THE BURNING ISSUE: RESEARCH AND STRATEGIES FOR REDUCING ARSON

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research and strategies
for reducing arson

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FOREWORD

Arson is a particularly pernicious crime, which impacts on both the individual victim and on society as a whole. It is now the largest single cause of major fires in the UK. At its worst, arson leads to loss of life and significant financial damage. Yet even minor arson, where it is persistent and pervasive, sets a strongly detrimental (and visually harmful) tone to deprived communities and contributes to social exclusion.

One of the key findings of the Arson Scoping **Study Safer communities - towards effective arson control** was the need for greater inter-agency working to address the arson problem. The Arson Control Forum was established by the government to provide the framework for that inter-agency partnership. Since it was established in 2001 the Forum has led the fight against arson by investing in local initiatives, reviewing the legislative framework to ensure it is sufficient to tackle the problem, producing best practice guidance and by conducting research.

This *report, The burning issue: research and strategies for reducing arson* was commissioned by the Arson Control Forum and is a significant contribution to the body of knowledge on the problem of arson. I welcome it, and commend it to specialists in the field and to all who have an interest in reducing arson.

Chris Leslie

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Parliamentary Under Secretary of State
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Introduction: the challenge of arson

In the UK it is estimated that the direct financial costs of arson are well over £2.1 billion a year. Between 1990 and 2000 the number of arson fires in buildings increased by 40% and arson fires in vehicles tripled. Arson fires often devastate whole families. Injuries can leave the victims with a lifetime of pain as well as permanent physical and mental scars. In 2000 deliberate fires accounted for 90 deaths and a further 2,800 injuries. The outcome of widespread arson in a community can create degeneration within an area, provoking a loss of business and unemployment (Weiner, 2001; DTLR, 2002).

Reducing arson, both as it relates to crime and as it relates to death, injury and damage is therefore an important component of the Government's aim of creating safer communities. In order for effective government strategies to be developed for dealing with arson its nature and extent need to be fully understood.

One of the key findings of the Arson Scoping Study *'Safer Communities - towards effective arson control'* was the need for greater inter-agency working to halt and ultimately reverse the long-term increase in arson in England and Wales (Home Office, 1999).

The Arson Control Forum (ACF) was formally established in April 2001 to provide that framework. The Forum is chaired by HM Chief Inspector of Fire Services, Sir Graham Meldrum, and includes representatives from a large number of organisations including, among others, the police, the fire service, the Home Office, the Local Government Association, the Confederation of British Industry, the Crown Prosecution Service and the Insurance Industry. That so many organisations have an interest in arson and have a role to play in its reduction is itself indicative of the need for a strategic forum like the ACF to co-ordinate inter-agency work. (Arson Control Forum, 2002).

The Forum has four topic-based sub-groups:

Intervention - this group is addressing issues relating to the prevention and investigation of arson. The sub-group is developing an inter-agency approach to arson reduction and investigation and it is producing best practice guidance across a range of subjects.

Legislation - this group is assessing whether the existing statutory arrangements for investigating fires are sufficient and whether the fire service should become a full member of the partnerships established under crime and disorder legislation. The sub-group is also producing guidance for local authorities, the police and fire services on their existing powers to address particular aspects of the arson problem.

New Projects — this group is considering local arson prevention initiatives, providing a degree of financial support and disseminating examples of best practice. In 2001/2 and 2002/3, £2.1 million was allocated to a total of 43 local projects, all of which reflect the multi-agency partnership approach to the arson problem to varying degrees.

The **Research and data collection** - this sub-group oversees the Forum's Strategic Arson Control Research Programme. In April 2001, this group commissioned this report to assess what is known about arson, arsonists and appropriate prevention and deterrent approaches.

This study was commissioned to specifically identify the following:

- The types of arson that occur,

- Estimates of the proportion of vehicle and property arson attributable to each type,

- Proposals of forms of intervention for the different types identified,

- Future directions for projects that will help to reduce arson further.

This study is based primarily on published material in the academic and professional literature however some unpublished material has also be acquired from a number of bodies listed in the acknowledgements.

This report is in four sections. Chapter One summarises the magnitude and distribution of arson in the United Kingdom.

This is followed by a review of the current literature on the different forms arson can take. Four broad types of arson are discussed: youth disorder; malicious, such as revenge against an employer or partner; emotional expression or psychological; and criminal, where the arson is committed for financial gain or to cover up other criminal activity. Estimates are made of the proportion of vehicle and property arsons in the UK that can be attributed to each of these four categories.

Chapter Three discusses the approaches that can be used by the agencies involved to intervene with the arsonist, whether by educational programmes or improved investigation and detection, and also the action, that can be taken to reduce the risk to arson targets, such as abandoned vehicles, derelict buildings or schools.

The final chapter discusses future research and development: the report identifies a number of key areas where they are significant information gaps that can impact on the success of arson reduction and prevention work, and suggests work that could be undertaken fill these gaps.

CHAPTER 1

The magnitude and distribution of arson in the United Kingdom

Establishing the exact magnitude and distribution of arson in the United Kingdom is not straightforward. The police and fire service, the two main agencies responsible for collecting most of the information, record the number of deliberately started fires in different ways resulting in different figures (Home Office, 1999).

National Fire Statistics, published annually by the Office of the Deputy Prime Minister[1], are derived from statistical returns completed by fire crews attending each fire. What are often referred to as 'arson fires' are in fact fires where malicious or deliberate ignition is suspected. In 2000, fire brigades in England and Wales attended 98,000 malicious fires, representing over half of all major fires (i.e. excluding minor 'secondary fires').

Only a proportion of these malicious fires are later categorised by the police as arson as defined by the Criminal Damage Act 1971. In 2001/2, 52,800 arson offences (around half the number of malicious fires recorded by the fire brigade) were recorded by the police in England and Wales, of which 4,400 (8%) were detected. This compares with a detection rate of 14% for all criminal damage and 24% for all indictable offences (Home Office, 2002).

Table 1 shows the number of malicious fires per year since 1996 for England and Wales. The huge overall increase in arson fires, 29% between 1996 and 2001, is almost solely due to the rise in fires in road vehicles. These have risen by 46% over the period and in 2000 accounted for 64% of all arson fires in England and Wales. Potential reasons for this increase are discussed in Chapter Three.

Table 1: Malicious fires by location of fire, 1996-2000 England and Wales					
					Fires (thousands)
Year	Total	Dwellings	Other buildings	Road vehicles	Other outdoor
1996	78.0	**11.8**	**18.6**	**40.1**	7.4
1997	72.9	**11.4**	**16.4**	**38.2**	6.9
1998	**76.1**	**11.0**	**14.9**	43.9	6.4
1999	**91.1**	**11.3**	**15.7**	56.9	7.3
2000	98.0	**11.5**	**15.5**	63.8	7.3

Figures are rounded so may not sum to independently rounded totals. Figures for 2000 are provisional.
Source: Fire Statistics United Kingdom, 2000 (DTLR, 2002).

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1 In June 2002 responsibility for fire, including statistics, was transferred from the former Department for Transport, Local Government and the Regions to the Office of the Deputy Prime Minister.

At around 11,500 each year the number of dwelling fires has remained reasonably constant over the five years, whereas arson fires in 'other buildings' has decreased from over 18,600 in 1996 to 15,500 in 2000.

It should not be inferred from these statistics that only road vehicle fires should be the subject of public policy. The impact of a single dwelling or school fire can be greater in terms of injury, distress and cost than a large number of vehicle fires. Although non-vehicle arsons have levelled off, the number per year is unacceptably high.

Not all communities suffer the same risk of becoming victims of arson. Nearly half of fires in England and Wales take place in the seven Metropolitan brigades, and there is a strong relationship between arson and other indications of social exclusion. The Arson Scoping Study found that the most socially deprived communities had a risk of an arson attack that was 31 times higher that that of the most affluent areas (Home Office, 1999).

Arson is also strongly linked to youth disorder. Brigades estimate that half of all property arsons, and around a third of vehicle fires, are committed by individuals 18 or under (Home Office, 2000). In 2000 of the 2,500 found guilty or cautioned from arson under the Criminal Damage Act about half were males under 18, a proportion that has remained constant since 1996 (Home Office, 2002).

The age and other socio-demographic characteristics of those who commit arson are explored more fully in the following chapter.

CHAPTER 2

Different forms of arson

The first stage in developing a coherent strategy for dealing with arson is to identify the various forms of arson and arsonists. It is recognised by psychologists that assigning individuals to one of a few 'types' is likely to be very crude and that any such classification process can only be approximate. However, in order to develop a strategy for dealing with arson some attempt must be made to identify the different forms it can take in order to facilitate the targeting of appropriate policies and interventions. It is important to develop a framework that will reduce ambiguities and provide a way of distinguishing between the acts of arson and that takes account of both the characteristics of the arsonist and of the property that is the target (Prins 1994).

This study adopts the four broad categories proposed in the Arson Scoping Study for the purposes of policy formulation and planning interventions; youth disorder, malicious, emotional expression[2] and criminal. This fourfold classification provides the most fruitful starting point for developing a strategy for dealing with arson, since each category can be related to the agency(ies) that have responsibility for dealing with these individuals (Home Office, 1999).

From the available literature it is possible to make broad estimates of different proportions of vehicle and property arsons attributed to each category.

Using seven of the most rigorous sources, table 2 estimates the proportion of property and vehicle arson attributed to each category. Because of potential bias within some of the studies these estimates should be treated as the best currently available until further research is carried out. (Annex A contains a short technical summary as to how the figures were derived.)

Table 2: Estimated Proportions of Each Type of Arson		
	Property	**Vehicle**
Youth Disorder	**36%**	**39%**
Malicious	**25%**	**3%**
Emotional Expression	**27%**	**13%**
Criminal	**13%**	**45%**
Total number in 2000[3]	**32,200**	**70.800**

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2 This a slight change from the Arson Scoping study, which termed this category 'psychological'. The change is terminology is to indicate the focus of the psychological problems this group has.

3 Source: Fire Statistics United Kingdom 2000.

The table draws attention to two clear processes. Firstly, the significance of youth disorder for both property and vehicle crime. Policies that address youth disorder directly are likely therefore to have a major impact on arson as a whole. Given the likelihood that many of these acts of arson are committed by individuals local to the fire, in a social context that may go some way to facilitate the action, leads to the perspective that community related strategies may be particularly effective.

The second process is the amount of criminal activity that now occurs around setting fire to vehicles. Given the very high proportion of arson that is vehicle related, this suggests that successful strategies to tackle the criminal arson of vehicles could have a very significant impact.

Malicious fires and those that are a product of emotional expression do seem to have a dominant focus on property. They are likely to be more diffuse in a community than vandalism and criminal arson, and will therefore require rather different strategies to tackle them.

The rest of this chapter discusses what is known from the literature about each category, in particular the characteristics in terms of age, gender and social background of offenders, based on the seven studies used to produce the table 2 estimates along with other sources.

YOUTH DISORDER

This report estimates youth disorder is responsible for 39% of vehicle arson and 36% of property arson.

Within this category lie two different types of firesetters. One involves young children playing with fire as a form of curiosity without malicious intent. The second involves youth people using fire as a form of vandalism. Although estimates are not available, it is likely that the latter category is responsible for significantly more malicious fires than the former, particularly in vehicles.

Children playing with fire

Those children who occasionally or accidentally start fires while unsupervised may be described as non-severe firesetters. Fire play grows out of curiosity or exploratory behaviour usually involving the child's own property. This category excludes fire setting that deliberately expresses anger and revenge.

In one of the few direct studies of fire play, Kafry (1990) investigated fire behaviour and knowledge in a sample of 99 young boys interviewed with their parent. In addition, the parents were asked to complete a questionnaire. Kafry found that 45% of the boys studied played with fire. Single incidents of fire play resulted in fires for 33% of the cases, while 81% of the repeater fire players caused fires.

Fineman (1991) states that the curiosity firesetter is typically a young boy aged between 5 and 10, reporting that 60% of fires set by children can be attributed to curiosity. Regular access to matches and lighters is also associated with fire play: Wood (1995) found that 89% of parents whose child played with fire smoked. Those who persist in setting fires are predominately males, exhibiting higher levels of behavioural and psychological dysfunction

and are often part of families which are in turmoil, experiencing disruption, conflict and disharmony. He suggests that such behaviour is rooted in the social background in which the child is raised.

Researchers in America are currently examining the link between juvenile firesetting and Attention Deficit/Hyperactivity Disorder (ADHD), a neurobiological disability characterised by attention skills that are developmentally inappropriate, impulsive, and in some cases, hyperactive. Low self esteem and other behavioural difficulties can accompany it. ADHD may not be a cause of firesetting, rather it inhibits the child's ability to learn about the dangers fire play presents (Porth, 2000).

Fire-play is dangerous and often results in severe fires. Wood (1995) states that in one brigade alone 13 deaths have been attributed to children playing with fires in the years 1990-95. Although this sub category may not amount to the criminal offence of arson it does indicate a severe problem that needs to be addressed by parents and other agencies.

Vandalism

Fire vandalism is an antisocial disruptive behaviour that is more likely to occur in areas of social deprivation, and is carried out by older adolescents. Wood (2000) found that 89% of detected fire-vandals were aged 6-15 years, the average age being 12 years. Nearly three-quarters of Wood's sample acted in partnership with other young people. The most likely targets are vehicles, uninhabited property, residential buildings, schools, factories and shops.

Swaffer (1993) defined this group as delinquent, typically anti-social, individuals for whom firesetting is not the only problem behaviour exhibited. The majority may already be known to various agencies for offending behaviours ranging from theft, breaking and entering, to truancy and malicious damage (Strachan, 1981). This type of firesetting activity is often committed by groups of young people where the choice of target is opportunistic. Criminological explanations for these acts of vandalism have shifted from psychological reasons such as aggression and frustration to more sociological reasons such as lack of employment, lack of stimulating schooling, and inadequate provisions for young people to express their developmental needs in legitimate ways (Home Office, 1988).

This type of arson is usually unplanned arising from opportunity, bravado and social peer pressure. Although individuals in this category are less likely than other types of arsonists to be psychologically disturbed, there is a risk that a firesetting vandal may progress towards serial arson, setting increasingly severe fires, indicating some fascination with fire itself. Such individuals would be considered within the Emotional Expression sub-group, but there is currently no empirical evidence to indicate prevalence of such a development in offence behaviour.

In areas of social deprivation fire setting may used as a deviant display in an attempt to push against the limits of tolerance within a community. As the number of arson attacks increase in one area there is the possibility that this sort of behaviour will become tolerated, accepted and normalised. This type of antisocial behaviour, if allowed to continue, will spread and affect other disadvantaged areas in close proximity. Individuals who commit this offence are often not aware of the consequences of fire itself. This is coupled with the knowledge that they are unlikely to be apprehended. These personal and social factors combine to make vandalism a major source of arson in this country.

MALICIOUS

It is often assumed that arson is a crime against property. However, it does share some of the characteristics of personal or violent crimes in often being an attack against a person or group of people. Put simply, fire is sometimes chosen as a weapon.

Estimates vary as to the proportion of property fires attributable to this category, from 5% in Marsh's study of Newcastle (2000) to figures of 36% and 50% from studies of psychiatric populations. The weighted average across all studies considered is 25%. This is in comparison to only 3% of vehicle arsons.

Most studies cite revenge, against a particular individual, an institution, or society as a whole as the key factor. Typical targets may be ex-partners or ex-employers, thus emphasising some degree of inter-personal or professional conflict with the offender, with most offences showing signs of planning. Malicious arson is particularly serious when the fire blocks escape routes from buildings (Prins, 1994; Canter and Fritzon, 1998).

Malicious arsonists tend to be older - Wood found an average age of 26 in his study, and is also the type of arson most likely to be committed by women (15% of Wood's sample). Other studies have showed revenge as a key motivation for women committing arson, although these studies have been biased towards psychiatric populations (Bourget and Bradford, 1989; Stewart, 1993). Rix (1994) also showed revenge is a common factor with psychiatric arsonists, indicating some cross-over with the 'emotional expression' category discussed below.

For most arsonists in this category the main targets are residential property. Malicious arsonists who seek revenge from society may choose targets with no obvious plan; others will retaliate against specific institutions such as churches, schools, public buildings or particular businesses.

Within this category are the terrorist or social protest firesetter, civil unrest and hate-crime incidents (e.g. racist attacks on minority ethnic households; attacks on places of worship).

EMOTIONAL EXPRESSION

Jackson, Glass and Hope (1987) identified certain individuals who lack the ability directly to communicate their frustration, pain or feelings of hostility. These individuals may use arson as a means of communication, to express a desire, wish, or need for change. This includes cry for help or attention-seeking arson, would-be hero arson and attempted suicide. As Geller (1992) argues, arson is a good medium of expression for certain individuals because it is overtly confrontational and requires no verbal exchange or direct communication of any kind.

The proportions attributed of property arson attributed to this factor vary from 10% to 44%, with higher proportions reported from research carried out in psychiatric populations and, interestingly, the prison population. The weighted average of the studies considered in this research is 27%. For vehicle arson, the figure is 13%.

Arsonists in this category are most likely to require some form of formal psychiatric or psychological assessment. The diagnosis formerly used within the scientific literature to describe many of these firesetters was 'pyromania', defined by the American Psychiatric Association as *'Repeated deliberate and purposeful firesetting associated with tension or affective arousal before the act, followed by intense pleasure or relief when setting the fires or witnessing/participating in the aftermath'* (APA, 1994). Today this diagnosis is very rare for arsonists within the emotional expression category. They are more likely to be diagnosed by mental health practitioners as suffering from an antisocial personality disorder, schizophrenia or organic psychosis (Barnett & Spitzer 1994). The term 'excitement motivated' arsonists has also been used within the literature.

Douglas et al in their 1997 study of incarcerated offenders in the US identified arsonists who were seeking thrills or attention or wanted recognition, or may in a minority of cases, gained sexual satisfaction from fire setting. Residential properties and public buildings are common targets. The individual may select a target that offers a good vantage point from which to safely observe the fire and the fire brigade. Serial offending is common with this type of offender and they are likely to have pre- convictions for arson and a history of police contact for nuisance offences.

Some individuals may set fires to enhance themselves in the eyes of employers by pretending to discover and deal with the fire they actually started, to show willingness and loyalty. Arsonists who commit this type of arson may be male security guards, inexperienced police officers or retained fire fighters between 25 and 35 years old (Wood 1999). A well-known example is the case of Fleur Lombard, the first female fire fighter to die on peacetime duty, in a Bristol supermarket fire in 1996. A security guard was later jailed for manslaughter and arson. In the US this type of arson is a particular problem, given the number of volunteer fire-fighters (Huff, 1994).

A recent study at Rampton high security hospital identified a group of 'chaotic arsonists' who use fire as a means of coping with negative feelings such as sadness, loneliness, anger and rage associated with their abusive family backgrounds. Individuals in this group habitually use arson as a method of handling difficulties and problems. They have often been in care before the age of sixteen and have extensive social services involvement. With no specific trigger, fires are used as a way of communicating a general discontent with society (Haggett, 2001).

For some individuals arson becomes another form of self-harm. Many have engaged in numerous episodes of self-injury and attention seeking behaviours such as wasting police time or making hoax calls, (Stewart 1993). Although these individuals do not generally set fires as a deliberate attempt to kill, their impulsiveness often leads to endangerment of lives.

CRIMINAL

This category involves two forms of arson; that used to cover up evidence of another crime and that for financial gain. The proportion of deliberate property fires attributed to this category is 13%, the weighted average of estimates that ranged from 4% to 17%. For vehicle arson the estimated proportion is much higher, 45%, indicating that individuals are targeting vehicles more frequently to either cover up other criminal activity or to make fraudulent insurance claims.

Some of these malicious vehicle fires, particularly in abandoned vehicles, may be more appropriate within the youth disorder category discussed above rather than be seen as criminal as defined in this section. In February 2002 the Arson Control Forum commissioned research that will explore more fully the link between the increase in abandoned vehicles and vehicle theft/joyriding.

Cover up another crime

These offenders are not interested in the fire itself. It is only used to destroy potential incriminating evidence. The target is therefore dependent on the nature of the concealment; it may be a business, a residence or a vehicle. In murder concealment, arson is used to destroy forensic evidence, and/or conceal the victim's identity.

In Wood's (1999) study slightly less than two-thirds of criminal offenders were aged between 17-22 years, therefore identifying older adolescents as the main perpetrators of crime concealment arson. Often multiple offenders are involved. His analysis found that 94% of cases involved theft and 100% involved forcible entry. Cars were found to be the primary target followed by residential property.

In most cases of crime concealment arson cars are involved, either through 'joy riding' or used for other crimes. The individuals concerned are likely to be young adult males who live within the surrounding area and are likely to have a history of contact with the police. Alcohol and recreational drug use is also common with this type of offender (Douglas et al 1997).

Financial gain

Arson for financial gain is a relatively under-re searched area. Wood (1999) identified four types of individuals who commit arson for financial gain:

- Semi-professional or professional paid offenders

- Paid individuals with little or no fire experience

- Economically restricted business or property owners

- Individuals covering inventory losses.

Fires of this sort are often more sophisticated in planning and execution than other types of arson, often with a 'professional arsonist' instigating the fire. As the complete destruction of the target is intended there may be evidence of excessive use of accelerants and multiple seats of fire. Items of value are often removed, especially if a residence is the target. While it may be clear that the owner of a property stands to gain from the consequences of a fire it can be very hard to prove direct involvement due to the possible involvement of a third party.

Research conducted in Britain identified 71 cases of actual or suspected arson in businesses over the period 1990-1995, with an overall value of £38.5m. Clarke (1996) carried out interviews with loss adjusters and showed that fraudulent arson in Britain does not show a pattern of significant involvement by organised crime. Regionally there was an increase of cases in the London area. All the businesses considered were small or medium sized - whether this was due to larger companies expertly undertaking arson frauds and thus going undetected is not clear. There were a number of identifiable financial motives however the financial records of the business may not necessarily reveal such a motive — it may be a case of simple financial gain rather than financial distress.

Very little is known about the scale of fraudulent arson, as no one knows the number of fires wrongly attributed to accidents, or where arson was identified but the owner not suspected.

The rise in malicious vehicle fires since 1998

As discussed in the previous chapter, the recent rise in malicious fires nationally has been due to the rise in malicious vehicle fires. Research commissioned by the Home Office in the Knowsley area of Liverpool has demonstrated a link between the number of cars burnt out in the area and the price of scrap metal. As shown in Figure 1, as the price of scrap metal severely decreased, from around £40 per tonne in 1998 to £2 in 2000, the number of cars found burnt out dramatically increased. Alongisde this fall in the value of scrap metal, the cost of disposing of old vehicles has also risen as a result of changes in environmental legislation, particularly The Waste Disposal Act. It is expected that the problem will be further exacerbated by the forthcoming implementation of the End of Life Vehicles Directive.

Figure 1: The relationship between the price of scrap metal and the number of burnt out vehicles, Knowsley, Merseyside 1995-2000
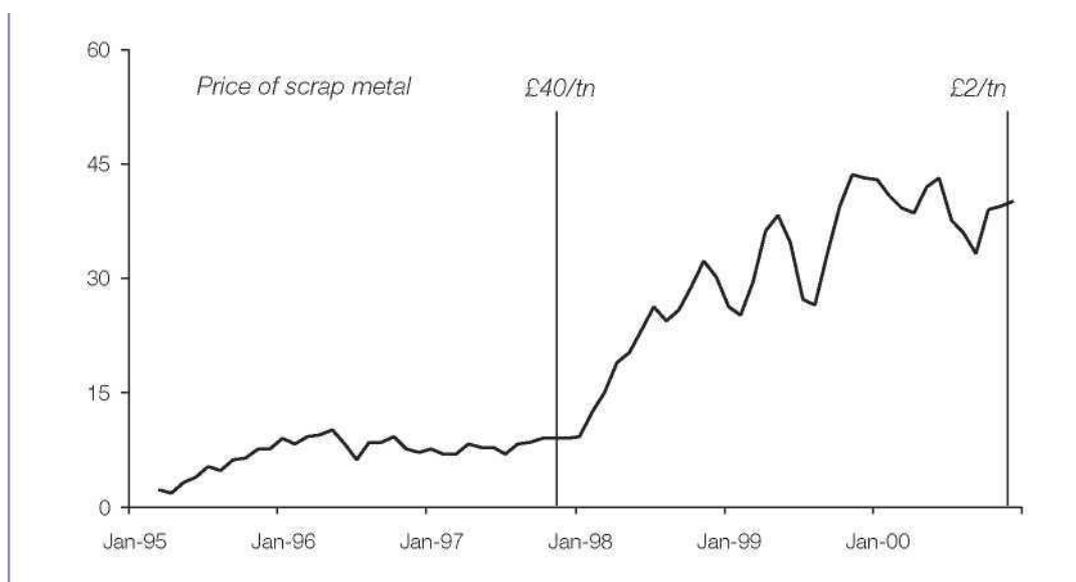
Graph presented by Pease & Townsley at Environmental criminology and crime analysis seminar June 2001 held in Liverpool

The researchers point to three reasons why cars are burnt out in Knowsley:

• by 'joyriders';

• in order to claim fraudulently on the insurance;

• by vandals targeting abandoned vehicles.

The authors argue that before 1998 the majority of burnt out vehicles were the result of joyriders setting fire to stolen vehicles. They argue that the increase in the number of burnt out vehicles from January 1998 is due to increases in the number of individuals abandoning their vehicles, leading to increased arson attacks by vandals; and also an increase in the number of individuals setting fire to their own vehicle in order to claim insurance (Pease and Townsley, 2001).

This relationship between scrap metal prices and vehicle fires is likely to be a national phenomena, although the precise interplay between insurance fraud, joyriding, other criminal activity, vehicle abandonment and vandalism may be different in other areas.

SUMMARY OF ARSON CLASSIFICATION

It must be emphasised that many acts of arson will draw from a mix of these different categories, but just as most colours are a mix of their primary elements, it is useful to identify the primary forms of arson in order to guide policy making. Broadly, the sorts of people who commit the different forms of arson can be distinguished from each other and their targets will be different so that the agencies that can contribute to the reducing each form of arson can be distinguished.

CHAPTER 3

Strategies for arson

Arson can be dealt with both by interventions with people who intend to or do commit arson and it can be dealt with by protecting, or 'hardening', the potential target of arson. This distinction between the person who causes the arson and the target that suffers it has wide ranging policy implications because, in general, different agencies are concerned when dealing with the arsonists as opposed to those when dealing with the targets. Any strategies for dealing with arson to be effective they must incorporate both aspects of arson, perpetrators and targets, into a coherent framework on which interventions may be built.

For these different agencies to be able to co-ordinate their efforts it is of value that they agree on the various ways in which they can reduce arson and to map out the areas on which each agency should take a lead role and on which their should be careful collaboration.

Interventions involving the arsonist

This section surveys the current evidence regarding the effectiveness of intervention involving arsonists. What is noticeable is that very few approaches are systematically monitored or evaluated. This knowledge gap is discussed in more detail in Chapter four.

YOUTH DISORDER

Over recent years fire brigades have been increasing their efforts and directing extra resources to reduce fire-setting by juveniles. Currently more than three quarters of UK fire brigades are running some form of fire-setting intervention/education programmes to address the significant problem of juveniles setting deliberate fires. These programmes are provided in many forms and with varying degrees of complexity. The principles on which they are based are not always clear, nor are they always established on overt, validated principles. It is also rare for these programmes to have any systematic evaluation.

At present schemes in the UK fall into four categories:

1. Those that follow the Merseyside Fire Brigade, Fire Awareness Child Education (FACE) - used by around 16% of fire brigades that focus on education.

2. Schemes advocated by the Psychologist Andrew Muckley - used by around one third of fire brigades. These focus on counselling.

3. In-house schemes developed internally within a brigade. Key elements of the scheme vary between each brigade.

4. Combination schemes. Elements of FACE programme and Muckley scheme with some in-house adaptations. The mix varies from scheme to scheme.

Fire Awareness Child Education

FACE was established in 1988 to educate children aged 4-12 years who play with fire, involving the family unit. It aims to change a child's attitude towards fire. Preliminary advice is given to the parent or carer by phone on fire safety precautions. A 'fire friend' carries out a home visit and talks with the child about the frightening power of fire. The child is then given projects to complete which have been designed to promote awareness of fire safety.

This scheme stresses the importance of developing a multi-agency approach. Therefore built into the FACE programme is a network system, which consists of other professional bodies. If children persist in their fire-setting behaviour they may be referred to more appropriate agencies such as social services or mental health services. The fire brigades themselves do not tackle the problem on their own, but provide an education programme in conjunction with other organisations (Broadhurst1999).

Muckley's Training Courses

The education psychologist, Andrew Muckley, designed a resource and training manual in 1997 for fire brigades wanting to set up fire-setter programmes. Training courses are provided for staff involved in the scheme, to be used in conjunction with the manual. The scheme encourages the brigades to determine the type of fire-setter being referred before deciding which intervention response should occur. The manual provides a descriptive typology of fire-setters including behavioural characteristics, behavioural problems as well as which intervention response is most appropriate for each of the different types of fire-setter. Intervention varies therefore on the classification of the child.

Kent and Medway fire brigade have had a designated fire-setters team since April 1999. This follows some of Muckley's principles in a *Fire-setters Resource Ladder,* which combines the type of referral with the type of intervention deemed appropriate.

Youth Justice Programmes

Following the introduction of the Crime and Disorder Act 1998, agencies are required to ensure that appropriate youth justice services are available for children and young people aged 10-17 years who offend or are accused of offending.

Sunderland Youth Offending Service have established have established a multi-stranded strategy that aims reduce offending by young people with a history of fire-setting. The project include a work experience week with the Arson Task Force and the Fire Brigade, a juvenile firesetters intervention scheme, and co-operation with the young fire-fighters association.

The project encourages young people to think about the consequences of their actions for themselves and for others, and includes an element of reparation to the community as participants take part in a 'clean up day' of the local area. In the year up to September 2001, 97 young people, average age 15 years, had been referred to the project. Education and welfare services are the biggest signal source of referral - the project is specially designed for young people at risk of criminality. Only 8% of the young people were regular attendees at mainstream schools. Given this, it is encouraging that over 70% of participants successfully completed the project, although evidence in terms of long term impacts on offending behaviour is not currently available (Hermanns et al, 2001).

The FACE UP Arson Programme for Young Offenders was established in 1991 by Merseyside fire service and Liverpool's youth justice department, when it was realised that there were no community alternatives to offer the courts in cases involving arson by juveniles. The course aims to confront, challenge and change the offender's misguided negative attitudes that are seen to underlie the acts of arson. The programme is intensive and is designed as an alternative to custody for juveniles aged 10-17 years. Participants are expected to attend two-hour sessions each week for 13 weeks as well as completing home study exercises. None compliance could end in custodial sentence (Broadhurst 1999).

The development of all these schemes has proceeded without any central guidance: the choice of scheme to be applied by a brigade is therefore inevitably based on limited information, decisions tending to reflect experiences of the fire officers involved. The Arson Control Forum in collaboration with the National Community Fire Safety Centre (NCFSC) has now developed a module of the NCFSC Toolbox that provides detailed guidance for fire brigades on all issues relating to juvenile fire-setter intervention. The module provides information on the models currently being used by the fire service, giving examples of good practice. It stresses the importance of close liaison and partnership working with other agencies. The module will also assist brigades to develop criteria for staff selection and training and identify the relevant child protection issues. It also gives information about data collection and evaluation methodologies. The module became available to fire brigades in 2002.

As these programmes are working with potentially vulnerable juveniles it is vital that selection, screening and training of the staff involved be rigorous. Follow up data on the juveniles should also be maintained in order to evaluate the relative success of these schemes. Although many brigades claim very high levels of success there is at present very little empirical evidence to support these claims.

MALICIOUS

There are few specific programmes for malicious arsonists. An adaptation of the Liverpool Fire Brigade 'FACE UP' began in HM Prison Liverpool in 1998, the first of its kind within the prison system, to reduce the risk of fire within the prison. The format is similar to the programme for young offenders but uses stronger, more adult material. By monitoring re-offences over the next few years it may be possible to evaluate the programme.

The prison also include fire safety training as part of its voluntary pre-release course, to help prevent further arson incidents within the community. A fire safety module is also included in the prison's drug support and resettlement programme, which aims to improve educational and social skills of offenders (Broadhurst, 1999). All three programmes include non-arsonists as well as those arsonists who would be included in the youth disorder or even the emotional expression categories.

Again in Liverpool, in 2000 Merseyside Fire Brigade and Merseyside police created an innovative partnership (Operation Lomond[4]) after problems with a suspected serial arsonist. Twelve fire incidents were linked to one individual but due to a lack of tangible evidence a prosecution was not practical. Instead, a multi-agency approach was adopted and a meeting convened involving social services, probation services and housing associations. The background of the individual was discussed and the catalyst for his

4 Details on Operation Lomond obtained from conversations with Merseyside Fire Brigade.

offending behaviour was established. A problem-solving approach was adopted and all agencies offered practical solutions. At the time of writing no more malicious incidents of fire have occurred within the individual's immediate vicinity. Those involved in Operation Lomond see it as an exemplary piece of inter-agency collaboration which offers a blueprint for dealing with known or suspected arsonists from the other categories considered in this report.

Notwithstanding the above examples, there are no evaluated treatment programmes that are specifically for malicious arsonists - depending on the age and circumstances of the arsonist they may be the subject of the juvenile programmes or psychiatric programme discussed elsewhere in this section. Indeed, the fact that many malicious arsonists are choosing to use arson as a weapon of retaliation indicates that they may lack normal coping skills. The psychological literature suggests a number of theoretical models that could form the basis of interventions, notably Jackson, Glass and Hope's (1987) Social Integration Model which may be drawn upon to enable individuals to develop more appropriate and successful methods of controlling and influencing their environment.

Stewart (1993) recommends the use of the Relapse Prevention model. This enables individuals to comprehend their offence cycle, developing an understanding of the emotional, cognitive and situational antecedents to their offence. Treatment can then target coping behaviour, such as avoidance of high-risk situations, relaxation, assertiveness and cognitive restructuring.

EMOTIONAL EXPRESSION

Very little has been written about the treatment of fire-setting that emerges out of serious emotional difficulties. The models of treatment for this form of arson are limited and rare. In part this is probably because the more severe offenders in this category are potentially so disruptive, and therefore need high staffing levels in special therapeutic accommodation. This makes treatment very expensive. It is therefore important that any treatment are thoroughly evaluated and where good practice is revealed it is widely publicised. A number of specific research and development needs can be identified:

• Psychometric measures of behaviours related to fire-setting need to be improved.

• Group and individual methods of treatment need to be devised and evaluated in relation to the problems of different sub-groups.

• The nature of the appropriate accommodation for treatment programmes and its location in general hospitals and secure hospitals should be explored and the details published.

• The form of specialist help made available for the treatment of arsonists released into the community needs to be identified.

Two schemes[5] that have been reported that go some way towards meeting these needs, the Northgate Hospital Fire-Setters Programme and the Rampton Hospital Treatment programme for adult pathological fire-setters.

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5 The descriptions of the programmes are based on correspondence with the individual hospitals.

Both are derived from Jackson, Glass and Hope's 1987 social integration model, which views arson as a short-term approach to problem solving allowing the individual to attain control over their environment, which they deem unobtainable by more conventional means. The Rampton programme, which deals with more serious offenders within a high security environment, is also influenced by Fineman's 1995 model of fire-setting. The Rampton scheme has a greater emphasis on relapse prevention strategies, giving offenders the facility to recognise the risk factors related to their own offending behaviour.

Although neither scheme has been fully evaluated, patients on both are assessed by a wide range of clinical and non-clinical measures such as family circumstances, psychiatric and offence history as well as each individual's current status. Over time these information will form a valuable data source that can be compared with any subsequent treatment gains.

These two programmes are the exception. The absence of such suitable treatment and accommodation for this type of arsonist has meant they might often be placed in restrictive custody which offers these individuals little opportunity for personal development, resulting in an increased risk of recidivism when released.

CRIMINAL

Previous sections have concentrated on intervening with the arsonists when convicted, whether through Fire Brigade programmes (e.g. Muckley, FACE et al), youth justice programmes or, in minority of cases, psychiatric services. With arsons committed for financial gain or to conceal other crimes, the more immediate concern for the fire brigade and the police is to improve detection and conviction rates.

As discussed in Chapter One, arson has a low detection rate - 8% in 2001/2 (Home Office, 2002) compared with 24% for all indictable offences. Where fires are committed for criminal purposes, arson as defined by the criminal damage act may not be the principal offence. It is highly likely that because so much insurance fraud is undetected the true extent of this crime may be far greater than any official sources currently indicate.

Although the Fire Service does not have a statutory duty to investigate fires, a number of brigades, principally in metropolitan areas, do have dedicated Fire Investigation teams.

The report of the Arson Scoping Study (Home Office, 1999) recommended improved training for fire investigators. Under the umbrella of the Arson Control Forum, working in conjunction with organisations such as the Institution of Fire Engineers (IFE), a number of initiatives are being put in place from 2001/2 onwards to improve fire investigation. IFE are modernising their syllabus for Fire Investigation work, and our also increasing the provision of equipment for use by fire investigators. Other developments include the increased use of hydrocarbon detector dogs to detect the use of accelerants at fire scenes. In 2002 eleven brigades in England and Wales had dog teams, which are often made available for use by neighbouring brigades (Williamson, 2002).

Alongisde these improvement in training and resources, new protocols and procedures are being devised by the Forum's Intervention sub-group to improve the fire investigation process. For each fire incident a Fire Service investigator will carry out a screening investigation to determine whether a fire is suspicious. With more serious fires a multi-agency approach will be required, involving all the relevant agencies including police, forensic science and insurance investigators (Foster, 2002). The overall effect should be to bring a more co-ordinated approach to fire investigation, to remove any confusion over where responsibilities lay between different stakeholders.

The impact of these new initiatives is being evaluated by the Arson Control Forum.

Interventions involving the target of arson

This chapter considers the steps that can be taken to reduce the risk of malicious fires to specific targets.

Although many of the initiatives are similar to those for targets at risk from other anti-social behaviour, such as criminal damage or burglary, there are some factors specific to arson. In particular, as has been discussed in previous sections, the rise in vehicle fires is related to the deliberate abandonment of those vehicles. In such cases the appropriate approach may not be to concentrate solely on reducing the risk of vehicles being stolen, but to also encourage compliance on the part of owners regarding vehicle end of life disposal.

The Arson Control Forum has a co-ordinating role in ensuring the following actions take place.

CENTRAL GOVERNMENT

Alongside the co-ordinating role in supporting central and local government strategies, central government can reduce the risk to arson targets via legislation.

With regard to the risks posed by abandoned vehicles, in April 2002 new measures were announced to reduce the time taken to remove derelict and abandoned vehicles, following the government consultation paper issued in October 2001. The measures include:

- Powers to remove vehicles abandoned on the street anywhere in England after 24 hours, instead of the seven days previous in force.

- Increased opportunities to work with DVLA to remove unlicensed cars.

- Powers to dispose more quickly of unlicensed vehicles removed under DVLA powers, after seven days rather than 35. (DEFRA, 2002).

Fire safety in places of employment is governed by the Fire Precautions (Workplace) Regulations, 1997 which came into force on the 1st December 1997. The regulations are based upon self-compliance, with emphasis being placed on the employer's own assessment of risk, with the fire authority is the enforcing authority. These Regulations apply to all employers and place a duty upon them to assess the risks of fire and the effect it would have on staff. Although such regulations primarily cover accidental fires, they can also reduce risk of malicious fires.

The effect of this legislation and changes to the building regulations are not clear. Legislation can improve the way buildings are built and protected, but without a thorough examination of the conditions under which the Regulations are operated and their consequences in daily practice it is difficult to be certain of their impact.

LOCAL EDUCATION AUTHORITIES

Schools

Schools have one of the highest risks of arson of any type of property in the UK. Surveys reveal that nearly one in eight schools experience arson or suspected arson during the year. (Burrows et al 1996). Because of the strong relationship between arson and other anti-social behaviours, if schools are experiencing other criminal damage or burglary they should think seriously about their precautions against arson. Vulnerable schools are likely to be readily identifiable in part from the demographics of the areas in which they are sited.

Recognising these vulnerabilities, some Local Education Authorities, especially those in high-risk areas, have tried to develop special school designs to prevent arson. One difficulty, though, is balancing this target hardening approach with educational objectives. The design of schools need to enshrine educational purposes, taking into account such objectives as openness and community involvement (Burrows et al 1996).

When focusing on the targets of arson, the Arson Prevention Bureau (1998) has offered some general principles to reduce the risks. These have been articulated mainly in relation to schools but have a general relevance to many other non-residential buildings, especially those in which there is not a 24-hour occupancy. The report contains evidence under the following headings: *Deter unauthorised entry onto the site; Prevent unauthorised entry into the building; Reduce the opportunity for an offender to start a fire; Reduce the scope for potential fire damage; Reduce subsequent losses and disruption resulting from a fire.*

Given the apparent involvement of pupils and local youths in school arson attacks, many attacks being an extension of vandalism and general anti-social behaviour, training and preventative education in schools about the risk of fire ought to be given high priority. This my also help to alleviate other local arson problems.

LOCAL AUTHORITIES IN CONJUNCTION WITH OTHER ORGANISATIONS (E.G. ARSON TASK FORCES)

Since the 1980s the concept of 'zero tolerance' has been gaining increasing acceptance within crime prevention. The approach is based on the premise that in failing to tackle seemingly minor acts of vandalism and disorder such as graffiti, anti-social behaviour is seen as being tolerated, which leads to further more serious crimes such as burglary and arson. Zero tolerance seeks to prevent the more disorder from occurring by focussing on the minor disorder as soon as it occurs (Wilson and Kelling, 1982).

Several protocols that acknowledge this process, at least implicitly, have been established between local authorities, the fire service and the police that, as earlier indications suggest, can have a significant impact on arson reduction. These include:

- Removal of refuse.

- Securing of void properties.

- Rapid recovery of abandoned vehicles.

In some local authority areas a successful approach has been to form specific teams - often known as Arson Task Forces (ATFs) - that though usually fire brigade led include specialists from police and local authorities. The first successful model in the UK was formed in October 1997 in the West End of Newcastle, an area with a high incidence of arson. The scheme was based on an approach initiated in Lawrence, Massachusetts, a city with similar social problems (Marsh, 2000). Using agreed protocols the task force successfully reduced incidence of malicious fires by removing opportunities, particularly by focussing on void properties.

Under Arson Control Forum funding, similar schemes have been launched in a number of areas from 2001/02 onwards, including Luton and Bedfordshire, London and Mid and West Wales (Arson Control Forum, 2002).

Some brigades, rather than form ATFs, have concentrated on specific types of arson, most notably by setting up vehicle removal schemes, including Operation Cubit in Kent, which utilises DVLA powers, and the Bristol Car Clear scheme, which involves the active participation of the police and local authorities. Such schemes used the powers available at the time to remove vehicles within 24 hours/7 days, depending on the condition of the vehicle. Initial results are positive, with evidence of reduced incidents of car fires in regions where the schemes have operated[6]. A key question for such schemes is whether this reduction in the incidence of car fires can be sustained over a period of time.

The decision whether to form an arson task force or to concentrate on a specific arson target will require a thorough assessment by the brigade and other stakeholders as to the specific problems within a given area (other schemes launched with ACF funding include projects focussing on school and arson fires). The Crime and Disorder Act 1998 places a responsibility on local authorities working with other local agencies to develop and implement strategies to tackle anti-social disorder. This provides an umbrella under which arson reduction activities can be organised. In many local authorities, the three-year action plans published in 2002 have contained explicit targets to reduce arson which agencies must work together to meet (Sugg, 2002).

BUILDING DESIGN

Architects have the earliest contribution to make, by incorporating measures at the design stage of new buildings or in renewal of existing ones, which in themselves can play a vital part in eliminating the opportunities for arson.

Secured by design is a UK police initiative supporting the principles of designing out crime. It covers a family of national police projects involving the design for new homes, refurbished homes, commercial premises and car parks. It is primarily an initiative to encourage the building industry to adopt crime prevention measures to assist in reducing the opportunity for crime, creating a safer and more secure environment. Supported and managed by the Association of Chief Police Officers (ACPO), it has the backing of the Home Office.

6 Based on unpublished data supplied by Avon Fire Brigade.

Secured by design does not guarantee that a particular area will be crime proof. But it indicates that the site has been subject to a crime aware design process and improved level of security. In the experience of the police service and other agencies this has been shown to significantly reduce the risk of crime, including arson.

INDIVIDUAL CITIZENS

There are steps the individual citizen can take to reduce the risk of becoming a victim of arson, either as an owner of a business, an occupier of a dweller or an owner of a vehicle. A number of bodies, most notable the Arson Prevention Bureau, have issued guidance on how the risk and impact of an arson attack can be reduced covering a number of topic areas (e.g. *'Prevention and control of arson in industrial commercial premises', 2000; Car fires: the growing problem and how to help extinguish it,* 1998). The advice centres around ensuring buildings and vehicles are securely locked and well lit, with CCTV for business premises if possible. Sprinklers are recommended in buildings to minimise the impact of an arson attack.

CHAPTER 4

Future research and development

This report has produced estimates for the proportion of arson incidents attributable to certain categories of arson, and in doing so has shed light on a number of processes, in particular the significance of youth disorder and the connection between vehicle fires and other criminal activity. This was followed by a review of the steps the relevant agencies can take by intervening with arsonists and/or their targets.

In both areas - the prevalence of different types of arson and treatments & interventions - this study has highlighted significant gaps in current knowledge where further research and development is needed. These gaps are discussed in this final chapter.

Determining the Nature and Extent of Fire-Setting

Although estimates have been given in this review of the proportions of various forms of arson, against a backdrop of overall arson levels across the country, it is clear that all these estimates are very approximate. The police clear-up rate for arson is put at 8% which means that some definitive account of who committed the arson, under what circumstances, and why, must remain speculative in 92% of cases. But even these figures are problematic and likely to be over-optimistic because of the variations between police recording of arson and fire service recording of deliberately set fires. Only 50% of arson attacks attended by fire service are recorded as crimes by the police. Furthermore, there are likely to be large regional variations in both the extent and forms of arson that are not apparent in National Statistics. Yet clear figures on the extent and varieties of arson are fundamental to any policy development and the evaluation of any initiatives that are taken.

In particular the arson associated with criminal activity is likely to be severely underestimated because of the difficulties of obtaining strong enough evidence to gain a conviction. It is therefore appropriate in all future studies to pay particular attention to obtaining estimates in a variety of different ways of undetected arson or arson committed for directly criminal purposes.

A Co-ordinated Central Database

Improvements in the way figures are collected and closer co-ordination between the police, fire service and insurers would greatly help to identify the actual scale of the problem. Ideally this would produce a centralised, national database of suspected deliberate fire-setting to which all parties would have access. It would need very careful maintenance and so would have costs beyond that of data handling, but its existence alone could reduce the incidence of arson by a variety of means.

This would be a national co-ordination of data on both offenders and incidents. The content and structure of the database should allow information to be retrieved quickly. Therefore when any juvenile or adult is referred to one of the agencies an immediate search can be made in order to determine whether this individual has previously

committed an arson offence. Until there is a centrally co-ordinated system it will be impossible to assess the true levels of recidivism. This system would allow the identification of individuals who have a history of fire-setting allowing these people to have continuing supervision with help being provided were necessary.

Intensive Focused Studies of Clearly Defined Samples

However, it seems unlikely that these 'hands-off, official recording procedures will ever give a fully detailed account of the nature and variety of the problems of arson. A close examination of all incidents in carefully identified areas is likely to prove particularly productive. This might include, for example, visit by a dedicated, multi-disciplinary team to every event reported by the police or fire service as possibly a deliberate fire-setting. The team would attempt to contact the fire-setter and build up a picture of the circumstances in which the fire had occurred.

The importance of such an intensive study is because current figures are fraught with problems. They are particularly biased in relation to the study of fire-setters. This is because the fire-setters studied tend to be those directly available as literally a captive sample in institutions. Even within these institutional studies, research has tended to focus on children who are resident in care homes or those who have been referred for other mental health problems. A further consequence of this is that the research has tended to small samples, making generalisation difficult.

The clinical orientation of many of these studies has led to the search for variables that can be considered a predictive cause of fire-setting rather than understand normal fireplay in children. So although there a some indications that an interest in fire is normal and universal at about four years of age little research has investigated this normal fascination with fire by children and how it can be channelled harmlessly.

Study of Fraudulent Arson

Arson for profit and related commercial and fraudulent arson is very poorly studied indeed and has a very low clear-up rate. Research is needed to examine the extent and nature of this form of arson. This would require collaboration between the insurance industry, the police and fire service. The research itself could open the way to effective co-operation between these different institutions.

Cross-Institutional Studies of Known Arsonists and Treatment Programmes

Virtually all reports to date review one sub-sample of arsonists in one context and one treatment programme. For results to be of wider value these studies should make comparisons across different sub-groups, using standard instruments so that the comparisons will be meaningful and generalisable. Such comparative research could include the following considerations:

- The most effective risk factors or predictive factors to be utilised, enabling young people who could be considered to be potential arsonists to be identified.

- Review of the facilities provided across local health authorities for the assessment and treatment of arsonists.

- Comparison of arsonists in hospitals and other institutions such as prisons and day care facilities. Such studies could consider the effects of closing large mental health institutions and the problems arising from community care.

- Central to many of these studies should be a direct, systematic examination of the reasons why an individual chose fire as their weapon of choice.

Evaluation of Interventions

The various treatment programmes and other forms of intervention are currently not evaluated in any consistent, and often not in an objective, way. The development of standardised processes of evaluation could greatly improve the impact of any interventions. This would take a number of forms:

- Evaluation of the effectiveness of reducing fire-setting behaviour through work with arsonists and potential arsonists.

- Determination of the skills and training needs as well as the professional controls necessary for people carrying out interventions with arsonist and potential malicious fire-setters.

- Development of intervention programmes for groups not currently catered for, notably within many prisons.

- Evaluation of the effectiveness of procedures for dealing with the targets of arson.

- A central database containing information about current arson reduction initiatives and the assessments of their effectiveness.

- Comparisons and evaluations across the country of fire safety educational awareness programmes, possibly leading to devising and implementing and evaluating a nationally run programme.

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ANNEX A

Technical note: derivation of property and vehicle estimates discussed in Chapter 2

Proportions of the Different Forms of Arson

PROPERTY ARSON

No national figures exist that allow an estimate of the number of each different form of arson. However, a number of different studies do provide details of the numbers of each form of arson in the samples they studied. Some estimate can therefore be made from these studies of the *proportion* of each form of arson in each sample. By making some allowances for the obvious biases in the samples it is therefore possible to provide an overall estimate of the proportion of arsons nationally that can be assigned to each of the four major forms that have been discussed above. Table 4 summarises the proportions from those studies that allow a reasonable estimate to be drawn.

Table 4: Proportions of Arsonists in each of the four main subgroups indicated in seven different samples				
Study	**Youth disorder & nuisance**	**Malicious**	**Emotional expression**	**Criminal**
Day 2001	Vandalism 10%	Anger/revenge 50%	Attention seeking 15% Excitement 10%	Concurrent with other offence 15%
Fritzon 1998	Damage 26.5%	Destroy 20%	Despair 18.5% Display 10%	
Fritzon 2001	Damage 27%	Destroy 26%	Despair 38% Display 6%	
Kidd 1998		Revenge 24% Terrorist 2%	Mental problems 20% Heroism 1% Excitement 5%	Conceal crime 7% Financial gain 6%
Marsh 2000	Vandalism 73% Fireplay 8%	Revenge 3% Racial 2%	Excitement 7% Mental illness 3%	Conceal crime 2% Profit 2%
Rix1994	Vandalism 9%	Revenge 31% Manipulative 4% Political 1%	Excitement 11% Cry for help 7% Suicide 7% Psychotic 5% Heroism 4% Antidepressant 2%	Re-housing 7% Financial 5% Cover up 5% Proxy 2%
Wood 2000	Vandalism 56%	Revenge 23%	Excitement 7% Mental illness 8% Despondency 5%	Conceal crime 13% Profit 2%

VEHICLE ARSON

Estimates for the proportion of vehicle arson's attributable to each category are based on Marsh's 2000 study in Newcastle. The figures should therefore be treated with some caution until more evidence becomes available.