# Fire Research Report

## An Outcome Evaluation of New Zealand Fire Service Fire Awareness and Intervention Programme

## University of Auckland

## October 2009

The purpose of the current study was to assess the post intervention arson recidivism rates and other offending behaviours of a group of children and adolescents referred to the New Zealand (NZ) Fire Awareness and Intervention Programme (FAIP) over an approximate follow up period of 10 years. Based on the findings and in light of current literature the report aims to provide key recommendations for the FAIP.

(This research was done in two-parts. Please see report# 97: 'Sparking up an Old Flame: A Process Evaluation of the Fire Awareness and Intervention Programme (FAIP) in New Zealand' for the other outcome on this piece of work.)

# An Outcome Evaluation of New Zealand Fire Service
# Fire Awareness and Intervention Programme
## Final Report

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**Our Ref:** 12868.00

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# ABSTRACT

## *Purpose*

The purpose of the current study was to assess the post intervention arson recidivism rates and other offending behaviours of a group of children and adolescents referred to the New Zealand (NZ) Fire Awareness and Intervention Programme (FAIP) over an approximate follow up period of 10 years. Based on the findings and in light of current literature the report aims to provide key recommendations for the FAIP.

## *Method*

The offence histories of a group of 200 children and adolescents who participated in the FAIP in 1999 were accessed from the National Intelligence Application (NIA) database from the NZ Police in August 2009. The offence histories of the sample over the follow up period of approximately 10 years were recorded, and the data was analysed using both descriptive and inferential statistics.

## *Results*

The rate of arson recidivism was low with only 2% of the sample having committed arson offences during the follow up period. The rates of general offending however, were high with 59.5% of subjects having committed an offence during the follow up period. Fifteen percent  of the sample could be classified as severe offenders, 40% as moderate and 4.5% as minor. The average total number of offences committed by those who offended was 8.15 and 11.8% of offenders had been imprisoned during the follow up period.

## *Key Recommendations*

In light of existing research, the findings of the current study indicate that firesetters are likely to be at risk for future offending and that this is an important consideration for any organisation involved with firesetting individuals. There is a need for a collaborative multiagency approach to dealing with firesetting behaviour in order to minimise this risk. It is important that firesetters are assessed for risk of future offending and based on this assessment, receive appropriate referrals. It is recommended that the FAIP maintains and strengthens existing relationships and communication systems with organisations such as NZ Police – Youth Aid, and mental health as a basis for formulating specific and appropriate interventions for this population. It is also recommended that an appropriate assessment screening tool is developed, validated and implemented as a standard part of the FAIP assessment process to guide  appropriate referral.

## INTRODUCTION

The aim of this literature review is to consider existing research, theory and practice regarding child and adolescent firesetters. This review considers firesetting typologies, risk factors for firesetting and firesetting recidivism, possible trajectories in the development of firesetting behaviour, and methodological limitations of relevant studies. The extent to which firesetting should be understood within the framework of antisocial behaviour is considered and predominant approaches to the assessment and treatment of firesetters are discussed. Firesetting has been approached in a myriad of ways and lacks a coherent, consistent and comprehensive set of empirical findings. This literature review aims to consider ways in which existing typologies, particularly the first empirically derived firesetting sub-types (Del Bove, 2005) may relate to theorised and empirically validated risk factors, developmental trajectories and intervention approaches.

### PREVALENCE and COST

Recent community sample studies indicate that firesetting occurs in around 5-10% of children and adolescents (Chen, Arria & Anthony, 2003; Dadds & Fraser, 2006; Martin, Bergen, Richardson, Roeger & Allison, 2004). However, a recent community sample of Italian adolescents, found firesetting to be far more prevalent with just under a third (29%) of the sample reporting engagement in firesetting behaviour (Del Bove, Carara, Pastorelli & Paciello, 2008). Firesetting is incredibly problematic because youth are shown to consistently account for a large percentage of arson offences in a range of national statistics and the cost and damage incurred is extensive. In the United States, approximately half of arson arrestees are under the age of 18 and those of 10 years of age or under account for a greater percentage of arson arrests than they do for any other crime (Hall, 2007). In the United Kingdom, in the year 2000, 40% of arson offences were perpetrated by young people aged between 10 and 17 years of age (Arson Prevention Bureau, 2003). Similarly, of all serious offences committed by children and adolescents in New Zealand, arson is the most common (Youth Justice, 2008), and in New Zealand for 2007/8 under 21 year olds accounted for 73 % of all apprehensions for arson and under 17 year olds for 55.6% (Statistics New Zealand, 2008). Of those children who were referred to the Fire Awareness and Intervention programme (FAIP) in New Zealand, in the year 2007/8, in the overwhelming majority of the cases (82.5%), fires were classified as non- accidental (FAIP, 2008) and the location of firesetting was relatively proportioned between home (33.5%), school (32.5%) and away from home (34%). The damage incurred as a result of firesetting is extensive. Within New Zealand the total estimated property damage caused by the 502 children referred to the FAIP in the year 2007/8 was $3,094,105, with an additional $477,200 in fire fighter costs (FAIP, 2008). It is notable that this is likely to be a very conservative cost estimate as it is probable that many firesetters were not referred to the programme.

## TYPOLOGIES

Firesetters are a very diverse group of children and adolescents, exhibiting extensive variation in their backgrounds, firesetting behaviours, motives, and extent of comorbid psychopathology. Approaching firesetters as a singular group therefore fails to address the complexity of the behaviour and its causes. Consequently, there have been many attempts to identify firesetting subtypes as a means of enhancing understanding of these individuals, the differences in the severity, pervasiveness and development of their behaviour and their consequent assessment and treatment needs.

### Child vs. Adolescent

Many theorists have distinguished between child and adolescent firesetters on the premise that firesetting in adolescence tends to be more severe and antisocially motivated than that in childhood. However, it is notable that the relationship between age and rates of firesetting has also seen *within* the child group in a community sample (Dadds & Fraser, 2006). Additionally, similar numbers of children and adolescents are present across different severity groups, and within these groups, children and adolescents were equally likely to engage in recidivism, indicating that children may be equally at risk for severe firesetting behaviour as are their adolescent counterparts (Del Bove, 2005). No studies specifically compare these two groups in terms of firesetting and therefore at this stage, the extent to which they may or may not be considered distinct groups remains unclear. However, an acknowledgement of the different developmental stages and needs of children and adolescents is likely to be necessary for working effectively with behaviourally problematic youth and delivering age appropriate treatment (Farmer, Compton & Burns, 2007; Ministry of Social Development, 2009).

### Motivational Typologies

Motivation is widely understood to be a crucial element in understanding and treating firesetters (Kolko, 2002). The most well-known motivational typologies are derived from the 7 firesetting subtypes theorised by Fineman (1995): *Curiosity firesetter, Accidental firesetter, Cry-for-help firesetter, Delinquent firesetter, Severely Disturbed firesetter, Cognitively Impaired firesetter* and *Sociocultural firesetter.* The four subtypes which most commonly inform practice in the area of firesetting are as follows (Kolko, 2002):

*The Curiosity firesetter* - usually very young, firesetting is experimental, absence of wider psychopathology or family dysfunction.
*The Cry-for-help firesetter* - often show early behaviour problems, engage in firesetting behaviour largely for attention, behaviour results from environment dysfunction and stressors.
*The Delinquent firesetter* - behaviour is usually present in adolescence, exhibit greatest deviance and behavioural dysfunction.
*The Severely Disturbed or Pathological firesetter* - rare, firesetting is comorbid with a wide range of other pathologies, early signs of behaviour resulting from individual pathology.

While the above motivations are evident in firesetting youth, and while motivation is an important consideration in assessment of firesetters, this typology is problematic in a number of ways. Firstly, while there is some limited evidence in support of these typologies (Slavkin, 2001b), there is no evidence that they each represent a distinct path of behavioural development or aetiology. While there is evidence for clear differences between the pathological (Cry-for-help, Delinquent, Severely Disturbed) and non-pathological (Curiosity) subtypes, within the pathological group, significant differences between motivational subtypes are less apparent (Slavkin, 2001b). Secondly, this typology also fails to account for the fact that these motivations are not necessarily mutually exclusive and that more than one motivation may play a role in an individual's firesetting behaviour as is indicated by Kolko and Kazdin's (1991a) study of firesetting motivations. Finally, the label 'curiosity' firesetter is both misleading and inaccurate as it implies that curiosity is a distinguishing feature of non-severe firesetting behaviour. As a result of this theory, it is widely assumed that curious firesetters are of less concern than other subtypes and need relatively little in the way of intervention. It is concerning that such assumptions continue to provide a foundation for the understanding, assessment and treatment of firesetters as they have been increasingly contradicted by studies which show that curiosity, particularly fire curiosity is actually associated with more severe, frequent and persistent firesetting behaviour (Del Bove, 2005; Mackay et al., 2006; Kolko & Kazdin, 1991a). Firesetters whose fire involvement is motivated by curiosity have been found to have heightened levels of externalising behaviour, overt and covert behaviours and aggression, a more extensive history of fire interest and involvement and to be at greater risk for firesetting recidivism than their low-curiosity counterparts (Kolko & Kazdin, 1991a).

**Del Bove's Empirically Derived Typology**

In response to the absence of empirically typologies for firesetters, Del Bove (2005) applied cluster analysis techniques to a sample of firesetters and derived three distinct clusters, or subtypes, which differ not only in the severity of their firesetting behaviour but also on a large range of other individual, environmental, and fire specific variables. This typology, although in need of replication, provides a multi-factor and empirically derived foundation which future research can both draw from and build on.

_Conventional Limited (CL)_
This cluster represents individuals with the least severe firesetting behaviour. In comparison with the other two clusters they exhibit less fire involvement and are less versatile in their use of targets and ignition sources. Their behaviour tends not to be antisocially motivated and this group tend to express remorse for their behaviour. They exhibit the oldest age of onset for firesetting behaviour and the least fire interest or curiosity. This group has the highest level of socio-economic status and is least characterised by family dysfunction with the most parental contact and least abuse exposure (15%). This group exhibit the lowest levels of child psychopathology with no social skills deficits, externalising behavioural or attention problems of clinical significance. They exhibit oldest age at first mental health and child welfare contact, as well as the best school performance. While this group is at the least risk for future fire involvement and general behaviour problems, it is notable that CL firesetters are not 'one - off' firesetters but rather have an average of 3-4 occasions of fire involvement.

*Home- Instability-Moderate (HM)*

The HM cluster represents the middle cluster in terms of firesetting severity but are characterised by the greatest family dysfunction. Firesetting behaviour in this group is characterised by, in comparison with CL, more frequent fire involvement, a wider range of targets and ignition sources, a younger age of firesetting behaviour onset and heightened fire interest. They are more likely to have an antisocial motivation for their behaviour (38%) and express less remorse (33%) than the CL cluster. They exhibit increased social, attentional and externalising behavioural problems than CL but less than MP. HM firesetters experience the most family dysfunction of the three clusters with the least parental involvement, the highest rates of abuse (75%) and heightened maternal psychopathology. This group tend to be within child welfare agency care, rather than living with a parent and their referral for firesetting tends to closely follow the experience of an immediate stressor.

*Multi-Risk Persistent (MP)*

MP firesetters represent the most severe of the three clusters with the greatest number of fire incidents, the most diverse use of targets and ignition sources, the youngest age of onset and the highest level of fire curiosity. They are similar to the HM cluster in terms of the level of remorse expressed and the extent to which fire related behaviour is antisocially motivated. This cluster experience more family dysfunction than CL with lower levels of parental involvement, increased rates of abuse and more child welfare agency contact. However, in comparison to the HM cluster, they have more parental involvement, less exposure to physical abuse and neglect, comparable levels of sexual abuse and were less likely to be in the care of a child welfare agency. This group present with clinically significant levels of social skill deficits, externalising behaviours and attentional difficulties and tend to be academically below average. MP firesetters had significantly higher rates of recidivism at follow up than the other two groups.

## RISK FACTORS

Many factors have been found to correlate with firesetting behaviour and to differentiate between firesetters and non-firesetters. Most of these factors are also risk factors for child and adolescent psychopathology in general. While some studies have looked to understand the interactions of selective factors in the development and persistence of firesetting (Chen et al., 2003), none have successfully revealed mechanisms involved in a behaviour that appears to result from a complex and cumulative interaction of multiple variables. See Appendix A for a table summarising risk factor studies.

### Gender

Boys are consistently shown to be more likely to exhibit firesetting behaviour, with a prevalence of around 2-3 times that of girls, across a range of samples (Chen et al., 2003; Del Bove, 2008; Martin et al., 2004) which is consistent with gender differences seen in other externalising antisocial behaviours, and Conduct Disorder (CD) (Ministry of Social Development, 2009). Because of the small number of female youth who engage in firesetting, research has largely neglected to address this group, or the possibility of differences between the genders. There is some evidence that different risk factors may be associated with firesetting behaviour in boys than in girls (Dadds & Fraser, 2006; Martin et al. 2004),

highlighting the probability that girls may have different needs in treatment. However, because similar proportions of females are seen across severity groups it is possible that they may not represent a distinct firesetting subtype (Martin et al., 2004; Del Bove, 2005).

*Family dysfunction*

Like many youth with behavioural and emotional disturbances, firesetters tend to come from families characterised by dysfunction, parent psychopathology and maladaptive parent-child relationships. Although this trend is relatively consistent throughout the literature, there is less consistency in terms of the relationship between specific family factors and firesetting, which is likely to be largely due wide variations in study design, measures and variables investigated.

In comparison to those of non-firesetting children, families of firesetters tend to be characterised by higher parental stress (Dadds & Fraser, 2006), parent psychological dysfunction, less family and marital cohesion, less overall quality of parent cohabiting relationships (Kolko & Kazdin, 1990) as well as increased marital violence, paternal alcohol use and paternal abuse of animals (Becker, Stuewig, Herrera & McCloskey, 2004). In comparison with non- or minor firesetters, severe firesetters were found to be more likely to experience strong feelings of anger at maternal rejection, neglect or abandonment and anger at paternal absence, rejection, abandonment or abuse (Sakheim & Osborn, 1999). Given that their families tend to be characterised by dysfunction, it is not surprising that firesetters have been found to experience a significantly higher number of stressful life events than their non-firesetting counterparts (Kolko & Kazdin, 1990).

Parents of firesetters have been found to provide limited supervision (Sakheim & Osborn, 1999) and child report measures have shown parents of firesetters to be higher on instilling anxiety and non-reinforcement scales (Kolko & Kazdin, 1990). Mothers of firesetters have been found to be more lax in their discipline, monitor their children less, and to report less child acceptance and child-centeredness (Kolko & Kazdin, 1990). Interestingly, Dadds and Fraser (2006) found that both positive and negative parenting were associated with firesetting in girls but comment that such a finding is not easily explained.

It is important to note that an Australian community sample which identified family dysfunction to be one of the variables most strongly associated with firesetting behaviour, found that it did not independently contribute to firesetting behaviour after controlling for antisocial behaviour (Martin et al., 2004). This indicates that while family dysfunction may constitute a risk factor for antisocial behaviour in general, it is not necessarily a risk factor for firesetting behaviour specifically.

*Abuse*

As with child and adolescent psychopathology in general, there is evidence for the role of abuse in contributing to firesetting behaviour (Martin et al., 2004; Root, MacKay, Henderson, Del Bove & Warling, 2008). Within a firesetting sample 48% of children were found to have experienced maltreatment and a history of maltreatment was also been found to be associated with increased severity on measures of firesetting frequency and versatility of ignition sources and targets (Root et al.,

2008). In addition to this, Root et al., (2008) found that involvement with fire for maltreated youth was more likely to be motivated by anger or an immediate family stressor. Because the influence of maltreatment on fire related variables was found to be partially mediated by externalising behaviour, Root et al. (2008) hypothesised that maltreatment results in behavioural and emotional regulation problems which act as mechanisms in the development of firesetting behaviour. Becker et al. (2004) suggests that while there is limited evidence for the role of sexual abuse, specifically, this is likely to be due to the low number of girls in firesetting samples and the disproportionate number of girls to boys who have experienced sexual abuse.

### *Individual characteristics*

A number of individual factors indicate the often serious clinical profiles of those individuals who present with firesetting behaviour. In girls, firesetting appears to be associated with internalising problems such as anxiety and depression (Dadds & Fraser, 2006). Firesetting has also found to be significantly related to the number of depression, conduct disorder (CD), oppositional defiant disorder (ODD) and attentional deficit hyperactivity disorder (ADHD) symptoms of an individual (Becker et al., 2004).

Social skills deficits such as poor social judgement, poor planning, weak social anticipation and feelings of loneliness, isolation and inadequacy in peer relations (Sakheim & Osborn, 1999), as well as peer rejection (Chen et al., 2003) were all found to be significantly higher for firesetters than non-firesetters, whereas sociability was higher for non-firesetters (Kolko & Kazdin, 1991b). Depression, interpersonal problems, alienation and deviation were all found to be risk factors for repetitive firesetting (McCardle, Lambie & Barker-Collo, 2004). Severe firesetting has been linked with a lack of empathy as well as a lack of remorse (Sakheim & Osborn, 1999), a finding that is supported by Del Bove's (2005) severe firesetting subtypes (HM and MP), which show significantly higher rates of low levels of remorse than the less severe CL firesetters.

Curiosity as a firesetting motive, within firesetting samples, is associated with externalising behaviours including heightened covert and overt antisocial behaviour, aggression, increased interested in and contact with fire as well as increased rates of recidivistic firesetting (Kolko & Kazdin, 1991a). These findings pose problems for the theoretically non-severe, non-pathological, 'curious' subtype (Fineman, 1995).

An apparent relationship between firesetting and impulsivity (Kolko & Kazdin, 1991b; Sakheim & Osborn, 1999), emotionality (Kolko & Kazdin, 1991b), risk taking (Martin et al., 2004) cruelty to animals, thrill seeking temperament, and hyperactivity (Dadds et al. 2006) indicates the significance and relevance of personality and trait-like factors, particularly those pertaining to impulse control. Additionally, high levels of risk taking as well as serious, harmful or illegal drug use were found to significantly contribute to the prediction of firesetting in both boys and girls (Martin et al., 2004).

Sexual dysfunction, although historically and theoretically linked to firesetting, lacks empirical evidence in the literature. Sakheim & Osborn (1999) did, however, find sexual conflicts or dysfunction as well as pleasurable arousal or sexual excitement added significantly to the prediction of firesetting status.

Based on the finding that both her severe subtypes (HM and MP) had similar levels of sexual abuse, behaviour and concerns, Del Bove (2005), postulated that sexual behavioural concerns may be a bi-product of arousal regulation or impulse control difficulties and are more characteristic of firesetters with emotional and behavioural psychopathology rather than of firesetting specifically.

*Antisociality, Anger, Hostility and Aggression*

Research consistently links antisocial behaviour to firesetting. An Australian community sample of grade 8 students, assessing the relationship between firesetting and a large range of other family and individual factors, found serious antisocial behaviour to be the best predictor of self reported firesetting (Martin et al., 2004). Within a firesetting sample 48% of subjects were in the clinical range in terms of externalising behaviour, placing them in the most extreme 2% for their age group (Mackay et al., 2006). In comparison to non-firesetters, firesetters exhibit more antisocial behaviour (Dadds & Fraser, 2006), and are more likely to be classified as 'extreme' in their antisocial behaviour (Martin et al., 2004). They exhibit increased internalising and externalising behaviour, inappropriate behaviour, total problem behaviour scores and more aggressiveness, hostility and substance use (Kolko & Kazdin, 1991b; Martin et al., 2004).

 In comparison to non-firesetters, both firesetters and matchplayers have been found to display more aggression (both direct and indirect) and hostility and to engage more in fighting and arguing (Kolko & Kazdin, 1991b). Sakheim and Osborn (1999) found that a past history of physical violence, cruelty to children or animals, power struggles with adults, and rebellious, oppositional and defiant behaviour were all significantly more characteristic of firesetters than non-firesetters. As well as the aforementioned overt antisocial behaviours, firesetters have also been shown to display more covert antisocial behaviours (Kolko & Kazdin, 1991b) including lying and deviousness.

In addition to this, firesetters whose firesetting behaviour was motivated by high levels of anger were found to engage in more fire related activities, elicit greater community complaints about their fire contact, and had greater exposure to models of fire interest. They also exhibited high levels of deviant behaviour prior to a firesetting incident and in comparison with their low anger counterparts, received milder punishments and greater peer rejection and family attention subsequent to their firesetting (Kolko & Kazdin, 1991a).

Considering these findings, it is not surprising that conduct disorder is significantly more prevalent in firesetters than non-firesetters (Becker et al, 2004). However, it must be noted that Kolko and Kazdin (1991b), comparing these two groups on a number of variables found no interaction effect between firesetting status and conduct disorder, indicating the presence of a conduct disorder diagnosis was not sufficient to explain differences between firesetters and non-firesetters.

*Fire related factors*

Fire interest has been found to account for variance in the severity of firesetting over and above that which was accounted for by antisocial behaviour (Mackay et al., 2006). This indicates that fire interest could be of significant utility in assessing risk for firesetting in particular, as opposed to antisocial

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behaviour in general. Mackay et al. (2006) acknowledge however, that further research is necessary to investigate the origin of fire interest in firesetting children and adolescents. The association between fire interest and severity is reflected in Del Bove's (2005) firesetting clusters. Del Bove's (2005) CL cluster has the lowest severity of behaviour and also has the lowest level of fire interest. The most behaviourally severe cluster, MP, exhibits the highest level of fire interest and the HM cluster sits between the other two clusters on levels of both these factors.

Research which shows that firesetters who exhibit high levels of curiosity also exhibit increased fire interest (Kolko & Kazdin, 1991a), and that fire interest predicts severity of firesetting (MacKay et al, 2006) provide further evidence that the notion of a low-risk, non-severe 'curiosity' subtype (Fineman, 1995) is inaccurate.

Other fire related factors found to relate to firesetting status are fire preoccupation, attraction or fantasy, projection of fire content, early exposure to fire and a history of fireplay (Sakheim & Osborn, 1999).

## RISK FACTORS FOR, AND PREDICTORS OF FIRESETTING RECIDIVISM

See Appendix A for a table summarising recidivism studies.

### *Firesetting history*

In a systematic review of the literature, a history of firesetting was consistently found to predict recidivistic firesetting (Kennedy, Vale, Khan & McAnaney, 2006). Kolko, Herschell and Scharf (2006) found that fire history (frequency of firesetting, matchplay and involvement in fire related acts), was an important predictor of follow up firesetting across three different treatment conditions. Additionally, in a community sample study, Del Bove et al. (2008) found that adolescents who were identified as firesetters at initial assessment were significantly more likely to report firesetting at follow up. Although these findings highlight firesetting history as a crucial factor to assess in order to determine risk for recidivistic firesetting behaviour, Kennedy et al. (2006) notes that such findings do not assist with an understanding of reasons for the emergence of firesetting behaviour.

### *Fire interest*

Curiosity about, attraction to, and interest in fire have all been found to predict firesetting behaviour at follow up assessment (Kolko et al., 2006). Fire interest has also been found to predict severity of recidivistic firesetting over and above that predicted by firesetting history (MacKay et al., 2006). Kennedy et al.'s (2006) review of the literature, found that, of all the studies which assessed fire interest as a predictor of recidivism, only one (Kolko et al., 2001) found no significant effect. It is notable that parent reports of fire attraction and interest were significantly greater in recidivists than non-recidivists (Kolko & Kazdin, 1992), however because these factors were assessed at a one-year follow up rather than at initial assessment, this study provides evidence only of their association with recidivism, rather than evidence of their value as predictors of recidivism.

*Fire incident variables*

There is mixed evidence for the role of specific fire incident variables in predicting recidivistic behaviour. Kolko and Kazdin (2004) found that fire involvement at a two year follow up was predicted by prior acknowledgement of being likely to set another fire, a neutral or positive reaction to a fire incident at assessment, as well as no parental response, and an out of home location for this fire incident. Those who were recidivists at follow up were 4.7 times more likely to have reported neutral or positive feelings in relation to a fire incident at assessment (Kolko and Kazdin, 2004). However, given that no differences in fire specific variables were significant across Del Bove's (1995) empirically derived subtypes, she suggests that the referral episode specifically may be less important than fire history, individual and environmental characteristics in assessment. It is possible however, that regardless of cluster type, the presence of specific fire incident variables might place any firesetting individual at increased risk for recidivism.

*Antisociality*

Covert antisocial behaviour in particular has been found to be an important predictor of recidivism (Kennedy et al, 2006). The association between firesetting recidivism and heightened externalising behaviour problems (Del Bove, 2008; Kennedy et al, 2006; Kolko, et al., 2006) exemplifies the potentially very high risk nature of antisocial firesetting individuals. However, within a firesetting population, anger as a motivating factor in firesetting was not found to relate to follow up recidivism (Kolko and Kazdin, 1991a), and studies assessing social skill deficits are mixed in their findings (Kennedy et al., 2006). While Kolko and Kazdin (1992) found that hostility and carelessness were the most robust predictors of recidivism, Kennedy et al. (2006) report mixed findings for these variables.

Cruelty to animals (Slavkin, 2001a), has also been associated with firesetting recidivism. While cruelty to animals and enuresis have long been theorised to be associated with firesetting behaviour as a result of Yarnell's (1940) ego triad, no empirical evidence for this relationship has been found (Slavkin 2001a; Slavkin, 2001b). Slavkin (2001a) hypothesises that the relation between cruelty and firesetting may be due to exposure to risk factors for, and subsequent display of a wide range of antisocial acts, including both these behaviours.

*Family factors*

The role of family factors in firesetting recidivism is less evident than the role of family factors in firesetting generally, and studies have been very mixed in the area (Kennedy et al., 2006). While Kolko and Kazdin (1992) found that family dysfunction contributed significantly to the prediction of recidivistic behaviour at follow up, a later study (Kolko et al., 2001), found that family risk factors did not contribute to the prediction of firesetting in either patient or non-patient samples.

## THE ANTISOCIAL NATURE OF FIRESETTING BEHAVIOUR

The association between firesetting and antisocial behaviour is unsurprising given that firesetting is an antisocial behaviour in itself and is one of 15 criteria of which three are needed for a diagnosis of Conduct Disorder (CD) (DSM-IV-TR, 2004). However, not all firesetters meet the criteria for conduct disorder and nor do all conduct disordered children exhibit firesetting behaviour and consequently the close relationship between firesetting and antisocial behaviour has been deemed to warrant further investigation. Questions have been raised as to whether firesetting is unique syndrome or alternatively whether it must be understood within the context of antisocial behaviour, and research tends to indicate that within antisocial populations, the latter provides for a more accurate conception of firesetting behaviour.

Among those with serious antisocial behaviour, firesetters differed from non-firesetters in that they reported more *extreme* antisocial behaviour (Martin et al., 2004). Further evidence for the importance of acknowledging this relationship is that firesetting predicts both violent and non-violent later delinquency, based on both official and self-reports (Becker et al, 2004). Becker et al. (2004) found that child firesetters were three times more likely to later be referred to juvenile court in adolescence even after controlling for CD, indicating the seriousness of the increased risk for and extreme nature of antisocial behaviour exhibited by firesetters. However, research has yet to elucidate the reasons why firesetting is associated with more extremely antisocial individuals.

Additionally, when delinquent firesetters were compared to non-firesetting delinquents with the same number of conduct symptoms, no significant difference was found between the two groups on measures of antisocial behaviour, withdrawal, delinquency or aggression, although both these groups differed from non-firesetters with fewer CD symptoms (Forehand, Wierson, Frame, Kemptom & Armistead, 1991). As groups differed on the severity of conduct disorder symptoms rather than firesetting status it may be deduced that severity of antisocial behaviour better defines antisocial firesetters than their firesetting status itself (Forehand et al., 1991).

Despite its association with severe antisocial behaviour, Forehand et al., (1991) acknowledge that it is still possible that firesetting differs from other antisocial behaviours in its aetiology and development. Stickle and Blechman (2002) investigated whether the structure and pattern of antisocial behaviour differed between firesetters and other antisocial individuals. Although firesetters, as expected, exhibited significantly more total antisocial acts as well as higher aggression than non firesetting offenders in the sample, a three factor model of antisocial behaviour proved to best fit *both* groups, indicating that while the severity of their behaviour differed, its underlying structure did not.

Because firesetting has been found to be associated with, share a number of risk factors with and to be structurally similar to severe antisocial behaviour, it is necessary to determine specifically what it is that makes antisocial subtypes of firesetters such a high risk group and what factors increase their risk for firesetting specifically. Although research has largely ignored this issue, fire interest, as a predictor of both firesetting status and firesetting recidivism *after* controlling for antisocial behaviour has potential as an important risk factor for firesetting *within* antisocial youth (Mackay et al, 2006). There is, however, a lack of understanding concerning the mechanisms involved in heightened fire interest in youth and

adolescents. Martin et al., (2004) found that while there are many differences between firesetters and non firesetters in general, fewer differences are apparent when comparing these two groups both with severe antisocial behaviour. After accounting for antisocial behaviour, for boys, firesetting was associated with *extreme* antisocial behaviour, serious and extreme drug use, suicide plans and attempts and experience of sexual abuse whereas for girls firesetting was associated with extreme antisocial behaviour, perception of academic failure and feelings of hopelessness (Martin et al., 2004). Additional studies, which similarly look at risk factors for firesetting after controlling for antisocial behaviour, are necessary in order to enhance understanding of which factors place antisocial individuals at risk for firesetting specifically.

The conception of firesetting as an advanced antisocial behaviour, while empirically supported, is limited to those firesetting individuals who are comorbidly conduct disordered, or whose behaviour is accompanied by a range of antisocial behaviours, and is not therefore applicable to more 'conventional', less antisocial firesetters.

## DEVELOPMENT

Within a sample of offenders, firesetting is associated with early onset and severity of antisocial behaviour (Stickle and Blechman, 2002). However, it must be noted that severe antisocial behaviour is not limited to early onset. Conduct disorder has two subtypes – child-onset and adolescent-onset (DSM-IV-TR, 2004) which have been theorised to have different associated causal factors (Ministry of Social Development, 2009). Child onset, is more persistent, and thought to result from a number of personal and environmental difficulties whereas adolescent-onset has been linked to factors which lead to abnormally extreme teenage rebellion and is often limited to this specific developmental phase (Dandreaux & Frick, 2009). Thus, it is possible that, as with antisocial behaviour in general, for some antisocial youth, firesetting is adolescent limited and that if so, understanding their firesetting within this developmental framework may prove useful in addressing their behaviour. Such a possibility should not be excluded from developmental theory until research suggests otherwise.

Research has largely pointed to the role of risk factors associated with firesetters with heightened environmental and psychopathological problems, rather than less severe, less antisocial individuals with more family stability, more parent involvement and low behavioural and emotional disturbance. It is likely that boredom, lack of parental supervision, low fear of fire, lack of fire safety knowledge and access to matches, lighters or other ignition sources may contribute to a firesetting episode in these children, however additional research is necessary to further elucidate the aetiology and possible development of firesetting behaviour in these individuals.

In more antisocial, severe firesetting subtypes, it is likely that family dysfunction (conflict, abuse, and psychopathology) coupled with lack of secure attachment to parents, may result in a child with an underdeveloped ability to regulate emotion and maladaptive strategies of coping with the multiple life stresses they experience. Additionally, Kolko and Kazdin (1991b) suggest that firesetters tend to have a limited adaptive repertoire in interpersonal interactions. Firesetting and other problematic behaviours may therefore emerge as a means of coping, gaining significance or a sense of control, relating to

peers, and expressing emotions including anger. This may be reflected in the finding that the use of substances as a coping strategy was significantly more prevalent in both aggressive and non-aggressive firesetters than aggressive non-firesetters and controls (Del Bove et al., 2008). When firesetting behaviour emerges, it is likely that dysfunctional family factors (such as a lack of appropriate parental discipline, abuse and parental psychopathology), act to maintain the behaviour or possibly reinforce it. Additionally, it is likely that firesetting in itself is potentially self-reinforcing due to its role in expressing emotions, gaining attention or providing peer group interactions (Wilcox and Kolko, 2002).

While Del Bove's (2005) Home-instability-moderate (HM) cluster has the most severe environmental dysfunction, the Multi-risk Persistent (MP) cluster exhibits the most severe behaviour, suggesting that environmental dysfunction is unlikely to be operating alone to produce firesetting behaviour within the MP cluster. Del Bove (2005) suggests that for the MP cluster, firesetting may result more from a temperamental predisposition, rather than the family stressors implicated in the HM cluster. This is theoretically consistent with developmental theory for conduct problems in general and the notion that CD in some individuals may develop as primarily as a result of temperamental characteristics, particularly the presence of callous unemotional (CU) traits (Dadds, Whiting & Hawes, 2006). Such a relationship between CU traits and behaviour was found in a study of children exhibiting cruelty to animals suggesting the possibility of a similar role for CU traits in the development of other severe antisocial behaviours such as firesetting (Dadds, Whiting & Hawes, 2006). In antisocial youth, CU traits have been found to be associated with early onset, severe, aggressive and stable antisocial behaviour as well as later delinquency (Dandreaux & Frick, 2009; Frick, 2005; Frick & White, 2008). Because some firesetting typologies are also closely linked to severe antisocial behaviour, and also because they firesetting behaviour has been shown to relate to cruelty to animals (Dadds et al., 2006), the role of CU traits in determining severe, pathological firesetting necessitates further investigation and has yet to be sufficiently addressed in the literature.

## INTERVENTIONS

Arguably the most understudied area of interest concerning firesetters is that of intervention. The two most prevalent intervention approaches for firesetting children and adolescents are fire service operated educational interventions, and mental health-based psychosocial interventions. While there does exist literature intended to guide professionals working with firesetters (Kolko, 2002, Stadolnik, 2000), it is none the less subject to the limitations of the research from which it draws its conclusions. Assessment tools are, at this stage somewhat limited and in need of testing. While research supports multidimensional collaborative treatment approaches (Kolko, 2001), lack of long-term outcome studies mean that evaluations of intervention efficacy are limited.

### *Assessment*

Assessment of firesetting children and adolescents is essential in gaining an understanding of the nature of their behaviour and selecting an appropriate treatment approach. There is widespread agreement amongst clinicians and researchers working with firesetters as to the need for comprehensive assessment which consider the domains of fire history, individual functioning (cognitive,

behavioural, social and emotional), and family functioning (Kolko, Wilcox, Nishi-Strattner & Kopet, 2002; Stadolnik, 2000). The Oregon Cycles Model (Oregon Treatment Strategies Task Force, 1996, as cited in Stadolnik, 2000) emphasises the interactive contribution of community, family, behavioural and cognitive-emotional cycles in firesetting and the importance of acknowledging the interactive effect of risk factors in the causation, reinforcement and maintenance of firesetting behaviour. Wilcox and Kolko (2002) emphasise the importance of considering, in assessment, the potentially self-reinforcing nature of firesetting in its function of relieving boredom, expressing anger, satisfying curiosity or because it involves peer group involvement.

*Assessment tools*

Despite a clear need for such assessment of firesetters, there is far less consensus regarding specific assessment tools or approaches in gathering information (Stadolnik, 2000) and assessment approaches range from brief screening administered by fire service staff to extensive in-depth clinical assessments. The following assessment tools and approaches are those which recur in practitioner's handbooks, interventions and as study measures.

Kolko and Kazdin developed two standardised tools for assessing fire history. The Fire History Screen (FHS) (Kolko & Kazdin 1988, as cited in Wilcox & Kolko, 2002 and Stadolnik, 2000) is a very brief, 14 item assessment, with two versions administered separately to the parent and firesetter. The FSH assesses engagement in fire related behaviours in both the last 12 months and prior to this period. The Firesetting Incident Analysis (FIA) (Kolko & Kazdin, 1991 as cited in Wilcox & Kolko, 2002) uses parent and child interviews to assess the motives, consequences, behavioural and emotional correlates, and specific characteristics of a specific firesetting incident.

Various other assessments have been developed to assess a wide range firesetting correlates and thus have the potential to elucidate necessary targets for treatment. The Child Firesetting Interview (CFI), (46 item) and Firesetting Risk Interview (FRI), (86 item) (Kolko & Kazdin, 1986, as cited in Wilcox & Kolko, 2002) are based on child and parent report respectively and assess risk factors such as curiosity, involvement, fire knowledge and competence, exposure to models and material, supervision and discipline. Based on their research assessing firesetting correlates and firesetting severity, Sakheim & Osborne (1994) developed the Firesetter Analysis Worksheet intended identify whether an individual is at 'minor', 'moderate', 'definite' or 'extreme' risk for future firesetting.

The F.I.R.E protocol (Pinsonneault & Richardson, 1989, as cited in Kolko et al., 2002) is a very comprehensive, semi-structured interview-based assessment aimed at serious, high-risk firesetters which consists of over 320 questions and takes place over a number of sessions. The protocol includes a firesetting interview & risk evaluation assessment designed to assess youth factors, fire behaviour factors, environmental factors, and factors regarding reaction to the fire incident. The protocol assesses individual treatment readiness and acceptance of responsibility of actions, the likelihood of family system to support attempts to change behaviour as well as the 'capacity' of environmental systems to take the behaviour seriously and minimise behaviour thus making it a useful tool for guiding the selection of suitable treatment approaches.

The Massachusetts Coalition Model (cited in Stadolnik, 2000) guides comprehensive assessment of firesetters in areas of fire history, fire scene evidence, fire knowledge, parent and family functioning and behavioural, emotional, cognitive and school functioning. The protocol suggests a wide range of possible tools for, and sources of data collection within in each area of assessment (Stadolnik, 2000). The model includes a firesetting history interview and encourages a semi structured interview approach whereby flexibility, probing and encouragement of a narrative approach help to maximise depth of information.

*Educational interventions*

In a recent review of firesetting interventions throughout England and Wales, Palmer, Caufield and Hollin (2007) observed that fire and rescue service educational interventions were conducted by a fire fighter and consisted of a one-off home visit, with follow up contact and provision for further follow up visits if necessary. Such programmes operate across North America, Canada, Australia and New Zealand. These programmes are considered suitable for lower risk firesetters and aim to reduce an individual's fire involvement by increasing their knowledge and understanding of fire and fire-safety practices. Due to the need to minimise access to fire starting materials and to maximise parental supervision of firesetters, parent presence in fire safety education is generally considered to be important and parental involvement in educational interventions has also been shown to significantly increase the implementation of fire safety into the home (Carroll et al, 1986).

The rationale behind the use of educational interventions for firesetters is that in teaching fire knowledge and fire safety skills, correlates of firesetting such as high fire interest, fire curiosity (MacKay et al., 2006, Kolko et al., 2006), and low fire fear (Del Bove, 2005) will be minimised whilst encouraging and teaching alternative, positive, fire-safe behaviours.

While educational interventions through fire services are relatively common, they vary hugely and lack coordination or standardisation, reflecting the lack of available research and established practice to guide programmes (Barreto et al., 2004; Palmer et al., 2007). There is limited information regarding the efficacy of established educational programmes largely due to an absence of post intervention monitoring and a lack of programme evaluations (Palmer et al., 2006).

*Mental health interventions*

Because the psychopathology of severe firesetting youth is often in the clinical range, it is apparent that their needs go beyond the fire safety, skills and knowledge offered by fire education programmes. Emphasis has increasingly been placed on the role of mental health based psychosocial and behavioural interventions to address the extensive number of firesetting correlates such as family dysfunction and individual psychopathology which are typical of multi problem youth. While educational interventions are widely available, and may involve referral to mental health services, there are far fewer mental health based programmes available which are specifically aimed at, age appropriate for, and able to target more serious firesetting behaviours in children and adolescents (Barreto et al., 2004; Palmer et al., 2007). Palmer et al., (2007) noted that such interventions in England and Wales were residential and catered only for older adolescents or adults. While mental health based treatments are

becoming more widespread, such as The Arson Prevention Program for Children (TAPP-C) which has shown high rates of adoption amongst mental health professionals who attended its workshops (Henderson, MacKay & Peterson-Badali, 2006), these programmes generally lack systematic evaluation.

Psychosocial interventions generally take a cognitive-behavioural approach to addressing problem behaviour and its causes and tend to involve therapy techniques and approaches that are commonly employed by clinicians to address a wide range of child psychopathology. While a focussed, direct and 'zero tolerance' approach have been considered necessary in all interventions, due to the heterogeneous nature of the firesetting population and the need to target firesetting correlates and treatment needs specific to the individual of concern, treatments will vary widely (Stadolnik, 2000).

Within a predominantly cognitive-behavioural approach to treatment, methods such as parent training, problem solving and assertion skills training and community based multisystemic treatments are used, all of which are also used for disruptive behaviour disorders (ODD, CD). Training firesetters and their families in problem solving and assertion skills, identifying and challenging dysfunctional and distorted cognitions, teaching appropriate anger expressiveness, anger control and affect identification (Kolko, 2002), are all techniques intended to decrease firesetting by addressing maladaptive patterns of thought, emotion and behaviour and replacing them with more appropriate alternatives. In order to effectively address interactive factors which cause and maintain firesetting, it is important that the clinician, firesetter and their caregivers have an understanding of the antecedents and consequences of behaviour and the causal relationships between experience, thoughts, emotions and firesetting behaviours. Graphing (Bumpass, Fagelman, & Brix, 1983) is a method of visually graphing feelings along a timeline of external stressors and behaviour and is intended to 'help the patient become aware of the cause-effect relationship between feelings and behaviour'.

Because family dysfunction is a consistent correlate of severe firesetting behaviour and has been shown to play a role in the wider antisocial behaviour of more severe firesetting individuals, it is crucial that the family system is addressed in any intervention. Family therapy is an important means of providing parental support, training, guidance and education, and improving parent-child communication, discipline and family problem solving skills (Stadolnik, 2000, Kolko, 2002). Treatment often aims to increase effective parenting through parent training which teaches child management, monitoring, reinforcement and response-cost techniques (Kolko, 2002). Family therapy may also provide an opportunity to identify and address parental psychopathology, which may contribute to or maintain firesetting behaviours (Kolko, 2002). For firesetters who experience significant environmental and familial difficulties, such as Del Bove's (2005) Home-instability-moderate cluster or Fineman's 'Cry-for-help' subtype, family focussed intervention is likely to be key to success, along with ongoing support and parent control and supervision. Affect regulation strategies and coping skills are also likely to be necessary in treating behaviour individuals whose behaviour functions as a reaction to an environmental stressor.

The placement of firesetters in residential treatment facilities has been deemed necessary in very serious cases where community based interventions are insufficient for treating behaviour, when the living environment of the individual poses great risk to continued behaviour or when the individual

poses a significant risk of harm to themself or to others (Stadolnik, 2000). However, because for many of these youth environmental and family factors play an important role in their behaviour, it is essential that they continue to be addressed in the intervention, even though the individual has been temporarily removed from these family and community systems.

*Integrative treatment*

Because of the importance of fire education for all firesetters and the necessity of rigorous assessment and the availability of mental health services for those who require it, many authors support an integrative approach to treatment. Stadolnik (2000) suggests that best practice interventions will specifically target firesetting behaviour and problematic family or environmental factors, will improve deficits in individual functioning (social, emotional or academic) and will increase fire safety knowledge and skill. The Massachusetts Coalition Model (cited in Stadolnik, 2000) recommends a multidimensional treatment approach involving fire service, juvenile justice, law enforcement, mental health, & social service professionals. It recommends that treatment is delivered by trained professionals, operates under clear guidelines, can provide ongoing care from a range of services and is subject to thorough evaluation (Stadolnik, 2000). Similar recommendations resulted from a review of existing literature and interventions in Rhode Island (Barreto et al., 2004).

Stadolnik (2000) noted that firesetters, as a heterogeneous population, seem best served by multidisciplinary, community based, fire service led intervention. Because many firesetters are first referred to the fire department, a collaborative approach means that, if required, the mental health needs of those individuals can be sufficiently met as intervention is not limited to the fire specific expertise of fire service personnel. Palmer et al. (2006) observed that very close multi-agency contact especially during assessment and referral was characteristic of best practice programmes. Collaborative programmes such as the JFAIP in New York City initially screen firesetting youth upon fire service contact to classify the 'concern' level of the firesetter, and referral to mental health for further assessment and treatment is made when it is deemed necessary (Webb et al,. 1990). Given that her conventional limited cluster did to some extent (although at a lower rate than the severe clusters), have previous mental health contact and learning difficulties, Del Bove (2005) suggests that mental health referral is likely to be necessary even for some non-severe firesetters and that thorough initial assessment is therefore necessary in order to determine this necessity.

A multiagency approach not only ensures a maximal number of sources of information concerning the firesetter, and the greatest provision of support, services and intervention approaches for the youth and their family, but also allows for the use of coercion where necessary for resistant families. It must be noted that while severely dysfunctional families have the greatest need for intervention, it is also these families who are most likely to resist such help and least likely to cooperate when referred to mental health services (Webb et al, 1990). In a review of the JFAIP NYC, Webb et al., (1990) conclude that disruptive family environments, whist likely to both contribute to and be exacerbated by firesetting, also may distract from and interfere with treatment and that a coercive component and 'aggressive outreach' whereby fire marshals can make repeat home visits to explain that the mental health referral that has been agreed upon is required, contribute to the programme's success. In an early review of the Juvenile Fire Offenders Programme, a collaborative initiative in Colorado, it was noted that social

service participation was not only important in providing psychological interventions for severely problematic children but also in supporting fire service personnel, in their ability to work with behaviourally problematic youth.

*Efficacy of Treatment Approaches*

There is limited research indicating the efficacy of different programmes and treatment approaches in the reduction of firesetting behaviour, which aspects of multifaceted treatments are most successful, or which intervention approaches may be best suited to which subtypes of firesetting individuals (see Appendix A for a table summarising intervention studies). A lack of systematic outcome evaluations of existing programmes means that there is a limited information base to guide and improve future interventions.

Interestingly, Adler et al (1994) found that a multi-component treatment involving fire safety education, parental directed behaviour modification through satiation, parental negative consequence responses to firesetting and graphing did not prove to be more efficient than education alone. However, it is arguable this is likely be due to elements of the intervention which did not reflect a 'best practice' collaborative intervention and which therefore reduced its efficacy. Specifically, while the intervention had both educational as well as cognitive-behavioural components, it was administered solely by a fire fighter and did not therefore utilise a multiagency approach, nor utilise the appropriate  professionals as would characterise  the 'best practice' intervention described by various authors such as Stadolnik (2000). In addition to this the use of satiation methods whereby a firesetter repeatedly lights fires in an attempt to decrease their fire interest and firesetting behaviour are controversial, rarely seen in recent practice and should be avoided considering the positive alternatives (Kolko , 2002).

Kolko (2001) compared an eight-week, psychologist administered CBT programme, designed to specifically address clinical factors associated with firesetting (involving graphing, problem solving, assertion and interpersonal conflict resolution training, parent education and behaviour training as well as the development of a home-based contingency) with an eight-week fire-safety education programme (FSE) and a two-contact fire fighter home visit (HVF). The study found that while all treatment conditions resulted in a significant reduction in firesetting, subjects in the CBT and FSE groups exhibited significantly less firesetting, matchplay and fire interest at follow up for the than those in the HVF group. The CBT condition resulted in the greatest reduction in fire related acts and fire attraction and while the HVF group showed a significant increase, the CBT showed significant decreased in deviant fire behaviours (inappropriate interest in fire, deviant fire activities such as hiding fire materials, and negative peer influences) at both post treatment and one year follow up.

Another study which assessed the efficacy of CBT, FSE and a two contact firefighter home visit (FHV) condition in improving intervention-specific targets (Kolko, Herschell & Scharf, 2006) found that fire safety education, unsurprisingly, resulted in the greatest improvement in fire safety skills and knowledge. CBT resulted in greater improvement than the two educational interventions on measures of problem solving skills but not in other child behaviours and parenting practices which it targeted. With more dysfunctional families, CBT and FSE were found to be more effective than FHV and among

firesetters with increased exposure to fire models and materials and fire safety knowledge FSE was found to be more effective than FHV.

Fire safety skills training has been shown to result in a greater reduction in preference for, or contact with, fire related stimuli, less overall involvement with fire, and firesetting at a 6 month follow-up when compared to a discussion and assessment of firesetting behaviour (Kolko, Watson & Faust, 1991). Similarly, in a comparison of CBT with education and fire skills training, it was the education and fire-safety skills that had a greater effect on the reduction of fire interest (Kolko, 2001). Although further research is needed, these findings would seem to indicate that the increased fire knowledge and reduction in fire interest that result from educational interventions play an important role in reducing firesetting behaviour and that for these reasons, educational interventions, although not sufficient for firesetting youth with wider psychopathology, are likely to be an important factor in any successful treatment programme for both non-severe and severe firesetters.

The finding that a more extensive, eight-session fire education and skills training delivered by a fire fighter, when compared to a typical two session educational home visit, resulted in a significantly greater reduction, and maintenance of reduction in a number of fire related behaviour measures, as well as fire interest, (Kolko, 2001) may indicate the potential for educational interventions administered by fire fighters to have a more far reaching effects through a more extended and extensive focus with emphasis on skills as well as education. It is notable that short but intensive programmes have been found to be successful, such as a 1 day interactive educational programme based in a trauma burn centre, which focussed on the impact of firesetting behaviour and involved burn centre staff, burn victims, social workers, firefighters and programme graduates (Franklin et al., 2002).

Although current research is limited, the need for multisystemic, multidimensional and comprehensive treatment approaches is reinforced by indications that different treatment approaches may target different aspects of fire-related behaviours, and may differ in efficacy depending upon individual, environmental and family differences.

## METHODOLOGICAL LIMITATIONS [1]

### *Samples*

While more recently, a small number of community sample studies have been conducted (Becker et al., 2004; Dadds & Fraser, 2006; Del Bove et al., 2008; Martin et al., 2004) the majority of samples in firesetting research consist of incarcerated individuals or those who are undergoing mental health care. Consequently, the majority of samples are likely to represent severe firesetters and may not generalise to less severe typologies. Because there have been significant differences found between mental health care patient and non patient samples (in both rates of firesetting and predictors of recidivism)

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[1] The following methodological limitations refer to those in the existing body of research concerning firesetters. Limitations of the current study are outlined on pages 36-38

(Kolko, Day, Bridge & Kazdin, 2001, Kolko & Kazdin, 1991b), a study of one of these groups is unlikely to be able to be generalised to other populations. With the exception of community samples, and prospective studies, firesetting samples consist of previously identified firesetters and as a result of this, those who remain unidentified, are not represented in the findings of such studies.

Because firesetting is significantly more prevalent in males than females, samples tend to be all, or largely male. Although research using male samples and thus providing information about male firesetters is very useful, it can certainly not be assumed that these findings will generalise to female firesetters, who are often included in research in such a small numbers that studies lacks sufficient power to detect gender differences. Research has yet to determine whether female firesetters constitute a distinct group of firesetters, however indications that their associated psychopathology and needs for treatment may differ (Dadds & Fraser, 2006; Rappaport & Thomas, 2004) emphasise the importance of understanding such differences.

There is inconsistency between typological theory which places emphasis on the heterogeneity of firesetters and empirical studies, which tend to approach firesetters as a single group or separate them simply in terms of 'severe' and 'non severe'. Consequently, the fact that firesetters are a heterogeneous group, and have, more recently, been empirically sub-typed, poses issues for the validity of the existing body of research. It is possible that results of studies which compare firesetters to non firesetters may be prone to considerable variation dependant on the relative numbers of severe and non-severe firesetters in the firesetting group. Similarly, those that compare severe and non-severe firesetters would be prone to variation dependent on relative levels of different severe subtypes (such as HM and MP firesetters) in the sample. This possibly explains the lack of consistency in risk factor and recidivism studies.

Studies tend to use samples of either children, adolescents, or both. However, due to the lack comparative studies exploring the extent to which these firesetting groups are similar or different, it remains unknown whether the findings from one age group are able to be generalised to the other.

*Constructs and Measures*

Within existing research there is inconsistency in definitions of constructs as well as in the measures used. The definition of firesetting ranges from 'falling within the top 5% for age and gender' (Dadds & Fraser, 2006), to a single positive response to the item 'I have set fire to things in public places just for fun' (Martin et al., 2004). Community sample research regarding firesetters often extracts data from larger, more general surveys (Martin et al, 2004) and consequently firesetting behaviour is measured by a single question that is open to misinterpretation by the participant and provides little information concerning the nature of their firesetting.

Studies vary in their use of parent or child report to measure behaviours. Discrepancies between the two have been found, particularly in that children tend to report higher rates of their antisocial behaviour (Kolko & Kazdin, 1994). This suggests an inaccuracy in parent reports which authors have suggested is likely to be a result of parents being unaware of their children's covert behaviours (Del Bove, 2008). It is

therefore preferable to base studies on a wide range of data sources including from parent, child, psychological and school reports.

*Development and Causality*

Due to a lack of prospective studies, and because risk factor studies tend to examine variables and firesetting status or severity concurrently, (Kolko & Kazdin, 1990), such research is unable to establish causality and direction of influence. For example, parental stress (Dadds & Fraser, 2006) may be an environmental factor which contributes to firesetting, or a factor that is elicited or exacerbated by firesetting.  It is likely that risk factors for firesetting will change over time, probably dependant on an individual's development, age and firesetting typology. While there is some indication that predictors of firesetting behaviour or recidivism at one point may no longer be significant at a later point (Kolko et al., 2001), due to the lack of longitudinal studies, such conclusions remain very tentative.

*Limitations in intervention studies*

Intervention studies often lack true control groups largely due to the unethical nature of offering no treatment to a group of individuals. Unsurprisingly, Kolko, Watts and Faust (1991) reported significant parent reluctance to participate as part of a control group where no treatment was offered to their child. Because such studies lack control groups, the conclusions that can be drawn from them are limited.

Because most efficacy studies look purely at the outcomes of one intervention or one intervention versus another, little empirical information is available regarding which subtypes of firesetters may benefit from which type of intervention. It is plausible that certain interventions would show significantly more efficacy when applied to only certain subtypes of firesetters.

## CONCLUSIONS

From the current review of theory and literature, the following conclusions have been reached.

Typological theories have failed to sufficiently account for the complexities of firesetting behaviour and has a number of inherent flaws, most important of which is the misleading label of the non-severe 'curiosity' subtype. Del Bove's (2005) typology, although in need of replication, provides most comprehensive and multidimensional typology to date.

Non-severe firesetters show the least frequency and versatility of firesetting are likely to exhibit few other comorbid disorders, antisocial behaviours, psychopathology or family dysfunction. Due to the fact that the majority of risk factors which emerge from the literature are also associated with antisocial behaviour in general and as well as an absence of studies looking at conventional firesetters as a subgroup, there remains a lack of indication as to risk factors for non-antisocial firesetters.

In more severe firesetters, firesetting is likely to be one of a number of antisocial behaviours and exist within a context of individual psychopathology and family dysfunction. Due to the fact that the majority

of risk factors which emerge from the literature are also associated with other antisocial behaviour it remains unclear which factors place an antisocial individual at risk for firesetting specifically rather than antisocial behaviour in general. Within the group severe firesetters, it is likely that there are severe subtypes which have different trajectories in the development of their behaviour. It is likely that for the majority of severe firesetters, environmental stressors and dysfunction are largely responsible for the development of firesetting, but that in the most severe firesetters, temperamentally based factors may also play a role. It is possible that CU traits may play a role in a more temperamentally based development.

Thorough assessment and a multiagency collaborative approach to treatment is which addresses both fire education and psychosocial needs are important to ensure all the correlates of firesetting specific to any given individual are addressed.

## RATIONALE AND AIMS FOR THE STUDY

The rationale for the current study was to evaluate the outcome(s) of the FAIP for the first time since its inception in 1992 using measures of recidivism over an approximate follow up period of ten years. Its primary aim was to determine the arson recidivism amongst firesetters following their participation in the FAIP and to compare this to overseas data. Secondly, the study aimed to establish whether these firesetters developed a pattern of offending behaviour subsequent to their involvement in the FAIP. Lastly, the study intended to address the nature and severity of any subsequent offending to further understanding of firesetters and related offending behaviours. Other factors associated with offending were also explored.

This study is an evaluation of the effectiveness of the FAIP to determine whether participation in this programme reduces re-offending. This involved a retrospective analysis of data obtained from NZ Fire Service and matched to further offence data (if present) obtained separately through the NZ Police.

## METHOD

### *The New Zealand Fire Awareness and Intervention Programme (FAIP)*

The New Zealand Fire Awareness and Intervention Programme (FAIP) is a nation-wide educational programme, established in Auckland in 1992 and available for youth up to the age of 18, who have engaged in concerning fire-related behaviours.

The primary aim of the FAIP is to reduce the incidence of fire related behaviours and increase the acquisition of fire safe attitudes, knowledge and appropriate behaviour through establishing an understanding of motivational factors and context of the child's behaviour, provision of fire safety education and promotion of fire safe attitudes and behaviour.

Referrals to the programme are made by any person concerned about a child's firesetting behaviour, most commonly a member of the public or the child's family, police, school, the New Zealand Fire Service or Youth Aid. Once the coordinator has received the referral, made contact with the parent and gained some background information, they then select a suitable FAIP practitioner. Practitioners are firefighters who have undergone training in delivering FAIP interventions.

A trained FAIP practitioner will arrange and attend an intervention meeting with the child or adolescent and their parents or caregivers. While the intervention usually takes place in the home, another setting may be used if it is deemed to be more appropriate (such as at school, if this is where the incident took place). The duration of an intervention meeting is usually an hour to an hour and a half but may be longer if necessary. If the practitioner considers it necessary, follow up phone calls or further intervention appointments can be made.

The intervention format is a semi-structured interview using a standard questionnaire involving discussion with both the parent and child on a range of topics including demographics, antisocial behaviours, the fire incident for which they were referred as well as firesetting, health and mental health histories. Additionally, the intervention involves fire safety education for both the child and parents. Interventions may vary hugely depending on the child, parent and family dynamics and are by no means limited to the questionnaire. Practitioners will engage in wider discussion with the child and parents, building rapport, tailoring the intervention accordingly to the age and behaviour of the child and family and drawing on a number of age appropriate resources.

If the practitioner considers it necessary, or if a parent or child is seeking assistance, the practitioner can refer the family on to other appropriate organisations, services or agencies. Two advisory psychologists act in a supporting role for practitioners, and are able to provide advice concerning appropriate referrals or other concerns a practitioner may have about a child. They are not however in direct contact with the client or their family.

*Access to data*

Following approval and commission from the NZ Fire Service to undertake this study, approval to access the data was a two-step process. Ethical approval was granted by the University of Auckland Human Subjects Ethics Committee (Ref: 2007/201). Following this, a written proposal to access The National Intelligence Application (NIA) was sought via NZ Police - Counties Manukau Community Services Team to its Research and Evaluation Steering Committee (RESC). RESC authorised a member of the research team to access NIA and to sign a confidentiality agreement with the NZ Police to ensure that information relating to personal identities was not disclosed to outside parties. The Principle Investigator was also required to sign a confidentiality agreement. A copy of the confidentiality agreement is presented in Appendix C.

NIA is a database within NZ Police which contains information of all persons who currently or previously have had involvement with police for example, through reporting a crime or committing a crime. This database involves sharing information and integrating interfaces between Police, Ministry of Justice, Department of Corrections, and Land Transport Safety Authority.

*Collection of Data*

Data was sourced from both the NZ Fire Service and NZ Police. Information provided by the NZ Fire Service was sent to the researcher in a pass-word encrypted, security coded memory stick. The dataset provided by the NZ Fire Service was a combination of its annual National Juvenile Database from 1999 – 2009 which contained all firesetters who had participated in the FAIP programme since 1999. The dataset contained the following information for each FAIP client:

- Name
- Date of Birth
- Date Seen
- Database

If there was no date of birth allocated to a name given by NZ Fire Service, then the individual was excluded from the list due to an inability to accurately match the individual on NIA

The first 200 names from the NZ Fire Service dataset complete with a date of birth were searched on NIA. All 200 had participated in the FAIP in 1999. If there was no match for the name and date of birth provided by the NZ Fire Service in NIA, then it was recorded that this individual did not commit any further offending. In some cases where a match was made in NIA and no offending history, then it was recorded that this individual did not commit any further offending. If the name and date of birth provided by the NZ Fire Service was matched, the following information was sourced from NIA:

- Name (matched with NZ Fire Service)
- Date of Birth (matched with NZ Fire Service)
- Address

- Offence history (including date of offence, offence type and offence outcome)[2]
- Family Violence notification (if present)
- Alcohol and Drug notification (if present)
- Gang notification (if present)
- Weapon notification (if present)
- Other notification (if present) such as suicidal or self harm tendencies and/or psychiatric illness

The data from NIA was collected onsite with the NZ Police - Community Services Team and the relevant information was saved onto a password encrypted security coded memory stick. Each individual was given a number used as a reference code. Once the relevant information for the individual was obtained from NIA, then the name and address of the individual was omitted from the file. The hard copy which matched the reference code to the name and address of each individual was kept in a locked filing cabinet with the researcher. [3] (See Appendix D for a copy of the data collection form)

### *Analysis*

Once the data was collated, the coded data (excluding name and address details), was entered into the Statistical Package for Social Sciences (SPSS) Version 17.

Using the 'date seen' for each participant and the month in which data was extracted from the NIA, the length of follow up period (months) was calculated for each subject Sand the mean follow up period for the sample was calculated. Based on advice from the NZ Fire Service indicating that one month was the average time spent involved in the programme, an estimated 'date of completing the FAIP' was calculated to be one month after the 'date seen' for each participant. Any offences prior to this date were excluded from the data as the offences of interest in the current study were those which occurred after completion of the FAIP. The total number of offences was calculated for each participant and it was noted whether the outcome of any offence committed by each participant had ever been imprisonment.

Participants were labelled as *'offenders'* if they had any offence history in NIA or *'non-offenders'* if there was no evidence of any offence history. A chi-square test for goodness of fit was performed to determine whether there were significant differences between the frequencies of offenders and non-offenders.

Offenders were grouped into three mutually exclusive offender severity groups, based on advice from police concerning which offences were regarded to be minor, moderate and severe. An offence typically refers to a violation of law and order.  The severity of the offence (in this report, and in

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[2] Youth Aid history (if applicable) was also included, but not separated within their offending history.
[3] The name and address of each individual was seen by the Principal Investigator and a member of the research team.  This was agreed and signed to with the RESC.

consultation with NZ Police) was based on the extent of damage or harm to an individual and/or property. The offences which fall into each category are listed in Appendix B.

The three offender severity groups were as follows:

- *Severe offender*
  Participant had committed at least one severe offence such as robbery, immoral behaviour (unlawful sexual intercourse with a child or young person),  serious assault.

- *Moderate offender*
  Participant had committed at least one moderate offence such as arson, burglary, speeding, but no severe offences.

- *Minor offender*
  Participant had committed at least one minor offence such as theft, bylaw breach, duties and obligations (failure to report an accident) but no moderate or severe offences.

The mean total number of offences for each offender severity grouping was calculated. An independent sample t-test was performed in order to determine whether there were any significant differences between the severe and moderate severity groups on mean total number of offences. Comparisons were not run for the offence rates of the three severity categories, as the assumption of homogeneity of variance was not satisfied due to the small size of the minor offence group (N=9).

A chi-square test for independence was performed to determine whether there was a significant relationship between a participant's offending and whether or not they were imprisoned at any point during the follow up period.

Arson recidivism was defined as the presence of any arson offences subsequent to completion of the FAIP. For individuals who were identified as having committed arson after leaving the FAIP, the age of involvement in the FAIP was calculated using the date of birth and 'date seen'. Similarly, the age at any arson offences, as well as the age at most recent offence was calculated using the date of birth and date of offence.

## RESULTS

Descriptive statistics, an independent samples t-test and chi-square tests were used to explore and analyse the current data. Results are shown in the tables and figure below.

### *Arson Offenders*

There were four offenders who committed arson offences during the follow up period. As shown in Table 1, all four arson offenders were categorised as moderate offenders, their age of re-offending ranged from 12 to 15. The time between leaving the FAIP programme and committing their first offence ranged from 22 to 52 months. Ages of first offence ranged from 14 to 17 years old. Table 2 shows the other types of offences made by these four offenders. The most common offences accompanying arson were intimidation/threats, trespass, manner of driving, and duties and obligation.

Table 1

*Descriptive statistics concerning the four repeat arson offenders: Ethnicity, number of arson offences, whether other offences were committed, the total number of offences, their offending severity (M = moderate), the age that they entered the FAIP programme, the time between leaving the FAIP and committing their first offence, and their age at first, second and third arson offence.*

| Arson Offender | Ethnicity | No. of Arson offences | Other offences? | Total # of offences | Offending Severity | Age at entering FAIP | Time between leaving the FAIP programme and committing the first offence | Age at Arson offence | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 1st Offence | 2nd Offence | 3rd Offence |
| A | Unknown | 1 | No | 1 | Mod | 12 | 23months | 14 | - | - |
| B | Unknown | 1 | Yes | 11 | Mod | 13 | 52months | 17 | - | - |
| C | European | 2 | Yes | 4 | Mod | 15 | 22months | 17 | 17 | - |
| D | European | 3 | Yes | 17 | Mod | 14 | 30months | 17 | 20 | 23 |

Table 2

*Types of other offences committed by the four repeat arson offenders. These include: Intimidation/ Threats, Cannabis, Disorder, Burglary, Car Conversion, Theft, Endangering, Trespass, Firearm Offences, Against Justice, Arson, Alcohol Related, Manner of Driving, and Duties & Obligations*

| Offender | Intimidation/ Threats | Cannabis | Disorder | Burglary | Car Conversion | Theft | Endangering | Trespass | Firearm Offences | Against Justice | Arson | Alcohol Related | Manner of Driving | Duties & Obligations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | - | - | - | - | - | - | - | - | - | - | Yes | - | - | - |
| B | Yes | - | Yes | - | - | - | - | Yes | - | Yes | Yes | - | Yes | Yes |
| C | - | - | - | - | - | - | - | - | - | - | Yes | Yes | Yes | - |
| D | Yes | Yes | - | Yes | Yes | Yes | Yes | Yes | Yes | - | Yes | - | - | Yes |

The average follow up period for the given sample (N = 200) was 120 months or 10 years, with a range of 117 – 126 months or 9 years and 9 months to 10 years and 6 months. Of the given sample, the majority of participants were classified as offenders (59.5%, N = 119), and the remaining participants were classified as non-offenders (40.5%, N = 81). A chi-square test for goodness of fit showed there were significant differences in the frequencies of offenders and non-offenders ($X^2_{(1)}$ = 7.22, p = .007).

Table 3 represents the data concerning the ethnicities of participants. Ethnicity data was collected from NZ Police where the predominant ethnic group of the sample were European, representing 48.5% of the entire sample. Pacific Islander was the least represented ethnic group representing 3% of the entire sample. The Unknown ethnicity was identified due to an absence of this information from NZ Police records. As this Unknown group represented over a third of our entire sample, caution is advised and discussed further in the Limitations section of this report.

Table 3
*Percentages of ethnicities from the whole sample, offenders, and non-offenders.*

| Ethnicity | Percentage of whole sample (%) N = 200 | Percentage of offenders (%) N = 119 | Percentage or non-offenders (%) N = 81 |
|---|---|---|---|
| European | 48.5 | 68.1 | 19.8 |
| Maori | 12 | 16.8 | 4.9 |
| Pacific Islander | 3 | 4.2 | 1.2 |
| Unknown | 36.5 | 10.9 | 74.1 |

### *Offence type, frequency and imprisonment*

The total number of offences committed by those who offended ranged from 1 - 74 with a mean of 8.15 total offences (see Table 6). The most common number of offences was one, followed by three, then four offences (See Figure 1). Table 4 displays the eight offence categories and the offence type committed for each category. For both the whole sample and offenders only, most offences fell under the dishonest category with the highest offence rate concerning theft, followed by burglary, then car conversion.

### *Offending Severity*

Participants were categorised into one of three offence severity groups: severe, moderate, and minor. As shown in Table 5, most participants were moderate offenders, followed by severe and then minor offenders. An independent sample t-test showed the number of offences for those in the severe offence categorisation ($M$ = 15.67, $SD$ = 15.63) to be significantly higher from those in the moderate offence categorisation ($M$ = 5.94, $SD$ = 6.22; $F_{(32.51)}$ = 24.09; p = .002). Comparisons were not run for the offence rates of the three severity categories as the assumption of homogeneity of variance was not satisfied. This was due to the small sample size of the minor offence group. Data concerning the total number of offences for each severity grouping are presented in Table 6. The number of offences was greatest for participants categorised as severe offenders, this was followed by those in the moderate offenders, and then minor offenders. The same pattern exists for the range of the number of offences. Severe offenders obtained the greatest range, while minor offenders obtained the least. Data on imprisonment was also obtained. Out of the whole sample, the percentage of people imprisoned was 7.5%. For offenders only, 12.7% were imprisoned. As shown in Table 6, imprisonment rates were highest for those categorised as severe offenders. This was followed by moderate offenders and then minor offenders.

Table 4

*Number and percentage of offenders, and percentage of whole sample who committed each offence. The offence types are ordered by offence category.*

| Offence Category[4] | Offence type | Number of offenders | Percentage of offenders (%) n = 119 | Percentage of whole sample (%) n= 200 |
|---|---|---|---|---|
| Violence | Robbery | 7 | 5.9 | 3.5 |
| | Grievous Assaults | 3 | 2.5 | 1.5 |
| | Serious Assaults | 23 | 19.3 | 11.5 |
| | Minor assaults | 22 | 18.5 | 11 |
| | Intimidation Threats | 25 | 21 | 12.5 |
| Sexual | Sexual Attacks | 3 | 2.5 | 1.5 |
| | Immoral Behaviour | 3 | 2.5 | 1.5 |
| Drugs and anti-social | Drugs (not cannabis) | 3 | 2.5 | 1.5 |
| | Drugs (cannabis) | 31 | 26.1 | 15.5 |
| | Disorder | 36 | 30.3 | 18 |
| | Vagrancy | 2 | 1.7 | 1 |
| | Sale of Liquor Act | 14 | 11.8 | 7 |
| Dishonesty | Burglary | 38 | 31.9 | 19 |
| | Car conversion | 37 | 31.1 | 18.5 |
| | Theft | 59 | 49.6 | 29.5 |
| | Receiving | 11 | 9.2 | 5.5 |
| | Fraud | 5 | 4.2 | 2.5 |
| **Property damage and new drugs** | Destruction of Property | 34 | 28.6 | 17 |
| | **Arson** | **4** | **3.4** | **2.0** |
| | Endangering | 1 | 0.8 | 0.5 |
| | Drugs | 2 | 1.7 | 1 |
| Property | Trespass | 27 | 22.7 | 13.5 |
| | Postal abuses | 3 | 2.5 | 1.5 |
| | Firearm offences | 11 | 9.2 | 5.5 |
| Administrative | Against Justice | 24 | 20.2 | 12 |
| | Bylaw breaches | 2 | 1.7 | 1 |
| | Justice Special | 4 | 3.4 | 2 |
| Other codes | A- Alcohol related | 28 | 23.5 | 14 |
| | D- Manner of Driving | 34 | 28.6 | 17 |
| | L- Driver licensing and vehicle licensing | 19 | 16 | 9.5 |
| | V- Vehicle | 3 | 2.5 | 1.5 |
| | G- speeding | 1 | 0.8 | 0.5 |
| | B- Duties and Obligations | 20 | 16.8 | 10 |

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[4] The offence categories are official NZ Police codes. Refer to Appendix B for further information.
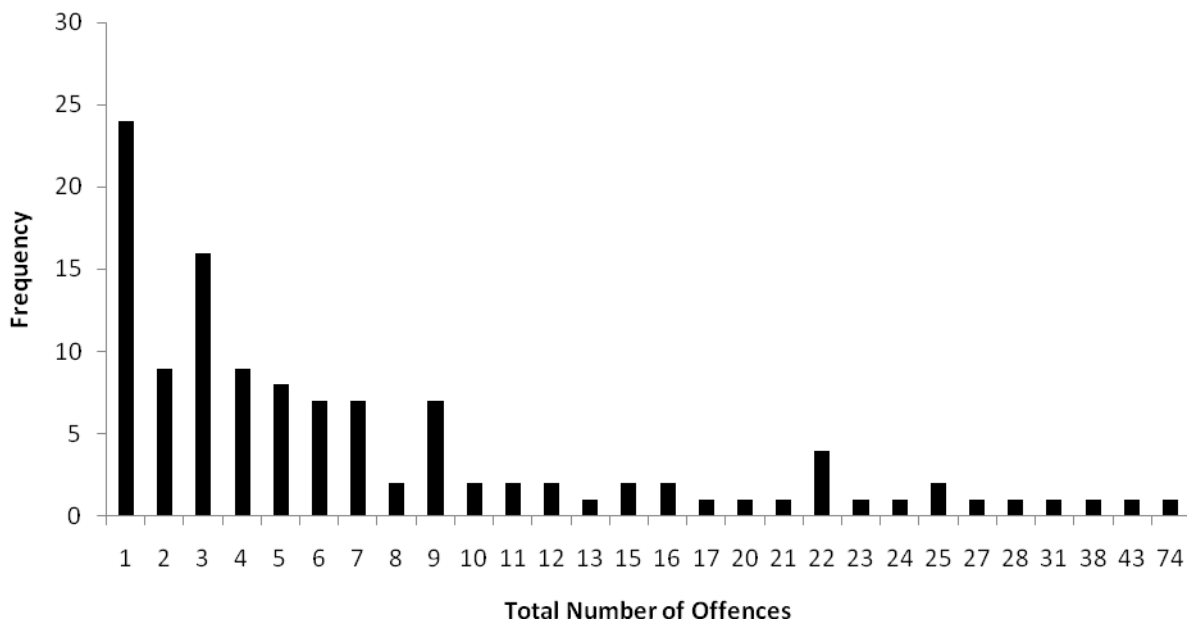
*Figure 1.* Bar graph showing the total number of offences and the frequency of their occurance.

Table 5
*Number of participants and percentage of participants that fall into the severity categorisation: severe, moderate, minor, and non-offenders*

| Severity Group | Number of participants | Percentage of participants (%) |
|---|---|---|
| Severe | 30 | 15% |
| Moderate | 79 | 40% |
| Minor | 9 | 4.5% |
| Non-Offender | 81 | 40.5% |

Table 6
*Imprisonment data and number of offence data for the three severity categories: severe, moderate, and minor.*

| Severity group | Imprisoned | | Number of Offences | |
|---|---|---|---|---|
| | N | % | Range | Mean |
| Severe | 8 | 26.7 | 1 - 74 | 15.63 |
| Moderate | 7 | 8.75 | 1 - 31 | 5.94 |
| Minor | 0 | 0 | 1 - 3 | 1.89 |

Table 7

*Number of participants (N) and percentage of police variables (%) from each severity group (plus non-offenders) that were noted as having experienced: suicidal tendencies, self-harm tendencies, family violence, gang affiliation, known drug user, or weapon use.*

| | Minor | | Moderate | | Severe | | Non-Offenders | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N |
| Suicidal | 0 | 0 | 4 | 66.6 | 1 | 16.7 | 1 | 16.7 | 6 |
| Self harm | 0 | 0 | 0 | 0 | 4 | 100 | 0 | 0 | 4 |
| Family | 2 | 4.3 | 23 | 48.9 | 18 | 38.3 | 4 | 8.5 | 47 |
| Gang | 0 | 0 | 1 | 16.7 | 4 | 66.7 | 1 | 16.7 | 6 |
| Drug | 0 | 0 | 2 | 40 | 3 | 60 | 0 | 0 | 5 |
| Weapon | 0 | 0 | 2 | 40 | 3 | 60 | 0 | 0 | 5 |

## DISCUSSION

As the primary objective of any firesetting intervention programme is to reduce, or to eliminate firesetting behaviour, the primary indicator of an intervention's efficacy is a measure of firesetting recidivism after completion of the programme. Of the 200 FAIP participants sampled, only 4, or 2% were found to have reoffended with arson in the follow up period. This is a relatively low recidivism rate and is lower than many treatment outcome studies for various firesetting intervention approaches in the literature which report follow up recidivism rates of between 0.8 and 58% (Franklin et al., 2002; Kolko, Watson & Faust, 1991).

The follow up period for the current study ranged from 9 years and 9 months to 10 years and 6 months, with an average follow up period of 10 years. This is considerably longer than most firesetting related studies which tend to have a maximum follow up period of 3 years (see Appendix A). A recidivism rate of only 2% is positive, particularly in light of the significant follow up period in this study.

Due to the small arson group size (N=4) it is difficult to ascertain to what extent the four arsonists in the sample may be considered a distinct group. It is clear however, that within the group there is some variation in the persistence, versatility and nature of offending behaviours (see tables 1 and 2). This suggests that the offending behaviour of FAIP participants who subsequently committed arson, may be diverse in nature and further studies may wish to investigate this.

All but one of the arson offenders (Offender A, who was an arson-only offender) committed a range of other types of offences. Offender B committed a single arson offence followed by 10 non arson offences, Offender C committed 2 arson offences followed by 2 non arson offences and Offender D committed a total of 3 arson offences and 14 non arson offences. All 4 arson offenders were categorised as moderate offenders, and interestingly, all committed arson as their first offence. All committed their first offence subsequent to completing the FAIP as teenagers, and all, with the exception of Offender A, continued to offend into adulthood and committed offences in the final year of follow-up (2009). This means that for all but one of the 4 arson offenders their general offending was not limited to adolescence, however, at the point of follow-up, the firesetting behaviour of all but one was adolescent limited.

Although the arson recidivism rate of this sample was low, it is important to note that the rates of other offending were high with over half (55%) of the 200 sampled being found to have committed severe or moderate offences after completing the FAIP. The percentage of offenders was significantly larger than would have been expected to occur by chance, indicating the particularly serious antisocial nature of this sample of young people who are referred to the FAIP programme. Seven and a half percent % of the entire sample, and 12.6% of offenders were imprisoned at some point during follow up and the average total number of offences was 8.15 which emphasises the severity and frequency of their offending.

The most common offence was theft, which was committed by almost 30% (29.5%) of the entire sample, and almost half (49.6%) of offender. This indicates that there is possibly a relationship between firesetting behaviour and theft, whereby firesetting may represent one factor in a range of general

offending behaviour. Future studies may therefore wish to investigate this further. High proportions of those who offended also committed burglary (31.9%), car conversion (31.1%), disorder (30.3%), destruction of property (28.5%), manner of driving (28.6%) and cannabis (26.1%) offences.

Offence severity groups differed in terms of the total number of offences committed within the follow up period. Unsurprisingly severity of offending was associated with total number of offences with the severe offending group having a significantly higher mean number of total offences than the moderate offender group. It is notable however that moderate offenders still tended to be repeat offenders with an average of six offences.

The presence of family violence was the only additional NIA variable found to be present in a large proportion of offenders (36.1%). Of all offenders who were noted to have some involvement in family violence either as the perpetrator, victim or complainant, 48.9% were moderate, 38.3% severe and 12.7% minor offenders. These findings are not surprising considering that family violence is indicative of family dysfunction and abuse, both of which are risk factors for both firesetting and antisocial behaviour in children and adolescents (Becker, Stuewig, Herrera & McCloskey, 2004; Martin et al., 2004; Root et al., 2008). This finding does however suggest a need for further investigation of this factor in future research.

The current study shows that a significant proportion of children who participate in the FAIP go on to later offend throughout adolescence and early adulthood.  These findings appear to support the notion that for some individuals firesetting may occur within a wider range of antisocial behaviours and that antisocial firesetters are more severe in their antisocial behaviour and are more at risk for future offending than both non-firesetting antisocial youth and non-antisocial firesetters (Becker et al., 2004; Martin et al., 2004).  While other offending was found to be far more problematic and persistent than firesetting within this sample, the presence of firesetting behaviour may, in a certain group of firesetters, act as a key indicator of an individual at particularly high risk for future offending.  However, there appears to be a current lack of understanding as to why firesetting is associated with such severe antisocial behaviour and risk for future offending and it is important that this relationship is acknowledged and investigated further.

Results show that while there is a very low arson recidivism rate, rates of general offending are quite high. It seems therefore that for many of these individuals, other offending behaviours are likely to be far more persistent and prevalent than their firesetting behaviour. Due to limitations of the study it is difficult to determine precisely why this might be, however there are several possibilities. Firstly it is possible that while the education provided by the FAIP acted to reduce firesetting behaviours in most participants it did not affect the presence of other antisocial behaviours. Secondly, it is possible that firesetting in adolescents is distinct form adult arson and is a behaviour which generally diminishes with age and possibly with the adoption of other offending behaviours. It is also possible that a combination of the two is occurring with the effect of the FAIP helping to further diminish naturally decreasing rates of firesetting behaviours. However, due to a lack of studies which look at firesetting behaviours over long follow-up periods there is no solid empirical evidence of this.

## LIMITATIONS OF THE STUDY

Several limitations of the study should be considered. Firstly, the current outcome evaluation lacks a control group of firesetting individuals who did not participate in the FAIP. Consequently, the arson recidivism rate of 2%, whilst providing an indication of the extent to which the FAIP is effective in achieving its aim to reduce firesetting behaviour, cannot be causally attributed to the FAIP as it is unknown whether would have been significantly lower than that for a group of firesetters who had not been involved in the intervention.

Any study which looks to assess the efficacy of programmes to address behavioural or psychological difficulties faces this problem due to ethical and recruitment issues surrounding engaging families in a study which does not offer treatment for their behaviourally problematic child. It could also be considered socially irresponsible to deny treatment to a group of children or adolescents with a serious behavioural problem, particularly when their risk of recidivism is high. As the current study was retrospective in nature it would have been necessary to identify a group of children who withdrew from the programme to comprise a control group. However, the non completion rate of the FAIP is extremely low and identifying such individuals would therefore have been extremely difficult.

The difficulty in assessing the extent to which the recidivism rate is indicative of the FAIP's efficacy, is further complicated by the fact that firesetting is an under-researched area. Specifically, understandings of developmental trajectories of firesetting and the relationship or differences between childhood and adolescent firesetting and adult arson are currently very limited. It is largely unknown what would be expected from different groups of individuals at different ages and developmental stages, or what would be expected from our sample in terms of changes in the prevalence of firesetting behaviour over the 10 year follow up period.

Reliance on police data as the only source of firesetting recidivism information is limiting as it is possible firesetting behaviour which occurred after leaving the FAIP but still in childhood or adolescence, may not have come to the attention of police. Many studies use both parent and child report measures to ascertain firesetting recidivism.  However, in a retrospective study dealing with confidential information and with an extensive follow up period accessing other sources of recidivism data is not feasible. It is possible therefore that the low firesetting recidivism rate found in the current study may underestimate the actual number of firesetting incidents in its exclusion of those which did not come to police attention.  One possibility for addressing this issue is to source information regarding these individuals from other agencies such as Child, Youth and Family Services (CYFs).  It is possible that individuals may have been referred to CYFs for subsequent firesetting rather than a re-referral to FAIP.  Consequently, by sourcing data from a number of agencies allows for increased reliability of data and a more comprehensive understanding of the individual.

In addition, ethnicity data sourced from police records was limited.  The ethnicity data of a significant number of participants was not available.  Furthermore, Pacific Islanders were not separated into their island ethnicities.  This restricted the use of ethnicity as a comparison amongst the participants and thereby any interpretation of this nature should be treated with caution.

With such a small sample, and consequently, a very small group of arson recidivists, it is difficult to ascertain in a statistical manner in what way the arsonists may differ from each other or from the other offenders in the sample.

As is evident in the literature, firesetting is a complex behaviour with different firesetters engaging in firesetting behaviours for different reasons. Ideally therefore, an outcome evaluation would acknowledge this complexity and be far more multifaceted than a simple measure of recidivism. An assessment of the efficacy of an intervention in addressing the various correlates of firesetting behaviour such as fire interest and antisocial behaviour, and firesetting behaviour itself, provides a clearer picture of the mechanisms involved in a programmes efficacy and areas which could benefit from improvement. However, the use of an extended follow up period in the current study, whilst providing valuable information concerning offending into late adolescence and adulthood, means that other follow up information, particularly information concerning firesetting correlates more recently after intervention are unable to be analysed.

As the data sourced from the New Zealand Fire Service included only the name, date of birth, and date the individual was seen, information concerning other FAIP variables such as the behavioural, environmental, demographic and psychological characteristics of the sample at the time of the intervention remained unknown. This limited the study in several ways.

Firstly, it is difficult to inform conclusions about the relative efficacy of the FAIP by comparing the current recidivism rate to that of other treatment outcome studies as the extent to which the current sample resembled the samples of other studies on behavioural, psychological and demographic variables is unclear. Secondly, without obtaining percentages of the FAIP variables for the sample as a whole, it is difficult to see whether the current study reflects what is generally understood in the literature to constitute a firesetting population. Thirdly, differences between offenders and non-offenders on these FAIP variables were unable to be determined. Therefore, identification of the predictive, risk or protective factors for future offending was not possible. Relationships between antisociality at intervention and later arson and offending, including the severity of offending, could not be examined.

Lastly, while the length of follow up was a clear strength of this study, having used a group of children and adolescents who engaged in the FAIP approximately 10 years ago, it is unclear to what extent these findings are able to be generalised to children and adolescents who are currently engaged in the programme and those who will do so in coming years. It is however likely that because firesetters are such a diverse group, the group of firesetters seen by the FAIP will vary somewhat from year to year but that an understanding of this diversity is key to the success of the programme.

While the majority of existing research addresses firesetting behaviour only (see Appendix A), a strength of the current study is that it gathered both firesetting and other general offending data. This provided an opportunity to expand understandings of firesetting behaviour in a wider offending context. While there is evidence that firesetting is a risk factor for future offending, studies have rarely sought to investigate this possibly due to the difficulty in accessing police data and a tendency for studies to have far shorter follow up periods. By assessing offending behaviours of firesetters over an extended follow

up period, the current study has built upon a small amount of research suggesting a relationship between firesetting and later offending.

## RECOMMENDATIONS

Consistent throughout the literature is the notion that fire setters are an extremely diverse group in their backgrounds, motives for firesetting and levels of antisocial behaviours. Although there will undoubtedly be some individuals who benefit hugely from an educational intervention such as the FAIP, the current findings suggest that there are likely to be a number of individuals who require additional assistance in order to address comorbid psychopathology, environmental dysfunction and maladaptive coping mechanisms associated with their firesetting and other antisocial behaviours. Such findings provide a clear indication of the need for thorough assessment and a collaboration between fire safety education and mental health providers in effectively addressing firesetting and other problem behaviours.

**The following recommendations are made for the New Zealand Fire Service to consider:**

1. There is a need for an awareness of the potentially high risk nature of some firesetting individuals in terms of future offending. It is crucial that both researchers and those who are actively involved with firesetters in education and intervention are aware that, although firesetting is not always an indication of wider behavioural dysfunction and may be motivated by factors such as boredom or lack of supervision, it is clear that some firesetters are at risk for repeat and often moderate or severe future offending.

2. A multiagency, collaborative approach is widely understood to constitute a 'best practice' in terms of firesetting intervention and to provide the most comprehensive assistance for all firesetters and their families. While it would be ideal for firesetting interventions to provide all necessary services for every individual referred to the intervention, it is often difficult for a single intervention cater to the wide ranging needs of all firesetters. Often educational interventions, particularly those which are fire service based such as the FAIP, may lack the expertise or resources to provide the more mental health-based interventions required by those with comorbid psychological, emotional or behavioural difficulties. It is therefore important that any firesetting intervention adopts a collaborative, multiagency approach whereby the maximum number of services and organisations are drawn upon to address the needs of all firesetters. It is important that current relationships between the FAIP and a number of organisations from whom the programme receives referrals - including NZ Police - Youth Aide teams, Child Youth and Family Service, mental health organisations and schools - are maintained and utilised and that consistent communication systems and standardised procedures for addressing firesetting behaviour within the system of these relationships are established.

3. As firesetting is likely to act as an indicator of particularly severe antisocial behaviour programmes such as the FAIP, to whom firesetters are directly referred, can act to assist in ensuring the provision of early intervention aimed at minimising later offending behaviour. It is important that at-risk firesetters are correctly identified and referred on to the appropriate services in order address factors contributing to their behaviours and to therefore minimise risk for future offence. Ideally educational interventions such as the FAIP assess the risk level of the client and their need for further referral using a comprehensive, well tested assessment tool

able to be administered by a practitioner with no clinical training. This would ensure that referrals were consistent and accurate with the ability to minimise potential practitioner bias or error. Surprisingly, there is little or no mention of such tools in the literature and assessment has tended to focus solely on risk assessments for firesetting recidivism specifically. An assessment tool would therefore need to be developed and tested based on future research providing more conclusive results concerning the risk factors for future offending at the time of the FAIP intervention. Such an assessment tool would be particularly beneficial in cases where the firesetting incident and subsequent referral to the FAIP was the first time that a high risk individual had come to the attention of any organisation, as it would ensure provision of further intervention to minimise the risk for future offending.

4. Despite the low rate of arson recidivism, the rate of general offending by the participants was significant. This indicates that firesetters are likely to be at risk for future offending regardless of whether it is of the arson type.  As part of the recommendation for a multiagency approach towards these individuals, it is recommended that a further study of this nature is undertaken whereby all relevant information including the severity of their firesetting behaviour held by NZ Fire is obtained.  This should include the behavioural, environmental, psychological and demographic information concerning each individual.  As approval to access NZ Police data has been obtained, there is potential for a far larger study which, subject to funding, this research team has the ability to undertake.  By increasing the sample size and gathering further information held by appropriate sources, this is likely to provide an even clearer picture of firesetters and potentially a profile of their background and offending behaviour.  Such a profile may assist with a more accurate and early identification of a persistent offender.

## DIRECTIONS FOR FUTURE RESEARCH

The current study is unique in its long follow up period and focus on official records of future offending in general, rather than parent or child reports of firesetting behaviours specifically. There is a clear gap in the firesetting literature concerning the mechanisms involved in the relationship between firesetting behaviours, antisociality and future offending. The reasons for firesetting being associated with severity of antisocial behaviour remain unknown and further research is required in order to develop and test theory surrounding this issue. Similarly, the areas of firesetting typologies and the development of the behaviour is still largely under researched, although from the current study there is solid foundation upon which future research can build.

There is a need for firesetting research which assesses a wide range of different variables, draws on large and diverse samples, utilises appropriate comparison groups and conducts yearly follow-up assessments over an extended period of time. It is strongly recommended that there is a move towards more comprehensive treatment studies and treatment outcome evaluations which look not simply at the relative firesetting recidivism rates of different treatments. Future research should assess the efficacy of different treatments approaches for different individuals and firesetting typologies, as well as the effect of treatment on a range of firesetting correlates.

Because the primary purpose of this report was to evaluate the FAIP, and due to the aforementioned limitations, the current study was not able to investigate the nature of firesetting and offending behaviour in a group of New Zealand children and adolescents as extensively as would be ideal. However, the findings of the study have given some very clear indications concerning areas of importance for future research and a foundation upon which future studies, using the existing sources of data could be based.

Future studies research concerning the FAIP should make greater use of the demographic, behavioural, psychological, and environmental data collected by FAIP practitioners at the time of intervention. By using a larger sample size, and comparing those who were non-offenders and offenders at follow up on these variables at assessment a better understanding of those different groups would be achieved and analysis could assess which factors at assessment indicate risk for future offending. Future research comparing those who were, and were not antisocial at the time of the FAIP intervention on a range of other variables and offending data could better determine the extent to which antisocial behaviour increased risk for future intervention as well as gaining clearer profile of antisocial firesetters. Additionally, a larger sample size would allow for more definitive conclusions to be reached concerning the subgroup of arson offenders and how these may or may not differ to the rest of the sample in terms of risk factors, as well as severity and development of behaviour. It would also help to identify which groups of firesetters the FAIP it successfully caters to and which groups are in need of wider assistance through a process of referral. Such future study would in turn provide a foundation upon which assessment tools and protocols for the referral of these individuals could be developed.  A future study looking at a larger sample and assessing the group on a wide range of variables would be able to say with more certainty the extent to which the profile of the firesetting population in contact with the FAIP approximately 10 years ago is similar or different to that of recent years, and to what extent, therefore, the findings can be generalised.

## SUMMARY

*Key Findings*

- While the rate of arson recidivism was low (2%, N=4) the rates of general offending were high (59.5%, N=119).

- The average number of total offences was 8.15 and the most common offences were theft (committed by 29% of the sample), burglary (19%) and car conversion (18.5%).

- Those who committed arson (N=4) arson varied in their total number of offences, but all were categorised as moderate offenders and all committed arson as their first offence subsequent to completing the FAIP.

- Of those who offended, 15% (N=30) were categorised as 'severe' offenders, 40% (N=69) as 'moderate' offenders and 4.5% (N=9) as minor offenders.

- Nearly thirteen percent of all those who had offended were imprisoned at some point during the follow up period.

*Recommendations*

- That there is an awareness of the relationship between firesetting and severe antisocial behaviour and that the presence of firesetting, in a certain group of firesetters is likely to indicate risk for future offending.

- That the FAIP maintain and build upon relationships with other organisations to develop a collaborative multiagency approach to intervention, through a system of referral with which ensures early and wide ranging provision of intervention approaches to best minimise risk for both firesetting behaviour and future offending.

- That an assessment tool which allows for accurate referral to necessary agencies and is able to be administered by FAIP practitioners is developed and incorporated into the intervention process to ensure provision of appropriate and accurate referral when it is required for at-risk firesetters.

- An extended version of the current study is recommended. By obtaining all appropriate information held by FAIP and increasing the sample size, this may enhance understandings and further clarify the conclusions and outcomes of the report. Given that the findings of this report showed significant re-offending by participants, further investigation of this population in terms of their offending behaviour and background is critical. A subsequent study of this nature is likely to inform efforts to maximise effective interventions and minimise risk.

*Future Research*

- Future research should further investigate the relationship between firesetting, antisocial behaviour and future offending.

- Future research concerning the FAIP should draw upon the demographic, behavioural, fire specific, health and mental health data collected by the FAIP to gain a better understanding of the risk factors and predictors for future arson and offending behaviour within this population.

- Future research should draw on a larger sample in order to better investigate those who commit recidivistic arson offences, and how they may or may not constitute a distinct group.

- Future firesetting outcome evaluations should aim to assess the efficacy of a programme not solely in terms of its arson recidivism rate but also in terms of the extent to which it addresses different correlates of firesetting behaviour, and its relative efficacy for different groups of firesetting individuals

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# Appendix A
## Tables summarising existing research concerning firesetting risk factors, recidivism and treatment

### Risk Factor Studies

| Study | Country | Sample Characteristics | Sample Details | Age Group | Age Range | Definition of Firesetting Behaviour | Significant Risk Factors |
|---|---|---|---|---|---|---|---|
| Becker et al. (2004) | USA | Community sample - oversampled families with histories of domestic violence. (Boys N=184, Girls N=179) | Total N=363<br>• Firesetters (N=32)<br>• Non Firesetters (N=331) | Children & early adolescents | 6-12 years | If either the mother or child reported a firesetting incident on the Child Assessment Schedule (CAS). | Paternal abuse of pets, paternal alcohol use, marital violence, conduct disorder diagnosis, number of CD, ODD, ADHD and depression symptoms. |
| Chen et al. (2003) | USA | Community Sample - National sample survey data. (Boys N=2261, Girls N=2230) | Total N=4491<br>• Firesetters (N=284)<br>• Without self reported firesetting history (N=4207) | Adolescents | 12-17 years | Reported having set a fire in the past 6 months on a version of the Youth Self-Report. | Peer rejection, aggression and shyness (only when combined with aggression). Strongest association with firesetting when moderate to high levels of all three are present. |
| Dadds & Fraser (2006) | Australia | Community sample. (Boys N=706, Girls N=653) | Total N=1359 | Children | 4-9 years | Fall within top 5% of Fire History Screen (FHS) for age group (4-6 years or 7-9 years) and gender. | Boys - age, parental stress, antisocial behaviour, hyperactivity, cruelty to animals, thrill seeking temperament. Girls - parental stress, positive and negative parenting, antisocial behaviour, problems with anxiety and depression. |
| Del Bove et al. (2008) | Italy | Community Sample. (Boys N=311, Girls N=256) | Total N=567<br>• Control (N=250)<br>• Aggressive Non Firesetters (AGG) (N=130)<br>• Firesetters (FS) (N=92)<br>• Aggressive Firesetters (AGG/FS) (N=95) | Adolescents | 11-18 years | Response to Youth Self-Report item 'I have set fires'. | AGG/FS perceived by parents as significantly more likely to engage in delinquent behaviours, cruelty, sexual problems. *After controlling for aggression:* anxiety and depression, thought problems and attentional difficulties, less academic and regulatory self efficacy. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Forehand et al. (1990) | USA | Conduct Disordered Males (all incarcerated in state facilities). | Total N=363<br>• Firesetter (firesetter with CD (4-6 symptoms)<br>• Non Firesetter with CD (4-6 symptoms)<br>• Non Firesetter with fewer CD symptoms than 1&2 (3 symptoms) | Adolescents | 13-17 years | Youth reported having set fires during a standardised interview. | Firesetting group and high CD group differed from the low CD group on a range of CBCL measures (withdrawal, delinquency and aggression) but did not differ from each other. |
| Kolko & Kazdin (1990) | USA | Non patient (public school), Outpatient (from a psychiatric clinic) and Inpatient (psychiatric unit) populations. (Boys N=313, Girls N=164) | Total N=477<br>• Firesetter (N=198)<br>• Matchplayer (N=40)<br>• No fire (N=239) | Children & early adolescents | 6-13 years | If either parent or child reported firesetting in the past year. | Low parental acceptance, child centeredness, monitoring, and discipline, lower family cohesion and achievement motivation, high number of total life events in the current year than, mother's parenting (lax discipline, instilling anxiety and non reinforcement). |
| Kolko & Kazdin (1991a) | USA | Parent Report Firesetters. (Boys N=112, Girls N=21) | Total N=133<br>• High on both anger and curiosity (N=24)<br>• Low on both anger and curiosity (N=49)<br>• High curiosity, low anger (N=28)<br>• High anger, low curiosity (N=32) | Children & early adolescents | 6-13 years | Either parent or child report of firesetting as assessed the Firesetting History Screen (FHS). | Curiosity (risk for engaged in matchplay, have a current interest in fire, and engage in firesetting recidivism). *High vs. low curiosity motivated groups:* High curiosity groups higher on externalising behaviour, total problem behaviour score, overt and covert antisocial behaviours and aggression, more likely to set fires out of the house, set less costly fires. *High vs. low anger motivated groups:* High anger group significantly more exposure to peer/family models aggression/defiance and rule violations factors. |
| Kolko & Kazdin (1991b) | USA | Sample recruited from Non patient (public schools, no clinical service in past year) (N=186), Outpatients (N=104) and Psychiatric unit Inpatient samples (N=17). ( Boys N=211, Girls N=96) | Total N=307<br>• Firesetters (N=133)<br>• Matchplayers (N=34)<br>• No Fire (N=140) | Children & early adolescents | 6-13 years | Either parent or child report of firesetting during the present year as assessed the Firesetting History Screen (FHS). | Antisocial and inappropriate behaviour, fighting/arguing, aggression and hostility, emotionality, internalising, impulsivity, low sociability and social competence, lack assertiveness, covert behaviour, property infraction, self advancement, secretiveness, lower school performance, lower social competence, self injury and substance use/interest, lying and carelessness. |
| McCardle et al. (2004) | New Zealand | Sample recruited from agencies working with firesetters and those with behavioural or mental health problems as well as from a secondary school. Boys only. | Total N= 117<br>• Firesetters (N=50)<br>• Problem Behaviour (non firesetters) (N=33)<br>• Control (N=34) (no firesetting or behaviour problems) | Adolescents | 12-18 years | _ | Single parent families, ADHD diagnosis, deviation, poor school performance, attentional problems, low family cohesion and expressiveness. History of frequent matchplay and early onset of matchplay behaviour were key predictive factors in classifying firesetters as opposed to problem behaviour youth. *Risk for repetitive firesetting:* depression, interpersonal problems, alienation and deviation |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mackay et al. (2006) | Canada | Firesetters referred to the TAPP-C. Boys only. | Total N=192 | Both | 6-17 years | At least 1 episode of firesetting in the previous year that prompted referral to the TAPP-C. | Degree of antisocial behaviour problems and degree of fire interest (correlated with frequency, versatility and age at onset of fire involvement, and firesetting recidivism). Fire interest contributes to the frequency, versatility and recidivism in firesetting but not to age of onset (above and beyond antisociality). Fire interest also added predictive value for future fire involvement (recidivism) above and beyond both antisocial behaviour and past firesetting behaviour. |
| Martin et al. (2004) | Australia | Community sample. (Boys N= 1442, Girls N=1154). | Total N=2596 | Adolescents | Grade 8 students | Single item drawn from DSM-IV criteria for CD - ' I have set fire to things in public places just for fun'. | Boys and girls: extreme antisocial behaviour (ASB), serious drug use, risk taking, suicidal thoughts and suicidal plans, family dysfunction, lack of mother care, lack of father care, depressive symptomology and hopelessness. *Prediction of firesetting:* Boys - serious ASB is the strongest predictor of firesetting; serious drug use, physical abuse and risk taking make smaller but significant contributions. Girls - risk taking, serious drug use and serious ASB make similar contributions to the prediction of firesetting. *After controlling for ASB*: Boys - extreme ASB, serious and extreme drug use, suicide plans and attempts, experience of sexual abuse. Girls - extreme ASB, perception of academic failure. hopelessness, |
| Root et al. (2008) | Canada | Firesetters referred to the TAPP-C between 1996 and 2002. (Boys, N=178; Girls, N=27) | Total N=307 | Both | 4-17yo | Had at least one episode of fire involvement in the past year prompting referral to the TAPP-C. | Maltreatment (risk factor for greater frequency and versatility of firesetting). Maltreated firesetters were more likely to set out of anger or following acute family stressors. Results indicated maltreatment was partially operating through externalising, and to a lesser extent internalising, to impact in firesetting versatility and frequency. |
| Sakheim & Osborn (1999) | USA | Firesetters and Non Firesetters in residential treatment. | Total N= 180<br>• Severe/high risk firesetters (N=75)<br>• Minor/non-severe firesetters (N=50)<br>• Non firesetters (N=55) | Both | 05-33yo | _ | Excitement at fires, revenge fantasies, history of playing with fires, cruelty to animals or people, poor social judgement, rage at insults, inadequate superego development, IQ score, severe maternal rejection, sexual conflicts, obsessive, compulsive features, lack of empathy, history of physical aggression and anger at paternal figure. |
| Stickle & Blechman (2002) | USA | Juvenile offenders. (Boys N=157, Girls N=62) | Total N=219<br>• Firesetting juvenile offenders(N=85)<br>• Non firesetting juvenile offenders (N=134) | Adolescents | 11-18 years | _ | A three-factor model of antisocial behaviour with dimensions of aggressive, non aggressive and oppositional antisocial behaviour best fit both firesetting juvenile offenders and non firesetting juvenile offenders. |

## Recidivism Studies

| Study | Country | Sample characteristics | Sample age range | Follow up | Measure of recidivism | Recidivism rates | Factors associated with, or predictive of recidivism |
|---|---|---|---|---|---|---|---|
| Kennedy et al. (2006) | UK | n/a. A systematic review of the literature (8 studies which met selection criteria). | _ | _ | _ | _ | Previous firesetting behaviour and covert antisocial behaviour were the only two factors that consistently predicted firesetting in those studies which assessed them. |
| Kolko et al. (2001) | USA | N=268 Firesetters and non firesetters from outpatient clinic patients (N=162) and non patient (public school) (N=106) samples. | 6-13 years | 2 year follow up | Presence of firesetting in follow up period (between study intake and 2 year follow up) acknowledged by either the child or parent in responses to the Firesetting History Screen (FHS). | 50% (non patient sample) and 59% (patient sample) of initial firesetters became recidivists. | _ |
| Kolko, Herschell & Scharf (2006) | USA | N=46 Boys referred to the study for firesetting behaviour. | 5-13 yrs | 12 month follow up | Presence of firesetting (reported by either the child or the parent) at follow up. | _ | Number of matchplay and fireplay incidents, curiosity about fire, scores on the Fire Attraction and Interest Scale (FAIS), involvement in fire related acts, level of externalising behaviour problems. |
| Kolko & Kazdin (1992) | USA | N=138 All firesetters. Patient (outpatient clinic) (N=100) and non patient (community) samples (N=38). | 6-13 years | 1 yr follow up | Identified as a firesetter at initial assessment and as having set an additional fire by follow up. | 35% (of those initially identified as firesetters), 18% (of those initially classified non firesetters). | Hostility and carelessness, lax discipline, family conflict, exposure to stressful life events within the past year. Using the adjusted level, significant differences remained on only the hostility and lax discipline variables. Most robust predictors of recidivism were parent reports of child hostility and carelessness. Family conflict also predicted recidivism. |

| Kolko & Kazdin (1994) | USA | N=95<br>Firesetters who acknowledge having burned property or set a fire in the past year. Prior to intervention. From non patient public school (N=42), outpatient clinic (N=30) or inpatient unit (N=23) samples. | 6-13 years | 2 year follow up | Parent and Child report at follow up (FSH score). | _ | Having originally caused minor damages, indicating that a consequence would stop them from setting a fire, having had a plan to set the fire and a neutral or positive feeling about the incident at initial assessment. *Characteristics predictive of the overall severity of firesetting at follow up:* site of fire out of home, acknowledgement of being likely to set another fire, a neutral or positive reaction to the fire, no parental response to the fire, site of fire in the house, minor severity of damages, seeking out incendiary materials. |
|---|---|---|---|---|---|---|---|
| Mackay et al. (2006) | Canada | N=192<br>Firesetters referred to the TAPP-C with at least 1 episode of firesetting in the previous year. | 6-17 years | 18 month follow up | Involvement in an additional firesetting episode during the follow up period. | 26% | Fire interest (even after controlling for antisociality). |
| Slavkin (2001) | USA | N=888<br>Referred to MCAIN for firesetting. | 3-18 years | None | Presence of recidivistic firesetting behaviours as identified using information taken from the Juvenile Fire Risk Interview Form (Fineman, 1997). | _ | Cruelty to animals. |

## Treatment Studies

| Study | Country | Sample *N* | Treatment groups | Group *N* | Treatment description | Follow up period | Recidivism rates | Outcome measures | Finding |
|---|---|---|---|---|---|---|---|---|---|
| Adler et al. (1994) | Australia | 138 | (1) Home - Experimental | 22 | Fire fighter administered intervention. Education, behaviour modification, negative consequences, graphing. | 3, 6, 9 & 12 months | 19% | Rates and severity of firesetting. | Significant reduction in firesetting rates and severity after across all treatment conditions. No significant differences between treatment conditions in recidivism rates, severity or improvement. |
| | | | (2) Home - Control | 19 | Educational pamphlet. | | | | |
| | | | (3) Specialist - Experimental | 49 | Same as (1) + specialist referral | | | | |
| | | | (4) Specialist - Control | 48 | Same as (2) + specialist referral | | | | |
| Bumpass, Fagelman & Brix (1983) | USA | 26 | Graphing, No control | 26 | Graphing | 6 months-8 years. Mean 2.5 years | 6.9% | Report of firesetting at follow up. | 2 of 29 reported firesetting at follow up. |
| Bumpass, Brix & Preston (1985) | USA | 150 | Graphing | 150 | Delivered by fire department personnel trained by psychiatrists. Emphasis on destructiveness of firesetting. Graphing interview with emphasis on correlation between feelings and behaviour. Discussion of alternative, socially acceptable behaviours. Weekly sessions until firesetting ceases and 3 additional informal meetings (to aid child involvement with other community support systems). Additional contacts if required. 1 year follow up visit. | Unknown | 2% | Firesetting recidivism rates and official fire service records (prevalence and cost). | There was a 30% decrease in firesetting recidivism in the year following implementation of the programme. Of the 3 who did set subsequent fires, 2 did so before programme completion and did not after. There was a 31.4% decrease in the number of, and a 48% decrease in the cost of fires set by children or adolescents fires a six month period subsequent to the programme starting compared with the same 6 month period prior. |
| De Salvatore & Hornstein (1991) | UK | 52 | Inpatient. Education and behaviour therapy. | 52 | Assessment involving questionnaire, graphing, fire-related drawing, receipt of programme materials. Teach potential dangers of fire, fire safety and practice of the proper match use. Written test or verbal quiz (age dependant ) for graduation. | 3 - 12 months. | 4% | Parent and child report of firesetting at follow up (by phone call). | Of the 52 subjects, 2 had set fires at the point of follow up. |

| Author (year) | Country | N | Group | n | Description | Follow-up | Recidivism | Measures | Results |
|---|---|---|---|---|---|---|---|---|---|
| Franklin et al. (2002) | USA | 234 | (1) Trauma Burn Outreach Prevention Program (TBOPP) | 132 | 1-day. Focus on impact of firesetting behaviour and accountability. Parent/guardian attendance required. Involves nurse educators, trauma surgeons, social workers, firefighters, burn victims and former programme graduates. Interactive education in trauma burn intensive care unit, skin bank, morgue, and injury prevention centre. Fire safety equipment provided. | 8months – 2.5 years | 0.8% | Fire department and court follow-up records of firesetting & family report of firesetting at follow up. | After adjusting for age, sex, medical/behaviour history, type of original offense, and family home environment the no TBOPP were significantly more likely to set fires during follow up. Those from foster parent homes were significantly more at risk for future fire reoffence than those from two parent homes. The average satisfaction score (of participants and their families) was 4.9 out of 5 representing 'extremely satisfied. |
| | | | (2) noTBOPP (random control) | 102 | Did not attend the TBOPP program but satisfied entry criteria. | | 36% | | |
| Kolko (2001) | USA | 54 | (1) CBT (Cognitive-Behavioural Treatment) | 21 | 8 x 1 hr weekly sessions. Graphing, training in problem solving skills, self instruction, assertion and interpersonal conflict resolution skills. Parent psychoeducation and behaviour management training. A home based contingency developed. | 13 weeks, 1 year | 24% CBT | Frequency of firesetting and matchplay behaviour, individualised child problems with fire, fire related activities, fire interest/ attraction, court and social service records of juvenile court involvement for arson or related crime. | Significant reductions in firesetting in all conditions (at 1year follow up). Significant reductions in matchplay and fire interest in only CBT and FSE conditions. Significantly fewer CBT and FSE children (than HVF) children reported either behaviour. Significant reduction in fire related acts - greatest reduction for CBT. CBT showed a significant decrease in deviant fire behaviour at post treatment and follow up whereas HVF showed a significant increase. Significant reduction over time for fire attraction showing greatest improvement for CBT followed by FSE. |
| | | | (2) FSE (Fire Safety Education) | 17 | 8 x 1hr weekly session. Fire fighter educator, parents involved. | | 15% FSE | | |
| | | | (3) HVF (Home visit by fire fighter) | 16 | Two contact condition (second contact takes place 8 weeks after the first). Information, fire safety materials (e.g. colouring book). 'No-fire' contract, parents invited to be included and given home fire safety handout. 2nd contact - review and elaborate. | | 50% FHV | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Kolko, Herschell & Scharf (2006) | USA | 46 | (1) (CBT) Cognitive-Behavioural Treatment | 21 | 8 x 1 hr weekly sessions. Graphing, training in problem solving skills, self instruction, assertion and interpersonal conflict resolution skills. Parent psychoeducation and behaviour management training. A home based contingency developed. | 13 weeks, 3month, 1 year. | _ | Presence of firesetting (reported by either parent of child), presence of matchplay (reported by either parent or child). | FSE showed greater improvement in fire safety skills and knowledge. CBT associated with greater improvement in problem solving skills. FSE was not more effective in reducing curiosity about or attraction to fire. FSE more effective than FHV among children with heightened fire safety knowledge and exposure to fire models/materials. FHV less effective than FSE or CBT among families with heightened general dysfunction. |
| | | | (2) FSE (Fire Safety Education) | 17 | 8 x 1hr weekly session. Fire fighter educator, parents involved. | | | | |
| | | | (3) FHV (Firefighter Home Visit) | 16 | Fire fighter administered. Two contact condition (second contact takes place 8 weeks after the first). Information, fire safety materials (e.g. colouring book). 'No-fire' contract, parents invited to be included and given home fire safety handout. 2nd contact - review and elaborate. | | | | |
| Kolko, Watson & Faust (1991) | USA | 24 | (1) Fire Safety/Prevention skills training (FSST) | 12 | Four, weekly 1hr sessions, small group, common fire safety concepts/strategies and promote retention/application of these | 6 months | 16.6% FSST | Observation of toy play (fire- and non fire-related stimuli), Picture preference, fire safety/prevention knowledge, parent report fire involvement (matchplay or firesetting). | FSST showed greater overall improvement over time than FAA but no significant group differences in fire interest or involvement. Significantly fewer FSST than FAA children engaged in either matchplay or firesetting at follow up. FSST showed a significant reduction in fire stimuli preference scores and greater improvement in fire safety knowledge. FSST children (but not FAA) showed significant reductions in interest in fire, matchplay and firesetting at follow up. |
| | | | (2) Fire Assessment/Awareness (FAA) | 12 | Review of prior fire contact and colouring book and assessed by staff. | | 58.3% FAA | | |
| Nishi-Strattner. (2003) | USA | 219 | Washington County Fire Academy Program. No control. | 219 | Parent training (addresses supervision, involvement and disciplinary techniques) and child education (age appropriate, firesafety, firesetting consequences, and social skills). | 3 months-3 years | 6.2% | _ | _ |

# uniservices

## Appendix B
## Offence Severity Categories[5]

| Severe | | Moderate | | Minor | |
|---|---|---|---|---|---|
| 1300 | Robbery | 1600 | Minor Assaults | 3600 | Vagrancy |
| 1400 | Grievous Assaults | 1700 | Intimidation/Threats | 3900 | Sale of Liquor Act |
| 1500 | Serious Assaults | 3100 | Drugs (Not Cannabis) | 4300 | Theft |
| 2600 | Sexual Attacks | 3200 | Drugs (Cannabis) | 4400 | Receiving |
| 2800 | Immoral Behaviour | 3500 | Disorder | 6100 | Trespass |
| 2900 | Immoral Behaviour/Misc | 4100 | Burglary | 6500 | Postal / Abuses |
| | | 4200 | Car conversion | 7100 | Against Justice |
| | | 4500 | Fraud | 7600 | Bylaw Breaches |
| | | 5100 | Destruction of Property | 7900 | Justice special |
| | | 5110 | Arson | B | Duties and Obligations |
| | | 5200 | Endangering | C | Warrant & COF |
| | | 5900 | Drugs | F | Driver duties and obligations |
| | | 6800 | Firearm offences | H | Road User Charges and Overloading |
| | | A | Alcohol related offences | J | Speed Camera offences |
| | | D | Manner of Driving | K | Transport Licensing |
| | | G | Speeding | L | Driver licensing & Vehicle licensing offences |
| | | V | Vehicle | N | Vehicle related offences |
| | | | | W600 | Sale of liquor offences |

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[5] These are the offences committed by the sample and are part of the official NZ Police codes which have been re-categorised into Severe, Moderate and Minor for the purpose of this research. Only a brief definition of some of the codes is provided due to the complex nature of each offence.  Please refer to NZ Police and the NZ Crimes Act 1961 for further clarity and information.

# Offence Definitions

| | |
|---|---|
| 1300 Robbery | Involves theft and violence or threats of violence to any person or property in order to steal property. |
| 1400 Grievous Assaults | "An assault is the act of intentionally applying or attempting to apply force to another person.  Physical contact is not necessary |
| 1500 Serious Assaults | for a threat to constitute an assault" (www.nzpolice.govt.nz). |
| 1600 Minor Assaults | |
| 2600 Sexual Attacks | Also includes attempted and actual sexual connection with male/female. |
| 2800 Immoral Behaviour | Includes unlawful sexual intercourse with a child or young person, sexual exploitation, indecent acts. |
| 3500 Disorder | Includes obstructing police, inciting violence, disorderly and/or offensive behaviour. |
| 3600 Vagrancy | An individual was apprehended for vagrancy if they were living on the street and unable to prove a means of support i.e. money in their pocket.  However, this offence has been removed from legislation. |
| 3900 Sale of Liquor Act | Also includes closure of licensed premises due to riot/fighting or sales by unlicensed persons. |
| 4100 Burglary | Involves unauthorised entry of any part of the body of the person making the entrance into a building or ship. |
| 4200 Car conversion | Taking a vehicle, ship or aircraft (or its parts) without a claim of right. |
| 4300 Theft | Also regarded as stealing where person takes dishonestly yet they do not have a claim of right. |
| 4400 Receiving | Includes receiving/possessing stolen goods and/or drugs. |
| 5110 Arson | Involves intentional or reckless damage by fire to a property or vehicle or ship or aircraft. |

7100 Against Justice          Includes offences against judicial office and/or procedure.

7600 Bylaw Breaches           Includes breaches such as noise control, window washers at intersections, dogs without leashes.

Duties and Obligations        Includes failing to provide details to Police and/or failure to report an accident.

Vehicle                       Includes driving a vehicle with faults such as a damaged headlight and/or indicator.

# Appendix C
# Confidentiality Agreement

## Deed of Confidentiality

This Deed is made the                                  day of                                                    2007

**Between: HER MAJESTY THE QUEEN in right of New Zealand acting by and through the Commissioner of Police** ("NZ Police")

**And**:                                                of                                                     ("Researcher")

**Whereas**:

The Researcher is being given access to confidential information held by the NZ Police to enable the Researcher to complete a **contracted evaluation/postgraduate thesis [insert appropriate description]**, the researcher binds him/herself to preserve and maintain the confidentiality of all information he/she obtains, according to the terms of this Deed.

**It is hereby agreed as follows:**

1)  In this Deed, unless the contrary intention appears:

    "confidential information" includes:
    a)  NZ Police data stored within the PDSI, NIA and MAPS database and any other database, and all NZ Police files and documentation;
    b)  the personnel, policies or business strategies of NZ Police;
    c)  all information provided to the researcher to by NZ Police or third parties for the purpose of conducting the evaluation, whether being NZ Police information or information of others participating in the Justice sector (including EM Bail assessors reports and any Judges reports provided); and
    d)  any other information supplied by the NZ Police to the Researcher and which is expressly designated as confidential information or by its nature falls within that which is implicitly confidential.

2)  **The Researcher undertakes and agrees to use all reasonable efforts to keep secret all confidential information and shall :**

    a)  *use confidential information only for the purposes for which it was disclosed or obtained;*
    b)  before publication allow the NZ Police to read any paper or document produced from the confidential information and comply with the contractual provisions relating to report production; and
    c)  not divulge confidential information, nor details of such, to any person, body or agency without the prior written consent of the NZ Police;
    d)  take all reasonable steps to safeguard against accidental disclosure, including applying proper security measures in handling relevant papers and electronic data.

3)  *On receipt of any request for official information or for personal information obtained from the NZ Police, the Researcher shall transfer the request to the NZ Police and shall not directly release any such information.*

4)  Disclosure of confidential information by the Researcher may be agreed by the NZ Police in writing.

5)  The Researcher acknowledges and binds him/herself to adhere to the Information Privacy Principles of the Privacy Act 1993, particularly Principles 10 and 11, in relation to all confidential information obtained through or from the NZ Police.

6)  Accordingly, the Researcher agrees that all confidential information which is also personal information (in terms of the Privacy Act 1993) will be;

    a)  only be used or disclosed in a form in which no individual is identified; and
    b)  only being used or disclosed for research purposes.

7)  The Researcher agrees to indemnify and hold harmless the NZ Police against all costs, liability, losses and claims reasonably incurred by the NZ Police as a result of a breach of this Deed.

8)  The Researcher acknowledges that the undertakings given in relation to the confidential information shall continue in force until such time as the confidential information becomes public knowledge other than by breach of this Deed.

## EXECUTED AS A DEED AND SIGNED IN WITNESS HEREOF

Signed for and behalf of the Commissioner of Police by: _____

Name: _____

Address:  _____

**In the presence of:**

Name: _____

Signature: _____

Address: _____

Occupation: _____


Name of Researcher: _____

Signature: _____

Address:  _____

**In the presence of:**

Name: _____

Signature: _____

Address: _____

Occupation: _____

## Appendix D

| Fields | Variable Description | Recording code |
|---|---|---|
| | Participant Number[6] | |
| NZ Police (if matched) | Offender | Yes 0   No 1 |
| | Offences Committed (using NZ Police codes)<br>1000 Violence | |
| |    1300 Robbery | Yes 1   No 0 |
| |    1400 Grievous Assault | Yes 1   No 0 |
| |    1500 Serious Assault | Yes 1   No 0 |
| |    1600 Minor Assault | Yes 1   No 0 |
| |    1700 Intimidation/Threats | Yes 1   No 0 |
| | 2000 Sexual | |
| |    2600 Sexual Attacks | Yes 1   No 0 |
| |    2800 Immoral Behaviour | Yes 1   No 0 |
| |    2900 Immoral Behaviour (Misc) | Yes 1   No 0 |
| | 3000 Drugs & Antisocial offences | |
| |    3100 Drugs (not cannabis) | Yes 1   No 0 |
| |    3200 Drugs (cannabis) | Yes 1   No 0 |
| |    3500 Disorder | Yes 1   No 0 |
| |    3600 Vagrancy | Yes 1   No 0 |
| |    3900 Sale of Liquor Act | Yes 1   No 0 |
| | 4000 Dishonesty | |
| |    4100 Burglary | Yes 1   No 0 |
| |    4200 Car Conversion | Yes 1   No 0 |
| |    4300 Theft | Yes 1   No 0 |
| |    4400 Receiving | Yes 1   No 0 |
| |    4500 Fraud | Yes 1   No 0 |
| | 5000 Property Damage and New Drugs | |
| |    5100 Destruction of Property | Yes 1   No 0 |
| |    **5110 Arson** | Yes 1   No 0 |
| |    5200 Endangering | Yes 1   No 0 |

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[6] This from was similar to the one used by the consultant to record information which was then entered into SPSS. The Participant Number matched to a separate spreadsheet held by the Principal Investigator in a locked cabinet which held the name and date of birth of each individual.

| | | |
|---|---|---|
| | 5900 Drugs | Yes 1    No 0 |
| | 6000 Property | |
| |    6100 Trespass | Yes 1    No 0 |
| |    6500 Postal / Abuses | Yes 1    No 0 |
| |    6800 Firearm offences | Yes 1    No 0 |
| | 7000 Administrative | |
| |    7100 Against Justice | Yes 1    No 0 |
| |    7600 Bylaw Breaches | Yes 1    No 0 |
| |    7900 Justice Special | Yes 1    No 0 |
| | A  Alcohol related | Yes 1    No 0 |
| | B  Duties and Obligations | Yes 1    No 0 |
| | D  Manner of Driving | Yes 1    No 0 |
| | G  Speeding | Yes 1    No 0 |
| | L   Driving licensing and vehicle     licensing | Yes 1    No 0 |
| | V   Vehicle | Yes 1    No 0 |
| | Severity of Offending | Minor 1<br>Moderate 2<br>Severe 3 |
| | Imprisonment | Yes 1    No 0 |
| | Family Violence | Yes 1    No 0 |
| | Suicidal | Yes 1    No 0 |
| | Self Harm | Yes 1    No 0 |
| | Gang Association | Yes 1    No 0 |
| | Drug use | Yes 1    No 0 |
| | Weapon use | Yes 1    No 0 |