Article:

- Authored Book:

- Chapter in an Edited Book:

Illustrations

Illustrations submitted (line drawings, halftones, photos, photomicrographs, etc.) should be clean originals or digital files. Digital files are recommended for highest quality reproduction and should follow these guidelines:

- 300 dpi or higher
- Sized to fit on journal page
- EPS, TIFF, or PSD format only
- Submitted as separate files, not embedded in text files

Color Illustrations. Color art will be reproduced in color in the online publication at no additional cost to the author. Color illustrations will also be considered for print publication; however, the author will be required to bear the full cost involved in color art reproduction. Color reprints can only be ordered if print reproduction costs are paid. **Print Reproduction:** $900 for the first page of color; $450 per page for the next three pages of color. A custom quote will be provided for articles with more than four pages of color. Art not supplied at a minimum of 300 dpi will not be considered for print.

Tables and Figures. Tables and figures (illustrations) should not be embedded in the text, but should be included as separate sheets or files. A short descriptive title should appear above each table with a clear legend and any footnotes suitably identified below. All units must be included. Figures should be completely labeled, taking into account necessary size reduction. Captions should be typed, double-spaced, on a separate sheet. Refer to the APA Publication Manual, 6th Ed. for guidance and examples.

**REVIEW PROCESS**

Oppose Reviewers
You will be able to provide us with the names and details of reviewers you do not want to have review your manuscript. This could be due a variety of reasons (e.g., long-time collaborators, provided feedback on an earlier version of the manuscript prior to submission, a strong fundamental difference of views).

**Blind Review**
The *IJFMH* uses a double-blind review process, meaning that author and reviewer identities are concealed from each other throughout the entire review process. That is why it is important, in preparing your manuscript, that you ensure no identifying information is in the abstract, manuscript body, figures and images, or reference list.

Authors should submit a title page containing the authorship details, and a blinded manuscript with no author details as two separate files. When self-referencing, use third person pronouns to protect anonymity. Example: “... as our previous work has shown” becomes “... as has been shown previous.”

**Become a Reviewer**
If you are interested in becoming an ad-hoc reviewer please contact us. In order to facilitate this process, we recommend you are nominated by a member of IAFMHS (a succinct email is sufficient) and provide a CV; you can send this to and

**Student Reviewers**
We are particularly interested in supporting student reviewers. Students should be admitted to a graduate program in a related discipline and must have a direct supervisor who is willing to collaborate on the review(s).

**ACCEPTANCE & PUBLICATION**

The *IJFMH* publishes 4 times per year.

**Proofs**
Page proofs are sent to the designated author using Taylor & Francis' Central Article Tracking System (CATS). They must be carefully checked and returned within 48 hours of receipt.

**Reprints and Issues**
Reprints of individual articles are available for order at the time authors review page proofs. A discount on reprints is available to authors who order before print publication. Each corresponding author will receive 1 complete issues in which the article publishes and a complimentary PDF. This file is for personal use only and may not be copied and disseminated in any form without prior written permission from Taylor and Francis Group, LLC.
Authors for whom we receive a valid email address will be provided an opportunity to purchase reprints of individual articles, or copies of the complete print issue. These authors will also be given complimentary access to their final article on Taylor & Francis Online.

Publishing Ethics
The International Association of Forensic Mental Health Services and Taylor & Francis Group are committed to the highest academic, professional, legal, and ethical standards in publishing work in this journal. To this end, we have adopted a set of guidelines, to which all submitting authors are expected to adhere, to assure integrity and ethical publishing for authors, reviewers, and editors.

Taylor & Francis is a member of the Committee of Publications Ethics (COPE). COPE aims to provide a forum for publishers and editors of scientific journals to discuss issues relating to the integrity of their work, including conflicts of interest, falsification and fabrication of data, plagiarism, unethical experimentation, inadequate subject consent, and authorship disputes. For more information on COPE please visit http://publicationethics.org.

Open Access
Taylor & Francis Open Select provides authors or their research sponsors and funders with the option of paying a publishing fee and thereby making an article fully and permanently available for free online access – open access – immediately on publication to anyone, anywhere, at any time. This option is made available once an article has been accepted in peer review. Click here for Full details of our Open Access program.

Search Engine Optimization
Search Engine Optimization (SEO) is a means of making your article more visible to anyone who might be looking for it. Please consult our guide here.
08 January 2021

Dr Gary MacPherson
The State Hospital
Lampits Road
Lanark
ML11 8RP

Dear Dr MacPherson,

Study title: The relationship between adverse childhood experiences, violence, empathy and psychosis within forensic settings

REC reference: 19/SS/0088
Protocol number: V2.0
IRAS project ID: 262000

Thank you for your letter responding to the Research Ethics Committee’s (REC) request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Vice-Chair along with the Lead & Second Reviewers.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Adults with Incapacity (Scotland) Act 2000

I confirm that the Committee has approved this research project for the purposes of the Adults with Incapacity (Scotland) Act 2000. The Committee is satisfied that the requirements of section 51 of the
Good practice principles and responsibilities

The UK Policy Framework for Health and Social Care Research sets out principles of good practice in the management and conduct of health and social care research. It also outlines the responsibilities of individuals and organisations, including those related to the four elements of research transparency:

1. registering research studies
2. reporting results
3. informing participants
4. sharing study data and tissue

Conditions of the favourable opinion

The REC favourable opinion is subject to the following conditions being met prior to the start of the study.

**Confirmation of Capacity and Capability (in England, Northern Ireland and Wales) or NHS management permission (in Scotland) should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements. Each NHS organisation must confirm through the signing of agreements and/or other documents that it has given permission for the research to proceed (except where explicitly specified otherwise).**

Guidance on applying for HRA and HCRW Approval (England and Wales)/ NHS permission for research is available in the Integrated Research Application System.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of management permissions from host organisations.

**Registration of Clinical Trials**

All research should be registered in a publicly accessible database and we expect all researchers, research sponsors and others to meet this fundamental best practice standard.

It is a condition of the REC favourable opinion that **all clinical trials are registered** on a publicly accessible database within six weeks of recruiting the first research participant. For this purpose, ‘clinical trials’ are defined as the first four project categories in IRAS project filter question 2. Failure to register a clinical trial is a breach of these approval conditions, unless a deferral has been agreed by or on behalf of the Research Ethics Committee (see here for more information on requesting a
deferral: https://www.hra.nhs.uk/planning-and-improving-research/researchplanning/research-registration-research-project-identifiers/

If you have not already included registration details in your IRAS application form, you should notify the REC of the registration details as soon as possible.

Further guidance on registration is available at: https://www.hra.nhs.uk/planning-and-improving-research/research-planning/transparency-responsibilities/

Publication of Your Research Summary

We will publish your research summary for the above study on the research summaries section of our website, together with your contact details, no earlier than three months from the date of this favourable opinion letter.

Should you wish to provide a substitute contact point, make a request to defer, or require further information, please visit: https://www.hra.nhs.uk/planning-and-improving-research/applicationssummaries/research-summaries/

N.B. If your study is related to COVID-19 we will aim to publish your research summary within 3 days rather than three months.

During this public health emergency, it is vital that everyone can promptly identify all relevant research related to COVID-19 that is taking place globally. If you haven’t already done so, please register your study on a public registry as soon as possible and provide the REC with the registration detail, which will be posted alongside other information relating to your project. We are also asking sponsors not to request deferral of publication of research summary for any projects relating to COVID-19. In addition, to facilitate finding and extracting studies related to COVID-19 from public databases, please enter the WHO official acronym for the coronavirus disease (COVID-19) in the full title of your study. Approved COVID-19 studies can be found at: https://www.hra.nhs.uk/covid-19-research/approved-covid-19-research/

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

After ethical review: Reporting requirements

The attached document “After ethical review – guidance for researchers” gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
• Notifying the end of the study, including early termination of the study
• Final report
• Reporting results

The latest guidance on these topics can be found at https://www.hra.nhs.uk/approvalsamendments/managing-your-approval/.

Ethical review of research sites

NHS/HSC sites

The favourable opinion applies to all NHS/HSC sites listed in the application subject to confirmation of Capacity and Capability (in England, Northern Ireland and Wales) or management permission (in Scotland) being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Non-NHS/HSC sites

I am pleased to confirm that the favourable opinion applies to any non-NHS/HSC sites listed in the application, subject to site management permission being obtained prior to the start of the study at the site.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirmation of any other Regulatory Approvals (e.g. CAG) and all correspondence [Email correspondence from Public Benefit Privacy Panel]</td>
<td>1</td>
<td>22 March 2019</td>
</tr>
<tr>
<td>Confirmation of any other Regulatory Approvals (e.g. CAG) and all correspondence [Research Committee approval]</td>
<td>1</td>
<td>22 February 2019</td>
</tr>
<tr>
<td>Confirmation of any other Regulatory Approvals (e.g. CAG) and all correspondence [Initial PBPP enquiry application]</td>
<td>V1.0</td>
<td>01 March 2019</td>
</tr>
<tr>
<td>Confirmation of any other Regulatory Approvals (e.g. CAG) and all correspondence [Favourable opinion Scotland A REC for FN Database]</td>
<td>V1.0</td>
<td>26 August 2013</td>
</tr>
<tr>
<td>Confirmation of any other Regulatory Approvals (e.g. CAG) and all correspondence [PBPP Approval for FN Database]</td>
<td>V2.0</td>
<td>03 March 2017</td>
</tr>
<tr>
<td>Confirmation of any other Regulatory Approvals (e.g. CAG) and all correspondence [PBPP conditional approval]</td>
<td>V1</td>
<td>08 December 2020</td>
</tr>
<tr>
<td>IRAS Application Form [IRAS_Form_10072019]</td>
<td></td>
<td>10 July 2019</td>
</tr>
<tr>
<td>Other [L Banks response for additional information to REC]</td>
<td>V1.0</td>
<td>28 August 2019</td>
</tr>
<tr>
<td>Other [Cover letter - REC response Dec 2020]</td>
<td>V1</td>
<td>06 January 2021</td>
</tr>
</tbody>
</table>
Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website: http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/

HRA Learning

We are pleased to welcome researchers and research staff to our HRA Learning Events and online learning opportunities—see details at: https://www.hra.nhs.uk/planning-and-improvingresearch/learning/

IRAS project ID: 262000 Please quote this number on all correspondence

With the Committee’s best wishes for the success of this project.

Yours sincerely

Dr Mary-Joan Macleod Vice-Chair

Email:

Enclosures: “After ethical review – guidance for researchers” [SL-AR2]

Copy to: Mr Jamie Pitcairn, NHS State Hospital

Lead Nation: Scotland: nhsg.NRSPCC@nhs.net
Dear Ms Banks,

Re Application: The relationship between adverse childhood experiences, violence, empathy and psychosis within forensic settings
Version: v2

Conditional Approval

Thank you for your application for consideration by the Public Benefit and Privacy Panel for Health and Social Care. Your application has undergone proportionate governance review and has been approved, subject to the following conditions:

1. Please ensure the end date is consistent throughout the application. In Q 5.5.05 it states that the data will be deleted from July 2021. This should be updated to July 2022.
2. Please complete section 2.2 with details of Professor Lindsay Thomson.
3. Regarding the response to clarification #5, please note that Datix is not used at Bellsdyke, but it uses a system called Safeguard.
4. Please provide a copy of the REC approval when it has been received.
5. Please send an updated application encompassing the above conditions.

Please note you are required to satisfy the conditions before full approval can be given. Therefore, please could you notify the HSC-PBPP that you have satisfied the above conditions and we will send a full approval letter and your study can then start.

This approval is given to process data as specified as specified in this letter and in the approved version of the application, and is limited to this. Approval is valid for the period specified in your application until 31st July 2022. You are required to notify the Panel Manager, via your eDRIS.
Coordinator, of any proposed changes to your proposal e.g. purpose or method of processing, data or data variables being processed, study cohorts, individuals accessing and processing data, timescales, technology/infrastructure.

On conclusion of your proposal, as part of NHS Scotland Governance and monitoring we will require you to complete an End of Project reporting form to demonstrate that you have complied with the obligations outlined e.g. data destruction or submission of references for publications of findings.

I would take this opportunity to remind you of the declaration you have made in your application form committing you to undertakings in respect of information governance, confidentiality and data protection. It is the responsibility of the applicant and their organisation to ensure that their study complies with current legislation at all times during the study. In particular, you should be aware that once personal data have been transferred to you, that you will then become joint Data Controller as defined by data protection law, to use the data lawfully and within the purposes specified by the Panel.

Public Benefit and Privacy Panel for Health and Social Care (HSC-PBPP)
phs_PBPPhscot
https://www.informationgovernance.scot.nhs.uk/pbpphsc/

Requests for access to NHS Scotland data as part of this approved application must be supported by providing a copy of your approval letter and approved application to the relevant local board contacts and/or data providers.

Please note that summary information about your application and its approval, including the title and nature of your proposal, will be published on the panel website (https://www.informationgovernance.scot.nhs.uk/pbpphsc/).

Please note that our email address has changed and the previous addresses are no longer in use.

I hope that your proposal progresses well.

Yours sincerely,

Dr Marian Aldhous

Panel Manager

NHS Scotland Public Benefit and Privacy Panel for Health and Social Care

Email: phs_PKPP@phs.scot
Cc: Professor Lindsay Thomson, Main contact for Lead Organisation

Public Benefit and Privacy Panel for Health and Social Care (HSC-PBPP)
phs_PBPPhscot
https://www.informationgovernance.scot.nhs.uk/pbpphsc/
Leanne Banks,
NHS State Hospital Board for Scotland and University of Edinburgh
The State Hospital,
Lampits Road,
Lanark. ML11 8RP

Date: 14th January 2021
Our Ref: 1819-0331

Dear Ms Banks,

Re Application: The relationship between adverse childhood experiences, violence, empathy and psychosis within forensic settings
Version: v3

Further to your conditional approval issued by the Public Benefit and Privacy Panel for Health and Social Care on 8th December 2020, I am writing to confirm that all conditions applied to the approval have now been satisfied. Your application and supporting documents have undergone proportionate governance review and have now been approved in full.

This approval is given to process data as specified in the approved version of the application, and is limited to this. Approval is valid for the period specified until 31st July 2022. You are required to notify the Panel Manager, via your eDRIS Coordinator, of any proposed changes to your proposal, e.g. purpose or method of processing, data or data variables being processed, study cohorts, individuals accessing and processing data, timescales, technology/infrastructure.

On conclusion of your proposal, as part of NHS Scotland Governance and monitoring we will require you to complete an End of Project reporting form to demonstrate that you have complied with the obligations outlined e.g. data destruction or submission of references for publications of findings.

I would take this opportunity to remind you of the declaration you have made in your application form committing you to undertakings in respect of information governance, confidentiality and data protection. It is the responsibility of the applicant and their organisation to ensure that their study complies with current legislation at all times during the study. In particular, you should be aware that once personal data have been transferred to you, that you will then become joint Data Controller as defined by data protection law, to use the data lawfully and within the purposes specified by the Panel.

Requests for access to NHS Scotland data as part of this approved application must be supported by providing a copy of your approval letter and approved application to the relevant local board contacts and/or data providers.

Please note that summary information about your application and its approval, including the title and nature of your proposal, will be published on the panel website (https://www.informationgovernance.scot.nhs.uk/pbpphsc/). Please note that our email address has changed and the previous addresses are no longer in use.

I hope that your proposal progresses well.
Yours sincerely,

Dr Marian Aldhous

Panel Manager
NHS Scotland Public Benefit and Privacy Panel for Health and Social Care
Email: phs.PBPP@phs.scot

Cc: Professor Lindsay Thomson, Main contact for Lead Organisation
Dear Leanne,

Re: The relationship between adverse childhood experiences, violence, empathy and psychosis within forensic settings

Many thanks for your amended research proposal that was reviewed by the TSH Research Committee on Thursday the 31st of January 2019. The committee were satisfied that you had addressed the feedback provided to your original proposal review, and are happy to approve the study. I have also attached an annotated version of your proposal with some minor comments from the proposal review incorporated.

This letter will be copied to the Associate Medical Director along with evidence of your ethical approval once I have received that, and the AMD will subsequently provide final management approval for the study to commence within TSH.

One condition of the research committees’ approval is that you provide the committee with regular 6-monthly progress reports which is a key component of our research governance process, and a final report that addresses the study findings and any implications for practice.

If you require any further assistance, or have any feedback on the Research approval process then please do not hesitate to contact me.

Yours sincerely

JAMIE PITCAIRN
Research & Development Manager
The State Hospital
Dear Dr MacPherson

The relationship between adverse childhood experiences, violence, empathy and psychosis within forensic settings

I confirm that NHS Ayrshire and Arran have reviewed the undernoted documents and grant R&D Management approval for the above study.

Documents received:

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>OID</td>
<td>1.2</td>
<td>08/02/21</td>
</tr>
<tr>
<td>IRAS Form</td>
<td>5.12</td>
<td>06/07/19</td>
</tr>
<tr>
<td>Protocol</td>
<td>2.0</td>
<td>31/01/19</td>
</tr>
</tbody>
</table>

The terms of approval state that the investigator authorised to undertake this study within NHS Ayrshire & Arran is:
- Leanne Banks, Trainee Clinical Psychologist, NHS State Hospital

Local Contact:-

- Dr Allan Thomson, Principal Clinical Psychologist, Forensic Mental Health Services, NHS Ayrshire & Arran

PLEASE NOTE: Access to NHS Ayrshire and Arran premises will not be required. Datix data will be obtained by the NHS Ayrshire and Arran Risk Department and emailed using secure nhs.scot email address to Leanne Banks.

The sponsors for this study are The State Hospital.

This approval letter is valid until 8 June 2022.

Regular reports of the study require to be submitted. Your first report should be submitted to Dr K Bell, Research & Development Manager in 12 months time and subsequently at yearly intervals until the work is completed.

Please note that as a requirement of this type of study your name, designation, work address, work telephone number, work e-mail address, work related qualifications and whole time equivalent will be held on the Scottish National Research Database so that NHS R&D staff in Scotland can access this information for purposes related to project management and report monitoring.

In addition approval is granted subject to the following conditions: -

• All research activity must comply with the standards detailed in the UK Policy Framework for Health and Social Care Research [http://beta.hra.nhs.uk/planning-and-improving-research/policies-standards-legislation/uk-policy-framework-health-socialcare-research](http://beta.hra.nhs.uk/planning-and-improving-research/policies-standards-legislation/uk-policy-framework-health-socialcare-research) and appropriate statutory legislation. It is your responsibility to ensure that you are familiar with these, however please do not hesitate to seek further advice if you are unsure.

• Recruitment figures must be submitted to R&D on a monthly basis. If recruitment figures are not received timeously you will be contacted by a member of the R&D team to provide this data.

• You are required to comply with Good Clinical Practice (ICH-GCP guidelines may be found at [www.ich.org/LOB/media/MEDIA482.pdf](http://www.ich.org/LOB/media/MEDIA482.pdf)), Ethics Guidelines, Health & Safety Act 1999, General Data Protection Regulation (GDPR) and Data Protection Act 2018.

• If any amendments are to be made to the study protocol and or the Research Team the Researcher must seek Ethical and Management Approval for the changes before they can be implemented.
• The Researcher and NHS Ayrshire and Arran must permit and assist with any monitoring, auditing or inspection of the project by the relevant authorities.

• The NHS Ayrshire and Arran Complaints Department should be informed if any complaints arise regarding the project and the R&D Department must be copied into this correspondence.

• The outcome and lessons learnt from complaints must be communicated to funders, sponsors and other partners associated with the project.

• As custodian of the information collated during this research project you are responsible at all times for ensuring the security of all personal information collated in line with NHS Scotland policies on information assurance and security, until the secure destruction of these data. The retention time periods for such data should comply with the requirements of the Scottish Government Records Management: NHS Code Of Practice. Under no circumstances should personal data be stored on any unencrypted removable media e.g. laptop, USB or mobile device (for further information and guidance please contact the Information Governance Team based at University Hospital Crosshouse 01563 825831 or 826813).

If I can be of any further assistance please do not hesitate to contact me. On behalf of the department, I wish you every success with the project.

Yours sincerely

Dr Crawford McGuffie
Medical Director

c.c. Dr Alistair Gibb, Clinical Director – Forensic Services, NHS Ayrshire & Arran

Jamie Pitcairn, The State Hospital (sponsor contact)

Katie Bryant, Risk Manager, NHS Ayrshire & Arran
Lesley Douglas, Finance, NHS Ayrshire & Arran

Information Governance, NHS Ayrshire & Arran
13 May 2021

Mrs Leanne Banks
The State Hospital
Lampits Road
Lanark, ML11 8RP

NHS GG&C Board Approval

Dear Leanne,

**Study Title:** The relationship between adverse childhood experiences, violence, empathy and psychosis within forensic settings

**Principal Investigator:** Mrs Leanne Banks

**GG&C HB site** Leverndale Hospital & Rowanbank Clinic

**Sponsor** The State Hospital

**R&I reference:** GN21MH012

**REC reference:** 19/SS/0088

**Protocol no:** Version 2.0, 31/01/2019

I am pleased to confirm that Greater Glasgow & Clyde Health Board is now able to grant Approval for the above study.

**Conditions of Approval**
1. **For Clinical Trials** as defined by the Medicines for Human Use Clinical Trial Regulations, 2004 a. During the life span of the study GGHB requires the following information relating to this site

   i. Notification of any potential serious breaches. ii. Notification of any regulatory inspections.

   It is your responsibility to ensure that all staff involved in the study at this site have the appropriate GCP training according to the GGHB GCP policy (www.nhsggc.org.uk/content/default.asp?page=s1411), evidence of such training to be filed in the site file.

2. **For all studies** the following information is required during their lifespan.

   a. First study participant should be recruited within 30 days of approval date.
   b. Recruitment Numbers on a monthly basis
   c. Any change to local research team staff should be notified to R&I team
   d. Any amendments – Substantial or Non Substantial

   e. Notification of Trial/study end including final recruitment figures
   g. You must work in accordance with the current NHS GG&C COVID19 guidelines and principles.

   Please add this approval to your study file as this letter may be subject to audit and monitoring.

   Your personal information will be held on a secure national web-based NHS database. I wish you every success with this research study

Yours sincerely,
13 May 2021

Mrs
Leanne
Banks
The
State
Hospital
Lampits
Road
Lanark,
ML11
8RP

Dear
Leanne
Banks,

Letter of access for research

This letter should be presented to each participating organisation before you commence your research at that site. The participating organisation is **NHS Greater Glasgow and Clyde**.

In accepting this letter, each participating organisation confirms your right of access to conduct research through their organisation for the purpose and on the terms and conditions set out below. This right of access commences on **13/05/2021** and ends on **01/07/2022** unless terminated earlier in accordance with the clauses below.
You have a right of access to conduct such research as confirmed in writing in the letter of permission for research from **NHS Greater Glasgow and Clyde**. Please note that you cannot start the research until the Principal Investigator for the research project has received a letter from us giving confirmation from the individual organisation(s) of their agreement to conduct the research.

The information supplied about your role in research at the organisation has been reviewed and you do not require an honorary research contract with the organisation. We are satisfied that such preengagement checks as we consider necessary have been carried out. Evidence of checks should be available on request to the organisation.

You are considered to be a legal visitor to the organisations premises. You are not entitled to any form of payment or access to other benefits provided by the organisation or this organisation to employees and this letter does not give rise to any other relationship between you and the organisation, in particular that of an employee.

While undertaking research through the organisation(s) you will remain accountable to your substantive employer but you are required to follow the reasonable instructions of the organisation or those instructions given on their behalf in relation to the terms of this right of access.

Where any third party claim is made, whether or not legal proceedings are issued, arising out of or in connection with your right of access, you are required to co-operate fully with any investigation by the organisation in connection with any such claim and to give all such assistance as may reasonably be required regarding the conduct of any legal proceedings.

You must act in accordance with the organisations policies and procedures, which are available to you upon request, and the Research Governance Framework.

You are required to co-operate with the organisation(s) in discharging its/their duties under the Health and Safety at Work etc Act 1974 and other health and safety legislation and to take reasonable care for the health and safety of yourself and others while on the organisations premises. You must observe the same standards of care and propriety in dealing with patients, staff,
visitors, equipment and premises as is expected of any other contract holder and you must act appropriately, responsibly and professionally at all times.

If you have a physical or mental health condition or disability which may affect your research role and which might require special adjustments to your role, if you have not already done so, you must notify your employer and each organisation prior to commencing your research role at that organisation.

You are required to ensure that all information regarding patients or staff remains secure and strictly confidential at all times. You must ensure that you understand and comply with the requirements of the NHS Confidentiality Code of Practice and the Data Protection Act 2018. Furthermore you should be aware that under the Act, unauthorised disclosure of information is an offence and such disclosures may lead to prosecution.

You should ensure that, where you are issued with an identity or security card, a bleep number, email or library account, keys or protective clothing, these are returned upon termination of this arrangement. Please also ensure that while on the organisations premises you wear your ID badge at all times, or are able to prove your identity if challenged. Please note that the organisation do not accept responsibility for damage to or loss of personal property.

This organisation may revoke this letter and any organisation may terminate your right to attend at any time either by giving seven days’ written notice to you or immediately without any notice if you are in breach of any of the terms or conditions described in this letter or if you commit any act that we reasonably consider to amount to serious misconduct or to be disruptive and/or prejudicial to the interests and/or business of the organisation or if you are convicted of any criminal offence. You must not undertake regulated activity if you are barred from such work. If you are barred from working with adults or children this letter of access is immediately terminated. Your employer will immediately withdraw you from undertaking this or any other regulated activity and you MUST stop undertaking any regulated activity immediately.

Your substantive employer is responsible for your conduct during this research project and may in the circumstances described above instigate disciplinary action against you.

No organisation will indemnify you against any liability incurred as a result of any breach of confidentiality or breach of the Data Protection Act 2018. Any breach of the Data Protection Act 2018 may result in legal action against you and/or your substantive employer.

If your current role or involvement in research changes, or any of the information provided in your Research Passport changes, you must inform your employer through their normal procedures. You must also inform your nominated manager at each site and the R&I office in this organisation.

Yours sincerely,

Mr Scott
Broadley
Senior Research Administrator
Dear Mrs L Banks,

Management Approval for Non-Commercial Research

I am pleased to tell you that you now have Management Approval for the research project entitled: ‘Adverse childhood experiences, psychosis, empathy and violence - V1 The relationship between adverse childhood experiences, violence, empathy and psychosis within forensic settings’ [Protocol V2.0 31/01/20219].

I acknowledge that:

• The project is sponsored by NHS The State Hospital.
• The project has no external funding.
• Ethics approval for the project has been obtained from the Scotland A Research Ethics Committee (Reference Number:19/SS/0088)
• The project has a signed Organisational Information Document.
• The project is being undertaken for educational purposes.

The following conditions apply:
• The responsibility for monitoring and auditing this project lies with The State Hospital.
• This study will be subject to ongoing monitoring for Research Governance purposes and may be audited to ensure compliance with the UK Policy Framework for Health Headquarters: Assynt House, Beechwood Park, INVERNESS IV2 3BW

Chair: Professor Boyd Robertson
Chief Executive: Pam Dudek

and Social Care Research (2018, V3.3 07/11/17, however prior written notice of audit will be given.

• Any researchers coming into NHS Highland for the purposes of carrying out research with patients will require a Letter of Access before starting the study at this site. Please contact a member of the RD&I Governance team at for further assistance, if this is required.

• The paperwork concerning all incidents, adverse events and serious adverse events thought to be attributable to a participant’s involvement in this project should be notified to the NHS Highland RD&I Governance team. Please email documents to RD&I Facilitator at

• You are reminded that all amendments (substantial or non-substantial) to the protocol and associated study documents or to the REC application should be notified to the NHS Highland RD&I Office to obtain amendment approval (nhsh.RandD@nhs.scot). Guidance can be found at https://www.nhsresearchscotland.org.uk/services/permissions-coordinatingcentre/permissions

• If applicable, monthly recruitment rates should be notified to the NHS Highland RD&I Office, detailing date of recruitment and the participant trial ID number. This should be done by e-mail on the first week of the following month, to Debbie McDonald, Data Manager Please quote your RD&I Highland reference number (Highland 1552).

• Please report any other changes in resources used, or staff involved in the project, to the NHS Highland RD&I Office (nhsh.RandD@nhs.scot).

Please quote your RD&I Highland reference number (Highland 1552) on all correspondence.

Yours sincerely,
Frances Hines
RD&I Manager

cc  Jo Fraser, RD&I Administration Assistant, NHS Highland Research, Development & Innovation Division, Ground Floor Phase 3, Centre for Health Science, Old Perth Road, Inverness, IV2 3JH

Dr G Macpherson, Forensic Clinical Psychologist, The State Hospitals Board for Scotland, Lanark, ML11 8RP (Academic Supervisor and Chief Investigator)

Mr J Pitcairn, R&D Manager, The State Hospital, Lanark
Management Permission for Non-Commercial Research

STUDY TITLE: The relationship between adverse childhood experiences, violence, empathy and psychosis within forensic settings

PROTOCOL NO: v2, 31/01/19
REC REF: 19/SS/0088
IRAS REF: 262000

Thank you very much for sending all relevant documentation. I am pleased to confirm that the project is now registered with the NHS Grampian Research & Development Office. The project now has R & D Management Permission to proceed locally. This is based on the documents received from yourself and the relevant Approvals being in place.

All research with an NHS element is subject to the UK Policy Framework for Health and Social Care Research (2017 v3), and as Chief or Principal Investigator you should be fully committed to your responsibilities associated with this.

R&D Permission is granted on condition that:

1) The R&D Office will be notified and any relevant documents forwarded to us if any of the following occur:
   - Any Serious Breaches in Grampian (Please forward to pharmaco@abdn.ac.uk).
   - A change of Principal Investigator in Grampian or Chief Investigator.
   - Any change to funding or any additional funding

2) When the study ends, the R&D Office will be notified of the study end-date.

3) The Sponsor will notify all amendments to the relevant National Co-ordinating centre. For single centre studies, amendments should be notified to the R&D office directly.
We hope the project goes well, and if you need any help or advice relating to your R&D Management Permission, please do not hesitate to contact the office.

Yours sincerely

Susan Ridge
Non-Commercial Manager

cc: CI/Sponsor
    Research Monitor

Sponsor: The State Hospital
Dear Dr McPherson

Study title: The relationship between adverse childhood experiences, violence, empathy and psychosis within forensic settings
REC reference: 19/SS/0088

Following the favourable opinion from the Scotland A Research Ethics Committee on 8 January 2021, and the Organisation Information Document site agreement authorised by myself on 1st March 2021, I am pleased to confirm that I formally gave Management Approval to the study above on 1st March 2021. This approval is subject to the following conditions:

- An appropriate Letter of Access being provided for Leanne Banks

This approval is granted subject to your compliance with the following:

1. Any amendments to the protocol or research team must have Ethics Committee and R&D approval (as well as approval from any other relevant regulatory organisation) before they can be implemented. Please ensure that the R&D Office and (where appropriate) NRS are informed of any amendments as soon as you become aware of them.

2. You and any local Principal Investigator are responsible for ensuring that all members of the research team have the appropriate experience and training, including GCP training if required.

3. If someone working within NHS Forth Valley is recruiting participants, those figures **MUST** be recorded on the EDGE research management system. If you have not used EDGE before, you should already have been offered training on the system. If recruitment is all being handled outside Forth Valley, you will be contacted monthly for the latest recruitment figures.

4. All those involved in the project will be required to work within accepted guidelines of health and safety and data protection principles, any other relevant statutory legislation, UK Policy Framework for Health and Social Care Research and IHC-GCP guidelines. A copy of the Framework can be accessed at:

5. As custodian of the information collected during this project you are responsible for ensuring the security of all personal information collected in line with NHS Scotland IT security policies, until the destruction of this data.

5. You or the local Principal Investigator will be required to provide the following reports and information during the course of your study:

   - A progress report **annually**
   - Report on SAEs and SUSARs if your study is a Clinical Trial of an Investigational Medicinal Product
   - Any information required for the purpose of internal or external audit and monitoring
   - Copies of any external monitoring reports
   - Notification of the end of recruitment and the end of the study
   - A copy of the final report, when available.
   - Copies of or full citations for any publications or abstracts
The appropriate forms will be provided to you by the Research and Development office when they are needed. Other information may be required from time to time.

Yours sincerely

MR. ANDREW MURRAY
Medical Director

CC: Leanne.banks1@nhs.scot
Dear Ms Banks

**Project Title: Adverse childhood experiences, psychosis, empathy and violence**

Thank you for your application to carry out the above project. Your project documentation (detailed below) has been reviewed for resource and financial implications for NHS Fife and I am happy to inform you that NHS permission for the above research has been granted on the basis described in the application form, protocol and supporting documentation. The documents reviewed were:

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRAS R&amp;D Form</td>
<td>5.12</td>
<td>7 July 2019</td>
</tr>
<tr>
<td>Protocol</td>
<td>1</td>
<td>31 January 2019</td>
</tr>
<tr>
<td>REC Provisional Favourable Opinion Letter</td>
<td></td>
<td>8 August 2019</td>
</tr>
<tr>
<td>REC Final Favourable Opinion Letter</td>
<td></td>
<td>8 January 2021</td>
</tr>
<tr>
<td>Study-Wide Governance Report</td>
<td></td>
<td>11 January 2021</td>
</tr>
<tr>
<td>PBPP Approval Letter</td>
<td></td>
<td>14 January 2021</td>
</tr>
<tr>
<td>IRAS OID Form</td>
<td></td>
<td>15 April 2021</td>
</tr>
</tbody>
</table>

The terms of the approval state that you are the Principal Investigator authorised to undertake this study within NHS Fife, with assistance from Moira Scott, Consultant Forensic and Clinical Psychologist.
The sponsors for this study are The State Hospital. Please note that it is the responsibility of the Sponsor to ensure that adequate and appropriate insurance is maintained throughout the course of the study.

Details of our participation in studies will be included in annual returns we are expected to complete as part of our agreement with the Chief Scientist Office. Regular reports of the study require to be submitted. Your first report should be submitted to Professor Frances Quirk, Assistant R&D Director, R&D Department, Queen Margaret Hospital, Whitefield Rd, Dunfermline, KY12 OSU (Frances.Quirk@nhs.scot) in 12 months time and subsequently at yearly intervals until the work is completed. A copy of the REC Annual Progress Report (where relevant) is acceptable. A Lay Summary will also be required upon completion of the project.

In addition, approval is granted subject to the following conditions:-

All research activity must comply with the standards detailed in the UK Policy Framework for Health and Social Care Research:

Any amendments which may subsequently be made to the study should also be notified to Fife Research Approvals: fife.fiferesearchapprovals@nhs.scot as well as the appropriate regulatory authorities. Notification should also be given of any new research team members post approval and/or any changes to the status of the project.

This organisation is required to monitor research to ensure compliance with the UK Policy Framework for Health & Social Care Research and other legal and regulatory requirements. This is achieved by random audit of research. You will be required to assist with and provide information in regard to monitoring and study outcomes (including providing recruitment figures to the R&D office as and when required).

As custodian of the information collated during this research project you are responsible for ensuring the security of all personal information collected in line with NHS Scotland IT Security Policies, until the destruction of this data.

Permission is only granted for the activities for which a favourable opinion has been given by the REC (and which have been authorised by the MHRA where appropriate).

The research sponsor or the Chief Investigator or local Principal Investigator at a research site may take appropriate urgent safety measures in order to protect research participants against any immediate hazard to their health or safety. The R&D office (fife.fiferesearchapprovals@nhs.scot) should be notified that such measures have been taken. The notification should also include the reasons why the measures were taken and the plan for further action. The R&D office should be notified within the same time frame of notifying the REC and any other regulatory bodies.
I would like to wish you every success with your study and look forward to receiving a summary of the findings for dissemination once the project is complete.

Yours sincerely

DR CHRIS MCKENNA
Medical Director
NHS Fife

Cc: Fife Research Approvals, NHS Fife fife.fiferesearchapprovals@nhs.scot
Moira Scott (moira.scott1@nhs.scot)
Dear Mrs Banks,

Lothian R&D Project No: 2019/0186          REC No: 19/SS/0088
Title of Research: The relationship between adverse childhood experiences, violence, empathy and psychosis within forensic settings

Protocol:
Version 2.0, dated 31 January 2019
Approved Location(s) within NHS Lothian: Royal Edinburgh Hospital

I am pleased to inform you this letter provides Site Specific approval for NHS Lothian for the above study and you may proceed with your research, subject to the conditions below.

Please be aware that ACCORD has issued COVID-19 Clinical Research Plan and Guidance that includes instructions for restarting/commencing non-COVID-19 clinical research, and also advice on what to do if there is a requirement to halt recruitment of new participants to an active study, what to do if the study design needs to be amended or if there is a resource issue within the study team in light of the ongoing COVID-19 pandemic.

The guidance detailed here applies to research projects Sponsored by NHS Lothian and/or the University of Edinburgh and to NHS Lothian hosted studies until further notice.

Please note that the NHS Lothian R&D Office must be informed of any changes to the study such as amendments to the protocol, funding, recruitment, personnel or resource input required of NHS Lothian.

Substantial amendments to the protocol will require approval from the ethics committee which approved your study and the MHRA where applicable.

Data controllers and processors have a legal obligation to hold a register of all its information assets (e.g. personal information (data) and/or special categories of personal data held in paper or electronic format for the purpose of clinical research). This R&D management approval is given on the understanding that you, as a potential information asset owner, will register any information assets associated with this research project with your employing organisation (where the data is held) in accordance the Data Protection Act 2018.

Please keep this office informed of the following study information, which is a condition of NHS Lothian R&D Management Approval:

1. Date you are ready to begin recruitment, date of the recruitment of the first participant and the monthly recruitment figures thereafter.
2. Date the final participant is recruited and the final recruitment figures.
3. Date your study / trial is completed within NHS Lothian.

I wish you every success with your study.

Yours sincerely

Fiona McArdle (Jul 1, 2021 12:39 GMT+1)

Ms Fiona McArdle

Deputy R&D Director

CC: Shauneen Porter, Clinical Psychologist, Royal Edinburgh Hospital
Dear Dr Banks,

Thank you for sending us details of your study with a request for management approval. We can confirm that the study review team has reviewed the documentation and on this basis are pleased to inform you that your study has management approval for commencement within NHS Dumfries and Galloway.

It is a condition of this approval that everyone involved in this study abides by the guidelines/protocols laid down by this Health Board in respect of confidentiality and Research Governance. It is your responsibility to ensure you are familiar with these; please do not hesitate to seek advice if you are unsure. Copies of Research Governance Framework documents are available via the website www.sehd.scot.nhs.uk/cso and then use the publications link.

We also note that it is the sponsor's responsibility to ensure that appropriate training is in place for all local investigators. It is important that all research must be carried out in compliance with the...

As part of the Health Board's responsibilities under Research Governance a sample of studies will be monitored, and it is therefore important that all records in connection with the study are kept up to date and available for review. We are also required to inform you that details of your study will be entered onto our R&D database. As custodian of the information collated during this research project, you are responsible for ensuring the security of all personal information collected, in line with NHS Scotland IT Security Policies, until the destruction of this data.

If your study is adopted by UKCRN into a portfolio then please advise this department of recruitment figures by adding accrual data to that database on a monthly basis.

Please notify the R&D office immediately you become aware of any serious adverse events associated with this research.

Research Floor and Development Support Unit
Ground
Dumfries and Galloway Royal Infirmary
Bankend Road
Dumfries
DGI 4AP

You must contact the R&D Department if/when the project is subject to any minor or substantial amendments so that these can be appropriately assessed, and approved, where necessary. We understand that performance of this study will not infringe on NHS Dumfries and Galloway's ability to deliver our usual level of service.

We take this opportunity to wish you every success with your project. Please do not hesitate to seek help and advice from the R&D Support Unit (ext 33165/33815) if there is anything you feel you require assistance with. We look forward to hearing about your work and would appreciate a short annual report and a final report when the study is complete.

Yours sincerely

Mrs Janie Candlish
Clinical Trials/Research Project Manager
### Appendix 13: Full list of diagnostic categories used

<table>
<thead>
<tr>
<th>(1) Unknown/not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) Acquired brain injury</td>
</tr>
<tr>
<td>(3) Dementia</td>
</tr>
<tr>
<td>(4) F10.2 Alcohol Dependence</td>
</tr>
<tr>
<td>(5) F10.1 Alcohol Harmful use</td>
</tr>
<tr>
<td>(6) F10.3 Alcohol Withdrawal</td>
</tr>
<tr>
<td>(7) F19.2 Drug Dependence</td>
</tr>
<tr>
<td>(8) F19.1 Drug Harmful use</td>
</tr>
<tr>
<td>(9) F15.3/F19.3 Drug Withdrawal</td>
</tr>
<tr>
<td>(10) F20 Schizophrenia</td>
</tr>
<tr>
<td>(11) F21 Schizotypal disorder</td>
</tr>
<tr>
<td>(12) F22 Persistent delusional disorders</td>
</tr>
<tr>
<td>(13) F23 Acute and transient psychotic disorders</td>
</tr>
<tr>
<td>(14) F24 Drug Induced psychosis</td>
</tr>
<tr>
<td>(15) F25 Schizoaffective disorder</td>
</tr>
<tr>
<td>(16) F29 Unspecified non-organic psychosis</td>
</tr>
<tr>
<td>(17) F30 Manic episode</td>
</tr>
<tr>
<td>(18) F31 Bipolar affective disorder</td>
</tr>
<tr>
<td>(19) F32 Depressive episode</td>
</tr>
<tr>
<td>(20) F33 Recurrent depressive disorder</td>
</tr>
<tr>
<td>(21) F41 Anxiety Disorder</td>
</tr>
<tr>
<td>(22) F43.1 Post-Traumatic Stress Disorder</td>
</tr>
<tr>
<td>(23) F43.2 Adjustment Disorder</td>
</tr>
<tr>
<td>(24) F60.0 Paranoid Personality Disorder</td>
</tr>
<tr>
<td>(25) F60.1 Schizoid Personality Disorder</td>
</tr>
<tr>
<td>(26) F60.2 Dissocial Personality Disorder</td>
</tr>
<tr>
<td>(27) F60.3 Emotionally Unstable Personality Disorder</td>
</tr>
<tr>
<td>(28) F60.4 Histrionic Personality Disorder</td>
</tr>
<tr>
<td>(29) F60.5 Anankastic Personality Disorder/Obsessive Compulsive Disorder</td>
</tr>
<tr>
<td>(30) F60.6 Anxious (avoidant) Personality Disorder</td>
</tr>
<tr>
<td>(31) F60.7 Dependent Personality Disorder</td>
</tr>
<tr>
<td>(32) F61.0 Mixed Personality Disorder</td>
</tr>
<tr>
<td>(33) Narcissistic Personality Disorder</td>
</tr>
<tr>
<td>(34) F70-F79 Mental Retardation / Learning Disability</td>
</tr>
<tr>
<td>(35) F84.5 Asperger’s Syndrome</td>
</tr>
<tr>
<td>(36) F84 Autistic Spectrum Disorder</td>
</tr>
<tr>
<td>(37) F90 Attention Deficit Hyperactivity Disorder</td>
</tr>
<tr>
<td>(38) F91 Conduct Disorder in childhood</td>
</tr>
<tr>
<td>(39) Other (specify)</td>
</tr>
</tbody>
</table>