Part I: Theory and research

CHAPTER 1

Adult firesetters: prevalence, characteristics and psychopathology

Geoff Dickens and Philip Sugarman

Introduction

In the USA, one in 100 adults has a self-reported lifetime history of deliberate firesetting and, for 38% of these firesetting persisted beyond the age of 15 years (Blanco *et al*, 2010; Vaughn *et al*, 2010). These statistics, findings from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), represent the first attempt worldwide to gauge the extent of intentional firesetting in a general adult population. If it is accurate, then, based on US population figures (US Census Bureau, 2010), there are roughly 1 million US adults who have deliberately set fires since age 15. In the UK the figure would approach 200 000 (Office for National Statistics, 2005). This chapter critically explores the current evidence base on the prevalence of firesetting behaviour and examines these new findings in the light of previous research on arson and firesetting among more highly selected offending and clinical populations. The key questions addressed relate first to the credibility of this new evidence, and the extent to which it supports the current knowledge base about the correlates, characteristics and psychopathology of arsonists and firesetters. Second, the chapter synthesises the current knowledge of the characteristics of those who deliberately set fires, and addresses the sociodemographic factors, psychopathological features, co-offending behaviours and developmental characteristics associated with deliberate firesetting (see Table 1.1). The chapter provides practitioners with state-of-the-art information on which to base clinical decision-making in this difficult and sometimes misunderstood area, and highlights gaps in knowledge, where future research is needed.

'Arson' is a legal term which defines the specific criminal act of intentionally or recklessly setting fire to property or wildland areas; an arsonist has, by definition, been convicted of the crime of arson. A firesetter displays a behavioural phenotype, the deliberate setting of fires, which may not have been prosecuted, for a number of reasons: the fire has been insufficiently severe to cause damage or has not been detected as a deliberate fire; it has not been possible to identify who set the fire; there is insufficient evidence to

gain a conviction; or the young age of the firesetter. 'Firesetting' is therefore applicable to a wider range of people who deliberately set fires than the narrow legal definition represented by the term 'arson'. In this chapter firesetting is the preferred term; however, arson is used when it is accurate to do so in the context of individual studies that have been conducted with that subgroup of firesetters who hold a conviction for arson.

Prevalence

Adults

The NESARC study recruited a representative sample in excess of 40 000 non-institutionalised adults resident across the USA. Vaughn *et al* (2010) describe the diligence with which representativeness was ensured both by over-sampling hard-to-reach groups (including young adults and minority ethnic groups) and by weighting results to adjust for over-sampling and non-response. Data for the study were collected using standardised instrumentation by trained US census workers during face-to-face interviews. In total, 407 participants answered 'Yes' to the following item embedded in the Antisocial Personality Disorder (ASPD) interview module of the survey:

In your entire life, did you ever start a fire on purpose to destroy someone else's property or just to see it burn?

On the basis of the one study, it was separately reported that, after weighting the data, the lifetime prevalence rate of firesetting was 1.0% (Vaughn *et al*, 2010) or 1.13% (Blanco *et al*, 2010). The disparity between reported results appears to reflect different approaches to data analysis. Firesetters, defined as those affirming the above statement, were compared with non-firesetting population controls (n= 41 552) across a range of sociodemographic and psychopathological variables, and to antisocial and offending behaviours. Blanco *et al* (2010) reported that 38% of firesetters affirmed a subsequent questionnaire statement that this behaviour had persisted beyond the age of 15 years. Unfortunately, no further analysis of data for this subgroup was presented.

The size and representativeness of the NESARC study (Blanco *et al*, 2010; Vaughn *et al*, 2010) are its key strengths. The sample recruited can confidently be expected to reflect the 'true' population response to the firesetting question within a fraction of a percentage point. The question item used to define firesetting, however, imposes a limitation on the study. Firesetting behaviour that is indicative of arson ('to destroy someone else's property') and other firesetting behaviour for imputed thrill- or pleasure-seeking ('just to see it burn') are conflated. It is possible, and is stated by the researchers, that non-pathological behaviour such as safely lighting bonfires could be defined as firesetting under the latter part of the definition,

as could childhood fire play or experimentation. The potential effect of this conflation is an overestimation of the prevalence of deliberate firesetting. A second limitation, common to all survey studies, is the potential for response bias. In the NESARC study, underestimation of the true prevalence of lifetime firesetting is suggested by the relatively low rate reported compared with studies of children and adolescents (for figures see 'Children and adolescents' below). This may simply reflect the fact that respondents fail to remember their own childhood behaviour accurately. A likely candidate cause of under-reporting of lifetime firesetting among adults, however, was the mode of data collection employed in the NESARC study. That is, the face-to-face interview may be more prone to social desirability bias than are, for example, anonymous self-interviewing techniques (Clark Newman *et al*, 2002), reflecting that respondents simply may not wish to admit to undesirable behaviours.

A subsequent UK study of the prevalence of self-reported deliberate firesetting behaviour among adults (Gannon & Barrowcliffe, 2011) approached the problem from a different and enlightening perspective. The potential for pro-social response bias was reduced by requesting participants ($n = 158$) to complete a questionnaire booklet anonymously. More detailed information about the respondent's firesetting history, where reported, was elicited by items that enquired about each individual's reasons for setting fires. Additionally, more precise operational definitions were given to respondents to exclude reporting of firesetting prior to age 10 years and non-problematical or non-deliberate firesetting, including bonfires or accidental fires. In total, 11% of participants reported that they had intentionally set fires. Two (1.3%) respondents reported setting fires during adulthood, and the remainder reported this behaviour during adolescence only. Gannon & Barrowcliffe's sample is, inevitably, less representative of the general adult population than that recruited for the NESARC study. In particular, there was an over-preponderance of female participants, and almost certainly of more highly educated respondents, which could have led to an underestimation of the population prevalence for firesetting. Their study does suggest, however, that increased rigour in the design of research questions about adult firesetting, and the use of data collection modes that act to minimise response bias, may lead to more accurate estimations of firesetting prevalence during adulthood. If anything, the true prevalence of adult firesetting is likely to be higher than current estimates suggest. However, on the current evidence, this is little more than informed guesswork.

Despite their limitations, the studies discussed above are the first serious attempts to measure the prevalence of firesetting in the general adult population. While estimations of the number of firesetters in the population are almost certainly imprecise due to the methodological limitations outlined, they hint at the scale of this potentially problematical and harmful behaviour. Alternative methods of estimating the prevalence of firesetting are also limited. For example, we know that around 323 900 intentionally

set fires were recorded by US fire departments in 2005, and that these fires caused 490 deaths, 9100 injuries and created $1 billion worth of costs related to property damage (Hall, 2007). However, the number of fires thought to be deliberate tells us little about the number of people responsible for those fires.

Children and adolescents

An interesting aspect of the NESARC firesetting study (Blanco *et al*, 2010; Vaughn *et al*, 2010) is its failure to reflect findings from the far more numerous epidemiological surveys of firesetting among children and adolescents. Different samples, definitions and measurements have been used by various researchers and therefore it is worth briefly describing a selection of studies. Dadds & Fraser (2006) collected data from the parent-reported Fire History Screen (Kolko & Kazdin, 1988) on 1359 Australian children aged 4–9 years. Fire play, as opposed to fire interest or match play, was reported by parents of 2% of 4- to 6-year-olds and over 5% of 7- to 9-year-olds. Del Bove *et al* (2008) reported that 29% of 567 Italian 11- to 18-year-olds self-reported 'yes' to the item 'I have set fires' on the Youth Self-Report form (YSR; Achenbach, 1991). Mackay *et al* (2009) collected self-report data from 396 Canadian pupils aged 11–19 years from 137 schools in 42 school boards. Firesetting was measured by response to the question 'In the last 12 months, how many times have you set something on fire that you weren't supposed to?' Only 32% selected the response 'Never in lifetime'. In contrast, 41% of respondents said they had set fires in their lifetime but not in the past 12 months, and the remaining 27% self-reported at least one incident of firesetting in the past year. Chen *et al* (2003) presented self-report data from a representative US national sample of 4595 adolescent respondents to the 1995 National Household Survey on Drug Abuse. Interestingly, this study examined the recent incidence of firesetting behaviour as opposed to the lifetime prevalence. An adapted form of the YSR employed in the study included an item about setting fires in the 6 months before interview. The self-reported 6-month incidence of firesetting was 6%. The study authors give the caveat that this YSR item may not discriminate between firesetting and experimentation.

The above studies indicate that firesetting behaviour is common in both children and adolescents. Indeed, Mackay *et al*'s (2009) survey results suggest that, for adolescents, some lifetime firesetting behaviour is the norm. The inescapable conclusion is that reported *lifetime* firesetting behaviour should, or certainly could, be equally prevalent among adults. The reasons for the discrepancy between self-reported lifetime prevalence of firesetting in adults (1%) and self-reported prevalence in children and adolescents (as high as 68% in Mackay *et al*, 2009) are not entirely clear, but to varying extents will include inconsistency between reporting measures and definitions, modes of data collection, pro-social bias and increased inability with advancing age to recall incidents of firesetting in youth. It is also possible that some people

simply regard their own childhood firesetting as fairly unimportant or trivial and therefore do not report it.

In summary, fire interest appears to be common in children and adolescents in the general population and some firesetting behaviour, particularly during adolescence, is widespread. While the new information about adult self-reported firesetting from the NESARC study is welcome, current knowledge about the epidemiology of adult firesetting does not approach that of juvenile firesetting.

Characteristics of firesetters

Knowledge about the characteristics of those who deliberately set fires has traditionally been limited to the subset of those who come to the attention of the criminal justice and mental health services, chiefly convicted arsonists. The new epidemiological evidence from the NESARC study (Blanco *et al*, 2010; Vaughn *et al*, 2010), despite its limitations, together with the most recent studies of criminal and clinical samples, offers the opportunity to take a fresh look at the issue (Box 1.1). In this section, findings from the NESARC study regarding the characteristics of firesetters are discussed alongside those from studies of criminal justice and psychiatric samples in order to assess the extent to which new epidemiological information supports or challenges our knowledge of firesetting gained from less representative samples.

Sociodemographic factors

Gender

Results from the NESARC study (Blanco *et al*, 2010; Vaughn *et al*, 2010) highlighted that in excess of 80% of self-reported firesetters were men, a male:female gender ratio approximating 5:1. Gender ratios approaching or, in certain cases, exceeding this are common in various selected samples. Lewis & Yarnell (1951) identified 1346 adult arsonists from underwriting and insurance records and reported a male:female ratio of 6:1. Soothill *et al* (2004) reported a 9:1 ratio among 10271 people convicted of arson in England and Wales between 1963 and 2001. Interestingly, the proportion of females convicted of arson increased from 4% (25 males to 1 female) in 1963–65 to 12% (8 males to 1 female) in 1980–81 and again to 14% (6 males for every female) in 2000–01, suggesting that the gender imbalance is not static across time. Anwar *et al* (2011) reported a ratio of nearly 4 males to 1 female based on the national database records of convictions for arson in Sweden from 1988 to 2000 ($n = 1340$). The lower male:female ratio in their study may reflect that, in Sweden, individuals are found guilty irrespective of mental illness and therefore any bias whereby women are diverted from the criminal justice system is removed.

Box 1.1 Common characteristics of firesetters

Sociodemographic features

- Predominantly male, white and young
- Unskilled employment or unemployment, low socioeconomic status
- Single, living alone, never married
- Low educational achievement

Psychopathology

- High rates of antisocial personality disorder and other personality disorders
- High levels of substance misuse as principal or comorbid disorder
- Most frequent other diagnoses include schizophrenia and affective disorders; the risk for firesetting is increased in those with schizophrenia
- Low numbers of those meeting full criteria for pyromania but emerging evidence (from relatively small populations) suggests a prevalence rate of 3–10% among those with depression or impulse control disorders
- No evidence for a link between firesetting and sexual pathology or fetishism
- Lack of assertiveness and communication skills, and presence of inwardly directed hostility and punitiveness
- Poor self-esteem, high levels of anxiety, guilt and low mood

Neurodevelopmental, developmental features and family history

- Intellectual disability may be a feature of about 10% of firesetters and there is some evidence of neurodevelopmental disorders in males (7% may have Asperger syndrome)
- Low IQ levels relative to general population
- Family history of offending is frequent
- Common reports of childhood behavioural disturbance, truancy, reading difficulties
- Childhood institutionalisation is common

History of offending and antisocial behaviour

- Firesetters have often been involved in an array of other offending and antisocial behaviours
- Offending behaviours are mostly non-violent offending but some firesetters are also violent

A similar gender imbalance, although slightly less pronounced, is also a feature of psychiatric samples. Enayati *et al* (2008) examined the Swedish national database, which held records of all 214 people convicted of arson between 1997 and 2001 who were subsequently referred for forensic psychiatric assessment, and reported a ratio of about 3:1. This supports the suggestion above that women are more likely than men to be referred to psychiatric services following arson or firesetting. Other studies, largely

with samples referred for pre-trial or pre-sentencing reports, have reported male:female ratios of between 3:1 and 6:1 (Fleszar-Szumigajowa, 1969; Bradford, 1982; Bourget & Bradford, 1989; Leong, 1992; Rix, 1994; Puri *et al*, 1995; Ritchie & Huff, 1999; Jayaraman & Frazer, 2006; Dickens *et al*, 2009), most lying towards the lower end of this range. One study, by Swinton & Ahmed (2001), reported a male:female ratio of just over 1.5:1 among their sample of 79 arsonists detained in a high-security psychiatric hospital. This suggests that women who deliberately set fires are disproportionately over-represented in high-security settings.

In summary, the pronounced over-representation of males suggested by the epidemiological evidence on firesetting is largely replicated in arson conviction data and in findings from highly selected psychiatric samples. Deliberate firesetting is, therefore, largely a male activity. Where research results are not presented separately by gender then study findings will largely reflect the over-preponderance of men in research samples, and care should be taken before generalising them to women. In the current chapter the reader should generally assume that quoted results, unless specifically stated otherwise, refer to male samples or to samples which are predominantly male. For an in-depth discussion of the characteristics of female arsonists, see Chapter 7 (also Gannon, 2010).

Age

The NESARC study (Blanco *et al*, 2010; Vaughn *et al*, 2010) reported that more than half (51%) of self-reported firesetters were aged 18–35 years, compared with 31% of non-firesetter population controls. Older firesetters were relatively rare: just 4% were aged 65 years and above, compared with 16% of population controls. Gannon & Barrowcliffe (2011) reported a non-statistically significant trend for firesetters to be younger (mean age 27 years) than non-firesetters (mean age 30 years) in a self-selected general population sample.

The tendency towards youth as a risk factor is common across studies of various samples. Lewis & Yarnell (1951) demonstrated a highly positively skewed age distribution among those arrested for arson. Soothill & Pope (1973) reported a mean age of 30 years for all 83 arsonists convicted at high court in England and Wales in 1951. Subsequently, Soothill *et al* (2004) studied convictions from all court cases including those aged from as young as 10. The mean age they reported is inevitably significantly lower in this later study: 23 years for men and 27 years for women in 2000, a statistically significant gender difference. Convicted arsonists in Sweden were significantly younger than general-population controls, irrespective of gender (Anwar *et al*, 2011). The mean age of firesetters and arsonists in psychiatric samples ranges from the mid-20s (Bourget & Bradford, 1989; Puri *et al*, 1995) to the mid-30s (Repo, 1998; Enayati *et al*, 2008). Males are generally found to be significantly younger than females (Bourget & Bradford, 1989; Dickens *et al*, 2007*a*; Enayati *et al*, 2008).

Firesetters are, therefore, generally young, but there is mixed evidence as to whether this differentiates them from other offenders. Use of a control group of non-firesetting offenders is a key strength of a number of studies. Hurley & Monahan (1969) examined 50 male arsonists in prison and compared them with a control group of 100 randomly selected inmates. Arsonists (mean age 25 years 10 months, range 15–57 years) were generally younger than controls, with only 14% older than 35 years at conviction, compared with 33% of controls. Jackson *et al* (1986) reported that male arsonists detained in a maximum-security hospital were younger (mean age 27 years) than non-arsonists (28 years), but this was not statistically significant, possibly due to the small sample size ($n = 18$ per group). Rice & Harris (1991) reported mean ages of 29 years and 32 years respectively for firesetters ($n = 243$) and controls ($n = 100$) detained in a maximum-security hospital, a statistically significant difference. More recently, Labree *et al* (2010) examined 25 arsonists detained in a maximum-security forensic hospital in the Netherlands and found no significant age difference between them and a control group of non-arsonist violent and sexual offenders. Furthermore, they did not differ on age at admission, first conviction or age at first psychiatric treatment. Conversely, Bradford (1982) reported that arsonists were significantly older than controls, although this result was from one of the smaller samples reported in the literature. Soothill *et al* (2004) found that all convictions for arson involving those aged over 62 years involved men only and this suggested that 'geriatric arson', a rare thing in itself, is solely a male phenomenon.

In summary, arsonists and firesetters are usually reported to be young. On the whole, the evidence suggests *statistically* significant age differences between firesetters and non-firesetting control offenders, but the clinical utility of this information is questionable given the small differences involved. There are clear gender differences, however, with female firesetters generally being older than males.

Ethnicity and immigration

People of Hispanic or African American origin were under-represented among self-reported firesetters (7% and 9%, respectively) compared with population controls (12% and 11%) in the NESARC study (Blanco *et al*, 2010; Vaughn *et al*, 2010). White firesetters (81%) were over-represented compared with population controls (70%). Self-reported firesetters were more likely to be US natives (94%) when compared with controls (85%). In contrast, Anwar *et al* (2011) found that, in Sweden, immigrant status among convicted arsonists, at around 20% for both men and women, was about double that in the general population. This was also reflected in a sample of arsonists convicted in Sweden and subsequently referred for forensic psychiatric examination (Enayati *et al*, 2008). The reasons for relatively low self-reported firesetting among non-nationals in a US general population sample and the relatively high immigrant status of convicted Swedish arsonists are not known, but may simply reflect the fact that

convicted arsonists are a subset of firesetters as a whole and the two sets of information are not directly comparable. The ethnicity of clinical samples of arsonists has been reported to be largely White or Caucasian and broadly reflective of the countries and regions from which samples are drawn (Rix, 1994; Dickens *et al*, 2009). Lewis & Yarnell (1951) reported that 6% of their sample were foreign-born and that 'practically every nationality' was represented. Ritchie & Huff (1999) presented contradictory evidence: that 54% of their sample of 283 arsonists from US prisons and hospitals were White. However, this figure was based on data from incomplete medical and other records from a highly selected sample. There is therefore little strong evidence for any particular association between ethnicity and firesetting.

Environment, education, employment and social class

The NESARC general population study found no difference in terms of education, income or marital status between self-reported firesetters and general population controls. Neither was urban or rural dwelling a risk factor for firesetting (Blanco *et al*, 2010; Vaughn *et al*, 2010). Respondents from the west of the USA were more likely to report firesetting than those from the north-east, mid-west or south. Vaughn *et al* (2010) suggest this explanation: the number of campfires that are set in the west as opposed to other areas could fit the study description (see above) of starting a fire 'just to see it burn' and thus may represent false positive reporting of firesetting behaviour in these populations.

Lewis & Yarnell (1951) believed there was insufficient evidence to confirm or refute the hypothesis (Aschaffenberg, 1913) that rural location would be associated with increased firesetting, but felt that different geographical areas could well be associated with differently motivated types of firesetting.

Among more highly selected samples there is evidence that arsonists are more likely to be unemployed or unskilled than other non-firesetting offenders (Bradford, 1982; Harris & Rice, 1991) and more likely to be disadvantaged in terms of social class (Hurley & Monahan, 1969). Compared with population controls, convicted arsonists in Sweden were clearly disadvantaged in terms of individual income, unemployment and receipt of social welfare benefits (Anwar *et al*, 2011). Firesetters in psychiatric samples have been reported to be likely to be living alone and never to have married (Bourget & Bradford, 1989; Puri *et al*, 1995; Ritchie & Huff, 1999; Dickens *et al*, 2009) and this appears to differentiate them from non-firesetting control offenders (Harris & Rice, 1991) and from the general population (Anwar *et al*, 2011). Arsonists appear to be low achievers educationally, as evidenced by completion of elementary school only among both males (63%) and females (62%) compared with population controls (39% and 41%, respectively) (Anwar *et al*, 2011). However, Labree *et al* (2010) reported no difference between arsonists and a control group of violent and sexual offenders in terms of high-school completion.

In summary, there is some good evidence that firesetters may tend to be low achievers educationally, may have difficulties forming lasting

relationships, and are likely to be unemployed, unskilled or disadvantaged on other social measures, including class and receipt of welfare benefits. However, this may not reliably distinguish them from other serious offenders.

Psychopathology

General psychopathology

Results from the NESARC study (Blanco *et al*, 2010; Vaughn *et al*, 2010) were based on a fully structured diagnostic interview conducted by trained US census workers using the valid and reliable Alcohol Use Disorder and Associated Disability Interview Schedule DSM-IV version (AUDADIS-IV) (Grant *et al*, 1995; Hasin *et al*, 1997) to assess substance use disorder, including alcohol and drug dependence, mood and anxiety disorders. Antisocial personality disorder (ASPD) and other personality disorder symptom sets were assessed. Possible psychotic disorder was assessed through self-report. Among self-reported firesetters any Axis I diagnosis was present in 91% of respondents but only 51% of population controls. Any Axis II diagnosis was recorded in 69% of firesetters and in 15% of controls. Alcohol use disorder was the most prevalent diagnosis and was present in significantly more self-reported firesetters (72%) than population controls (30%). Mood, specifically bipolar disorder, and anxiety disorders were more prevalent in firesetters than in controls after adjustment for sociodemographic characteristics (Blanco *et al*, 2010). The most prominent association was between firesetting and ASPD (52% of firesetters versus 3% of population controls). After adjusting for sociodemographic characteristics, ASPD was 22 times more likely in the firesetting population than in controls. ASPD remained strongly associated with firesetting even after controlling for substance use disorder and this suggested an independent relationship between the two variables. Conduct disorder and other personality disorders were also relatively common in firesetters following adjustment for sociodemographic variables. An increased prevalence of pathological gambling, substance use disorder and bipolar disorder in firesetters after adjustment was interpreted as suggestive of an underlying deficit in impulse control (Blanco *et al*, 2010). Interestingly, significantly more firesetters (46%) reported lifetime mental health treatment than did controls (19%). This supports studies of convicted arsonists in prison in which previous psychiatric treatment was found to be common (Sapsford *et al*, 1978); and studies of maximum-security psychiatric patients, among whom 84% of arsonists had previously received psychiatric treatment, compared with 60% of control non-arson offenders (Labree *et al*, 2010). This suggests that, in line with research findings presented above, firesetting may be common in clinical samples and should be screened for during psychiatric assessment. In brief, the large general population sample suggests that the lifetime prevalence rates

of ASPD and other personality disorders and substance use disorder were higher among a sample of self-reporting firesetters compared with the general population.

In both prison and psychiatric samples, personality disorder has been found to be common. For example, in a study of 266 jailed arsonists 61% of those sentenced to life imprisonment and 25% of other arsonists were reported to be psychopathic by Sapsford *et al* (1978). Ritchie & Huff (1999) reported that 20% of their sample of arsonists had a primary or secondary diagnosis of personality disorder. Among samples referred for psychiatric assessment, the prevalence of personality disorder has been reported to be 54% among 153 arsonists (Rix, 1994) and 41% among 92 arsonists (Bourget & Bradford, 1989). Among 79 arsonists resident in a UK high-security psychiatric hospital, the prevalence of personality disorder was 44% (Swinton & Ahmed, 2001). However, when compared with non-arsonist offender controls, psychopathy is no more prevalent: for example, 48% of 155 male and 41% of 59 female arsonists were diagnosed with personality disorder in Sweden (Enayati *et al*, 2008), but this was not significantly higher than among controls referred for non-arson offences. Labree *et al* (2010) reported that scores on the Psychopathy Checklist Revised (PCL-R; Hare, 2003) indicated no significant differences between arsonists and violent and sexual offending controls. Duggan & Shine (2001) examined data taken from a routinely recorded measure of ten personality disorder traits (Personality Diagnostic Questionnaire, fourth version; Hyler, 1994) for 68 male arsonists and 380 male offender control inmates of a UK prison. The only significant difference was in levels of borderline personality traits and the authors rejected their hypothesis that more personality disturbance would be present in arsonists than in controls. These findings are confirmed by results from a high-security psychiatric setting reported by Rice & Harris (1991), where 50% of arsonists and offender controls had a personality disorder, and by Jackson *et al* (1987), who found that 66% of arsonists and 78% of controls had a personality disorder (a statistically non-significant difference). Repo (1998) categorised male firesetters in three groups: those who had committed only one offence, that being arson ($n = 59$); those who had committed other non-violent crimes alongside arson ($n = 110$); and those who had committed other violent crimes in addition to arson ($n = 113$). ASPD was more common in the violent firesetting group (27%) than in the non-violent (9%) and one-time firesetting groups (3%). This may suggest that ASPD is associated with the most dangerous firesetters. Personality disorder appears to be a common feature of people referred to forensic psychiatric services, including firesetters. However, it has been reported at much lower rates in those with firesetting behaviour in general psychiatric settings (e.g., 4% with a primary diagnosis of personality disorder; Geller *et al*, 1992).

The prevalence of lifetime substance misuse, particularly alcohol misuse, in general population research on firesetters is mirrored to a large extent in prison and clinical samples. Again, however, this is not generally found

to distinguish firesetters from control samples of other offenders. Enayati *et al* (2008) reported that 47% of males and 48% of females had a principal or comorbid substance disorder, but this was not significantly higher than among control offenders. Hurley & Monahan (1969) reported higher, but not significantly higher, levels of alcoholism (44%) compared with non-arson offending controls (32%). Other samples have reported a common history of alcohol or substance misuse if not an actual disorder (Bourget & Bradford, 1989; Puri *et al*, 1995; Ritchie & Huff, 1999; Jayaraman & Frazer, 2006; Dickens *et al*, 2009). Alcohol intoxication at the time of the index offence may be especially common (Jayaraman & Frazer, 2006; Repo, 1998) particularly among men (Fleszar-Szumigajowa, 1969; Ritchie & Huff, 1999; Dickens *et al*, 2009).

Psychosis (not including bipolar disorder) was present in 25% of males and 48% of females among Swedish arsonists referred for forensic psychiatric examination (Enayati *et al*, 2008) and schizophrenia was diagnosed in 37% of Puri *et al*'s (1995) similarly referred, but smaller, sample ($n = 36$). Geller *et al* (1992) examined the hospital records of all 279 patients resident in a US psychiatric hospital. Of those with a history of firesetting behaviour ($n = 76$; 27%) 65% were diagnosed with schizophrenia, compared with 55% of controls with no firesetting history. This was not a statistically significant difference. When interpreting results from this study, consideration should be given to its wide definition of 'firesetting', which included 'careless smoking' and false activation of fire alarms. Anwar *et al*'s (2011) study of convicted arsonists in Sweden found that both men and women arson offenders were significantly more likely than controls to be diagnosed with schizophrenia or other psychoses than were population controls. The increased risks for arson among those with schizophrenia were very high: a 20-fold increase in men and a near 40-fold increase in women compared with non-arson offenders after adjusting for sociodemographic factors. This is reported as being equivalent to the increased risk for homicide in this group. Arsonists with schizophrenia or psychosis were responsible for 8% of arson in Sweden over a 12-year period. Relative risk was highest among those individuals with comorbid personality disorder, substance use disorder or both.

Psychological traits

Only a few studies of arsonists have reported data from valid psychometric assessment tools. Jackson *et al* (1987) found arsonists detained in a maximum-security hospital to be considerably less assertive and to have poorer communication skills than violent offender controls and population controls (hospital staff). Both arsonists and violent offenders were found to be more depressed than population controls. Koson & Dvoskin (1982) administered the Minnesota Multiphasic Personality Inventory (Hathaway & McKinley, 1940) to 26 pre-trial arsonists in a maximum-security hospital and reported that scores indicated a great level of inwardly directed hostility or aggressiveness. This was supported by Duggan & Shine (2001), who

reported that male arsonists ($n = 83$) in prison scored more highly on a measure of inwardly directed hostility (Hostility and Direction of Hostility Questionnaire, HDHQ; Caine *et al*, 1967) than offender controls ($n = 498$). Day (2001) conducted case-file reviews of 20 male arsonists, 20 male sex offenders and 20 male violent offenders in an English prison, which included routinely recorded psychometric data, but found no difference between arsonists and the other offenders on measures of self-esteem, social desirability, impulsivity, rumination, assertiveness or emotional loneliness. Duggan & Shine (2001) reported that arsonists had lower self-esteem as measured on all scales of the Culture Free Self-Esteem Inventory (Battle, 1992) than control prisoners, a finding consistent with those of Smith & Short (1995) and Swaffer *et al* (2001). Results from the revised Eysenck Personality Questionnaire (Eysenck & Eysenck, 1991) also indicated that arsonists had an increased tendency to suffer anxiety, guilt and low mood. Hurley & Monahan (1969) similarly reported a high incidence of neurotic features among imprisoned arsonists based on scores from the Eysenck Personality Inventory (Eysenck & Eysenck, 1964) and the Maudsley Personality Inventory (Eysenck, 1959), but no difference from offending, non-arsonist controls. The most robust data here suggest associations between firesetting and arson and self-esteem, inwardly directed hostility, lack of assertiveness and anxiety.

Pyromania

Pyromania is classified within DSM-IV-TR (American Psychiatric Association, 2000) as a psychiatric impulse control disorder not otherwise specified (312:33). Other impulse control disorders are pathological gambling, trichotillomania, intermittent explosive disorder, kleptomania, compulsive buying and compulsive sexual behaviour. Impulsivity, in a psychiatric context, has been defined by Moeller *et al* (2001, p. 1784) as a 'predisposition toward rapid unplanned reactions to internal or external stimuli without regard to the negative consequences of these actions to the impulsive individual or others', a definition which these authors believe to be ideologically neutral and to encapsulate biological, psychological and social aetiology. In addition to specific impulse control disorders, impulsivity is a feature of a range of mental disorders, including personality disorder, substance misuse, bipolar disorder, attention-deficit hyperactivity disorder and conduct disorder, but firesetting in the context of other mental disorders or impaired judgement should not, under current criteria, attract the diagnosis of pyromania. Pyromania is defined in DSM-IV-TR as deliberate and purposeful firesetting on multiple occasions. The diagnosis applies only to those for whom firesetting is accompanied by tension or affective arousal prior to the act. Additionally, the individual will display fascination with, interest in, curiosity about, or attraction to fire and its situational contexts, and will gain pleasure, gratification or relief when setting fires, or when witnessing or participating in their aftermath. Additionally, the firesetting will not have been undertaken for monetary

gain, as an expression of sociopolitical ideology, to conceal criminal activity, to express anger or vengeance, to improve living circumstances, in response to a delusion or hallucination, or as a result of impaired judgement (e.g., in dementia, mental retardation or substance intoxication). Finally, for pyromania to be diagnosed, the firesetting must not be better accounted for by conduct disorder, a manic episode or ASPD.

Pyromania was not addressed by the NESARC study and evidence for its prevalence must be drawn from other literature. In Lewis & Yarnell's (1951) classic work *Pathological Firesetting (Pyromania)*, 60% of their sample of 1145 male firesetters were classified as 'pyromaniacs', defined as 'offenders who said they set their fires for no practical reason and received no material profit from the act, their only motive being to gain some sensual satisfaction' (p. 86). This figure is far in excess of almost all other prevalence estimates and it is important to understand the historical context in which the research was conducted. Geller *et al* (1986) describe the wax and wane in the use of the term 'pyromania' in US psychiatry over a 150-year period up to 1985. A parallel is drawn between the use of the term and the ongoing wider debate in US psychiatry about issues of individual agency and responsibility. The growth in the use of the term, and the use of pyromania as a legal defence, in the period 1840–90 accompanied the development of the concepts of moral insanity and moral treatment. In this period, consensus viewed pyromania as a 'moral mania' or monomania, largely outside of the control of the individual: 'a morbid propensity to incendiarism, where the mind though otherwise sound, is borne on by an invisible power to the commission of this crime that has been so frequently observed, that it is now generally recognized as a distinct form of insanity' (Ray, 1838, p. 195). Present throughout this period, but usurping the notion of pyromania as an irresistible impulse towards its end, were arguments that emphasised the agency and culpability of offenders and railed against the idea of moral insanity:

> symptoms of moral insanity … are all striking delineations of what common sense … would call *depravity*. Yet we are asked to believe that these signs constitute evidence of a form of insanity destroying human responsibility. They [the defenders of moral insanity] make it appear that the decalogue and all human laws are unjust because they visit penalties on disease. (Ordroneaux (1873: p. 321)

Between 1880 and 1917, interest in pyromania dwindled, but it re-emerged in the period 1924–57, spurred on by the development of psychoanalytic theory, which again endorsed the condition as a disease entity characterised as an irresistible impulse (Magee, 1933), a urethra-erotic character trait (Hinsie & Shatzky, 1940) or a psychosexually based impulse neurosis (Henderson & Gillespie, 1944). However, while pyromania was included in DSM-I (American Psychiatric Association, 1952), as an obsessive–compulsive reaction, it gained little support as a distinct psychiatric diagnosis and was not included in DSM-II (American Psychiatric Association,

1968). By the time it re-emerged as a nosological classification in DSM-III (American Psychiatric Association, 1980), the language had been inverted and instead of an 'irresistible impulse', pyromania was described as a 'recurrent failure to resist impulses to set fires'. The tight exclusion criteria, outlined above, may exclude many deliberate firesetters from the diagnosis.

In this context, it becomes clear that Lewis & Yarnell's (1951) study occurred during a period when, on balance, US psychiatrists were disposed to view firesetting for non-profit motives as pathological. Furthermore, their study pre-dated publication of DSM-I and their definition of pyromania was less exclusive. Indeed, Geller *et al* (1986) remarked that the use of the term 'pyromania' in parentheses in the title of their book indicated Lewis & Yarnell's own uncertainty about this diagnostic entity (see also Lewis & Yarnell, 1951, p. 86). It is notable that, while 60% of their sample were classified as 'pyromaniacs', Lewis & Yarnell identified a small subset of about 50 (4%) of the group as having 'true pyromania'. Of this subsample they wrote:

> These are the mysterious 'firebugs' who terrorize neighborhoods by going on solitary firesetting sprees, often nocturnal, during which they touch off trash fires in rapid succession without regard to whose property is endangered. These offenders are able to give a classical description of the irresistible impulse. They describe the mounting tension, the restlessness, the urge for motion. (Lewis & Yarnell, 1951, pp. 86–87)

Subsequent studies of the prevalence of pyromania in clinical and criminal samples have been conducted largely with reference to the tighter operational definition detailed in DSM-III, DSM-III-R and DSM-IV and DSM-IV-TR (American Psychiatric Association, 1980, 1987, 1994, 2000). Doley (2003) reviewed the evidence base and found that most published studies at that time reported very low rates (less than 0.5%), or indeed the non-existence, of pyromania in criminal and clinical samples (Koson & Dvoskin, 1982; Harmon *et al*, 1985; Prins *et al*, 1985; O'Sullivan & Kelleher, 1987; Rice & Harris, 1991; Leong, 1992; Ritchie & Huff, 1999).

More recently, Lindberg *et al* (2005) reviewed the medical and psychiatric records of 90 males with a history of recidivist arson and found that just 3% met DSM-IV-TR criteria for pyromania, and suggested that a further 10% met all criteria except for absence of alcohol intoxication during the index arson. The authors appear to suggest that for these individuals alcohol consumption typically magnified the affective arousal that they were experiencing *in any event*, the implication being that they were likely to fit criteria for pyromania and that alcohol did not necessarily impair their judgement. Lindberg *et al* (2005) recommended that there should be reconsideration of the use of alcohol intoxication as an exclusion criterion for pyromania.

Two studies of non-offenders have used structured tools to assess pyromania and other impulse control disorders, in a sample of 107 people with major depressive disorder (Lejoyeux *et al*, 2002) and in a sample of

204 consecutively admitted patients to a private psychiatric hospital and a university hospital in the USA (Grant *et al*, 2005). Both reported a prevalence of 3%. Two smaller studies, each comprising reports of 20 individuals with the impulse control disorders kleptomania (McElroy *et al*, 1991) and compulsive buying (McElroy *et al*, 1994), found comorbidity rates of lifetime pyromania of 15% and 10%, respectively. Subsequently, Grant & Kim (2007) reported results from semi-structured interviews conducted with 21 adults and adolescents who met DSM-IV criteria for lifetime pyromania, 16 of whom also met criteria for current (defined as past 12 months) pyromania. Much of the firesetting reported by respondents did not meet the legal definition of 'arson'; for example, fires were small and controlled. However, firesetting was reported to be frequent and, on average, respondents reported setting a fire every 6 weeks. Psychiatric comorbidity was common, particularly for mood and substance use disorders. Grant & Kim (2007) raised the question of whether pyromania shares a neurobiology with other impulse control disorders, and suggested that undetected pyromania may mean that it is more prevalent than is currently conceded. This is an interesting development which may presage a change in the way pyromania is viewed by psychiatry, a new era in which a limited group of firesetters are again viewed as 'diseased', as were larger groups in the past (Geller *et al*, 1986).

In summary, the understanding of firesetting as a pathological behaviour and as a distinct mental disorder has changed over time. When the influence of psychoanalytical approaches was dominant, and firesetting was seen as a disease, Lewis & Yarnell (1951) reported high levels (60%) of pyromania but modified this to around 4% for those with 'true pyromania'. Increasingly tight operational definitions of pyromania in subsequent editions of the DSM, particularly the use of alcohol intoxication at index as an exclusion criterion, appear to have contributed to research findings of zero or near-zero prevalence of the disorder. Recent US studies have indicated a small but non-trivial prevalence of criteria for lifetime pyromania in clinical, non-offending samples. It is worth noting that the diagnosis of pyromania does not require that firesetting behaviour meets the legal definition of arson. Rather, the fires set by those meeting the criteria for pyromania may be small and controllable. As a result, it may be suggested that samples of convicted arsonists, largely typified by the presence of ASPD, may be a group distinct from those meeting criteria for pyromania.

Neurodevelopmental, developmental features and family history

Intellectual disability and neurodevelopmental disorders

Few researchers have formally assessed intellectual disability among firesetters and the picture is clouded by the differing definitions employed between studies. Lewis & Yarnell (1951) reported 70% of their sample to be at least below average intelligence, 48% of whom were classified as

'morons or imbeciles', suggesting an IQ between 20 and 70 for nearly half their sample (Reber, 1995). Fleszar-Szumigajowa (1969) reported 'mental deficiency' in 19% of incendiarists. Dickens *et al* (2007*b*) reported IQ to be below 85 in 44% of arsonists. Rix (1994) reported 11% to be 'learning disabled' and Puri *et al* (1995) just 3%. More recently, Enayati *et al* (2008) have reported learning disability to be a feature in 10% of males and 9% of female convicted arsonists referred for forensic psychiatric examination, significantly greater levels than among offending controls (3% for both males and females). However, among a group of arsonists detained under maximum security, Labree *et al* (2010) found 8% of arsonists and violent offender controls had 'mental retardation', as indicated by scores below 70 on the WAIS-R or WAIS-III (Wechsler, 1981, 1997). Räsänen *et al* (1994) found the full-scale IQ on the Wechsler Adult Intelligence Scale test (Wechsler, 1965) of both arsonists and control offenders charged with homicide to be in the 'dull normal' range, with no significant difference between them. Among arsonists referred for psychiatric assessment, Dickens *et al* (2007*b*) reported that those with low normal and below intelligence were characterised by a pattern of lifelong temperamental problems. While intellectual disability may not be as prevalent among those who deliberately set fires as perhaps once thought, it may increase the risk for arson more than for other offences, although perhaps this is not the case among the most serious offenders. See Chapter 6 for a wider-reaching discussion of firesetting and intellectual disability.

There is little evidence relating to neurodevelopmental disorders and firesetting. Enayati *et al* (2008) reported that autism (excluding Asperger syndrome) was rare in both arsonists and control offenders referred for forensic psychiatric assessment. However, there was a significantly higher prevalence of Asperger syndrome among convicted arsonists (7%) relative to other offender controls (3%). There are several published case studies of firesetting or arson conducted by males with Asperger syndrome (Everall & LeCouter, 1990; Tantam, 1991; Murrie *et al*, 2002).

Other family and developmental factors

The developmental features of adult, as opposed to child and adolescent, firesetters have been insufficiently studied; moreover, as noted above, no longitudinal study has followed juvenile firesetters through to adulthood. In the general population there is a high prevalence of family history of antisocial behaviour among self-reported firesetters (60%) relative to population controls (23%) (Vaughn *et al*, 2010). From studies of more highly selected samples there are few reports of the family or developmental features of adult arsonists or firesetters compared with control groups. Hence, while apparently high rates of childhood disturbance are commonly reported, including behavioural disturbance, truancy and reading difficulties (Puri *et al*, 1995; Dickens *et al*, 2009), there is little control information to contextualise this. Evidence is largely from psychiatric populations and is indirect. For example, Harris & Rice (1991) compared 243 men admitted

to a maximum-security psychiatric institution for firesetting and compared them with non-firesetting control patients. There was little significant difference in terms of childhood history, including childhood poverty, reported parental physical abuse, presence of the MacDonald triad (animal cruelty, enuresis and obsession with firesetting), or of childhood aggression. Significantly more firesetters had been institutionalised during childhood and about 10% had a family history of firesetting, lending support to a social learning component to their behaviour. More arsonists than controls came from 'broken homes' (Hurley & Monahan, 1969). Bradford (1982) compared arsonists referred for pre-trial forensic examination with offending, non-arsonist controls and found, similarly, that more arsonists had been reared outside of their natural birth family, but proportionately fewer reported parental childhood abuse. The evidence is mixed, however, and Labree *et al* (2010) found no difference between arsonists and control patients in a maximum-security hospital in terms of having been raised in their natural (biological) home. Hurley & Monahan (1969) reported that most arsonists came from large families (four or more children); however, they did not present control data for this variable and they noted that this may not distinguish the firesetters from other offenders. Dickens *et al* (2007*a*) found more evidence of childhood sexual abuse among female arsonists than among males.

Gannon & Pina (2010) reviewed the developmental features of adult arsonists and noted the preponderance of single men who are typified by loneliness and impoverished social support networks (Inciardi, 1970; Barracato, 1979; Bennett & Hess, 1984; Leong, 1992; Ritchie & Huff, 1999; Rice & Harris, 1991, 2008). Hurley & Monahan (1969) noted that a high proportion (62%) of arsonists were found to have difficulty forming social relationships with women. However, these features are also found among other non-firesetting criminals (Ward *et al*, 1996; Van Ijzendoorn *et al*, 1997; Frodi *et al*, 2001; Ross & Pfäfflin, 2007) and it is therefore questionable the extent to which conclusions can be drawn from these findings.

Offending and antisocial behaviour

Epidemiological research (Blanco *et al*, 2010; Vaughn *et al*, 2010) has suggested that, compared with controls, firesetters self-reported a wide range of antisocial or offending behaviours. This ranged from relatively trivial issues such as playing truant (61% of firesetters *v*. 21% of controls), repeated school or work absence (33% *v*. 7%), repeated lying (33% *v*. 5%), or loss of driving licence (26% *v*. 8%). More serious acquisitive offending behaviours among firesetters compared with controls included shoplifting (58% *v*. 11%) and illegal money-making (28% *v*. 3%); non-acquisitive property crimes were also more common among firesetters and included destruction of others' property (50% *v*. 3%). Finally, a self-reported history of violent offending was far more prevalent in firesetters, including 'hitting someone sufficiently hard to injure them' (35% *v*. 6%), using a weapon in a

fight (21% *v*. 3%) and forcing someone to have sex (1.4% *v*. 0.1%). Blanco *et al* (2010) report that 76% of firesetters affirmed the statement that they had done 'anything that you could have been arrested for', compared with 15% of controls. The behaviours most associated with firesetters relative to controls were robbing, mugging or purse-snatching (5% *v*. 0%) and harassing, threatening or blackmailing someone (22% *v*. 2%). In short, in this large general population survey, self-reported lifetime firesetting was associated with a wide range of other self-reported antisocial or offending behaviours, including non-violent and serious violent crime. However, whether this pattern of offending differentiates firesetters from non-firesetting offenders is not known.

Soothill *et al* (2004) identified past convictions for a period of up to 37 years among 3335 arsonists convicted in England and Wales in 2000–01. More than two-fifths (43%) had at least one previous conviction; the most common were for theft (28%), criminal damage (23%), violence (20%) and motoring offences (18%). Sexual offending was relatively uncommon (1.6%) but it is not known whether arsonists are less likely than other non-sexual offenders to commit sexually offences. The proportion of those with previous convictions for violence had risen from 8% in 1951 to 12% in 1980–81 and to 20% in 2000–01. Soothill *et al* (2004) reflected that this probably indicated the increasing relevance of the prior offending record in any decision to prosecute. There was a small but increasing proportion of previous convictions for arson among convicted arsonists (1% in 1951 to 11% in 2000–01). This was argued to reflect the decreased probability of arson fires being detected in the war years, which formed a significant period of the pre-1951 conviction data-set. These data support the arguments that many arsonists are versatile in their offending behaviour and that some arsonists are also violent offenders: it is notable that in one study those with a conviction for arson were as likely subsequently to commit homicide as were those who had blackmailed and made threats to kill (Soothill *et al*, 2008).

On the whole, however, it would appear that most arsonists are not characterised by violent behaviour. Jackson *et al* (1986) compared arsonists without mental disorder or intellectual disability to controls with index offences involving interpersonal violence. Arsonists had significantly fewer recorded incidents of assaults both prior to and since admission than did violent offenders. This is supported by work among males referred for psychiatric assessment conducted by Hill *et al* (1982), who, interestingly, found that arsonists ($n = 38$) were less violent than violent offenders ($n = 24$) but more violent than property offenders ($n = 30$). Labree *et al* (2010) found no difference in the number of previous convictions between arsonists and non-arsonist offending controls, but did not report on the severity or type of previous offending. Hurley & Monahan (1969) reported lower rates of previous imprisonment (42%) among arsonists compared with offending controls (77%), and a smaller proportion of arsonists (15%)

had previous convictions for violence than did controls (32%). Arsonists had more previous convictions for property damage (26% *v*. 7%) but fewer convictions than controls for sex offences (15% *v*. 31%), larceny (37% *v*. 78%), breaking and entering (25% *v*. 63%) or deception (4% *v*. 33%). In psychiatric samples, aggression to others (53% *v*. 82%) and sexual offences (9% *v*. 82%) have been reported to be less common among arsonists than among controls (McKerracher & Dacre, 1966). However, there appear to be few hard-and-fast rules about offending and some arsonists do recidivate violently. For example, Rice & Harris (1996) reported a 57% rate of non-violent recidivism and a rate of 31% for violent recidivism in arsonists over an average follow-up of 7.8 years.

To summarise, it appears that firesetting is often part of a general array of offending behaviour. However, from the available evidence, firesetters and arsonists as a group are more like property offenders than violent offenders, but a minority of firesetters are also violent recidivists.

Summary and conclusions

This chapter has provided an overview of the emerging epidemiological evidence on firesetting in the general adult population. The NESARC study suggests a headline figure of 1% for lifetime prevalence of deliberate firesetting. Furthermore, 38% of firesetters reported this behaviour persisting after age 15 (Blanco *et al*, 2010; Vaughn *et al*, 2010). The extent to which this is a credible finding is offset by poor phrasing of survey questions and the potential for response bias in the original survey design. Nevertheless, this new epidemiological evidence largely supports previous empirical work on the sociodemographic characteristics of firesetters conducted with more highly selected samples of criminal and clinical populations. Those who deliberately set fires are predominantly young, White males. Low educational achievement is common and there is evidence that arsonists may experience difficulty in forming lasting relationships. However, studies of those convicted of arson suggest that many of these characteristics probably do not distinguish arsonists from other young men who offend. Firesetting does appear to be sufficiently prevalent among young men with mental disorder to warrant routine screening for evidence of the behaviour during psychiatric assessment. Early identification will inform risk assessment and any subsequent management plan.

In terms of psychopathology, the new population data also largely support what is known from clinical and criminal samples. Substance use disorders, ASPD and other personality disorders have been reported to be common in multiple studies. However, this is also true of many young men who offend. There is some evidence that firesetters may lack assertiveness and self-esteem, and be prone to inwardly directed hostility. It is noteworthy that risk for arson is particularly increased relative to population controls among those with schizophrenia and other

psychoses. Questions pertinent to firesetting are certainly warranted when assessing this group. Pyromania, or at least firesetting that shares some of its characteristics (including intense pleasure and interest in fire and emotional arousal associated with lighting fires) may be present in a small proportion of individuals, but historical reports of pyromania appear to reflect shifting attitudes as much as fundamental shifts in firesetting behaviour in the population. The presence of pyromania among samples of people with other impulse control disorders (kleptomania and compulsive buying) and in other disorders associated with impulse control deficits (ASPD, substance misuse) may suggest a biological basis for a small subset of those who set fires. However, the potential biological basis of firesetting behaviour is outside the scope of the current chapter and readers are advised to consult Chapter 4 for a summary of this area.

Evidence from population studies suggests that firesetters have been frequently involved in a variety of antisocial and offending behaviours relative to the general population, and a small subset have been involved in very serious violent and sexual acts. Those who are convicted of arson are usually versatile in their offending behaviour and a proportion have convictions for grave crimes. On the whole, the evidence suggests that most of those who deliberately set fires share more in common with property offenders than with violent offenders. However, this is not true of all firesetters and practitioners should of course bear in mind that some arsonists deliberately set out to endanger life and thus more closely resemble violent offenders. Current classificatory systems for those who set fires are unsatisfactory (Gannon & Pina, 2010) and more work needs to be done to aid in the assessment of those who will go on to set the most dangerous fires (Dickens *et al*, 2009).

Finally, the emerging epidemiological data, though limited, provide a welcome advance from the position espoused by Barker (1994, p. 88), who suggested that such a comprehensive survey would be impracticable and cause 'at best, outright hostility' among respondents. Moving forwards, research is needed which combines the representativeness of the NESARC study with the detailed questioning and minimisation of response bias employed by Gannon & Barrowcliffe (2011) and the better epidemiological studies of firesetting in children and adolescents in order to improve the epidemiological picture. Epidemiological evidence for firesetting among juveniles is currently far more advanced than that for adults. However, it is claimed that only half of intentional firesetting brought to the attention of professionals is committed by juveniles (Cassel & Bernstein, 2007) and there is an urgent need to build the current evidence base on adult firesetting in order to inform assessment and treatment. In particular, there is a dearth of longitudinal studies that follow children into adulthood, meaning that we know very little about whether those who set fires as children go on to do so as adults. This issue can be addressed only by the initiation of a far-sighted project which aims to identify specific risk factors for adult firesetting.

References

Achenbach, T. M. (1991) *Manual for the Child Behavior Checklist (CBCL)/4–18 and 1991 Profile*. University of Vermont Department of Psychiatry.

American Psychiatric Association (1952) *Diagnostic and Statistical Manual of Mental Disorders* (1st edn) (DSM-I). APA.

American Psychiatric Association (1968) *Diagnostic and Statistical Manual of Mental Disorders* (2nd edn) (DSM-II). APA.

American Psychiatric Association (1980) *Diagnostic and Statistical Manual of Mental Disorders* (3rd edn) (DSM-III). APA.

American Psychiatric Association (1987) *Diagnostic and Statistical Manual of Mental Disorders* (3rd edn, revised) (DSM-III-R). APA.

American Psychiatric Association (1994) *Diagnostic and Statistical Manual of Mental Disorders* (4th edn) (DSM-IV). APA.

American Psychiatric Association (2000) *Diagnostic and Statistical Manual of Mental Disorders* (4th edn, text revision) (DSM-IV-TR). APA.

Anwar, S., Långström, N., Grann, M., *et al* (2011) Is arson the crime most strongly associated with psychosis? A national case–control study of arson risk in schizophrenia and other psychoses. *Schizophrenia Bulletin*, **37**, 580–586 .

Aschaffenberg, G. (1913) *Crime and Its Repression*. Patterson Smith.

Barker, A. F. (1994) *Arson: A Review of the Psychiatric Literature*. Oxford University Press.

Barracato, J. (1979) *Fire: Is It Arson?* Aetna Life and Casualty.

Battle, J. (1992) *Culture-Free Self-Esteem Inventory*. Pro-Ed.

Bennett, W. M. & Hess, K. M. (1984) *The Arsonist: A Closer Look*. Charles C. Thomas.

Blanco, C., Alegria, A. A., Petry, N. M., *et al* (2010) Prevalence and correlates of fire-setting in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *Journal of Clinical Psychiatry*, **71**, 1218–1225.

Bourget, D. & Bradford, J. M. (1989) Female arsonists: a clinical study. *Bulletin of the American Academy of Psychiatry and the Law*, **17**, 293–300.

Bradford, J. M. (1982) Arson: a clinical study. *Canadian Journal of Psychiatry*, **27**, 188–193.

Caine, T., Foulds, G. & Hope, K. (1967) *The Hostility and Direction of Hostility Questionnaire*. University of London Press.

Cassel, E. & Bernstein, D. A. (2007) *Criminal Behaviour* (2nd edn). Pearson.

Chen, Y. H., Arria, A. M. & Anthony, J. C. (2003) Firesetting in adolescence and being aggressive, shy and rejected by peers: new epidemiologic evidence from a national sample survey. *Journal of the American Academy of Psychiatry and the Law*, **31**, 44–52.

Clark Newman, J., Des Jarlais, D. C., Turner, C. F., *et al* (2002) The differential effects of face-to-face and computer interview modes. *American Journal of Public Health*, **93**, 294–297.

Dadds, M. R & Fraser, J. A. (2006) Fire interest, fire setting and psychopathology in Australian children: a normative study. *Australian and New Zealand Journal of Psychiatry*, **40**, 581–586.

Day, J. (2001) Understanding the characteristics of fire-setters. *Prison Service Journal*, **133**, 6–8.

Del Bove, G., Caprara, G. V., Pastorelli, C., *et al* (2008) Juvenile firesetting in Italy: relationship to aggression, psychopathology, personality, self-efficacy and school functioning. *European Child and Adolescent Psychiatry*, **17**, 235–244.

Dickens, G., Sugarman, P., Ahmad, F., *et al* (2007*a*) Gender differences amongst adult arsonists at psychiatric assessment. *Medicine, Science and the Law*, **47**, 233–238.

Dickens, G., Sugarman, P., Ahmad, F., *et al* (2007*b*) Characteristics of low IQ arsonists at psychiatric assessment. *Medicine, Science and the Law*, **48**, 217–220.

Dickens, G., Sugarman, P., Ahmad, F., *et al* (2009) Recidivism and dangerousness in arsonists. *Journal of Forensic Psychiatry and Psychology*, **20**, 621–639.

Doley, R. (2003) Pyromania: fact or fiction? *British Journal of Criminology*, **43**, 797–807.

Duggan, L. & Shine, J. (2001) An investigation of the relationship between arson, personality disorder, hostility, neuroticism and self-esteem amongst incarcerated fire-setters. *Prison Service Journal*, **133**, 18–21.

Enayati, J., Grann, M., Lubbs, S., *et al* (2008) Psychiatric morbidity in arsonists referred for forensic psychiatric assessment in Sweden. *Journal of Forensic Psychiatry and Psychology*, **19**, 139–147.

Everall, L. P. & LeCouter, A. (1990) Firesetting in an adolescent boy with Asperger's syndrome. *British Journal of Psychiatry*, **157**, 284–287.

Eysenck, H. J. (1959) *The Maudsley Personality Inventory*. University of London Press.

Eysenck, H. J. & Eysenck, S. B. G. (1964) *Manual of the Eysenck Personality Inventory*. University of London Press.

Eysenck, H. J. & Eysenck, S. B. G. (1991) The Eysenck Personality Questionnaire. The revised version of the psychoticism scale. *Personality and Individual Differences*, **6**, 21–29.

Fleszar-Szumigajowa, J. (1969) The perpetrators of arson in forensic-psychiatric material. *Polish Medical Journal*, **9**, 212–219.

Frodi, A., Dernevik, M., Sepa, A. *et al* (2001) Current attachment representations of incarcerated offenders varying in degree of psychopathy. *Attachment and Human Development*, **3**, 269–283.

Gannon, T. A. (2010) Female arsonists: key features, psychopathologies and treatment needs. *Psychiatry*, **73**, 173–189.

Gannon, T. A. & Barrowcliffe, E. (2011) Firesetting in the general population: the development and validation of the Fire Setting and Fire Proclivity Scales. *Legal and Criminological Psychology*. DOI: 10.1348/135532510X523203.

Gannon, T. A. & Pina, A. (2010) Firesetting: psychopathology, theory and treatment. *Aggression and Violent Behaviour*, **15**, 224–238.

Geller, J. L., Erien, J. & Pinkus, R.L. (1986) A historical appraisal of America's experience with 'pyromania' – a diagnosis in search of a disorder. *International Journal of Law and Psychiatry*, **9**, 201–229.

Geller, J. L., Fisher, W. H. & Moynihan, K. (1992) Adult lifetime prevalence of firesetting behaviors in a state hospital population. *Psychiatric Quarterly*, **63**, 129–142.

Grant, B. F., Harford, T., Dawson, D. A., *et al* (1995) The Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS): reliability of alcohol and drug modules in a general population sample. *Drug and Alcohol Dependence*, **39**, 37–44.

Grant, J. E. & Kim, S. W. (2007) Clinical characteristics and psychiatric comorbidity of pyromania. *Journal of Clinical Psychiatry*, **68**, 1717–1722.

Grant, J. E., Levine, L., Kim, D., *et al* (2005) Impulse control disorders in adult psychiatric inpatients. *American Journal of Psychiatry*, **162**, 2184–2188.

Hall, J. R. Jr. (2007) *Intentional Fires and Arson*. Fire Analysis and Research Division, National Fire Protection Association (http://www.nfpa.org/assets/files/pdf/arsonsummary.pdf).

Hare, R. D. (2003) *Hare Psychopathy Checklist Revised (PCL-R)* (2nd edn). Multi Health Systems.

Harmon, R. B., Rosner, R. & Wiederlight, M. (1985) Women and arson: a demographic study. *Journal of Forensic Sciences*, **30**, 467–477.

Harris, M. E. & Rice, G. (1991) Firesetters admitted to a maximum security psychiatric institution: offenders and offenses. *Journal of Interpersonal Violence*, **6**, 461–475.

Hasin, D., Carpenter, K. M., McCloud, S., *et al* (1997) The Alcohol Use Disorders and Associated Disabilities Interview Schedule (AUDADIS): reliability of alcohol and drug modules in a clinical sample. *Drug and Alcohol Dependence*, **44**, 133–141.

Hathaway, S. R. & McKinley, J. C. (1940) A multiphasic personality schedule (Minnesota): I. Construction of the schedule. *Journal of Psychology*, **10**, 249–254.

Henderson, D. K. & Gillespie, R. D. (1944) *A Textbook of Psychiatry for Students and Practitioners*. Oxford University Press.

Hill, R. W., Langevin, R., Paitich, D., *et al* (1982) Is arson an aggressive act or a property offense? A controlled study of psychiatric referrals. *Canadian Journal of Psychiatry*, **27**, 648–654.

Hinsie, L. E. & Shatzky, J. (1940) *Psychiatric Dictionary with Encyclopaedic Treatment of Modern Terms*. Oxford University Press.

Hurley, W. & Monahan, T. M. (1969) Arson: the criminal and the crime. *British Journal of Criminology*, **9**, 4–21.

Hyler, S. E. (1994) *Personality Diagnostic Questionnaire* (4th edn). New York State Psychiatric Institute.

Inciardi, J. (1970) The adult firesetter. *Criminology*, **8**, 145–155.

Jackson, H., Glass, C. & Hope, S. (1986) A functional analysis of recidivistic arson. *British Journal of Clinical Psychology*, **26**, 175–185.

Jackson, H., Glass, C. & Hope, S. (1987) Why are arsonists not violent offenders? *International Journal of Offender Therapy and Comparative Criminology*, **31**, 143–151.

Jayaraman, A. & Frazer, J. (2006) Arson: a growing inferno. *Medicine, Science and the Law*, **46**, 295–300.

Kolko, D. J. & Kazdin, A. E. (1988) Prevalence of firesetting and related behaviours among child psychiatric patients. *Journal of Consulting and Clinical Psychology*, **56**, 628–630.

Koson, D. F. & Dvoskin, J. (1982) Arson: a diagnostic study. *Bulletin of the American Academy of Psychiatry and the Law*, **10**, 39–40.

Labree, W., Nijman, H., van Marle, H., *et al* (2010) Backgrounds and characteristics of arsonists. *International Journal of Law and Psychiatry*, **33**, 149–153.

Lejoyeux, M., Arbaretaz, M., McLoughlin, M., *et al* (2002) Impulse control disorders and depression. *Journal of Nervous and Mental Disease,* **190**, 310–314.

Leong, G. B. (1992) A psychiatric study of persons charged with arson. *Journal of Forensic Science*, **37**, 1319–1326.

Lewis, N. O. C. & Yarnell, H. (1951) *Pathological Firesetting (Pyromania)*. Nervous and Mental Disease Monographs no. 82. Coolidge Foundation.

Lindberg, N., Holi, M. M., Tani, P., *et al* (2005) Looking for pyromania: characteristics of a consecutive sample of Finnish male criminals with histories of recidivist fire-setting between 1973 and 1993. *BMC Psychiatry,* **5**, 1–5. At http://www.biomedcentral.com/content/pdf/1471-244x-5-47.pdf (accessed 17 December 2010).

Mackay, S., Paglia-Boak, A., MacKay, S., *et al* (2009) Epidemiology of firesetting in adolescents: mental health and substance use correlates. *Journal of Child Psychology and Psychiatry*, **50**, 1282–1290.

Magee, J. H. (1933) Pathological arson. *Scientific Monthly*, **37**, 358–361.

McElroy, S., Pope, H., Hudson, J., *et al* (1991) Kleptomania: a report on 20 cases. *American Journal of Psychiatry*, **148**, 652–657.

McElroy, S., Keck, P., Pope, H., *et al* (1994) Compulsive buying: a report of 20 cases. *Journal of Clinical Psychiatry*, **55**, 242–248.

McKerracher, D. & Dacre, A. (1966) A study of arsonists in a special security hospital. *British Journal of Psychiatry*, **112**, 1151–1154.

Moeller, F. G., Barratt, E. S., Dougherty, D. M., *et al* (2001) Psychiatric aspects of impulsivity. *American Journal of Psychiatry*, **158**, 1783–1793.

Murrie, D. C., Warren, J. I., Kristiansson, M., *et al* (2002) Asperger's syndrome in forensic settings. *International Journal of Forensic Mental Health*, **1**, 59–70.

Office for National Statistics (2005) *United Kingdom: Estimated Resident Population by Single Year of Age and Sex; Mid–2004 Population Estimates*. ONS. At http://www.statistics.gov.uk/cci/nugget.asp?id=6 (accessed 17 December 2010).

Ordroneaux, J. (1873) Moral insanity. *American Journal of Insanity*, **29**, 313–340.

O'Sullivan, G. H. & Kelleher, M. J. (1987) A study of firesetters in the south west of Ireland. *British Journal of Psychiatry*, **151**, 818–823.

Prins, H., Tennent, G. & Trick, K. (1985) Motives for arson (fire raising). *Medicine, Science and the Law*, **25**, 275–278.

Puri, B. K., Baxter, R. & Cordess, C. C. (1995) Characteristics of fire-setters. A study and proposed multiaxial psychiatric classification. *British Journal of Psychiatry*, **166**, 393–396.

Räsänen, P., Hirvenoja, R., Hakko, H., *et al* (1994) Cognitive functioning ability of arsonists. *Journal of Forensic Psychiatry*, **5**, 615–620.

Ray, I. (1838) *A Treatise on the Medical Jurisprudence of Insanity*. Charles C. Thomas & James Brown.

Reber, A. S. (1995) *The Penguin Dictionary of Psychology* (2nd edn). Penguin Books.

Repo, E. (1998) Finnish fire-setting offenders evaluated pre-trial. *Psychiatrica Fennica*, **29**, 175–189.

Rice, M. E. & Harris, G. (1991) Firesetters admitted to a maximum security psychiatric institution: offenders and offenses. *Journal of Interpersonal Violence*, **6**, 461–475.

Rice, M. E. & Harris, G. T. (1996) Predicting the recidivism of mentally disordered firesetters. *Journal of Interpersonal Violence*, **11**, 364–375.

Rice, M. E. & Harris, G. T. (2008) Arson. In *The Encyclopedia of Social Problems* (ed V. N. Parrillo). Sage.

Ritchie, E. C. & Huff, T. G. (1999) Psychiatric aspects of arsonists. *Journal of Forensic Science*, **44**, 733–740.

Rix, K. J. B. (1994) A psychiatric study of adult arsonists. *Medicine, Science and the Law*, **34**, 21–34.

Ross, T. & Pfäfflin, F. (2007) Attachment and interpersonal problems in a prison environment. *Journal of Forensic Psychiatry & Psychology*, **18**, 90–98.

Sapsford, R. J., Banks, C. & Smith, D. D. (1978) Arsonists in prison. *Medicine, Science and the Law*, **18**, 247–254.

Smith, J. & Short, J. (1995) Mentally disordered firesetters. *British Journal of Hospital Medicine*, **53**, 136–140.

Soothill, K. L. & Pope, P. J. (1973) Arson: a twenty-year cohort study. *Medicine, Science and the Law*, **13**, 127–138.

Soothill, K., Ackerley, E. & Francis, B. (2004) The criminal careers of arsonists. *Medicine, Science and the Law*, **44**, 27–40.

Soothill, K. Francis, B. & Liu, J. (2008) Does serious offending lead to homicide? Exploring the interrelationships and sequencing of serious crime. *British Journal of Criminology*, **48**, 522–537.

Swaffer, T., Haggett, M. & Oxley, T. (2001) Mentally disordered firesetters: a structured intervention programme. *Clinical Psychology and Psychotherapy*, **8**, 468–475.

Swinton, M. & Ahmed, A. (2001) Arsonists in maximum security: mental state at time of fire-setting and relationship between mental disorder and pattern of behaviour. *Medicine, Science and the Law*, **41**, 51–57.

Tantam, D. (1991) Asperger's syndrome in adulthood. In *Autism and Asperger Syndrome* (ed. U. Frith), pp. 147–183. Cambridge University Press.

US Census Bureau (2010) *US and World Population Clocks*. US Census Bureau. At http://www.census.gov/main/www/popclock.html (accessed 17 December 2010).

Van Ijzendoorn, M. H., Feldbrugge, J. T. T., Derks, F. C. H., *et al* (1997) Attachment representations of personality disordered criminal offenders. *American Journal of Orthopsychiatry*, **67**, 449–459.

Vaughn, M. G., Fu, Q., DeLisi, M., *et al* (2010) Prevalence and correlates of fire-setting in the United States: results from the National Epidemiological Survey on Alcohol and Related Conditions. *Comprehensive Psychiatry*, **51**, 217–223.

Ward, T., Hudson, S. M. & Marshal, W. L. (1996) Attachment style in sex offenders: a preliminary study. *Journal of Sex Research*, **33**, 17–26.

Wechsler, D. (1965) *Manual for the Wechsler Adult Intelligence Scale*. Psychological Corporation.

Wechsler, D. (1981) *Wechsler Adult Intelligence Scale – Revised (WAIS-R)*. Psychological Corporation.

Wechsler, D. (1997) *WAIS-III Administration and Scoring Manual*. Psychological Corporation.