

# ALCOHOL



**reducing the harm**

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12 Whitehall London SW1A 2DY

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This paper was written by David Taylor

# Introduction

Produced easily by fermentation, ethyl alcohol has for at least 5 to 8 thousand years played a part in the development of human civilisation; as a medicine, as a substance endowed with religious significance, as a food and important element in many cuisines, as a fuel, as an economic good and as a disinhibiting/intoxicating drug used to aid social intercourse. It is in this last context that alcohol is most widely employed in the modern world. With the main exception of Muslim societies it is generally accepted as a legal 'social psychotropic' for adult use, that is as a self purchased and self administered substance taken by healthy individuals primarily for its mind affecting properties.

Even in Britain, still one of the more sober of the developed nations despite a virtual doubling of *per capita* alcohol intake in the last quarter of a century, the scale of ethyl alcohol consumption can be seen to be enormous if compared to, for instance, that of medically legitimated drugs/medicines. The most frequently prescribed group of the latter substances are the benzodiazepine tranquillisers and hypnotics, some 30 million scripts for which were filled in 1979. The cost to the NHS (£1979) was a little over £30 million. In the same year the British population drank 40 million proof gallons of spirits, 1,500 million gallons of beer and 100 million gallons of wine. This is equivalent to over 17 pints of absolute (pure) alcohol for every individual aged over 15 in the country. The cost (£1979) to the public was almost £9,000 million.

The use of any pharmacologically active substance to such a degree is likely to be associated with some forms of harm. In the case of 'drinking' these include mortality and morbidity from conditions like alcohol related liver diseases and peptic ulcers, the results of driving whilst intoxicated and the many economic and social burdens which may be inflicted on an individual and/or his or her family as a consequence of alcohol dependence. These factors are difficult to quantify accurately, but broad indicators include the estimate that the number of premature deaths associated with alcohol use in Britain is probably in the order of 5,000 to 10,000 per annum and official claims that between 500,000 and 750,000 people in England and Wales alone have some form of serious drink related problem. Even excluding intangible costs of suffering, government economists have recently suggested that the unwanted effects of alcohol consumption may lose the nation around £1,000 million (£1981) a year.

Against this, of course, have to be balanced the desirable aspects of alcohol use. In an ideal world, it could be argued, scientifically acceptable techniques for quantifying the value of drinking and its linked costs would be developed and a policy for influencing alcohol use in the community aimed at optimising the welfare balance introduced. Much concern has been expressed to the effect that

recent British policy has failed to control adequately the level of alcohol related harm. For example, an unpublished but widely seen report from the government's Central Policy Review Staff urged policy makers to introduce, on health grounds, increased taxes on alcoholic beverages, to encourage alcohol treatment facilities in workplaces and to amend the law to permit random breath testing for drivers.

However, the barriers to establishing a rational approach to policy are significant. On the technical level, for example, the methods of quantifying the global social and economic benefits of this form of drug use are still relatively immature. Whilst at the political level, debate and decision making may be influenced by a number of powerful and conflicting interests. These include, first, those of the brewers, distillers and purveyors of alcohol beverages, who do not only contribute to the UK economy by providing up to 700,000 jobs but also export large quantities (about £1,000 million worth) of spirits and provide the State with a significant (currently £3,500 million plus) route for revenue raising. Second, those of the medical and allied professions and the UK Health Departments, which may be genuinely striving to increase the wellbeing of the population but which might sometimes appear to be a little authoritarian or paternalistic. And, third, those sections of the population who for religious or allied reasons believe that drinking is wrong *per se*.

Against this background this paper seeks to clarify some of the issues relating to the consumption of alcohol in Britain. It describes recent thinking regarding the processes by which harm from the dependence on alcohol are induced, the nature of alcohol as a mind affecting drug and a cause of physical disorders and the various ways in which society and individuals may be protected against its ill effects. Special attention is paid to economic factors, although a wide range of social phenomena, such as the shifting pattern of alcohol consumption amongst the female population and the interaction between the use of medicines and social drugs, are touched on. The overall objective is to help to stimulate and inform public discussion of this important area and to identify those aspects of alcohol usage where disciplined scientific research needs to be further encouraged.

## Terminology and models of the drinking population

In current everyday usage the term 'an alcoholic' refers to any individual who habitually drinks to what is considered an excessive degree and/or who appears to have special problems related to the consumption of alcohol. 'Alcoholism', a word first coined by a

Swedish doctor named Huss in the late 1840s, is commonly employed to describe the overall condition suffered by such people. It often seems to be regarded as a distinct disease state almost comparable to, say, tuberculosis or schizophrenia.

In some respects it is not undesirable for the general public to think in such a manner. For example, the moralistic attitudes and pejorative phrases common in the past (such as 'inveterate drunkard') can imply an undue lack of sympathy with those unfortunate individuals who need others to help them with their drinking problems. But in other key ways terms like 'alcoholics' and 'alcoholism' can, if loosely applied, be seriously misleading. For they fail to indicate the various widely differing dimensions of harm that alcohol use can entail and may imply that there exists a single, categorical state of alcoholism suffered by subjects who are for some reason, over and above the degree of their drinking, different from normal persons.

A drawback of such thinking, which less progressive sections of the industry concerned with alcohol manufacture and sale are still sometimes accused of encouraging, is that it may lead attention away from the fact that anyone who drinks is at risk from the unwanted side effects of alcohol; and that the control of alcohol linked problems may often entail influencing the drinking behaviour of the entire population, not just that of an abnormal sub-group.

Thus many authorities active in the field of 'alcoholology' today discourage the use of phrases like 'the alcoholic population', at least in a broad, undefined context. Some have argued that the sets of experiences related to short or long term heavy alcohol ingestion are so varied that each investigator should spell out his or her own terminological criteria in relation to each specific study conducted (Kreitman 1977). Even at the start of the 1960s Jellinek stressed that 'alcoholism' referred to different states in different cultural environments whilst Keller suggested that no single definition was appropriate for all investigative purposes (Jellinek 1960, Keller 1960).

However, there has in the last few years emerged rather more consensus in the community professionally concerned with alcohol problems as to the basic concepts necessary for achieving an adequate understanding of this area. This is reflected in the progression of ideas shown in World Health Organisation publications on alcohol.

In the early 1950s, for instance, the report of a WHO Expert Committee (WHO 1952) emphasised deviance from cultural norms in its definition of alcoholism; the Committee soon amended this to include references to mental, physical and social harm associated with alcohol dependence and a resulting need for 'treatment'. In a subsequent WHO report (WHO 1964) the term dependence was examined in more detail, but its relationship with harm was not

fully defined. It was not until 1977 that a WHO paper (Edwards *et al* 1977) differentiated between what was described as the 'alcohol dependency syndrome'<sup>1</sup> – that is a psychic/physical addiction to alcohol – and 'alcohol related disabilities' – essentially the mental, physical or social harm associated with drinking. Often the two states co-exist. But sometimes they may occur independently, as in the case of, say, a person in middle life who is dependent on drink but retains health and an acceptable life style or that of a younger man who from time to time becomes acutely intoxicated and so violent or a danger on the roads without being a chronic user.

The dependency syndrome should, Edwards and his colleagues proposed, replace 'alcoholism' in the professionally employed terminology. This is an attractive approach, although it is not without critics. Some commentators have questioned the existence of the syndrome as a clearly identifiable entity. It could even be suggested that this narrowed concept might serve to justify in a suspect manner a continued special status for medical expertise and authority in the context of 'treating', or helping, people with alcohol problems.

Alternative nomenclatures include that of Davies (1979) who uses the word alcoholism to refer to 'the intermittent or continual ingestion of alcohol, leading to dependence, or harm, or both' and the employment by the DHSS Advisory Committee on Alcoholism (which sat during the latter half of the 1970s) of the term 'problem drinkers' to refer to those who cause harm by repeated drinking (DHSS 1978a, 1978b). Davies also distinguishes a small group of people who become alcohol dependent in a relatively short time and whose drinking is linked to serious underlying psychiatric disorder. This he terms 'symptomatic alcoholism'.

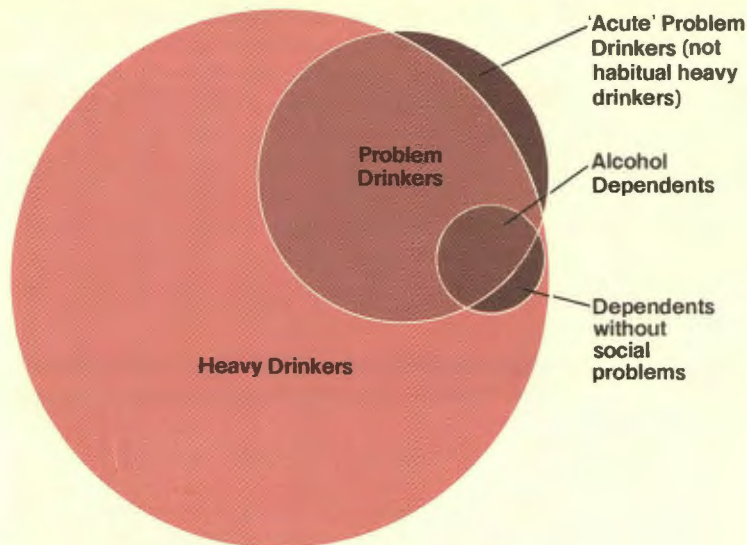
For the purposes of this paper 'alcoholism' is, if used, employed in the restricted sense of the WHO dependency syndrome. 'Problem drinkers' applies to all those people who cause or experience significant harm as a result of drinking alcoholic beverages. 'Heavy drinkers' is a term normatively defined by the drinking habits of the bulk of the population and is used to describe people who drink significantly more than their peers, hence to a degree thought of as excessive by many. Dependence and/or harm may or may not occur. Figure 1 outlines this scheme.

### **Drinking distributions – the Ledermann curve**

In post war research into the use of alcohol in communities like those of Western Europe one of the most significant influences has been the work of the French demographer Ledermann. He chal-

<sup>1</sup> A state, psychic and usually also physical, resulting from taking alcohol, characterised by behavioural and other responses that always include a compulsion to take alcohol on a continuous or periodic basis in order to experience its psychic effects and sometimes to avoid the discomfort of its absence: tolerance may or may not be present (Edwards *et al* 1977).

**Figure 1** *The terminology of drinking*



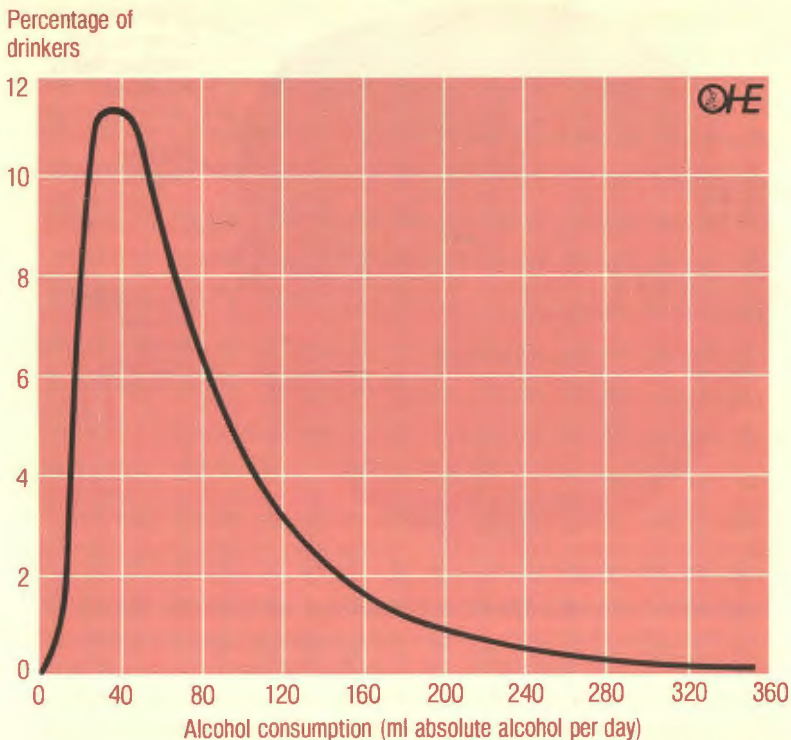
lenged the idea of a bimodal distribution of drinking behaviour which implies that the level of intake amongst alcoholics or very heavy drinkers is quite discrete from that of more moderate consumers. Instead he supported the alternative hypothesis that the distribution is unimodal: and suggested that in all populations it will follow the shape of what is mathematically termed a log-normal curve, illustrated in Figure 2. If this fixed pattern of drinking in the population is taken to apply it would mean that a rise in average consumption must inevitably be associated with an increase in heavy and harmful alcohol consumption (Ledermann 1956).

Ledermann's view was supported by de Lint and Schmidt (1971) who, working at the Addiction Research Foundation in Toronto, conducted an important analysis of alcohol consumption and liver cirrhosis. In 1965 a collaborative study (involving the Ontario Foundation, the WHO and the Finnish Foundation for Alcohol Studies) on alcohol control policies also endorsed the Ledermann approach in as much as it posited an empirical relationship between mean drinking levels and the number of problem drinkers in a given society (Bruun *et al* 1975).

That there is normally some linkage between these two variables seems clear. But the details of Ledermann's hypothesis are now widely regarded as unacceptable for a variety of technical reasons. These relate to inconsistencies in the mathematical interpretation of the empirical data he used (Skog 1971, 1977, Duffy and Cohen 1978, Duffy 1979) the quality of that data and the assump-



**Figure 2** *The Ledermann (log normal) curve*



Source de Lint 1977.

tions made about the highest drinking levels to be found in the population. There is in fact very strong evidence to the effect that drinking distribution patterns vary between and within given communities (Plant 1979). And from a rational stance there seems to be no reason at all to raise the Ledermann curve to the level of some form of universal law. Indeed, to do so would, paradoxically, seem in some ways to reflect the type of rigid and naive thinking which in the past saw 'alcoholics' as a totally discrete section of the population.

For an observer concerned with maximising the welfare associated with alcohol use the conclusion to draw from the debate resulting from Ledermann's work would therefore seem to be that there is almost certainly no fixed relationship between mean levels of drinking and the numbers of alcohol dependents, problem drinkers or heavy drinkers. Given the right social circumstances, rises in the former could, conceivably, be associated with falls in the latter. But to date a reverse relationship has more or less universally been observed and the available data does not permit the identification of precise harm control methods. Thus critiques of

Ledermann's hypothesis and detailed demonstrations of the failings of his work should not be allowed to draw attention away from the fact that, at present, limitation of global consumption by price is the best proven alcohol harm control policy (WHO 1980), any more than the concern of organisations like the National Council on Alcoholism and the Royal College of Psychiatrists (1979) to limit alcohol problems should blind potential legislators to the fact that many people may choose to accept higher levels of risk to themselves and society than such bodies believe desirable.

## Consumption trends

Britain is by tradition a predominantly beer drinking country – the Celts made ale in the pre-Roman era (and in addition mead and cider) whilst hop flavoured beers have been brewed since the fifteenth century. Whatever the current concerns regarding alcoholic beverages, it was until modern times frequently safer to drink beer than water; and the people of this country showed considerable prudence in this respect. In the 1680s, for instance, consumption reached an estimated peak level of 2.3 pints per person per day, some four times the present figure (Spring and Buss 1977).

At several points in the last few centuries there have been well documented social crises involving unusually high alcohol consumption. Perhaps the most notorious of all was the build up of spirit drinking in the first half of the eighteenth century. Controls on gin sales were lifted in the 1720s. By 1750, it has been reported, the volume of spirits imbibed reached about 7 million gallons, a *per capita* intake some 14 to 15 times greater than half a century or so before (Monckton 1969). It is highly probable that this caused most harm amongst the urban poor; underfed, underemployed and badly housed people for whom gin was not just a route to release from suffering but also one of the cheapest energy sources available.

Contemporary commentators regarded increased drinking with some concern, particularly when it could be seen as a threat to the maintenance of social order. For example, the preamble to an Act of Parliament in 1729 read 'the drinking of spirits and strong waters is becoming very common amongst people of inferior rank, and the constant and excessive use thereof tends greatly to the destruction of their health, enervating them, and debauching their morals, and driving them into all manner of vice and wickedness' (Royal Commission on Licensing 1932). Gin, rather than poverty, was often presented as the fundamental cause of evils like the high infant mortality amongst the least advantaged social classes. Restrictive legislation eventually passed in 1751 and 1752 cut consumption of spirits to under 2 million gallons by the end of the decade. But shortly afterwards it began to rise again.

A second wave of alcohol problems followed Wellington's 1830 Beer House Act, passed at a time of both growing political tensions and sympathy towards free trade philosophies (Glatt 1977). This in effect lifted the system of licensing as far as beer sales were concerned and marked the start of a steady increase in alcohol consumption throughout the key period of nineteenth century urbanisation and industrialisation. Cheap drink was widely seen as 'the quickest way out of Manchester', although the opiates consumed by many people were doubtless of similar efficacy.

'Free trade' in beer ended in the late 1860s whilst the rise in spirit drinking was finally checked in the mid 1870s, following new licensing legislation in 1872. Thus towards the end of the nineteenth century drinking had fallen off although *per capita* alcohol consumption in 1900 was still, as Figure 3 illustrates, over 10 per cent above that of today and more than double that of the 1950s.<sup>2</sup>

The major decline in drinking in the first half of the twentieth-century was initiated at the time of the First World War. Licensing and other controls imposed in 1915 and 1916 with the goal of boosting munitions production and the general war effort were subsequently largely maintained, and in the interwar period supported by the relatively high price of alcoholic beverages. As Figure 3 shows *per capita* alcohol intake in the form of spirits was kept at a level of almost one sixth of the 1900 figure throughout the 20 years between the early 1930s and early 1950s, a fall which, Figure 4 emphasises, correlated well with a decline in alcohol harm indicators like death from liver cirrhosis (OHE 1970). Despite boosts in beer consumption during World War II<sup>3</sup> (and an almost complete fall off in wine drinking) Britain as it entered the post war period was probably as 'sober' a country as it has ever been in its recorded history.

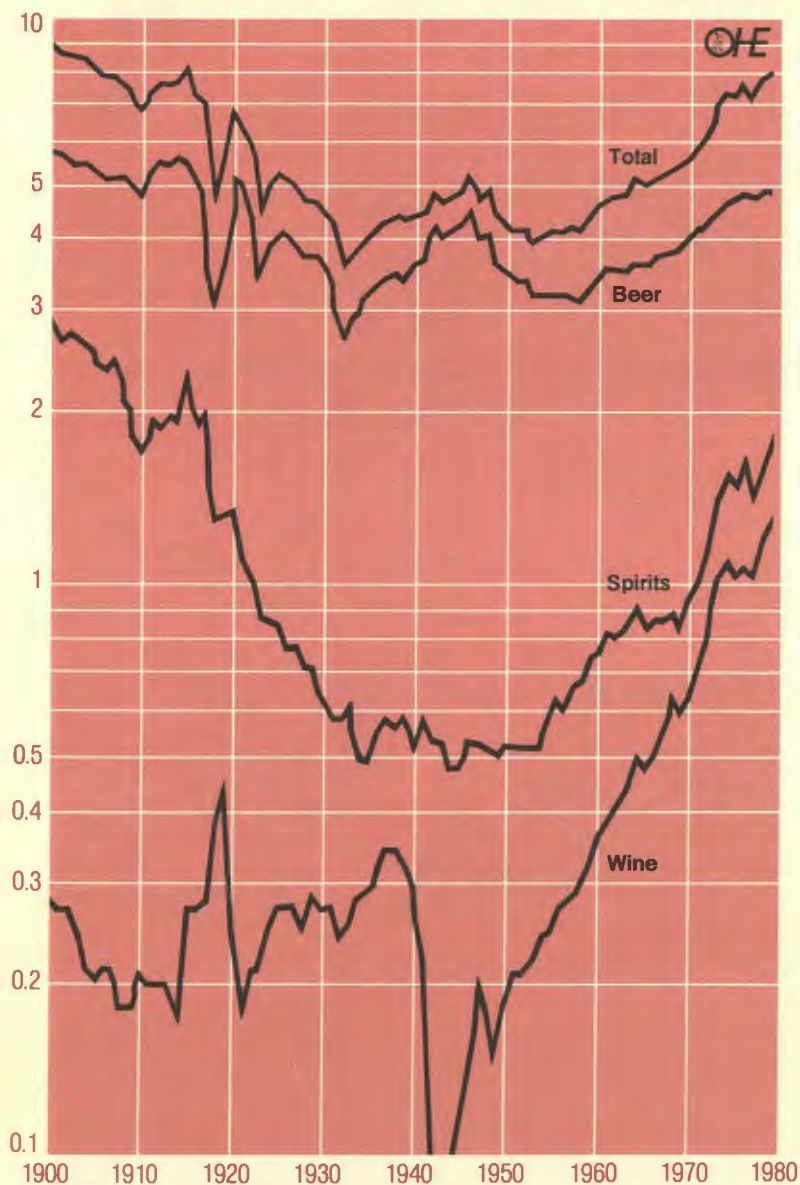
Even today the United Kingdom has significantly lower rates of alcohol intake and related problems than most other economically comparable countries (Davies 1979), a point broadly illustrated in Figure 5. Yet the return to higher, turn of the century, drinking

<sup>2</sup> The conversion used for assessing total consumption is based on alcohol content. It does not take account of changes in strength over time. For example, wine, which includes fortified wine, has been assumed to have an average 14 per cent alcohol content throughout, although with the relative decrease in port consumption and, more recently, an increase in the vermouths, the average content has no doubt varied. Further, there have been a number of significant changes in the way consumption statistics have been calculated over time, as well as problems of illicit and home production. All these factors lead to necessary caution in interpretation of consumption trends.

<sup>3</sup> Skog (1980) argues that the inverse relationship between liver cirrhosis and alcohol consumption shown particularly in the wartime period is a complex lag effect. It may also be noted that some alcohol may have been consumed by foreign soldiers posted to the UK and those subsequently killed.

**Figure 3** *Alcohol consumption by type, United Kingdom 1900–79*

Litres per capita,  
absolute alcohol

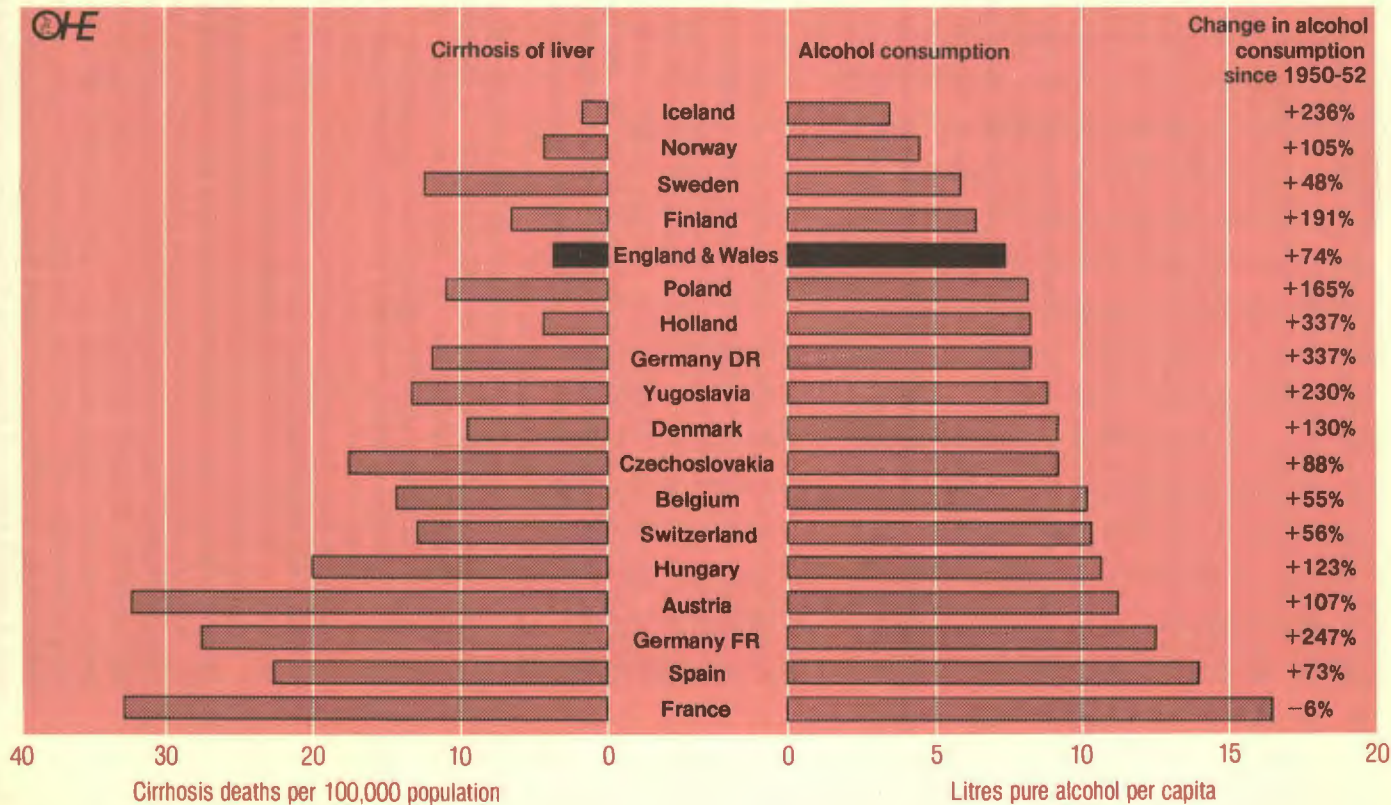


Sources Derived from Chilvers (1979) and Reports of Customs and Excise, various years.

**Figure 4** Deaths from alcoholism and cirrhosis, offences of drunkenness and consumption of alcohol (UK), England and Wales 1860–1978



**Figure 5** *Liver cirrhosis mortality and alcohol consumption, selected countries mid 1970s*



Sources WHO publications, various years.

levels is clearly a potentially disturbing phenomenon. In examining it a number of broad demographic and consumption pattern variables have to be taken into account.

One is that the type of beverages favoured has tended to alter, with wine sales now over four times the 1900 level and still rising steeply. They are now higher than at any time in the past. Beer still accounts for roughly two thirds of the alcohol taken (although this rose to 88 per cent in 1945), with wine now at about 15 per cent and spirits accounting for the remainder. This may, as the WHO has suggested, be seen as a shift towards a more 'international' style of drinking with traditional patterns tending to be augmented (rather than replaced) by those of other countries (WHO 1979).

A second is that the proportion of children (under 15s) in the population has more than halved in the last 80 years, whilst drinking amongst women has probably become more frequent and widespread. This increases the number of effective drinkers, so influencing the comparability of *per capita* intake figures. Any satisfactory analysis of consumption trends must therefore be based on a detailed appreciation of sex and age specific drinking patterns.

### **Current UK drinking habits**

Research into detailed aspects of the drinking behaviour of the population is, for practical reasons, generally conducted by means of field surveys which record people's self reported alcohol consumption in a given period. The problems with such retrospective studies are obvious. They include not just under-recording of drinking due to forgetfulness or embarrassment, but also biased sampling in the sense that particularly heavy drinkers may be either out of the population accessible to the investigation or especially likely to be non-responders.

As a result surveys usually show only half or less of the alcoholic beverage consumption known to take place in the community, with the strong probability that the unaccounted intake is not evenly distributed amongst the known drinking population. Other enquiry techniques, such as market research investigations conducted at points of alcohol purchase, may perhaps be useful in correcting the figures thrown up by field surveys (Tuck 1981). Yet they too have significant limitations and are not in any case normally available to agencies other than those which fund them.

It can of course be argued that the errors in survey results are likely to remain fairly constant over time and thus that time trend figures are good indicators of the nature and direction of drinking behaviour shifts. However, data of sufficient consistency are not on the whole available, although some very valuable studies have been conducted. These include two in Camberwell in 1965 and 1974 (Cartwright *et al* 1978), an investigation of Scottish drinking habits (Dight 1976), the 1978 General Household Survey (OPCS 1980) and a special Office of Population Census and Surveys (OPCS) pro-

ject on drinking in England and Wales (Wilson 1980a). This last was conducted by methods similar to those employed in a contemporaneous study in Northern Ireland and opcs research on the effects of the 1977 changes in Scottish licensing laws (Knight and Wilson 1980, Wilson 1980b).

These pieces of work can provide a reasonably reliable overall picture of current drinking habits and cast some useful light on issues like drinking amongst the young, class variations, aspects of female alcohol consumption and the significance of differing drinking habits in the constituent parts of the United Kingdom. They show, for example, that the highest consumption tends to be amongst young, unmarried, separated or divorced males, these variables being independently associated with heavier intake.<sup>4</sup> Dight (1976) found that some 30 per cent of all Scottish drinking was reported by only 3 per cent of the population, most of whom were single men in their late teens or twenties. It is amongst this group that the upturn of alcohol consumption since the 1960s seems primarily to have been concentrated (Cartwright 1978).

Nevertheless, market investigations also report significant rises in female drink purchasing and implied intake (Ratcliffe 1979, Shaw 1980), a trend linked to sex-role changes in society permitting women greater freedom of access to alcohol and higher discretionary spending power. Supermarket licenses and intensified advertising of products like sherries, vermouths, liqueurs and certain wines may have helped to direct the expression of this liberation.

Table 1 presents the most recent opcs age/sex data on UK drinking levels, measured in standard units. These are roughly equivalent to one centilitre of alcohol, that is half a pint of beer, a single English measure of spirits or a four fluid ounce glass of wine. The opcs figures indicate that in England, Scotland and Wales approximately 6 per cent of men over 20 and 11 per cent of women do not drink at all, as opposed to over a half of the female population and three quarters of all males who are regular drinkers. In Northern Ireland there are far more non-drinkers, with, as Table 2 shows, almost a third of men and half of all women reporting that they are teetotal.

In view of these findings it is of interest to note that current data on liver cirrhosis shows Scottish mortality rates for men to be virtually double those of England and Wales and Northern Ireland's to also be rather higher than the English ones. Since these figures, and also those related to phenomena like arrests for drunkenness, have often been taken as indicators of excessive drinking this observation needs to be correlated with the apparently broadly uniform drinking levels on the British mainland and the lower ones across the Irish Sea.

4 So too appears to be an above average propensity to drink in bars, especially for older individuals.



**Table 1** Average consumption in standard units\* of those who drank last week, by age and sex Percentages

	Men			Women		
	England & Wales	Scotland	N Ireland†	England & Wales	Scotland	N Ireland†
Age*						
20-27	26.6	26.2	18.9	9.7	7.7	7.0
28-37	19.7	24.9	15.2	6.4	6.3	6.9
38-47	19.5	20.9	14.4	7.7	6.2	
48-57	20.1	16.1	12.3	7.2	6.1	
58-67	15.5	13.5		4.4		5.4
68+	11.7	6.4	9.9	5.0	3.9	
all aged 20+	19.6	19.5	14.5	7.0	6.2	6.5

**Table 2** Consumption last week by sex Percentages

	Men aged 20 or over			Women aged 20 or over		
	England & Wales	Scotland	N Ireland	England & Wales	Scotland	N Ireland
Nothing (and nothing in the last year, ie teetotal)	6.0	7.0	31.0	11.0	11.0	53.0
Nothing (but had had a drink in the last year)	18.0	15.0	23.0	32.0	34.0	27.0
1- 5 units	20.0	21.0	14.0	34.0	33.0	14.0
6-10 units	14.0	12.0	11.0	10.0	13.0	3.0
11-20 units	16.0	18.0	12.0	10.0	7.0	1.0
21-35 units	13.0	14.0	5.0	2.0	3.0	1.0
36-50 units	8.0	8.0	1.0			
51 units or more	6.0	6.0	3.0	1.0	0.0	1.0
Average consumption of drinkers last week	19.6	19.5	14.5	7.0	6.2	6.5

\*These are in unconventional age-groups because the Scottish data were available only in this form at the time of the initial interviewing in autumn 1976.

†These of the smaller sample sizes for men and women in Northern Ireland and women in Scotland, it was necessary to use broader age-groups.

‡These are standard units which are equivalent to a half pint of beer, 1/6 gill of spirits (an English single), a glass of wine (4 fl oz) or a small glass of fortified wine (2 fl oz).

One set of explanations stems from doubts about the acceptability of the data. But other, in the context of this section more relevant, possibilities relate to differences in drinking styles between parts of the country and consequent levels of harm. For instance, Wilson (1980b) has emphasised that Scottish and Irish men drink on fewer occasions than the English relative to the total amount consumed. The former in particular tend to have more individual heavy drinking days despite an apparent shift towards English type of drinking following the extension of licensing hours in Scotland. Such a concentrated pattern is likely to induce more problems with drunkenness than might otherwise be expected.

As to liver cirrhosis it may be that English drinking levels have risen more rapidly than those in Scotland, which seem to have stayed at a relatively stable level during the 1970s, and that those on the south of the border have yet to display the full ill-effect of their changed behaviour. But Scottish males, particularly manual workers, seem to drink at high levels into their mid 30s, unlike the English who are more likely to decrease their intake towards the end of their 20s. And in Ireland the more polarised attitudes towards drinking could have some effect, either perhaps in increasing under-reporting or, in certain instances, encouraging some heavy drinkers to particular excesses. Both these factors could influence cirrhosis levels, as might possibly the tendency of Northern Irish and Scottish drinkers to take more spirits.<sup>5</sup> Amongst all males over 20 in England and Wales only 13 per cent of total reported alcohol consumption in the recent OPCS survey was in this form, compared to 28 per cent elsewhere in the UK. For women the equivalent proportions were 25 per cent as opposed to over 50 per cent.

Turning to the issue of social class it is remarkable that although there is some evidence of a downward class drift amongst dependents there do not appear to be major overall variations in alcohol consumption between the main social groupings,<sup>6</sup> despite the general sensitivity of alcohol sales to price changes and the income

5 It is unlikely that alcohol in the form of spirits is more damaging than an equivalent dose in a low concentration beverage. But spirit use, either alone or in conjunction with that of beer, might be related to drinking habits which involve unusually high blood alcohol levels. It is of note that in an attempt to control drinking problems in Russia the authorities recently imposed a reduction in the strength of vodka, although authorities in Britain doubt the efficacy of such a move in the context of this country's drinking customs.

6 There are, however, significant differences in drinking styles between classes. For instance, in addition to Dight's (1976) findings in Scotland the 1978 General Household Survey (which used a method of analysis which might tend to classify frequent imbibers as moderate drinkers whilst those consuming the same amount of alcohol on fewer occasions appear as heavy drinkers) suggests that only 9 per cent of adult male professionals are heavy drinkers (and 5 per cent abstainers) compared with 34 per cent of unskilled manual workers (9 per cent abstainers). Overall 25 per cent of males were classified as heavy drinkers in this survey, although in the industrial North of England 42 per cent were so identified.

variations observable in the population. Even with regard to cirrhosis death rates the only major discrepancy shown in the most recently available occupational mortality tables (OPCS 1979) for England is the raised hazard in social class II. This sub-group had a standardised mortality rate (SMR) of 145 (all groups 100), due largely to the inclusion in it of publicans who collectively suffer sixteen times as many cirrhosis deaths as would an equivalently sized group of average individuals.<sup>7</sup>

One possible explanation is that richer people buy more expensive drinks, indicating in part that drinking behaviour can be a way of claiming or displaying social status. The relationship between class and drinking levels is, however, clearly complex and existing data is simply not sufficient for a clear picture of this area to be formed.

Finally, with respect to drinking amongst persons under 18 the OPCS survey indicated that on a cohort by cohort basis the age at which people start drinking either at home or in bars has fallen in recent decades. The significance of this is that an early start to drinking appears to be associated with the subsequent development of heavier drinking patterns, although whether this is a contingent or causal relationship is uncertain.

### **Numbers of harmed and at-risk people**

Most authorities agree that sustained drinking at a level of over 10 to 15 units a day in adult males or 7 to 10 in females puts the consumer at very serious hazard of suffering ill health and/or other unwanted experiences. Although five pints of beer a day or its equivalent may not seem excessive to some people, particularly male manual workers in heavy industries who drink for fluid replacement as well as its other rewards, even this amount regularly taken should not be thought to be without risk. In its 1979 report *Alcohol and Acoholism* the Royal College of Psychiatrists argued that for men eight units – equivalent to four pints of beer – and for women six units was the upper most acceptable daily intake. The more traditional 'Anstie's limit', so called after the nineteenth century British doctor who proposed it, suggests that regular daily drinking should be confined to two pints of beer, the equivalent of half a bottle of wine or four singles of spirits.

However, although such limits may be relatively straightforward to define, identifying the number of people who drink above them is, because of the surveying difficulties noted above, by no means easy. Whilst enumerating those who may be alcohol dependent (in the sense of the full WHO syndrome) or problem

7 Other 'high risk' occupations were barmen, seamen, armed forces officers and doctors. Plant, in a study to investigate whether 'high risk' industry attracted (potential) alcoholics or produced them, concluded that among a sample of those working in the drinks industry in Scotland many had a problem before working there. (Plant 1979).

drinkers (in that they sometimes behave in a manner harmful to themselves or others because of taking alcohol but whose overall consumption is not necessarily excessive) is an even more daunting task. Thirty years ago a WHO sub committee on alcoholism decided that cirrhosis death rates were the 'least unsatisfactory' index of alcohol related harm, but that the then projected figure of 350,000 'alcoholics' in England and Wales was 'little better than a guess' (WHO 1951, 1952).

Recently quoted estimates that there may now be around three quarters of a million imprecisely defined 'alcoholics' (Jenkin 1980, Young 1981) are no more reliable. They are based on the work of Donnan and Haskey (1977) who employed both the Jellinek method<sup>8</sup> originally developed by the WHO experts and a projection method based on general practice surveys to estimate the number of 'alcoholics' in England and Wales in 1973. They obtained answers of 600,000 and 740,000 respectively. From this they concluded that it was reasonable to accept an earlier (DHSS 1976) estimate of 500,000 people in England and Wales with a serious drinking problem as a minimum figure.<sup>9</sup>

On the technical side the objections which might be raised to this work are numerous, as was accepted with regard to the WHO approach even in the 1950s (Seeley 1959, Brenner 1959, Jellinek 1959). In the context of their high (740,000) estimates Donnan and Haskey multiplied a figure of 37,000 general practitioner consultations with alcoholics (obtained from the not necessarily fully representative sample of just over 50 practices in the Second National Morbidity Survey) by a factor of twenty derived from a study which suggested that as few as five per cent of alcoholics are recognised as such by general practitioners (Wilkins 1974).

The latter is obviously a critically sensitive assumption, as was Donnan and Haskey's multiplication by four of their initial result of 155,000 alcoholics obtained by applying Schimdt and de Lint's calculation methods to the under 500 alcoholic liver cirrhosis deaths recorded in England and Wales in 1973. This was done in accordance with Jellinek's original work, which was based, as Donnan and Haskey point out, on an observation made in the United States in 1948 that three out of four alcoholics did not come into contact with a hospital. This ratio has probably not remained constant over time. Nor has the proportion of liver cirrhosis deaths due to alcohol related causes (Saunders *et al* 1981).

8 The formula is  $A = \frac{PD}{K}$ . A is the total number of alcoholics in a given year, D the number of cirrhosis deaths, P the proportion of these attributable to alcoholism and K the percentage of all alcoholics with complications who die of cirrhosis of the liver. These measures can be obtained from hospital records and autopsy surveys. R, the ratio of all alcoholics to those with complications, was added to the numerator later.

9 It is interesting to note that an estimate of 'alcoholics' for England and Scotland in the 1870s was 600,000 habitual drunkards plus 60,000 lunatics (MacLeod 1967). The population of Great Britain has, however, doubled since then.

**Table 3** *Number of heavy drinkers, problem drinkers and alcohol dependents. England and Wales, 1970s*

	<i>High estimate</i>	<i>Low estimate</i>	<i>OHE estimate</i>
Heavy drinkers	3,000,000	1,300,000	3,000,000
Problem drinkers	1,300,000	500,000	700,000
Alcohol dependents	240,000	70,000	150,000

*Notes* In all these groups women are reported to be outnumbered by men in a ratio of about 1:5. This is probably an accurate reflection of the actual situation, although it is possible that under-reporting of alcohol intake is more prevalent in the female population. In overall terms the OHE estimates indicate that about 8 per cent of the total adult population are heavy drinkers, 2 per cent problem drinkers and 0.4 per cent alcohol dependent. The number admitted for hospital treatment in any one year is about 20,000, and those identified in general practice in the order of 40,000 or more. The sources for these data include Wilson (1980a), Donnan and Haskey (1977), DHSS (1976), Cartwright *et al* (1975) and evidence given to the Expenditure Committee preventive medicine enquiry by Dr Griffith Edwards in 1976. Support for the higher estimate of heavy drinkers shown comes not only from the GHS and OPCS surveys but also from a sample of drinkers of whom 11 per cent were shown to have raised levels of gamma-glutamyltranspeptidase (GGT) (Whitehead *et al* 1978). This figure was weighted to include women on the basis of the OPCS consumption data and projected to the England and Wales population for 1979.

Thus although it is clear that a very substantial number of people are harmed by alcohol use in this country, the precise figures are uncertain. If possible it would obviously be desirable to support talk of 'epidemics of alcoholism' with firmer data. But for the moment crude estimates must suffice. Table 3 presents OHE figures for England and Wales, based on the best material available. It suggests that the number of fully manifest alcohol dependents (alcoholics in the terms of this paper) is rather lower than is sometimes implied. Yet the figures for heavy drinkers and problem drinkers are higher than is often quoted, with up to three million individuals, eight per cent of the total adult population, drinking sufficiently to show detectable biochemical abnormalities. Men with alcohol problems outnumber women by roughly five to one, although this ratio may now be closing.

## **Indicators of cost – and benefit?**

At present there are no generally agreed measures by which the relative costs and benefits of the alcohol consumption described above can be quantified. Indeed, the problems inherent in an exercise of this type are so significant that such evaluation will probably remain largely a matter of broad, subjective opinion. Yet this is not to say that the value judgements involved in deciding social policy cannot be made more explicit or that in given areas firmer empirical data cannot be gathered.

Most of this section is directed at reviewing the existing information on the costs of alcohol consumption; these relate to health risks, threats to the maintenance of 'law and order', undermining the quality of interpersonal relations, inefficiency in the workplace and economic estimates of factors like loss of production due to alcohol intake. The figures which result are both impressive and alarming. But it is worth noting at the start that many commentators neglect to mention that against the indicators of harm that are available should be balanced those which relate to the benefits which alcohol brings. It is unfortunate that these remain to a considerable extent unexplored; and that even where some effort has been made to outline them (see, for instance, the memorandum entitled *Benefits of Moderate Consumption of Alcoholic Beverages* submitted by the Wine and Spirit Association of Great Britain to the House of Commons Expenditure Committee sub-committee considering preventive medicine in the mid 1970s) it has often appeared to lack expertise and intellectual rigour.

The majority of the two thirds of the adult population of this country who regularly drink alcoholic beverages do so without appearing to suffer major harm. The fact that in 1979 terms they were prepared, in aggregate, to devote £9,000 million to this end, or almost eight per cent of all consumer outlay, must in an economy which attaches value to the idea of consumer sovereignty be counted very significant evidence of the welfare generated by drinking and the alcoholic beverages industries. In addition to the well over half million or so British jobs involved, the revenue raised via drink and a balance of trade surplus of nearing £500 million, alcohol has several less easily quantified functions in society. It is an aid to social life and a disinhibitor which may be valued by some as, for example, an aid to sexual interaction, at least in lower doses; it is a means of communicating social position both in terms of material wealth and the achievement of adulthood; it is a food and essential ingredient of substances valued for their taste; and it is a means of relieving day to day mental stress or distress. Furthermore public houses can act as important centres for the social life of communities in Britain.

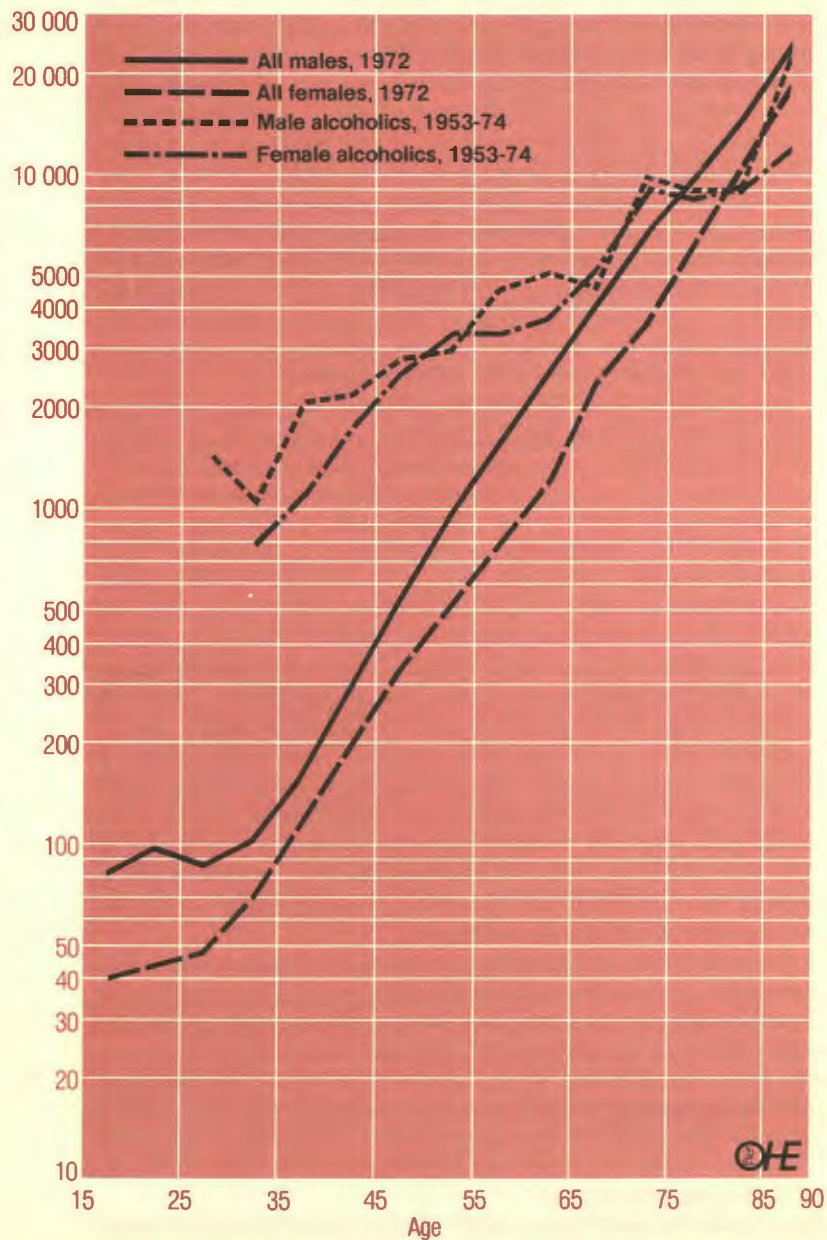
These observations should not, of course, be taken to imply that alternative, perhaps more desirable ways may not be found for all these needs to be met. But they support the contention that the costs of alcohol use outlined below, which to a degree may inevitably be incurred for any given mean level of 'moderate' consumption, do in present social conditions purchase significant social gains.

### **Mortality and Morbidity**

Figure 6 is derived from a study of over 2,000 alcoholic patients who had been admitted to NHS mental hospitals (Adelstein and White 1976). It shows that, especially amongst female and younger

**Figure 6** *Death rates of alcoholics by age and sex, England and Wales*

Deaths per  
100,000 population



Sources Adelstein and White, 1976.

subjects, death rates were well above those of the general population. Overall mortality amongst the alcoholic sample was over twice the expected level. For women aged 15-39 it was seventeen times the expected rate. The reduction of mortality differentials in later life may be due to the demise of especially vulnerable subjects earlier and/or the possibility that older 'alcoholics' are less deviant from the rest of the population than are their more junior fellows. These were shown to be particularly likely to die prematurely from violent causes, including accidents and suicide. In the latter context it has been suggested that people identified as alcoholics are up to 80 times more likely to kill themselves than their moderately drinking peers (Kessel and Grossman 1961).

Researchers in North America (Schmidt and de Lint 1972) and Scandinavia (Sundby 1967) have reported findings which support those of Adlestein and White. A recent Swedish survey showed that amongst males who died before the age of 50 alcohol intake was the most important single factor marking them out from the rest of the population. In over 60 per cent of the deaths investigated a history of excessive alcohol use or an explicit alcohol related cause was identified (Peterson *et al* 1980). Even after making allowance for confounding factors like the tendency of heavy drinkers to be heavy smokers the implication for Britain is that alcohol use is linked to many more deaths than analyses based on death certification alone would suggest. Whereas only about 3,000 certificates a year might mention alcohol the true premature mortality linked to drinking is more probably in the order of at least 5,000 to 10,000 per annum.

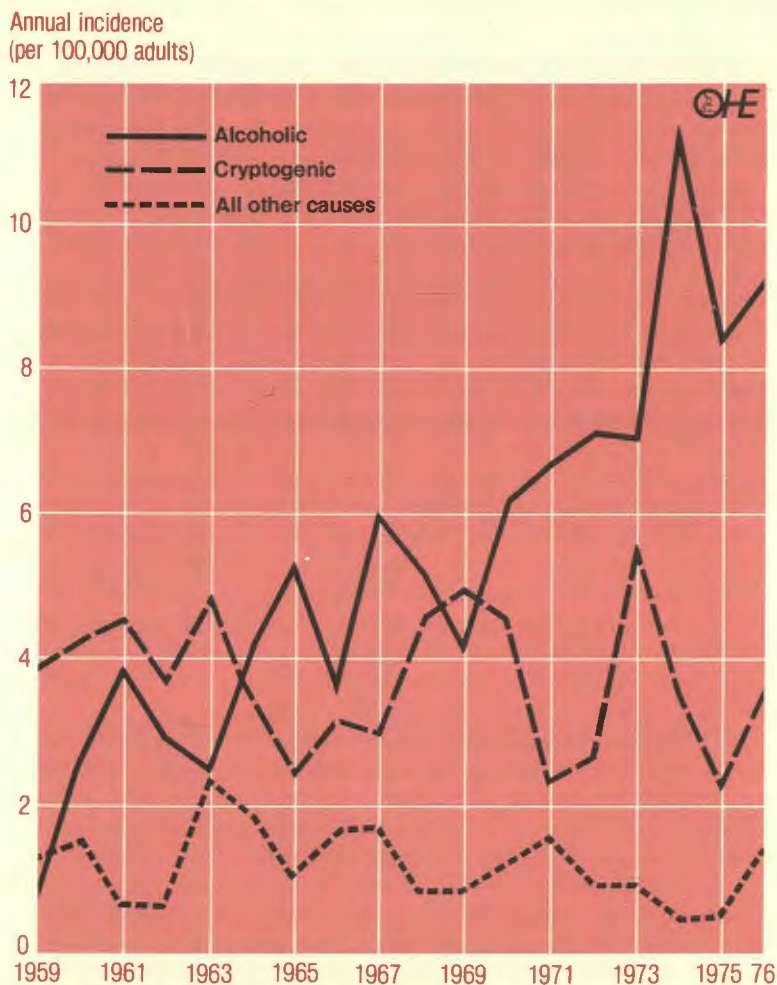
Perhaps the type of physical harm most likely to be thought of as being caused by drinking by members of the public is liver damage. This may take a number of forms, from benign fatty infiltration of the liver to alcoholic hepatitis (liver inflammation), cirrhosis (an atrophic state the name of which refers to the tan-coloured appearance of the diseased organ) and ultimately hepatoma (liver cancer). In the specific context of cirrhosis, the most frequently used indicator of alcohol problems in the community, national data show a more than fifty per cent increase in deaths in the last 30 years and an almost eight fold increase in cirrhosis mortality with mention of alcohol in the same period.

To some extent this last may be due to changes in certification practice. But it is of note that Saunders *et al* (1981), in a 20 year prospective study of cirrhosis in the west Birmingham area, found that the annual incidence rate more or less tripled between the late 1950s and the mid 1970s. The proportion of alcoholic cirrhosis cases rose from one third to two thirds with a five year survival rate of 36 per cent. Figure 7 illustrates aspects of this research which is substantive support for the view that alcohol problems are increasing in Britain, along with the overall amount consumed.

However, important as cirrhosis mortality may be as a guide



**Figure 7** Annual incidence of alcoholic, cryptogenic and other types of cirrhosis, West Birmingham 1959-76



to such trends it plays only a relatively small part in the global burden of alcohol related morbidity and mortality. Adlestein and White commented that it was only mentioned in eight per cent of the death records of alcoholics that they examined. In addition to the deaths by accident and suicide already mentioned they identified a wide range of neoplastic, cardiovascular, infective, mental, respiratory and digestive disorders which have a drinking dimension. These include acute pancreatitis, peptic ulceration and some forms of cancer. In addition maternal alcohol consumption may

be involved in raised rates of perinatal mortality and child handicap. Although the 'foetal alcohol syndrome' is probably only a hazard to a tiny proportion of severely alcohol dependent women (Orford 1979) the prevalence of milder impairments related to alcohol use in pregnancy is unknown. Table 4 outlines these and other issues in further detail.

### **Illegal or deviant behaviour and drinking**

Figure 8 illustrates the rise in convictions for public drunkenness which took place in England and Wales between the late 1950s and the mid 1970s. The rate increases are particularly concentrated in the younger male groups, with the peak incidence of arrest being at the age of 18. Female conviction rates run at only about one tenth of that of males although the number of females cautioned is relatively higher. Currently the total number of offences of drunkenness in the UK where there is a finding of guilt is in the order of 110,000 per annum (committed by roughly 70,000 individuals).

Compared with the experience of a century ago such figures do not appear particularly alarming. In the 1870s and 1880s the drunkenness conviction rates were more than twice those of today, with women being just as liable to be found guilty as men. Yet over the shorter time period 1950-80 the statistics indicate a virtual doubling of drinking offences, an increase which closely parallels the alcohol intake trends.

It has been observed that dependence on alcohol and the propensity to be found guilty on an alcohol related charge are associated. Typically some 50 per cent of 'alcoholics' have such a conviction (Gath 1969, Plant and Plant 1979). But the great majority of offences are not committed by alcohol dependent individuals. Whether the rise in convictions in the general population, particularly the young, should be thought of as being primarily due to problem drinking *per se* is open to question. For example, it has been suggested that teenagers who drink to what may reasonably be regarded as excess are more likely to display anti-social behaviour than their peers even when sober (Barnes 1975). Drunkenness may thus sometimes be a manifestation rather than a basic cause of phenomena like mis-behaviour in football crowds, although the disinhibiting effects of alcohol may well exacerbate violence and related problems.

In the same way heavy alcohol use may not always be causally associated with breakdowns of interpersonal relationships (sometimes involving violence) and petty crime. In the former area, for instance, a survey of members of Alcoholics Anonymous found that 30 per cent blamed drinking for the break up of their marriages. Wilkins (1974) found 20 per cent of male and 25 per cent of female alcoholics to be divorced or separated. Plant and Plant (1979), in an investigation of 100 patients attending an Alcohol

**Table 4** *Conditions related to alcohol use*

<i>Condition</i>	<i>Comments</i>
<b>Accidents</b>	The role of alcohol in traffic accidents is widely recognised. But it is also significant in other areas. For instance, Kirkpatrick <i>et al</i> (1967), in a Boston survey, found one third of all home accidents to be alcohol related. Murray (1977) examined a series of non-traffic accidents and reported 30 per cent of those dying to be alcoholics. He also observed that 62 per cent of male admissions to accident emergency facilities with head injuries had blood alcohol levels equivalent to having drunk 6 pints of beer or more. The Home Office (1977) considered some 14 per cent of drownings to be due to prior heavy drinking. Many workplace accidents are also alcohol linked.
<b>Acute pancreatitis</b>	Mortality from acute pancreatitis is increasing in the UK. It currently accounts for some 600 deaths per annum in England alone. It is estimated that perhaps a quarter of all cases relate to alcohol use (Benjamin 1977).
<b>Cancer</b>	Excluding hepatoma (liver cancer) the main associations between alcohol and neoplastic disease relate to cancers of the upper digestive tract, that is of the tongue, mouth, pharynx, larynx and oesophagus. To some extent synergism between smoking and alcohol is indicated. One American study found that amongst heavy users of both alcohol and tobacco oesophageal cancers occur over 40 times more frequently than in the general population. The risk was raised 5 times in heavy users of only tobacco and 18 times in heavy drinking non-smokers (Tuyns <i>et al</i> 1977). Adelstein and White's (1976) survey did not show such a marked linkage but nevertheless they concluded that alcohol is a determining element in such cancers. They also noted an association between cancers of the female breast and cervix and alcoholism, although in this case the likelihood is that factors like reduced parity and raised promiscuity are responsible.
<b>Circulatory system diseases</b>	Alcohol use raises blood pressure and has been observed to increase the risk of strokes. Adelstein and White found a statistically significant association between alcoholism and virtually all forms of circulatory disease. Certain conditions, like alcoholic cardiomyopathy which involves fatty infiltrations of the heart muscle, are specifically caused by alcohol. In balance, however, alcohol use in moderation may offer some protective effects against death from coronary heart disease associated with its capacity to raise high density lipoprotein cholesterol levels (Willett <i>et al</i> 1980).
<b>Digestive disorders</b>	Alcohol ingestion tends to damage the linings of all the organs of the upper parts of the digestive tract, causing inflammation and sometimes ulceration. Raised death rates amongst alcoholics occur in relation to ulcers of the stomach, duodenum and oesophagus as well as for diseases of the lower intestine. The Royal College of Psychiatrists (1979) estimated that some 20 per cent of alcoholics develop peptic ulcers alone.
<b>Foetal alcohol syndrome</b>	Jones and his colleagues coined the term the 'foetal alcohol syndrome' in the early 1970s. Amongst the children of a sample of 23 female alcoholics they found a perinatal mortality rate of 170/1,000; 44 per cent of the survivors suffered a degree of

impairment of intelligence and a third had abnormal physical features. However, the prevalence of this syndrome is unknown although three large epidemiological studies are underway in the United States. It would at present be irresponsible to overstate the danger of drinking in pregnancy. Kessell (1977) has commented that at the moment the evidence 'is not strong enough to justify any statement that women who drink moderately during pregnancy are harming their unborn children'. However, concern is now mounting that limited drinking may have damaging consequences (Dickerson *et al* 1981).

**Liver disease**

Mortality from liver cirrhosis is raised about 10 times above average in alcohol dependent individuals (Williams and Davies 1977). However, although this link is well documented the reasons why only about 10 per cent of all alcoholics develop the disorder whilst up to a third show no liver damage at all are uncertain. Recent work indicates an immunological component to the disorder involving the histocompatibility antigen HLA B8. (HLA-A28 might have a protective effect). An immune aetiology of some kind might explain why women tend to develop alcoholic liver diseases like cirrhosis more rapidly and in response to lower alcohol doses than do men. Men may be more vulnerable to carcinoma of this site, however. It is of note that drinking styles may influence the risks of certain forms of liver disease. For example, a Scottish study showed that two thirds of a group of continuous heavy drinkers developed alcoholic hepatitis, as opposed to only one third of 'bingers' (Brunt *et al* 1974).

**Mental illness**

Apart from alcohol addiction itself alcohol may cause brain atrophy, dementia and conditions like Korsakoff's psychosis, some of the most notable symptoms of which involve short term memory loss. Lee *et al* (1979) in fact found brain damage to be more prevalent than liver damage amongst a group of 37 alcoholics they examined. Disturbances like depression may also be related to alcohol use.

**Obesity and malnutrition**

Amongst many moderate drinkers alcohol contributes to weight problems. Amongst alcoholics who substitute drinking for eating it is a cause of malnutrition in that most alcoholic beverages lack key vitamins or minerals. Conditions like beri-beri result.

**Peripheral neuritis**

Peripheral neuritis develops in about 10 per cent of dependent individuals. This can cause significant distress and disablement.

**Suicide**

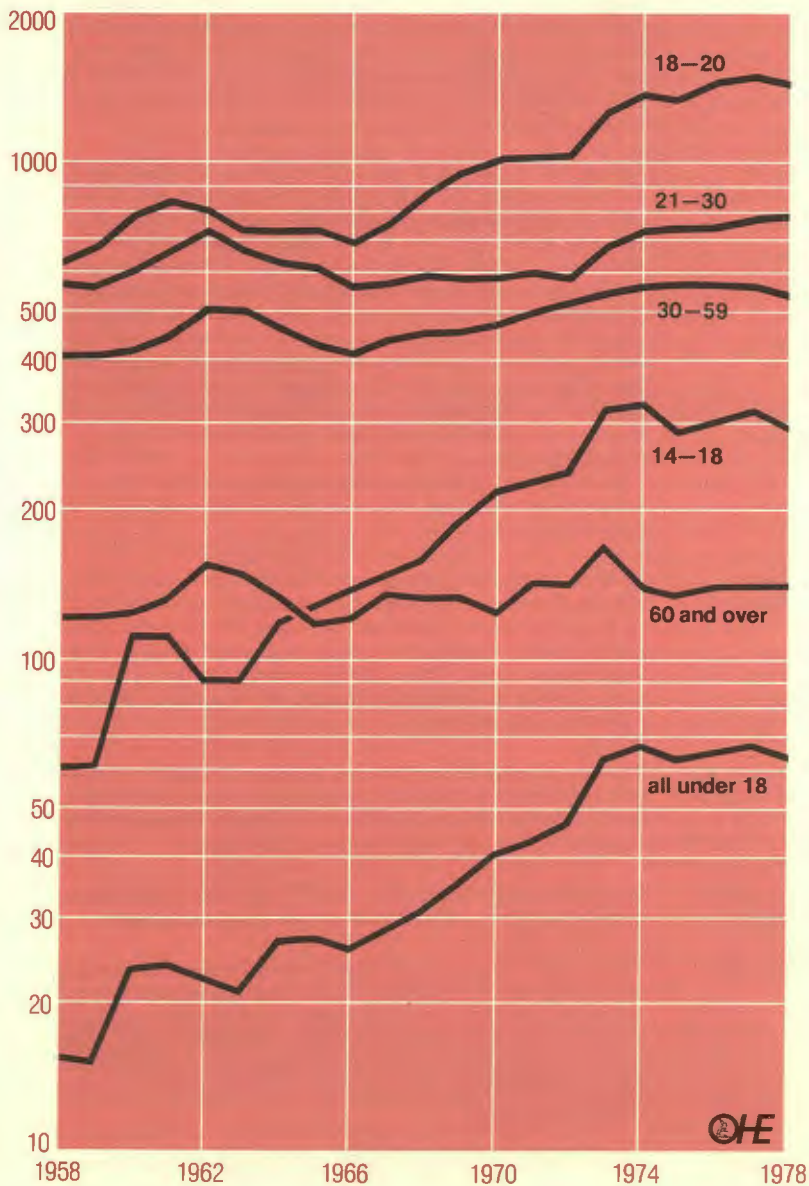
Ritsen (1977) has stated that reports from a number of countries give a range of 6 to 20 per cent of alcoholics ending their lives by suicide. In the light of this and Kessell and Grossman's estimate (see text) that in male alcoholics age specific suicide levels are up to 80 times higher than expected it appears possible that the recent upturn in Britain's suicide rate (see OHE 1981) could be in part due to increased drinking.

**TB and respiratory illness**

Tuberculosis death rates are higher than average amongst dependents, presumably because of their poor diets and living conditions. Similar factors help to promote respiratory illnesses like bronchitis, although here the interaction between smoking and alcohol use is relevant.

**Figure 8** Findings of guilt for offences of drunkenness, males, by age, 1958-78

Rate per 100,000



Source Home Office.

Treatment Unit, found 27 per cent to be in this category.<sup>10</sup> Nevertheless, the explanation for this link is not straightforward and in many instances a drink problem precedes the marriage (Orford 1979).

A history of alcoholism may be associated with crime, especially the types of offence typically committed by recidivists (Gibbens and Silberman 1970). But there is little reason to think of drinking as an underlying cause except perhaps in cases of spontaneous violence by acutely intoxicated individuals. Rather alcohol dependents and habitual offenders often share common problems of social inadequacy. After investigating this field the United States Health, Education and Welfare Department (1979) concluded 'criminality by and large precedes the development of a drinking problem'.

Finally, turning to the issue of drunken driving, the evidence implicating alcohol in motoring accidents is well established. The Blennerhasset report estimated that alcohol may account for at least one in five of all deaths on the road. About one in three drivers killed have blood alcohol levels over the legal limit. At night, the proportion approaches two in three (Department of the Environment 1976). It has been estimated by the OPCS that some 10 per cent of men each week break drinking and driving laws (Wilson 1980a). Amongst the 45,000 to 50,000 individuals annually convicted of such an offence in the late 1970s (two and a half times the figure of the late 1960s) men outnumbered women by 30:1.

The toll of alcohol linked deaths from road accidents is particularly heavy in the young. Up to 10 per cent of all the mortality experienced by people in their late teens and twenties – about 500 deaths a year – is so caused, and the trend is probably still rising (Havard 1977). Canadian research which analysed the effect of a lowering of the legal drinking age strongly indicates that the alcohol ingestion rate in the young themselves is the key determinant of this figure (Whitehead *et al* 1975).

### **Drinking, work and the resource costs of alcohol use**

The effects of heavy drinking on work life are on the whole poorly explored, although a number of studies have analysed the employment experience of individuals attending facilities like alcohol treatment and information centres (Moss and Davies 1967, Edwards *et al* 1967, Hare and Smith 1975). They show that the majority (say 70 to 75 per cent) stay in jobs, despite losing time and drinking during working hours. Saad and Madden (1978), examining the work record of 73 alcohol dependents attending an addiction unit, observed a sickness absence rate of 86 days per year as compared with an average level of 20 days. Only 3 per cent of certificates mentioned alcohol.

<sup>10</sup> Of those still married 56 per cent claimed their sexual relationship had deteriorated, 7 per cent that it had improved, since the drink problem developed.

This implies that alcohol use costs the community a significant amount of lost production. Holtermann and Burchell (1981), working at the DHSS Economic Advisors Office, have estimated the figure involved for England and Wales to be in the order of £200 million for sickness absence alone. This figure is in November 1977 prices and is based on an estimated 8–15 million days lost. Aggregating data relating to a range of police, prison, road accident, health services and loss of output indicators they put the total resource cost of alcohol problems in England and Wales at a low-est likely figure of £428 million and a high one of £650 million (£1977), that is around £1,000 million in 1981 terms.<sup>11</sup> They point out that this sum approaches the overall annual cost of road traffic accidents. Indeed, it may exceed that of the entire NHS medicines bill.

Yet the base information for Holtermann and Burchell's calculations is in many instances unavoidably weak. Also the assumptions they make could be challenged on a number of grounds. It is on the one hand of note that of their high estimate figure of £650 million (£1977) some 85 per cent is made up of lost production imputed to sickness absence, unemployment and premature death. In a surplus labour economy like that of Britain today the realism of this might be questioned. On the other hand Holtermann and Burchell point out that they do not include any allowance for factors like reduced efficiency at work, the intangible costs of suffering caused by alcohol related diseases, disabilities and injuries or the intergenerational effects of alcohol problems. On the whole this means that their work very probably significantly understates the true losses to the community generated by alcohol use.

## Alcohol as an addictive drug

The main pharmacologically active ingredient of wines, beers, and spirits is ethyl alcohol, although some of the other ingredients of such beverages (known as congeners) may also have toxic – intoxicating – properties. Alcohol is absorbed slowly into the blood stream through the stomach and more rapidly through the small intestine. Being both fat and water soluble it is swiftly distributed throughout the body and its organs, the functions of which alcohol is known to affect in numerous ways. For example, in males serum testosterone levels are rapidly and massively reduced after its administration. This in the long term leads to effects ranging from reduction of sex drive to marked loss of secondary sexual characteristics. Testicular atrophy ultimately results.

The metabolism of alcohol in man is not fully described. At least

<sup>11</sup> A recent US study (DHEW 1979) puts the community cost of alcohol use at \$43 billion in \$ 1975. This is equivalent to £25,000 – £30,000 million in 1981 terms. It includes an estimate of health care costs of \$12.8 billion.

three enzyme systems are probably involved in the first stage, its oxidation into acetaldehyde in the liver. Of these the most important are the alcohol dehydrogenases, which are present in the liver in surprisingly high amounts. This is presumably because they play a role in the metabolism of other substances. Acetaldehyde is further metabolised, ultimately to form carbon dioxide and water which are excreted, as is a small amount (roughly 5 per cent of intake) of unchanged alcohol, in the breath, urine and sweat. Again current understanding of the processes involved in the further transformation of acetaldehyde, which is highly toxic, is subject to many uncertainties.

Regarding alcohol's effects on particular organs, the most important area is the action in the brain. It is usually described as a non-specific central nervous system depressant (that is the same type of drug as the barbiturates) which in essence means that neuropharmacology has not yet advanced far enough to identify its precise actions. These may include effects on the properties of cell membranes which might be involved in the mechanisms of tolerance and cross-tolerance between alcohol, barbiturates and benzodiazapine tranquillisers and sedatives; changes in the balance of neurotransmitters<sup>12</sup> in the nervous system and/or the sensitivity of transmitter receptors; the production of unusual substances which may act like neurotransmitters so influencing brain functions; influences on the internal workings of neurones; and shifts in the balances of neuroendocrine – nervous system hormone – systems (Institute of Medicine 1980).

One example of the type of hypothesis currently of interest to researchers is the possibility that acetaldehyde produced by alcohol breakdown in the liver combines with endogenous substances to form compounds known as tetrahydroisoquinolines (TIQs). These are known to be psychoactive. Another is that alcohol ingestion in some way influences the production or availability of the brain's 'natural opiates', the enkaphalins and endorphins, and/or that of other neuropeptides. It is of note that the morphine counter-acting drug naloxone appears to block some of the intoxicating effects of alcohol.

A third theory is that benzodiazapine medicines may work in a manner in some respects similar to that of alcohol. Ideas such as the recently popular view that substances like diazepam act to enhance the actions of the inhibitory transmitter gamma-aminobutyric acid are now being very actively explored. Such fundamental work, conducted both by academic agencies and pharmaceutical companies, may eventually elucidate the nature of many key brain processes and so help to build a better understanding of

<sup>12</sup> These chemicals are involved in the transmission of nerve impulses between nervous system cells – the neurones. There are probably several hundred such substances. At present only 10 per cent or so of the main nervous system sub-systems have identified transmitters.



not only how drugs like alcohol effect nervous system function but how they may interact with medicines.

At a more easily observed level alcohol affects human behaviour in a variety of ways, depending on the mental state and expectations of the individual, the cultural context of its consumption and the dose taken. Generally speaking in low amounts, say 30 mgms per 100 mls of blood which in an average individual in normal circumstances will be found around an hour after drinking a pint of beer, alcohol induces a sense of mild well-being. If, however, the individual is in a circumstance where he or she is likely to feel aggressive or otherwise hostile the disinhibitory effects of even such a low dose of the drug (caused by depression of higher brain activity) will be likely to make his or her behaviour less controlled.

At around twice the above dose, that is 60 mgms per 100 mls of blood, which is likely to be induced by 4 standard units – two pints of beer or four single whiskies – loss of muscular control and abnormal eye movements are often observable. Even so a person with this blood alcohol level is within the British drinking and driving law. At 90–100 mgms of alcohol/100 mls of blood such impairment is marked. Most people will become semi or unconscious when their blood/alcohol level has risen to 200–300 mgms/100 mls and 500 mgms per 100 mls of blood is very likely to result in death.

It is to be stressed in context of these figures that it is difficult to predict what blood alcohol level will arise from a given volume of drink. Individual body size, the amount eaten, the concentration of alcohol in the stomach and small intestine and even its temperature may all effect this relationship. And regarding the level of intoxication displayed by individuals, this will vary with both the extent to which they are experienced in handling the subjective experiences of 'drunkenness' and the degree to which, as even moderate or occasional drinkers do, they have acquired physiologically based tolerance to alcohol.

The latter can reach surprisingly high levels amongst alcohol dependent individuals. Many can consume well in excess of a bottle of spirits a day without signs of intoxication (Mello and Mendelson 1970) although alcohol tolerance is more limited than that shown by, say, heroin users. The latter may, when addicted, be capable of taking or need to take between 20 and 100 times the dose they originally found effective. With alcohol this ratio is limited to three or four to one.

The Royal College of Psychiatrists stressed in its 1979 Report *Alcohol and Alcoholism* that the mechanisms of tolerance are probably closely associated with those of the alcohol dependence syndrome. That is, the development of tolerance appears often to be a physical pre-requisite for the emergence of the latter, although, over time, some alcoholics may lose their capacity to 'hold' their drink. This leaves subjects unable to take the alcohol dose necessary

for them to avoid withdrawal symptoms, which may range from relatively mild tremor to the potentially life threatening state of delirium tremens.

The 'morning shakes' experienced by many heavy drinkers are an example of the former. Tremulousness peaks six to twelve hours after drinking has stopped and is often accompanied by anxiety or other mental disturbances. This is why dependent drinkers look for 'the hair of the dog' early in the morning. More seriously, convulsions may be experienced twelve to twenty-four hours after ceasing drinking and delirium tremens (a term first used by Sutton in 1815) three days afterwards. The symptoms of this last include, when it is untreated, coarse, persistent trembling, heavy sweating, rapid pulse, mental confusion and usually distressing hallucinations, both visual and aural.

The remainder of this section describes, and analyses the possible causes of alcohol dependence in further detail. However, before this it should be noted that alcohol is classified as being a drug of only relatively mild addictive potential, far less than that of opiates like heroin, stimulants like cocaine and the nicotine of cigarettes. Its properties are like those of other depressant drugs. In many ways its hazards are comparable to those of barbiturate containing sedative/tranquillisers (although in all probability heavy alcohol use carries more risks than those of the benzodiazepine tranquilisers in medical employment). Most people do not become dependent to a life or life style endangering degree. And research has shown that many that do in some stage of their life become so move out of the problem over time (Room 1975, Cartwright *et al* 1978). If the general public is to be helped to appreciate fully the dangers linked to all types of drinking, care should be taken to maintain the credibility of warning messages by the avoidance of exaggeration or excessive concentration on the problems of a minority.

### **The dependency syndrome**

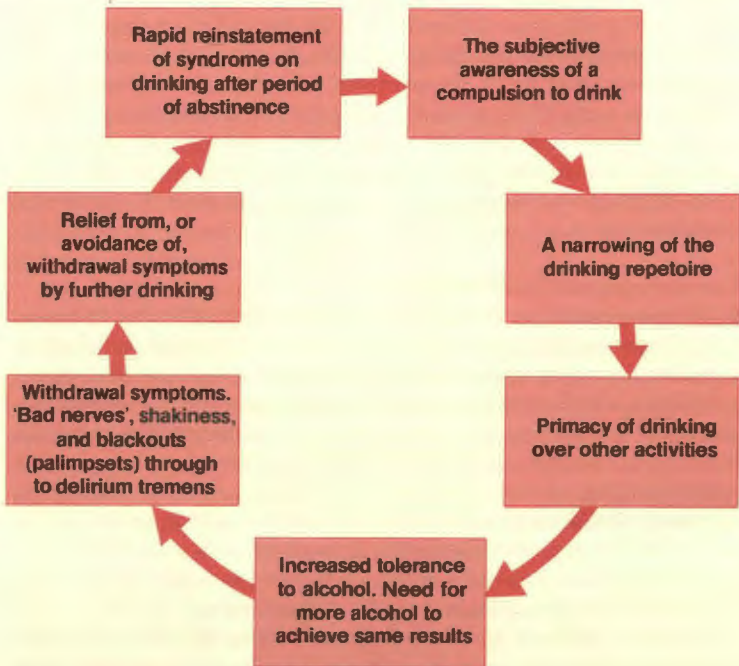
In the past, imprecise definitions of 'alcoholism' often led to confusions between the signs and symptoms of addiction to alcohol, those of independently occurring mental disorders, the social handicaps which excessive drinking can cause and the normative stances of people towards topics like heavy drinking. The resultant blurring of concepts hindered the development of an appropriate understanding of the social and individual problems caused by drinking. The description by Edwards and his colleagues in 1977 of an alcohol dependency syndrome distinct from alcohol related disabilities was thus a useful step forward, even though it may in reality be wrong to regard it as a rigidly defined state.

Figure 9 outlines the main characteristics of the syndrome, which should not be regarded as being presented in any particular order. To the extent that an identifiable progression exists it is

normally one of movement away from a pattern of heavy drinking through to the subject's life becoming more and more focused on alcohol consumption. The time spent in drinking increases; other activities are sacrificed; maintenance of the alcohol supply becomes seen as a central necessity. For the unfortunate the effects of such drinking lead to the destruction of work, family and other supportive social relationships, with alcohol left as the only source of comfort or reward. Physical and psychiatric symptoms increase in intensity and ultimately survival may be endangered.

There has been frequent debate as to at what stage particular symptoms extraneous to but associated with this syndrome appear. For example, 'losing control' of the amount consumed has often been regarded as a late concomitant of dependence but, as Table 5 suggests, it may in fact occur fairly early on in the career of a drinker. Similarly having periods of amnesia, or 'blackouts', after a drinking session is not an experience confined to severe alcoholics. Perhaps a third of young males will suffer it once or more (Shaw 1979). Such isolated events are best regarded as indicators of being in a state of significantly raised risk of problem drinking but not necessarily of the dependency syndrome shown in Figure 9.

**Figure 9** *Elements of the alcohol dependency syndrome*



**Table 5** *Symptoms of alcohol dependence in a typical order of occurrence*

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Completely unable to keep to a drink limit  
Need more than companions (eg going for drink between rounds)  
Difficulty preventing getting drunk  
Spending more time drinking  
Missing meals drinking  
'Black outs', memory loss  
Giving up interests because drinking interferes  
Restless without a drink  
Change to drinking same on working days as on days off  
Organising day to ensure supply  
Change to drinking same amounts whatever mood  
Passing out drinking in public  
Trembling after drinking the day before  
Times when can't think of anything but getting a drink  
Morning retching or vomiting  
Sweating excessively at night  
Withdrawal fit  
Morning drinking  
Decreased tolerance  
Waking up panicking or frightened  
Hallucinations

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*Source* After Chick and Duffy 1980.

### **Causal factors**

At one time considerable effort was put into attempts to identify the 'alcoholic personality', that is a type of individual who in their make up displayed a set of characteristics consistently related to the development of drinking problems and/or alcohol dependence. The basic cause of such vulnerability, some commentators believed, would eventually be narrowed down to (a) specific genetic factor(s) or traumatic formative experiences. But, parallel with the general shift in modern thinking away from categorical models of alcoholism towards a dimensional approach, ideas about the aetiology of alcohol dependence have also changed. Today many authorities believe that anyone could, in given combinations of circumstances, become alcohol dependent (Kessel 1979). The main factor is exposure to prolonged, heavy doses of alcohol (Davies 1977).

Thus it may now be thought that the most appropriate manner of considering the causes is one which emphasises the plurality of the factors involved and the different ways in which they can interact together to lead ultimately to an end state of dependence. One

way of dividing up the phenomena involved into easily comprehensible groups is to separate them into, first, environmental influences affecting the overall availability of alcohol and the commonly held attitudes to its use in a given society; and second, those which particularly influence the individual user, such as childhood experiences associated with drinking or, theoretically at least, genetically controlled abnormalities of alcohol metabolism.

Another, which has proved useful in recent investigations of psychiatric illness like depression, is to categorise possibly significant variables according to whether they act in such a way as to prime an individual to become a potential heavy or problem drinker, to precipitate directly a crisis involving abnormal drinking, or to perpetuate such drinking after it is initially established.

However, it is not here attempted to build a comprehensive picture based on either of these approaches. Rather just a few of the factors which may play an important role in many, but not necessarily all, cases of alcohol dependence are discussed.

First, over and above influences like the price of alcoholic beverages and licensing restrictions on their sale, informal social controls can be a major determinant of drinking patterns. Some communities seem to be able to protect their members from alcohol dependence despite its general availability. Jewish culture is the best documented case. Drinking is learnt in a controlled manner in the family circle, with overt intoxication being frowned on. Snyder (1958) has claimed that drunkenness is seen by many Jews as 'unjewish' behaviour, as in some societies becoming intoxicated is seen as unfeminine behaviour.

In countries like Ireland and America, with more ambivalent views on alcohol use, it seems to be more likely that drinking will become a problem for some individuals. Similarly there is evidence that the children of people who are teetotal yet who are raised in societies that permit drinking are at a raised risk of problem drinking and of ultimately becoming dependent (O'Connor 1978, Grant 1979). Nevertheless, the high reported rates of alcoholism and liver disease in France and Italy show that general acceptance of drinking at an early age is not in itself protective even though these societies may have only limited problems in the sense of antisocial behaviour related to alcohol. Moderation of consumption is essential if health risks are to be controlled.

A second area for consideration in relation to the risk of dependence is the extent to which an individual's personal life style involves opportunities to drink and/or pressure to do so from their peers. As the data reviewed earlier shows, those who work in bars (and perhaps other branches of the alcohol industry) and those who often frequent bars, such as young, single males, all report raised drinking rates.

Third, studies have repeatedly shown that rates of dependence are considerably raised amongst those with an alcohol dependent

parent. (See, for example, Davies and Stacey 1972). In a proportion of cases genetic factors may account for this correlation. But social causation cannot be excluded. For instance, observed parental patterns of 'coping' with stressful events which involve alcohol or other psychoactive substances may in a sense prepare children for acting in a similar manner in later life. More broadly a particular pattern of alcohol use may be taken as an indicator gender or social identity. It has been observed, for example, that boys tend from an early age to be encouraged to drink more than girls (Jahoda and Cramond 1972). Children tend to follow their parent's drinking patterns (Hawker 1978).

A fourth set of factors relate to the support an individual receives from his or her family, friends and the community agencies once a significant drinking problem has become manifest. The availability of voluntary or professionally backed services in workplaces or in the domestic locality is one significant variable here. Another may be the quality of the subject's marital relationship. An inability of an unaffected partner to sympathise with or successfully help to relieve the other's difficulties may lead to a deterioration of their relationship, so leaving the problem drinker increasingly dependent on alcohol for either reward in life or release from his or her suffering.

Finally, there is the question of whether genetically controlled or acquired constitutional variables serve as contributing causes of alcoholism. Significant attention has been paid to this area in the last few years (*Lancet* 1979, *BMJ* 1980) although as yet the available evidence is difficult to interpret. Various twin, adoption and family studies, for example, have produced conflicting data (see Kaij 1960, Goodwin 1963, Jonsson and Nilssen 1968, Winokaur *et al* 1971). And whilst theories such as those relating to the possibility that abnormalities related to acetaldehyde metabolism could raise some peoples risk of becoming alcohol dependent (Schuckit and Rayses 1979, Jenkins and Peters 1980) are of interest, they as yet lack any real proof.

At present one of the possible constitutional factors most clearly related to alcoholism is depression. But the extent to which this state precedes alcohol problems is uncertain as is the extent to which most forms of depressive illness are themselves genetically or environmentally caused. And virtually no work has been done on why some people who suffer depression may ultimately become alcoholic and why others seek and gain medical help.

Class and sex related attitudes to the use of psychotropic medicines and other psychiatric therapies could be significant here, with the better educated and women being more likely to respond to their distress by seeking antidepressants and/or professional counselling (ONE 1975). The less educated and men may tend to resort to 'social psychotropics' such as alcohol (which like tranquilisers can deepen depression despite short term benefits) and the

social life of the bar.<sup>13</sup> Both paths have risks and benefits, although in general it can be argued that individuals are well advised to divide their drug taking behaviours clearly between seeking relief from markedly abnormal distress, when medicines and medical help are appropriate, and the seeking of relaxation and enhanced pleasure, which social psychotropics can aid.

In conclusion it would seem that the 'agent' (alcohol) and the 'host' (man) can interact within the social and physical environment in many ways to result in the 'disease' (alcohol dependence). Physical changes and complex processes of learning both in childhood and adult life are involved, with the rewards of alcohol intoxication serving to positively reinforce the process in the early stages. Its possible penalties, such as a loss of work or the breakdown of family relationships, can paradoxically subsequently act as a negative reinforcement for problem drinking and/or dependence when it has become established in the sense that the unfortunate dependent is left with no other source of pleasure or comfort.

## The prevention of alcohol related harm

Historically, it may be suggested, the British state has been primarily interested in the consumption of alcohol from a fiscal viewpoint. Although parliament did, towards the end of the nineteenth-century, acknowledge some public health responsibilities in passing the Habitual Drunkards Acts of 1879 and 1898 such legislation was not enthusiastically implemented and was, in any case, not aimed at limiting alcohol harm amongst the bulk of the population.

Even the dramatically effective measures at the time of the First World War, which demonstrated the government's capacity to influence fundamentally the nation's drinking habits, were introduced primarily to ensure that the populace would fight the Kaiser's Germany more efficiently. Improved individual survival and enjoyment of life amongst the mass of the working population does not, in retrospect, seem to have been a major goal of the leaders of that generation, and indeed it may be doubted even today that all members of industrial, political and medical élites always see raising the welfare of the general population as their main aim.

Questionable policies may arise not merely in straightforward ways related to, say, the financial temptation to maximise alcohol tax revenues, even if this means allowing volume sales to rise rela-

<sup>13</sup> One known risk group, for instance, is older males who lose their spouses. A depressive reaction is 'coped' with by drinking with a high chance of dependence resulting. The elderly alcohol dependent presents services with problems which at present are often poorly met.

tively unchecked. More subtle factors, such as a narrow desire to minimise simplistic health hazard indicators regardless of other social variables, may be involved. It might also be thought that in a time when National Health Service resources are under extreme pressure it may be politically advantageous to shift the focus of public debate to areas like the prevention of alcohol harm, where major rises in health service spending need not be a key requirement for progress.

However, this is not to say that the recent intensification of public debate in this area – following reports such as those of the House of Commons Expenditure Committee's sub-committee on preventive medicine (1977), the DHSS Advisory Committee on Alcoholism (1978a, 1978b) and the Royal College of Psychiatrists (1979) – is unwarranted. The data reviewed in this paper indicates that alcohol related harm has now risen to levels which mean that new initiatives aimed at its prevention should be given considerable priority. The possibilities open are discussed below in two groupings. First, those which relate to general changes in society likely to affect global drinking patterns or the overall risks and penalties attached to acts like drunken driving. Second, those related to improving the help and guidance available to people when drinking starts to become a problem or when they have become alcohol dependent.

### **Drinking in society**

Variables to be considered in this context include the price of alcoholic beverages; their advertisement; controls over their sale; the availability and effectiveness of health education relating to alcohol; and road safety legislation. Of these the first is often thought the most important in as much as it appears to offer a simple and easily adjusted means of controlling alcohol consumption, although detailed analysis of the area may suggest certain reservations with regard to this view.

Figure 10 shows the price relative to income per litre of absolute alcohol consumed in the UK in the period 1949–1979. In these three decades the increase in the wealth of the community has more than offset the effect of tax and other alcoholic drink price rises. Thus the graph shows that to raise the population's consumption by a further litre *per capita per annum* in 1979 required a diversion of under half the extra money, expressed as a proportion of total consumer spending, than it would have done in 1949. That is, adjusting for income effects and substitution between products, the relative price of alcohol has fallen by over 50 per cent.

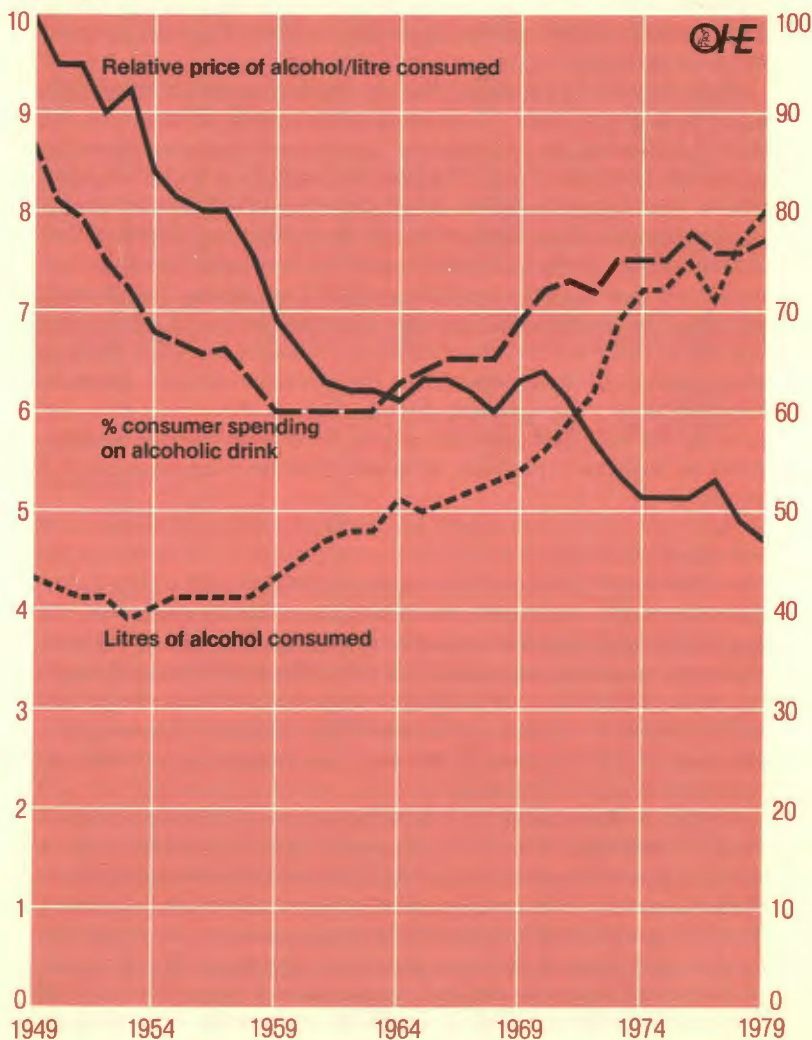
This clearly implies that one measure needed to restore drinking to the more moderate level of the 1950s, should this be thought desirable, would be a substantial price increase. (The government's Central Policy Review Staff is reported to have calculated that a 1 per cent rise in 'real' income increases beer intake by 0.7 per cent, that of



**Figure 10** *The relative price of alcohol in Britain 1949-79*

Litres of absolute alcohol consumed per capita, and % of consumer spending on alcoholic drink

Relative price of alcohol per litre consumed  
1949 = 100



Source OHE calculations based on Annual Abstract of Statistics, various years.

spirits by 2.2 per cent and that of wine by 2.5 per cent – Dean 1981). Most economists would question any crude assumption that, say, a doubling of alcohol's relative price would automatically drive consumption down to the 1950s level. But few would doubt that less drastic moves in such a direction would substantially change drinking patterns.<sup>14</sup>

However, there are caveats to be added to this observation. First, the diagram also shows that the behaviour of the population has, from the start of the 1960s, undergone a substantial qualitative transition. Up until that time alcohol consumption stayed reasonably constant, the falling relative price being matched by a drop in the proportion of consumer spending devoted to intoxicating beverages. But after that date increases in consumption started, despite a flattening out of the decline in the relative price curve. Proportionately more consumer spending began to go on alcohol, with the consumption curve turning steeply upwards in the 1970s when the relative price began to fall again. The reasons for this are unknown. But one explanation may be that as people attain a certain level of wealth their desire for alcoholic beverages begins disproportionately to increase. Another may be that the generations born in 1940 and after differ significantly from their parents in this context. And finally other factors, like changes in the number of places where alcohol is purchased, might have been involved.

A second caveat is that price is a crude weapon, effecting poor as well as rich but perhaps in different ways. Merely to raise the cost of drinking across the board could cause additional harm to the most socially deprived sections of society if, for instance, spending on family food were cut in order to compensate for increased drink outlay.

A third is that control by price may be limited by political factors. To what extent the population will accept overtly paternalistic interventions of this nature, based on, at best, questionable assessments of the social penalties of alcohol use and economic studies which in fact indicate the resource costs of alcohol harm are probably below the premium price already being paid in the form of customs and excise revenues, is uncertain. Some people may argue that the encouragement of informed individual choice, not the imposition of what could seem punitive state economic policies, is the most desirable path to moderating the level of alcohol harm attached to alcohol enjoyment. The resentful may even indulge in the illicit manufacture or purchasing of alcohol. Since at present no really coherent attempts to calculate the balance of the

14 Popham *et al* (1975) in a Canadian study concluded that the price of alcohol relative to disposable income was the most important variable affecting consumption. They found no relationship, however, between the number of outlets for alcohol sale and consumption. This contrasts with the British work of McGuinness (1980), described in the text, which identified a statistical link between the latter two variables.

costs and benefits involved have backed the various calls being made to increase significantly alcohol prices on welfare grounds, it is not absolutely certain that net community wellbeing would be raised by such a move.

A useful adjunct to, or even alternative to, enhanced consumption control by price might therefore be advertising control. McGuinness (1980) has, on the basis of UK data for the period 1956-75, suggested that a one per cent reduction in all types of drink advertising in 1975 would lead to a reduction in pure alcohol consumption of in the order of .2 per cent. A one per cent rise in price, he calculated would lead to roughly .25 per cent reduction in intake and a .75 per cent rise in consumer spending on alcohol.

These figures apply only at the margins of behaviour. They can not be taken to mean that a total press and television advertising ban would have commensurate benefits, as experience in British Columbia, where such a control was introduced, has shown (Smart and Cutler 1976). And the scale of alcohol problems in the Soviet Union suggests that factors other than advertising in the Western sense can promote high alcohol consumption. But they do indicate that some forms of new control on the £100 million or so a year that the drinks industries spend on advertising could at the least limit increases in alcohol demand, other social and economic factors remaining constant.

Another interesting result to emerge from McGuinness' study is the suggestion that a 1 per cent decrease in the number of licensed premises might reduce the total amount of alcohol consumed by around 2 per cent. In Britain the number of outlets has risen markedly since the 1961 Licensing Act, with sales via supermarkets and kindred vendors displaying considerable increases.

It may be argued that this shift was necessary to meet shopper's demands for convenient facilities. But it is of note that in other respects Britain's licensing laws have on the whole remained inflexible. For instance, despite the calls of both the Clayson and Erroll committees (SHHD 1973, Home Office 1972) for relaxation of certain of the restrictions which prevent children gaining access to public houses and perhaps also a lowering of the legal drinking age no moves have been made in that direction.

The DHSS Advisory Committee on Alcoholism, which sat between 1975 and 1978, concluded that such changes would have uncertain consequences and recommended against them, as did the Royal College of Psychiatrists (1979) and the 1977 Expenditure Committee Report. Research supporting such caution includes that relating to a fifty per cent rise in Finnish alcohol intake after a relaxation of restrictions on the sale of beer in 1969 (Makela 1970) and evidence from Canada and America on increased drinking in the young (and in motor accidents amongst them) after lowering the legal age of purchase (see Schimdt and Kornaczewski 1974).

Yet the relaxation of Scottish licensing hours appears, at

present at least, not to have led to the increases in drinking that some pessimists feared and if anything to have introduced a less concentrated, more English style of consumption (Wilson 1980b). Given the importance many commentators attach to the socialisation of children into balanced drinking habits and the nature of the environment in which drinking is conducted it is perhaps surprising that more attention has not been paid to the question of allowing children in public houses.

From a feminist viewpoint this is an important issue, in that sometimes the pattern is that men go out to 'the pub' whilst the women stay at home looking after young children. The undesirable social and psychological effects of this are probably far greater than the risks of alcohol to the bulk of the female population, notwithstanding the special hazards they may face (Jones 1980). But despite the arguments in favour of normalising public drinking environments by allowing children (and so mothers) better access to them the barrier's to such a step are substantial. On the one hand, for instance, the temperance element in politics may oppose changes on not entirely rational grounds; and on the other the alcohol industry, which may be described as oligopolistic and largely vertically integrated from production to point of sale, may see major shifts in traditional drinking arrangements as threatening. Similar forces may act to oppose the introduction of 'café-pubs' along the lines advocated by Clayson.

Turning to the topic of health education, much is often claimed for its potential impact on problems like alcohol related harm in the community. Yet in reality optimistic statements on this topic are frequently vacuous assumptions made on a basis of inadequate information (Mechanic 1980). Whilst a considerable amount may be known about the broad social conditions in which alcohol harm can be minimised (see Table 6) relatively little is known about how attitudes to drinking, once formed, are changed or the extent to which such attitudinal changes may cause desired behavioural changes. The cost effectiveness of initiatives like the Health Education Council's media based programme on 'alcoholism' in north east England (Cust 1980) can be doubted. Precise targets for such campaigns are necessary for efficiency.

With regard to this last point there has been some recent uncertainty regarding the overall performance of the Health Education Council, whether considered in isolation or in comparison to other bodies such as the Scottish Health Education Unit. One set of questions relates to the correct balance between the medical approach traditionally dominant in this field and the contributions which may be made by educationalists and other social/behavioural scientists. Another to the responsibilities of government.

However, this area is currently undergoing change. Perhaps the wisest conclusion to draw at present is that although education in relation to alcohol use is clearly in general desirable, it would be

**Table 6** *Societal characteristics which may help to minimise alcohol harm*

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Children are exposed to alcohol early in life, within a strong family or religious group. Whatever the beverage, it is served in very diluted form and in small quantities, with consequent low blood-alcohol levels.

Beverages commonly although not invariably used are those containing relatively large amounts of non-alcoholic components, which also give low blood-alcohol levels.

Beverages are considered mainly as foods and usually consumed with meals, again with consequent low blood-alcohol levels.

Parents present a constant example of moderate drinking.

No moral importance is attached to drinking. It is considered neither a virtue nor a sin.

Drinking is not viewed as a proof of adulthood or virility.

Abstinence is socially acceptable. It is no more rude or ungracious to decline a drink than to decline a piece of bread.

Excessive drinking or intoxication is not socially acceptable. It is not considered stylish, comical, or tolerable.

A wide and usually complete agreement exists among members of the group on what might be called the ground rules of drinking.

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*Source* NIMH 1967.

unwise to assume that either class room lectures or mass media 'health propaganda' will really enable people to identify expedient behaviour for themselves. The translation of general observations of risk to the context of personal reality is a difficult, sophisticated process, which may often require skilled help at an individual level. In this light the work of the Alcohol Education Centre, which was established in 1973 and aims to equip non-specialist health professionals such as general practitioners and health visitors with the necessary knowledge and ability to give such assistance, seems to be particularly worthwhile.

Finally, the CPRS report on alcohol policy, like that of the Blennerhasset committee before it, firmly recommended the introduction of random breath tests for drivers. This would appear to be a rational measure, especially likely to be useful in situations where, as with people driving away from public houses or private parties, there are reasonable grounds for believing that the law might be being violated. There is strong evidence that at present it is widely flouted (Wilson 1980a), even though by Scandinavian standards Britain's drink and driving regulations tend to ere on the side of the permissive. Given that drunken driving is an offence which appears to be committed by all sections of the population, with the amount of alcohol consumed being the only reliable predictor of an individual's likelihood of offending (Clayton 1980), firm prevention measures seem to be indicated.

However, it might be added that the toll of alcohol related

deaths and injuries could be cut by more general measures such as the introduction of the compulsory wearing of seat belts. Just as parliament has an obligation to control the use of intoxicants in the interests of road safety so, it might be argued, it has a duty to, as far as possible, ensure the well-being of even those who use alcohol illegally by making the environment as safe as can reasonably be achieved.

### **Help for problem drinkers and alcohol dependents**

Throughout the post-war period voluntary bodies have played an important part in providing support to people with alcohol problems. Perhaps best known of all is Alcoholics Anonymous (AA), which came to Britain from the United States in 1947. Its strongly religious approach to the area and its emphasis on the importance of complete abstinence for those wishing to recover from alcoholism proved attractive to, and appropriate for, a significant number of people. The organisation currently has around 1,200 groups in the UK, the meetings of which are yearly attended by approaching 10,000 members. Sister bodies, Al-Anon and Al-Atteen, offer support to the spouses and teenage children of alcoholics.

Another important voluntary organisation is the National Council on Alcoholism (NCA), founded in 1962 with the objective of providing advice and counselling on alcohol problems (NCA 1980). This it has attempted to do via the establishment of neighbourhood centres through local Councils on Alcoholism. Since 1973 government has financially assisted such initiatives. There are now about 30 Councils affiliated to the NCA and the Scottish Council on Alcoholism.

Finally on the voluntary sector side the Medical Council on Alcoholism, founded in 1967, contributes to medical education on alcoholism by organising seminars and distributing its *Journal on Alcoholism*. Thus its work in some respects overlaps with that of the Alcohol Education Centre, although the latter addresses itself to a wider professional audience.

Within the NHS much of the effort of the last thirty or so years has been aimed at the development of specialised centres for the treatment of alcoholism. The first was formed at Warlingham Park Hospital in the early 1950s. In 1962 the then Ministry of Health encouraged the development of such facilities associated with psychiatric hospitals in each health region. There are now over thirty Alcoholism Treatment Units (ATUs) in England and Wales, handling well over a third of the 20,000 or so NHS psychiatric hospital admissions for alcoholism. This overall total, which now represents some 10 per cent of all psychiatric admissions,<sup>15</sup> has risen almost thirty times in thirty years, an indicator primarily of in-

<sup>15</sup> The WHO (1979) estimates this proportion for countries like Germany, France and Eire to be between a quarter and a third.

creased treatment provision rather than of changes in the scale of alcohol problems.

Other developments have included the establishment of two experimental detoxification centres<sup>16</sup> following a Home Office (1971) report and a marked extension in local authority hostel provision for homeless, alcohol dependent individuals. In 1973 there were only about 250 such places available. But following a five year funding initiative by the DHSS made in that year (and recently supplemented to counter the effects of expenditure cut backs on social service provisions) the number has now risen to around 750 places.

Figures such as these show that the NHS and the allied local authority and state assisted voluntary agencies have, despite criticisms as to the severe geographical inequities in services, by no means been inactive in the face of the increasing level of alcohol problems within the country. But there has been recent debate as to the effectiveness of the support being offered because of changing beliefs about the types of treatment needed and of a widening view of the type of person needing help and advice.

One, sometimes contentious, debate has centred on the question of whether or not total abstinence should always be the therapeutic goal in treating alcoholics. Davies was amongst the first to argue, in the early 1960s, that a return to controlled social drinking might be a possible and appropriate alternative for a proportion of dependents. This view is now backed by a substantial volume of research (Hodgson 1979).

A second area of controversy relates to the place of hospital based treatment. Traditionally, alcoholics have been regarded as needing inpatient stays of several weeks. But although the facilities a hospital offers may be of value and even life saving in cases such as those of the unfortunate five per cent or so of alcoholics who develop delirium tremens<sup>17</sup> their role can in the majority of instances be questioned.

For example, Edwards and Orford (1977) conducted a trial comparing conventional hospital treatment with a single session of counselling. Both appeared to be of equal efficacy in helping individuals to, in the long term, break their dependency. And in the United States it was recently concluded that 'few differences in effectiveness among treatment settings, types and duration have

16 The value of such centres is uncertain and their future under review. For example, Smart (1974), working in Canada, found them to have little role to play in the long term treatment of people with a record of drunkenness offences.

17 The distress caused by this condition may be controlled by medicines like chlor-methiazole or chlordiazepoxide (a benzodiazepine tranquilliser), backed by vitamin preparations and compensation for potassium shortages and fluid loss. When the withdrawal phase is over the subject may be helped to remain sober by medicines like disulfiram. This blocks the body's capacity to breakdown the acetaldehyde produced by alcohol metabolism, so leading to unpleasant effects if alcohol is taken in conjunction with it.

been identified. The (alcoholic) patient's characteristics and motivation may be the essential factor in the recovery process' (DHEW 1979).

Many commentators have come to feel that an alternative strategy based on local extra-mural services might not only be less costly but could also reach a greater proportion of people with problems and at an earlier stage of their drinking careers. Most alcoholics only present themselves for help in or around their mid forties. This observation implies that there is a ten to twenty year lead-in period of heavy drinking (shorter for many women) during which appropriate assistance might have averted the onset of serious difficulties.

Thus the DHSS Advisory Committee on Alcoholism (1978b) argued in favour of the development of a flexible and to a considerable degree community orientated system involving primary and secondary levels of care, the latter serving to advise and support the former. It recommended that management and unions collaborate to provide help at work for people with drink difficulties; that the focus of ATU activities should be at district rather than regional level and that each locality should establish a team specifically concerned with alcohol related services. It also suggested changes in the patterns of professional training and the development of further education for voluntary counsellors, the work of whom the committee wished to see closely coordinated with that of the NHS and allied state services.

Clearly one major step towards achieving this pattern would be increased general practitioner participation in the care of people with alcohol problems. However, at present it appears that many family doctors do not wish to involve themselves in this area and fail to recognise all but a small percentage of their patients with such difficulties (Wilkins 1974). They may be particularly reluctant to accept the possibility that women are excessive drinkers, tending instead to diagnose (albeit coexisting) conditions like anxiety and depression (Blaxter 1978, 1980). Family doctors are frequently said to be unduly pessimistic about the outcomes of efforts to help alcoholics and problem drinkers. This is unfortunate, especially as much of the available data relates only to samples of severely dependent individuals. Outcomes might well be much more encouraging in earlier stages of the problem cycle.

Future technical improvements in screening for biochemical and other physical and psychological factors associated with heavy drinking could help to lessen the barriers to recognising at-risk individuals both in general practice and general hospital medicine. In the latter context, for example, it is believed that between 20 and 30 per cent of all those admitted may be excessive drinkers (Jarman and Kellet 1979, Holt *et al* 1980), the proportion probably being highest in accident and emergency departments. A reliable routine test for detecting an alcohol problem likelihood would be



a potentially highly beneficial innovation.

Presently known indirect indicators include an enlargement of red blood cells found in a proportion of subjects (Wu *et al* 1974) and raised serum levels of a number of liver enzymes, including gamma-glutamyltranspeptidase (GGT $\Gamma$ ) and gamma-glutamyl-transferase (GGT). Yet their full significance is currently by no means clear (Peterson *et al* 1980, *Lancet* 1980). Until fully evaluated procedures are available the desirability of direct blood alcohol testing and accurate history taking should not be underrated.

However, the field to which most attention is likely to be drawn in the immediate future is that of workplace intervention. As the Central Policy Review Staff has pointed out this is attractive because most heavy/problem drinkers are young males who are still in the labour force. A joint document from the Health and Safety Executive, the Department of Employment and the Department of Health and Social Security is due for publication in mid 1981. Based on data such as that contained in Hølterman and Burchell's (1981) work it argues that the costs of excessive drinking are high both to industry and individual workers and points to the ways in which unions and management may cooperate to, in a non-punitive way, encourage problem drinkers to seek help. The workplace may also provide a good setting for preventive interventions.

Experience in countries like Norway, Finland and the United States, which alone has over 2,400 major organisations with alcoholism prevention schemes, indicates the possible productivity of such measures. But this is not to say that directly comparable arrangements would necessarily be acceptable to everyone in Britain or would offer precisely the same pattern of economic benefits as they do abroad. For example, the universal availability of the NHS, as against the insurance based, often corporately purchased medical care of the United States, is a consideration here.

## Conclusions

Early in 1981 the Home Office Research Unit produced a paper which questioned the existence of a direct and inflexible association between alcohol price, its overall consumption and the incidence of alcohol related disabilities and dependence (Tuck 1981). It challenged the view of bodies like the DHSS Advisory Committee on Alcoholism that increased global intake of intoxicating beverages will necessarily mean more alcohol harm, and argued that more attention should be paid to situational factors relating to the physical environment and social context in which drinks are taken.

Perhaps predictably this contribution to public health debate was not welcomed by established medical authorities. *The Lancet*, for instance, carried an editorial which described the Home Office

paper as a 'national embarrassment, superficial and laying claim to an expertise which the Home Office Research Unit does not possess' (*Lancet* 1981). Yet despite this the analysis offered in this report in fact tends to support the contention that, in theory, there is no categorically fixed directional relationship between alcohol consumption and alcohol harm in a community. And that many of the statistics about the occurrence of alcohol dependence and problem drinking and its costs to the community quoted by government spokesmen and other influential commentators are broad guesses rather than precise estimations.

However, this is not to say that drink related distress has not become a widespread problem in Britain today indeed, it will probably become even more prevalent in the coming decade. The DHSS Homelessness and Addictions Research Liaison Group (RLG) has suggested (1980) that two million people in England and Wales, 1 in 25 of the population, are now either directly themselves or through their immediate families disadvantaged or otherwise hurt by a drinking difficulty. In Scotland and Northern Ireland, the RLG maintains, the ratio is nearer 1 in 10. Those who defend the use of alcohol containing beverages cannot show any reason why the general correctness of these figures should be doubted. Nor is there any reason to question the RLG statement that recent rises in drunkenness offences, liver cirrhosis death rates and the numbers of drivers killed whilst intoxicated all point to a growing burden.

In the face of this it may be thought that what is now required from government is a coherent policy to restrict alcohol harm to minimal levels consistent with the population's general desire to enjoy alcoholic drinks; that is to maximise the overall balance of benefits over costs resulting from drinking, difficult though this might be in the current limited state of knowledge and in the context of the disparate forces acting on policy makers. The latter stem from rival commercial agencies, religious and temperance movements and health orientated interest groups as well as from conflicting aims within the machinery of government itself. The concerns of those wishing to maintain the physical health of the nation may sometimes, for example, be contrary to those of people wishing to maintain tax revenues and export earnings.

In the longer term continued research into social, economic and biomedical aspects of human alcohol use will allow policies increasingly to be based on firm information. It may, as the Appendix to this paper indicates, open up novel solutions to problems such as those of alcohol dependence and alcoholic liver disease. Indeed, fundamental research conducted by agencies such as the Medical Research Council and multinational pharmaceutical companies may one day provide not only pharmacologically active substances to counter alcohol's unwanted side effects but also to promote its desired ones in a safer manner. But alternatives to alcohol, worldwide by far the most widely used sedative social

psychotropic drug, would need to be very carefully evaluated.

In the foreseeable future harm reduction must be based either on primary prevention and or improved treatment and assistance for those at risk from heavy drinking. The weight of evidence is that, notwithstanding the advantages that innovations like improved community and workplace advice and counselling facilities coupled with more appropriate professional education might bring, it is in the former area that at the present time the most effective and practical strategies for harm reduction lie. These range from the introduction of drink and driving controls like random breath testing to school courses on how to drink with reduced risk, the imposition of stricter advertising restrictions and raised price barriers to excessive alcohol use. All these measures may themselves have certain costs but if used in combination, in an intelligent and flexible manner these need not, it might be thought, be incurred at counter-productive levels.

It would be beyond the scope of this paper to attempt to prescribe in detail the form which remedies for alcohol harm in Britain might ideally take. Further public discussion, such as that which might take place if the DHSS eventually chooses to publish a green paper on alcohol problems, is necessary. Perhaps some new form of campaigning organisation, designed on lines similar to those of Action on Smoking and Health (ASH) and intended to highlight alcohol's risks and to counter or limit advertising of products containing the drug, is also needed. But for the moment what is clear is that of all the possible measures the one which is likely to be central, both in terms of controversy and probable impact, is that of global consumption limitation via the price mechanism.

Despite the technical criticisms of some aspects of the demographic, sociological and economic work done in this field (frequently by medically qualified individuals) the conclusion of this report is that, in the current state of knowledge, this is the most potent harm control strategy at present open. If alcohol related damage to the community is to be checked, some dimension of health and social welfare considerations needs to be explicitly added into the Exchequer thinking on alcohol taxing. The real debate relates to with what degree of stringency the rising trend of drinking seen over the past thirty years should be checked or reversed. This is a matter for political decision. But roughly speaking OHE's calculations, based on the experience of the period 1949-79, imply that a policy aimed at ensuring that a further rise of UK *per capita* pure alcohol intake of one litre would entail a diversion of at least one and more desirably one and a quarter per cent of total consumer spending would be a reasonable starting point.

The recent budget changes and depressed economic climate mean that this year any growth in alcohol consumption is likely to be very low. Indeed, it may even fall. Yet no long term commitment to alcohol control on health grounds has been made. The

reason is not a fear of lost revenue (which could be raised via other routes) but, probably, of lost votes. It could therefore be argued that in line with a consumption inhibiting pricing policy (and tougher drinking and driving measures like those advocated by the Blennerhasset Committee and the Central Policy Revue Staff) some measure of licensing reform aimed at increasing consumer satisfaction with drinking controls should also be considered. Relaxation of restrictions to permit daytime family use of licensed premises is one possibility; opening the trade to more testing competition via café-pubs with flexible opening hours is another. Such reforms would very probably meet opposition from existing commercial interests and/or the 'anti-drink' lobby (which may sometimes act in a manner which paradoxically encourages anti-social drinking habits). However, in reality, they might help to change the social context of public drinking in a desirable manner. And for many people they could possibly offset the political impact of the tightening of other alcohol harm reducing regulations, in as much as they would serve to demonstrate that the goal of public policy is to genuinely enhance consumer wellbeing, not merely to 'kill joy'.

## Appendix: Research on alcohol

Unlike the situation in America (with the National Institute of Alcohol Abuse and Alcoholism), Canada, Finland and France there is no central coordinating organisation for alcohol research in the United Kingdom although a new body, probably to be known as the Alcohol Education and Research Centre, is shortly to be formed. The initial capital for this (£2 million) is to come from the liquidation of the Licensing Compensation Fund, which was set up under the 1904 Licensing Act. The AERC is expected to receive industrial funding, organisations such as The Brewers Society and the National Council on Alcoholism having been closely involved in negotiations over its establishment. It has also been suggested that a European Alcohol Research Society be established (Commission of the European Communities 1979), to which Britain would presumably contribute. At present the main research funders are the DHSS/SHHD and the Medical Research Council, which acts for the entire country. Important contributions are made by groups such as the Addiction Research Unit at Denmark Hill and the MRC's Medical Sociology Unit in Aberdeen. The DHSS is currently funding work in six areas:

Evaluation of detoxification

Screening and early detection tests for alcoholism in hospital and general practice

Research into young adult children of problem drinking parents

Research into experimental day centres for alcoholics

Detection of alcoholism in ante-natal clinics

Inter-relationships between socio-economic and genetic factors in determining the pattern of alcohol liver disease

In addition another Government agency, the Office of Population Censuses and Surveys, has just completed a major survey of drinking habits.

However, there are still unfortunately many areas where adequate information is lacking. Epidemiological knowledge of drinking patterns is flawed and prospective surveys of individual's drinking careers are needed. Not enough is known of the natural history of dependence; the relation between heavy drinking and dependence; the efficacy of control measures, health education and treatment programmes and the identification of high risk sub-groups. Much of the economic work relating to the area is of insufficient quality; a good cost benefit survey could be of real value to policy makers. Yet in a time of expenditure limitations and uncertainty in the health services research field there is a danger that appropriate new research initiatives will not be taken.

In the light of this a recent American review of opportunities for research in the field of alcoholism and related problems provides interesting reading (Institute of Medicine 1980). The detailed reports go beyond the scope of this paper. But the suggestions made by the 6 panels involved in this project are very briefly summarised below, as are the major economic points the report contained.

### **Institute of Medicine Recommendations on Research Opportunities**

*Research on biomedical issues:*

Elucidation of the pathway(s) for alcohol metabolism, the physiologically

significant consequences of its metabolism, and possible genetic variations in the metabolism that help explain differential individual responses to alcohol.

Development of more appropriate animal models – including primates and cell culture systems – to assess alcohol metabolism, intoxication, tolerance, dependency, and toxicity.

*Research on neuropharmacological issues:*

Investigation of the effects on cell membranes of acute and chronic consumption of alcohol – including studies of fluidity, lipid and enzyme composition, and transmembrane ion distribution.

Investigation of the effects of acute and chronic consumption of alcohol on the concentration, turnover, localisation, and action of neurotransmitters, and on adaptive changes in neurotransmitter receptors that may ensue.

*Research on clinical and epidemiological issues:*

Exploration of the link between use of alcohol and occurrence of adverse consequences, through epidemiological studies of variables such as psychological and behavioural disorders; ethnicity, gender, and genetic endowment; and family characteristics.

Studies of the natural history of alcohol-related diseases such as liver cirrhosis and pancreatitis.

*Research on psychosocial issues:*

Assessment of the influence on levels of alcohol consumption – and severity of associated problems – of such variables as price, industry marketing practices, use or abuse of other drugs, general economic conditions, and changing social values and policies.

Identification of situational factors that affect at-risk drinking – including family and work-related socialisation and social supports.

*Research on prevention:*

Studies directed to early identification of those at risk – including natural history studies, genetic studies, development of biochemical and psychological tests, and examination of individual coping mechanisms.

Determination of elements of the environment – such as mass media, community programmes, and school, work, and family structure – that deter or promote abuse of alcohol.

*Research on treatment:*

Development of administrative structures and outcome criteria to allow efficacy studies that would elucidate effective combinations of patient characteristics and treatment settings, approaches, and goals.

Assessment of factors such as employer policies, insurance coverage, and family attitudes, that may influence access to treatment programmes.

*Research on economic costs:*

Improvement of methodology to assess societal costs imposed by alcoholism and alcohol abuse.

Studies of the fiscal relationships between the alcohol beverage industry and national and local government.

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