ALCOHOL IN TRANSPORT: ISSUES AND INTERVENTIONS

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Contents

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1. Introduction

Whilst the majority of the population in England consume alcohol within the Government's recommended limits (or not at all), an estimated 6.6 million people (20.1%) drink at hazardous levels and a further 1.55 million (5%) drink at harmful levels (NWPHO 2008).[1] These higher levels of consumption are linked with a wide range of related harms including assaults (Anderson and Hungerford 2007; Hughes et al. 2007), anti-social behaviour (Harrington 2000), arguments (Morleo et al. 2008a), and accidents and injuries (Jones et al. 2008). More long-term negative consequences may also be attributable to excessive alcohol consumption including cancer, heart disease and liver cirrhosis (Jones et al. 2008). Such harms can have a devastating effect on the individual, family, community and society in general. In fact, alcohol misuse is estimated to cost the United Kingdom (UK) economy £20 billion per annum, including costs to the health service, criminal justice system and the economy (Strategy Unit 2003).

Levels of alcohol consumption may be particularly high in specific settings such as nightlife venues (Hughes et al. 2008; Measham and Brain 2005), at sports events (De Jong 2007; IAS 1998; Wright 2006), and during the summer (Cho et al. 2001). Correspondingly, increased levels of harm may be experienced in these settings. Efficient transport mechanisms have been seen as a solution to some of the identified harms, as they can enable the effective dispersal of intoxicated individuals before issues arise, particularly within a nightlife setting (CLG 2004; Hughes et al. 2007; ICAP 2007; ODPM 2003). Whilst few transport provision interventions have been fully evaluated (Hughes et al. 2007), Manchester's night service has helped to reduce assaults (Brown undated cited in Hughes et al. 2007). However, whilst adequate provision of transport may ease frustrations, it does not reduce intoxication, and inevitably effective dispersal may move incidents rather than control them. Thus, it is important to ensure that late night transport provides a safe service for those travelling at times such as the end of licensing hours (as mentioned in the National Alcohol Strategy; DH et al. 2007). Because of such issues, the National Alcohol Strategy recommends that transport providers must work with local partners in order to provide safe night time transport (DH et al. 2007).

The project, led by Risk Solutions and commissioned by the Rail Safety and Standards Board, was for researchers at the Centre for Public Health (CPH), Liverpool John Moores University (LJMU) to investigate the concerns outlined above, looking at both the relationship between alcohol misuse and potentially resulting problems that may occur in the rail environment, but also assessing how the rail industry can overcome such issues effectively and without unduly impacting on those who do drink but do not cause problems. To do this, this review has gone beyond the Great Britain (GB) rail environment to consider interventions in other transport contexts and elsewhere both within the UK and internationally. The literature review was undertaken as part of the rail industry's research and development programme, managed by RSSB, and funded by the UK Department for Transport. The full project report and good practice guide published by RSSB are available at the following web address: http://www.rssb.co.uk/Proj_popup.asp?TNumber=704&Parent=82&Ord=

1.1. The format of this report

This report is divided into the following sections:

- Methodological details of how the literature was located and reviewed.
- Findings, in particular: perceptions of alcohol's involvement in harm; problems caused by alcohol which could affect the rail environment; interventions and policies in public transport; and intervention effectiveness.
- Conclusions.

[1] Hazardous alcohol consumption: drinking 22-50 units of alcohol per week for males and 15-35 units for females (NWPHO 2008). Harmful alcohol consumption: drinking over 50 units per week for males and over 35 units for females.

2. Methodology of the comprehensive review

The search strategy was divided into two parts: a full systematic search was conducted of alcohol initiatives in the transport environment; and a review of online policies, interventions and other strategies to further identify intelligence relating to both the transport environment and beyond.

2.1. Systematic search strategy

The systematic review collated information from the following article databases: Cinahl; Cochrane library; EDDRA; Medline; Psychinfo; TRIS; Urbadoc; and Web of Science. Search terms used varied according to the individual database but were focused around alcohol intoxication and transportation (see Appendix 1). Where possible, search terms generated by the individual databases were used which linked in with keywords in the articles and acted as umbrella terms for subtopics. For example, “transportation” in Medline is an overarching search term which also incorporates aviation, railroads, ships, commerce and transport, and so on. Generic search terms were deliberately chosen in order to retrieve articles covering a wide range of alcohol-related issues (such as intoxication, violence and so on) in a variety of transport settings.

2.2.1 Inclusion criteria

Articles were included that: had been published between 1998 and 2008; were published in English; gave information on consumption of transport users (rather than staff); and provided information on an intervention that had been used to target alcohol consumption and/or related harm in a transport environment. Reviews, systematic reviews, conference proceedings, meta-analyses, randomised controlled trials, before and after studies, and grey literature (that is government reports, technical reports and so on) were used.

2.2.2 Extraction strategy

In total, the search retrieved 1,201 articles. Repeated articles and those from before 1998 were removed. The abstracts from each were then independently reviewed by two researchers. Of these, 150 were identified by one or both researcher(s) as being relevant to the review and were selected to be located and critically appraised. It was not possible to locate 19 of the articles, so these were excluded from the analysis.

2.2.3 Quality assessment

Article details were stored in a Microsoft Access database. A third researcher assessed the quality of the studies. At this stage, 68 articles did not meet the inclusion criteria (see Section 2.2.1) and so were excluded from analysis. Relevant articles from the references of those identified were also included, where appropriate, providing a final sample of 82 (24 reviews and 58 research papers; see Appendices 2 and 3 respectively for the studies involved). Each of the intervention studies were graded from 0 (lacks effect) to +++ (highly effective) in line with critical appraisals performed elsewhere (Babor et al. 2003). In the text, references to the sources identified through the systematic search strategy are italicised to enable easy identification and to inform the reader that further information on these studies can be found in the appendices. During this stage, a number of limitations were identified within the literature including a substantial over-representation of studies from the United States of America (USA) and of studies addressing alcohol-related harm in the context of drink driving rather than public transport.

2.2. General search strategy

Because of concerns relating to applicability of the articles identified through the systematic search strategy (see Section 2.2.3), researchers used their expertise, sources known to them, sources uncovered through the general review, as well as suggestions from the commissioners and partner organisations to fill in identified gaps. However, due to time constraints, those sources latterly identified have not been subjected to the same level of critical appraisal as those from the systematic review. The general review has collated information through a wide range of sources including:

- Alcohol specific websites such as: Alcohol (Australian Government website); Alcohol Policy; Hub of Commissioned Alcohol Projects and Policies; International Center for Alcohol Policies; National Institute on Alcohol and Alcoholism.

- Government websites including: Crime and Disorder Reduction Partnerships; Department for Transport; Department of Health; Home Office; National Health Service; Office for National Statistics.
- Research-specific websites including: the Centre for Public Health (original research and relevant past reviews); North West Public Health Observatory (original data and relevant past reviews).
- Transport company websites including: Civil Aviation Authority; Easyjet; Emirates; Greyhound (Australia, South Africa and USA); Irish Rail; National Express; Ocean Village Holidays; P&O (Peninsula and Oriental Steam Navigation Company); Rail Australia; Royal Caribbean International; Stagecoach; Stena Line.

3. Findings: Perceptions of alcohol harm

3.1. Perceptions and attitudes around alcohol

Research on perceptions of consumption and related harm is rare. Nevertheless, existing research indicates that overall, individuals perceive alcohol to be less risky than it is, and do not recognise the harms that may arise even from low levels of consumption, for example, individuals tend to perceive red wine as being beneficial regardless of the quantity consumed (Green et al. 2007; Mukamal et al. 2008). In fact, for most drinkers, any positive health gains are likely to be cancelled out because of the impacts of alcohol consumption, even at lower levels, on increasing the risks of conditions such as cancer and liver cirrhosis (Jones et al. 2008). Further, individuals underestimate the amount they themselves drink (Sproston and Primatesta 2004) not only through overestimating the definition of moderate drinking (Green et al. 2007) (thus allowing themselves to drink more), but also because they may not correctly perceive how much they drink. Self-reported estimates through national surveys historically have shown overall national consumption levels which are dramatically lower than those estimated through tax revenues (DH et al. 2007; HMRC 2008; Robinson and Lader 2008). In addition, perceptions may be influenced by industry marketing strategies aiming to encourage alcohol sales. Thus, using and misusing alcohol has become increasingly acceptable (Watts 2008), so that now over a third (35%) of 15 year olds in England think it is acceptable to get drunk once a week (Fuller 2008).[2]

3.2. Public perceptions of alcohol-related crime and anti-social behaviour

Whilst understandings surrounding the impact of alcohol on health may be limited (see Section 3.1), people's perception of a link with crime is more evident. For example, nearly half (45%) of participants who were involved in the British Crime Survey (BCS)[3] who had experienced violence perceived the offender(s) to have been under the influence of alcohol at the time of the incident (Kershaw et al. 2008). In comparison, only 19% believed them to be under the influence of illegal drugs. When examining different types of violence, alcohol was most often reported as being involved in stranger violence (58% of incidents reported). However, the BCS does have a number of methodological weaknesses, and so any related intelligence should be viewed in light of this. For example, because the BCS performs household interviews, it does not interview groups such as those who are homeless, who may be more at risk of experiencing harms including violence (North et al. 1994). Nevertheless, this perception of a link between alcohol and criminal or anti-social behaviour may contribute towards a fear of rowdy or intoxicated individuals by some transport users (see Sections 4.2.2 and 4.3.1). Further details of the links between crime and alcohol are discussed in Section 4.2.3.

[2] These data are taken from the 2007 schools survey on drug use, alcohol and smoking. The survey achieved a sample size of 7,831 pupils in 273 schools (Fuller 2008). Because the survey is conducted during normal school time, it will not account for those who are excluded or truanting, which could bias the responses.

[3] The British Crime Survey (BCS) is a nationally representative, face-to-face survey of adults aged 16 or over living in private households (Kershaw et al. 2008). The BCS is carried out across England and Wales each year and asks participants whether they have been a victim of crime in the last year and details of this if appropriate. For the survey covering the financial year 2007/08, 46,983 interviews were conducted.

4. Findings: Problems caused by alcohol which may affect the rail environment

4.1. Experiences of alcohol-related problems on the railway

Whilst the majority of public transport users do not experience problems on the rail, a 2002 household survey (n=1,809) reported that a quarter of participants had experienced at least one negative incident caused by other passengers whilst on public transport in the last year (Crime Concern 2004).[4] However, it is not known to what extent the incidents reported were alcohol-related. More specifically, estimates from national surveys report that three per cent of alcohol-related stranger violence reported to the BCS in 1998-2000 occurred on or near public transport facilities (Budd 2003). Whilst this is not high in relation to other assault locations (such as outside a licensed venue; 53%), it can still have a significant impact on individual lives and future transport choices. (See Section 3.2 for methodological limitations of the BCS and household surveys in general.)

Incidents may be directed both towards passengers and staff (Crime Concern 2004; DfT 2004, 2005a) and are more likely to occur during the weekend and/or in the evenings (Budd 2003; DfT 2008a; Jochelson 1994). Further, assault[5] presentations to accident and emergency departments typically peak during the weekend (Anderson and Hungerford 2007). Whilst there are few studies which directly link peak times for harms with peak times for higher levels of consumption, a number of studies highlight that the peak times for consumption are also in the evenings and at weekends (Engineer et al. 2003; Hughes et al. 2007; Jochelson 2004), as with harms, suggesting an association between these behaviours.

Levels of fear on public transport are typically higher at night: in the 2002 household survey discussed earlier, 60% of women felt unsafe waiting at a train station and 61% at an underground station after dark (compared with 20% during the day on the underground; Crime Concern 2004)[6]. Incidents may occur across the whole evening, as a notable proportion of alcohol consumption can take place in the home before arriving in nightlife areas (known as pre-loading; Hughes et al. 2008; Morleo et al. 2008a; Roberts and Eldridge 2007). However, alcohol-related problems may also occur at other times as well, for example, relating to sports events such as football, rugby or cricket (Crime Concern 2004; De Jong 2007; IAS 1998; Wright 2006). Football in particular has been associated with excessive alcohol consumption: in 2000/01, 27% of all arrests in League football in England and Wales were for alcohol-related offences (University of Leicester 2001).

4.1.1 Individuals likely to be involved

- **Quantities of alcohol consumed:** In general, higher levels of consumption are associated with increased risk of harm (Hughes et al. 2008; Kershaw et al. 2008; Morleo et al. 2008a, 2008b) but lighter patterns of drinking may also contribute significantly to harm. In Finland, two thirds of alcohol-related problems and of hospitalisations are reported by light to moderate drinkers[7] (Poikolainen et al. 2007). Thus, policies targeting only heavy or problematic drinkers may not be entirely effective at reducing alcohol-related harm overall (Grube 2006).
- **Demographic characteristics:** Young males (under 35 years) are more likely to be involved in assaults, with such incidents being one of the most common reasons for hospital admission for

[4] Public transport was defined here as including travel by bus, train, coach, underground, tram, taxis and private hire vehicle (Crime Concern 2004). Such incidents included being stared at in a hostile way, being deliberately pushed or jostled, being threatened, or experiencing sexual and/or racial harassment. Nine per cent saw someone else be threatened with violence or be harassed because of their colour, race or religion.

[5] Assaults are known to have a strong association with alcohol (see Section 4.2.3).

[6] The percentage of women who reported feeling unsafe waiting at a train station during the day is not provided (Crime Concern 2004). However, the location where most women reported feeling unsafe was the underground (20%).

[7] Alcohol consumption was calculated based on self-reported estimates for the last four drinking occasions (Poikolainen et al. 2007). Researchers then estimated a total annual consumption for participants based on the frequency of their drinking. Heavy drinking was defined as those reported consumption in the highest 10% of the distribution (which equated to an annual intake of at least 9040g of pure alcohol for men and 2560g for women – 1,130 and 320 units respectively). whilst the remaining 90% were classified as light or moderate consumption.

this group (Jones et al. 2008). Further, alcohol-related deaths resulting from intentional self-harm are particularly common in those aged under 34 years. When such an age group is known to consume alcohol at significantly higher levels (Cook et al. 2008; Robinson and Lader 2008), it may be possible that these higher patterns of consumption are associated with increased risk of alcohol-related harm. Thus, the National Alcohol Strategy recommends that the priority groups for interventions include young people: those aged 18-24 years and underage drinkers (DH et al. 2007). However, specific harms may also be more prevalent amongst different groups. For example, falls in general (not alcohol-related) are a more common reason for hospital admission amongst those aged over 75 years (Jones et al. 2008).

- **Deprivation:** Individuals living in more deprived areas are more likely to experience alcohol-related harms including those resulting in hospital admission and mortality (Deacon et al. 2007; DH et al. 2007).
- **Location of transport stop:** Research from Los Angeles (USA) on bus stops highlighted that crime incidents are concentrated around hot spot locations (Loukaitou-Sideris 1999). Incidents of bus stop nuisance at nine bus stops accounted for 12% of all such incidents across the 19,650 bus stops in the city.

4.1.2 Incident reporting

There is a large body of evidence to highlight that both alcohol-related incidents and incidents in general may not always be reported to the police by the general public, rail passengers or rail staff (Anderson et al. 2007a; DfT 2005b; Granville and Campbell-Jack 2005; Kershaw et al. 2008; Loukaitou-Sideris 1999; Mistral et al. 2007). In the 2002 household survey (see Section 4.1), 80% of those who had experienced/observed an incident on public transport did not report it to anyone (Crime Concern 2004). In general, the most common reason for not doing so was that respondents did not feel incidents were serious enough. However, those who had experienced one or more incidents were more likely to think that personal security on public transport was poor or very poor (40%) compared with those who had not experienced any incident (10%). Because of these issues, hospital admission or accident and emergency presentations can provide a more comprehensive indication of the prevalence of assault incidents (Bellis et al. 2008); however, only more serious assaults will be recorded in this way.

4.2. Types of incidents potentially involved

This section identifies potential harms that may be experienced within transport settings and their relationships with excessive alcohol use. Not all of the examples provided are based within transport settings but nevertheless exemplify the types of incidents that are likely to be experienced in that environment.

4.2.1 Accidents

Whilst most drinkers consume alcohol without experiencing any immediate adverse effects, consumption can cause the adoption of risky behaviours. In an Australian qualitative study on attitudes and behaviours relating to alcohol, one participant reported:

> *I remember one night I walked home on the train line. God knows how I got home.*
> Source: Shahanen et al. 2001 p.15

An analysis of accidental fatalities on the subway in New York between 1990 and 2003 (n=315) found that almost half (46.0%) showed toxicological evidence of alcohol at the time of the incident (Gershon et al. 2008). Accidental fatalities can occur in a number of ways: for example, falls in general are substantially related to alcohol consumption: a fifth (22%) of male falls and 14% of female falls for those aged 16 to 64 years are attributable to alcohol, leading to a total of 289 deaths in 2005 and 13,084 hospital admissions in 2005/06 in England and Wales (Jones et al. 2008). For those aged 65 years or over, the proportion of falls attributable to alcohol is lower (12% of male and 4% of female) but because this age group are more likely to fall in general, the number of hospital admissions and deaths due to alcohol-related falls is still considerable (169 deaths and 11,156 hospital admissions). In the rail environment, falls may occur at the station, on the train or on the tracks, with the latter being particularly worrying because of the increased possibility of fatality. Falls onto the track may occur as the result of mistaken steps or to retrieve personal effects and individuals may struggle to climb back onto the platform (Gershon et al. 2008). Accidents and injuries may also be the result of irresponsible behaviour:

in an analysis of recorded 'train surfing'[8] incidents in Berlin from 1989 to 1995 (n=41), 50% had consumed alcohol (Strauch et al. 1998). Whilst the actual number of recorded incidents is small, over four in ten (18) resulted in a fatality. Alcohol's involvement in all of these types of incident is particularly important because consumption can increase the risk of more serious injuries (Fuller 1995).

4.2.2 Anti-social behaviour

Anti-social behaviour covers a wide variety of different issues such as littering, noisy behaviour and rowdiness. Alcohol can contribute to this significantly:

- In 2007/08, 2,702 incidents of disruptive behaviour were reported to the Civil Aviation Authority (DfT 2008b). Such incidents included violence, verbal abuse and disobeying airline staff. For two fifths of these incidents (39%), alcohol was suspected as a contributory cause. Of these, a quarter (27%) involved passengers drinking their own alcohol (rather than that purchased on board), 22% involved alcohol consumed before boarding and 13% involved consumption of alcohol supplied by the airline.
- Fifteen percent of 12-17 year olds in the Youth Lifestyles Survey (n=1,790) have been involved in anti-social behaviour (such as arguments, fights, vandalism, theft) during or following alcohol consumption, and frequent drinkers[9] were the most likely to be involved (Harrington 2000).
- In Stockport, alcohol-related litter was found on 62% of paths inspected during a local campaign (Stockport Council 2007). Litter can contribute to anxieties about personal security as it may imply a lack of effective management (Crime Concern 2004). This may be of concern to the rail industry because bins have been removed from stations because of security fears (Crime Concern 2004).
- Over half of street noise complaints are seen as being due to alcohol (Ireland and Thommeny 1993).
- A quarter of BCS participants reported that drunkenness or rowdy behaviour was a problem in their area (Kershaw et al. 2008). Such behaviour can cause anxiety in a public transport environment because of the unpredictability and perceived potential for violence to occur (DfT 2004).
- In Ireland, alcohol-related problems experienced on trains carrying individuals returning from hen or stag parties included abusive behaviour, drunken stripteases and urinating in public (Healy 2003).

4.2.3 Crime and disorder

Whilst the majority of drinkers do not experience any immediate negative consequences associated with consumption, alcohol misuse can affect cognitive and physical functioning, reducing self-control, facilitating aggression, increasing impulsivity and impairing the ability to process incoming information (Graham et al. 2003; Peterson et al. 1990; Room et al. 2005). Combined, this can make a person more likely to resort to violence in confrontation. In addition, alcohol may be used to provide the courage to offend (Hunt and Laidler 2001). Thus, the NEW-ADAM arrestee survey[10] showed that a significant proportion of arrestees provided urine samples which tested positive for alcohol, particularly for violence and criminal damage (Table 1; Strategy Unit 2003). However, as the authors report, alcohol can be processed relatively quickly by the body and so such tests can only examine heavy or recent consumption, under-estimating alcohol's true involvement. Further, this study related to crime generally rather than crime committed in railway or other transport environments, and so it is not known whether or not the rail environment experiences the same situation. Nevertheless, alcohol has also been cited as being involved in sexual assaults on subways in Hong Kong (Chui and Ong 2008). Finally, alcohol may be associated with violence because of the use of glasses and bottles as weapons: in the UK, 8% of facial injuries sustained in assaults were inflicted with these objects (Hutchison et al. 1998).

[8] Train surfing refers to incidents where individuals ride on the outside of the train, for example, on the roof.
[9] Frequent drinkers are defined in this study as those who drink at least once a week (Harrington 2000).
[10] Researchers involved in the NEW-ADAM (New English and Welsh Arrestee Drug Abuse Monitoring) survey visited 15 sites in England and Wales between 1999 and 2002 (Strategy Unit 2003). The number of participants is not reported.

Table 1: Proportion of arrestees who tested positive for alcohol consumption following a urine test

Offence	Proportion of arrestees
Violence against the person	37%
Criminal Damage	47%
Other	26%
Drugs offences	19%
Burglary	17%
Fraud and forgery	16%
Sexual offences	13%
Theft and handling stolen goods	13%
Robbery	12%

Source: Strategy Unit (2003)..

Conversely, reduced physical control and a reduced ability to recognise warning signs in potentially dangerous situations can heighten vulnerability (Abbey et al. 2001; Testa et al. 2000). Thus, in the 2001 BCS module on interpersonal violence, 17% of women reporting serious sexual assault in the last year highlighted that this occurred when they reported that they were incapable of providing consent due to alcohol (Walby and Allen 2004).[11] In addition for victims, alcohol consumption may be associated with more severe injury following an assault (Hutchison et al. 1998). Finally, alcohol and criminal behaviour may be related through other common risk factors (such as anti-social personality disorder) that contribute to the risk of both occurring (Moeller and Dougherty 2001).

4.2.4 Criminal damage

Crime Concern (2002) suggested that those involved in criminal damage incidents (such as graffiti and vandalism) may be more likely to misuse alcohol but provided no supporting evidence. As with crime generally (see Section 4.2.3; Hunt and Laidler 2001), alcohol may be used as a means to gain courage to participate, particularly if intending to offend in dangerous areas such as on the railway tracks. However, evidence is lacking as to the extent of alcohol's involvement. Nevertheless, graffiti and a poorly maintained environment can contribute to people's anxieties by demonstrating a lack of management or control (Crime Concern 2004).

4.2.5 Trespass

There are very few articles on the links between alcohol consumption and trespass on the rail. However, it is thought that alcohol is likely to be a factor in a notable proportion of trespass incidents, and may be involved in subsequent accidents that occur whilst trespassing. Studies from North and South Carolina (USA) and Cape Town (South Africa) together suggest that 39-80% of fatalities occurring on the train lines may have occurred whilst the victim was under the influence of alcohol (Cina et al. 1994; Lerer and Matzopoulos 1996).

4.2.6 Suicide

In England in 2005, there were 1,694 deaths related to intentional self harm or an event of undetermined intent that were attributed to alcohol (Jones et al. 2008). In fact, it was the second most common cause of alcohol-related mortality in that year (after alcoholic liver disease). Train lines and stations have been used as locations for suicide (Gershon et al. 2008; Hannon et al. 2009; Kerkhof 2003). An analysis of suicide fatalities on subways in New York between 1990 and 2003 (n=343) found that almost a fifth (17.8%) showed toxicological evidence of alcohol at the time of the incident (Gershon et al. 2008).

4.3. The wider effects of alcohol-related harm

4.3.1 Fear of crime and using transport

Safety fears even among those using public transport are widespread, particularly in the evenings or at night (Crime Concern and TTR 1997; Crime Concern 2004; DfT 2008a) and may surround the whole

[11] The BCS module in 2001 consisted of a nationally representative sample of 22,463 individuals in private households aged 16-59 years (Walby and Allen 2004). Over half of these (12,226) were women and of these, 0.5% reported having experienced a serious sexual assault in the last year.

journey including to and from the stop or station (Crime Concern 2004). Although only a small proportion of respondents in the National Centre for Social Research Omnibus Survey (n=3,100) reported not using trains because of fears surrounding anti-social behaviour or crime (DfT 2008a), elsewhere it has been reported that almost half (44.8%) of adults in the North West avoid the town centre at night because of alcohol issues (Cook et al. 2008)[12]. This may be because, for example, youths spend time in the evening in bus shelters and train stations to drink and/or smoke (Crime Concern 1999). Certain groups are more likely to be affected: 60% of women in the 2002 household survey reported feeling unsafe waiting on a train platform at night compared with 25% of men (Crime Concern 2004). However, fear may not always be linked to the real dangers present. For example, a survey of New York City passengers showed that 77% of participants were afraid of being pushed onto the tracks and 80% took precautions to prevent this from occurring even though such an occurrence is very rare (Martell and Morrison 1992 cited in Gershon et al. 2008). In addition, personal opinions of whether crime is increasing or decreasing do not always align with official statistics (Kershaw et al. 2008). Here, such perceptions are strongly linked with demographic factors with women and older people being more likely to think that crime has risen substantially. Geographic characteristics may also be involved: those living in areas with higher levels of deprivation are more likely to report that crime is increasing. Fear of travelling on public transport can have wide ramifications if it prevents large numbers of people travelling on public transport over a substantial period of time. Not only will service providers experience a loss in revenue but it may also contribute to environmental damage, increased congestion on the roads and social exclusion (Granville and Campbell-Jack 2005).

4.3.2 Long-term injury and harm

Experiencing or witnessing incidents such as violence can lead to alcohol use in attempt to cope or self-medicate (Hunt and Laidler 2001). Thus, individuals who were victims of violence during adolescence report higher levels of alcohol consumption in later life (Kaukinen 2002). In addition, violence and accidents can lead to a range of physical and emotional consequences: for example, facial injuries can cause permanent scarring, and emotional and psychological trauma (Magennis et al. 1998).

4.3.3 Impact on the workplace

Long-term injury and harm to staff could affect the employer through, for instance, productivity, sickness and absenteeism (see Harkins et al. 2008 for information on the impacts of alcohol consumption on the employer). For example, one assault on a bus driver led to the driver requiring three months of sick leave, and demoralisation and fear amongst their colleagues (Granville and Campbell-Jack 2005). Such problems may affect employee retention (Granville and Campbell-Jack 2008): a report by the Office for the Deputy Prime Minister (ODPM 2003) noted that it can be difficult to persuade taxi drivers to work at night.

4.3.4 The cost of alcohol

Excessive alcohol consumption and resulting behaviour or harms contribute significantly to financial costs experienced by the railway. Not only does this relate to loss of revenue caused by possible avoidance of using public transport (see Section 4.3.1) and the costs of lower staff productivity, sickness, absenteeism and recruitment (see Section 4.3.3) but may involve cleaning, repairs, increased insurance premiums and the replacement of vandalised vehicles during repairs (Granville and Campbell-Jack 2005).

[12] The Big Drink Debate surveyed over 30,000 residents in the North West (Cook et al. 2008).

5. Findings: Interventions and policies in public transport

This section looks at alcohol policies and/or interventions that are in place within public transport environments but outside the Great British (GB) railway environment (please see the accompanying document SPN 2009 for details of GB rail strategies and interventions). It also provides some discussion of generic crime prevention strategies, where appropriate. Details of possible effectiveness are discussed in Section 6.

5.1. General public transport initiatives

Generic alcohol campaigns have been used to raise awareness of issues including the consequences of alcohol misuse. Examples include:

- "Stop! Underage drinking" campaign was launched in Japan in 2005 to prevent underage drinking and the provision of alcohol to minors (under 19s)[13]. The Brewers Association of Japan organised supporting materials for supermarkets (such as badges), advertisements in newspapers and on public transport. Awareness of the campaign logo increased from 49% in 2005 to 87% in April 2008, and the proportion acknowledging that underage drinking was wrong increased from 76% in 2005 to 88% in April 2008. However, this does not necessarily equate to a reduction in the provision of alcohol to minors or underage drinking.
- In Paris (France) in 1999, a campaign was launched on public transport aiming to promote awareness that everyone is responsible for a culture of disrespect and indifference in order to change the perceived indifferent behaviour of passengers and staff (*Bernadini and Rivet 2002*). However, no evidence of effectiveness was provided.
- "Alcohol has its price" was launched in Helsinki (Finland) in 2005 targeting individuals who use public space and/or public transport (*Heinänen 2005*). Here, posters and cards were use to promote health and wellbeing but no information was provided as to its actual impact (see Appendix 3).

5.2. International rail

5.2.1 Alcohol-related strategies

The websites from five international rail companies were searched. Of these, four referred to alcohol policies and/or initiatives relating to reducing or controlling alcohol on their transport mode. In addition, generic searches were performed on the existence of 'dry trains' or alcohol bans. Combined, these searches highlighted the following policies and interventions employed on rail networks internationally (although very limited details were available on enforcement or effectiveness):

- **Access management:** On Long Island Railroad (LIRR, New York, USA), only alcohol bought through LIRR's trains, bars or restaurants can be consumed. [14] Whilst such policies may be more directed towards increasing profitability rather than alcohol consumption or harm control (no reason was given for the restriction), such policies may also reduce access to alcohol and ensure that any such access is within the rules of the organisation involved.
- **Dry trains:** Two services in Ireland, which had been particularly affected by alcohol, have been operated as dry trains for at least one year (Healy 2003). These were services that were affected by return journeys from stag and hen parties. The initiative was viewed as successful but no details were provided to support this and we were unable to ascertain whether the ban is still in place. More recently, alcohol has been banned on a number of trains in Ireland and New York (USA) during key times when excessive consumption is most likely, for example, during celebrations such as thanksgiving and for sports matches.[15,16] In New York, this is enforced by

[13] See http://www.icap.org/PolicyTools/ICAPBlueBook/ExamplesofTargetedInterventions/tabid/113/Default.aspx.
[14] See http://www.mta.info/lirr/pubs/Rules/Rules.htm.
[15] For details on the Irish alcohol bans, see http://www.irishrail.ie/news_centre/general_news.asp?action=view&news_id=272 and http://www.irishrail.ie/news_centre/general_news.asp?action=view&news_id=469.
[16] For details on example alcohol bans in New York, see http://www.mta.info/lirr/TrainTalk/11-2008, http://www.mta.info/lirr/News/2008/NewYears2009.htm, or http://www.mta.info/mta/news/releases/?en=090311-MNR7.

the police and bags can be subject to searches. Bars and cafes may also be closed. Finally, as part of its generic crime reduction procedures, passengers on the Metro in Washington (USA; Table 2) are prohibited from eating or drinking anything. This is enforced by the police.

- **Alcohol limits:** On the ski train, Eurostar has set a maximum quantity of alcohol which is allowed to be carried by passengers (four bottles/cans of lager, one bottle of wine or one 50cl bottle of spirits).[17] However, the service does also provide facilities such as a bar-buffet and it is not stated on the website as to whether there is a restriction on drinks consumed whilst on board.[18]
- **Glass bans:** Glass bottles have been banned on Irish Rail for specific sports fixtures.[19]
- **Intoxication bans:** On LIRR (New York, USA), individuals are prohibited from entering the train, station or terminal whilst intoxicated. Rail Australia also states that individuals are prohibited from boarding their trains if they are under the influence of alcohol.[20] Current railway byelaws in England could be used to remove intoxicated individuals from trains and stations by train companies and/or the police.[21]

5.2.2 Generic crime prevention strategies

In 1991, Hong Kong's Mass Transit Railway (MTR; China) system was described as the "most successful subway system in the world", with extremely low levels of crime and disorder (Gaylord and Galliher 1991). Washington's Metro (USA), seen as one of the safest subways in the world, and trains in Sydney (Australia) have both employed strategies to minimise the incidence of crime and disorder (Jochelson 1994; La Vigne 1996). Examples of initiatives are listed in Table 2. Whilst the system in Hong Kong strived to encourage crowds as a crime reduction mechanism, the system in Washington sought to avoid crowds because of associated fears. However, as can be seen, the two systems are very similar. Nevertheless, it should be noted that these reports are each over ten years old and do not address alcohol consumption or related harms specifically. In addition, the source from Hong Kong highlights a cultural setting where crime levels generally are very low and residents are used to being crowded, and so the level of transferability is unknown.

[17] See http://www.eurostar.com/UK/uk/leisure/destinations/direct_services/ski_train/ski_on_board.jsp
[18] See http://www.eurostar.com/UK/uk/leisure/travel_information/on_board/travel_classes.jsp.
[19] For details on glass bans in Ireland, see: https://www.irishrail.ie/your_ticket/special_offers.asp?action=view&news_id=139.
[20] See http://www.railaustralia.com.au/pdf/CountryLink_Terms_and_conditions.pdf.
[21] See http://www.publications.parliament.uk/pa/cm200809/cmhansrd/cm090427/text/90427w0002.htm#09042725000550.

Table 2: Generic crime prevention strategies employed by railways in three international cities

Strategy	Hong Kong Mass Transit Railway (China)	Sydney (Australia)	Washington Metro (USA)
Consumption	No details provided in source used.	No details provided in source used.	Passengers must not consume food or drink. Notices raise awareness of this & police enforce it.
CCTV	Over 200 CCTV cameras in 38 stations.	CCTV has been a popular crime prevention method.	At the end of each platform, on ceilings at entrances and exits and in more concealed areas. Cameras are visible to raise awareness of their existence.
Discouraging loitering	No chairs, public toilets, fast food facilities, or left luggage lockers. Loitering is a bye-law offence. Tickets expire if not used within 90 minutes of entry.	Accurate display of departure times to reduce time spent on the platform.	Absence of long passageways, toilets or commercial activity beyond opportunities to purchase fares & newspapers.
Lighting	Good lighting is provided.	Well-lit safety zones or nightsafe areas exist on some platforms. It is hoped that such schemes will also ensure that passengers are not thinly spread.	Lights are a minimum of one foot long & are recessed to avoid shadows. Indented walls maximise reflection. Overhead lights reduce dark spots.
Minimising hiding places	Avoided use of alcoves, dog-leg passageways & columns. Where this was not possible, mirrors & CCTV were installed.	Working to eliminate barriers and dead-end corridors.	Minimal supporting columns, escalators & stairs are lengthy rather than curved or with corners to avoid shadows. Elevators have glass panels.
Fares	Exact fare policy in operation.	No details provided in source used.	Fares are distance-based, rising in rush hour.
Rapid response	Police usually respond to an emergency in 90 secs (3 mins if an officer comes in from elsewhere).	No details provided in source used.	Graffiti & litter are removed within hours. Damaged structures are removed immediately.
Passenger alarms	Passenger alarm plungers enable passengers to talk to train operators. There is also a public address system and response microphone for passengers	CityRail have installed help points in Sydney	No details provided in source used.
Police involvement	Police advised on MTR & interchange design, & safety & security procedures. Every constable carries a radio to contact District headquarters.	Police involved in staff training (see below).	Police advised on the design of the Metro. Police enforce rules around consumption & report any maintenance problems.
Staff	No details provided in source used.	Ticket officers have been trained at the police academy in security. Private security guards are also being employed. Internal reporting system for staff to record incident reports.	Every mezzanine has a uniformed station attendant and attendants are posted at kiosks at platform entrances. Attendants use the public address system to notify passengers disobeying the rules.
Station design	Large open platforms & wide passenger tunnels to minimise concealment. Escalators deposit passengers at either end of the platform to encourage occupation of the whole platform. There are a limited number of entrances & exits so areas can be sealed off quickly. Number of platforms used is adjusted when stations are quieter.	Stations have been redesigned to increase attractiveness and minimise hiding places (see above).	Station design is uniform between stations to ensure passengers can use it with ease. High ceilings & wide platform vaults to provide feelings of openness and space. Stations built from concrete, brick, granite & bronze to increase durability, fire resistance and easy maintenance. Recessed walls behind bars discourage graffiti. Litter bins & recycling bins are situated along the station.
Train design	Trains are designed so passengers & police can walk freely between carriages, preventing isolation. There is a slight rise between each carriage to allow a good view. Lengths of trains can be adjusted when stations are quieter.	Late night trains should have only two carriages, with both being adjacent to staff & stopping in well-lit parts of the station.	Trains are shortened from eight cars to four at 8pm to avoid isolation.

Sources: Hong Kong: Gaylord and Galliher (1991); Sydney: Jochelson (1994); Washington: La Vigne (1996).

5.3. Aviation

In 2007/08, the Civil Aviation Authority received 2,702 reports of disruptive behaviour that had occurred on board an aircraft (see Section 4.2.2; DfT 2008b). Alcohol was involved in 39% of reported incidents. For the majority of cases, a warning was given and in a quarter of these (25%), this warning was seen as effective. However, for a further quarter (26%), the warning was ineffective (for the remainder, effectiveness was not reported). In order to understand the use of alcohol policies on aircraft, the websites from eight aviation companies were searched (both UK-based and international). Of these, four referred to specific alcohol policies or initiatives relating to reducing or controlling alcohol on their transport mode. In addition, generic searches were performed on alcohol policies in aviation. Combined, these searches highlight the following policies and interventions employed in aviation in the UK and internationally (however, limited information was available as to enforcement or effectiveness):

- **Access management:** Whilst onboard RyanAir and EasyJet, passengers cannot consume their own alcohol.[22] Whilst such policies may be more directed towards increasing profitability rather than alcohol consumption or harm control (no reason was given for the restriction), such policies may also reduce access to alcohol and ensure that any such access is within the rules of the organisation involved.
- **Alcohol ban:** In the UK, individual airlines can decide whether to prohibit alcohol consumption whilst flying as they manage onboard behaviour (CAA 2001). Alcohol-related disorder is not seen as a significant issue for aircraft safety (CAA 2001). However in certain circumstances, alcohol may be banned: for example, Emirates does not serve alcohol on flights to Saudi Arabia,[23] a country where it is illegal to consume or distribute alcohol.
- **Alcohol limits:** In the USA, increasing numbers of airlines are thought to be limiting the provision of free alcohol during flights and at the airport in order to tackle aggression (Johnson 2006). Whilst the effects of doing this are not clear, anecdotal evidence suggests that passengers may bring their own alcohol on board covertly.
- **Intoxication ban:** Under UK aviation law, it is an offence to enter an aircraft whilst drunk or to be drunk when on board (Air Navigation (No. 2) Order 1995). Unlike drink driving, the level of illegal intoxication is not defined specifically.[24] Whilst the number of cases is unknown, news articles have reported on incidents (BBC 2000, 2004, 2008). These are associated with behaviour resulting from intoxication (such as aggression) rather than drunkenness in isolation. In order to prevent such incidents from occurring, websites for EasyJet, Emirates, and RyanAir state that intoxicated passengers can be refused carriage.[25]
- **Managing intoxication:** In the USA, the Association of Flight Attendants (AFA 2001) recommends that gate agents should enforce legislation and prevent intoxicated individuals from boarding with appropriate training being provided. RyanAir stipulates that individuals who are impaired by alcohol can be restrained if endangering or obstructing the crew. EasyJet notes that the individual is liable for any costs associated with their intoxication, including flight diversions.

5.4. Buses and coaches

5.4.1 Alcohol-related interventions

A number of areas have established alcohol bans in the UK (however, no information was available as to enforcement or effectiveness):

- Birkenhead (Merseyside) has banned alcohol consumption in bus stations (DfT 2002a).

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[22] See http://www.easyjet.com/EN/Book/regulations.html and http://ryanair.com/site/EN/faqs.php?sect=inf&requesr=bringalcohol.

[23] See http://www.emirates.com/english/flying/dining/wines.aspx.

[24] The drink drive limit is 0.08% BAC or Blood Alcohol Concentration, whilst in aviation law, it is stated that the individual must not be "drunk". Offenders could face a fine of up to £5,000 and two years in prison. See http://www.caa.co.uk/default.aspx?catid=286&pagetype=90&pageid=5719.

[25] See http://www.emirates.com/english/Images/COC-eng_2006_tcm233-194795.pdf, and http://www.ryanair.com/site/conditions/docs/ryanair_carriage.pdf.

- National Express has banned alcohol from their coaches, with customer information cards available[26]. Further, alcohol consumption can invalidate any related claims for insurance through their travel policies.[27]
- Stagecoach has banned the consumption of alcohol on their buses.[28]

Outside the UK, coach alcohol bans have also been implemented on Greyhound coaches in the USA,[29] Australia (where the ban extends into the terminals)[30] and South Africa.[31] Further, intoxication bans have been established by Greyhound Australia and Greyhound South Africa. In Australia, the website notes that any costs incurred are borne by the individual. However, the area surrounding the stop or station can also affect crime experienced: in Los Angeles (USA), Loukaitou-Sideris' (1999) highlighted that bus stops adjacent to licensed premises (such as off-licences or bars) experienced higher levels of offences associated with public drinking. This may be because such venues inadvertently encourage anti-social behaviour.

5.4.2 Generic crime prevention strategies

Loukaitou-Sideris' (1999) analysis of hot spot bus stops for crime in Los Angeles (USA) highlighted a number of concerns that can be associated with increases in crime and disorder more generally: neglect, graffiti and litter indicate that no one cares to regulate the area; and locating a bus stop next to car parks, vacant buildings or other unused space isolates those waiting at the bus stop (crime tends to occur in more desolate settings). Suggestions for addressing crime at bus stops and on buses included: driver alarm buttons; uniformed and undercover police officers on buses; good lighting; appropriate shelter design that offers visibility of the road and neighbouring buildings; and avoidance of hiding places for potential perpetrators (such as tunnels, walls). Examples of initiatives established by bus companies in England to tackle disorder generally are listed in Table 3. Note that only one of these has been evaluated.

Table 3: Generic crime prevention strategies employed by bus companies in the United Kingdom (table continued overleaf)

Initiative	Details	Location
Campaigns	As part of the Robbery Reduction Initiative, West Yorkshire launched a publicity campaign to warn potential offenders & reassure passengers. Signs have also been used to raise awareness that staff have a right to work in an environment free from risk of assault & that offenders will be prosecuted. Finally, Know Your Limits posters have been displayed on buses on the Isle of Wight aiming to raise awareness of alcohol units, as well as other locations.[32] It was suggested that there was a 14% decrease in reduction in crime in the Christmas period.	West Yorkshire Dundee, Strathclyde & West Lothian Isle of Wight
Cash rewards	Stagecoach Bluebird Nightbird offers rewards of up to £100 for identifying abusive individuals, which lead to a conviction.	Aberdeenshire
CCTV	CCTV cameras have been installed on some buses which rotate to observe bus stops as the bus approaches the bus stop. Further, a six month trial of live CCTV was launched on 21 double-decker buses in October 2008 to reduce anti-social behaviour. The footage will be sent live to the central control centre. An evaluation is planned.	Dundee London
CCTV information	Notices are used to inform passengers of the presence of CCTV.	Warrington
CCTV maintenance	The bus station controller checks the CCTV cameras for any damage & their position & number are evaluated every year.	Canning Town
Crime-stoppers	Telephone lines have been set up to encourage the reporting of anti-social behaviour incidents.	Strathclyde

[26] See http://www.nationalexpress.com/coach/OurService/safe_journey.cfm.
[27] See www.nationalexpress.com/utilities/insurance_policy_summary.pdf.
[28] See www.stagecoachbus.com/uploads/CONDITIONSOFCARRIAGESouth2008%5B1%5D.doc
[29] See http://www.greyhound.com/home/en/docs_cms/Greyhound_Prohibited_Items_List.pdf.
[30] See http://www.greyhound.com.au/Footer/terms-and-conditions.aspx.
[31] See http://www.greyhound.co.za/default.asp?id-1000000460.
[32] See http://www.hubcapp.org.uk/php/displayprojects.php?status=displayprojectdescription&projectcode=JLLZ.

Initiative	Details	Location
Data sharing	Data can be shared to identify incident hotspots & target action.	West Scotland
Diversionary activities	First Buses has organised initiatives with Glasgow City Council & the Scottish Football Association to develop diversionary youth programmes & promote sport as an alternative to disorder.	Glasgow
Graffiti management	In one area, graffiti is being addressed on subways & bridges through lighting, & working with the community for the provision of appropriate artwork. Further, protective film, glass alternatives, & specialist chemical treatments can be installed which either prevent graffiti or ensure that surfaces are easy to wipe clean.	Cambridgeshire Edinburgh & West Scotland
Help points	Each of the bus bays at St Paul's Bus Station has a help point & CCTV cameras focus on these when activated. Panic alarms can be installed in buses for drivers.	Walsall United Kingdom
Information	Centro has been funded to provide real-time information to bus shelters, shopping centres, offices, & hotel foyers. Passengers can also use their mobile phones to check actual arrival times.	West Midlands
Invoicing parents	Parents of children involved in vandalism have been invoiced for the associated costs (up to £800).	Glasgow
Lighting	Worcester's Park & Ride has a staffed waiting area, with CCTV & security lighting. In Edinburgh, lighting is being used in buses & bus stops to discourage disorder & provide clearer images for CCTV.	Worcester Edinburgh
Partnership working	A Bus Quality Partnership includes representatives from the police & the bus company. Here, initiatives can be developed to address security issues, & police travel on buses when necessary.	Kingston-upon-Hull
Police involvement	A dedicated police officer has been appointed to work with transport providers & address anti-social behaviour incidents. Plain clothes officers & bus company security staff have been used in Glasgow. This has led to 37 arrests (although timeframe is unknown).	Edinburgh & Strathclyde Glasgow
Restorative justice	Young people involved in vandalism are forced to clean vandalised buses themselves.	Glasgow
Safety screens	In 2001, all Nottingham buses were installed with safety screens.	Nottingham
School visits	Drivers & police have been sent to schools to build relationships with children, teach them issues surrounding bus safety & explain the dangers of behaving badly on buses through the Central Fife Crime Prevention Panel.	Central Fife
Spit kits	Bus drivers have been issued with spit kits so that DNA samples can be taken following an incident, & matched with police records.	Glasgow
Staff presence	At one bus station, one staff member is designated as being a 'crime rep' & this employee has regular meetings with the police. In addition, all staff wear high visibility jackets, have panic alarms & two way radios. In this way, their presence can deter offenders, intervene in incidents & target fare evaders.	Birkenhead
Staff training	TRANSfED offer S/NVQs (Scottish/National Vocational Qualifications), which include training on customer care & passenger support. In addition, the Department of the Environment Transport & the Regions (DETR) funded a pilot project to train bus drivers in more effective management of bus services used heavily by young people, involving young people. A toolkit was developed to guide schools, bus companies & transport managers. In addition, Travel West Midlands train all bus drivers & revenue inspectors in conflict avoidance, as are Customer Service Officers in St Paul's bus station in Walsall (West Midlands).	United Kingdom Leeds West Midlands
Telephone hotline	As part of the Robbery Reduction Initiative, West Yorkshire established a telephone hotline to enable fast track reporting (Crime Concern 2002).	West Yorkshire
Travel couriers	Travel couriers were introduced to help people get on & off the bus, perform market research & offer reassurance to passengers. However, the pilot was ended after four months.	West Midlands
Visibility	In Warrington, new bus shelters have glass panels fitted to maximise visibility.	Warrington

Sources: Crime Concern (2002); Granville and Campbell-Jack (2005); Hill (2008); Home Office (2003).

5.5. Ferries, hovercraft and cruises

Two hovercraft websites, four cruise websites and nine ferry websites were searched. Of these, five made specific reference to an alcohol intervention or policy in English (mainly the cruise websites). One of the ferry companies mentioned that their alcohol policy was restrictive, but no further details were available in English. Key initiatives included (however, there was limited details of enforcement or effectiveness):

- **Access management:** P&O ferries,[33] Royal Caribbean International[34] and Ocean Village Holidays[35] do not allow passengers to consume their own alcohol whilst on board the ferry. Any such alcohol can be confiscated with the latter two companies returning alcohol at the end of the trip. The latter two also state that staff are able to search any bags in this respect. Whilst such policies may be more directed towards increasing profitability rather than alcohol consumption or harm control (no reason was given for the restriction), they may also reduce access to alcohol and ensure that any such access is within the rules of the organisation.
- **Alcohol bans:** Alcohol consumption has been prohibited on ferries transporting football fans on Stena Line.[36]
- **Alcohol confiscations:** On P&O cruises, alcohol can be confiscated from guests as the need arises (including those aged under 18).
- **Intoxication bans:** Alcohol intoxication has been prohibited on ferries transporting football fans for Stena Line. Royal Caribbean International has rules surrounding over-consumption of alcohol and resulting irresponsible behaviour, as guests are expected to behave responsibly at all times (whether ashore, transferring, inside terminals, on the boat and so on).
- **Prevention of underage consumption:** Ocean Village Holidays comply by UK laws on minimum purchasing age for alcohol whether on shore or at sea.[37] On P&O cruises, any alcohol purchased ashore by those aged under 18 years is confiscated.[38] Royal Caribbean International states that passengers are not allowed to provide alcohol to anyone who is underage (under 21 years).
- **Managing rule-breaking:** On Royal Caribbean cruises, drinking privileges can be revoked or restricted. In addition, guests can be asked to disembark if they disobey the rules.

5.6. Summary

Interventions and policies identified in public transport outside the GB rail environment, which aim to prevent alcohol-related harm specifically have generally focused on the prohibition of alcohol and/or intoxication. Alcohol prohibition follows a more universal approach, affecting the entire population of transport users (including those who drink within recommended guidelines) whereas strategies such as intoxication prohibition only affect those who are more likely to be involved in alcohol-related harms. The advantages and disadvantaged of these types of policies are discussed in more detail in Section 6. Because of the limited nature of the alcohol policies / initiatives established in the transport environment, generic crime prevention strategies from transport modes were included in this report; however, from these sources, it is not known to what extent they would address alcohol-related disorder. Further, whilst it is useful to consider the policies and initiatives being employed in other public transport modes, it is necessary to remember that other transport modes may operate in different contexts both culturally (in terms of international examples), physically (for example, planes operate in a very confined space) and operationally (for example, buses are used for shorter journeys). In general, the sources identified provide extremely limited information either on enforcement or effectiveness, so it is difficult to assess which would be the most suitable to employ.

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[33] See http://www.poferries.com/tourist/content/pages/template/_footer_terms_&_conditions_terms_&_conditions.htm

[34] See http://www.royalcaribbean.com/customersupport/faq/details.do;jsessionid=0000rtHk_pwLLpWoMDxYi96q0wu:12hdhu93n;jsessionid=0000VvbPSm_M4lzIUelKG7HbYIk:13hldcgo7?pagename=frequently_asked_questions&pnav=5&pnav=2&faqSubjectName=Onboard+Policies&faqId=309&faqSubjectId=333&faqType=faq

[35] See http://www.oceanvillageholidays.co.uk/frequently_asked_questions.aspx

[36] See www.stenaline.co.uk/ferry/special-offers/ibrox.

[37] See http://www.oceanvillageholidays.co.uk/uploadedFiles/OVH/documents/ThingsToKnow_Med07.pdf

[38] See http://www.pocruises.com/Help/health-and-safety.axd.

5.7. Limitations of intelligence identified

A number of limitations were evident in the information uncovered. These are listed below:

- It is not known to what extent crime prevention strategies would address alcohol-related disorder.
- No information on effectiveness of these policies was provided either in the short or long-term.
- There was very limited or minimal information on how these policies are enforced.
- A number of the websites investigated do not publish information relating to their alcohol policies on their websites.
- It is not known to what extent the policies uncovered (either from outside the UK or outside the rail environment) would be applicable to a UK rail environment.

6. Findings: Intervention effectiveness

Section 5 highlights a number of initiatives to reduce alcohol harm in public transport settings; however, evaluations have not been carried out in the vast majority of examples. In order to answer whether or not the interventions / policies are likely to be effective, this section looks beyond alcohol in a transport environment to present evidence from other settings where evaluations have been performed. The initiatives are divided into three subsections to address: strategies to manage alcohol consumption, strategies to manage the negative consequences of alcohol consumption, and multi-component strategies. In the text, references to the sources identified through the systematic search strategy are italicised to enable easy identification and to inform the reader that further information on these studies can be found in Appendices 2 and 3. Appendix 2 details literature reviews (including systematic reviews) and Appendix 3 details articles discussing specific interventions.

6.1. Strategies to manage alcohol consumption

This section discusses strategies that have been used to reduce alcohol consumption in transport settings and beyond. If such strategies were employed within the rail industry they would not affect consumption external to it, but they could affect consumption of alcohol carried by passengers or purchased on the rail network.

6.1.1 Alcohol ban

It has been seen as good practice to ban alcohol consumption in bus stations (DfT 2002b). This is thought to be supported by staff in preventing nuisance behaviour (DfT 2002b). Rail companies could choose to prohibit alcohol on trains using railway byelaws already in existence[39]. However, very little information has been available to date on how this can be instigated and its effects within a public transport arena. In particular, further information is required not only as to how this might reduce alcohol-related issues on the rail, but also on its impacts on individuals who drink within the recommended daily guidelines. Whilst they might welcome the potential reduction in alcohol-related issues and are likely to benefit from its establishment (lighter drinkers are also at risk of alcohol-related harms; see Section 4.1.1), they may not welcome the ban's impact on their own consumption. Further, public transport has been hailed as a viable alternative to drink driving and to the dispersal of intoxicated individuals, and it is not known as to what extent an alcohol ban on public transport would lead to increased incidents of drink driving or other harms.

In the USA and New Zealand, studies have examined banning alcohol consumption amongst populations more likely to be involved (young people) in alcohol-related incidents of harm such as alcohol-related car crashes. Here, reducing the minimum legal drinking age (MLDA) has had a mixed effect on drink driving and related harms (*Hedlund et al. 2001; McCartt and Kirley 2006; Shults et al. 2001*). However, when the MLDA was lowered in New Zealand, the crash rate increased notably for young people, (*Kypri 2006*). In the UK, the minimum purchasing age for alcohol is 18, but despite tough enforcement measures, underage young people continue to successfully access alcohol illegally (Bellis et al. 2007; DCSF 2008).

Alcohol bans have also been established in public areas more generally. Designated Public Place Orders (DPPOs) criminalise drinking alcohol in a public area after individuals are required by a police officer not to do so. Refusal can lead to arrest. During the pilot in Coventry, surveys (n=1,200 approximately) showed a decrease in both the proportion of people experiencing verbal abuse (12% to 8%) and the perception that public drinking was a problem (52% to 23%; Ramsey 1990). Subsequent evaluations have been limited (Hannon et al. 2008). Nevertheless, reports have shown that rigorous, frequent and high profile uniform enforcement, continuous resources (Home Office 2007a) and residential support can be important in success (Three Rivers Council 2007). Any evaluation on the impact of these should examine crime reduction as well as appearance and atmosphere (which are important to citizens), and should monitor the impact on marginalised groups (such as rough sleepers) who may be excluded from town centre areas by the measures (Dixon et al. 2003). Long-term effectiveness is not known.

[39] See http://www.publications.parliament.uk/pa/cm200809/cmhansrd/cm090427/text/90427w0002.htm#09042725000550

6.1.2 Campaigns

The Updated National Strategy and others recommend campaigns as a means to raise awareness of the excessive alcohol consumption and the possible surrounding negative consequences (DH et al. 2007; Gershon et al. 2008; Home Office 2003). Campaigns have been run nationally and locally (DH et al. 2007; Mistral et al. 2007; Morleo et al. 2008a). Examples highlighted in the National Strategy (DH et al. 2007) include (although evidence of effectiveness is minimal):

- Know Your Limits aims to raise awareness of alcohol units amongst 18-24 year old binge drinkers (DH et al. 2007). It uses a range of media and public relations strategies. This national campaign is also used locally. In the Isle of Wight, it may have contributed towards a 14% reduction in crime in the Christmas period.[40]
- THINK! aims to reduce drink driving (DH et al. 2007). Academic literature on campaigns in transport mainly focuses around drink driving (such as *Berg 2006; Foss et al. 2001; NHTSA 2008a*). One of these (a social norms campaign[41]) reported a significant but limited effect: whilst there was a significant decrease in levels of intoxication shown through the breathalyser, there was no change in self-reported drinking (*Foss et al. 2001*). No details of a possible long-term effect were provided.

Other examples also include (although, again evidence of effectiveness is minimal):

- Safer Travel at Night (STAN) was launched to combat sexual assaults associated with illegitimate taxi drivers in London. This used posters, television advertisements, leaflets and cinema advertisements to advise women on safe late night travel options (Hungerford et al. 2008). Reported sexual assaults decreased from 212 in 2002 to 140 in 2003 (GLA 2004). However, no information is available on the current situation.
- The NHS Zero Tolerance campaign was launched in 1991 among staff to tackle under-reporting (BBC 1999). Posters were displayed in hospital accident and emergency departments, staff rooms and doctors' surgeries. Information packs have also been produced to advise managers on establishing safer working conditions. There has been a significant increase in reported violent or abusive incidents between 1998 and 2001/02.[42]
- The Freedom from Fear campaign seeks to prevent violence, threats and abuse towards shopworkers through negotiations with employers to improve safety and security; campaign to the Government for policies to tackle retail crime and anti-social behaviour; raise awareness with the public that violence and abuse are unacceptable; and give shop workers the confidence to speak out.[43]

Working with the local media may also be beneficial, for example, by reducing media coverage that might contribute to fear (Home Office 2003). In Austria, media guidelines were developed in mid-1987 to tackle suicide on the subway (Etzersdorfer and Sonneck 1998). These advised journalists of the negative consequences of suicide reporting (the possibility for triggering other suicide attempts). Subsequently, reports were more moderate and there was an 84.2% decrease in suicides and attempted suicides on the subway (comparing the six months before the campaign with the six months after; numbers decreased from 19 to three). Levels continued to remain relatively low (at least up until 1996). However, it is not known to what extent alcohol was involved. However, because individuals select the information they choose to receive and act on (Shimp 1997; Windahl et al. 1992), communications strategies must go beyond information provision to influence behaviour (Jones et al. 2007). For example, labels detailing alcohol content in units may increase awareness but are unlikely to change behaviour (Anderson and Baumberg 2006; Babor et al. 2003). Thus, in general, evidence suggest a limited impact of information-based strategies (Morleo et al. 2008b). This may be because:

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[40] See http://www.hubcapp.org.uk/php/displayprojects.php?status=displayprojectoutcomes&projectid=191&key=.

[41] A social norms campaign can be used to raise awareness of what constitutes normal behaviour for the majority of people in order to reinforce positive behaviours. This is based on the hypothesis that a population tends to perceive that a large number of people are engaged in a risky behaviour (and so encourage further involvement), rather than the small minority in reality.

[42] See http://www.dh.gov.uk/en/Publicationsandstatistics/Lettersandcirculars/Dearcolleagueletters/DH_4009619.

[43] See http://www.usdaw.org.uk/campaigns/freedom_from_fear/.

- Mass media health promotion campaigns may struggle to compete with industry marketing strategies because of their much smaller budgets (Babor et al. 2003; Giesbrecht 2007).
- They are trying to discourage an activity (drinking) that the target population enjoy doing (Engineer et al. 2003), and so may struggle to engage with their audiences.

Therefore, it may be more appropriate to follow a targeted social marketing approach, whereby population segmentation techniques are used to identify the motivations of individual groups (see Carlin et al. 2008). In this way, levers for behavioural change and ideal opportunities for intervention can be better understood and acted upon. One example of this is Road Crew, a social marketing initiative established to reduce the number of incidents of drink driving in Wisconsin (USA; *Karsten et al. 2003*). Research identified that men were very proud of their vehicles and did not want to leave them behind after drinking in case of damage or being ticketed. Alternative and attractive rides were devised: for example, subsidised or free rides were offered to and from venues in, for example, limousines or cadillacs. From July 2002 to June 2003, 19,757 rides were given to potential drunk drivers and estimated to have reduced alcohol-related road traffic accidents by 17% (n=15). Whilst, as highlighted by the Youth Alcohol Action Plan, the Government aims to develop a social marketing campaign to change young people's attitudes towards alcohol consumption (DCSF 2008); further research would be needed to see how applicable this could be to public transport.

6.1.3 Community programmes

Community programmes could be effective in reducing excessive consumption and harms such as drink driving (*Hedlund et al. 2001; Williams 2006*). Seven original related research articles identified through the systematic review (see Appendix 3) highlighted the impacts of such programmes but only two interventions reported a significant beneficial effect. The Trelleborg project (Sweden), for example, saw the adoption of community and school alcohol policies, the distribution of leaflets to parents and efforts to reduce underage sales (*Stafström et al. 2006*). The risk of experiencing an alcohol-related accident or violent incident subsequently decreased by 40% for 14-16 year olds between 1999 and 2003. Other community programmes showing effectiveness include the Community Alcohol Project in St Neots, Cambridgeshire (RASG and Cambridgeshire County Council undated). Here, initiatives included: Trading Standards working with retailers to advise underage people and proxy purchasers on why their purchase was refused; stakeholders working with the local press to boost perceptions of local spaces; police providing education at colleges and boosting the number of patrols in hotspot areas; and offering alcohol awareness workshops for parents. There was a subsequent decrease of 42% in the number of anti-social behaviour incidents (from 335 in August 2007 to 196 in February 2008) and a 92% decrease in the number of alcohol-related litter identified (from 107 in the first weekend of the initiative in September to nine in its final weekend in January). However, the report did not account for seasonal variations. To maximise effectiveness, such programmes could include attitude or behavioural change programmes based on social learning theory[44]; be well publicised; and involve parents, police and teenagers (*Williams 2006*).

6.1.4 Diversionary activities

There are a number of diversionary schemes in operation across the country and internationally. These aim to engage with young people through activities such as sport (see Section 5.4.2 for details of one involving a bus company in Glasgow). Positive Futures is an enhanced national programme (a social inclusion programme), which engages young people in a wide range of activities as a catalyst for project participation.[45] It also aims to steer the young people involved towards education, training and involvement. It does not specifically aim to address alcohol consumption but involves young people from vulnerable areas who might be more likely to be involved in related disorder. Between October 2006 and March 2007, 27,171 young people were involved in the scheme, of whom 37% had been involved with a project for three months or more (Home Office 2007b).

6.1.5 Education

Bus drivers and police officers have worked with schools in order to reduce anti-social behaviour (see Section 5.4.2). Two of the articles retrieved through the systematic review discussed the impact of school-based education programmes on reducing alcohol consumption and related harm within a

[44] Social learning theory is a learning method whereby individuals learn behaviour through other people via a reward and/or punishment process.
[45] See http://drugs.homeoffice.gov.uk/young-people/positive-futures/ for further details.

transport setting (*Bell et al. 2005; Griffin et al. 2004*). Both were based in the USA and within a drink driving environment. Only one reported a significant effect on reducing alcohol consumption and/or related harm, with a significant impact on recorded risky driving offences after six years (see Appendix 3; *Griffin et al. 2004*). However, in general, evaluations of such educational programmes have suggested a limited effect especially in the long-term (*Hedlund et al. 2001;* Jones et al. 2007). Workplace education can also be used to reduce excessive alcohol consumption (*NHTSA 2008a*). Whilst none of the interventions reported a significant beneficial effect, a number of studies outside the transport context provide supporting intelligence on the effectiveness of workplace initiatives (Bennett et al. 2004; De Greef and Van den Broek 2004).

Finally, education can be directed specifically at those groups who are most at risk of harm such as young people, young drivers or nightlife users. In general, there has been little evidence of effectiveness of interventions such as driving school education programmes (*Compton and Ellison-Potter 2008; Roberts and Kwan 2009; Vernick et al. 1999; Williams 2006; Williams and Ferguson 2004*) potentially because young people may enjoy behaving riskily (*Compton and Ellison-Potter 2008; Williams and Ferguson 2004*). However, one study disseminated brief pieces of information to nightlife users as they travelled to nightlife areas (*Lange et al. 2000*). This American-based study highlighted that of all the methods tested, the group norm method (where all group members were provided with information on the reasons for having a designated driver) was the most effective in reducing alcohol consumption of the designated driver, but suggested that men and women needed to be targeted differently. In a similar vein, it has been suggested that offenders could be educated about the dangers and consequences of vandalism to prevent future offending (Home Office 2003). However, this assumes that offenders would be concerned about the dangers of offending and that they are unaware of them (Home Office 2003). Further, no details are provided on the most effective way of doing this (such as the teaching methods, the length of the lessons required, whether booster sessions should be used).

6.1.6 Intoxication ban

A more targeted approach than banning alcohol (see Section 6.1.1) would be to ban intoxication. This would affect only most at risk of causing problems and provide benefits for other transport users (as removing intoxicated individuals from a transport environment could improve personal security; DfT 2004), rather than the whole public transport using population. However, as with an alcohol ban, public transport has been hailed as a viable alternative to drink driving and to the dispersal of intoxicated individuals, and it is not known as to what extent an alcohol ban on public transport would lead to increased incidents of drink driving or other harms. Nevertheless, there are a number of environments where such intoxication is actively prohibited. Door supervisors, for example, may eject intoxicated individuals if their behaviour leads to problems (Monaghan 2002). In the UK, to maximise the potential of door supervisors in this role, legislation introduced in 2004 has a number of requirements including training (see Section 6.2.17). Intoxicated individuals may also be removed from sports events. For football matches where one team is from one of the top five divisions, it is a crime to enter the ground drunk, be drunk in the ground, or drink alcohol in sight of the pitch (FA 2006). For large events, restrictions can extend outside the stadia: at a World Cup qualifier in 2005, drinking or carrying alcohol was prohibited in Manchester and Trafford (FA 2005). Football-related arrests have decreased significantly since the 1980s (FA 2005), and continue to do so, falling by 22% from 2003/04 to 2005/06 (Home Office 2006a). However, other measures have also been used such as season ticket bans, banning hooligans from grounds and targeted police operations (Pearson 2005). Nevertheless, there are a number of issues with the prohibition:

- Restrictions are extremely unpopular with fans (Scottish Executive 2007).
- Bars may be open in the venue until the game starts (Hannon et al. 2008).
- Fans may arrive already drunk (FA 2005).
- Organised violence may occur away from the venue and away from security officers who could manage the incident (FA 2005).
- Fans may substitute illegal drugs for alcohol (O'Brien et al. 2005).
- The number of more serious violent incidents is not decreasing (FA 2005).

- In Rome, at the recent Champions League final, licensed venues were reportedly ignoring the ban.[46]

6.1.7 Intoxication limit

Section 6.1.1 discusses the effectiveness of total alcohol bans, and Section 6.1.6 highlights the possibilities of banning intoxication. However, it is also possible to set specific limits on levels of intoxication allowed in certain environments. This can be demonstrated through the literature surrounding drink driving, where individuals are not allowed to have a blood alcohol concentration (BAC) over a specific level (0.08% BAC in the UK). A large number of articles (mainly from the USA) were uncovered via the systematic search strategy which addressed the issue of enforcing alcohol limits on drivers (full details of which can be found in Appendices 2 and 3). They discussed eight types of enforcement (such as police patrols and sobriety checkpoints), with four having a significantly positive effect on reducing alcohol consumption and related harm. However, there are a number of issues with drink driving enforcement methods: it may be difficult to change resistant populations such as repeat offenders (*GAO 2008*); and multiple enforcement events may be needed as the effects of a single event are small (*Creaser et al. 2007*). If alcohol intoxication were to be limited on the railways, these studies highlight effective methods for enforcement. Specialist training would be required to enable staff to effectively and efficiently remove such individuals from the environment (or prevent them from entering). Further, intoxication policies such as zero tolerance are difficult to enforce because individuals may not appear intoxicated at low levels of consumption (*McCartt and Kirley 2006*).

In order to maximise the effects of drink driving limits, these have been lowered in a number of cases. Twelve articles uncovered through the systematic review discussed the impact of this (see Appendices 2 and 3 for more details). The results of such a strategy were mixed (for example, see *Mann et al. 2001*) and it was difficult to separate the effects of the legislation with those of licence revocation laws (*Shults et al. 2001*), with no information on the long-term benefits. Lower intoxication limits can also be directed to specific groups (for example, those under 21 years) through Graduated Driving Licences. These have been shown to help reduce alcohol-related crashes in the USA, Canada and New Zealand (*Begg and Stephenson 2003; Compton and Ellison-Potter 2008; Mayhew et al. 2002; Shults et al. 2001; Ulmer et al. 2000*). However, they remove hazardous driving situations rather than address risky driving (*Ferguson 2003*) and may not remain effective once a full licence is issued (*Grube 2006; Mayhew et al. 2002*). Whilst these studies provide a useful insight into how intoxication limits could be enforced on the railway and the possible effects of doing so, their level of applicability to a public transport environment is low.

6.1.8 Responsible beverage server programmes

By law, it is illegal to serve intoxicated individuals. Yet, there are high levels of intoxication in town and city centres across the UK every weekend. Bar server training could be one way to tackle this: a small-scale survey of bar servers (n=87) in Manchester suggested that only a quarter (26.5%) had received training in alcohol service from their current employer (Hughes and Anderson 2008). Further, server training in Glasgow was considered to have contributed to a 13% decrease in violent crime in the city centre (Mistral et al. 2007). Dram shop liability laws can also be used but further research is needed on their effectiveness (*Grube 2006*).[47] Such training could include:

- All basic information that is relevant to servers (such as the relationship of alcohol to harms and legal requirements; *Mosher et al. 2002*).
- Identifying signs of, for example, sexual violence (Hungerford et al. 2008).
- Safety advice to patrons (Hungerford et al. 2008).
- Importance of limiting alcohol drinks promotions (Hungerford et al. 2008).
- Refusing sales to obviously intoxicated individuals (Hungerford et al. 2008), although it can be difficult to track the number of drinks consumed per patron (Moskowitz 2006).
- Use of food: eating food (especially carbohydrates) before or while drinking alcohol can reduce the rate of alcohol absorption into the bloodstream and so could reduce the risk of drunkenness (Gentry 2000; Paton 2005). In nightlife venues in Blackburn (Lancashire), providing toast has

[46] See http://www.goal.com/en/news/10/italy/2009/05/27/1288767/rome-alcohol-ban-ignored-as-50000-fans-arrive-for-champions.

[47] Dram shop liability laws are where individuals injured by a minor or intoxicated individual can recover damages from the retailer who sold the alcohol (Grube 2006).

been reported to have contributed to reductions in the number of violent incidents (Morning Advertiser 2007).

However, there are no formal assessments on the effectiveness of these strategies and reviews examining responsible beverage server programmes show mixed results in reducing intoxication and/or related harm (*Beirness et al. 2001; Grube 2006; NHTSA 2008a; Ramirez et al. 2008; Shults et al. 2001; Wagenaar and Tobler 2006; Wiggers et al. 2004*). For example, one study in the USA reported a significant decrease in drink drive arrests comparing three months before the intervention with three months after (*Ramirez et al. 2008*). However, seasonal fluctuations could have contributed to these. Other issues include the potential for dispersal (for risky drinkers to go to other venues), and difficulties in assessing intoxication (*Mosher et al. 2002*) in a busy bar environment. Nevertheless, it is thought that the impact of such programmes can be maximised through:

- Managerial support (*Mosher et al. 2002; Shults et al. 2001; Wagenaar and Tobler 2006*).
- Community support (*Shults et al. 2001*).
- Subsidising training as a way to encourage participation (Mistral et al. 2007).
- Training being at least four hours in duration (*Mosher et al. 2002*).
- The use of behavioural change and communication techniques (*Mosher et al. 2002*).[48]
- Using mandatory schemes (*Mosher et al. 2002*).

Whilst bar server training cannot be effective in addressing irresponsible sales made before the individual enters the rail environment, it may be appropriate for preventing further misuse once the individual is there, for example, by encouraging the consumption of non-alcoholic drinks and/or food, and the provision of advice.

6.1.9 Retail restrictions

There are a number of ways in which retail restrictions can be used to reduce alcohol consumption and related harm. These are outlined below.

Advertising: A ban on advertising could reduce alcohol-related drink drive fatalities (*Laurell 2006*). Modelled data by Saffer (1997) suggest that a total ban on advertising could reduce fatal road traffic accidents by up to 10,000 per year in the USA. Whilst this review is over ten years old, a more recent systematic review on the impacts of promoting alcohol consumption suggested that there is a small but consistent effect of advertising on consumption (Booth et al. 2008). Further, authors note that exposure to advertisements outdoors or in newspapers or magazines may increase the likelihood of young people drinking and the quantity consumed. Thus, modelled data from the USA suggest that a complete ban on alcohol advertising would reduce alcohol-related years of life lost by 16.4% (Hollingworth et al. 2006).

Hours: A number of studies have examined the impacts of licensing hours on harm. These are outlined below. However, there have been a number of methodological limitations with mixed effects of hours on related harms (*Vingilis 2006*).

- Reducing closing time from 5am to 2am in Juarez, Mexico, lowered the number of American individuals crossing back over the border from Juarez by 89% after 3am but there was no significant change between 12am and 3am (*Voas et al. 2006*). Thus, a displacement was seen into the earlier hours. No such change was seen in a neighbouring town where the licensing hours had not changed. However, this does not mean that participants' consumption habits changed.
- An extension of licensing hours in Ontario from 1am to 2am showed little impact on BAC positive fatalities after four years (Vingilis et al. 2005). This may be because the extension was only marginal.
- In Perth (Australia), an evaluation of extending opening hours by one hour in 45 licensed public houses showed an increase in recorded violence in or around these premises by 70% (July 1991-June 1997; Chikritzhs and Stockwell, 2002).
- In Diadema (Brazil), prohibiting alcohol sales after 11pm in 2002 may have helped to prevent 273 homicides in the next two years (PIRE, 2004).

[48] Behaviour change programmes focus on the individual, community and environmental influences on behaviour. They encourage individuals to reflect on their risk behaviours and change them in order to reduce vulnerability.

Identification requirements: There are a number of schemes across the country to help retailers identify underage individuals and prevent underage sales. Local initiatives have developed their own photo identity cards but nationally, PASS (Proof of Age Standards Scheme) cards are available.[49] In addition, many retailers now operate Challenge 21 schemes, whereby individuals who look under the age of 21 are asked for identification on attempted purchases.[50] Whilst such schemes are recommended by local Trading Standards agencies (Morleo et al. 2007) and national Government policies and/or strategies (DCSF 2007; DH et al. 2007), it is not known to what extent they are effective in reducing alcohol consumption.

Outlet density: A review suggested a strong link between outlet density and alcohol-related motor vehicle crashes (*Gruenewald 2006*). Together, the studies examined showed that a 1% increase in outlet per population would proportionally increase alcohol-related crashes by 0.1-0.4%.

Price: A systematic review on the effects of price and promotion for the Department of Health noted that point of sales promotions can affect overall consumption of underage drinkers, binge drinkers and regular drinkers (Booth et al. 2008). Literature has highlighted the effectiveness of price rises on reducing levels of alcohol-related harm in the USA and Australia (Chikritzhs et al. 2005; Cook and Moore 1993; *Laurell 2006;* Markowitz 2000; Markowitz and Grossman 1998; *Young 2006*). Modelled data for England and Wales suggest if the price of beer was sustainably increased by 1% above inflation, the number of violent injuries would decrease by 7.25% (equivalent to 2,200 a month; Sivarajasingham et al. 2006). Because of the closed nature of the rail environment, it may be possible that pricing strategies would show increased effectiveness compared with more open environments where consumers are free to purchase elsewhere. This has been discussed by Caraher and Cowburn (2005) relating to food pricing strategies in schools and workplaces. However, as with an alcohol ban (see Section 6.1.1), such a strategy is unlikely to be popular with passengers themselves and will affect both moderate and more problematic drinkers.

6.1.10 Treatment and brief interventions

Treatment or brief interventions can be offered to individuals who are drinking excessively to prevent future harm.[51] Involvement in alcohol-related harm such as drink driving or other offences could be an opportune moment to offer a brief intervention because such incidents may be symptomatic of a larger alcohol misuse problem (*NHTSA 2007*). Thus, the National Alcohol Strategy suggests that binge drinkers who have been arrested for alcohol-related offences respond well to brief advice sessions with alcohol specialists on the effects of their drinking (DH et al. 2007). The systematic search identified six studies examining the effects of specific interventions directed at individuals who had committed an alcohol-related offence (see Appendix 3). All related to drink drivers and all but one were from the USA. Three reported statistically significant effects compared with normal punitive measures. However, long-term effectiveness is not known. Further, the effects of treatment or rehabilitation can vary, and studies to date have been limited methodologically due to short follow-up periods and lack of randomisation in group allocation (*Freeman and Liossis 2002*). Overall, however, a meta-analysis suggests that rehabilitation can reduce drink driving recidivism by 7-9% and that the benefits appear to be more long-term than for sanctions on driving licences, as well as providing the opportunity to impact on knowledge, attitudes, lifestyle and psychosocial functioning (*Ferguson et al. 1999*). Further, the National Alcohol Strategy suggests that for every eight people who receive advice, one will reduce their drinking to within lower-risk levels (that is within the recommended maximum levels; DH et al. 2007). To maximise effect, the meta-analysis suggests that this should be based on multi-modal models (that is including counselling, education, probation and licence suspension), target high-risk offenders, be community-based, and follow a directive approach (*Ferguson et al. 1999*). It has been suggested that health care providers should be the main delivery agent of appropriate interventions (*NHTSA 2007*) such as via emergency settings (that is accident and emergency departments; *Dill et al. 2004*) and, as suggested by

[49] See http://www.pass-scheme.org.uk/.
[50] See http://www.challenge21.co.uk/.
[51] The term brief interventions is used to identify those interventions that can be delivered quickly and easily and include information on the nature and effects of harm, written self-help material and emphasis on the individual having responsibility for change. Thus, they can include initiatives from leaflet provision to motivational interviewing. Please see DH and NTA (2006) for further details.

the National Strategy, general practice (GPs; DH et al. 2007). However, it has been suggested that generic non-specialist services could be appropriate providers (DH and NTA 2006). This could even take the form of leaflets. In the nightlife environment, some club promoters and ticket agents provide safer clubbing information on flyers or tickets (Home Office et al. 2002). However, further research is needed as to the applicability and effectiveness of this.

6.1.11 Summary

There are a number of different interventions that attempt to tackle excessive alcohol consumption: alcohol bans, community programmes, diversionary activities, education, intoxication bans and limits, responsible beverage server programmes, retail restrictions, and treatment and brief interventions. A number of these would impact specifically on those more likely to be involved in alcohol-related issues (such as an intoxication ban) whilst the more universal suggestions (such as price or an alcohol ban) would affect both problematic and moderate drinkers. Consideration needs to be given as to how these would be established and the potential effects on the majority of the population who drink within the recommended limits. However, details of the enforcement of these policies is lacking and evidence for the overall impact of these is inconclusive due to a lack of evaluation, and where this has occurred, a lack of high quality studies (such as randomised controlled trials or before and after studies). Further, applicability may also be lessened because much of the consumption that affects the rail environment may occur outside the rail environment. This makes many of the strategies discussed in this setting obsolete. However, such strategies could still be used to tackle alcohol consumption that occurs either on the train itself or in the station. Further, they could be used to manage consumption once it has taken place. This is particularly the case for interventions such as the responsible beverage server training programmes, which could be used to advise individuals on their consumption or to slow further intoxication through the provision of soft drinks or food. Further evaluation is needed to understand the impacts of any intervention implemented.

6.2. Strategies to manage the negative consequences of alcohol consumption

This Section discusses strategies which are employed to manage the negative consequences of alcohol consumption such as crime and disorder, and accidents. See Section 4 for more details on possible harms.

6.2.1 Campaigns

See Section 6.1.2.

6.2.2 Closed Circuit Television

There are a number of examples whereby closed circuit television (CCTV) has been shown to be effective in reducing crime in the transport environment:

- In 1994, New York (USA) taxis were required to install either cameras or partition walls to reduce homicide (Taxi L cited in Hughes et al. 2007). The numbers of such incidents subsequently fell from 40 or more per year in the early 1990s to five or less since 2001.
- In 2004/05, Manchester City Council conducted a pilot scheme on the use of CCTV in hackney carriages (n=20) to prevent crime and disorder (Wheater et al. 2005a). Stickers were used to notify passengers of the presence of CCTV. Following their installation, the majority of drivers felt that crime and disorder in their cabs had reduced. In addition, a brief questionnaire for passengers (n=245), showed that 85% of females and 98% of males reported that they felt safer in the presence of CCTV.

As well as crime reduction and fear management, CCTV can also be used in crowd management as it can enhance the capabilities to identify problems in a crowd resulting from surges or public disorder (HSE 1999). Thus, CCTV is a popular request by both bus and rail passengers to maximise personal security (Crime Concern 2004). The Department for Transport (DfT 2005c) suggests that CCTV can be maximised by: identifying areas where passengers are most vulnerable and not immediately visible; placing cameras where they are difficult to damage or obscure; being flexible in case cameras need to be moved (this is particularly important as camera positioning is more important than quantity; HSE 1999); considering using CCTV in the surrounding area; consider the use of dummy cameras; publicising

the use of CCTV and any successful prosecutions; monitoring CCTV as this will reassure passengers; enabling passengers to see staff monitoring of CCTV to build confidence; and providing good quality recording. The effects of this can be maximised if responses are efficient (Home Office 2003) and if cameras are not static (HSE 2008). However, it is not known as to what length of time individuals can watch CCTV without getting distracted or how many screens they can monitor simultaneously (HSE 2008). Further, no supporting evidence was provided to show that such measures could reduce crime and/or related fear. In fact, existing evidence surrounding the effectiveness of CCTV outside the transport environment is mixed. Interviews with 30 offenders in Airdrie, near Glasgow in 1996 suggested that the presence of CCTV may not impact on levels of offending (Short and Ditton 1998). This may be because involvement in offences such as assaults and thefts are spontaneous decisions (CCTV is less likely to prevent spontaneous crimes; Gill and Spriggs 2005) and because the cameras may lead to offending out of sight of the cameras (Crime Concern and SRA 1999). Together, these may suggest that whilst well-managed CCTV may reassure passengers, the effectiveness of CCTV in preventing alcohol-related crimes in the transport environment is unknown.

6.2.3 Communication tools

Effective communication systems have been recommended as a means to reduce incidents on the rail network (Gershon et al. 2008), allow employees to request help and ensure offenders are apprehended (Home Office 2003). However, different people respond to cues and information in different ways (HSE 1999). Thus, there are a number of ways in which communication could be maximised (although details of evaluation are limited and none are alcohol-specific):

- Installing passenger communication devices such as help points may increase the effectiveness of CCTV cameras and improve responsiveness to incidents (DfT 2005c). Methods to maximise impact include: information detailing when help points should be used and the type of response to expect (Crime Concern 2004; DfT 2005c); signs highlighting the existence of help points (Crime Concern 2004); and staff being based locally to affirm that responses are quick and locally appropriate (Crime Concern 2004). It is also recommended that transport providers should: locate help points in sites of higher risk; provide access for disabled passengers; ensure staff are always available; and direct CCTV towards the help point (DfT 2005c).
- Silent alarms or panic alarms could also be provided (Granville and Campbell-Jones 2005; Home Office 2003). However, a rapid response from the company or police is required for them to be effective (Granville and Campbell-Jones 2005).
- Pro audio (PA) systems are essential in event management for communication with the audience (HSE 1999). To maximise their impact, the announcer should have a good view of the venue, and the output should be clear and intelligible.
- Video screens are used at large events to disseminate public announcements to reinforce other messages and provide information to those with hearing difficulties (HSE 1999).
- Information could be provided on tickets as recommended for public events (HSE 1999). This could include telephone numbers for further information, main routes and safety information. Health advice leaflets are offered on the Norwich SOS bus, which provides help to those in distress in the nightlife area.[52]
- For large public events, site plans can highlight the location of toilets, exits and entrances, car parks, main roads, first aid points, fire points, information points, police points and catering facilities (HSE 1999). Such information could be displayed at entrances, information points and car parks.

However, little information is available on the effectiveness of these communication tools either generally or in relation to preventing alcohol-related issues from occurring. Further, it would be difficult to use a help point to prevent a robbery or mugging due to insufficient time (Crime Concern and SRA 1999). Thus, help points can be more useful if needing information or if a passenger had lost their child.

Communication tools have also been developed in nightlife. Pubwatch was launched in Crewe in 1998 to tackle disorder (Pratten and Greig 2005). Licensees who were part of the initiative banned individuals from all represented establishments if they were found guilty of: verbal assaults or threatening behaviour

[52] See http://www.hubcapp.org.uk/php/displayprojects.php?status=displayprojectdescription&projectcode=JLLZ.

towards the licensee, employees or customers; violence towards the licensee, employees or customers; the possession, supply or procurement of drugs on licensed premises; assaulting members of the public within the pub's vicinity; and/or causing criminal damage within the pub's vicinity. Member pubs displayed posters to raise awareness of the scheme and their membership status and used radio communications to alert other members of any individuals causing problems. Police were informed of any bans and letters posted to individuals involved. Whilst no figures were provided, the scheme resulted in extremely low levels of alcohol-related violent crime and increased trade at the weekends. Pubwatch has since been rolled out to a number of areas across the country (Mistral et al. 2007). Problems have arisen in some areas where radios were stolen or ran out of batteries (Mistral et al. 2007); however, the initiative in Liverpool has been highlighted as an example of good practice by the National Alcohol Strategy (DH et al. 2007).

6.2.4 Criminal justice interventions: notices and orders

The Home Office (2003) toolkit for reducing crime on public transport suggests campaigning for tougher penalties for assaults or robberies involving public transport employees in order to deter potential offenders (Home Office 2003). Here, posters could be used to maximise the effects of any such penalties; however, no information was provided as to the likely impact of tougher penalties either in reducing crime generally or in reducing that which is specific to alcohol. There is a number of alternative generic criminal justice interventions which have been employed to reduce disorder in general. Although these are not for addressing alcohol issues specifically and information on effectiveness is minimal, they could be used in its prevention. Examples include:

- **Licensing Act 2003:** see Section 6.2.11.
- **Violent Crime Reduction Act 2006:** This established alcohol disorder zones (where police and local authorities can charge licensed premises for the cost of additional enforcement activity), enables police or Trading Standards to ban the sale of alcohol in a venue for up to 48 hours, enables fast track reviews of problem venues and provides drinking banning orders (see below).
- **Anti-social behaviour orders (ASBOs):** These civil orders were introduced to deter anti-social behaviour and could be used to exclude known offenders from specific transport locations (Home Office 2003). From April 1999 to September 2001, 466 ASBOs were granted in England and Wales most commonly for verbal abuse, harassment and making threats (Campbell 2002). Practitioner interviews highlighted their belief that ASBOs could reduce anti-social behaviour, although experiences differed between areas. However, an analysis of 40 ASBOs showed that for 36% (n=14), the individual involved had breached their order.
- **Fixed penalty notices (FPNs):** These on the spot fines can be used to manage environmental offences such as graffiti and littering.[53] Very little information is available on their effectiveness.
- **Penalty notices for disorder (PNDs):** These are issued for more serious offences such as throwing fireworks or being drunk and disorderly to those over 16 years.[54] Very little information is available on their effectiveness. However, in 2004, the scheme was piloted amongst 10-15 year olds in six police forces. Numbers involved in the evaluation were small but three quarters of survey participants (n=208; 5% of those who had received notices) said that the notice would prevent them from offending, whilst parental responses were more ambiguous (n=13; Amadi 2008).
- **Drinking banning orders:** These will be introduced in the summer of 2009 and will enable police and local authorities to prevent an individual entering a particular venue for up to two years if they have been involved in criminal or disorderly conduct under the influence of alcohol[55]. Breach of this Order can lead to a fine of up to £2,500.
- **Dispersal order:** A dispersal order has been issued in Swindon which enables police to ask groups of two or more to move on if they are causing problems. Swindon bus station is covered by the order in a bid to prevent intoxicated homeless people from gathering there. This was

[53] Fixed Penalty Notices can be issued by local authority offices and police community support officers to anyone over 10 years old. They are not criminal convictions but can result in such if they are not paid. See http://www.homeoffice.gov.uk/anti-social-behaviour/penalties/penalty-notices/.

[54] Penalty Notices for Disorder are not criminal convictions but can result in such if they are not paid. See http://www.homeoffice.gov.uk/anti-social-behaviour/penalties/penalty-notices/.

[55] See http://www.policeoracle.com/news/Drinking-Banning-Orders-Planned_18087.html.

brought in following public demand. Between March 2004 and April 2007, 24 dispersal orders were issued.

- **Football banning orders (FBOs):** These ban known football hooligans from causing further trouble either at home or abroad and can last between two and 10 years.[56] Precise conditions vary but can include a ban on public transport on match days, or a ban on entering other hotspot areas such as town centres or specific venues. Their effectiveness is hampered by issues such as a high turnover in hooligans; reports of banning orders being attached to innocent individuals; and the occurrence of rioting even with substantial numbers of FBOs in place (Stott and Pearson 2005).

6.2.5 Criminal justice interventions: police presence

Increasing the visibility of the police can be an important component in reducing disorder in a transport environment (Gershon et al. 2008). A systematic review found that increased police patrols can help to prevent alcohol-related road accidents, but do not necessarily reduce alcohol-impaired driving (*Goss et al. 2009*). Three of the four studies investigated found a significant effect on reducing alcohol-related traffic injuries. This may be because increasing the presence of police, security personnel or other employees may help to deter offenders, especially if deployed at locations and/or times when incidents are most likely to occur (Home Office 2003). Thus, the initiative Cardiff after Dark provided a highly visible police presence as part of its crime reduction methods (Mistral et al. 2007) and these have been one of the strategies employed in reducing the incidence of drink driving (see Section 6.1.7). Whilst information on drink driving enforcement has shown a mixed response, there is no supporting evidence for the other suggestions highlighted. Nevertheless, such a strategy may lend itself readily to a railway environment as police patrols could be used on the trains to reduce harms which may occur after intoxication has taken place, as would be the case for nightlife users returning home. It may be possible to use staff marshals in the same way (see Section 6.2.14).

Undercover police officers could also be used, who might be more likely to observe offences and so apprehend offenders (Home Office 2003). They should be used at times and locations where incidents are most likely to occur. However, no information was provided as to the effectiveness of doing this (especially in relation to providing a deterrent), or the effects on passenger confidence compared with the use of uniformed officers to provide reassurance.

6.2.6 Fare structures

Fare structure should follow a simple format to avoid frustration or confrontation (Home Office 2003). In event management, it is recommended that admission prices are set at a round figure to reduce the need to handle small change (HSE 1999). Manchester adopted a set fare policy as part of its City Safe initiative but it is not known as to what extent this contributed to the reported decreases in assaults (see Section 6.3.1).

6.2.7 Glassware restrictions

Glassware from licensed premises may be used in fights and cause significant harm to individuals involved. Polycarbonate glasses have been developed as a practical alternative: the plastic used is almost unbreakable, it looks the same as a normal glass, they are more hard wearing and use less energy in production (Anderson et al. 2009).[57] Such glasses have been recommended for use in venues that are deemed to be high risk by the National Strategy (DH et al. 2007). Trials of these glasses in Lancashire showed that the number of glass breakages in licensed venues reduced from an average of 17 per week to none (Anderson et al. 2009). In addition, initially sceptic licensees were impressed with the glasses on their arrival and reported that they would be happy to introduce them into their venue. Licensing legislation can insist on the use of polycarbonate glasses at particular times to reduce the impacts on disorder in specific venues.

6.2.8 Graffiti material removal

In New York, the sale of spray paints and markers is illegal to those aged under 18 years old (DfT 2003). Further, such products cannot be displayed openly in shops. A shop in the Netherlands has similar

[56] See http://www.homeoffice.gov.uk/crime-victims/reducing-crime/football-disorder/.
[57] See http://www.bfbi.org.uk/index/articles_print.php?id=1005&cat_id=2&start=40.

procedures in place, as it has agreed to only sell spray cans to customers from behind the counter to prevent graffiti and the theft of such items (DfT 2003). Whilst this is said to have significantly decreased the number of incidents in the local area, no specific details were provided (DfT 2003).

6.2.9 Information

The provision of information can provide a quick way to convey orientation and emergency information to individuals, as well as assisting in audience flow management (HSE 1999) and increase passenger confidence (DfT 2005b). Effective provision of information can reduce frustration and anger both in transport and more generally (Home Office 2003; HSE 1999). Easy to follow signage has also been recommended as a means to reduce accidents in rail environments (Gershon et al. 2008). Whilst it is not known to what extent this is effective in doing this either generally or specifically surrounding alcohol-related issues, there are a number of recommendations as to how information should be presented:

- Providing up to date and high quality information: This has been requested by passengers as a means of enhancing personal security (Crime Concern and TTR 1997). This is also supported by the DfT (2005d) and the Home Office (2003). The DfT recommends that transport managers replace out of date publicity and posters, and provide up to date and accurate signage, maps, timetables, real-time information (enabling monitoring of the progress of transport), public address systems, and responses to queries.
- Signs should be lit in the dark (HSE 1999).
- Using large signs: In the nightlife environment, safer clubbing guidance relating to the provision of information via signage recommends large signs to advertise the location of water; however, no further guidance is provided on effectively informing intoxicated individuals (Home Office et al. 2002).
- Accounting for non-readers: good practice guidance for events in public places suggests that signs should use recommended internationally recognised logos for non-English speakers or those who do not read (Home Office 2006b).
- Accounting for the rules: people may be more likely to comply with the rules if they understand the reasons behind them (HSE 1999).
- Timetables and other transport information could be supplied to local pubs or clubs (Manchester Public Health Development Service 2006).

6.2.10 Involvement of other passengers / citizens

Passengers in general can be enrolled to reduce alcohol misuse in the immediate environment: Operation Extra Eyes used volunteer citizens to monitor nightlife venues for possible incidents of drink driving (*Kelley-Baker et al. 2006*). Citizens involved were trained and then contacted police who could arrive at the scene and take appropriate action. Authors suggested that there was some evidence of decreases in drink driving. Initiatives to involve other passengers in promoting responsibility may be important in a rail environment because a supportive response from other passengers to an incident may affect how a victim and/or observer feels about the event, and knowing that someone may intervene may increase confidence (Crime Concern and TTR 1997). However, a review of studies from the mid-80s to early 90s suggests that the presence of passers-by may not be a key factor in offender decisions' surrounding whether or not to offend (Ramsey 1991).

6.2.11 Licensing

The Licensing Act 2003 was implemented in November 2005 to modernise the licensing system and provide local authorities and agencies with more powers and flexibility to manage their nightlife environments at a local level (DCMS 2007). As part of this increased flexibility, venues can now apply for extended hours or licensing activities (such as use of entertainments) but local agencies involved in licensing (known as responsible authorities) can negotiate the inclusion of specific conditions in order for their licence to be granted (known as licensing conditions). These conditions must be tailored towards the four objectives of the Act: to prevent crime and disorder; to promote public safety; to prevent public nuisance; and to protect children from harm. Licences can be reviewed if problems arise in relation to the delivery of these objectives. Since the Act came into force, a number of evaluations have taken place both nationally and locally to assess its impact (see Morleo et al. in press). However, because of methodological limitations and the inherently flexible nature of the legislation, it is very difficult to provide an overall evaluation of its impact or to understand which aspects are working most effectively (Morleo et

al. in press). Nevertheless, the Act provides a number of possibilities which transport authorities and operators could use in order to tackle nightlife harms:

- Advise agencies such as the police and local authorities on delivering safe and swift transport in order to enable effective dispersal of individuals when people are leaving nightlife venues.
- Monitor routes for evidence of disorder. If complaints or incidents of disorder are clustered along geographical areas (such as public transport routes) can be linked with a specific venue and its closing time, this could provide justification for a review of that premises' licence (DCMS 2007). Such intelligence could be collated through the use of questionnaires asking those involved in disorder of the place of last drink. Such questionnaires are distributed in accident and emergency departments to victims of assault, for example, in areas such as Merseyside requesting details on the location of the assault and of their last drink (Anderson and Hungerford 2007).

Licensing schemes such as All Bar None and Best Bar None are used to encourage best practice in licensed venues and involvement can be a condition on premises licences. Best Bar None, for example, was developed as part of Manchester City Safe (see Section 6.3.1) but has now been rolled out nationally[58]. Accreditation is provided to licensees who are able to demonstrate that their venue is committed to working towards the following elements: promotion of responsible licensed trade management; promotion of socially responsible drinking; commitment to caring for and protecting customers; and commitment to reducing the potential for disorder in town centres and public places arising from alcohol abuse. Accredited venues are awarded distinctive plaques to display outside the premises and licensees attend a special awards ceremony to showcase their work.

6.2.12 Lighting

Lighting has been recommended as both a crime and disorder reduction method (DfT 2005e; Home Office 2003; HSE 2008) and as a way to reduce accidents (Gershon et al. 2008). It can be used in a number of ways:

- **Maximising awareness of risks:** Being seen is important in preventing road traffic accidents even during the day (*WHO 2004*): a meta-analysis suggested that daytime running lights on cars could reduce daytime crashes by 10-15% (*Elvik 1996*). Further, lighting could be used to protect pedestrians from road traffic accidents (*Graham 1998*). These may be applicable to the rail industry in preventing passenger fatalities on the line.
- **Reducing fear of crime:** Lighting is a popular suggestion by passengers as a way of improving personal security (Crime Concern 2004).

To maximise the effectiveness of lighting, the DfT (2005e) recommend that lighting should simulate daylight and not create pools of brightness or silhouettes. In addition, it should be frequently inspected for maintenance purposes. However, there are a number of issues relating to its use in crime prevention. Firstly, not all offences occur at night and so lighting is unlikely to prevent daytime crime (Ramsey 1991). In addition, levels of crime may increase during the summer months, yet these months provide longer periods of daylight. Secondly. a review of studies from the mid-1980s to early 1990s suggests that lighting is not a key factor in offender decisions to commit crimes (Ramsey 1991). Finally, small scale evaluations have had methodological problems for example, by not accounting for displacement or using small timescales to assess impact (whereby changes could be due to normal fluctuations; Ramsey 1991). Furthermore studies evaluating the effectiveness of lighting in crime or disorder prevention have had limited results (Atkins et al. 1991; Nair et al. 1993). From November 1985-1988, 3,500 new lights were installed in Wandsworth (Atkins et al. 1991). Police data on crimes committed from November 1984 to August 1989 in Wandsworth (n=100,816) showed no significant change in the number of crimes reported after dark. In addition, interviews (n=379) showed no increase in feelings of safety even though 96% had noticed the changes. More recently, Crime Concern and SRA (1999) highlighted the relighting programme, noting the Council's belief that the programme had contributed to road safety and better security for pedestrians and residents. However, no supporting evidence was provided. In conclusion, there is a lack of evidence surrounding the effectiveness of lighting in reducing alcohol-related crimes but its provision may reduce fear of such incidents (Ramsey 1991).

[58] See http://www.bbnuk.com/what-is-best-bar-none-/index.php.

6.2.13 Maintenance and design of the immediate area

Design of public transport should account for differences in the wider environment, usage, existing facilities, crime problems, resources and competing demands (DfT 2005e). Local knowledge and front line staff can to provide an understanding of this. Nevertheless, there may be some key universal design aspects that can be employed to reduce alcohol-related consumption, related harm and surrounding fear. These are outlined below (however, there are very limited details on the actual impact of these).

Design: Design could be used in a number of ways:

- Use of public or community art to reduce vandalism and misuse, and to create ownership (DfT 2005e). Alternatively, legal opportunities for graffiti could be provided but this could lead to new offenders (who have enjoyed participation) or dispersal to other areas[59].
- Maximum visibility: this can be achieved through minimising recesses, blind corners and wide pillars; the use of mirrors; ensuring paths, platforms and shelters are in view; and using open fencing not solid walls (DfT 2005e). This is because secluded areas can be conducive to crime (Jochelson 1994).
- Design features can minimise the impact of graffiti (see Section 6.2.18).
- Separating individuals by providing separate areas for female passengers and providing barriers or shelters to separate passengers from other people (Home Office 2003). The former, although potentially impractical, might reduce the number of indecent assaults and the latter makes it more difficult for offenders to come into close contact with passengers (although offenders may still travel on the transport mode). Perimeter fences could reduce the number of trespassers (as recommended in event management; HSE 1999).
- Drainage pits can increase the distance between the train and the ground, allowing someone who has fallen onto the track to lie safely underneath (Gershon et al. 2008).
- Limiting access to vulnerable areas through fencing or caging (Home Office 2003). For example, platform screen doors can prevent falls on the tracks (Gershon et al. 2008). Here, train doors and platform doors open simultaneously at designated points; however, the cost is substantial.
- Reducing the opportunities for slips and falls through the provision of ground that is as flat as possible (a recommendation in event management; HSE 1999).
- Crowd reduction can make it more difficult to offend and prevent disputes due to jostling (Home Office 2003). In catering for large outdoor music events, the Health and Safety Executive (HSE 1999) recommends design elements which could reduce over-crowding: the provision of 0.5m^2 space per person to account for factors such as audience migration to more sheltered areas during inclement weather; and providing seats to prevent crowds surging.
- Use of heavy furniture which cannot be easily moved and used as weapons (HSE 2008).

General maintenance: A household survey (n=1,618) highlighted that good maintenance of the area, such as being litter and vandalism free, can increase confidence (Crime Concern and TTR 1997). Thus, it is recommended that graffiti should be rapidly removed to discourage further vandalism (DfT 2005e; Home Office 2003). This can minimise adverse effects on passengers, discourage further vandalism and deny the offender any reward from people seeing their work (Home Office 2003). Passengers, personnel and residents could be encouraged to identify vandalism whilst volunteers, school students and offenders may be able to assist in repairs or graffiti removal. Whilst no evidence was provided for these suggestions, such an approach is in line with the Broken Windows Theory (Wilson and Kelling 1982). This suggests that a swift response to small scale disorder can prevent escalation because one broken window can suggest that no one cares to fix it. However, the effectiveness of this as a crime prevention strategy has been questioned (Harcourt and Ludwig 2006).

Shops: Focus groups highlight how the presence of shops can increase confidence in a transport environment (Crime Concern 2004), as they may act as surveillance or provide assistance during an incident (Home Office 2003). Whilst the DfT (2005f) recommends their provision, they also provide a note of caution that the presence of alcohol outlets may generate issues as well (see Section 6.1.9). No supporting evidence was provided.

[59] See http://www.crimereduction.homeoffice.gov.uk/toolkits/pt00.htm.

Vegetation: A survey noted the importance of tackling overhanging trees and dense vegetation (n=1,809; Crime Concern 2004). Thus, the DfT (2005e) recommends using vegetation to improve appearance but not to provide hiding places or create anxiety, as it is important to maximise visibility in order to reduce passenger fear (Home Office 2003).

Whole journey initiatives: Crime Concern and SRA (1999) noted that measures to improve the pedestrian environment may encourage greater use of public transport as the same design and maintenance principles apply inside the station as outside (DfT 2005e). For example, it is thought that alterations to stations and their surrounding environments can discourage loitering, reducing the potential for confrontation (no information was provided on what form these modifications should take; Home Office 2003). In addition, the effective maintenance of surrounding areas may help to reduce vandalism through the removal of objects such as lineside material. Finally, there are a number of ways in which crime reduction can be maximised in car parks through effective design such as: being capable of receiving surveillance from surrounding areas or premises; using fencing to decrease pedestrian traffic; avoiding the use of overhead walkways which offenders' accomplices could use to watch out for the arrival of the car owner or security personnel; using lighting; instigating patrols; and installing emergency phones on platforms where passengers can report incidents observed in the carparks (Home Office 2003). However, no supporting evidence was provided for these. Outside the transport industry, the University of Queensland has launched the initiative UniSafe, as a whole journey intervention[60]. As well as offering advice and free campus buses, this provides free escorts to public transport stops or cars. Whilst no evidence of effectiveness was provided, the latter might be useful to explore within the rail industry to reduce fear of harm. Such consideration of the whole transport journey and how passengers move on within their journey home is important in preventing the dispersal of alcohol problems (Hughes et al. 2007).

6.2.14 Marshals or wardens

It can be reassuring to have staff present in the transport environment (CLG 2007; Crime Concern 2004) as a uniformed staff presence (or that of security personnel) is seen as an authority and can create an atmosphere of control (Crime Concern and TTR 1997). Thus, taxi marshalling schemes have been recommended as an example of good practice by the National Alcohol Strategy (DH et al. 2007). In Manchester, as part of the CitySafe initiative (see Section 6.3.1), wardens were posted at taxi ranks to manage queues and help customers (Wheater et al. 2005b). This led to an increased perception of personal safety and a 50% decrease in assaults at marshalled taxi ranks.[61] In Melbourne, roving safety officers operating in the night on public transport have contributed to a 12.9% decrease in and around public transport in the first eight months of 2004 compared with the same period in 2003 (Minister for Public Transport and Minister for Police and Emergency Services 2004). Whilst such initiatives are resource intensive, this demand for a greater staff presence could be addressed through more sensitive deployment to increase visibility and mobility (DfT 2005a). Alternatively, Calm Streets in Stockholm (Sweden) used volunteer unemployed young people to patrol the transport network (DfT 2003). Here, those involved assisted passengers, and talked with young people who might be loitering in the network. Approximately 100 young people were involved and they wear distinctive clothing for easy identification. However, no information was provided on actual impact. Outside, the transport context, Stockport Town Centre employs wardens from 9am to 6pm to assist pedestrians, provide information on public transport, report faults and/or damage to street furniture and lighting (Crime Concern and SRA 1999). The wardens are very popular and there has been a reported reduction in bag snatching, car thefts, and trips or falls amongst older people. However, no supporting figures were provided. In addition, it has been suggested that neighbourhood warden programmes may have contributed towards a 28% fall in the level of recorded crime in their areas of operation (CLG 2007). However, no reference for the original article was provided.

Recommendations on how to maximise the impact of marshals include (although no evidence was provided to support these):

- Staff should have radio links with a communications hub (Crime Concern and TTR 1997).

[60] See http://www.uq.edu.au/unisafe/index.asp for more information.
[61] This study compared crime figures from December 2003 to March 2004 with data from the previous year when no marshals were present (Wheater et al. 2005).

- Staff presence could be maximised through glazed facilities, a live public address system, mobile staff teams, and making staff multi-functional to improve services. However, the effectiveness of employing such measures to reduce alcohol-related harm is unknown.
- Event safety guidance suggests that there should be a single chain of command from the safety officer to the marshal (Home Office 2006b). In this context, marshals can be used to perform safety checks, direct spectators, to recognise crowd conditions so as to prevent overcrowding and to respond to emergencies.
- Marshals should wear high visibility jackets, tabards or arm bands (Home Office 2006b; HSE 1999).
- Appropriate staff training is crucial (Home Office 2006b; HSE 1999). Such training could provide information to marshals on what constitutes normal activities in a crowd and the need to maintain a calm and courteous manner (both important parts of event crowd management; HSE 1999). Recommended training topics for event marshals also include fire safety, emergency evacuation and dealing with incidents such as bomb threats (HSE 1999).
- The location of marshals should be identified following a risk assessment (HSE 1999). Possibilities include: gangways, entrances and exits. They should not leave their designated location without permission.

Whilst using staff in this way could be beneficial in reducing and/or responding to alcohol-related harm and has been recommended by the Home Office (2003) toolkit in reducing crime on public transport, further research is needed to understand this fully.

6.2.15 Restorative justice

In 1995, New York (USA) established an Anti Graffiti Task Force (DfT 2003). This provided police patrols of public transport terminals and stations to deter offenders and arrest those involved. Those found guilty of vandalism were forced to paint over or remove graffiti as part of their community service orders. During the initiative's first three months in 2001, those serving community service orders cleaned graffiti from 800,000 square feet of public space. Similar initiatives have been established in Texas (USA; Granville and Campbell-Jack 2005) and the Netherlands (DfT 2003). For the latter, 12 to 18 year olds are confronted with the consequences of their actions and made to either repair the damage themselves, pay for the repairs to take place or face prosecution. They are also required to attend educational sessions on the causes of offending. Of those involved, between 11% and 20% re-offend during the next eighteen months. However, further details are not provided and it is unknown as to how this compares with normal re-offending rates.

6.2.16 Spit kits

Spit kits, which allow DNA swabs to be taken after a spitting incident for comparison with police records, were welcomed by bus drivers in interviews in Scotland (Granville and Campbell-Jones 2005). However, no information was provided on results.

6.2.17 Staff training

In a survey of 174 bus drivers, just under a third reported that they had received formal training on managing anti-social behaviour incidents and 14% had received training as part of their ongoing development (Granville and Campbell-Jack 2005). Those who had received training were less likely to have experienced anti-social behaviour, especially if this training had been ongoing. However, the numbers involved were small. This is important because a supportive response from staff or other passengers to an incident may affect how a victim or observer feels about the event (Crime Concern and TTR 1997). Thus, in order to maximise this, staff must feel secure and competent to deal with threats (DfT 2005a). Staff training could include:

- **Conflict resolution:** It is recommended that new staff are provided with training relating to conflict resolution to prevent crime and disorder in the public transport environment (DfT 2005a; Home Office 2003). Interviews with 24 bus drivers in Scotland highlighted that if drivers take an aggressive stance with individuals involved in anti-social incidents (generally rather than alcohol-related specifically), it can aggravate the situation (Granville and Campbell-Jack 2005).
- **Interpersonal skills:** It is recommended that new staff are offered training on interpersonal skills to reduce crime and disorder in public transport (DfT 2005a; Home Office 2003). In the interviews described above, bus drivers mentioned that a friendly attitude can diffuse a situation (Granville

and Campbell-Jack 2005). Here, verbal and non-verbal communication skills could be an important part of training (HSE 2008).

- **Recording of incidents:** It is important to support staff in reporting incidents (DfT 2005a; HSE 2008). Bus driver interviews (mentioned above) noted a severe lack of time to be able to report incidents; however the same report mentioned that they would welcome training on how to report incidents to police (Granville and Campbell-Jones 2005).
- **Crowd control:** Staff can be trained in methods of crowd control in order to prevent crowds or queues becoming a concern (HSE 2008).
- **Intoxication policies:** Staff of licensed premises should be aware of bar serving policies and be trained to develop the necessary skills to implement these (see Section 6.1.8; HSE 2008).

Managers should be provided with separate training covering the pertinent issues described above as well as issues such as performing risk assessments, keeping staff calm, developing emergency plans and providing post incident support (HSE 2008). For both managers and employees, such training could be provided through inductions, ongoing formal training, shadowing current staff members, and through refresher courses. Ongoing training is supported by drivers (Granville and Campbell-Jack 2005) but the latter is recommended by national government for crime reduction although the toolkit offers no details relating to format or frequency (Home Office 2003; HSE 2008). Barriers to providing such training include lack of money, lack of time, perceptions that anti-social behaviour is not a problem, a shortage of drivers and no interest from staff (Granville and Campbell-Jack 2005). However, 93% of bus drivers in the Scottish survey reported that they would welcome more training in handling anti-social behaviour (Granville and Campbell-Jack 2005). Thus, whilst staff training could be beneficial in reducing and/or responding to alcohol-related harm, further research is needed of its long-term impact on reducing alcohol-related harm.

In the UK, to maximise the potential of door supervisors in crime reduction, new legislation introduced in 2004 provided a number of requirements including training course participation. The curriculum includes: behavioural standards, searching, arrest, recording incidents and crime scene preservation, verbal and non-verbal communication skills, identification of conflict hotspots, problem solving, effective refusal and ejection skills, calming measures and incident management. [62] There is little information on its effectiveness (Anderson et al. 2007b). However, the STAD project in Stockholm (Sweden) saw the integration of door staff training into wider nightlife safety measures (such as responsible beverage server training; Wallin et al. 2003). Violent crime subsequently decreased by 29% in the intervention area. Here, door supervisors attended a two-day training event covering topics including the medical effects of alcohol and conflict management.

6.2.18 Vehicle design

Vehicle design could be used in a number of ways to reduce harm (although details are limited on the actual effect of the suggested initiatives and these were suggested as ways to tackle harm generically rather than alcohol-related harm specifically):

- Passengers may choose seats near the bus driver to increase feelings of security (Crime Concern and TTR 1997). Design mechanisms could enable this or increased visibility within and between train carriages could be used to achieve a similar effect. The DfT (2005e) recommends an open design of vehicles enabling passengers to be within sight of staff and other passengers.
- Maximising visibility through the use of shorter vehicles and single deck buses (DfT 2005e).
- Microfilm developed by the public transport agency for Rome (Italy, known as the ATAC SpA) can be applied to walls, buses and carriages to ensure graffiti can be washed off easily (Granville and Campbell-Jack 2005). This is seen as being an effective mechanism for graffiti removal.
- Protective screens can help to protect drivers from physical assault (Home Office 2003; Granville and Campbell Jack 2005). However, it would only be effective when employees do not leave the cabin area and it could hinder communication with passengers (increasing the potential for conflict).
- Damage resistant technology (such as sacrificial coatings for windows) could prevent vandalism and decrease accidental damage (Home Office 2003). However, vandalism methods and targets change over time.

[62] Please see http://www.the-sia.org.uk for further information.

- The shape and stiffness of motor vehicles can be designed to reduce harm to pedestrians and cyclists (*WHO 2004*). For example, an analysis of past pedestrian injuries through truck collisions suggested that bumper height, bumper offset and grille inclination could affect injuries in speeds of up to 35 km/hour (Chawla et al. 2000). This may be applicable to the rail industry in the prevention of passenger fatalities on the line.

6.2.19 Summary

As with preventing alcohol consumption, there is a very large number of strategies which could be implemented in relation to preventing the negative consequences of consumption. The main interventions include physical design of the environment (such as CCTV and lighting), criminal justice interventions (such as orders and police presence), policies (such as licensing), use of rail staff through employing staff as marshals or improving staff training. Again, there is little evidence of evaluation, and where evaluation has occurred, it is not of a high quality and may have methodological issues such as the use of short time spans to monitor change, which do not account for seasonal fluctuations. Applicability continues to be an issue for these studies as well as those aiming to address the prevention of alcohol consumption in terms of the country of origin, the setting and the fact that not all of the strategies discussed aim to tackle alcohol specifically. Nevertheless, such strategies represent more practical options for the rail environment as a possible means to reduce harm compared with those discussed in Section 6.1, which look at the prevention or reduction of alcohol consumption. This is because such methods provide ways of managing a situation after consumption or intoxication has occurred, a common scenario for the rail industry where consumption is likely to have taken place before the individual boards the vehicle.

6.3. Multi-component strategies

This section discusses strategies which incorporate a range of different initiatives in the prevention of alcohol-related harm. A number of the initiatives discussed incorporate interventions which are discussed in isolation in Section 6.2.

6.3.1 Manchester City Safe

City Safe was launched in Manchester city centre in 2000 (as City Centre Safe) to tackle alcohol and nightlife disorder.[63] It has since been expanded to cover the whole of the city. Measures introduced include:

- A bye-law to prohibit the consumption of alcohol in public areas, which enables the police to seize bottles and glasses from those drinking in the streets.
- Taxi Safe which aims to increase the number of taxis using the city centre and to improve the safety of the taxi ranks.
- Night Bus is operated in partnership with four bus companies and the Greater Manchester Passenger Transport Authority. This runs services until 4am on Friday and Saturday nights, and offers protected night-time bus stops, comfortable buses, CCTV, set fares and other crime prevention/safety features.
- The licensing enforcement team performs regular structured visits to all licensed premises, where the venue's management practices are checked. Other agencies such as Environmental Health may also be involved. Those venues with the highest levels of crime and disorder are prioritised.
- Best Bar None (see Section 6.2.11).
- All initiatives are supported by the internationally acclaimed 'Think Safe Drink Safe' advertising and marketing campaign, which aims to tackle binge drinking cultures and provide helpful advice to nightlife users. It uses local radio advertisements.
- Safety glasses in pubs and clubs.
- Secure bottle bins.
- The '18? Prove it' campaign to tackle underage drinking.

Other measures include help points at bus stops, set fares on buses, marshals at bus stops and high profiling of the night routes (Home Office 2003). In addition, radio contacts were established between

[63] See http://www.citycentresafe.com/whatiscitysafe.php.

bus employees, employees at the pubs and clubs, the CCTV control room and police patrols. The initiative was considered to have contributed to the 12.3% decrease in recorded assaults in Manchester city centre in 2001/02. However, the source does not provide details on the number of assaults (and so it is difficult to judge the meaning of the percentage decrease), which dates the decrease was being compared with, or whether the decrease was significant. Finally, wardens were also posted at taxi ranks to manage queues and help customers (Wheater et al. 2005b). This led to an increased perception of personal safety and a 50% decrease in assaults at marshalled taxi ranks.[64]

6.3.2 Nightzone

Nightzone was launched in Glasgow in December 2005 for 12 weeks in order to reduce crime and disorder and tackle the population's perceptions of this (Mistral et al. 2007). Interventions included: upgrading and additional lighting to cover night-time taxi ranks and bus stops; installation of pan and tilt CCTV cameras; additional highly visible police; extra public help points; and the removal of graffiti and fly posting. In addition, Nightzone relocated night bus stops and improved visibility of these; distributed leaflets on taxi ranks and bus timetables; increased the number of taxis available during Christmas; and provided taxi wardens and bus inspectors. Overall, violent crime decreased by 19.1%, and robbery by 21.5%, whilst arrests for disorder increased by 61%.

6.3.3 Purple Flag

The Purple Flag accreditation has been developed by the Civic Trust as an international standard for night-time management of town and city centres.[65] In order to obtain the award, town centres should be well regulated and hospitable; accessible and attractive; provide a balance of activities; and a vibrant choice of entertainment.

6.3.4 Zero tolerance

In New York in the 1990s, a programme of zero tolerance towards disorder was launched (Granville and Campbell-Jack 2005). This included targeting issues such as street drinking and graffiti. Local police commanders were granted increased powers in relation to resource deployment and operation management. Between 1990 and 2001, the number of incidents on the subway (in general rather than alcohol-related) dropped by 75.7% from 17,497 to 4,262 (Granville and Campbell-Jack 2005). However, a number of issues have been raised which question its efficacy such as a potential coincident demographic change in the New York population (that is fewer young people), a general fall in crime even in areas where the policy did not apply, possibility of victimisation, and too much emphasis on performance indicators and targets to provide effective policing (BBC 1997). Further, such policing strategies follow the broken windows approach, which may not be effective in reducing crime and disorder (see Section 6.2.13).

6.3.5 Summary

The interventions discussed in this section are evidence of multi-component strategies, which aim to tackle whole situations in a number of different ways. Such strategies are important because no measure in isolation can be effective in reducing harm or fear of harm, as reported by passengers (Crime Concern and TTR 1997) and published literature (Crime Concern 2004; DfT 2005f). Manchester CitySafe and Nightzone are particularly good examples. Their evaluations show that such strategies can be highly effective in harm prevention in nightlife. Such approaches have strong parallels with the interventions employed in rail industries in Hong Kong (China) and Washington (USA), areas which are known to have lower levels of crime and disorder (see Section 5.2.2).

6.4. Limitations of the literature

- The literature identified through the systematic review may be limited in terms of its applicability to the rail industry because much of the identified information refers to drink driving.
- There is a lack of high quality evaluations including randomised controlled trials and controlled before and after studies even in the peer-reviewed literature.

[64] This study compared crime figures from December 2003 to March 2004 with data from the previous year when no marshals were present (Wheater et al. 2005).
[65] See http://www.civictrust.org.uk/our-work/purple-flag-award/.

- A number of studies evaluate the intervention involved using short time periods, and do not account for likely seasonal fluctuations.
- The literature identified may be limited because the vast majority of the studies identified were from outside the UK, from countries such as the USA and Australia. This may limit whether they can be extrapolated to a UK situation because of the differences in culture, legislation and expectations (for example, in the USA, young people cannot purchase alcohol until they are 21 years old compared with 18 years here in the UK).
- Very few of the studies identified investigated the long-term impacts of the programme discussed.

7. Conclusion

Whilst the majority of the population drink within the recommended guidelines and do not experience any immediate negative consequences associated with drinking (DH et al. 2007), there are a wide variety of harms associated with excessive alcohol consumption which may be applicable to a public transport environment. These include: accidents such as falls; anti-social behaviour including littering and noise; crime such as assault, including sexual assault; fear of crime; long-term injury and harm; and wider effects on the employer through absenteeism, reduced productivity after an incident and financial implications (see Section 4 for more details). Excessive alcohol consumption and relating harms are more prevalent in specific circumstances such as in nightlife, and transport recommendations to date have been focussed on their use as a way to remove or disperse drinkers from the city centre at the end of the night (CLG 2004; Hughes et al. 2007; ODPM 2003). Yet, such action may simply serve to shift issues rather than tackling them directly. Thus, this review intended to investigate the types of interventions that could be used to tackle alcohol-related problems in the transport environment.

A wide-ranging systematic search strategy was devised to identify interventions being employed in the transport industry to tackle alcohol. However, in doing this, it became apparent that there were substantial gaps in the published literature. The majority of studies identified were from the USA, related to drink driving rather than public transport and had limited information on actual effectiveness, especially in the long-term. Thus, whilst the information retrieved provided a useful insight into possible interventions, the studies were not wholly suitable for the task at hand. Nor did they provide a comprehensive understanding of the actions undertaken. To account for this, further searches were conducted of websites from, for example, individual companies, research organisations, government bodies and other agencies were conducted. These provided a much more in-depth understanding of the types of policies and practices that could be used to tackle disorder both generically and alcohol-related, in public transport and beyond. However, again, issues surrounding a lack of quality evaluations and of applicability to the GB rail environment continued to emerge. Further, details of how policies were enforced or interventions were operated were lacking in a number of cases. It is, therefore, difficult to provide recommendations on the most effective course of action for the railway industry as there is not enough high-quality intelligence available to allow this.

Nevertheless overall, the literature did identify a large number of possible interventions that could be established to try to tackle excessive alcohol consumption and related harms in a transport environment, of which a number tied in directly with recommendations from national Government (Home Office 2003; HSE 2008) and the National Alcohol Strategy (DH et al. 2007). The main strategies identified included:

- Criminal justice orders and police presence.
- Design initiatives (such as CCTV, communication and lighting).
- Licensing.
- Prohibiting alcohol consumption and/or intoxication.
- Responsible beverage server training.
- Staff marshals and staff training.
- Multi-component strategies.

The most promising of these are the multi-component strategies which incorporate a wide range of different initiatives including staff training, police presence, and design. Examples both in the UK (Glasgow, Manchester) and abroad (Hong Kong, China, and Washington, USA) show that where multi-component strategies have been implemented, incidents of crime and disorder can either have either been considerably reduced or effectively controlled from the outset. Indeed, both research with passengers, literature reviews and government bodies affirm that no one single measure can be effective in reducing either harm or fear of harm (Crime Concern and TTR 1997; Crime Concern 2004; DfT 2005f). Furthermore, it is likely that within any effective package of measures, close working will be required between a number of different agencies (CLG 2007; ODPM 2003). Again, the importance of this is reiterated by passenger comments (Crime Concern and TTR 1997; HSE 2008). This could include agencies such as the police, local businesses, local authorities and trade unions, who are recommended partners for working towards reducing violence in licensed premises and retail environments (HSE 2008). Within this, it is acknowledged that further research and evaluation is needed to fully understand how

alcohol issues affect the rail environment, and how interventions introduced can be maximised for optimal impact. This requirement for further research and evaluation is endorsed by the Department for Transport (DfT 2005b).

8. References

** References to the sources identified through the systematic search strategy are italicised to enable easy identification and to inform the reader that further information can be found in Appendices 2 and 3. Appendix 2 details literature reviews (including systematic reviews) and Appendix 3 details articles discussing specific interventions.*

Abbey A, Ross LT, McDuffie D et al. (2001). Alcohol and sexual assault. Alcohol Res Health. 25:43-51.

AFA (Association of Flight Attendants) (2001). Flight attendants issue air rage report card: government and airlines fail. Press release. 6 July 2001. AFA.

Air Navigation (No 2) Order (1995). The Stationery Office, London.

Amadi J (2008). Piloting penalty notices for disorder on 10- to 15-year olds: results from a one year pilot. Ministry for Justice, London.

Anderson P, Baumberg B (2006). Alcohol in Europe: a public health perspective. Institute of Alcohol Studies. London.

Anderson Z, Hungerford D (2007). The Royal accident and emergency department: assault and last year drink location yearly report. April 2006 to March 2007. CPH, LJMU, Liverpool.

Anderson Z, Hughes K, Bellis MA (2007a). Exploration of young people's experience and perceptions of violence in Liverpool's nightlife. CPH, LJMU, Liverpool.

Anderson Z, Hughes K, Bellis MA (2007b). Violence Prevention Alliance Working Group on Youth Violence, Alcohol and Nightlife. Fact sheet 2: the role of door staff in violence prevention. CPH, LJMU, Liverpool.

Anderson Z, Whelan G, Hughes K et al. (2009). Polycarbonate glass pilot project. CPH, LJMU, Liverpool.

Apsler R, Char AR, Harding WM et al. (1999). The effects of 0.08 BAC laws. Rainbow Technology and National Highway Traffic Safety Administration.

Atkins S, Husain S, Storey A (1991). The influence of street lighting on crime and fear of crime. Crime Prevention Unit Paper No 28. Home Office, London.

Babor T, Caetano R, Casswell S et al. (2003). Alcohol: no ordinary commodity. Research and public policy. Oxford University Press.

BBC (1997). Ray Mallon and 'zero tolerance'. BBC. Online article 1 December 1997.

BBC (1999). Zero tolerance for NHS violence. BBC. Online article. 14 October 1999.

BBC (2000). Fine for drunken plane couple. BBC. Online article. 5 April 2000.

BBC (2004). Air rage man given rude awakening. BBC. Online article. 10 October 2004.

BBC (2008). Drunk plane passenger spared jail. BBC. Online article. 14 November 2008.

Begg D, Stephenson S (2003). Graduated driver licensing: the New Zealand experience. J Safety Res. 34:99-105.

Beirness DJ, Schmidt SL, Hawkins D et al. (2001). Using smart card technology to prevent sales of alcohol to minors. Traffic Injury Research Foundation, Ottawa, Canada and Pennsylvania Liquor Control Board, Harrisburg, PA, USA.

Bellis MA, Hughes K, Morleo M et al. (2007). Predictors of risky alcohol consumption in schoolchildren and their implications for preventing alcohol-related harm. Subst Abuse Treat Prev Policy. 2:15.

Bellis MA, Hughes K, Anderson Z et al. (2008) Contribution of violence to health inequalities in England: demographics and trends in emergency hospital admissions for assault. J Epidemiol Community Health. 62(12):1064-71.

Bell ML, Kelley-Baker T, Rider R et al. (2005). Protecting You/Protecting Me: effects of an alcohol prevention and vehicle safety program on elementary students. J Sch Health. 75(5):171-7.

Bennett JB, Patterson CR, Reynolds GS et al (2004). Team awareness, problem drinking and drinking climate: workplace social health promotion in a policy context. Am J Health Promot. 19(2):103-13.

Berg H-Y (2006). Reducing crashes and injuries among young drivers: what kind of prevention should we be focusing on? Inj Prev. 12:j15-8.

Bernardini JM, Rivet G (2002). Behavioural communication strategy. Public Transp Int.

Booth A, Meier P, Stockwell T et al. (2008). Independent review of the effects of alcohol pricing and promotion. Part A: systematic reviews. University of Sheffield.

Budd T (2003). Alcohol-related assault: findings from the British Crime Survey. Home Office Online Report. 35/03. Home Office, London.

CAA (Civil Aviation Authority) (2001). The future of aviation: the Civil Aviation Authority's response to the Government's consultation document on air transport policy. CAA, London.

Campbell S (2002). A review of anti-social behaviour orders. Home Office Research Study 236. Home Office, London.

Campostrini S, Holtzman D, McQueen DV et al. (2006). Evaluating the effectiveness of health promotion policy: changes in the law on drinking and driving in California. Health Promotion International, California, USA.

Caraher M, Cowburn G (2005). Taxing food: implications for public health nutrition. Public Health Nutr. 8(8):1242-9.

Carlin H, Morleo M, Cook PA et al. (2008). Using geodemographics to segment the market for hazardous and harmful drinkers in Cheshire and Merseyside. North West Public Health Observatory, CPH, LJMU, Liverpool.

Chawla A, Mohan D, Sharma C et al. (2000). Safer truck design for pedestrian impacts. J Crash Prev Inj Control. 2(1):33-43.

Chikritzhs T. Stockwell T (2002). The impact of later trading hours for Australian public houses (hotels) on levels of violence. J Studies Alcohol. 63:591-9.

Chikritzhs T, Stockwell T, Pascal R (2005). The impact of the Northern Territory's Living With Alcohol program 1992-2002: revisiting the evaluation. Addiction. 100(11):1625-36.

Cho YI, Johnson TP, Fendrich M (2001). Monthly variations in self-reports of alcohol consumption. J Studies Alcohol. 62(2):268.

Chui, WH, Ong R (2008). Indecent assault on public transport in Hong Kong. Int J Law Crime Justice. 36:2-14.

Cina SJ, Koelpin JL, Nichols CA et al. (1994). A decade of train-pedestrian fatalities: the Charleston experience. J Forensic Sci. 39(3):669-73.

CLG (Communities and Local Government) (2007). How to manage town centres. CLG, London.

Compton RP, Ellison-Potter P (2008). Teen driver crashes: a report to congress. National Highway Traffic Safety Administration, Washington, DC, USA.

Cook PJ, Moore MJ (1993). Taxation of alcohol beverages. In: Hilton ME (ed). Economics and the prevention of alcohol related problems. Research Monograph No. 25 NIH Pub No 93-3513, Rockville, MD.

Cook PA, Tocque K, Morleo M et al. (2008). Opinions on the impact of alcohol on individuals and communities: early summary findings from the Big Drink Debate. North West Public Health Observatory, CPH, LJMU, Liverpool.

Creaser JI, Affleje W, Nardi F (2007). Evaluation of Minnesota's Operation NightCAP program. Minnesota Department of Transportation, USA.

Crime Concern (1999). Young people and crime on public transport.

(http://www.dft.gov.uk/stellent/groups/dft_mobility/documents/pdf/dft_mobility_pdf_503832.pdf. Accessed 2 March 2006.)

Crime Concern (2002). People's perceptions of personal security and their concerns about crime on public transport. Literature review. Department for Transport, London.

Crime Concern (2004). People's perceptions of personal security and their concerns about crime on public transport. Research findings. Department for Transport, London.

Crime Concern, SRA (Social Research Associates) (1999). Personal security issues in pedestrian journeys. Department for Transport, London.

Crime Concern, TTR (Transport and Travel Research) (1997). Perceptions of safety from crime on public transport. Crime Concern and TTR, London.

DCMS (Department for Culture, Media and Sport) (2007). Guidance issued under section 182 of the Licensing Act 2003: coming into force when laid before Parliament on 28 June 2007. DCMS, London.

DCSF (Department for Children, Schools and Families) (2008). Youth Alcohol Action Plan. DCSF, London.

De Greef M, Van den Broek K (2004). Making the case for workplace health promotion: analysis of the effects of WHP. Prevent, Belgium.

De Jong S (2007). Watching the Rugby World Cup can kill you. The New Zealand Herald. 8 September 2007.

Deacon L, Hughes S, Tocque K et al. (2007). Indications of public health in the English regions 8: alcohol. Association of Public Health Observatories, York.

Desapriya E, Shimizu S, Pike I et al. (2007). Impact of lowering the legal blood alcohol concentration limit to 0.03 on male, female and teenage drivers involved alcohol-related crashes in Japan. Int J Inj Contr Saf Promot. 14(3):181-7.

DeYoung DJ (2002). An evaluation of the implementation of ignition interlock in California. J Safety Res. 33:473-82.

DeYoung DJ, Tashima HN, Masten SV (2005). An evaluation of the effectiveness of ignition interlock in California: technical report. California Department of Motor Vehicles, Sacramento, CA, USA.

DfT (Department for Transport) (2002a). Get on board: an agenda for improving personal security – case studies. DfT, London.

DfT (Department for Transport) (2002b). Get on board: an agenda for improving personal security – guidance. DfT, London.

DfT (Department for Transport) (2003). Case study report on graffiti. DfT, London.

DfT (Department for Transport) (2004). People's perceptions of personal security and their concerns about crime on public transport. (http://www.dft.gov.uk/stellent/groups/dft_mobility/documents/page/dft_mobility_029301.pdf. Accessed 2nd March 2006.)

DfT (Department for Transport) (2005a). Developing the role of staff. DfT, London.

DfT (Department for Transport) (2005b). Why personal security? DfT, London.

DfT (Department for Transport) (2005c). Making the best use of personal security measures. DfT, London.

DfT (Department for Transport) (2005d). Providing information to passengers. DfT, London.

DfT (Department for Transport) (2005e).Design and maintenance of the infrastructure and vehicles. DfT, London.

DfT (Department for Transport) (2005f). Fear of crime – what can operators do? DfT, London.

DfT (Department for Transport) (2008a). Experiences and perceptions of anti-social behaviour and crime on public transport. Transport Statistics as Official Statistics, 18th September 2008. DfT, London.

DfT (Department for Transport) (2008b). Disruptive behaviour on board UK aircraft 2007/08. DfT, London.

DH (Department of Health), NTA (National Treatment Agency for Substance Misuse) (2006). Models of Care for Alcohol Misusers. DH, NTA, London.

DH (Department of Health), Home Office, DfES (Department for Education and Skills) (2007). Safe. Sensible. Social. The next steps in the National Alcohol Strategy. DH, London.

Dill PI, Wells-Parker E, Soderstrom CA (2004). The emergency care setting for screening and intervention for alcohol use problems among injured and high-risk drivers: a review. Traffic Inj Prev. 5(3):278-91.

Dixon J, Levine M, McAuley R (2003). Street drinking legislation, CCTV and public space: exploring attitudes towards public health measures. Online document.

(www.psych.lancs.ac.uk/people/uploads/MarkLevine20041022T115242.pdf Accessed 10 June 2009.)

DOT (Department of Transportation) (2007). Evaluation of the national impaired high visibility enforcement campaign: 2003-2005. DOT HS 810 789. DOT.

Eby DW, Kostynui LP, Spradin H et al. (2002). An evaluation of Michigan's repeat alcohol offender laws. Transportation Research Institute, University of Michigan, USA.

Elvik R (1996). A meta-analysis of studies concerning the safety effects of daytime running lights on cars. Accid Anal Prev. 28(6):685-94.

Engineer R, Phillips A, Thompson J et al. (2003). Drunk and disorderly: a qualitative study of binge drinking among 18 to 24-year-olds. Home Office Research Study 262. Home Office, London.

Etzersdorfer E, Sonneck G (1998). Preventing suicide by influencing mass-media reporting. The Viennese experience 1980-1996. Arc Suicide Research. 4:67-74.

FA (Football Association) (2005). Advice for travelling fans. England V Northern Ireland: match library. 21 February 2005. FA, London.

FA (Football Association) (2006). Terms and conditions for Football Association events. FA, London.

Ferguson SA (2003). Other high risk factors for young drivers – how graduated licensing does, doesn't, or could address them. J Safety Res. 34:71-7.

Ferguson M, Sheehan M, Davey J et al. (1999). Drink driving rehabilitation: the present context. Centre for Accident Research and Road Safety and Queensland University of Technology, Australia.

Foss RD, Stewart JR, Reinfurt DW (1998). Evaluation of the effects of North Carolina's 0.08% BAC law. Highway Safety Research Center, University of North Carolina, USA.

Foss RD, Marchetti LJ, Holladay KA (2001). Development and evaluation of a comprehensive program to reduce drinking and impaired driving among college students. Highway Safety Research Center, University of North Carolina, USA.

Freeman J, Liossis P (2003). Drink driving rehabilitation programs and alcohol ignition interlocks: is there a need for more research. Road Transp Res. 4:3-13.

Fuller MG (1995). Alcohol use and injury severity in trauma patients. J Addict Dis. 1545-0848. 14(1):47-54.

Fuller E (ed) (2008). Drug use, smoking and drinking among young people in England in 2007. National Centre for Social Research and the National Foundation for Educational Research, London.

GAO (Government Accountability Office) (2008). Traffic safety: improved reporting and performance measures would enhance evaluation of high visibility campaigns. Report to the Chairman, Committee on Transportation and Infrastructure, House of Representatives. GAO-08-477. GAO, Washington, DC.

Gaylord MS, Galliher JF (1991). Riding the underground dragon: crime control and public order on Hong Kong's Mass Transit Railway. Brit J Criminol. 31(1):15-26.

Gentry RT (2000). Effect of food on the pharmacokinetics of alcohol absorption. Pharmacology and cell metabolism. Alcohol Clin Exp Res. 24(4):403-4.

Gershon RRM, Pearson JM, Nandi V et al. (2008). Epidemiology of subway-related fatalities in New York City, 1990-2003. J Safety Res. 39(6):583-588.

Giesbrecht N (2007). Reducing alcohol-related damage in populations: rethinking the roles of education and persuasion interventions. Addiction. 102: 1345-9.

Gill M, Spriggs (2005). Assessing the impact of CCTV. Home Office Research Study 292. Home Office, London.

GLA (Greater London Authority) (2004). Mayor announces fall in sexual attacks on women in illegal cabs in London. Press release. 10 November 2004.

Gorman DM, Huber JC, Carozza SE (2006). Evaluation of the Texas 0.08 BAC law. Alcohol Alcohol. 41(2):193-9.

Goss CW, Van Bramer LD, Gliner JA et al. (2009). Increased police patrols for preventing alcohol-impaired driving (review). The Cochrane Collaboration. John Wiley & Sons, Ltd.

Graham S (1998). Stay safe, walk sober. Traffic Safety Chicago. 98(4):16-7.

Graham K (2003). Social drinking and aggression. In Mattson M (Ed.). Neurobiology of aggression: understanding and preventing violence. Totowa, New Jersey, Humana Press.

Granville S, Campbell-Jack D (2005). Anti-social behaviour on buses. Scottish Executive Social Research, Edinburgh.

Green C, Polen M, Janoff S et al. (2007). "Not getting tanked": definitions of moderate drinking and their health implications. Drug Alcohol Depend. 86(2-3):265-73.

Griffin KW, Botvin GJ, Nichols TR (2004). Long-term follow-up effects of a school-based drug abuse prevention program on adolescent risky drinking. Prev Sci. 5(3):207-12.

Grube J (2006). Alcohol regulation and traffic safety: an overview. Traffic safety and alcohol regulation: a symposium. June 2006. Irvine, California.

Gruenewald P (2006). Limits on outlet density and location. Traffic safety and alcohol regulation: a symposium. June 2006. Irvine, California.

Hannon K, Morleo M, Cook PA et al. (2008). Fact sheet 4: restricted drinking in public places. CPH, LJMU, Liverpool.

Hannon K, Deacon L, Giles S et al. (2009). Non-residential suicide sites in the North West. North West Public Health Observatory, CPH, LJMU, Liverpool.

Harcourt BE, Ludwig J (2006). Broken windows: new evidence from New City and a five-city social experiment. Univ Chic Law Rev. 73:271-320.

Harkins C, Morleo M, Cook PA (2008). Alcohol in business and commerce survey: workplace alcohol questionnaire – 2007. CPH, LJMU, Liverpool.

Harrington V (2000). Underage drinking: findings from the 1998-99 Youth Lifestyles Survey. Home Office Research Findings 125. Home Office, London.

Healy A (2003). More 'dry trains' threatened. Irish Times. 1 September 2003.

Hedlund JH, Ulmer RG, Preusser DF (2001). Determine why there are fewer young alcohol-impaired drivers. National Highway Traffic Safety Administration, Washington, DC.

Heinänen M (2005). Risks of heavy alcohol consumption – a visual health intervention in the Helsinki city area. EDDRA.

Hill D (2008). Trials of live CCTV cameras on buses. The Guardian. 20 October 2008.

HMRC (HM Revenue and Customs) (2008). Alcohol fact sheet. HMRC, London.

Hollingworth W, Ebel BE, McCarty CA et al. (2006). Prevention of deaths from harmful drinking in the United States: the potential effects of tax increases and advertising bans on young drinkers. J Studies Alcohol. 67(2): 300-8.

Home Office (2003). Crime reduction toolkit: public transport. Online guidance. (http://www.crimereduction.homeoffice.gov.uk/toolkits/vc00.htm. Accessed 29 April 2009).

Home Office. (2006a). Statistical highlights: statistics on football-related arrests and banning orders 2005-2006. Home Office, London.

Home Office (2006b). The good practice safety guide for small and sporting events taking place on the highway, roads and public places. Home Office, London.

Home Office (2007a). Designation Orders: alcohol consumption in public places. Crime reduction. Home Office, London.

Home Office (2007b). Positive Futures. Review of the year. You're part of it. Home Office, London.

Home Office, London Drugs Forum, Release (2002). Safer clubbing: guidance for licensing authorities, club managers and promoters. Home Office, London.

HSE (Health and Safety Executive) (1999). The event safety guide: a guide to health, safety and welfare at music and similar events. HSG 195. HSE Books, London.

HSE (Health and Safety Executive) (2008). Managing violence in licensed and retail premises. Online tool. (http://www.hse.gov.uk/violence/toolkit/. Accessed 29 May 2009).

Hughes K, Anderson Z (2008). Identifying drunkenness and preventing sales of alcohol to intoxicated customers in Manchester. CPH, LJMU, Liverpool.

Hughes K, Hungerford DJ, Anderson Z et al. (2007). Violence Prevention Alliance Working Group on Youth Violence, Alcohol and Nightlife. Fact sheet 3: late night transport. CPH, LJMU, Liverpool.

Hughes K, Anderson Z, Morleo M et al. (2008). Alcohol, nightlife and violence: the relative contributions of drinking before and during nights out to negative health and criminal justice outcomes. Addiction. 103(1):60-5.

Hungerford DJ, Anderson Z, Hughes K et al. (2008). Violence Prevention Alliance Working Group on Youth Violence, Alcohol and Nightlife. Fact sheet 4: preventing sexual violence in nightlife environments. CPH, LJMU, Liverpool.

Hunt GP, Laidler KJ (2001). Alcohol and violence in the lives of gang members. Alcohol Res Health, 25: 66-71.

Hutchison IL, Magennis P, Shepherd JP et al. (1998) The BAOMS United Kingdom survey of facial injuries part 1: aetiology and the association with alcohol consumption. Br J Oral Maxillofac Surg. 36:3-13.

IAS (Institute of Alcohol Studies) (1998). World Cup fouled by drink and violence. Alcohol Alert. Issue 2.

ICAP (International Center for Alcohol Policies) (2007). Module 14: public order and drinking environments. ICAP, Washington, USA.

IIHS (Insurance Institute for Highway Safety) (1999). Who cares about a camera if you're not speeding? Status report. 34(6).

Ireland CS, Thommeny JL (1993). The crime cocktail: licensed premises, alcohol and street offences. Drug Alcohol Rev. 12(2):143-50.

Jochelson R (1994). Crime on the rail system. New South Wales Bureau of Crime Statistics and Research, Sydney, Australia.

Johnson A (2006). Airlines curtail free alcohol on international flights. Wall Street Journal. 18 January 2006.

Jones RK, Rodriguez-Iglesias C (2004). Evaluation of lower BAC limits for convicted OUI offenders in Maine. National Highway Traffic Safety Administration. Washington, DC, USA.

Jones L, James M, Jefferson T et al. (2007). A review of the effectiveness and cost-effectiveness of interventions delivered in primary and secondary schools to prevent and/or reduce alcohol use by young people under 18 years old. National Institute of Clinical and Health Excellence, London.

Jones L, Bellis MA, Dedman D et al. (2008). Alcohol-attributable fractions for England: alcohol-attributable mortality and hospital admissions. North West Public Health Observatory, CPH, LJMU, Liverpool.

Karsten C, Rothschild ML, Miller Brewing Company et al. (2003). The Road Crew final report. National Highway Traffic Safety Administration, Washington, DC.

Kaukinen C (2002). Adolescent victimization and problem drinking. Violence Vict. 17:669-89.

Kelley-Baker T, Lacey J, Brainard K et al. (2006). Citizens reporting of DUI – Extra Eyes to identify impaired driving. National Highway Traffic Safety Administration, Washington, DC.

Kerkhof A (2003). Railway suicide: who is responsible? Crisis. 24(2):47-8.

Kershaw C, Nicholas S, Walker A (2008). Crime in England and Wales 2007/08. Home Office Statistical Bulletin. Home Office, London.

Kloeden CN, Hutchinson TP (2006). The crash and offence experience of drivers eligible for the South Australian Driver Intervention Program. Centre for Automotive Safety Research, University of Adelaide, Australia.

Kypri K (2006). New Zealand lowers drinking age: case study. Traffic safety and alcohol regulation: a symposium. June 2006. Irvine, California, USA.

La Vigne NG (1996). Safe transport: security by design on the Washington Metro. Crime Prev Studies. 163-97.

Lacey JH, Jones RK (2000). Evaluation of changes in New Mexico's anti-DWI efforts. Mid-America Research Institute, Inc of New England, Winchester, Massachusetts, USA.

Lacey JH, Jones RK, Smith RG (1999). Evaluation of Checkpoint Tennessee: Tennessee's statewide sobriety checkpoint program. Mid-America Research Institute, Inc of New England, Winchester, Massachusetts, USA.

Lacey JH, Jones RK, Anderson EW (2000). Evaluation of a full-time ride service program; Aspen, Colorado's Tipsy Taxi Service. National Highway Traffic Safety Administration, Washington, DC, USA.

Lacey JH, Williszowski CH, Jones RK (2003). An impact evaluation of underage drinking prevention programs. National Highway Traffic Safety Administration, Washington, DC, USA.

Lange JE, Reed MB, Johnson MB et al. (2000). The efficacy of experimental interventions designed to reduce drinking among designated drivers. J Studies Alcohol. 67(2):261-8.

Lapham SC, Kapitula LR, C'de Baca J et al. (2006). Impaired driving recidivism among repeat offenders following an intensive court-based intervention. Accid Anal Prev. 38:162-9.

Laurell H (2006). Alcohol regulation in Sweden and the European Union: effects on road safety. Traffic safety and alcohol regulation: a symposium. June 2006. Irvine, California, USA.

Lerer LB, Matzopoulos R (1996). Meeting the challenge of railway injury in a South African city. Lancet 348(9028):664.

Loukaitou-Sideris A (1999). Hotspots of bus stop crime: the importance of environmental attributes. J Am Plann Assoc. 65(4):395-411.

Magennis P, Shepherd J, Hutchison I et al. (1998). Trends in facial injury: increasing violence more than compensates for decreasing road trauma. BMJ. 316: 325-6.

Manchester Public Health Development Service (2005). Calling time: helpful advice for staff. Manchester Public Health Development Service.

Mann RE, Macdonald S, Stoduto G et al. (2001). The effects of introducing or lowering legal per se blood alcohol limits for driving: an international review. Accid Anal Prev. 33:569-83.

Markowitz S (2000). The price of alcohol, wife abuse, and husband abuse. Southern Ec J. 67:279-304.

Markowitz S, Grossman M (1998). Alcohol regulation and domestic violence towards children. Contemp Ec Pol. 16:309–20.

Masten SV, Hagge RA (2003). Evaluation of California's graduated licensing program. California Department of Motor Vehicles, Sacramento, CA, USA.

Mayhew DR, Simpson HM, Williams AF et al. (2002). Specific and long-term effects of Nova Scotia's graduated licensing program. Insurance Institute for Highway Safety, Arlington, VA.

McCartt AT (2001). Evaluation of enhanced sanctions for higher BACs: summary of states' laws. DOT HS 809 215. National Highway Traffic Safety Administration, Washington, DC.

McCartt AT, Kirley BB (2006). Minimum purchase age laws: how effective are they in reducing alcohol-impaired driving? Traffic safety and alcohol regulation: a symposium. June 2006. Irvine, California, USA.

Measham F, Brain K (2005). Binge drinking, British alcohol policy and the new culture of intoxication. Crime Media Culture. 1:262-83.

Minister for Public Transport and Minister for Police and Emergency Services (2004). On track for massive drop in public transport crime. Media release. 1 April 2004.

Mistral W, Velleman R, Mastache C et al. (2007). UKCAPP: an evaluation of 3 UK community Alcohol Prevention Programmes. University of Bath and Avon and Wiltshire Mental Health Partnership NHS Trust.

Moeller FG, Dougherty DM (2001). Antisocial personality disorder, alcohol and aggression. Alcohol Res Health. 25: 5-11.

Monaghan L (2002). Regulating "unruly" bodies: work tasks, conflict and violence in Britain's night time economy. Brit J Soc. 53:403-29.

Morleo M, Harkins C, Hughes K et al. (2007). Developing safer night-time environments through effective implementation of planning. CPH, LJMU, Liverpool.

Morleo M, Elliott G, Cook PA (2008a). Investigating drinking behaviours and alcohol knowledge amongst young people resident in the Linacre and Derby wards of Sefton: an evaluation of the It's Your Choice intervention. Final report. CPH, LJMU, Liverpool.

Morleo M, Phillips-Howard P, Cook PA et al. (2008b). Fact sheet 1: tolerance and perceptions of drinking. CPH, LJMU, Liverpool.

Morleo M, Lightowlers C, Anderson Z et al. (in press). A review of the impact of the Licensing Act on levels of violence in England and Wales: a public health perspective. Crime Prev Comm Safety.

Morning Advertiser (2007). Hot buttered toast = peace. Morning Advertiser. 24 April 2007.

Mosher JF, Toomey TL, Good C et al. (2002). States laws mandating or promoting training programs for alcohol servers and establishment managers: an assessment of statutory and administrative procedures. J Public Health. 23(1):90-113.

Moskowitz H (2006). Detecting alcohol impairment by observation of intoxication. Traffic Safety and Alcohol Regulation: A Symposium. June 2006, Irvine, California.

Mukamal KJ, Phillips RS, Mittleman MA (2008). Beliefs, motivations, and opinions about moderate drinking: a cross-sectional survey. Fam Med. 40(3):188-95.

Nair G, Ditton J, Phillips S (1993). Environmental improvements and the fear of crime. Brit J Crim. 33(4):555-61.

NHTSA (National Highway Traffic Safety Administration) (2007). The nation's top strategies to stop impaired driving. NHTSA, Washington, DC.

NHTSA (National Highway Traffic Safety Administration) (2008a). A summary report of six demonstration programs to reduce impaired driving among 21 – to 34 – year old drivers. National Highway Traffic Safety Administration, Washington, DC.

NHTSA (National Highway Traffic Safety Administration) (2008b). The effectiveness of seven publicised demonstration programs to reduce impaired driving: Georgia, Louisiana, Pennsylvania, Tennessee, Indiana, Michigan, and Texas. National Highway Traffic Safety Administration, Washington, DC.

NHTSA (National Highway Traffic Safety Administration) (2008c). Strategic Evaluation States Initiative – case studies of Alaska, Georgia, West Virginia. National Highway Traffic Safety Administration, Washington, DC.

NWPHO (North West Public Health Observatory). (2008). Local Alcohol Profiles for England (LAPE). Online tool. (www.nwph.net/alcohol/lape).

North CS, Smith EM, Spitznagel EL (1994). Violence and the homeless: an epidemiologic study of victimisation and aggression. J Traumatic Stress. 7(1):95-116.

O'Brien F, Hughes K, Sousa Vicente E (2005). Violence at major events. In Council of Europe (eds). Drugs and alcohol: violence and insecurity? Council of Europe, Strasbourg.

ODPM (Office for the Deputy Prime Minister): Housing, Planning, Local Govt and the Regions Committee (2003). The evening economy and the urban renaissance. Twelfth report of session 2002-03. HC 396-I. The Stationery Office, London.

Paton A (2005). ABC of alcohol: alcohol in the body. BMJ. 330:85-7.

Pearson G (2005). The regulation of football crowds. In McVeigh C, Hughes K, Lushey C et al. (eds). Preventing violence: from global perspectives to national action. CPH, LJMU, Liverpool.

Peterson JB, Rothfleisch J, Zelazo PD et al. (1990). Acute alcohol intoxication and neuropsychological functioning, J Studies Alcohol. 51: 114–22.

PIRE (Pacific Institute for Research and Evaluation) (2004). Prevention of Murders in Diadema, Brazil: The Influence of New Alcohol Policies. Calverton, Maryland: PIRE.

Poikolainen K, Palijärvi T, Mäkelä P (2007). Alcohol and the preventative paradox: serious harms and drinking patterns. Addiction. 102(4):571-8.

Polacsek M, Rogers EM, Woodall WG et al. (2001). MADD victim impact panels and stages-of-change in drunk-driving prevention. J Studies Alcohol. 62(3):344.

Pratten J, Greig B (2005). Can Pubwatch address the problems of binge drinking? A case study from the North West of England. Int J Contemp Hospitality Manage. 17(3):252-60.

Ramirez R, Nguyen D, Cannon C et al. (2008). Demonstration project report: a campaign to reduce impaired driving through retail orientated enforcement in Washington State. National Highway Traffic Safety Administration, Washington, DC.

Ramsey M (1990). Lagerland lost? An experiment in keeping drinkers off the streets in Coventry and elsewhere. Crime Prevention Unit: paper 22. Home Office, London.

Ramsey (1991). The effect of better street lighting on crime and fear: a review. Crime Prevention Unit Paper No 29. Home Office, London.

RASG (Retail of Alcohol Standards Group) and Cambridgeshire County Council (undated). A new way of tackling public under-age drinking. Wine and Spirit Trade Association.

Rider R, Voas RB, Kelley-Baker T et al. (2007). Preventing alcohol-related convictions: the effect of a novel curriculum for first-time offenders on DUI recidivism. Traffic Inj Prev. 8:147-52.

Roberts M, Eldridge A (2007). Quieter, safer, cheaper: planning for a more inclusive evening and night-time economy. Plann Pract Res. 22(2):253-66.

Roberts IG, Kwan I (2009). School-based driver education for the prevention of traffic crashes (review). The Cochrane Collaboration. John Wiley and Sons, Ltd, London.

Robinson S, Lader D (2008). Smoking and drinking among adults, 2007. Office for National Statistics, London.

Roeper PJ, Voas RB Pdailla-Sanchez et al. (2000). A long-term community-wide intervention to reduce alchool-related traffic injuries: Salinas, California. Drugs Educ Prev Pol. 7(1):51-60.

Room R, Babor T, Rehm J (2005). Alcohol and public health. Lancet. 365:519-30.

Saffer H (1997). Alcohol advertising and motor vehicle fatalities. Rev Ec Statistics. 79:431-42.

Scottish Executive (2007). Murrayfield drink ban dropped. Press release. 8 June 2007. Scottish Executive, Edinburgh.

Shimp TA (1997). Advertising, promotion and supplemental aspects of integrated marketing. The Dryden Press, Harcourt Brace College Publishers, Inc.

Short E, Ditton J (1998). Seen and now heard: talking to the targets of open street CCTV. Brit J Crim. 38(3):404-28.

Shults RA, Elder RW, Sleet DA (2001). Reviews of evidence regarding interventions to reduce alcohol-impaired driving. Am J Prev Med. 21(4S):66-88.

Sivarajasingham V, Matthews K, Shepherd J (2006). Price of beer and violence-related injury in England and Wales. Injury. 37(5):388-94.

SPN (Stafford Patterson Neath) (2009). RSSB T704: The contribution of alcohol to personal safety and security. Literature review. SPN, London.

Sproston K, Primatesta P (2004). Health Survey for England volume 2: risk factors for cardiovascular disease. The Stationery Office, London.

Stafström M. Östergren P-O (2008). A community-based intervention to reduce alcohol-related accidents and violence in 9th grade students in southern Sweden: the example of the Trelleborg Project. Accid Anal Prev. 40:920-5.

Stafström M. Östergren P-O, Larsson S et al. (2006). A community action programme for reducing harmful drinking behaviour among adolescents: the Trelleborg Project. Addiction. 101:813-23.

Stockport Council (2007). Alcohol litter campaign goes down well. North West liveability foundation case studies. ENCAMS.

Stott D, Pearson G (2005) Football banning orders, proportionality, and public order policing. Submission to Howard Journal of Criminal Justice.

(http://www.liv.ac.uk/Psychology/staff/CStott/Football_Banning_Orders_resub.pdf. Accessed 29 May 2009.)

Strategy Unit (2003). Alcohol misuse: how much does it cost? Cabinet Office, London.

Strauch H, Wirth I, Geserick G (1998). Fatal accidents due to train surfing. Forensic Sci Int. 94:119-27.

Syner J, Jackson B, Dankers L et al. (2008). Strategic Evaluation States Initiative – Case Studies. National Highway Traffic Safety Administration. Washington, DC, USA.

Tashima HN, Helander CJ (2007). 2007 annual report of the California DUI management information system. California Department of Motor Vehicles, Sacramento, CA, USA.

Testa M, Livingston JA, Collins RL (2000). The role of women's alcohol consumption in evaluation of vulnerability to sexual aggression. Exp Clin Psychopharmacol. 8: 185-91.

Three Rivers District Council (2007). Regulatory Services committee minutes. 3 October 2007. Three Rivers District Council.

Ulmer RG, Preusser DF, Williams AF et al. (2000). Effect of Florida's graduated licensing program on the crash rate of teenage drivers. Accid Anal Prev. 32:527-32.

University of Leicester (2001). Fact sheet 1: football and football hooliganism. Sir Norman Chester Centre for Football Research, Leicester.

Vernick JS, Li G, Ogaitis S et al. (1999). Effects of high school driver education on motor vehicle crashes, violations and licensure.

Vingilis E (2006). Limits on hours of sales and service. Traffic safety and alcohol regulation: a symposium. June 2006. Irvine, California, USA.

Vingilis E, McLeod AI, Seeley J et al. (2005). Road safety impact of extended drinking hours in Ontario. Accid Anal Prev. 37:549-56.

Voas RB (2008). A new look at NHTSA's evaluation of the 1984 Charlottesville Sobriety Checkpoint Program: implications for current checkpoint issues. Traffic Inj Prev. 9:22-30.

Voas RB, Taylor E, Kelley-Baker T (2000). Effectiveness of the Illinois .08 Law. National Highway Traffic Safety Administration. Washington, DC, USA.

Voas RB, Tippetts AS, Taylor EP (2002). The Illinois .08 law: an evaluation. J Safety Res. 33:73-80.

Voas RB, Romano E, Kelley-Baker T (2006). The effects of establishing closing hours in Juarez, Mexico. Traffic safety and alcohol regulation: a symposium. June 2006. Irvine, California, USA.

Wagenaar AC, Tobler AL (2006). Alcohol sales and service to underage youth and intoxicated patrons. Traffic safety and alcohol regulation: a symposium. June 2006. Irvine, California, USA.

Wagenaar AC, Murray DM, Toomey TL (2000). Communities Mobilizing for Change on Alcohol (CMBA): effects of a randomized trial on arrests and traffic crashes. Addiction. 95(2):209-17.

Walby S, Allen J (2004). Domestic violence, sexual assault and stalking: findings from the British Crime Survey. Home Office, London.

Wallin E, Norström T, Andréasson S. (2003). Alcohol prevention targeting licensed premises: a study of effects on violence. J Studies Alcohol. 64: 270–7.

Watts B (2008). What are today's social evils? Joseph Rowntree Foundation, London.

Wheater CP, Shaw EM, Haines BJ (2005a). Evaluation of CCTV in taxi and private hire vehicles pilot scheme. Manchester Metropolitan University.

Wheater CP, Haines B, Shaw E et al. (2005b). Taxi Safe: reducing anti-social behaviour problems in night time Manchester using a taxi rank marshalling scheme. Club Health 2006: Fourth International Conference on Substance Use, Nightlife and Related Health Issues. Piran, Slovenia.

WHO (World Health Organization) (2004). World report on road traffic injury prevention. WHO.

Wiggers J, Jauncey M, Considine R et al. (2004). Strategies and outcomes in translating alcohol harm reduction research into practice: the Alcohol Linking Program. Drug Alcohol Rev. 23:355-64.

Wilson JQ, Kelling GL (1982). Broken windows: the police and neighborhood safety. Atlantic Monthly. March 1982.

Windahl S, Siquitzer B, Olsan JT (1992). Using communications theory: an introduction to planned communication. Sage Publications, London.

Williams AF (2006). Young driver risk factors: successful and unsuccessful approaches for dealing with them and an agenda for the future. Inj Prev. 12:j4-8.

Williams AF, Ferguson SA (2004). Driver education renaissance? Inj Prev. 10:4-7.

Woodall WG, Delaney HD, Kunitz SJ et al. (2007). A randomised trial of a DWI intervention program for first offenders: intervention outcomes and interactions with antisocial personality disorder among a primarily American-Indian sample. Alcohol Clin Exp Res. 31(6):974-87.

Wright NR (2006). A day at the cricket: the breath alcohol consequences of a type of very English binge drinking. Addiction Res Theory. 14(2):133-7.

Young D (2006). Alcohol prices and traffic safety. Traffic safety and alcohol regulation: a symposium. June 2006. Irvine, California, USA.

Zwicker TJ, Chaudhary NK, Solomon MG et al. (2007). West Virginia's impaired driving high visibility enforcement campaign, 2003-2005. National Highway Traffic Safety Administration. Washington, DC, USA.

9. Appendices

Appendix 1: Search terms

Search engine	Terms used (italicised represents where official search terms were used)	Number of articles identified
Cinahl	*Alcohol intoxication AND Transportation*	0
Cochrane Library	Alcohol, Transport	2
EDDRA	Transport	8
Medline	*Alcohol drinking and intoxication AND Transportation AND Programme evaluation* Years:1998-2008	0
Psychinfo	*Alcohol abuse OR Alcohol drinking attitudes OR Alcohol drinking patterns OR Alcohol intoxication AND Transportation OR Transport accidents* Years: 1998-2008	0
TRIS	Alcohol AND evaluation OR Intervention. Years: 1998-2008	962
Urbadoc	Alcohol$, Transport$	144
Web of Science	Alcohol*, Transport*, Evaluat*	185
TOTAL		1,201

Appendix 2: Details of reviews

Author(s)	Design	Number of studies	Inclusion / Exclusion	Key findings
Begg and Stephenson 2003	Non-systematic	Not known	Studies in New Zealand	Graduated driving licences can contribute to a reduction in drink driving amongst young people. Compared with those licensed before the scheme came into place, those with a graduated driving licence were significantly less likely to have a road traffic accident where alcohol was suspected (OR: 0.72, p=0.034).
Berg 2006	Non-systematic	Not known	Not known	Both communication and enforcement methods should be used. It is important to target young people with such communications whilst their attitudes are still forming. To do this, communication methods should use persuasive, emotional messages in order to maximise effectiveness. Active learning is also needed. However, no supporting evidence was provided.
Compton and Ellison-Potter 2008	Non-systematic	Not known	Not known	Driving school education programmes are ineffective in reducing alcohol-related harm on the roads. Teenagers may be involved because of inexperience or risk-taking rather than not knowing the rules. Studies about raising the drinking age to 21 years and enacting zero tolerance have reduced crashes amongst young people. Zero tolerance policies ban any alcohol consumption for those aged under 21 years when driving. Such laws have reduced road traffic fatalities by 13% in 18 to 20 year olds. Graduated driving licences have been shown to be highly effective in reducing crashes amongst novice drivers.
Dill et al. 2004	Non-systematic	Not known	Not known	Emergency settings (such as accident and emergency departments) could be a suitable location for delivering brief interventions to injured and high risk drivers.
Elvik 1996	Meta-analysis			Daytime running lights on cars could reduce daytime crashes by 10-15%
Ferguson 2003	Non-systematic	Not known	Not known	Alcohol use puts people at risk of road traffic accidents but it can be difficult to tackle through interventions. This is because risky driving may be due to factors such as power, esteem and independence.
Ferguson et al. 1999	Meta-analysis	Not known	Not known	Evaluations of rehabilitation have generally been positive in terms of its effects on drink driving. Rehabilitation can reduce drink driving recidivism by 7-9%. It highlights that the benefits appear to be more long-term than for sanctions on driving licences, as well as providing the opportunity to impact on knowledge, attitudes, lifestyle and psychosocial functioning. It suggests that the most effective interventions are multi-modal models (that is including counselling, education, probation and licence suspension), if they target high-risk offenders, if they are community-based, and follow a directive approach. However, sample sizes are small and there were little data surrounding long-term follow-up.
Freeman and Liossis 2002	Non-systematic	Not known	Not known	*Alcohol ignition locks:* Studies have been based in America, Australia and Canada. These suggest recidivism can be reduced by up to 65% and unlicensed driving by up to 91% (compared with those given only licence suspensions). Methodological limitations include

Author(s)	Design	Number of studies	Inclusion / Exclusion	Key findings
				small sample sizes, non-random assignment of groups (or unmatched controls). Once the lock has been removed, drivers may return to drink driving. Few studies have examined wider impacts on factors such as lifestyle and motivations. *Rehabilitation:* The effects of treatment or rehabilitation programmes can be variable and there are a number of methodological weaknesses to the studies involved including incompletion of programmes, short follow-up periods and lack of randomisation in group allocation. Some showing effects were published in the mid-1990s. Rehabilitation may be most effective when combined with licence disqualifications.
GAO 2008	Non-systematic	Not known	Not known	Checkpoint programmes and high visibility campaigns have generally been effective in America and elsewhere in reducing risk factors associated with fatal crashes. They combine law enforcement with communication and/or education to the public about the campaign. However, challenges are evident in reaching out to resistant populations such as rural drivers, truck drivers and repeat offenders. Further training may be needed for arrested officers to help boost the presence of court cases.
Goss et al. 2009	Systematic review	9	1) At least one quantifiable outcome relevant to drink driving. 2) Evaluated increased police controls (for example, to number of officers, frequency or duration). 3) Excluded weaker methodologies.	Increased police patrols can help to prevent alcohol-related road accidents, but do not necessarily reduce alcohol-impaired driving. Four found beneficial effects, of which three found a significant effect on reducing alcohol-related traffic injuries.
Grube 2006	Non-systematic	Not known	Not known	*Bar server training:* Evidence of effectiveness of bar server training programmes is mixed. Dram shop liability laws can also be used (where individuals injured by a minor or intoxicated individual can recover damages from the retailer who sold the alcohol). These may reduce harm but further research is needed. *Designated drivers:* Little evidence of the effectiveness of designated drivers in drink driving or related accidents. The safer person for driving may be the person who has drunk the least. *Ignition locks:* there is little evidence of effectiveness once the device is removed. If lower risk drivers are assigned to ignition locks, it will skew any intelligence relating to effectiveness. *Graduated driving licences:* These may not be effective once the individual passes the point at which the restrictions are lifted. This suggests that it is the restrictions rather than the extra instructional time which has the impact.
Gruenewald 2006	Non-systematic	Not known	Not known	There is strong evidence of a link between outlet density and alcohol-related motor vehicle crashes. Together, studies show that with a 1% increase in outlet per population, there is a proportional increase in alcohol-related crashes by 0.1-0.4%.
Hedlund et al.	Non-	Unknown	Unknown	In America in 1982, 10,270 drivers under the age of 21 years were involved in fatal crashes.

Author(s)	Design	Number of studies	Inclusion / Exclusion	Key findings
2001	systematic			Of these, 43% (n=4,393) had been drinking prior to the crashes. In 1998, 8,128 were involved in fatal crashes (21% being alcohol-related; n=1,714). The number of drivers involved in fatal road traffic accidents who had been drinking declined by 61%. These decreases are linked with a number of changes: 1) Minimum legal drinking age (MLDA): In 1982, 14 states had a MLDA of 21 and the others (n=36) had a MLDA of <21. By 1988, all states had a minimum drinking age of 21 (to reduce drink driving and after Government incentives). Evaluations of the laws show that MLDA has reduced youth drink driving by reducing alcohol availability. However, young people can still access alcohol and can do so with little chance of detection. There has been less effect on youth drinking. 2) Zero tolerance laws for young people when driving: By 1998, all states had such policies in place.This has also been seen as being effective in the reduction of drink driving. 3) Enforcement: No significant relationship has been found between number of arrests (for example for drink driving) and fatal road traffic accidents involving young people. 4) School and community youth programmes: Limited evidence of effectiveness relating to drink driving measures. Methodological issues such as low participtionn, lack of school involvement. Community programmes can be successful when well-funded and well-organised.
IIHS 1999	Non-systematic	Not known	Not known	Reports solely on Checkpoint Tennessee from Lacey (1999). Details of this study are provided in Appendix 3.
Laurell 2006	Non-systematic	Not known	Not known	There was evidence to suggest that a ban on advertising and/or an increase in price could reduce alcohol-related drink drive fatalities.
Mann et al. 2001	Non-systematic	Not known	Not known	The effects of lowering drink driving have been mixed but many show at least a temporary reduction.
McCartt and Kirley 2006	Non-systematic	102	Not known	Sixty-six studies found a significant effect of minimum drinking age laws: 98% of these found that there was a significant decrease in traffic crashes and 2% found the opposite. Yet Canada has seen declines but has not changed its minimum drinking age laws. Zero tolerance is difficult to enforce because individuals will not display any signs of intoxication. Although programmes show success, many individuals still drink and drive and alcohol remains an important factor in the reasons behind road traffic accidents. McCartt and Kirley recommend strict enforcement of the laws.
NHTSA 2007	Non-systematic	Not known	Not known	High visibility enforcement, support for prosecutors in following drink driving cases and screening and brief intervention are three of the top interventions for tackling drink driving. Issues such as drink driving may be a symptom of a larger alcohol misuse problem and suggests that health care providers should be the main delivery agent of appropriate interventions to tackle this. No supporting evidence provided.
Shults et al. 2001	Systematic review	Drink drive limit: 9 Lower drink drive limits for young	Not known	*Lowering the intoxication limit for drink driving:* eight suggested a decrease in harm with a median post-law change of –7%. However, it can be difficult to separate the effects of this from that of the administrative licence revocation laws. *Lower drink drive limits* for young people: Each study showed a post-law reduction in crashes

Author(s)	Design	Number of studies	Inclusion / Exclusion	Key findings
		people: 6 Minimum drinking age: 33 Sobriety checkpoints (13) Server training: 5		with between a 9% and 24% reduction in fatal car crashes. *Minimum drinking age:* Raising the minimum drinking age was associated with a median decline in crashes by 6% but some studies showed no effect. It is not known what happens to crash rates once individuals reach the minimum age. *Sobriety checkpoints:* There is no evidence of increased effectiveness of random breath testing compared with selective but none of the studies were designed to directly compare the two. One study saw a 13% decrease in blood alcohol levels through random breath tests compared with previously. There are positive economic effects. *Server training:* some studies have shown such training can impact on the potential for patron intoxication but that managerial support, community support and insurance discounts could bolster this further. None of the studies were discussed within a transport environment.
Vingilis 2006	Non-systematic	Not known	Not known	There have been a number of methodological limitations in the studies examining the effects of limiting hours of sales and service (such as a lack of time series analysis) and a mixed effect of hours on related harms such as assaults, drink driving, collision rates. Omnibus studies seem to be less likely to see clearer differences but small scales studies are more likely to find significant changes. Changes in hours do not tend to be dramatic so notable changes in consumption or harm would not be expected. Cultural differences will impact on the effectiveness.
Wagenaar and Tobler 2006	Non-systematic	14	Not known	In the prevention of underage sales, schemes can be implemented voluntarily or legislation can be used to enforce them. There was little evidence of effectiveness of server training programmes in the early stages but in the 1990s, such programmes began to involve managers and owners. However, evidence is still mixed. Ten of the studies examined show improvements in server knowledge but this does not necessarily mean an improvement in server behaviour. Seven reported an increase in responsible beverage service such as offering food, refusals to serve alcohol and asking about drink driving. Eight of the studies reported on the effects of alcohol consumption and/or sales with six showing clear decreases and two reporting no change. Three reported the effects on road traffic accidents. Two reported a significant change and one reported no change.
WHO 2004	Non-systematic	Not known	Not known	Being seen is important in preventing road traffic accidents even during the day. Shape and stiffness of motor vehicles can be designed to reduce harm to pedestrians and cyclists. Widespread random breath testing (where one in ten drivers are tested each year) achieves the high level of compliance in reducing drink driving. Mass media campaigns can help to increase awareness.
Williams 2006	Non-systematic	Not known	Not known	*Driving school education programmes:* These are ineffective in reducing alcohol-related harm on the roads for reasons such as being too short. *Graduated driver licences:* Little information on what happens after individuals pass beyond graduated driving licences. *Community programmes:* These have been found to be effective. Community programmes

Author(s)	Design	Number of studies	Inclusion / Exclusion	Key findings
				should encompass graduated driving licences; attitude or behaviour change programs based on social learning theory; insurer education with discounts for crash free driving; be well publicised; and involve parents, police and teenagers.
Young 2006	Non-systematic	Not known	Not known	There is mixed evidence on the impact of increased taxes on lowering alcohol-related traffic fatalities. Relating intelligence in earlier studies may have been confounded by factors such as minimum drinking age legislation, environmental and enforcement strategies. Prices may be a better indicator as there is strong evidence that fatalities are significantly negatively related to the price of alcohol.

Appendix 3: Details of specific interventions discussed by original research studies

Each of the intervention studies were graded from 0 (lacks effect) to +++ (highly effective) in line with critical appraisals performed elsewhere (see Babor et al. 2003).

Name	Location	Author(s)	Target population	Details of initiative	Outcome	Impact
Alcohol ban						
Minimum legal drinking age	New Zealand	Kypri 2006	Young drivers	The minimum drinking age was lowered from 20 to 18 years.	The crash rate for young men aged 18-19yrs increased by 12% (95% CI 1.00-1.25) and by 14% for 15-17 year olds (95% CI 1.01-1.30; Kypri 2006). For women, rates increased by 51% for 18-19 year olds (95% CI 1.17-1.94) and by 24% for 15-17 year olds (95% CI 0.96-1.59).	++
Campaigns						
Alcohol has its price	Helsinki, Finland	Heinänen 2005	18-65 year olds who spent time in public places and used public transport	Launched in 2005, the campaign used posters and cards to increase wellbeing, reduce positive images associated with alcohol, and reduce the health and social costs associated with alcohol misuse.	The article provided no information on the resulting changes.	Not known
Most of us (4/5) don't drink and drive	Montana, USA	NHTSA 2008a	College students. Sample size is not provided	A social norms campaign aiming to tackle identified misperceptions.	In the intervention counties, there was a 13.7% decrease in the proportion who reported drinking and driving. (No figures or indication of significant were provided.)	+
Road Crew	Wisconsin, USA	Karsten et al. 2003		A social marketing initiative to reduce drink driving. Men were very proud of their vehicles and did not want to leave them behind after drinking in case of damage or being ticketed. Alternative and attractive rides such as subsidised or free rides to and from venues limousines or cadillacs.	From July 2002 to June 2003, 19,757 rides were given to potential drunk drivers. Based on this, it was estimated to have reduced alcohol-related road traffic accidents by 17% (n=15).	++
Violence. Indifference. To talk about it is to act	Paris, France	Bernadini and Rivet 2002	Passengers on public transport	A campaign was launched on public transport aiming to promote awareness that everyone is responsible for a culture of disrespect and indifference, and to change behaviour of passengers and staff.	No details were provided on the effectiveness of the project.	Not known
Whether its Thursday,	North Carolina, USA	Foss et al. 2001	College students.	A social norms campaign aimed to tackle the misconception that many	The proportion with an estimated Blood Alcohol Concentration (BAC) of above	++

Name	Location	Author(s)	Target population	Details of initiative	Outcome	Impact
Friday or Saturday, 2 out of 3 students return home with a 0.00 BAC			Participants were surveyed and breath tested in autumn 1997 (n=1,786) and again in 1999 (n=2,535)	students returned home drunk. It used stickers, posters, interactive demonstrations (for students and parents) and the student media.	0.08% declined from 10.7% to 8.3% ($p<0.001$) but self-reported drinking did not change. The number of alcohol-related student incidents decreased by 48% (160 to 83) for those in a residential hall and by 13% for those on campus but in another location (85 to 74).	
Community programmes						
Communities Mobilizing for Change on Alcohol	Minneapolis, USA	Wagenaar et al. 2000	Community members	This employed a part-time community organiser, who worked with community members (such as schools, media, alcohol outlets, police) to reduce alcohol misuse. Policy changes were also instigated relating to alcohol sales, as well as increased media coverage of alcohol.	There was a statistically significant decline in drink drive arrests for 18-20 yr olds. (No accompanying figures were given.)	++
Community intervention	Salinas, USA	Roeper et al. 2000	Residents of Salinas	This incorporated increased drink drive enforcement, a responsible beverage service, increased media coverage and more controlled access to alcohol at events and in the community.	It helped to reduce injury accidents by 116 between November 1993 and December 1996 (to 36 per year). Both the comparison community and intervention community witnessed decreases in weekend nightly injuries and crashes but the decrease was stronger in the intervention community.	+
Project Extra Mile	Omaha, USA	Lacey et al. 2003	Residents of Omaha	Following a comprehensive needs assessment, the programme was launched. It included a 10 minute video, public service announcements on the radio, monthly newsletters to stakeholders, postcards to parents, and retailer encouragement to ask for identification.	There was no significant effect on night-time single crashes for under 21 year olds.	0
Safe and Sober Youth	Chesterfield County, USA	Lacey et al. 2003	Young drivers	This incorporated a number of different aspects: 1) Driver licences were granted to young people in courtrooms with their parents present and information disseminated on drink driving. 2) A graduation / prom event was rolled out	There was no significant change in the number of drivers (under 21 years) involved in night-time injury crashes between 1991 and 2000.	0

Name	Location	Author(s)	Target population	Details of initiative	Outcome	Impact
				to all schools, which was alcohol and drug free. 3) Newsletters were sent to parents. 4) Assemblies were performed in secondary schools. 5) Sponsored events and awards. 6) A quarterly publication sent to stakeholders.		
Salt Lake City Underage Drink Prevention Project	Utah, USA	Lacey et al. 2003	Underage drinkers	Following a needs assessment in 1995, Cops in Shops was launched. Plain-clothed police officers worked in alcohol retailers, issuing citations to underage individuals attempting to buy alcohol and identifying problem servers to managers. There was also an anti-drunk driving month in schools and teen courts (where peers gave punishments to underage youth attempting to buy alcohol).	There was no significant effect on night-time injury crashes for under 21 year olds.	0
Tipsy Taxi Service	Aspen, USA	Lacey et al. 2000	Residents	Residents received free and confidential taxi rides home.	There was no significant change in the number of night time crashes.	0
Travis County Underage Drinking Prevention Program	Texas, USA	Lacey et al. 2003	Underage drinkers	It provided community education through a 45 minute video shown at schools, halfway houses, recreation centers, fairs and so on. Promotional items were distributed (such as notepads and pencils). A television show was produced and shown monthly. Presentations were also made at schools and community service work was also scheduled for violators of underage drinking laws.	There was no significant effect on night-time injury crashes for under 21 year olds.	0
Trelleborg Project	Trelleborg, Sweden	Stafström et al. 2004; Stafström and Östergren 2008	Trelleborg residents	The council adopted a community policy and action plan on managing alcohol and drugs in 1999. The police and the city administration worked together to reduce illegal alcohol sales. A school policy was approved. Finally, parents of	Before and after school surveys with 15-16 year olds from 1999 to 2003 (average sample size = 258) showed that the risk of experiencing an alcohol-related accident or violence decreased in 2003 compared with 1999 (OR 0.6 95% CI 0.39-0.98; OR 0.7	+++

Name	Location	Author(s)	Target population	Details of initiative	Outcome	Impact
				12-13 year olds were given a leaflet and a curriculum was developed for 12-15 year olds.	95% CI 0.43-1.01 respectively). Heavy episodic drinking[66] also declined (OR: 0.5 95% CI 0.04-0.07).	
Victim Impact Panels (VIP)	New Mexico, USA	Polacsek et al. 2001	First time drink driving offenders (n=813)	Large groups (several hundred) attended a session of four presentations by individuals such as the victim's family, police and/or paramedics. Individuals were randomly assigned either to VIP or to those sent to drink driving schools.	After two years, there was no difference in recidivism as reported by the participants themselves through surveys (n=422) or through matched driving records (n=788) Participants from both settings reported being less likely to engage in drink driving. Using the driving records, the overall rate of recidivism was 17.9%. A comparable study found that the recidivism rate for VIP participants was 8.8% in Oregon, compared with a general re-arrest rate of 40-45% (Mothers Against Drink Driving (MADD) 1989 cited in Polacsek et al. 2001)	+
Education						
Designated drivers	San Diego, USA	Lange et al. 2000	Participants crossing the border to Mexico for nightlife who: 1) Intended to return home via car from 1am to 6am. 2) Aged 18-30. 3) All group members agreed to participate. 4) Were in groups of two or more	Participants were randomly assigned to: 1) Control. 2) Cue only – the group was asked to identify the designated driver (DD). 3) Cue plus reminder – the identified DD asked to wear a bracelet denoting their status. 4) Intervention - the identified DD read a pro-DD message and then read this to the group for $1. Interviewee then asked if they had used a DD on the last drinking occasion. 5) Driver reward - DD offered $10 to return sober. 6) Group reward - all group members were offered $10 for DD to return sober. 7) Group norm – researchers randomly selected a group member to read the pro-DD message with a $1 inducement	Compared with all other groups, group seven returned with the lowest breath alcohol values (F=12.47, 1/415 df, p<0.01). For males, lower BACs were more likely via the reward system whereas for females it was the wearing of the bracelet.	++
It costs too	Louisiana,	NHTSA	21-34 yr olds	It included worksite training programmes	The report provided no information on the	Not known

[66] Heavy episodic drinking was defined as having consumed six cans of low strength lager, six bottles (four cans) of normal beer, one bottle of wine or one bottle (0.35 litres) of spirits in one session at least once in the last 30 days (Stafström and Östergren 2008).

Name	Location	Author(s)	Target population	Details of initiative	Outcome	Impact
much	USA	2008a	in the south central region of Louisiana	and drink drive enforcement checkpoints at peak times (such as the summer), and a media campaign.	initiative's impact on alcohol consumption or drink driving behaviour.	
Last Call	Pueblo County, USA	NHTSA 2008a	This initiative focused on blue collar workers	Education on the hazards of drink driving via a presentation and 15 minute video, public information (for example, on hard hats, safety goggles), and a radio and television campaign.	The report provided no information on the initiative's impact on alcohol consumption or drink driving behaviour.	Not known
Protecting Me / Protecting You	USA	Bell et al. 2005	Pupils aged 6-11 yrs. The intervention group was compared with matched controls over 4 years (sample = 1,214)	A classroom based-program, where lessons delivered covered alcohol's affects on the brain development, vehicle safety and life skills.	Changes in attitudes were highlighted but no information was presented on changes in levels of harm experienced.	+
School based education	USA	Griffin et al. 2004	School pupils aged 12 to 13 (n=3,500)	Schools were divided into low, medium and high-risk smoking prevalence and then randomised as intervention or control groups. The programme used lifeskills training, taught resistance skills and norms against drinking and drug use. It started when pupils were aged 12-13 years, with booster sessions in the next two years.	Six years later, individuals were matched to official driving records (n=2,042). Those who had received the intervention were significantly less likely to have received points on their driving licence (Odds Ratio (OR): 0.75 95% Confidence Interval (CI): 0.60-0.94).	+++
Smart Roads	Colorado, USA	NHTSA 2008a	College students	This used a media campaign (via television, radio, billboards), a workplace educational initiative (through paycheque inserts, table tents, posters, banners) and offered employers interactive worksite sessions.	Night-time injury crashes in the area decreased by 40% (from 38 before the intervention to 23) compared with the rest of the state, where it increased by 2% (from 7,965 to 8,147).	++
Intoxication limit						
Alcohol ignition locks	California, USA	DeYoung et al. 2005	Drink drive offenders.	Installation of alcohol ignition locks on cars.	Locks can be effective in reducing recidivism but not in all situations or for all offenders.	+
Alcohol ignition locks	California, USA	DeYoung 2002	Drink drive offenders who	Installation of alcohol ignition locks on cars.	Conviction rates for this population whilst they are suspended are low anyway and	Not known

Name	Location	Author(s)	Target population	Details of initiative	Outcome	Impact
			have been suspended from driving		judges order such locks only on a fraction of cases, so it is difficult to assess effectiveness. Not everyone installs the locks once they are ordered to do so.	
Checkpoint Tennessee	Tennessee, USA	Lacey et al. 1999	Drivers in Tennessee	Checkpoint Tennessee was implemented in March 1994 where each weekend, four sets of three checkpoints were in action across the state.	There was a statistically significant decrease in night-time single vehicle injury by 5.5% after the start of the programme.	++
Enhanced sanctions	Twenty-nine states in the USA	McCartt 2001	Drivers in the USA	Tiered sanctions for those found with higher BACs (0.15-0.20%). Sanctions vary but include: longer or more intensive education, plea reduction limitations, additional or enhanced sanctions for drivers, vehicle sanctions and court consideration of BAC level.	Considerable differences between the laws both across and within states, with very little evidence of implementation or effects. The author raised concerns regarding jail over-crowding, added expense, insufficient treatment services, the possibility for individuals to avoid the sanctions through agreement with the prosecutor, and the possibility for increased breath test refusals.	Not known
Graduated driving licence	California, USA	Masten and Hagge 2003	Licence applicants under 18 years	The scheme ran from January 1994 to December 2001. Here, the drink drive limit was 0.0%BAC, and anyone caught with a drink drive level of 0.01%BAC or above whilst under 21 years received a licence suspension for one year. Night time restrictions were also enforced.	There was no overall reduction in total crashes or fatal injury crashes immediately following the programme or after six months. However, there was a 19.5% decrease in total crashes for 18-19 year olds six months after the programme. Night time restrictions were associated with a 0.44% reduction in total crashes occurring from 12-5am for 15-17 year olds. This was estimated to have prevented 153 crashes in one year.	
Graduated driving licence	Nova Scotia, Canada	Mayhew et al. 2002	All novice drivers	In the first six months: an experienced driver must be present in the front seat with no other passengers (reduced to three months with a driver education course). The drink drive limit is 0.0%BAC. They must then pass a road test. For the next two years: no unsupervised driving is allowed from 12-5am, zero tolerance, and to have the same number of passengers as seat belts. Then, they do a training course.	The collision rate for 16-17 year olds was 50% lower than before the licences were introduced in the first six months of their licence and 10% lower in the first two years. The possibility for a three month discount did not provide a safety benefit. There was no long-term effect when drivers received a full licence.	+

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Graduated driving licence	Florida, USA	Ulmer et al. 2000	Drivers under the age of 18	Graduated licences were introduced in July 1996 and must be held for six months before drivers can apply for an intermediate licence. For the first three months, they cannot drive between 7pm and 6am, after which they cannot drive from 10pm. Those aged 16 cannot drive unsupervised from 11pm to 6am, and 17 year olds from 1am to 6am. The drink drive limit is 0.0%BAC.	For 15-17 year olds combined, there was a 9% decrease in fatal and injury crash involvement between 1995 and 1997. The largest decreases were amongst 15 year olds. Such reductions were not seen in Alabama (where the licence was not in operation) or in 18 year olds in Florida.	++
High visibility enforcement	USA	DOT 2007	Law enforcement agencies in America	Here, high visibility law enforcement was encouraged across America around Labor Day using a model similar to that of Checkpoint Tennessee.	In seven of the 13 states involved, there was a reduction in the average number of yearly crashes from 2001-02 to 2004-05 but a similar trend was also observed in the non-observation states (23/26 states).	+
Lowering drink drive limit	Japan	Desapriya et al. 2007	Drivers in Japan	Lowering the limit from 0.05% to 0.03%BAC in 2002	Significant reductions in alcohol-related crashes recorded: for example, for 16-19 year olds: Relative risk ratio (RR) 0.60; 95% CI 0.52-71) when comparing 1998-2001 with 2002-2005 even though the overall number of crashes increased.	+++
Lowering drink drive limit	Eleven states in the USA	Apsler et al. 1999	Drivers in 11 states	Lowering the drink drive limit from 0.10%BAC to 0.08%BAC	Eight studies reported a statistically significant decline in the rate of alcohol involvement in fatal crashes. Where these decreases were significant, licence revocation laws were in effect. For example, California experienced a decrease of 42 alcohol-related fatalities (those at or above 0.01% BAC) per month associated with the licence revocation laws being introduced (t-value = -3.72).	++
Lowering drink drive limit	California, USA	Campostrini et al. 2006	Drivers in California	Lowering the drink drive limit from 0.10%BAC to 0.08%BAC in 1990 followed by the introduction of immediate licence suspension for violators six months later.	A significant decrease in drink driving following the change but much of this only occurred when immediate licence suspension was introduced. (The article does not provide an overall figure of the reduction in reported drink driving or any indication of significance.)	+

Name	Location	Author(s)	Target population	Details of initiative	Outcome	Impact
Lowering drink drive limit	Maine, USA	Jones and Rodriguez-Iglesias 2004	Drivers in Maine	Lowering the drink drive limit from 0.10%BAC to 0.08%BAC in 1995.	After the law was introduced, the percentage of alcohol-related fatal crashes decreased from 18% in 1982-87 to 15% in 1996-2001. The proportion of drivers with a BAC level of 0.01-0.0.9% remained stable.	++
Lowering drink drive limit	Illinois, USA	Voas et al. 2000, 2002	Drivers in Illinois	Lowering the drink drive limit from 0.10%BAC to 0.08%BAC.	Comparing Illinois before and after the law was introduced, a decrease alcohol-related drink drivers was reported (Voas et al. 2000). There was a 13.65% decrease in drink drivers involved in fatal crashes (p=0.038) but an increase in the percentage of drink drivers (Voas et al. 2002).	++
Lowering drink drive limit	North Carolina, USA	Foss et al. 1998	Drivers in North Carolina	Lowering the drink drive limit from 0.10%BAC to 0.08%BAC.	No clear effect reported.	0
Lowering drink drive limit	Texas, USA	Gorman et al. 2006	Drivers in Texas	Lowering the drink drive limit from 0.10%BAC to 0.08%BAC.	No effect on traffic crashes or fatalities in Texas reported.	0
Lowering drink drive limit and other measures	New Mexico, USA	Lacey and Jones 2000	Drivers in New Mexico	Lowering the drink drive limit from 0.10%BAC to 0.08%BAC for adults alongside a lowered BAC for young people (from 0.05% to 0.02%), increased taxes, a requirement for alcohol servers to establish and implement certified server training, and drink driving education before getting a driving licence from 1993-95.	There was no significant change in alcohol-related fatal crashes or reported drinking.	0
National Impaired Driving High-Visibility Enforcement Campaign	West Virginia, USA	Zwicker et al. 2007	Drivers in West Virginia		This campaign led to a 2.8% decrease in drivers with a positive BAC when comparing April-June 2004 with the same period in 2005 (p=0.017). The number of alcohol-related fatalities also decreased from July 2003-December 2004 compared with January 2000 to June 2003 (p=0.012).	+++
Operation NightCAP	Minnesota, USA	Creaser et al. 2007	Drivers	Increasing enforcement and raising awareness at community events serving alcohol (such as concerts or sports events). Saturation patrols were used at events and times where drink driving was most likely (such as weekends,	The observed change in alcohol-related fatal crashes was not statistically significant (p=0.08) but the saturation patrols did have an effect on alcohol-related sever injury crashes that was approaching statistical significance (p=0.05). However, an overall	+

Name	Location	Author(s)	Target population	Details of initiative	Outcome	Impact
				holidays). In 2001, the programme targeted college and university towns, and then in 2003 it focused on the 13 counties with the highest levels of harm.	decline was observed before the patrols were introduced. The overall effects of a single patrol were very small so large numbers may be needed to have an impact.	
Publicised high visibility enforcement	Georgia, Indiana, Louisiana, Michigan, Pennsylvania, Tennessee, Texas, USA	NHTSA 2008b	Drivers in the seven states	Well publicised and highly visible enforcement campaigns. The specific details varied widely between states.	Georgia: A significant decline in the proportion of drinking drivers to non-drinking drivers (by 14%; $p<0.005$). No change was observed in alcohol-related fatalities per million vehicle miles travelled (VMT). Indiana: A significant decrease in alcohol-related fatalities per million VMT ($p<0.002$). The significance remained when change was compared with neighbouring states. Louisiana: No significant change. Michigan: A significant decrease in alcohol-related fatalities per 100 million VMT by 18% ($p<0.03$). Pennsylvania: No significant change. Tennessee: A significant decrease in the proportion of drinking drivers to non-drinking drivers (by 10.6%; $p<0.35$). No significant change in alcohol-related fatalities per million VMT. Texas: No significant change. Three of the four states demonstrating a decrease in crashes used paid advertising (Georgia, Indiana, Michigan).	++
Sobriety checkpoint	Charlottesville, USA	Voas 2008	Drivers in Charlottesville	Here, one vehicle was manned by two officers on weekend nights.	The monthly percentage of nighttime crashes in Charlottesville was reduced by 17% from the baseline ($p<0.001$).	++
Strategic Evaluation States	Alaska, Georgia, West Virginia, USA	NHTSA 2008c; Syner et al. 2008	Drivers in Alaska, Georgia and West Virginia	The states involved agreed to participate in highly visible operations including sobriety checkpoints and saturation patrols at least monthly with surrounding publicity. The activities were to cover at least 65% of population or areas where 65% of fatalities occur.	Georgia and West Virginia experienced decreases in alcohol-related fatalities overall between 2002 and 2005 (Georgia: 533 to 489; West Virginia: 179 to 118). Alaska experienced a decrease until 2004 but then numbers increased (37 in 2002; 44 in 2005).	+
Involvement of citizens and other passengers						
Operation	Montgomery	Kelley-	Drivers in	Launched in 2002. This recruited	Whilst there were no changes in the number	Not known

Name	Location	Author(s)	Target population	Details of initiative	Outcome	Impact
Extra Eyes	County, USA	Baker et al. 2006	Montgomery County	citizens to train and work with the authorities in identifying drink drivers. Those involved were sent to locations such as car parks near licensed premises. Once a potential perpetrator was identified, citizens contacted the police who made the arrest, if appropriate.	of drink drive crashes, the number of arrests did increase from one per night in 2000 before the programme was instigated to nearly eight in 2005 on the nights when the campaign was in action (5-8 times per year). This could not be attributed to the programme.	
Lighting						
Lighting project	New Mexico, USA	Graham (1998)	Residents of Gallup	287 lights and six light masts were installed on one problematic stretch of road by 1992.	Between 1985 and 1992, 24 pedestrian fatalities had occurred on the road. No pedestrian fatalities have occurred since the lights were installed in mid-1992 until the article was published.	++
Responsible bar server training						
Alcohol Linking Program	New South Wales, Australia	Wiggers et al. 2004	400 hotels	This was run by the police. Hotels were randomly allocated to control or intervention settings. The experimental group received a feedback report detailing incidents following alcohol consumption on their premises. Those with more than one incident received a police audit and further feedback.	Over the three month follow-up period, there was a 15% decrease in alcohol-related incidents associated with the experimental group compared with the controls. This was not significant ($p<0.08$).	0
Electronic identity card readers	Pennsylvania, USA	Beirness et al. 2001		Card readers were issued to alcohol outlets (60/130 in a given area) alongside an awareness and education program.	Frequency of use varied but outlets may not use them every time anyway, for example, if an underage person aborts the sale rather than provide ID. Some staff wary of technology.	Not known
Promoting Responsible Retailing Practices	Ventura, USA	NHTSA 2008a	Venues identified through drink drive offenders' surveys on their place of last drink	Those venues identified were risk assessed to determine server liabilities and training was provided to venues (3hrs) along with assistance on developing new policies.	The survey was repeated and two venues (36 were risk assessed) were mentioned fewer times. (No details are provided on possible levels of significance.	+
Responsible beverage	Twenty-three states in the	Mosher et al. 2002	Bar servers	Training to identify and refuse both underage and intoxicated sales. Training	In 11 states, the schemes are incentive based and the other 12 have mandatory	Not known

Name	Location	Author(s)	Target population	Details of initiative	Outcome	Impact
server programmes	USA			also applies to managers to help them to develop appropriate supporting policies.	schemes. It discussed dimensions which could influence effectiveness such as: reviewing all information to servers (including alcohol-related harms and legal requirements); targeting both managers and servers; demonstrating policy development; and lasting a minimum of four hours. Mandatory schemes were rated higher by Alcoholic Beverage Control than those that were incentive-based.	
Targeting establishments	USA	Ramirez et al. 2008	Those establishments frequently identified as being a place of last drink by drink drive offenders	Venues were issued with letters regarding reported business practices, education packages and free training on avoiding sales to underage and intoxicated individuals.	There were reductions in the number of monthly drink drive arrests involving drivers who had been drinking at intervention sites and a reduction in average BAC among drink drive arrestees in the intervention sites from 0.135g (n=105) in the three months before the intervention to 0.127 (n=19) in the three months after (p=0.033) compared with an increase in the comparison sites	+++
Retail restrictions						
Licensing hours	Juarez, Mexico	Voas et al. 2006	Drinkers	Reduced closing time from 5am to 2am.	The number of American individuals crossing back over the border from Juarez decreased by 89% after 3am but there was no significant change between 12am and 3am. No such change was seen in a neighbouring town where the licensing hours had not changed.	+
Treatment and rehabilitation						
Alcohol education	California, USA	Tashima and Helander 2007	First time drink drive offenders	Assessment of whether a three, six or nine month alcohol education program was more effective for reducing recidivism	No significant differences between the programme durations were found. The programme's overall effectiveness compared with normal criminal justice proceedings was not reported.	Not known
Driver Intervention Program (DIP)	Adelaide, Australia	Kloeden and Hutchinson 2006	Disqualified L or P plate drivers <25 yrs (disqualified due to, for	Offenders could pay for inclusion in DIP ($32) or pay an expiation fee of ($74). DIP is a 90 minute interactive workshop for small groups.	70% chose DIP (usually younger drivers), and they had significantly lower levels of moving and administration offences after the notice to attend letter was sent but not for crash rates. For example, the DIP group	++

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			example, drink driving)		were half as likely to commit an administrative offence than the expiation group (OR: 0.493; p<0.001). However, they were self-selected.	
Intensive probation	USA	Lapham et al. 2006	Offenders convicted of drink driving at least twice in the past decade (but with no arrests for violence)	This programme lasted three years and involved weekly attendance at Alcoholic Anonymous, licence suspension, and breath testing. Involvement reduced time in jail.	Participants were matched on frequency of previous offending, age, gender and year of conviction. The intervention group (n=460) were half as likely to re-offend compared with those who went through normal jail time (n=497) after five years (Relative Risk (RR) 0.52 95% CI 0.36-0.76).	+++
Mandatory substance abuse treatment	Michigan, USA	Eby et al. 2002	Offenders convicted of drink driving at least twice	In the decade before the article was written, Michigan had implemented mandatory substance abuse treatment alongside vehicle immobilisation and metal licence plate forfeiture.	Subsequently, there has been a 30% decrease in the rate of crashes involving drivers whose licences were suspended or revoked, resulting in a 37% decline in injury rates.	++
Preventing Alcohol-Related Convictions (PARC)	USA	Rider et al. 2007	First time drink drive offenders (n=9,571)	This initiative aims to control driving rather than drinking (for example by advising not to drive to an event in the first place).	Students were allocated to 116 instructors, who were randomly allocated to PARC or a traditional curriculum aiming to control drinking. PARC students were significantly less likely to recidivate than controls when examining official crime records after one year (OR:0.58, p=0.002) but the effect weakened over time.	+++
Treatment for first time offenders	USA	Woodall et al. 2007	First time drink drive offenders compared with normal jail time (n=325)	A randomised clinical trial tested the effectiveness of a treatment program. It used motivational interviewing principles covering domestic violence, drink driving, goal setting and work release.	Reductions were seen in self-reported consumption but it is not reported by how much. Three quarters of the sample were native American, affecting its applicability to a UK context.	+

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