

# ALCOHOL

AND OTHER RECREATIONAL DRUGS



THE BECKLEY FOUNDATION

COVER: TITIAN 'THE ANDRIANS' 1523-4

Bacchus's arrival at the island of Andros creates a river of wine which inebriates the inhabitants.

AN INTERDISCIPLINARY PERSPECTIVE ON ALCOHOL  
AND OTHER RECREATIONAL DRUGS



## ADMIRALTY ARCH

GOVERNMENT CENTRE FOR  
MANAGEMENT & POLICY STUDIES

SOCIETY & DRUGS: A RATIONAL PERSPECTIVE

SEMINAR III

AN INTERDISCIPLINARY PERSPECTIVE ON ALCOHOL  
AND OTHER RECREATIONAL DRUGS

CONFERENCE PROCEEDINGS  
ADMIRALTY ARCH, LONDON.  
15 JULY 2003



THE BECKLEY FOUNDATION

COPYRIGHT © THE BECKLEY FOUNDATION 2003

THE BECKLEY FOUNDATION  
BECKLEY PARK  
OXFORD  
OX3 9SY

TELEPHONE. 01865 351209  
EMAIL. [OFFICE@BECKLEYFOUNDATION.ORG](mailto:OFFICE@BECKLEYFOUNDATION.ORG)

# CONTENTS

1. PREFACE	3
2. EXECUTIVE SUMMARY	5
3. ABSTRACTS AND SYNOPSES OF PRESENTATIONS	
SCIENCE, HEALTH & ECONOMICS	
Professor David Nutt	
<i>Alcohol and the Brain</i>	11
Professor Les Iversen	
<i>Comparing Cannabis and Alcohol</i>	19
Professor Ian Gilmore	
<i>Alcohol and Physical Health – A Complex Equation</i>	27
Professor Colin Drummond	
<i>The Dangers of Alcohol and the Costs to the NHS</i>	35
Professor Jonathan Chick	
<i>Treatment Strategies and Individual Differences</i>	43
Professor Christine Godfrey	
<i>Economics of Alcohol Compared with Other Drugs</i>	49
HISTORY	
Professor Virginia Berridge	
<i>Why Alcohol is Legal and Other Drugs are Not</i>	55

## POLICY

Hazel Blears MP

*Towards a Pragmatic Policy* 63

Mike Trace

*Costs and Benefits of Alcohol and Drugs Policies* 69

Professor Colin Blakemore

*A Scientifically Based Scale of Harm for all Social Drugs* 75

## 4. REFERENCES 83

## APPENDICES

I. Speaker Biographies 87

II. Participants Attending Seminar III 93

III. The Beckley Foundation 97



## PREFACE

This seminar, *An Interdisciplinary Perspective On Alcohol And Other Recreational Drugs*, is the third in a series entitled *Society & Drugs: A Rational Perspective*. The Beckley Foundation organized this seminar in collaboration with the Cabinet Office Strategy Unit, with invaluable help provided by Professor David Nutt. The Beckley Foundation would also like to thank Lord Wilson of Dinton and Sir Michael Rawlins for chairing the morning and afternoon sessions.

The Beckley Foundation was grateful for the invitation to hold the seminar in Admiralty Arch at the heart of government, and hopes that the information provided by the speakers will be of some help to the Strategy Unit in their difficult task of developing the National Alcohol Harm Reduction Strategy.

The aim of the series is to encourage a rational overview of the scientific, medical, social and economic issues surrounding the use of drugs, both legal and illegal. Everyone agrees that more informed debate is required as the basis for any further change in attitude and policy. These seminars bring together leading experts from a wide range of disciplines to examine the rigorous scientific and professional evidence on:

- \* the effects of different drugs on the brain, behaviour and health;
- \* the effectiveness of different methods of informing and educating the public (particularly young people) about drugs and the consequences of their use;
- \* issues in the prevention and treatment of addiction, including the relative merits of education and rehabilitation versus penalties and incarceration;
- \* the likely consequences of changes in legislation, and their implications for public health, law and order, and the economy.

Participants at this seminar included representatives from the fields of neuroscience, health, education, the law, and policy-making. This Conference Proceedings document summarises the presentations and the discussions that followed. We thank all those involved in organizing the seminar and in the preparation of the Proceedings.

Amanda Neidpath and Colin Blakemore

October, 2003



## EXECUTIVE SUMMARY

In the UK there are approximately 40,000 premature deaths a year related to alcohol consumption. This puts into perspective the approximate 1,500 lives claimed by all the illegal recreational drugs combined. Over the last 30 years alcohol has become an increasing problem in Britain's communities, causing a shift in public perception and government thinking on the subject. Problem drinking is on the increase, especially among women, and there is a clear link between the amount drunk and various indices of harm, i.e. health, crime, productivity and social harms. The massive costs of alcohol misuse to both the individual and society are just being realised and underline the need for a targeted alcohol strategy, set in context of our current cultural attitudes and legal approach to other drugs. As *Lord Wilson*, who chaired the morning session and introduced the seminar, emphasised, debate on what to do about this growing problem is urgently needed, although it may prove difficult to bring rationality to a subject that often elicits more emotion than understanding due to the vested interests involved, and the large proportion of the population who drink.

In order to create an evidence-based policy on alcohol, it is necessary to understand the neurophysiological effects of alcohol and compare these with the effects of other psychoactive drugs. *David Nutt* looked at the brain mechanisms that underlie the actions of both legal and illegal drugs, which are only now beginning to be understood. The pleasurable effects of alcohol arise from the activation of the same pathways as those activated by natural activities such as sex and eating, as well as by other illegal drugs. The effect of alcohol on the major transmitters, GABA and glutamate, explains many of the acute dangers of intoxication. Its effects on amine and peptide function, notably serotonin, dopamine and the endorphins, contribute to its pleasurable effects, and to dependence and craving.

The same receptor mechanisms are involved in the tolerance, withdrawal and dependence seen in both illegal drug and alcohol misusers, underlying a common addictive potential. A genetic predisposition to alcohol dependency or risk-taking behaviour in general may present itself in the form of specific variations in receptors or receptor subtypes. Similarities between the action of alcohol and other drugs on the brain indicate the need to study these substances conjointly and establish a research policy that considers the effects of one substance within the framework of all others.

*Leslie Iversen* considered the comparison of alcohol and cannabis, an illegal drug but one considered "soft" and used more prolifically than any other. Although cannabis and alcohol act on different targets in the brain, their associated intoxicated states have certain similarities. However, whereas alcohol in overdose can kill, cannabis cannot. The health risks associated with cannabis are generally related to its route of administration – smoking, often in conjunction with tobacco. The health risks associated with alcohol use are both more severe and more prevalent. Public opinion is moving towards the legalisation of cannabis. Britain regulates alcohol use by standardising quality and taxing consumption, so it is difficult to understand why cannabis use cannot be controlled in a similar way. Some consistency of legislation is required in relation to the relative harmfulness of these drugs.

The massive health implications of alcohol misuse were considered by *Ian Gilmore*, bringing to light its damaging effects on both the brain and the rest of the body. Alcohol is a major contributing factor to accidental injury and acute deaths. Death rates from cirrhosis have been increasing rapidly in the last ten years in England and are approaching those seen in other European countries where the trend is on the decline. Evidence suggests alcohol consumption may reduce the risk of mortality by heart attack, but increases the likelihood of all other fatal conditions including cancer and stroke. Closer analysis shows that any

beneficial effects only come into play when alcohol is consumed later on in life. Binge drinking is particularly dangerous, mortality risks considerably increasing with the amount consumed in any one session.

The enormous burden of alcohol on health services was examined by *Colin Drummond*, who also looked at the potential treatment approaches to alcohol misuse. On a population level, it cannot be disputed that there is a significantly greater problem with drinking than with drug use. Even conservative estimates of annual alcohol-related NHS costs are in the billions of pounds. Although alcohol misuse is common, it is currently seldom identified or treated in medical settings. A system that caters for the full spectrum of problem drinking is urgently required, and must be backed by sufficient funding and political will.

*Jonathan Chick* drew attention to the worsening problem of alcohol, and talked about the possible effects of advertising on younger people who are drinking more and dying at an earlier age. He also emphasised the need for more effective treatments, which as well as saving lives, would actually give net savings to the health service due to reduced subsequent psychiatric and physical disease-related costs. Brief interventions have been shown to be effective in some populations, but the number needed to be screened to avert one case of alcohol dependency is very large, and the interventions prove difficult to implement. Psychosocial treatments are more effective than pharmaceutical treatments, but there is a shortage of specialists qualified to administer them.

There currently exists an indefensible imbalance between central spending on treatment and prevention for illicit drugs (£95 million a year) compared to that for alcohol (£1.1 million a year). This is a major contributing factor to the rapidly increasing numbers of problem drinkers in Britain.

The economics of alcohol and other drugs also goes some way to explaining current trends in use and misuse, as discussed by *Christine Godfrey*. Alcohol has been found to be a complement rather than a substitute for other drug use. Because polydrug use is the norm, increasing the price of alcohol may simply increase the consumption of another drug. The price of drugs has been shown to affect their consumption. Relatively recent reductions in the cost of alcohol parallel an upward trend in problem drinking countrywide. In addition, incomes, information about the effects of the drug, advertising, marketing and supply all influence the consumption of a substance.

The social costs of alcohol and tobacco are far greater than those of all the illegal drugs put together. The World Health Organisation places illicit drugs seventeenth on the scale of the world's greatest social costs whereas alcohol is fifth. Social costs include premature deaths, unemployment and social disability, and victim costs. A considerable amount of research is available on the economic aspects of alcohol and other recreational drugs, but this is seldom used to inform debate because it is not accessible to the wider public.

While alcohol must be looked at in the context of other drugs, it is also important to put current alcohol and drug legislation in a historical context in order to understand how we arrived at the present position. *Virginia Berridge* reviewed the progression of alcohol and other drug legislation over the past 150 years. In this period opiates fell from a position of accepted medical and recreational use to a position where their use incurs the most severe penalties. In more recent years, smoking tobacco, which currently kills approximately 120,000 people a year in the UK, has become less culturally acceptable, while the popularity of alcohol and the drinking culture has increased. It would be logical to assume that these differences reflect the relative harmfulness of the substances concerned, but legislation is not always based on rational criteria and a host of other factors are involved.

Historically, the moderate use of both alcohol and opiates was not considered harmful because moderate users were able to maintain good health and continue working. Technological changes pushed alcohol and tobacco into mass production, while opiates

moved into the medical domain with purification processes and the invention of the hypodermic syringe. A strongly prohibitionist regime controlling the worldwide trade of drugs came into existence in the 1920s under American influence. Alcohol was not a serious candidate for overall international regulation because alcohol taxes were (and still are) a crucial component of western finance, and alcohol industry interests were (and still are) allied with political interests. On the other hand, coca and opium were not produced by the industrial nations so there was little interest in protecting their markets. In addition, the recreational use of these substances competed with that of alcohol and tobacco, and their associated industries.

The afternoon session of the seminar was chaired by *Sir Michael Rawlins*, who stressed the need for any alcohol strategy to adopt long-term aims and objectives in order to reverse current trends. Alcohol is embedded in western culture and consumption depends largely on personal choice. It may no longer be an option to try to educate young people to choose not to drink or take illegal drugs. Even educating the youth about safe and sensible use may prove a gargantuan task, because many young people already have entrenched attitudes that it is cool to be out of control. If a strategy can target and change this underlying belief the prizes are immense. If it cannot, the costs will continue to escalate.

*Hazel Blears*, who is the Minister in charge of the alcohol strategy, gave a talk on the government's viewpoint on the alcohol problem and the potential for interventions. The government is committed to producing an alcohol strategy by 2004. Because alcohol holds legal status, it is necessary to use a different framework to that used when developing a drug strategy. Vulnerable groups in society should be a clear focus for interventions. Some factors that affect the choice to drink can be controlled, like that of price, availability and advertising. Others are beyond government control like personality, ethnicity, age, family status and life experiences. A good policy depends on the strength of the evidence that underpins it, so the real threats posed by alcohol to the individual and the wider community need to be established with more research. Policies must reflect the reality of cultural issues, focusing on measures which will make real differences to people's lives, while acknowledging the present situation in which drinking is an accepted cultural activity.

*Mike Trace*, who was involved in creating the National UK Drug Strategy in 1998, questioned why drug and alcohol policy had been kept separate and why the alcohol strategy has taken six years to develop. Over 90% of the population will use alcohol at some point in their lives and 10% will become problem drinkers. Despite the high profile given to drug problems, alcohol problems remain much more prevalent, indicating the need for more focus on this drug. The current legal status of a substance determines the nature of the problems associated with its use. For example, most alcohol-related crime results from the way people behave under its influence, whereas drug-related crime is predominantly property crime carried out by addicts to feed their habits.

Alcohol policy in the past has depended on well-meaning intentions, but new policy must be based on evidence and rational thought processes. More investment is desperately needed but it is crucial to be clear on which processes to promote before backing them. The framework for a National Alcohol Strategy is developed but is not yet populated with accurate data. Although a strategy is yet to emerge in parallel with the National Drug Strategy, the time lag has given the government the opportunity to assess the evidence thoroughly, hopefully enabling it to produce a coherent, evidence-based programme of action.

Once the context has been set and the effects, both individual and social, established then it becomes necessary to consider possible lines of action. *Colin Blakemore* underlines how the present drug strategy has clearly failed. For all the efforts of the War on Drugs since the 1920s, never have drugs been more freely available at such a low cost. The Draconian policies have resulted in a vast increase of notified drug addicts in spite of massive investment. The

present classification of drugs makes little sense, reflecting the prejudices and misconceptions of a previous era.

As discussed earlier, alcohol is a drug and has features in common with other drugs, both legal and illegal. Like most of the social drugs, it is parasitic on natural mechanisms in the brain associated with pleasure and motivated behaviour. It activates the same receptor mechanisms as eating, sex and gambling. *Colin Blakemore* proposes a rational classification of psychoactive substances based on the principle that all drugs should lie on a unified scale of harm. On this scale, illegal drugs would lie in relation to those already accepted by society, and there would be a continuous review of the scientific and sociological evidence determining their relative positions. In this way, key questions such as 'Does the drug harm individuals other than the user?' 'Is its use costly to society in other ways?' and 'How do the risks compare to legal drugs?' can be answered, and the policy controlling their use adjusted accordingly.

Alcohol and tobacco are at the top, or near the top, of every index of harm, yet hold legal status and are widely accepted in British culture. Despite the risks associated with alcohol misuse and the resulting costs to society, its marketing remains virtually unrestricted and problem use is increasing rapidly in the UK, especially among women and young people. A means of arresting and reversing these worrying trends needs to be found while respecting people's freedom of choice.

## ABSTRACTS AND SYNOPSES OF PRESENTATIONS





# ALCOHOL AND THE BRAIN

DAVID NUTT

Psychopharmacology Unit, School of Medical Sciences, University of Bristol

Although it used to be thought that ethanol, like other alcohols, acted as a non-specific solvent, recent research has shown that the primary action of alcohol is to produce selective alterations in the function of several neurotransmitters, probably by acting on membrane bound receptors. These neurotransmitters and their receptors are also the targets of other abused drugs. In addition the brain circuits underlying the actions of alcohol, and dependence on it, are also becoming understood and seem to be the same as those underlying heroin and cocaine dependence.

This interaction of alcohol with neurotransmitters can be considered in the context of current classification of neurotransmitters into primary (amino acid) and secondary or modulatory neurotransmitters (amines and peptides). Alcohol has a clear action on both the primary inhibitory neurotransmitters, GABA and glutamate. Through an interaction at the GABA-A receptor alcohol increases brain inhibition, so calming the brain, which leads to sedation, unsteadiness and contributes to the loss of memory. However, at high doses, alcohol can over-stimulate these receptors, leading to coma, respiratory depression and death. Different subtypes of the GABA receptors are expressed in different brain regions, and new data suggest that certain subtypes mediate specific actions of alcohol, a discovery which is already leading to new approaches to treatment. Genetic variations in these subtypes have now been shown to affect the sensitivity to alcohol, and so may help predict vulnerability and possibly direct interventions.

Glutamate is the major excitatory neurotransmitter in the brain. At levels producing profound intoxication, alcohol blocks one of the three major subtypes of this receptor (the NMDA receptor). This contributes to the amnesic and sedative actions of alcohol. The brain attempts to compensate for this interference with its function by increasing the number of these receptors, so that when alcohol is withdrawn there is an excess of excitatory stimulation that results in neuronal death (brain damage).

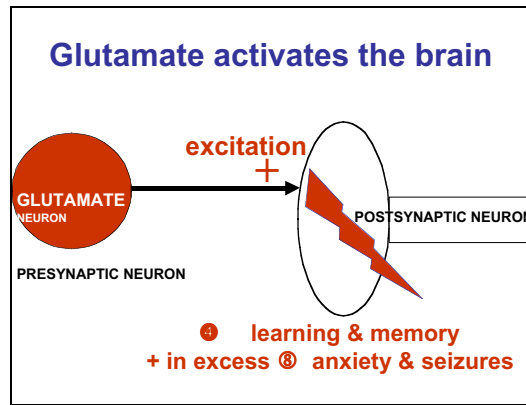
Alcohol has many actions on amine and peptide function in the brain and alterations in some of these neurotransmitter systems, especially 5HT (serotonin), have been found to be a predisposition to alcohol abuse. Dopamine release is a common feature of many abused drugs, especially stimulants and opiates, and it is likely that part of the pleasurable action of alcohol is mediated by this neurotransmitter, and also by the release of endorphins. This latter effect helps explain why the opiate antagonist naltrexone is effective in preventing relapse.

## ALCOHOL AND THE BRAIN

Alcohol has significant actions on the primary neurotransmitters, GABA and glutamate, and on the modulatory neurotransmitters, amines and peptides.

### ALCOHOL & GLUTAMATE

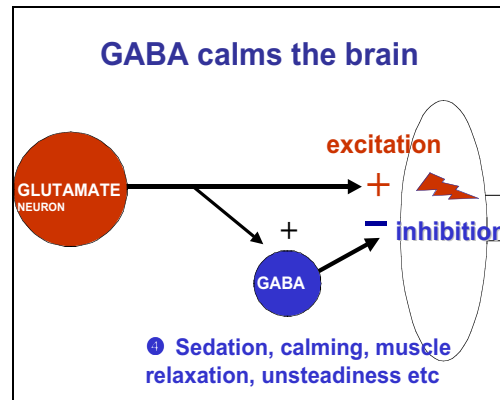
Glutamate is the main excitatory neurotransmitter in the brain. It is critical to learning and memory but in excess causes anxiety and seizures.



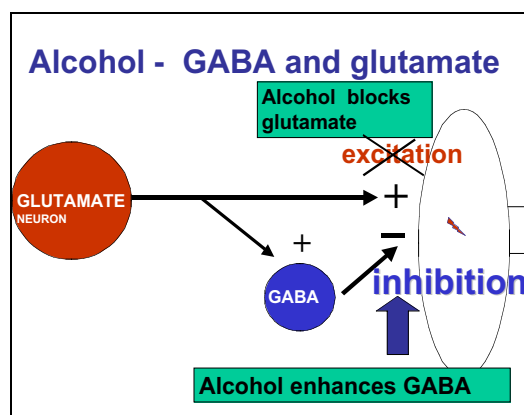
- In order to prevent excessive excitability, which will result in seizures (fits), the brain has developed a sophisticated system with projections to neurons that release inhibitory transmitters occurring where most glutamate is released.
- Alcohol blocks a particular subtype of the glutamate receptor called the NMDA receptor. Normally, activation of the NMDA receptor by glutamate allows calcium ions to flux through the membrane, but the ethanol molecules block the flow of these ions through the channel, causing amnesia and also sedation and then death
- The brain makes more NMDA receptors in an attempt to compensate for the blockade by alcohol. As a result, one of the most obvious features of chronic alcohol use is the upregulation of NMDA receptors.
- With more NMDA receptors, there is more excitation possible in the brain. This can make the brain go into a hyperexcitable state when abstaining from alcohol, causing seizures and excitotoxic brain damage. This is a significant feature of the alcohol withdrawal syndrome.
- The alcohol-induced brain damage that alcoholics experience is probably due to the excessive brain stimulation experienced during repeated withdrawal.
- Acamprosate (a new treatment for alcoholism) can reduce the hyperexcitable brain states by acting as a partial glutamate antagonist, offsetting the effects of alcohol on the glutamate system.

### ALCOHOL & GABA

- GABA is the main inhibitory neurotransmitter in the brain. This inhibition causes sedation and muscle relaxation but in excess leads to unsteadiness and amnesia.
- GABA release is simultaneously produced when glutamate is activated, so reducing the degree of excitation and allowing fine adjustments of the primary neurotransmission in the brain.

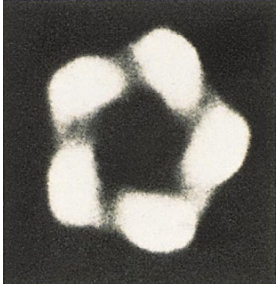


- Alcohol blocks glutamate transmission (excitation) and increases GABA transmission (inhibition). The net effect of intoxication is to produce a very profound reduction in excitation in the brain, which can lead to coma.



- Alcohol has a biphasic action on GABA receptors. It acts like benzodiazepines at low doses, enhancing GABA-A receptor function and causing disinhibition, sedation, clumsiness and inattention. It acts like barbiturates at high doses, mimicking GABA action by opening chloride channels leading to coma and eventually leading to terminal respiratory depression.
- The receptor is a protein made of 5 sub-units combining to form an ion channel, and occurring in a particular combination to function correctly. The movement of ions through that channel regulates the excitability of surrounding cells.

#### GABA-A receptor - electron microscopy

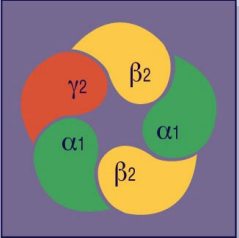


5 associated proteins [subunits]

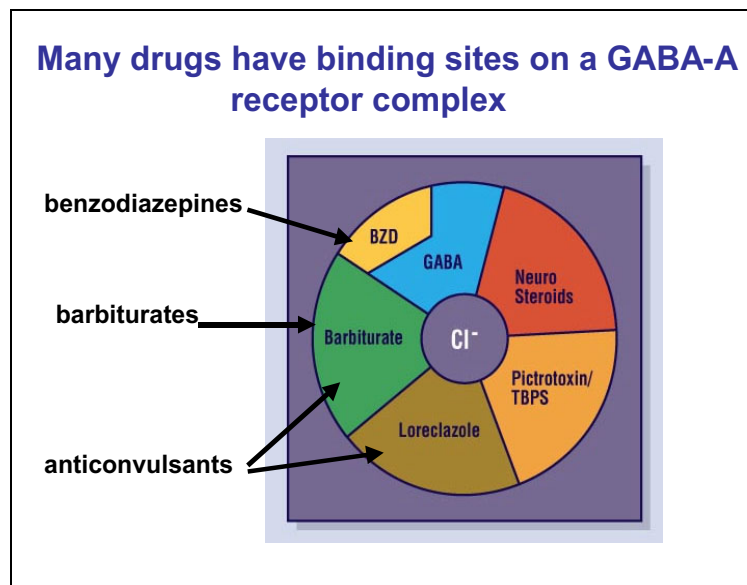
#### Alcohol and GABA-A receptor subtypes

Five GABA-A receptor subunits make up a single receptor

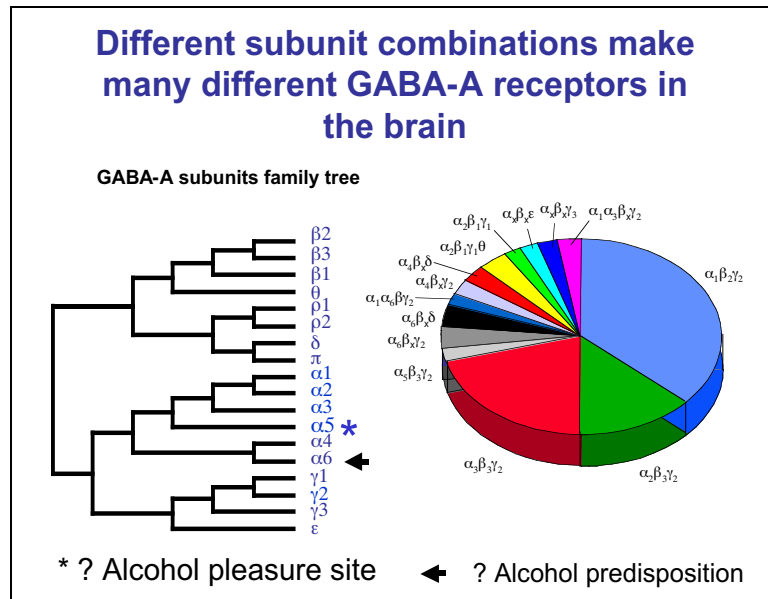
2-  $\alpha$ s  
2-  $\beta$ s  
1-  $\gamma$



- On the complex of 5 proteins there are binding sites for many different drugs including benzodiazepines, barbiturates and anticonvulsants.
- Alcohol can interfere with the function of this receptor because it has a binding site on the GABA-A receptor complex near the barbiturate site.
- At low doses, it causes the ion channel to open wider allowing more ion flux. At high doses the channel can remain open preventing the normal adaptive mechanisms of the brain operating and explaining the acute toxicity of alcohol.

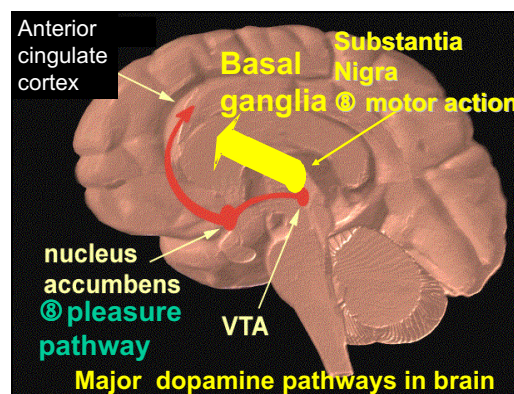


- Alcohol use downregulates the GABA-A receptors, particularly in the frontal decision-making parts of the brain. There are significant differences in the density of GABA receptors in the brains of male alcoholics compared with normal controls.
- A multitude of different variants (subtypes) of the GABA-A receptors exist in the brain and their density varies, some combinations being very common and others rare.
- Different sub-types of GABA receptors mediate the different effects of alcohol.
- The alpha 5 subunit is very highly expressed in the hippocampus, a part of the brain involved in memory. It is possible this subtype mediates the pleasurable effects of alcohol.
- The alpha 1 subunit is particularly expressed in the cortex and cerebellum, areas related to higher cognitive functions. Alcohol increases inhibition of these receptors inducing sedation, ataxia and discoordination.
- Genetic variation in these receptors or receptor sub-types may predispose to alcohol dependence and account for variations in individual propensity to misuse. The alpha 6 subunit has been linked to the predisposition to alcohol dependence.
- There is also growing evidence that GABA receptors are involved in tolerance to the effects of alcohol, dependence and withdrawal effects.



## ALCOHOL & AMINES

- A common pleasure circuit exists in the brain in which dopamine plays a key role. This system includes the anterior cingulate cortex and the nucleus accumbens, parts of the brain involved in motivated behaviour.
- Pleasurable experiences can cause release of dopamine in the pathway. This is critical for the learning association between the experience of pleasure and what you did to get it.
- Dopamine is thought to be the core transmitter mediating the effects of reinforced behaviour, particularly for drugs of misuse.

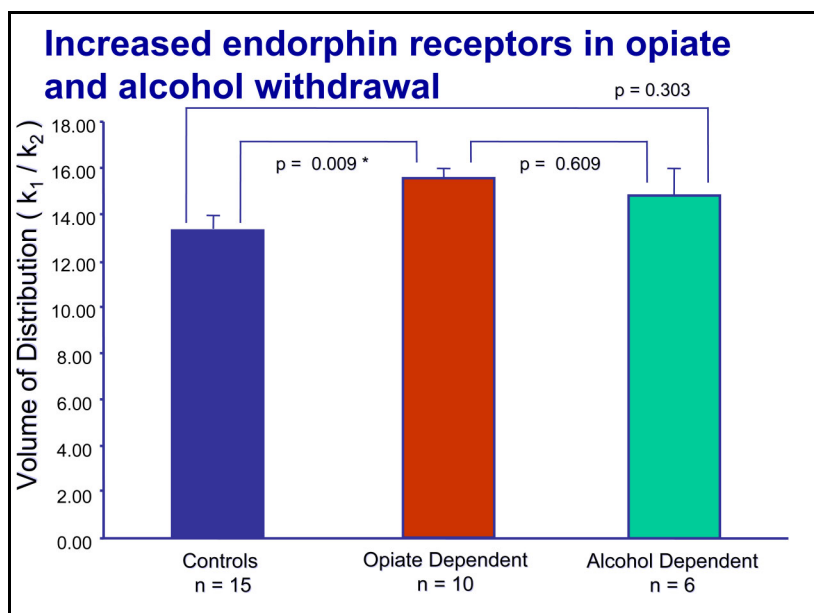


- Alcohol, like stimulants and opiates, releases dopamine activating the pleasure pathways of the brain.
- Serotonin (5HT) is a neurotransmitter manipulated by antidepressant drugs like Prozac, which boosts 5HT in the brain.
- Low 5HT receptor function is linked to alcohol dependence and chronic use may damage 5HT function in the brain. Other factors, including poor parenting and chronic stress, may also predispose individuals to alcohol dependence through reducing 5HT function.
- Drugs that promote serotonin, like the SSRIs (Selective Serotonin Reuptake Inhibitors), may have some utility in treating certain forms of alcoholism.
- Alcohol abuse may also damage the noradrenaline system, involved in attentional processes.

- Post-mortem studies show that heavy alcohol use is associated with the same magnitude of loss of noradrenaline neurons as seen in conditions like Alzheimer's disease. This may contribute to the chronic dementia seen in long-term alcohol users.

#### ALCOHOL & ENDORPHINS

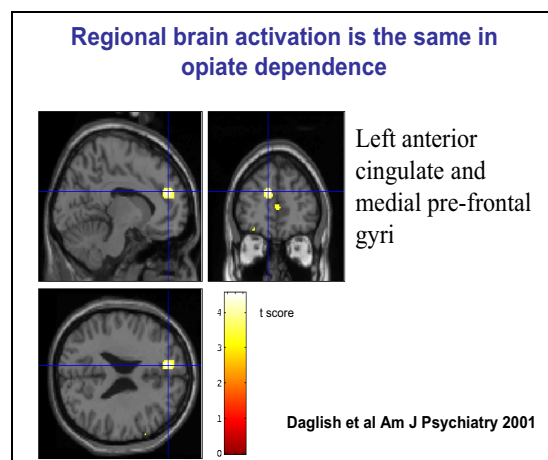
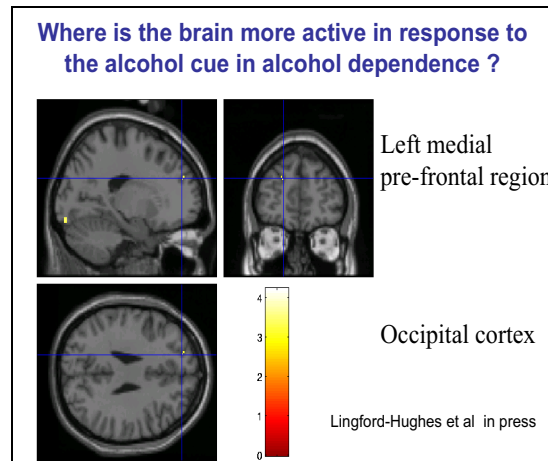
- The brain's endorphin system is a natural system activated in response to stress in order to calm down the brain and attenuate pain.
- The receptors for the endorphins are also those on which morphine and heroin work to produce analgesia and pleasurable effects.
- Alcohol releases endorphins. This may be its primary means of producing pleasurable effects with dopamine release acting as a secondary mechanism.
- Naltrexone may have some utility in the treatment of alcohol dependence because it blocks the endorphin receptors in the brain. When endorphins are released they promote memories of experiencing pleasure, explaining why naltrexone has some therapeutic effect, preventing relapse in alcohol dependents.
- As with the glutamate system, there is an upregulation of endorphin receptors with chronic heroin and cocaine use, and preliminary evidence for similar effects with alcohol abuse. This could explain the similarities between the physical withdrawal symptoms and the propensity to relapse associated with alcohol and hard drug dependence.



University of Bristol Psychopharmacology Unit and MRC Clinical Sciences Centre

#### BRAIN CIRCUITS OF ALCOHOL

- Using PET or fMRI it is possible to detect changes in brain activity caused by exposure to, and craving for, a particular drug induced by specific images, smells or tastes.
- Regional brain activation is seen in similar areas in response to different drugs, from alcohol to heroin. Activation is greater with some drugs than others, which may be an indicator of the strength of the craving, but the regions activated are the same indicating a shared circuit of action.



- The common circuits associated with alcohol dependence are the same as those associated with other drugs such as heroin and cocaine. There is a commonality of action on the endogenous pleasure systems in the brain.

## CONCLUSIONS

- Brain mechanisms for both legal and illegal drugs are beginning to become understood.
- Alcohol activates multiple neurotransmitters, even more so than other drugs.
- Brain receptors are involved in tolerance, withdrawal and possibly dependence to all drugs including alcohol.
- There are significant commonalities with other drugs in terms of addictive mechanisms.
- There is a need to look at patterns of receptor subtypes in persons with alcohol dependency.
- The effects of alcohol on the main neurotransmitters, glutamate and GABA, explains many of the problems with intoxication and the acute dangers of alcohol, i.e. the anesthetic effect of the drug, the ability to kill people by overdose or by virtue of accident.
- The modulatory transmitters, like dopamine and 5HT, contribute to alcohol dependence and craving. Chronic use profiles are like those of other drugs of abuse.

## QUESTIONS & ANSWERS

**To what extent are drugs and alcohol working through the primary appetitive mechanisms of the brain and to what extent do they have drug-related mechanisms? Is alcohol dependence part of a bigger issue of appetite regulation rather than a problem specific to alcohol?**

Drugs and alcohol both work through both mechanisms. Neurotransmitters, particularly dopamine, have a role in various forms of addictive behaviour, including eating excessively. Dopamine is a drive-related transmitter linking desires to satisfaction after the achievement of goals. Neuropeptide Y is one of the many peptides in the brain, a natural appetite transmitter, which has recently been implicated in the effects of alcohol. When the receptors for this substance incur abnormalities or are knocked out in animals, they tend to drink more alcohol.

Therefore, drugs acting on neuropeptide Y receptors may help to prevent alcohol and other substance addictions. The balance of effects between two or three different modulators may be quite critical in determining the progress of substance use.

**The brain seems to change and develop according to the way we treat it. Is there any way to treat the damaging effects of alcohol as they develop? Is it possible to reverse the effects of alcohol abuse simply by abstinence?**

Abstinence reverses some of the toxic effects but once an association between the drug and pleasure is learnt, it is very difficult to undo. It is possible to induce craving even in the unnatural conditions of a scanning machine, the activation produced being present even in people who have been clean for 10 years. Conditioned responses are formed to different cues and it is very difficult to psychologically desensitize these. Even after years of abstinence associations can be reinstated, the memories and their emotional content triggering recurrent episodes of alcohol or drug use. Psychologists are studying ways of eradicating or weakening these associations.

**Is there any evidence that starting to drink at some ages will have less effect on the brain than at other ages?**

It is possible that developing brains are going to be more vulnerable to the learning and other adverse effects of alcohol consumption. It is possible that when synaptogenesis is complete, the brain is more resistant to permanent damage. Alcohol is likely to have devastating effects on brain development. The age at which you get drunk for the first time appears to be a significant predictor of problem drinking, 80% of those with alcohol problems having been drunk at least once by the age of 13. However, causality cannot be assumed from this statistic, whether young risk takers are predisposed to drink or whether drinking at young age predisposes one to alcohol dependence. In one study of young offenders, 50% were found to be suffering from some kind of substance misuse induced memory loss, the most common substances cited being alcohol and cannabis.



# COMPARING CANNABIS AND ALCOHOL

LESLIE IVERSEN

Department of Pharmacology, University of Oxford

Alcohol and cannabis are the two most widely used “recreational” drugs in Western countries. The drugs act on different targets in the brain, but the consequences are similar – leading to a state of intoxication characterized by disinhibition and fatuous euphoria. But whereas the cannabis “high” is usually followed by a calm state of withdrawal, alcohol often unleashes aggression which can proceed to violence. In overdose alcohol can kill; cannabis cannot.

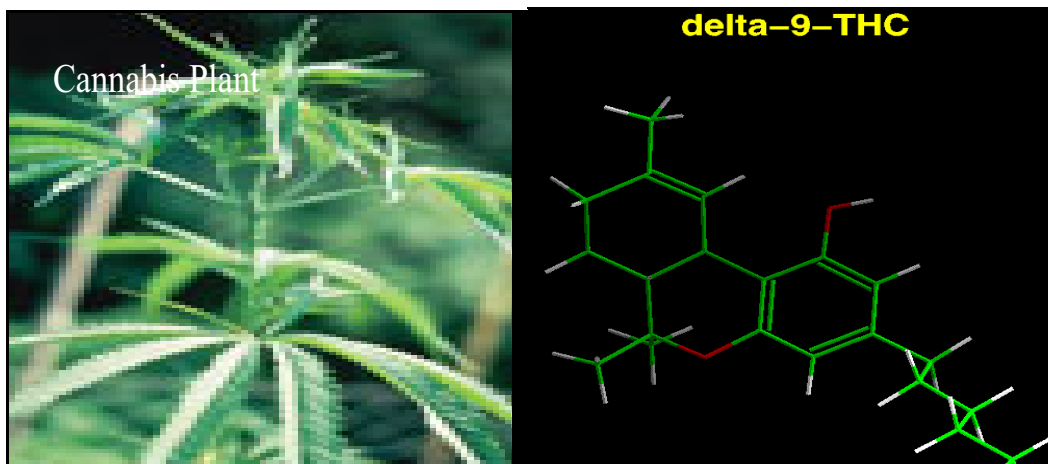
Regular use of either drug leads to addiction/dependence in about 10% of users but many cannabis users quit by age 30 while most alcoholics do not.

In terms of health risks, maternal use of alcohol can damage the unborn child and lead to “foetal alcohol syndrome”, with permanent physical and mental impairment. Alcohol is also a major cause of liver and pancreas disease and is associated with an increased risk of cancers of the mouth and throat. Cannabis smoke can cause bronchitis and there is a possibility of an increased risk of cancers of the mouth, throat and lung. Heavy use of cannabis by young people may increase their risk of subsequent psychiatric illness.

Alcohol and cannabis have many similarities and the health risks associated with their use are comparable, although those associated with alcohol are much more severe. There is little scientific or medical basis for the differences which exist in the laws that seek to restrict the use of these two intoxicants.

## CANNABIS

- The cannabis plant has been used by humans as a psychedelic and psychopharmaceutical for several thousand years.
- Cannabis was relatively unknown in the west until the 19<sup>th</sup> century when it was introduced to British medicine from India.
- It first came into widespread recreational use in the 1960s and 1970s as one of the preferred drugs of the hippy movement.
- Its active principle, tetrahydrocannabinol (THC) was first identified in the 1970s.
- THC accounts for virtually all the psychic, central nervous system effects of smoking the plant extract.
- Its administration is difficult because it is almost totally insoluble in water. It can be dissolved in oil or fat and made into edible foodstuffs.
- Ingestion is problematic because its absorption is unpredictable.
- Smoking is the most effective way of taking the drug, it passing quickly from the lungs to the bloodstream to the brain.
- Experienced smokers can titrate the dose by the number of times and how deeply they inhale.



## INTOXICATION

- Initially cannabis acts quite differently to alcohol in the brain. THC molecules attach to specific protein cannabinoid receptors.
- Cannabinoid receptors exist to recognise a naturally occurring system of cannabis-like brain chemicals called the endocannabinoids that form part of a physiological control and chemical messaging system.
- The cannabinoids influence similar neurotransmitter systems to alcohol, e.g. GABA and glutamate mechanisms which control dopamine levels.
- The release of dopamine seems to be a common feature of all drugs that have euphoriant and potentially addictive qualities, e.g. alcohol, nicotine, cannabis, cocaine, amphetamines and heroin.
- The active component of cannabis, THC, and alcohol act on different brain mechanisms, but their effects on brain function are somewhat similar – leading to disinhibition and intoxication.

- The early stages of alcohol and cannabis intoxication (both dizzy & delightful) are similar but this similarity weakens as levels of intoxication increase (drunk & disorderly vs. relaxed and peaceful).
- Alcohol intoxication dramatically increases levels of public disorder and accidents. Cannabis intoxication is not identified with antisocial behaviour.
- There are no cases of fatalities caused by cannabis overdose. There are many acute alcohol-related fatalities.

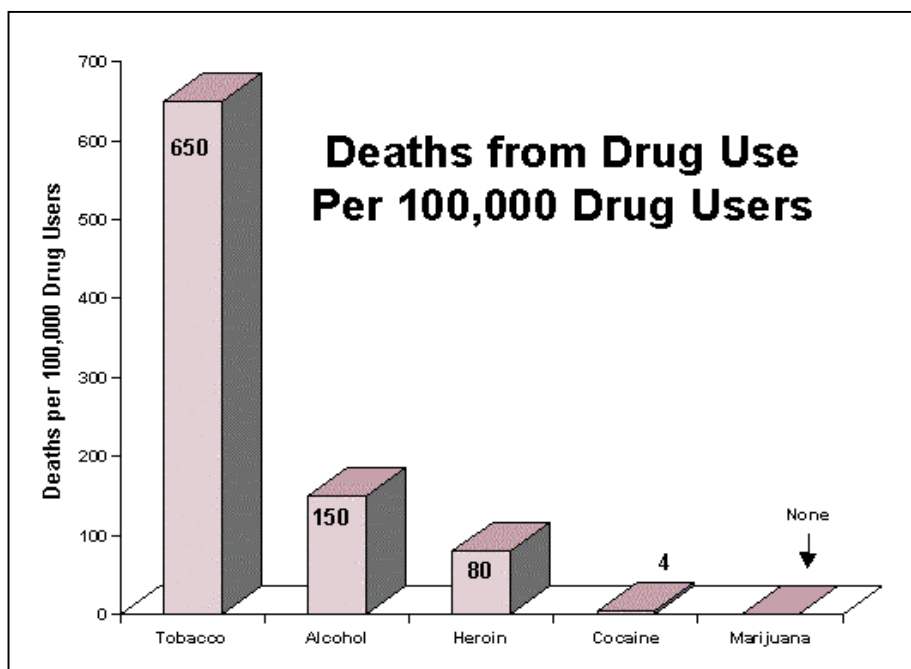
### Stages of Cannabis Intoxication

- BUZZ – dizziness, light headed, tingling, warmth
- HIGH –heightened perception, giggly, euphoria, rush of thoughts & ideas
- STONED – relaxed, peaceful, calm, distorted sense of time, maybe hallucinations, fantasies
- SLEEP

### Stages of Alcohol Intoxication

- 0.1% Dizzy and Delightful
- 0.2% Drunk and Disorderly
- 0.3% Dead Drunk
- 0.4% Danger of Death

(Sir John Gaddum – British pharmacologist)



Source: Thinking About Drug Legalisation by James Ostrowski. Cato Institute Paper # 121

## DRIVING UNDER THE INFLUENCE

- Alcohol causes clear deficits in driving skills as demonstrated by impairments in driving simulator tests, while it is hard to show serious deficits resulting from cannabis intoxication.
- Alcohol is a major factor in road traffic accidents, increasingly in combination with cannabis.
- Both drugs clearly impair psychomotor function.
- There is a simple roadside test available for alcohol in the form of a breathalyser, while there is no simple test for cannabis intoxication. Cannabis remains in the body long after its psychoactive effects have ceased, so its presence in small amounts in the bloodstream or urine does not indicate intoxication.

## DEPENDENCE AND WITHDRAWAL

- Regular use of either drug can lead to addiction / dependence in approximately 10% of users.
- Alcohol withdrawal includes physical signs (some very serious), whereas cannabis withdrawal is accompanied only by a psychological syndrome, e.g. irritability, anger, unhappiness, anxiety or sleep disorder.
- A behavioural withdrawal syndrome can be elicited by giving cannabinoid receptor antagonists to cannabis dependent animals.
- Many cannabis users quit spontaneously by the time they are 30, usually when they acquire families and responsibilities, whereas few dependent drinkers or tobacco smokers do.
- There is a very large range of cannabis use frequency compared to cigarette smoking.

## HEALTH RISKS – I: THE UNBORN CHILD

- Cannabis use during pregnancy may lead to lower birth weight babies but this may be due to carbon monoxide in the cannabis smoke rather than the THC. There is little evidence of subsequent impaired physical or mental development.
- Foetal alcohol syndrome affects approximately 0.1% of all births in the USA in recent years. These children are permanently impaired, both physically and mentally.

## HEALTH RISKS – II: ADULTS

- Alcohol is the major cause of liver and pancreas disease; increases the risk of mouth and throat cancers; and can cause brain damage and dementia in high-level users.
- The more important health risks of cannabis are related to smoking as a means of delivering the drug. Smoking cannabis can lead to bronchitis; as yet unproven increased risk of mouth, throat and lung cancer.
- Heavy use by young people can increase the risk of subsequent psychiatric illness - although one cannot assume causality - and can exacerbate existing psychiatric illness.
- An added problem specific to the UK is that most people use cannabis in combination with tobacco, unlike many other European countries and the USA, where this is not the cultural norm. This increases the risk of smoking-related illnesses and increases the risk of becoming addicted to tobacco.
- Cannabis use has not been prevalent for long enough in western society to know if it increases the risk of cancer later in life.
- Cannabis use does NOT cause permanent brain damage; impair the immune system or cause sterility as previously rumoured.

## PUBLIC OPINION

- Recent research would suggest attitudes towards cannabis are beginning to change.
  - In contrast to the views of politicians, many people believe the drug is not as dangerous as has been depicted.
  - Opinion polls in the UK and the USA show voters in favour of legalising cannabis are on the increase. American polls show percentages in favour:
    - 1972 = 15%
    - 2000 = 34%
    - 2003 = 42%
- A poll conducted in the UK in 2001 found 49% to be in favour of legalisation. Those against were mainly in the over 55 age bracket.
- A large majority of the population is in favour of medicinal cannabis.
  - There is increasing sentiment towards relaxation of cannabis laws despite vehement anti-drug propaganda.

### Canadian Senate Special Committee on Illegal Drugs – Sept 2002

"Marijuana users are unlikely to become dependent. Most users are not at-risk users ... and most experimenters stop using cannabis. ... Heavy use of cannabis can result in dependence requiring treatment; however, dependence caused by cannabis is less severe and less frequent than dependence on other psychotropic substances, including alcohol and tobacco."

"Scientific evidence overwhelmingly indicates that cannabis is substantially less harmful than alcohol and should be treated not as a criminal issue but as a social and public health issue. We have come to the conclusion that, as a drug, it should be regulated by the state much as we do for wine and beer, hence our preference for legalisation over decriminalisation."

## CONCLUSIONS

- Cannabis and alcohol have many similarities, and share some of the same health risks.
- Since the Gin Acts of 18<sup>th</sup> century Britain we have learned how to regulate and control alcohol use, standardising quality and taxing consumption.
- Perhaps it is possible to learn how to control cannabis use in a similar manner.

## QUESTIONS & ANSWERS

### **What difference will the reclassification of cannabis make?**

Parliament has recently agreed with the Home Secretary's recommendation that all cannabis preparations be put into class C of the Misuse of Drugs Act; this will come into force at the end of January 2004. Despite this, there are political obstacles which prevent it being dealt with in accordance with the real harm it causes. The government has acknowledged that cannabis is not as dangerous as it has been portrayed, but has simultaneously increased penalties for supplying class C drugs. Consideration is being given to increasing the maximum penalty imprisonment for possession of a class C drug from 2 to 5 years under the new Criminal Justice Act, and the penalty for supplying has been increased from 5 to 14 years in an attempt to deal with large scale cannabis trafficking. Police will be allowed to stop and search on the grounds that someone might be carrying category C drugs and to search a house without a warrant, impinging on people's basic liberties. These contradictions present a very ambivalent governmental attitude towards drugs.

### **How do the police presently deal with cannabis use in drivers?**

In 1998, legislation was introduced that a license can be withdrawn if there is a relevant disability present. The existence of cannabis in the bloodstream was deemed to be a relevant disability. Over 300 people lose their license every year for this reason. The medical advisory council for the DVLA advises that licenses not be reissued unless blood tests show the person to be clean for 6 months. While it is not safe to drive while intoxicated, the cannabis test is unreliable. There is no way of testing whether the driver is intoxicated at the time because cannabis stays in the bloodstream for several days, long after the psychoactive effects of the drug have worn off.

### **What in a strategic time scale is a rational policy to achieve harm reduction?**

There is a role for the government in terms of educating people about alcohol. Publicity campaigns are needed to make people aware that while alcohol is accepted in our culture it is nevertheless a dangerous drug. The mainstay of public education for the last 20 years has been safe drinking levels and unit limits but this is a very complex message depending on the age and sex of the consumer, and the context, situation and frequency of consumption. This approach has been given considerable support by the drinks industry but it ultimately comes down to consumer choice and individual responsibility. By comparison, hard-hitting media campaigns and changes in policing have been effective in reducing levels of drink driving in the UK. There is other evidence to suggest that media campaigns work: in the 1960s, the US Supreme court required equal opportunity on television for public health advertising as was given to tobacco advertising. After 3 years the tobacco companies sued for loss of business. There is a genuine need to get credible messages to target groups.

### **What is the role of the drinks companies in the increase in problem drinking?**

In the last 10 years, there has been an increase in the potency of wine and beer. It is not uncommon to find wine with 14% alcohol volume and beer with 8% volume. Drinks companies advertise prolifically and use sophisticated viral marketing (so called because it spreads so rapidly). They take advantage of the youth culture's obsession with mobile phones and the Internet, using these as advertising tools. Some drinks, such as alcopops, are deliberately marketed to the youth. Some alcopops are laced with caffeine to make them more interesting as psycho-pharmaceuticals.

**Does criminal justice policy have any impact on consumption?**

The evidence is that targeted policing works, such as directed patrols managing the nighttime economy of our cities. From an epidemiological point of view, the influences of convention are more important than the severity of the punishment. Deterrence has certainly played a role in the reduction of drink driving. However, there has been a big decrease in drink driving in all industrial countries regardless of jurisdiction. In the UK, there is no random alcohol breath testing, but there has been a similar decline in drink driving to that seen in Finland and Australia where this is in place.

**Is there a particular type of drinking behaviour that is most damaging?**

There is a worrying movement towards binge drinking, especially in young people who go out with the intention of getting drunk. A weekend binge drinking culture is established. Learning impairments seen in binge drinkers are equivalent to those seen in alcoholics, which are both much greater than those seen in people who drink moderate levels consistently.





# ALCOHOL AND PHYSICAL HEALTH – A COMPLEX EQUATION

IAN GILMORE

Registrar, Royal College of Physicians  
Consultant Physician and Professor of Medicine, Royal Liverpool University  
Hospital

Alcohol is our favourite drug. As well as the complex interactions of benefit and risk on a social and behavioural level, the balance as applied to physical health is not always clear. There is a danger that the reported population benefits of 'a couple of glasses of red wine a day' can be taken as a *carte blanche* by individuals for whom the balance of risk is clearly in the other direction.

Alcohol can damage every organ system in the body, and is a factor in almost a third of all accidents. Liver cirrhosis is the best known of the physical risks, but affects only 10-20% of heavy drinkers, and genetic factors are also likely to be important. About half of patients presenting with alcoholic cirrhosis are not dependent drinkers, and would have stopped or moderated consumption with better information. Most concerning at present is the trend to present with problem drinking at a younger age and the rapid rise in alcohol misuse in women.

The beneficial effects on ischaemic heart disease are well known, but have to be set against the other cardiovascular effects of alcohol, especially hypertension where the fraction attributable to alcohol is about 15%. The risk of ischaemic cerebrovascular accidents (strokes) is reduced in moderate consumers but the risk of haemorrhagic strokes is increased, particularly in binge drinking.

The balance of risk and benefit of differing levels of consumption is critically dependent on age, sex and socio-economic circumstance. In developing countries, the benefits never outweigh the deleterious effects on the health of the population. In Western societies the beneficial effects overall are seen only in the over 70's age group. When analysed by level of consumption, the benefits of drinking at the upper limit of 'safe levels' are apparent only in men over 55 and women over 65. Theoretical tables can be constructed for the consumption associated with the lowest overall risk for each sex and age group. Patterns of drinking add a further level of complexity, with evidence that binge drinking, when adjusted for total consumption, can increase all-risk mortality 3-fold and mortality from acute myocardial infarction 6-fold.

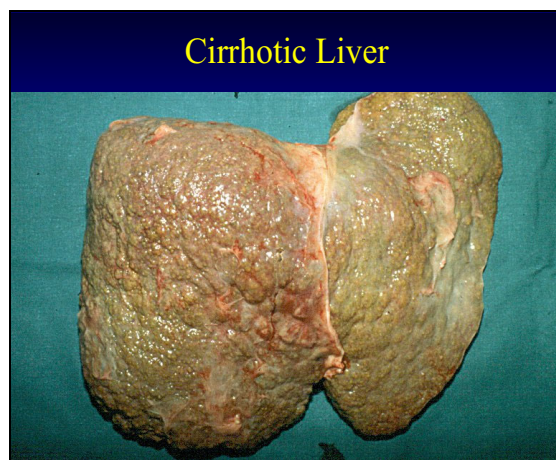
These complex interactions have to be taken into account when developing any public health message or educational programme. Such strategies need urgent development to take advantage of the increasing evidence that early interventions can influence drinking patterns.

### ALCOHOL AND ACCIDENTAL INJURY

- Alcohol is a factor in 20-30% of all accidents.
- Alcohol is associated with 15% of all drownings.
- Alcohol is associated with 39% of deaths in fires; people anaesthetised by alcohol do not wake up so quickly and are more likely to die from smoke inhalation.
- There are 550 deaths and 2940 serious casualties each year resulting from drink driving.
- 37% of pedestrians killed on the road had drunk over the legal limit for driving.

### CIRRHOSIS OF THE LIVER

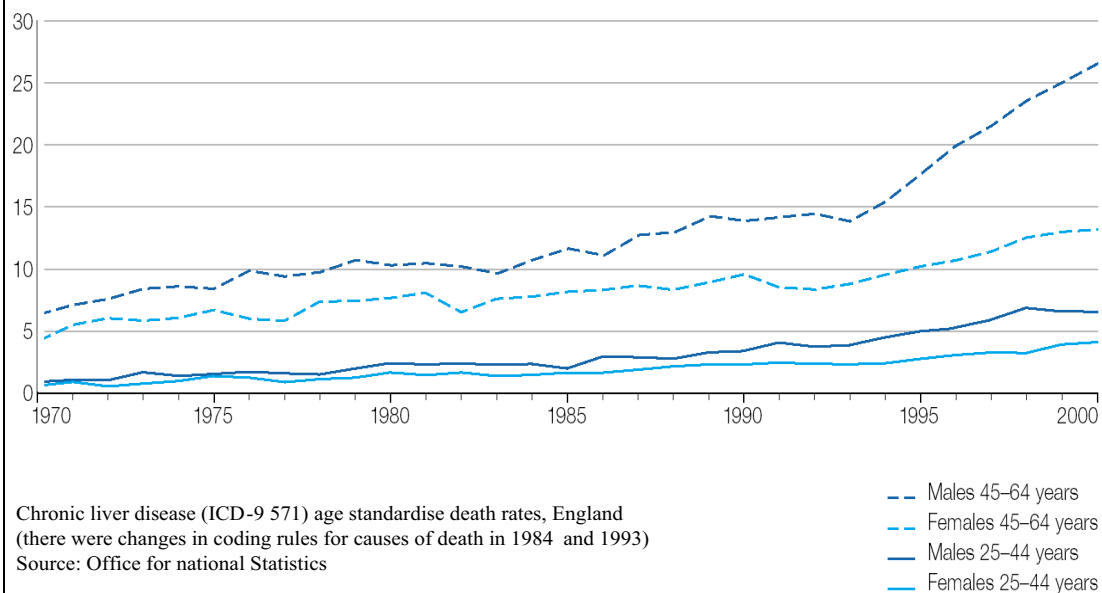
- 30% of those with cirrhosis of the liver do not acquire it as a result of alcohol consumption. 70% of cirrhosis in the UK is a direct result of alcohol.
- Only 20% of those who grossly misuse alcohol acquire cirrhosis of the liver. Strong genetic factors influence this, e.g. different ways of metabolising alcohol.
- 50% of patients presented with alcoholic liver disease are not dependent on alcohol. This affirms the importance of brief interventions, as some people will stop drinking if the risks they are taking are drawn to their attention.
- People are generally aware of alcohol units, but grossly overestimate what a unit is. They are unaware of the consequences of not adhering to guidelines on sensible consumption, and expect to be warned in advance of dangerous drinking behaviour. Unfortunately, many people only seek help when it is too late.
- The warning signals associated with alcoholic liver disease, namely jaundice and abdominal swelling often occur late when cirrhosis is already established.



- Death rates from cirrhosis in England have been increasing slowly since the 1970s, but have started increasing more rapidly in the last 10 years.
- The Chief Medical Officer expressed concern in 2001 about the rising incidents of cirrhosis in young men, but there is now evidence suggesting that a similar marked increase is observable in young women.

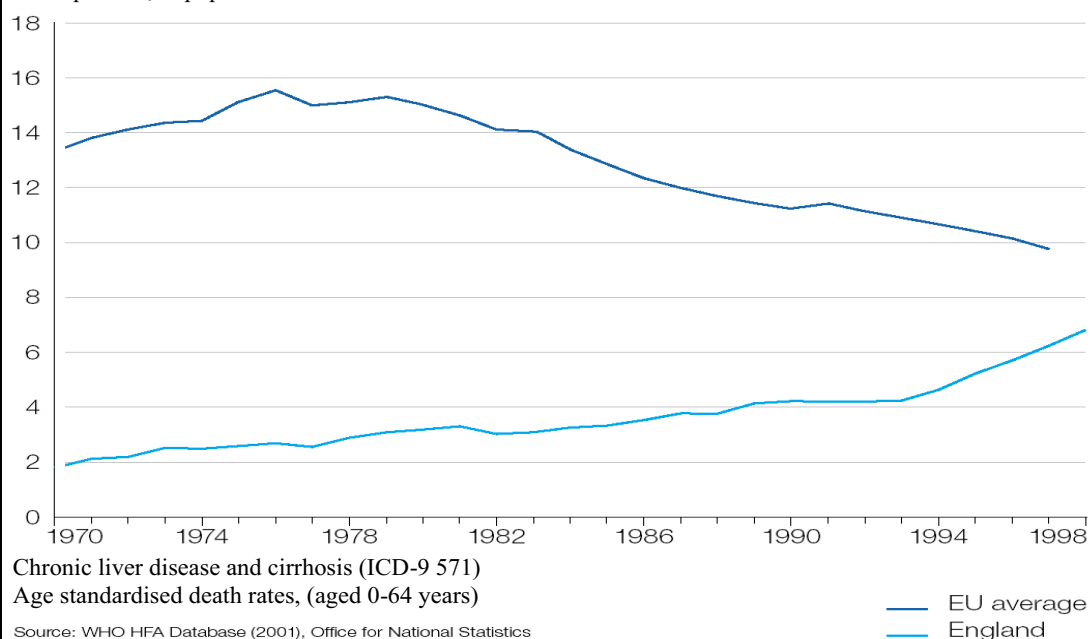
## Death Rates from cirrhosis in England, 1970–2000 (CMO's report 2001)

Rates per 100,000 population



## Trends in cirrhosis deaths between England and EU, 1970 – 1998 (CMO's report, 2001)

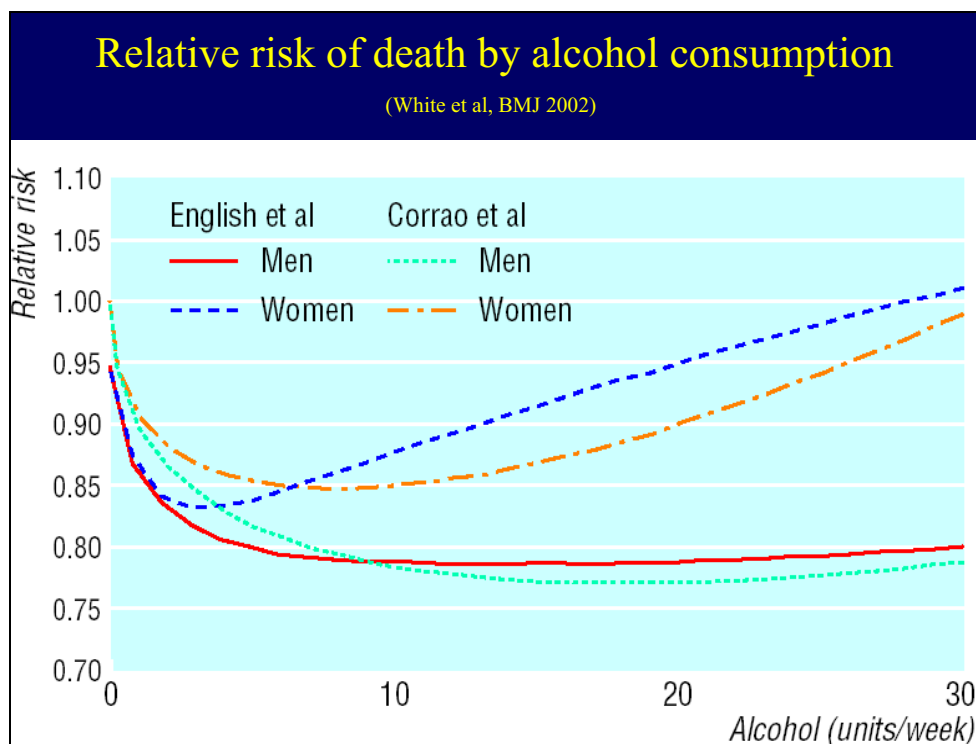
Rates per 100,00 population



- The UK is catching up with the rest of Europe, with numbers of cirrhosis deaths increasing every year in England, while the European Union average is steadily declining.
- Some countries, including Italy and France, have reduced their per capita consumption by nearly 50% in the last few decades. It is important to establish how this has been achieved.

#### POTENTIAL BENEFITS

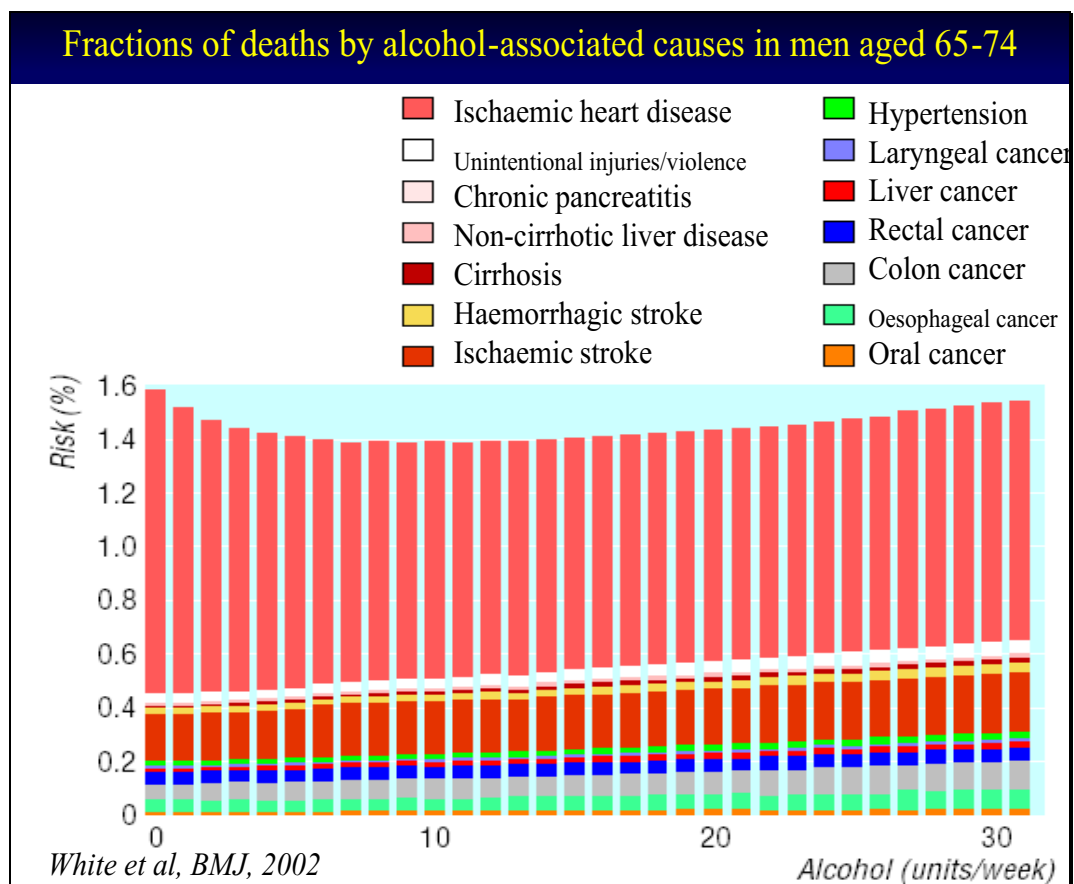
- Evidence from epidemiological and pathological studies suggests that alcohol consumption may actually reduce the risk of dying. In women, this trend reverses over approximately 10 units but in men, there is little increased risk of mortality with increased consumption up to 30 units a week. This is called the J-Shaped curve or Physician's Friend.



- Potential benefits are mainly mediated through atherogenesis, preventing cholesterol being laid down on the arterial walls.
- Levels of HDL (good) cholesterol increase in people that drink moderately and levels of bad cholesterol go down.
- It has a similar effect on platelet function to aspirin and the effects can be additive, making it even more beneficial on atherogenesis.
- The same pattern is found in all laboratory research and can be generalised to all types of alcohol, not just red wine as is commonly thought.
- Moderate alcohol consumption decreases the chances of atherosclerosis, cardiomyopathy, and ischaemic strokes.

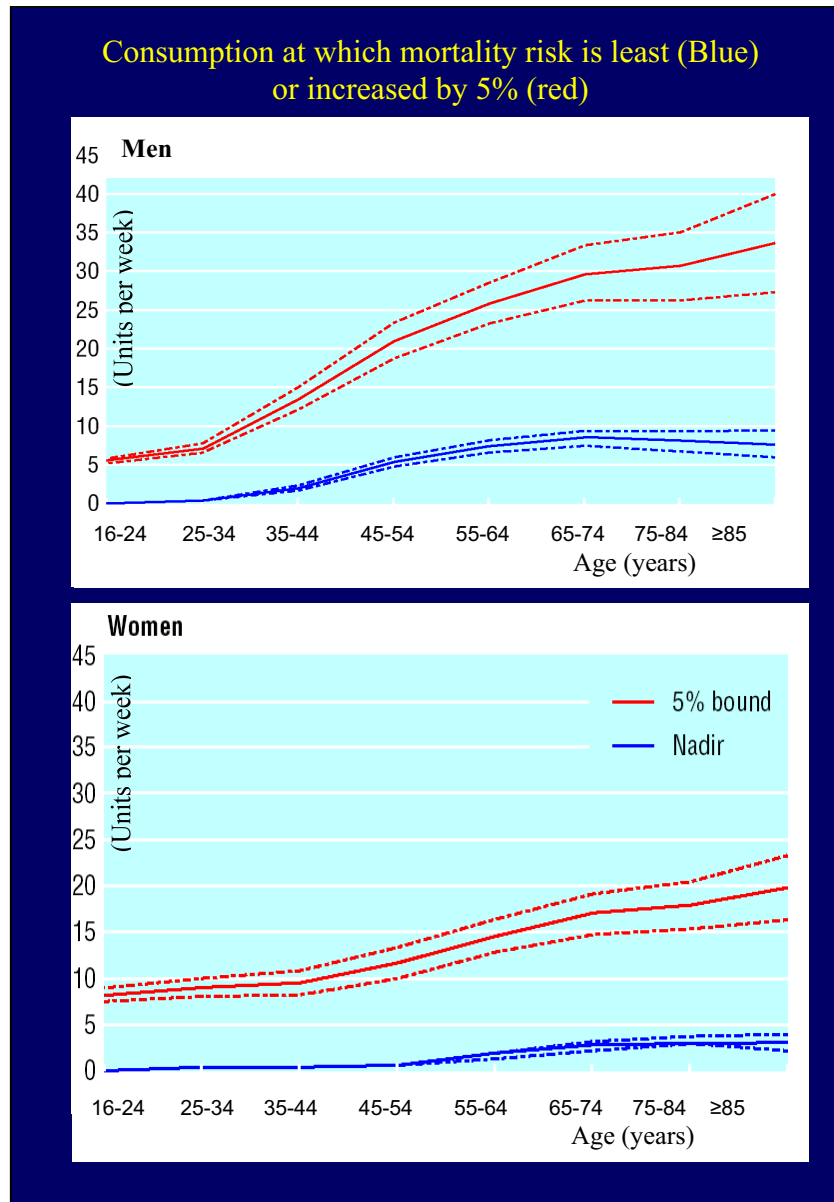
#### OTHER ALCOHOL-RELATED HEALTH RISKS

- The immediate risk of alcohol is trauma NOT cirrhosis. Injury and trauma swamp any other effects of alcohol in the early years of consumption.
- Many different systems are affected by alcohol consumption and damage is not always related to the volume drunk. Even very small amounts can predispose to some diseases like chronic pancreatitis.
- Systems affected by alcohol include the heart and blood vessels, liver, pancreas, gut, brain and peripheral nerves, muscle and bone, endocrine and reproductive systems, and the blood.
- Alcohol increases the chances of potentially fatal arrhythmias. Post-drinking exercise may be dangerous because the heart is so unstable.
- Alcohol is a major contributory factor to hypertension, causing 15% of all problems, creating a major burden on the NHS.
- Alcohol damages the cardiac muscle and can weaken the heart to a point of not withstanding major surgery, which can limit the use of liver transplantation.
- Haemorrhagic stroke linked to increased hypertension is also increased.
- The reduction in mortality rates from alcohol consumption is due to a reduced occurrence of ischaemic heart disease BUT all other problem effects are on the increase, particularly colon, rectal, and oesophageal cancer, and haemorrhagic stroke.



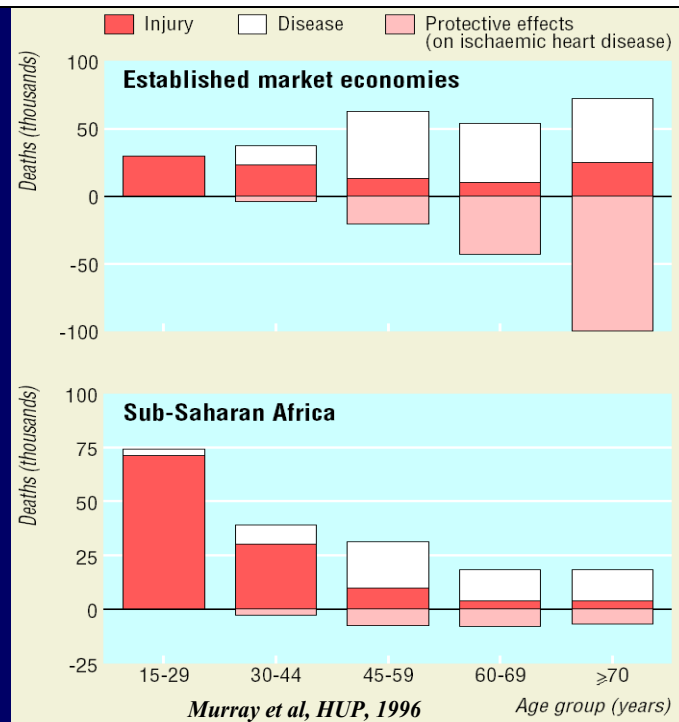
## TRENDS IN DRINKING AND ASSOCIATED EFFECTS

- The J-shaped curve does not hold up to close analysis, in terms of age breakdowns.
- Drinking in men significantly increases the risk of mortality compared to non-drinkers in the under 35s and there is no overall benefit in younger age groups. In women, no overall benefit is seen until over the age of 55.
- In men, mortality risk is lowest if no alcohol is consumed until the age of 35, after this no more than 10 units a week. Accepting an increased mortality risk of 5% allows drinking between 5 and 15 units a week until the age of 45, after which point consumption can increase.



- In women, mortality risk is lowest if no alcohol is consumed until the age of 55, after this no more than 4 units a week. Increasing mortality risk by 5% allows drinking less than 10 units a week until the age of 45.
- Alcohol risks and benefits vary in different societies. In the West the reduction in ischaemic heart disease almost balances the increased risk of injury (especially seen in the young) and disease (more apparent with age). In the third world where this type of heart disease is not prevalent, the risks far outweigh any benefits.

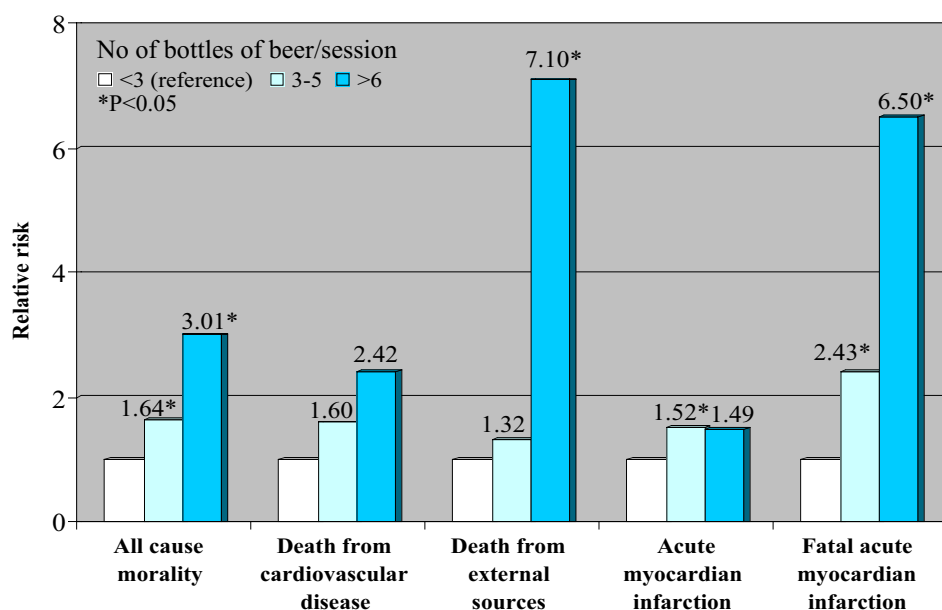
## Competing benefits and risks of alcohol in different societies



- Patterns of drinking have a significant impact on the risks even if total alcohol consumption is the same.
- Overall mortality rates were 3 times higher in those drinking more than 6 bottles of beer in a session, compared to those who never drank more than 3 bottles. Risk of death from external sources increases 7 fold. Occurrence of fatal heart attacks increases 6 fold.

## Pattern of drinking and mortality risk

Kauhanen et al, BMJ, 1997



## QUESTIONS & ANSWERS

### **What can we do to tackle these problems?**

We need to see a shift in funding from presently illegal drugs, which have a far greater government research budget, to alcohol. A great deal more should be done on strategies to tackle problematic alcohol use. Alcohol is never going to be made illegal to reduce the prevalence of problem use because it is too entrenched in English culture but more needs to be done to inform people of the very real dangers of alcohol consumption, especially binge drinking. It is necessary to teach people how to use alcohol more safely. Approximately 10-20% of the population does not know the facts about alcohol consumption and it is these people we are failing by not moving alcohol up the political agenda.

### **Why is alcohol consumption reducing in some European countries?**

There is less alcohol advertising and increased expenditure on treatment. Those countries with more restrictive advertising in all media are those in which consumption is reducing the most. Very heavy drinkers consume a very large proportion of alcohol and reducing the consumption of these people with effective targeted interventions may explain the declining consumption in many European countries.

### **If a healthy liver is given to a patient in a transplant, and that person continues to drink after their operation, can they still acquire cirrhosis?**

Even if the liver comes from one of the 80% of the population not prone to cirrhosis, accelerated recurrence of alcoholic disease is often seen after grafting if the patient continues to drink. This is explained by a predisposition of the immune system rather than the organ. However, many patients transplanted for alcoholic liver disease return to some alcohol consumption without apparent significant damage to the new liver.

### **What is the impact of undiagnosed hepatitis C?**

It is thought there may be as many as 300,000 undiagnosed hepatitis C cases in the population. It is likely the full impact of hepatitis C has not yet been realized. In blood transfusion studies, the incidence is under 1% and in low incidence areas like the north of England, hepatitis C is only seen in a small minority of patients with alcoholic disease. Those who do have both get an accelerated form of the disease. It is likely that hepatitis C is the main cause, and that alcohol consumption is an extra risk factor for acquiring cirrhosis. The risks of hepatitis C kick in later in life and are accumulative with alcohol-abuse side effects.



# THE DANGERS OF ALCOHOL AND COSTS TO THE NHS

COLIN DRUMMOND  
St George's Hospital Medical School

Alcohol misuse causes a large amount of preventable morbidity and mortality in the UK. Alcohol misusers are over-represented in a wide range of medical settings including primary care, general hospitals, Accident and Emergency departments, and psychiatric hospitals. For example, half of psychiatric inpatient admissions, and half of A&E attenders on weekend nights are related to excessive drinking. 20-30% of general hospital admissions and 30% of attenders in general practice have alcohol problems.

Alcohol is responsible for up to 40,000 premature deaths per annum, and 17,000 annual injuries due to drunk driving. Alcohol problems are increasing, particularly in women who have had a 70% increase in excessive drinking in the past 12 years. This paper will examine some of the research indicating the large burden of alcohol problems on the NHS. Well-targeted, brief interventions can reduce alcohol misuse by 20-30%, but to implement this nationally will require a commitment across the spectrum of agencies from government to individual practitioners.

#### THE SCALE OF THE PROBLEM

- 90% of males and 80% of females over 16 years of age drink alcohol.
- 29% of males and 17% of females drink over a “safe” level, as recommended by the government.
- 7% of males drink over 50 units a week. 3% of females drink over 35 units a week. This volume is significantly high.
- 38% of males and 25% of females can be classified as “hazardous drinkers,” scoring over 8 on an audit questionnaire used as a screening tool by the ONS.
- 12% of males and 3% of females can be classified as “alcohol dependent”.
- This compares to 0.5% of the population who can be regarded as being problem drug users.
- On a population level there is a significantly greater problem with drinking than with drug use.

#### THE HARM

- The Royal College of Physicians estimates 25,000-40,000 premature deaths per annum are alcohol-related.
- Alcohol consumption increases the risk of cancer, heart disease and mental illness (65% of suicide attempts are alcohol-related).
- Alcohol consumption increases the risk of accidents and injuries (20-30% of accidents, 47% of drownings, and 50% of assaults are alcohol-related).
- 20-30% of all medical inpatients are related to alcohol misuse.
- 17,000 injuries and 530 deaths result from drink driving each year.
- A conservative estimate of annual alcohol-related NHS costs is £1.7 billion in the UK.

#### AN INCREASING PROBLEM

- Alcohol misuse in 18-24 year old men has increased by 32% in the last 12 years.
- Alcohol misuse in women has increased by 70% in the last 12 years.
- In men aged over 65 alcohol misuse has increased by 31%.
- In women aged over 65 alcohol misuse has increased by 75%.
- Alcohol-related mortality has increased by 25% in the last 10 years, more in women than in men.
- There was a 23% increase in alcohol-related road injuries between 1993 and 2000.

#### ALCOHOL AND MENTAL ILLNESS (Barnaby et al., 2003)

- A survey of 200 inpatients in two psychiatric hospitals in south-west London was conducted this year.
- The people included presented with a range of problems including severe mental illness, although specialist addiction units were excluded.
- Half of the patients were rated as having hazardous or harmful drinking behaviour and a quarter were rated as alcohol-dependent. This is a much higher percentage than that found in the general population.
- The male to female ratio of hazardous drinkers (53% males and 44% females) was much smaller than that seen in the general population, indicating that women with psychiatric disorders are particularly vulnerable to developing problems related to drinking.

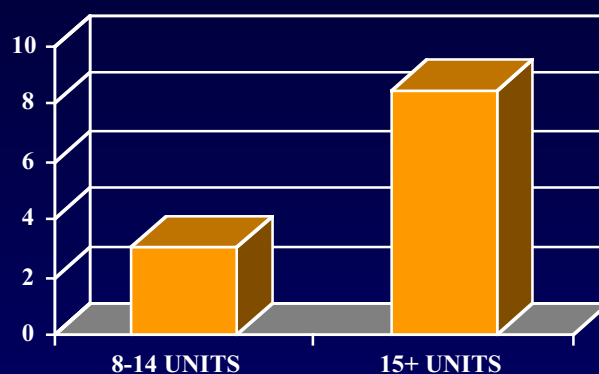
- Only one of the 200 patients had a full alcohol history, and only a quarter had a partial alcohol history. The psychiatrists assessing these patients either did not detect or did not consider the importance of their alcohol misuse.

### Inpatient psychiatric survey Alcohol misuse McCloud et al., 2003

Drug	Ever used	Last 30 Days
Sedatives	68%	54%
Cannabis	51%	18%
Cocaine	28%	11%
Amphetamine	27%	2.5%
Hallucinogens	26%	1%
Codeine	25%	6%
Heroin/Methadone	18%	10%

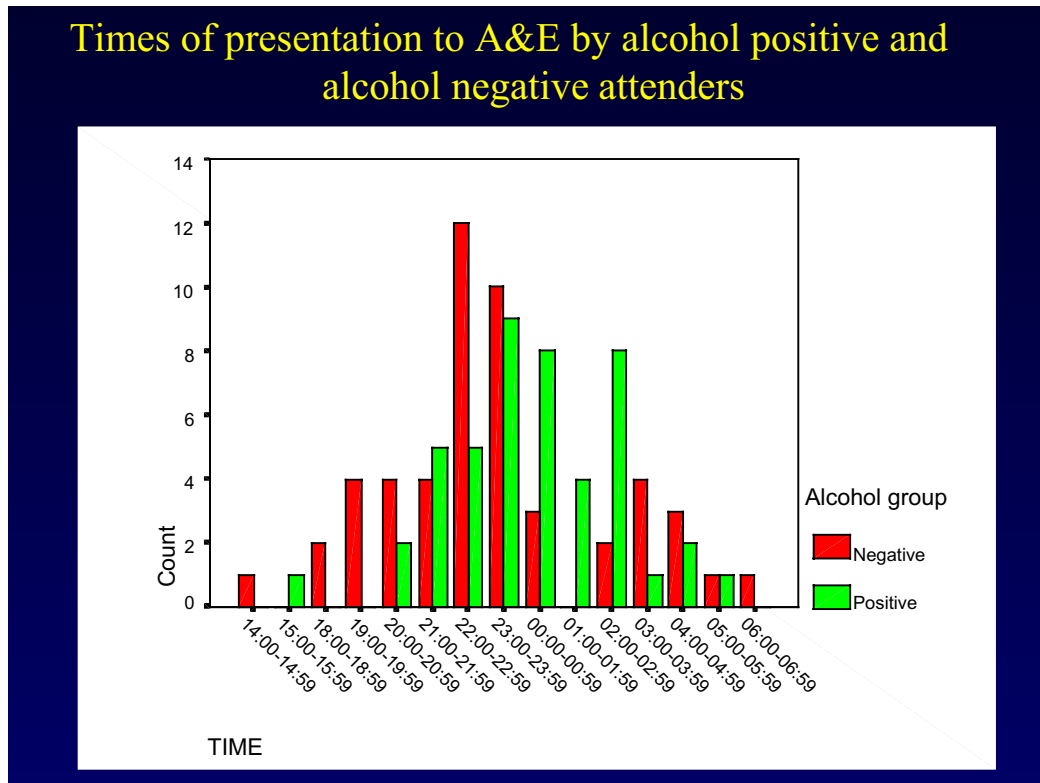
- Drug misuse in the same set of patients was significantly less, around 10-20% across the range of substances. Sedative use was very high (54%) but these drugs are likely to be prescribed to psychiatric patients. Problem drug use was also poorly detected.
- Alcohol misuse was related to an increased risk of suicidal presentation to hospital. 40% of the population who came into hospital had suicidal ideas or had made a suicide attempt before they were admitted. Alcohol consumption was directly related to having suicidal ideas and behaviour.

### Risk of suicidality and alcohol misuse: adjusted odds ratios



#### ACCIDENT & EMERGENCY (Drummond et al, 2002)

- An outpatient study was conducted at St.George's Hospital A&E department in London looking at all admissions between 10pm and 6am on Friday and Saturday night.
- 1/2 of all admissions had a positive alcohol breath test.. 2/3 were over the legal limit for driving (80mg/dl). 1/5 were intoxicated to a toxic level (200mg/dl).



- Most of the alcohol-related attendees were male and many were young.
- 83% of all assault cases, 64% of falls and 100% of collapses were alcohol positive.
- Alcohol-related attendance peaked between 11pm and 12pm and again at 2am, correlating with pub and club closing hours.
- Non-alcohol-related attendance peaks shortly before 11pm, suggesting these people are aware of and consciously avoid what occurs in A&E departments at this time.
- A 24-hour national survey of 36 randomly selected A&E departments across the country, funded by the Department of Health and the Cabinet Office, was recently conducted to study the burden of alcohol-related trauma on hospitals.
- Researchers were measuring blood alcohol concentrations and using shortened versions of an audit questionnaire.
- Around 5000 people were assessed between 8am on a Saturday and 8am on a Sunday morning. Data analysis was not complete at the time of the talk.

#### BRIEF INTERVENTIONS

- Because of the prevalence and frequency of attending, medical settings may be ideal for early detection and interventions. People who have drinking problems visit their GPs about twice as often as those who do not, and attend A&E departments more frequently than the general population.

- Systematic reviews indicate brief alcohol interventions are most successful in primary care settings, usually resulting in a 20-30% reduction in excessive drinking and are relatively cost-effective. American research shows reduced re-hospitalisation and health-care costs following brief intervention.
- Although most evidence comes from primary care, implementing interventions across a range of health settings is likely to have an overall impact, which will have significant public health implications.
- Research shows alcohol interventions are effective in a range of medical settings with a range of drinkers, but brief interventions are better suited to treat early-stage drinking problems, whereas more severe drinking problems are likely to require more intensive treatment.

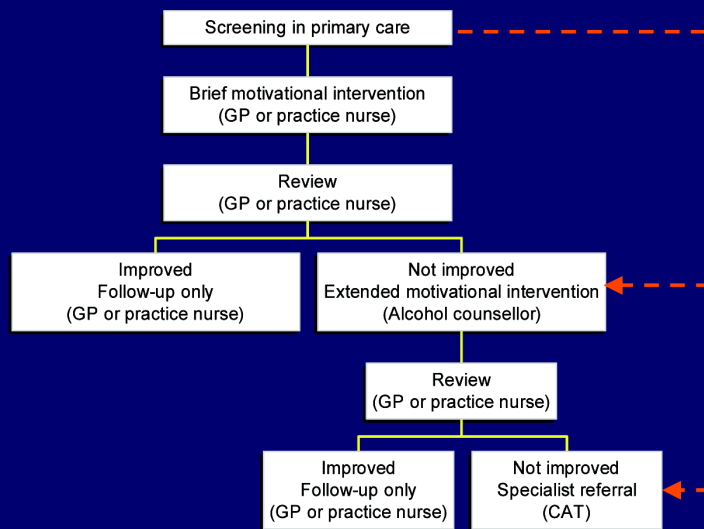
#### PROBLEMS OF INTERVENTION

- There is a very high prevalence of problem drinkers but very low levels of detection.
- One of the major problems is getting doctors to screen patients, detect problems and intervene.
- Potential misusers are the individuals that are most likely to be open to treatment and should be the focus of primary care interventions, but these are least likely to be detected by GPs.
- GPs attitudes form potential barriers to intervention success. Although they generally agree primary care is the appropriate place to carry out alcohol treatment, the majority find problem drinkers difficult to manage. They are considered unrewarding to treat, and GPs felt they were neither sufficiently well-trained nor supported to do this type of work.
- Alcohol interventions are not being implemented in practice due to the attitudes of GPs and the rest of society, lack of primary care training, competing priorities, prior bad experiences with the group, and the gap between research and practice in terms of how effective interventions actually are.

#### STEPPED CARE

- A model of treatment has been developed to deal with problem drinking in primary care settings but also to apply to use in general and psychiatric hospitals.
- *Stepped Care* caters for a range of needs, giving intensive treatment only to those that do not respond to briefer interventions. This type of treatment strategy is already used for a number of other conditions, e.g. high blood pressure and diabetes.
- The *STEPWISE trial* is the first randomised control trial of *Stepped Care*, opportunistically screening for hazardous and harmful alcohol consumption in the primary care setting.
- A practice nurse screens patients and follows up those screened at 6 months to assess changes in drinking behaviour.
- The brief intervention (Step1) is one hour-long behaviour change counselling session with a nurse. The extended intervention (Step2) is four hour-long sessions with a trained alcohol counsellor. The specialist referral to a community alcohol team (Step3) has no limit on intensity and duration of intervention.
- 30% of the 1300 screened were judged to be problem drinkers but only 10% were included in the study. However, this is a significantly higher proportion than in other brief intervention studies.
- Half of those randomised entered *Stepped Care* and the other half received a controlled intervention.
- Almost half of those entering *Stepped Care* did not respond to Step1 and were referred on to Step2. Only 2 of these needed to be referred to Step3, so there is little increase in the numbers referred on to specialist help using this type of intervention.

## STEPPED CARE FOR ALCOHOL USE DISORDERS IN PRIMARY CARE



### CONCLUSIONS

- Alcohol misuse is common in medical settings but is currently seldom identified or treated.
- Some interventions are effective but implementation is very poor.
- It is crucial to have a system available that caters for the full spectrum of users, from the early stage problem drinkers to those with severe dependence. *Stepped Care* has this potential.
- Funding and political will are essential to overcoming the obstacles preventing effective technology coming into practice.

## QUESTIONS & ANSWERS

### **Should there be a national alcohol strategy similar to the national policy on drugs?**

Some political sensitivity is required in forming policies to deal with alcohol because 80-90% of the people who do drink, can do so sensibly and do not have a problem with it. 5 years have passed since the initial consideration of an alcohol strategy, and the necessary policy thinking to identify the nature of the problems, what can be done to reduce those problems and how much needs to be spent on it, is only happening now with the current consultation process.

### **Why is there so little research on alcohol?**

It is very difficult to secure funds from the Medical Research Council for alcohol research. The present existence of an Alcohol Education and Research Council excuses any government obligation to put money into research despite the fact the investment is tiny (£500,000 a year) in comparison to the money spent on illicit drugs. More needs to be spent on alcohol research and treatment services. At present there is a massive imbalance in spending in relation to the relative harms caused by the different substances.

### **Was there any sense of a change in opinion when the STEPWISE trial in the GP practices was completed?**

There was a sense of relief that the trial was completed. Freeing up rooms for the trial was practically very difficult. GP practices are fundamentally target driven. As the trial did not help them to achieve their targets and the alcohol nurses were not allowed to assist in other standard practices, the mindset was not very supportive. Unless targets regarding problem alcohol use and treatment are introduced into primary care there is little incentive for GPs to pursue it, so little is likely to happen.

### **What do you mean by the term 'effective'? How do you decide which terms are used to classify problem drinking?**

Many studies use terms GPs are likely to be familiar with, such as misusers and potential misusers, and avoid terms like hazardous or harmful drinkers, which are preferred by the specialists. People can be defined as hazardous (over 8) or dependent (over 15) drinkers depending on their audit scores. The term 'effective' is misused; most of the brief intervention studies in general practice have been efficacy studies rather than effectiveness studies. When a treatment is described as effective it should mean that it is both cost-effective and clinically effective. More research is required in the normal clinical setting to give a better sense of overall effectiveness.

### **How do we help effective treatments cascade down to patient level?**

A 1-day census in 1996 looked at how many people were attending alcohol treatment in any one day. 10,000 people in Wales were presenting for treatment, 80% of these going to voluntary agencies. Alcohol treatment services across the UK are very patchy and generally not run by specialists. More funds for treatment services, especially those that are evidence-based, are desperately needed. Brief interventions are only effective in some instances, and are best suited for opportunistic situations. It is very difficult to implement stepped care due to a lack of resources and target-driven primary care practice. More resources and higher profile are needed to prove the worth of these interventions.





## TREATMENT STRATEGIES AND INDIVIDUAL DIFFERENCES

JONATHAN CHICK

Department of Psychiatry, University of Edinburgh

The cost-effectiveness of 'screening and brief intervention' for alcohol problems in primary care should not be exaggerated. The research studies found that GPs screened about 1,000 patients in order for 5 to become low-risk drinkers who would not otherwise have done so. For drug users, although even a few sessions of motivational interviewing helps, there appears to be no evidence for one-session 'brief intervention'.

There are effective treatments, psychosocial (including '12 step') and pharmacological, for alcohol problems including for the most severely affected ('dependent'). These treatments can lead to stable abstinence or low-risk use. The evidence for effective abstinence treatment for drug dependence is weaker.

The younger the start of drinking, the more likely it is that the individual will not develop stable personality and social supports. Alcohol can permanently affect the developing (teenage) brain. Early onset of drinking problems is associated with less good response to current treatment. So the next generation of problem drinkers may present more treatment challenges, as well as developing liver cirrhosis and permanent brain damage at a younger age. More pharmacological treatments are in the pipeline.

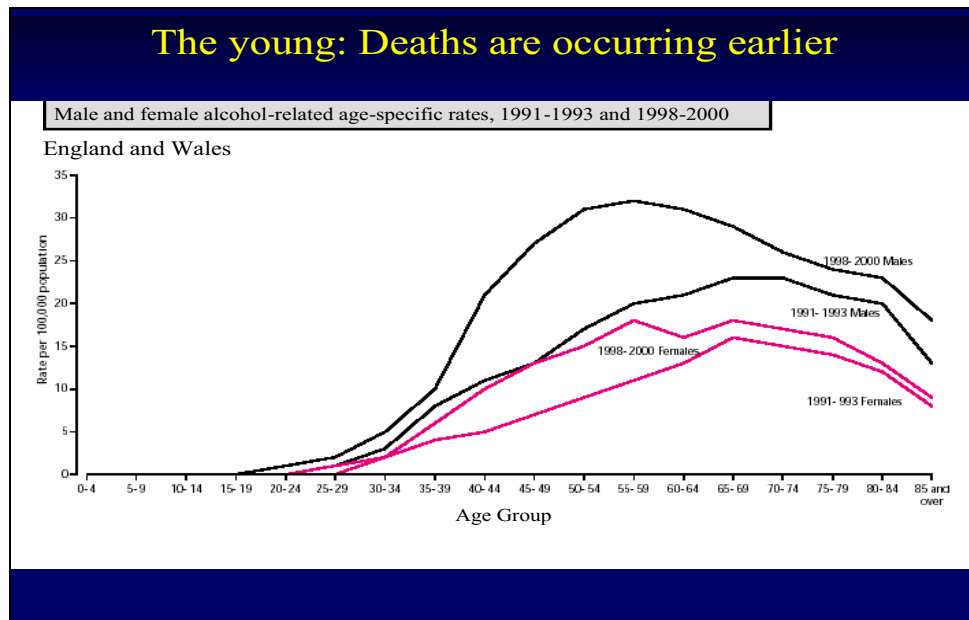
During the last decade, UK drinkers died younger than in the previous decade, many well inside the economically productive age range. Some early deaths are related to young heavy-session drinking. Other deaths are due to dependence.

If effective treatments for dependence are applied, one death can be prevented at a net saving to the NHS of £1,122 for acamprosate treatment, and £3,073 for coping skills therapy, because supplying those treatments to all patients seen spares NHS costs in treating repeated alcohol-related disorders, as well as saving lives. Unfortunately, in the UK, there is a dearth of personnel trained to use existing psychosocial and pharmacological treatments of proven efficacy.

Central spending on prevention and treatment is considerably lower for alcohol than for illicit drugs. Spending per related death is £118,750 for illicit drugs, and £25 for alcohol.

## WORSENING PROBLEM

- Younger people are drinking more and dying at a younger age as a result of their drinking than in the past.
- The peak age of alcohol-related deaths in males was in the 60s in the early 1990s and is presently in the 50s, indicating a considerable shift in a relatively short time-frame. Many more deaths are now occurring between 25 and 40.



- The increase may be due to the fall in the real price of alcohol as a percentage of weekly earnings, e.g. A 30-50% decrease in the price of foreign spirits in Switzerland in 1999 was associated with a 50% increase in the amount of spirits consumed by the under 30s.
- The increase may be due to magazine and television advertising exposure, which predicts increases in teenage alcohol consumption. The British Medical Association supports a ban on alcohol advertising.
- The increase may be contributed to by increased rates of hepatitis C. However, probably less than 8% of those with alcoholic cirrhosis of the liver also have hepatitis C.

## TREATMENTS

- The effectiveness of treatments for alcohol dependence has been formally assessed by NHS Quality Scotland.
- Some dependent patients sustain improvement without interventions as shown by follow-up studies in the community. However, when treatment is offered the success rates, in terms of one-year abstinence from alcohol, are approximately doubled.
- The 12-Step approach adopted by Alcoholics Anonymous is effective, but its success is difficult to quantify because there have been no randomised control trials. When compared to other psychological treatments over a three-year period, those introduced to AA fare well.
- The one-year success rates of most British treatment studies are very low, only 15% managing to stop drinking or curb drinking to sensible levels.
- Most studies have shown both naltrexone and acamprosate to be fairly effective treatments for alcohol dependence.

- Acamprosate is thought to modulate GABA-glutamate disturbances. Many high quality studies have tested its effectiveness but the improvement overall is not large.
- Naltrexone reduces endorphin activity by blocking their receptors. It is used to treat hard drug addiction, but is only effective if administered under supervision. Its use in alcohol dependence in the UK has to be off-license. A monthly injectable naltrexone has successfully completed initial trials.
- It is not yet clear for whom these treatments work best, and which adjunctive treatments might be needed.
- Psychosocial treatments are the most effective treatment for alcohol dependence. Behavioural therapy teaching life and coping skills shows people how to communicate better, handle stress and anxiety, and use alternatives to drinking to help them relax.
- Motivational interviewing, marital and family therapy and behavioural self-control training are also well supported by evidence.

<b>Number of patients pooled for the meta-analysis</b>		<b>% abstinent or controlled drinking (study duration varies)</b>
Basic Support : typical one year outcome in UK		15%
Acamprosate	4259	26%
Naltrexone	2112	21%
Unsupervised disulfiram	486	19% not sig. diff from control
Coping skills training	631	27%
Behav. self-control training	276	24%
Motivational interviewing	154	25%
Marital/family/community reinforcement therapy	742	26%

Meta-analysis (published & unpublished data) of studies with 'support' or no-treatment controls, and categorical outcome data reported.

## COSTS

- In a cohort of 1000 patients, the net cost saving of coping skills therapy is estimated to be £274,000. The net cost saving for acamprosate therapy is estimated at £69,000, despite the cost of the drug itself and the doctor prescribing it.
- When calculating the economic costs of alcohol dependence, it is assumed that patients who attain one year's abstinence do not incur later alcohol-related health costs.
- Effective treatments give net savings due to lower subsequent hospitalization and other psychiatric and physical disease-related costs.

**The cost of dying of end-stage liver disease.  
153 patients followed for 5 years 1991-5**

- 129 patients with esophageal varices had 202 admissions over 5 years (mean 13.7 day @ \$30,980)
- 38 died after 24 days with a mean charge of \$67,091
- 7 died on admission at \$110,576 per admission
- 17 had transjugular intrahepatic portosystemic shunt @ \$43,209
- 6 had surgical shunt @ \$53,994
- 7 had liver transplantation @ \$222,968

**36.7% of all charges were for patients who died during the 5 years**

*(Wong et al Arch Intern Med 1997, 157:1429-32)*

- There are few treatments in the Health Services that save lives whilst saving money. The net health care saving per death averted is £3,073 for coping and social skills training, £2,388 for marital and family reinforcement therapy, and £1,122 for acamprosate therapy.

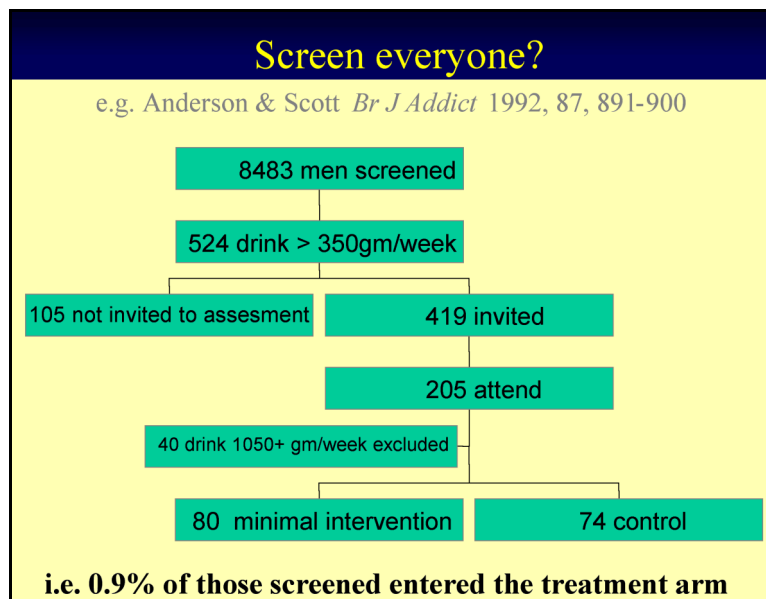
- Central spending on treatment and prevention of alcohol is £1.1 million compared to £95 million for the illegal drugs.
- About 40,000 deaths a year are directly related to alcohol compared to only 800 deaths a year related to illegal drugs.
- Therefore, central spending on treatment and prevention is grossly disproportionate: £118,750 per death for illicit drugs compared to £25 per death for alcohol.

#### MISDIRECTED SPENDING

- Prescriptions for antidepressants (such as Prozac) are one of the largest single costs on the NHS drug bill. 1 in 3 or 4 alcoholics newly referred to the Alcohol Problems Clinic have already been prescribed an antidepressant by the GP. This is not only the practice in the UK. For example, the chauffeur driving the car in which Princess Diana died was reported to be taking tiapride, a drug prescribed in France specifically for alcoholism, and Prozac.
- Antidepressants are not effective treatments for problem drinking. They only help those with a primary underlying depressive illness, or perhaps those with 'late onset' alcoholism.
- Prescription of antidepressants may worsen 'early onset' patients (those whose regular or problematic drinking commenced before the age of 25).

#### BRIEF INTERVENTIONS

- When patients are screened and those drinking at risk (e.g. over 3 pints of beer a day) selected, a brief discussion and non-judgemental advice increases the number who 6-12 months later have reduced their drinking to non-risky levels.
- Such brief interventions are not sufficient for patients who are actually seeking treatment. They have probably already been offered advice by family, friends or their GP.



- The NNT is the Number Needed to Treat for one more patient to reduce consumption to non-hazardous levels than in the control group.
- For brief interventions the NNT is 7-9, which compares favourably with treatments for other medical conditions, e.g. the NNT is 30-90 for statins to prevent cardiovascular mortality following myocardial infarction.
- The NNS is the Number Needed to Screen for one patient detected in the screening to reduce consumption to non-hazardous levels. From three British studies screening everybody that came into contact with primary care, less than 5% of those screened met the criteria and entered the treatment arm. For an NNT of 8, it means that out of every 1000 people screened, only 6 would become low-risk drinkers who would not otherwise have done so, i.e.  $NNS = 6/1000$ .
- The Scottish SIGN guideline favours 'targeted' screening, for pragmatic and cost-effectiveness reasons, in preference to the screening of whole primary care populations.
- In hospital settings, brief interventions by nurses have tended to show modest effects. For example, counselling in a motivational style by a nurse for those presenting with alcohol-related facial injuries resulted in reduction in alcohol consumption at 3 and 12 months post-accident.
- Brief interventions for drug users are less well researched and seem not to be particularly effective. In a study of hospitalised psychiatric patients with a psychiatric illness, neither an individual motivational interview (30-45mins) nor a self-help booklet reduced cannabis use. There was a modest short-term effect of the motivational interview on aggregate drug and alcohol use.
- Brief interventions are not sufficient to treat established alcohol problems or dependence. A 2-hour motivational intervention failed to alter recurrent drinking behaviour in alcoholics with gastro-intestinal disease.
- Those already with a severe degree of illness seeking treatment require referral to more specialised help. In established problem drinkers detected in general hospitals, the results of referral to specialised treatment were significantly better than a single risk-reduction counselling session.

## QUESTIONS & ANSWERS

### **To what extent are coping skills protective against alcohol abuse?**

The only approach in educating young people in schools which has been shown to have a preventative effect in future drug or alcohol use, is a coping skills approach. It is expensive but effective. The Alcohol Education and Research Council is interested in developing life skills training. Well-developed coping skills are likely to be beneficial in other aspects of society such as employment.

### **Where is treatment presently being directed?**

The number of non-dependent but excessive drinkers is vastly greater than the number of dependent patients. Behavioural self-control training is effective in dependent and non-dependent drinkers at an early stage. However, there is a great shortage of trained people to provide this treatment. The focus is on treating those with established alcohol dependence. If this treatment could be extended to heavy drinkers, the potential economic savings are huge, although heavy drinkers may not be committed to following an 8-week programme in coping skills training if they have not reached a point where they perceive immediate pay-off.

### **Does trial design contribute to the worryingly low NNS figures?**

The high NNS in the brief intervention literature is because whole practice populations were screened. Having to screen every person that enters the primary care system is seen as a burden to some primary care staff. The staff used in some trials may instinctively have felt this would not be cost-effective, creating some resistance. And, of course, dependent drinkers were excluded. On the other hand, encouraging staff to use their clinical skills in regular clinic work and providing them with relevant training is more effective. There are no figures on the accuracy of extrapolating from these research results to real life.

### **What interventions are likely to be effective for young people?**

Most young people are first given alcohol by their parents, it being regarded as an acceptable social custom. Parents condone alcohol because they prefer their children to drink rather than take drugs. Purposeful alternative leisure activities can direct children away from the drinking culture. In universities and colleges in North America and Sweden, research has shown the effectiveness of screening and brief intervention for heavy drinkers. Keeping price relatively high in premises where young people drink reduces the amount consumed.

### **Is there any evidence of the efficacy of the courses convicted drink drivers do to regain their licences or shorten their sentences?**

The Department of Transport has been trying to evaluate course efficacy but without randomised controlled studies. These courses have been running for several years now and in terms of recidivist rates, they may be having some effect. More serious drink drivers ('High-risk offenders') are given a medical test before their license is fully restored, encouraging them into formal treatment to regain their licenses. They are mainly alcohol-dependent. More evaluation is needed to gauge real levels of success.

# THE ECONOMICS OF ALCOHOL COMPARED TO OTHER DRUGS

CHRISTINE GODFREY

Professor of Health Economics at the University of York

Economic analyses of alcohol and other recreational drugs can be broadly divided into three areas: analysis of markets, especially the role of price and other factors on consumption patterns; studies estimating the costs of different substances to both the individual and third parties; and the economic evaluation, that is value for money of different policy interventions. In examining the evidence in these three areas, there tend to be more similarities between the substances than differences. Indeed alcohol has generally been found to be a complement rather than a substitute for other drug use. Perhaps the most diverse findings are found in social cost estimates of various substances, not so much in the total sum but how these costs vary across different types of impacts.

Summarising the harm in economic terms, however, depends crucially on the view taken on which “harms” and “benefits” are included, and the values put by society on some of these individual items. The presentation will give a brief overview of current research and findings across these three areas of economic analyses, and highlight some of the major issues that impact on policy debates.

Much of the innovative empirical research does appear in the National Bureau of Economic Research working paper series before being published in refereed journals. The web site giving more information is <http://www.nber.org>. The National Institute of Alcohol Abuse and Alcoholism also has a good database of economic studies covering the three areas of economic analysis covered in the presentation. Full references to the studies mentioned in the presentation are available on request.

#### HOW DOES THE PRICE OF DRUGS AFFECT CONSUMPTION?

- Evidence gathered from statistical analysis of sales data, individual data and experimental studies suggests price has a definite impact on alcohol consumption.
- The UK overall price elasticity is approximately  $-1$ , meaning a 10% increase in price leads to a 10% decrease in consumption. This evidence is particularly strong for the impact of price on young people and binge drinking.
- US students faced with higher prices were found to be less likely to make the transition from abstainer to moderate drinker and from moderate to heavy drinker.
- There is a large amount of evidence suggesting the effect of price on consumption of tobacco, but it is a smaller effect than for alcohol.
- There is accumulating evidence on the impact of price on the consumption of other drugs.
- It is important to consider that polydrug use is the norm, and most evidence suggests that drugs are complements, that is the fall in the price of one drug will increase consumption of both that and other drugs.

#### HOW DOES PEOPLE'S INCOME AFFECT CONSUMPTION?

- Income is a major factor influencing the consumption of alcohol.
- Income has less effect on the consumption of tobacco.
- There is little evidence about the impact income has on the consumption of other drugs.
- It is particularly difficult to estimate the effect of income on consumption in younger users who often do not have regular salaries.

#### HOW DOES INFORMATION ON THE EFFECTS OF ALCOHOL AFFECT CONSUMPTION?

- People tend to overestimate the risks of smoking and drinking alcohol.
- People tend to be confused and ill-informed about the short-term risks of alcohol and illicit drugs.
- Influence from peers and the family is a major factor affecting substance use.
- In young men, forming families is the most protective factor in reducing binge drinking.

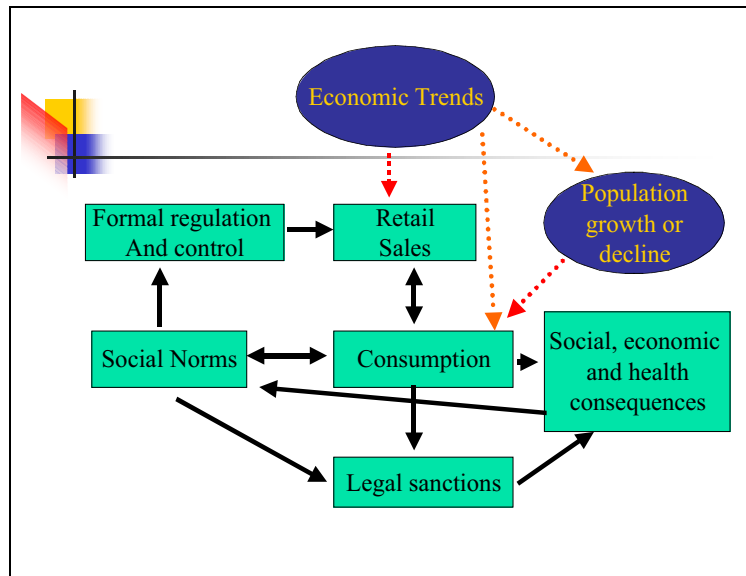
#### HOW DOES ADVERTISING AND MARKETING AFFECT CONSUMPTION?

- Images used tend to merge across alcohol and other recreational drugs.
- Illicit drugs have some marketing aspects.
- The tobacco debate highlights the government's role in restricting harmful behaviour.
- One study in the US suggests that a complete ban on alcohol advertising would reduce binge drinking by about 42% in young people.

#### HOW DOES SUPPLY AFFECT CONSUMPTION?

- The black market and smuggling are historical features of alcohol and tobacco markets, but there are few studies comparing legitimate and illegal markets.
- Global markets adapt to consumers' needs and demands, illicit markets adjusting even quicker than legal ones.
- Market interactions are important with the potential for policies to have unintended consequences, so a full system model is essential. Population growth and decline, economic trends, retail sales, legal sanctions and moral values are all involved.





Source: Holder (1998)

#### WHAT ARE THE COSTS OF DRUG USE?

- Social costs are equivalent to the individual's private costs plus external costs caused by their behaviour.
- Rational behaviour should consider all costs but people tend not to be aware of all the consequences of their actions.
- Social costs include premature deaths, unemployment and social disability, and victim costs.

#### ALCOHOL

- Major cause of avoidable loss of life years
- External costs, e.g. accidents, violence / public disorder
- NHS burden, especially hospital care
- Reduction in productivity.

#### TOBACCO

- Large number of premature deaths- 120,000 a year, but of an older average age than alcohol-related deaths
- Large NHS costs for smoking-related diseases- estimated at £1.5 billion
- External costs, e.g. passive smoking health effects in home and workplace, fires and accidents.

#### ILLICIT DRUGS

- The World Health Organisation places illicit drugs 17<sup>th</sup> on the scale of the world's greatest social costs, whereas alcohol is 5<sup>th</sup>.
- Class A drugs users are the most costly to society
- Social cost per young recreational user- £36-£72 per year
- Social cost per older regular user- £3-£6 per year
- Social cost per problem user- £35,455 per year
- No data on some external costs, e.g. workplace, driving.

## WHY DO WE NEED POLICIES TO DEAL WITH RECREATIONAL DRUGS?

- Policies can be *population based* (e.g. tax, advertising controls etc.), *problem based* (e.g. drink driving, needle exchanges etc.) or *face to face* (e.g. treatment, brief interventions).
- The consequences of successful policies include positive changes in the quality and quantity of life of the individual and their family, and benefits plus averted costs to third parties. However, policies can also have unexpected adverse side effects, which need to be considered.

## WHAT POLICIES MIGHT REDUCE CONSUMPTION?

### ALCOHOL

- There is good evidence to support the impact of increasing taxes and reducing availability.
- There is less support for school education and other information-only policies.
- There is good evidence that advertising restrictions are effective, but this is a very controversial area.
- There is good evidence for routine brief interventions, but these prove difficult to implement.
- There is a range of available treatment interventions which have the potential to be cost-effective.

### TOBACCO

- There is good evidence to support the impact of increasing taxes.
- There is good evidence to support positive effects of treatment at an individual level.
- There is less support for school education and other information-only policies.
- There is good evidence that advertising restrictions are effective.

### ILLICIT DRUGS

- Treatment is the most cost-effective and most cost-saving in social terms.
- The present political emphasis is on education and law enforcement, but there is little evidence to support this approach.
- There is some US evidence that the overestimation of health risks reduces cannabis consumption.

## QUESTIONS & ANSWERS

### **Is there any impact of the Channel Tunnel on the price of alcohol?**

It does not have as big an effect on the price of alcohol as it does on tobacco because alcohol has a large volume, making it difficult to transport. There is considerably more value in a much smaller volume with cigarettes. Any effects are more prevalent in deprived communities where income is stretched and there is greater motivation to buy from unauthorised vendors. Teenage and binge markets are also likely to create hotspots for illegal trafficking.

### **Does the high price of alcohol in some countries affect rates of problem drinking?**

The high price of alcohol in Scandinavia does impact on the levels of drinking; the overall rates of alcohol dependence are significantly lower in Scandinavian countries than in the UK.

### **Is the price elasticity talked about general to all types of alcohol?**

Customs and Excise have just published a new analysis, which suggests the impact of the reduced prices in supermarket affects not just wine but beer and spirits consumption too. Other price elasticity studies have shown that the effect is specific to the consumption of wine, not beer and spirits.

### **Alcohol prevalence rates are coming down in continental Europe while they are going up in the UK. Alcohol is lower-taxed in many parts of Europe than it is in the UK. How can we reconcile these two findings?**

European tax levels are on the increase and there is not as much of a gap between the UK and the rest of continental Europe as there used to be. In France there are many other reasons why alcohol consumption is reducing, including social factors such as family unit stability and divorce. The treasury would not lose a great deal of money if it were drastically to increase the taxes on alcohol, but the health service would make immense savings from the related reductions in health problems caused by alcohol misuse.



# WHY ALCOHOL IS LEGAL AND OTHER DRUGS ARE NOT

VIRGINIA BERRIDGE

London School of Hygiene and Tropical Medicine, University of London

Current licensing legislation means that alcohol is subject to a whole set of legal controls, so why can you buy a drink in a pub yet need a doctor's prescription for an opiate? At different times in history and in different societies, the legal and regulatory control of drugs has varied. Both laudanum and beer were available over the counter in the first half of the nineteenth century. Now the opiates and alcohol are the subject of different systems of control and their cultural positioning differs radically.

What has led to these changes? Are they simply the rational result of the relative harmfulness of the substances? Or has a wider range of factors been at work?

This presentation outlines seven key issues which have helped determine these historical changes and looks at how a better understanding of them can be applied to present day strategies.

The issues are:

- Cultural positioning and 'tipping points'
- Activism and social movements
- Building alliances – the role of medicine
- Technology and markets
- Vested interests
- Internationalism
- The role of science and the state

The paper finishes with a discussion of moderation, harm reduction and convergence of substance use policies, with some options and models drawn from the historical discussion.

## THE ROLE OF CULTURE

- Some drugs have become less culturally acceptable over time, while others have become more so.
- In 18<sup>th</sup> century society drinking culture was endemic and alcohol was built into the fabric of social life. It played a part in nearly every public and private ceremony. The *Gentleman's Magazine* recorded 87 idioms for drunkenness, ranging from the genteel 'sipping the spirit of Adonis' down to the vulgar 'stripping me naked'.
- Opiates were similarly accepted and there was no differentiation made between their medical and non-medical uses. In England you could buy opiates over the counter until the 1860s, in the same way as alcohol. Laudanum (opium dissolved in alcohol) was used as a semi-medical / semi-recreational pick up. It was accepted that many people of all classes took opium as a matter of course: Gladstone and Queen Victoria were among them.
- Over the next 150 years opiates became less culturally acceptable, whereas alcohol became, if anything, more popular.

## ACTIVISM AND SOCIAL MOVEMENTS

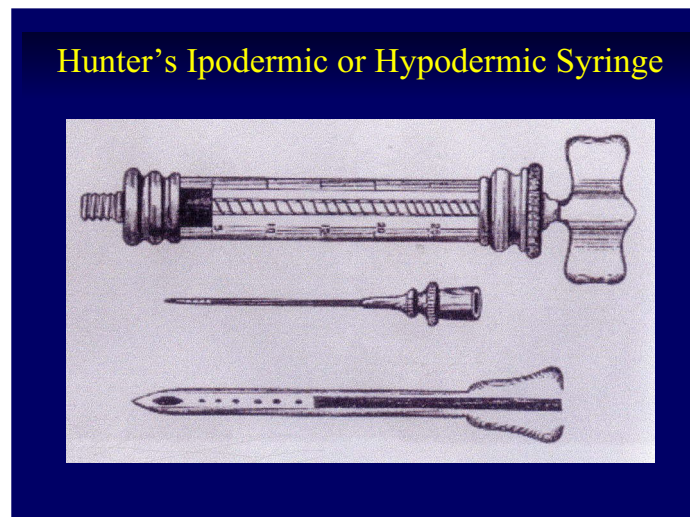
- The construction of anti-substance sentiment and the role of activist movements and organisations have been instrumental in policy formulation.
- Temperance is the great exemplar of anti-substance activism for alcohol. Temperance meant different things at different times. It originally meant the notion of moderate living rather than total abstinence from spirits.
- Temperance was a mass movement with a clear political agenda. It was initiated by the middle classes with a focus on spirits, but later became a working class movement after the failure of wider political reform through the Chartist movement.
- By the end of the 19<sup>th</sup> century, the temperance movement had shifted from the elimination of all drink to the reduction of licences; and to a focus on temperance education as part of social hygiene.
- The anti-opium movement was an allied, but never such a strong force in the British context. The issue of concern in the UK was the Indo-Chinese opium trade rather than problems associated with home consumption.
- So why did opium end up more restricted than alcohol?

## THE ROLE OF MEDICINE

- Activism is a matter of alliances and in these alliances medicine has been important.
- Until the mid 19<sup>th</sup> century, the medical profession had a strong belief that drink was good for you, and many medical preparations contained alcohol. Pharmacists often held alcohol licences and drink was regularly prescribed, as shown by hospital and infirmary records.
- A medical opinion hostile to alcohol began to emerge - dating back at least to 1804 when Thomas Trotter published his *Essay, Medical, Philosophical and Chemical on Drunkenness*. Trotter called the habit of drunkenness a disease, to be managed by the discerning physician.
- At the end of the century these beliefs coalesced into the scientific specialism of inebriety, later addiction. Many of the doctors involved were both medical professionals and temperance supporters.
- Opiate use was not considered harmful because moderate users could maintain good health and continue working. However, the moderate use of opium eventually disappeared into the medical concept of 'maintenance,' while the moderate use of alcohol, part medical, and part social, retained greater legitimacy.
- The development of a medical model for the opiates, reinforced by the introduction of the hypodermic syringe, made their recreational use less culturally acceptable. Addiction and medical-only utility became firmly established for the opiates, while a more blurred picture remained for alcohol.

### THE ROLE OF TECHNOLOGY

- Technology had a differential impact on these substances in the 19<sup>th</sup> and early 20<sup>th</sup> centuries.
- For the opiates the advent of the alkaloids (morphine and codeine) in the early 19<sup>th</sup> century, and of the hypodermic syringe in the 1840s, lead initially to the development of a more medicalised model, and restricted use by the mass market.



- For alcohol, as with smoking tobacco and the advent of the cigarette, technological change meant an amplification of the mass market and the ability to produce and market a standardised product.

### THE ROLE OF VESTED INTERESTS

- Alcohol taxes were crucial in both core and peripheral regions of the modern world. They were the bedrock of western finance and also supported many colonial governments in Africa and Asia.
- The alcohol industry had a size and fiscal importance in western nations that dominated the world's economic and diplomatic affairs. The French alcohol industry affected the livelihoods of 5 million people in the early 20<sup>th</sup> century, or roughly 13% of the French population.
- Industrial interests were allied with political interests from the early 20<sup>th</sup> century onwards.
- Here we can draw a contrast with the opiates. By the end of the 19<sup>th</sup> century, the pharmaceutical industry was becoming established, but the general production and trade in opium and coca products was still small in comparison to the alcohol industry.
- Alcohol could be sold and produced internally by the industrial nations, unlike coca and opium, which could not. Poor nations and colonies in South-East Asia grew most of the opium. Peru and Java accounted for most of the coca.
- A handful of industrial nations manufactured morphine and cocaine. Germany was the world's major producer of cocaine, and Britain the main manufacturer of morphine. Just before World War 1, both countries resisted international regulation of these substances, but they worked through the Board of Trade rather than any political alliance.
- The producer and industrial interests for drugs were in general more limited, both geographically and in terms of power bases, than those for alcohol.

## THE ROLE OF INTERNATIONALISM

- Internationalism was, and remains, a key feature of anti-substance alliances, but there are crucial historical differences between drugs and alcohol in this area.
- In 1878, the first international alcoholism congress was held in Paris. In 1906, the first international association was set up and located in Lausanne where, as the ICAA, it still sits.
- The closest approximation to an international effort was the regional control system set up through the anti-slavery provisions of the General Brussels Act of 1889-90, but alcohol was never a serious candidate for overall international regulation.
- American efforts, prompted both by missionary concerns and strategic imperatives, helped to transmute a draft regional system, set up by the Shanghai Opium Commission in the early 1900s, into a nascent worldwide drug control system before WW1.
- Since the 1920s there has existed a worldwide control system for the opiates, which has dominated and helped to determine systems of domestic regulation.
- Germany and Britain resisted regulation, but the post-war settlement saw export controls instituted under the supervision of the League of Nations.
- The trade control system changed after WW2, under American influence, into a strongly prohibitory regime whose impact continues to be felt in illicit trade and domestic drug control legislation.

## THE ROLE OF THE STATE

- The state has had different interests in both sets of substances, through licensing and taxation for alcohol, and through medical and penal forms of control for other drugs.
- The late 19<sup>th</sup> century moves for compulsory institutional confinement and treatment of the inebriate aimed to substitute a medical for a penal view of alcohol misuse.
- Different forms of control deserve evaluation. Greater restriction is not always a failure. State restriction has been shown to be effective for alcohol, e.g. during WW1 alcohol was restricted, due to its association with industrial inefficiency. The work of the Central Control Board produced significant decreases in prosecution for drunkenness offences and in cirrhosis of the liver.
- The impact of increased regulation was further demonstrated in America under Prohibition in the 1920s. In its early years this experiment was successful in changing patterns of working class drinking and had widespread popular support.
- The post-WW1 years saw a different, medical system put in place for opiates. The Rolleston Report of 1926 legitimised a medical system of control-maintenance prescribing for the opiates, replacing the former OTC system of regulation, which had some parallels with the licensing system for alcohol.

## WHAT CAN WE LEARN FROM HISTORY?

### CULTURE AND 'TIPPING POINTS'

- Cultural 'tipping points' (how something 'smart' can become 'unsmart' or the other way round) are important and cultural change can be achieved. For instance, spitting in public moved from being acceptable to unacceptable.
- The cultural positioning of smoking tobacco has changed significantly since WW2.
- Cultural tipping is likely to be a difficult process for alcohol as demonstrated by the failure of the Russian anti-drinking campaign. There is no sign of alcohol becoming a 'loser's drug,' like tobacco or the opiates. If anything, 'skid row' behaviour is now glamorised.
- The history of drink driving offers a model of cultural change in the alcohol field. It indicates the potential for positive change and is a success story for public health activism allied with science.



#### THE ROLE OF ALLIANCES AND OF ACTIVISM

- Renewed concern about drinking has fuelled a 'new temperance movement' since the 1970s, but there is little similarity with the 19<sup>th</sup> century mass political movements.
- The 20<sup>th</sup> and 21<sup>st</sup> century activist model is media-focussed, e.g. ASH for tobacco in the 1970s was the first exemplar of the new style of public health activism.
- The unit drinking strategy and drink driving awareness may be the greatest successes of the alcohol-related public health campaigns.

#### INTERNATIONALISM

- A strong international dimension has been introduced by the World Health Organisation.
- Scientific theories have been important at the international level, and public health concepts have been disseminated in preference to formal international controls.
- The most recent international dimension of significance is the impact of international trading treaties which prevent, rather than promote, greater alcohol controls.

#### THE ROLE OF SCIENCE AND THE STATE

- The public health movement relies primarily on science, in population-focused epidemiology and the concept of risk. But science and policy-making have been locked into reinforcing relationships.
- The recent focus on high-risk drinking has also brought revived interest in genetics and heredity.
- Some see it as regrettable that the earlier focus on disease, which gave an unambiguous public message, has been dropped.
- The 'policy community' around alcohol has changed, as has its influence. The 'Think Tank' report of the late 1970s, recommending a broad approach to the reduction of consumption, was never officially published. It was replaced by a document (*Drinking Sensibly*), published in 1981, which took a more circumspect view.
- Present high-risk drinking concern impacts considerably on health and criminal justice departments.

#### MODERATION, HARM REDUCTION AND CONVERGENCE

- Recently there have been moves for a policy of convergence, bringing the substances together, thereby offering the best option for controlling intractable problems and social issues.
- Moderation shows some of the difficulties of this approach. Moderation has been successfully defended as a strategy in the alcohol area.
- Moderation has been less acceptable for drugs and smoking tobacco. Safer smoking was a policy objective in the 1970s, which was phased out in favour of total abstinence. Harm reduction for drugs has been controversial.
- There are areas of similarity in response to drugs and to tobacco. Some of the features of current tobacco control bear resemblance to past developments in drug control, most notably international conventions and ideas about addiction, e.g. nicotine patches equate to methadone prescription.
- As smoking tobacco declines so the smoking of cannabis increases in popularity. There is a cultural balancing act over these substances.
- There is convergence between drugs and alcohol in the increasing overlap between health and criminal justice interests in both areas.

## CONCLUSION

- There are a number of questions which need to be asked in relation to history.
- What is the role for activism today in changing drinking culture? Can we draw from the temperance models?
- Can increased regulation have an impact as it did during WW1 and the 1920s?
- What is the interplay and balance between culture and regulation?
- Substances pass through cycles of consumption. The impact of policies on the rise and fall of substance use may be limited.

## QUESTION & ANSWERS

**Is there any historical reason that the legal age for drinking is 18 in England and 21 in the US?**

In Britain the legal age for drinking alcohol is 18, due to changes that occurred during the First World War. In all states in the US the legal age for drinking has been increased to 21. A recent evaluation of this legal change has estimated that it has contributed to a saving of 17,000 lives (Voas et al, 2003).

**Why did alcohol remain legal when other drugs were made illegal?**

It's not the case that drugs became illegal. The internationalization of the Hague Convention of 1912 was decided as part of the Versailles peace treaty at the end of WW1. The Convention covered cocaine and the opiates and required a system of domestic drug control legislation. But this was not necessarily a system of prohibition. In Britain what emerged was a system of control of supply organized primarily through the medical profession as gatekeepers i.e. the prescription pad was the mode of control. Possession through medical prescription was the key.

An alliance developed between the Home Office with its criminal justice interests and the medical profession's treatment interests. Up until the 1960s maintenance prescribing operated as a form of medical moderation. The harm reduction movement in the wake of HIV/AIDS has brought a revival of interest in moderation strategies like safe injecting and prescription of opiates.

Alcohol controls remained largely non-medical and there was never a system of international control of supply in the way in which this was initiated for drugs.



## TOWARDS A PRAGMATIC POLICY

### HAZEL BLEARS MP

Minister of State for Crime Reduction, Policing and Community Safety.  
Sponsor Minister for Alcohol Strategy

#### WHY DOES GOVERNMENT NEED AN ALCOHOL STRATEGY?

- Over 90% of adults in Britain - nearly 40 million people - drink alcohol. The majority do so with no problems most of the time. However, alcohol misuse brings with it significant harms, both to the drinker and to others.
- The government has a commitment to produce an alcohol harm reduction strategy for England by 2004.
- There is a need to look into a breadth of issues and feed the results of research and discussion into a policy-making process to develop the new alcohol strategy.
- A wide group of stakeholders is involved in the identification of the problems, including the police, medical experts, the business sector, and voluntary and community groups, in order to improve the dissemination of information and the testing of evidence.

#### THE ALCOHOL CULTURE IN BRITAIN

- The English drink more than the Swedish but less than the French or Irish.
- 5.1 million men and 3.1 million women presently drink more than is recommended by the Chief Medical Officer.
- Consumption of alcohol has risen since the 1950s but is still 25% less than in 1900.
- Alcohol is consumed more often than in the past, with both sexes, but especially women, drinking on more days of the week than before. One in four women now drinks on three or more days per week.
- The increase in problem women drinkers is particularly worrying. Nearly twice as many women now drink above the sensible guidelines as did in 1988.
- Problem drinking is increasing in young cohorts aged 16-25 and the rise is particularly sharp in young women.

#### WHAT ARE THE HARMS CAUSED BY ALCOHOL? WHAT IS THE SCALE OF THESE HARMS?

- There is a clear statistical link between the amount drunk and the indices of harm, such as accidents and cirrhosis of the liver.
- To maintain a balanced view, the positive aspects of alcohol, people's enjoyment of drinking and the cultural aspects of bringing people together, must also be considered.
- There are four major categories of harm: health, crime, productivity and social harms on communities. Alcohol problems do not create these harms but increase the risk of people suffering them.
- Alcohol is widely enjoyed by society and is a major part of the economy. One million jobs depend on the alcohol industry.
- Alcohol use is embedded in our culture. Alcohol is drunk to mark special occasions and much of our language and culture is connected to drinking.

## HEALTH

- Health problems include cirrhosis, strokes, heart disease and alcoholism, contributing to very large numbers of deaths.
- 30,000 people are estimated to be heavily dependent on alcohol. The ill effects of drinking are becoming apparent in much younger people.
- Acute problems include increased chances of accidents, usually in young drinkers, and alcohol poisoning.
- There is, however, some evidence to suggest low volume drinking protects against heart disease.

## CRIME AND DISORDER

- It is difficult to provide evidence that alcohol use *per se* causes crime and disorder.
- Alcohol consumption is very common in cases of physical harm and violent crime. It is implicated in three-quarters of all stabbings and nearly half of all violent incidents.
- Alcohol is linked with nearly 360,000 incidents of domestic violence each year.
- 25% of the population are concerned about the effects of alcohol on public order.
- Alcohol makes a significant contribution to worries about crime and safety, contributing to a perception gap between crime rates and how safe people feel in their communities.
- Drink driving is much less prevalent than 30 years ago but there has been a slight upward trend recently, so it is not possible to be complacent.

## PRODUCTIVITY

- Alcohol causes a major loss of productivity through premature deaths, lost jobs, short-and long-term sickness absence, and stunted careers.

## SOCIAL HARMS

- Alcohol has many effects on problem drinkers' lives and the lives of their families. Children of heavy drinking parents are much more likely to have problems, both in childhood and later in life.
- The impact on policing is enormous with massively increased costs as police resources are diverted into simply maintaining public order in city centres.

## WHAT TURNS DRINKERS INTO PROBLEM DRINKERS?

- Particularly vulnerable groups in society should be a clear focus for interventions.
- The number of young binge drinkers is on the increase, and are particularly susceptible to the acute dangers of alcohol.
- Regular very heavy users, usually men in their late 30s and 40s, are also a problem group. They often have difficulty holding down jobs and their drinking is likely to have a large impact on their families and home lives.
- Those with complex needs including the homeless, those in care, and people going in and out of prison are an extremely vulnerable group. Alcohol and often polydrug abuse are a real issue for this group.
- There is some evidence that problematic drinking behaviour has begun to extend beyond a phase of youth.
- There are a host of pressures and factors that affect the choice to drink, e.g. personality, attitudes and beliefs, surrounding culture, ethnicity, age, gender, family status, life experiences, etc.
- Drinking behaviour is also driven by factors within governmental control such as the price and availability of alcohol, and the nature of drinking establishments and advertising. The interaction and impact of all these factors is almost impossible to predict.

## PRINCIPLES OF FORMING A GOOD POLICY

- Policy needs to be practical, affordable, acceptable and possible to implement.
- Recommendations need to be robust, defensible and evidence-based because there are some powerful vested interests in the alcohol market.
- Policies need to reflect the reality of cultural issues and acknowledge the present situation in which drinking is an accepted activity.
- There exists a need to target the real harms to the individual and the wider community, including premature deaths, ruined lives, and drunken behaviour in town centres.
- There will be a large amount of debate on what approach to adopt. A whole population approach attempts to lower the levels of people's drinking in general. A targeted approach targets those for whom drinking is a particular problem.
- Evidence must be gathered from diverse sources because the strength of the strategy depends on the rigour, weight and credibility of the evidence that underpins it.

## WHAT INTERVENTIONS ARE LIKELY TO BE EFFECTIVE?

- Adopt a multi-strand approach, incorporating evidence from all areas, because there are no quick fixes and long-term objectives must be considered.
- Target interventions at transitional periods in people's lives.
- Convince the alcohol industry, the government, local communities and individuals to take some responsibility.
- Aim to prevent harmful drinking developing by giving people enough information and knowledge to make their own sensible choices.
- Aim to identify problem users and make sure they get help. More can be done to refer people across institutional boundaries. We need to look at drinking in the workplace and ensure people have access to occupational health.
- Use the health service as an early warning system, as health professionals may often be the first contact for problem drinkers or their family members. They need to receive more training on how to make appropriate referrals.
- There is growing evidence of the effectiveness of brief primary care interventions. GPs and practice nurses need to be trained how best to intervene at the early stages of problematic drinking.
- Attempt to manage the environment to reduce the opportunities for harmful drinking; tackle city centre culture; address the multiplicity of bars and chains of bars; put controls on advertising especially that aimed at young people.
- Manage the consequences of harmful drinking by rehabilitating people, in order to reintegrate them into their families and working lives.

## QUESTIONS & ANSWERS

**The importance of working across departments has been highlighted but have you thought also about working across drugs? There is an advisory council on the misuse of drugs, but it does not cover alcohol and tobacco. Have you considered including alcohol for means of reference?**

There is a need for coherence of policy and action across the different substances. The National Treatment Agency was set up to try and bring some coherence to the field of drugs, which did not exist before. There is pressure from the NTA to impose the same standards, frameworks, and models of good practice to alcohol research and policy as already exists with other drugs. In public health terms, there is a risk-taking behaviour that underpins the use of all drugs and is also evident in areas like sexual health. This needs to be targeted by broader policy thinking.

**Can we do anything to make it more difficult for young people to start drinking before the age of 18?**

A harm reduction model is at the heart of government thinking on alcohol. Many people start drinking before the legal age, but when you talk to young people, you often find they are very conscious of some of the problems associated with alcohol. Many youths believe people should not have access to alcohol at an early age. Licensing powers are in existence but are not utilised to their full capacity. It is illegal in England to sell alcohol to someone who is already drunk, but this law is rarely enforced. There is a need to create a stronger enforcement culture, and to highlight at what age it is appropriate to start drinking. Increasing the legal drinking age to 21 would incur extreme difficulties in terms of enforcement and licensing.

**There are no treatment facilities for alcoholics in prison except intermittent Anonymous meetings. Does the new strategy include provision for treatment of people who commit crimes and end up in prison?**

There is a pressing need for 'throughcare' in the prison system, ensuring not just treatment services in prison but a smooth transition on re-entering the community. It is important to have someone responsible for the person's treatment from arrest, through the sentence, and after release. Some treatment agencies are already doing this with hard drugs like heroin and cocaine, but are not specifically targeting alcohol abuse, despite the fact that most drug addicts also are also problem drinkers. Although these agencies are funded for drug work, some of their resources are put into alcohol work. Ensuring people receive treatment in prison is a top government priority, but the health service and support base in prison has been lacking for many years, particularly in terms of the mental health of prisoners.

**Evaluations of alcohol education in schools have shown it not only fails to discourage alcohol use but may even encourage it. Public campaigns, although politically very attractive, are also ineffective. Why are these least effective policies the most politically popular? Why are we not putting money into less popular but more effective strategies?**

Drug and alcohol education in schools is not completely ineffective. Research has shown that giving young people information about risk-taking behaviours, providing them with the opportunity to make some informed choices about how they lead their lives, can be quite effective. Anti-smoking public health campaigns have proved very effective and their lead should be followed. The recent campaign on the dangers of passive smoking has begun to alter people's perceptions and attitudes. Alcohol may not be the subject of such large-scale public health campaigns, but these should not be dismissed as a way of influencing people's decisions in a public health mode.



**Should more advice be given to local public health officials so they are better placed to deal with alcohol-related problems? How is the government dealing with the proven link between alcohol intoxication and injury and victimisation, aggression and violent behaviour?**

There has been an attempt to engage Accident & Emergency departments in doing routine surveillance of those attending. However, it has proven difficult to engage public health service workers to provide information, bar a few notable exceptions. There is a need for systematic surveillance and screening to check accident and alcohol correlations, which would logically be followed by appropriate treatment referrals. The public health agenda is attempting to get people to take some personal responsibility for their health but there is also a need to consider what communities can do to make their environment a healthier place to live in. Links between health and criminal justice are beginning to be made more overtly, targets to reduce crime and increase people's sense of confidence in their community existing in both government departments.

**As drug prohibition is a major criminogenic factor, why not just legalise the drugs?**

The government genuinely believes that illegal drugs, particularly Class A drugs, are harmful, can kill, ruin lives and trap people in a cycle of addiction, particularly vulnerable people without the support mechanisms to help them change. The clear government position is that drugs will remain illegal. The drug strategy attempts to target the most harmful drugs, putting an emphasis on reducing the supply of drugs and on treatment, helping people escape from addiction and rebuild their lives.



# COSTS AND BENEFITS OF ALCOHOL AND DRUGS POLICIES

## MIKE TRACE

In a short verbal presentation, Mike Trace will draw on his experience in creating the UK National Drugs Strategy that was launched in 1998, to compare the approaches taken to Drug and Alcohol policy recently. He will attempt to address the following questions:

- Should Drug and Alcohol Policy be kept separate?
- Most European countries have combined strategies for all psychoactive substances, some including tobacco as well. Does this lead to more effective policy and programmes?
- Why is there no National Alcohol Strategy to sit alongside the National Drug Strategy?  
The Drug Strategy was designed and published in 6 months in 1998 – are there good reasons why it is taking 6 years to develop an equivalent document covering alcohol?
- What was the thought process behind the National Drug Strategy?  
The steps taken to decide upon a programme of action to tackle drug problems should be applied to the issue of alcohol use and misuse:
  - Analyse the patterns of use of the substance(s)
  - Identify the related individual and social harms
  - Quantify the social and financial costs of these harms
  - Identify what works in reducing these harms
  - Pursue a programme of action that has the potential, over a realistic timescale, to achieve these reductions
  - Evaluate the effectiveness of the programme.
- Do the principles behind the Drug Strategy apply equally to the consideration of an Alcohol Strategy? :
  - Should we further restrict the availability of alcohol to reduce the levels of use?
  - Should we increase education programmes to deter young people from drinking?
  - Should we increase the number of treatment places available?
  - Should we take a harm reduction or zero tolerance approach?

The presentation will be aimed at stimulating discussion on whether an Alcohol Strategy is urgently needed, and if so, how it should be structured.

## AN ALCOHOL STRATEGY

- The current development of a National Alcohol Harm Reduction Strategy should follow the same thought patterns as the process of the development of the UK Drug Strategy in 1998.
- Any strategy to tackle the negative effects of the use of psychoactive substances should follow a structured methodology and address a series of key policy questions, in order to avoid falling into policies based on knee-jerk reactions or political convenience.
- In the UK, however imperfectly, the National Drug Strategy has been developed according to this thought process.
- It is disappointing that the same approach has not been taken to alcohol problems over the past 5 years, although the current work by the Strategy Unit and the Greater London Alcohol and Drug Alliance (GLADA) should point the way forward.
- A methodical approach would involve following a series of specified steps (see abstract).
- A strong evidence base is required to form a policy on any substance. Up until now policy has been based on well-meaning intentions but in the future it must be based on evidence and rational thought processes.
- The time lag between the emergence of a National Alcohol Strategy and the National Drug Strategy should have given the government plenty of time to assess the evidence and produce a coherent programme of action for the next 5 years.

## PATTERNS OF USE

- 90% of the population will use alcohol at some point in their life compared to 50% who will use other drugs.
- There are a very small percentage of lifetime alcohol abstainers (10%). This is equal to the percentage of the population that are problem drinkers.
- 36% of under 35s use alcohol regularly. 15-20% use other drugs regularly.
- 7-10% of under 35s are problem drinkers. 2% are problem drug users.
- Despite the high profile given to drug problems, it is clear alcohol problems remain much more prevalent, indicating the need for more focus on this drug.
- The Key Policy Question for both drug and alcohol policies is the extent to which these differences in prevalence are due to the different legal status of the substances, the breadth of their availability, their inherent properties such as price and perceived danger, cultural and/or historical factors.
- If you removed the legal controls on illicit drugs, what difference would it make to their prevalence and the associated problems?

## EXTENT OF HARMS

- We tend to look at the harms related to substance use in terms of health and social impact, particularly crime.
- Different substances are associated with harm in different ways, e.g. differences between drug-and alcohol-related crime.
- Most alcohol-related crime is a result of how people behave under its influence, e.g. drinking to excess and becoming violent.
- In contrast, drug-related crime is predominantly the result of the illegal status of the drugs, e.g. addicts committing property crimes to raise money to buy their drugs, or violence and disorder associated with illegal drug markets.
- The primary response of the drug strategy, to provide treatment to addicts in an attempt to move them away from criminal lifestyles, may not therefore be equally appropriate to an alcohol strategy.

#### EFFECTIVE RESPONSES

- The evidence base for reducing drug problems remains weak
- The drug strategy of 1998 was based on some suppositions that seem to hold true 5 years later, and others that do not.
- Opposing the original supposition, recent experience would suggest that a high proportion of drug-related health and social damage is associated with the relatively small number of chaotic users; that resources should be concentrated on addressing this group; that it is not possible to create the circumstances where the use of these substances is eradicated, and that offering treatment to the most damaged individuals can reduce health and crime problems.
- The supposition that co-ordinated programmes of education and prevention can reduce the number of young people choosing to use drugs has not been supported by the experience of the last 5 years.
- In the development of an alcohol strategy, these assumptions need to be tested against the available evidence on alcohol-related problems and interventions.

#### PROGRAMMES OF ACTION

- The Drug Strategy has benefited from an unprecedented level of political and financial support since 1998, with a direct investment of around £700 million in the current financial year.
- Investment in the prevention and treatment of alcohol problems is tiny by comparison.
- Until recently, there has been little or no public pressure to do anything about alcohol and problem drinking.
- It is hoped that the upcoming Alcohol Harm Reduction Strategy is accompanied by sufficient funds to implement the proposed activities properly.

#### EVALUATE THE IMPACT

- The overall use of drugs in the UK is stable at best, and there are worrying upwards trends in the use of some drugs such as cocaine.
- However, there is evidence of progress in reducing some drug-related harms.
- Actions implemented over many years have been effective in keeping the level of drug-related HIV infection at low levels in the UK.
- The US set out to reduce significantly the supply of drugs to young people. It succeeded in reducing access, but only from extremely high levels to a seemingly irreducible minimum, equivalent to existing levels in the UK.
- Evidence of the impact of alcohol harm reduction activities is scarce, since there is a significant lack of existing research in this area. However, some of the current treatment programmes are showing encouraging results in terms of crime reduction.

## QUESTIONS & ANSWERS\*

### **Is it possible to reduce the prevalence of drug use?**

Countries like Germany and Holland have demonstrated that it is possible to reduce the prevalence of drug use with the implementation of more relaxed drug laws. Illegal status is not necessarily incompatible with the relaxation of laws. The existing system in the UK is not effective, spending £500 million a year on identifying drug addicts and treating them but making no dent in the numbers of addicts or levels of drug-related crime.

### **Why do people raise money for one substance through mainly legal means and another through illegal means?**

There is a large evidence base to suggest the vast majority of money raised by people to buy heroin and cocaine comes through illegal activities. Possibly this is increased by the social exclusion of drug users and by the extremely addictive nature of the substances themselves. In contrast, even people who spend large amounts of money on alcohol tend to raise it by saving up in the week. People who are not dependent have patterns of drinking due to the social nature of the drug and tend to go binge drinking at the weekend. Another contributing factor may be the different personality types that make up drug addicts and problem drinkers.

### **Are the activities of the drug wars in the Andean jungle more harmful to global wellbeing than the activities of the alcohol and tobacco industries in Western Europe and America?**

Alcohol is a domestic problem, whereas the costs of drug prohibition are international, affecting all countries producing and trafficking from South-East Asia to the Caribbean. The dramatic effects seen in these countries include destabilisation, civil conflict, violence, and corruption at the highest levels. Although the activities of the drug lords are really little different to the tobacco barons, the illegality of the trade creates immense cost to the international community. The UK has a controlled authoritarian government, which tends to focus on national criminal harms rather than consider all harms, including the international impact of national policy.

### **What are acceptable limits of government intervention in personal behaviour?**

The government has gone to the limit of social intervention, and had to pull back in its dealings with truancy in schools. Increased interventionist policy is not a good way of governing when the country is already at the limits of libertarian restrictions. It is crucial to find political techniques, which regulate these issues in a way that is politically acceptable to the public.

### **What interventions are likely to work?**

Alcohol consumption is a key element of globalisation and is now embedded in Western society. Trying to educate people about the dangers of alcohol and hoping that they choose to abstain or to drink moderately is unlikely to work. Being drunk and out of control is appealing to the youth, so it is this perception that needs altering. Change should only be attempted in areas realistically susceptible to it. Effective treatment is impossible to deliver without sufficient funding. Little is known about the biology and epidemiology of alcohol because not enough research has been done.

### **Can you have a successful public health policy within a framework of prohibition?**

Many countries with jurisdictions are already managing successful public health approaches, including the Netherlands, Germany, Switzerland and some parts of Australia and the UK. It still remains debatable whether that framework of prohibition helps or injures that approach.

### **What proportion of the prison population is in prison as a result of drug-related crime?**

The official figure is 50% but this is only an estimate. 50% of property crime is committed by people who have addiction problems related to cocaine. 80% of drug users have a criminal record but this may just be a result of being caught for possession.

### **What proportion of the prison population is in prison as a result of alcohol-related crime?**

A large proportion of the prison population has alcohol problems and a lot of offending behaviour, especially violence, is alcohol-related. A great deal of alcohol-related offending is related to binge drinking, which is usually tackled by police after the event has occurred. A better societal response would involve tackling the problem before it results in criminal activity, focusing more on demand and supply, which occurs to some extent for the illicit drugs but not at all for alcohol. There are great opportunities with alcohol to influence the amount of misuse in society and this is where efforts should be directed, rather than leaving the mess for the police and A&E departments to deal with.

### **How far is the safe use of drugs possible?**

As a society we are convinced that the safe use of alcohol is possible. As yet the unresolved question is how best to teach young people to control their alcohol intake, acknowledging educational and cultural differences. Theoretically, there is little difference between being able to use alcohol and other psychoactive drugs safely if people are provided with all available information in a credible format. Indeed, if the currently illegal drugs were brought into the legal context, society could play a much greater role in the education of safe use and avoidance of those substances which lead to addiction.

\* The Beckley Foundation would like to point out that occasionally a question and answer has been allocated to the talk most similar in subject matter, so the answer is not exclusively that of the speaker.





# A SCIENTIFICALLY BASED SCALE OF HARM FOR ALL SOCIAL DRUGS

COLIN BLAKEMORE

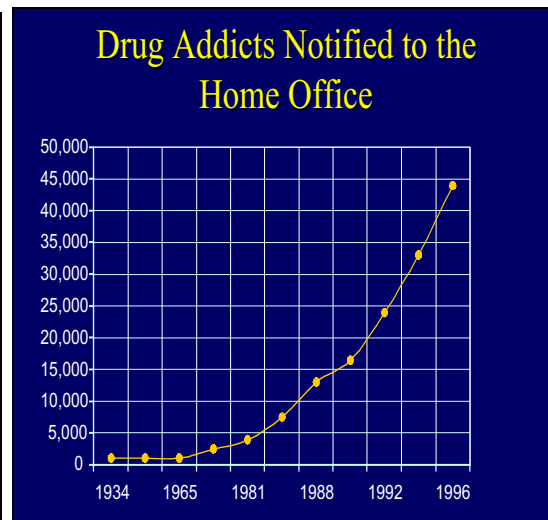
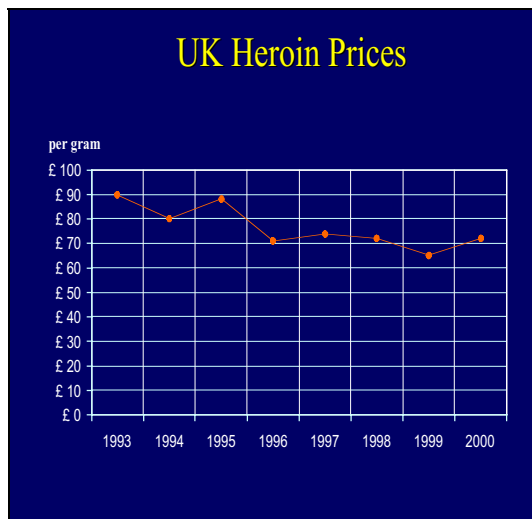
Chief Executive, Medical Research Council, London  
Waynflete Professor of Physiology, University of Oxford

## ALCOHOL IS A DRUG

- Alcohol is a drug and has features in common with other psychoactive drugs, both legal and illegal.
- Alcohol, like other social drugs, acts, in part, through brain mechanisms that generate the senses of need and pleasure associated with such natural activities as eating and sex.

## FAILURE OF CURRENT UK DRUG POLICIES

- The post-1920s war on illegal drugs has clearly failed.
- Investment in policing has escalated continuously, but this draconian approach to drugs can no longer be defended: it has been unsuccessful by any reasonable criterion.
- Street drugs have never been:
  - more freely available
  - more potent
  - lower in cost
  - so widely used
- For instance, in real terms, UK heroin prices have fallen steadily since the early 1990s. The number of notified drug addicts is increasing rapidly and is currently approximately 150,000 compared to 1,000 in 1965.



- The stated target of stopping illegal drug use is unattainable: "In the course of our enquiry it has become inescapably clear to us that the eradication of drug use is not achievable and is not therefore either a realistic or a sensible goal of public policy." *Runciman Report* (2000).
- The increasing emphasis on harm reduction seems to be more sensible than attempts to eliminate drug use entirely.

- Any effort to reduce harm clearly requires rigorous methods to estimate the potential harm from illegal drugs, set in the context of other socially acceptable risks.
- To be rational and consistent, any methodology for assessing the potential harm from illegal substances should include, as a calibration, an estimate of the harm associated with the use of legal drugs, especially alcohol.

#### LESSONS FROM THE RELAXATION OF CANNABIS LAWS IN THE NETHERLANDS

- In the Netherlands, it is no longer a criminal offence to use cannabis, or even to supply it in small amounts in certain licensed places e.g. some coffee shops.
- Despite this relaxation of the law, cannabis use is lower in the Netherlands than in the USA, the UK, and the rest of Europe. It is notably lower among young people, the group that legislation in the UK is most concerned to protect.

Cannabis Use in the General Population (2001)	
• Netherlands	6%
• Germany	6%
• Spain	7%
• USA	8%
• UK	9%
• France	10%
• Australia	13%
(EMCDDA a.o.)	

Problematic Hard Drug Use	
per 1000 inhabitants	
• Netherlands	2.6
• Germany	3.2
• Norway	3.9
• France	4.3
• Sweden	4.7
• UK	6.7
• Italy	7.8
• Portugal	9.0
(EMCDDA 1999)	

- “Hard” drug use in the Netherlands is the lowest in Europe, dramatically contradicting the “gateway” argument against decriminalization of less harmful “soft” drugs.
- The number of drug-related fatalities in the Netherlands is less than one-fifth of that in the UK.

Acute Drug Related Deaths	
per 100,000 inhabitants:	
• Netherlands	0.5
• Germany	1.3
• Austria	1.5
• Sweden	1.9
• UK	2.7
(EMCDDA 1999)	

- The Netherlands seems to have achieved an attitude to cannabis similar to the approach to alcohol in the UK. Cannabis use is treated like gambling, voting and sex – one of those somewhat risky pursuits in which adults are permitted to indulge.

- The extension of this attitude to cannabis has made it possible for the Netherlands to take a more open, less hypocritical approach to education about drugs.
- The successes of the Netherlands' experiment are all the more remarkable since it was conducted against the initial disapproval of many other European states, and despite the tight control of international agreements, mainly driven by the attitude of the USA. There are now signs that other European countries would be willing to shift from all-out war on drugs to a relaxation of the law in relation to the evidence of harm.

## HOW SHOULD DRUGS BE CLASSIFIED?

Present classifications of drugs relate more to the purposes for which they are used or the needs of courts to impose penalties than to a rational analysis of their potential harm.

- *Social drugs.* This category includes both legal and illegal drugs. Illegal drugs are often termed "hard" or "soft". They are classified by the Misuse of Drugs Act as Class A/B/C, an inflexible system of classification that is based on a mixture of scientific evidence, familiarity with the particular drug, and the needs of the legal system.
- *Medicinal drugs.* These are therapeutic and preventive drugs, and others useful in medicine, such as anaesthetics and antidepressants. The use of prescription drugs without prescription is illegal. Yet non-prescription medical drugs, some of them psychoactive and some potentially lethal, are entirely legal.
- *Enhancing drugs.* Many medicinal drugs, some prescription, others not, are used to enhance or modify performance or behaviour in the absence of what would normally be defined as illness: benzodiazepines to reduce anxiety, Viagra to improve sexual function, sleeping aids, and steroids to improve athletic performance are well-known examples. Some would argue that the widespread prescription of Ritalin to control the behaviour of inattentive children falls into this category. Others would say that alcohol, nicotine and "soft" illegal drugs are often used largely to facilitate normal life.

## DIFFICULTIES WITH CLASSIFICATION

- The distinctions between these classes are blurred and inconsistent. Drugs in very different classes are distinguished more by the objectives of their use and the way in which they are supplied than by their potential for harm.
- For example, both codeine and heroin work through the production of morphine in the brain, which then activates opioid receptors. But one is available over the counter as a medicinal drug whereas the other is an illegal Class A drug. Equally, methadone, a prescription opiate that acts on the same brain receptors, is widely used as a substitute treatment for the illegal use of heroin.
- The "hard"/"soft" distinction implies a judgement of relative harm, but it is not based on an explicit analysis of risk.
- The current ABC system also relates to a perception of harm, and this is the rationale for its linkage to laws and penalties, but is not sufficiently quantitative and evidence-based.
- Some legal drugs are widely supplied illegally, including 30% of all cigarettes.
- The acceptability of social drugs varies from culture to culture around the world, so there is no sharp global distinction between legal and illegal drugs. Alcohol is legal in the UK but not in some Muslim countries.
- Medicinal drugs are used for performance enhancement, e.g. Modafinil, a drug that prevents sleepiness and is used to treat narcolepsy, is also used to maintain vigilance in troops and to improve athletic performance.
- Medicinally useful drugs are also used for recreational purposes, e.g. Ketamine, Viagra, Valium.

## KEY QUESTIONS FOR CLASSIFICATION

A number of questions should underpin a rigorous system of classification of drugs.

- Does the drug in question harm any individual other than the user? A libertarian argument emphasises personal freedom, as long as it does not negatively impinge on other lives.
- Is its use costly to society in other ways, for instance placing additional demands on health and social services? This is the position taken by the *Runciman Report* (2000).
- Is it so patently dangerous to the health or well-being of users that society is obliged to protect them from their own wishes?
- How do the risks compare to those of legal drugs such as alcohol and tobacco? To keep a sense of proportion, it is vital to compare illegal drugs with others that are accepted by society.

## PROPOSED SCALE OF HARM

“We believe that the present classification of drugs in the MDA should be reviewed to take account of modern developments in medical, scientific and sociological knowledge.”  
*Runciman Report* (2000).

The Runciman Report suggested reclassification on the basis of better knowledge than that underpinning present classification, but suggested that the same distinctions between A, B and C should be retained because they facilitate the application of the law.

I propose the introduction of a *Scale of Harm*:

- There should be a continuous review of scientific and sociological evidence by a panel of experts, with representation from the police, relevant NGOs and the general public.
- The classification should be regularly reviewed, as new evidence emerges.
- Drugs should be ordinally ranked according to the current evidence of relative harm, rather than grouped into sharp, arbitrary categories.
- Alcohol, tobacco and certain medicinal drugs that are abused should be included for purposes of “calibration”.
- Such a classification would not suffer from the inherent conservatism and inflexibility of the current ABC system. It has taken over 15 years to reclassify cannabis from Class B to Class C.

## CRITERIA OF ASSESSMENT

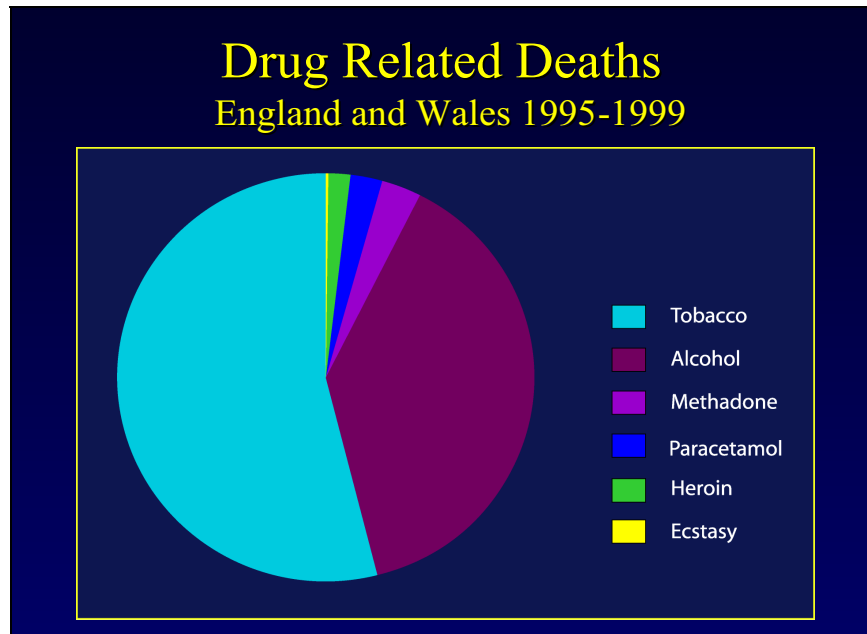
The following are suggested as criteria that might be considered for the ranking of drugs according to their potential risk. Under each heading, I give a few anecdotal observations on the nature of the criterion and its relevance to legal and illegal drug use. I do not wish to anticipate the judgement of an expert group, but I shall, in particular, consider the likely position of alcohol on such a scale of harm:

- Biological harm, toxicity, mortality and dependency:

Analysis of the pathological effects of drugs on users is obviously a crucial factor in assessing harm. Consideration of mortality reveals some interesting facts:

- Tobacco claims more than half of all drug-related deaths: on average, every cigarette smoked removes 7 minutes from life expectancy.
- Alcohol accounts for the majority of deaths not caused by smoking. Between them, tobacco and alcohol claim about 90% of all drug related deaths.
- There were 27 ecstasy-related deaths in 2002 (the yellow sector for these deaths in the pie-chart below has had to be exaggerated to make it visible). Analysis has shown that most deaths were associated with simultaneous use of other illegal drugs: it is very likely that alcohol was also involved.

- Individual anecdotal stories of deaths of young children resulting from ecstasy overdose are shocking, but they are atypical and the total number of fatalities is very small.
- Methadone – the drug most commonly used to treat opiate addiction – kills more people than any illegal drug.



- Relation to violent behaviour:
  - Violent behaviour is the most evident and public effect of drug use.
  - Most crimes of violence, particularly domestic violence, are alcohol-related.
  - Crack cocaine has a strong connection to violent behaviour, but the number of users is still low.
- Relation to crime:
  - A large fraction of crime is drug-related: one-third of the proceeds of acquisitive crime are used for the purchase of heroin or cocaine.
  - Alcohol is associated with criminal actions, e.g. injury and violence to others, especially domestic violence.
  - Smuggling is significant for both legal and illegal drugs, e.g. tobacco, as well as cocaine and heroin.
  - 80% of drug misusers have convictions for theft.
- Cost to the NHS:
  - The economic costs associated with drug use (legal and illegal) are very significant.
  - The costs to the NHS of medical problems arising from the use of tobacco and alcohol are many times higher than those of all illegal drugs put together.
- General impact on others:
  - Addicts and drug abusers can have significant negative effects on the lives of those around them.
  - Injected opiates often ruin the lives of the users, their families and dependents.
  - Smokers often suffer ill health in later life and this can have a huge impact on their families. Passive smoking can be fatal.
  - Alcohol dependence and the violence often associated with it are common factors in family break-up.
- Total economic impact:
  - This factor would integrate the economic impact on both the individual and society.

## CONCLUSIONS

Alcohol and tobacco are likely to be at or near the top of the comparative scale of harm for every criterion listed. This must be kept in mind when framing attitudes to other drugs, which are currently illegal and consequently viewed as unacceptable by society.

The following proposal was put to the North Wales Drug & Alcohol forum (a large group with representation of the police, social workers, etc) in September 2002:

*This conference supports a re-examination of the entire basis of drug classification. The current A/B/C system and the deceptive "hard/soft" distinction should be replaced with a "scale of harm" for all drugs. Drugs (including alcohol and tobacco, to provide familiar standards for calibration) could be placed on the scale on the basis of a continuous review of the scientific and sociological evidence by panels of experts, with representation of the police, relevant NGOs and the public.*

90% were in favour of this proposal and only 6% against.

The present classification of drugs makes little sense. It is antiquated and reflects the prejudices and misconceptions of an era in which drugs were placed in arbitrary categories with notable, often illogical, consequences. The continuous review of evidence, and the inclusion of legal drugs in the same review, will allow more sensible and rational classification, putting illegal drugs in context with those already accepted.

## QUESTIONS & ANSWERS

**Nicotine itself does not have the same toxic effect as tobacco tars, so it is different to other drugs where the active ingredient is the problem. Can we still compare it for this reason?**

The dangers associated with many illegal drugs are also attributable not so much to the chemistry and pharmacology of the pure substance as to the way it is delivered and to common contaminants. Neglect of hygiene, poor diet and infection, not to mention the social penalties of drug use, are at least as damaging as the drugs themselves. It is true that nicotine itself is not inherently very dangerous, but weight-for-weight, it is perhaps the most powerfully addictive social drug. It is the coupling of a highly addictive substance with a highly toxic delivery vehicle that makes smoking so insidious.

An argument can be made that addiction, though socially undesirable, is not necessarily of itself damaging. There are many examples of opiate addicts who lived productive, essentially normal lives, because they had access to controlled doses of clean drugs. Addiction is inconvenient but not necessarily biologically dangerous.

**Is the current A/B/C classification system not an attempt to classify drugs according to the harm they cause?**

The A/B/C classification is indeed ordinal and is based on an assessment of risk. Moreover, the technical committee for the Advisory Council of the Misuse of Drugs is reviewing the harm caused by different illegal substances, using a more objective basis, appraisal across a number of dimensions not too dissimilar from those that I propose to underpin the scale of harm. A big problem is to decide what weighting to give to the different criteria for harm. The current classification system gives a lot of loading to drug-related deaths, and it is biased by the novelty of drugs and by media attention and public opinion. The main problem with the A/B/C system is the artificial sharpness of the boundaries and the difficulty that it presents to the reclassification of drugs on the basis of changing scientific evidence. Look, for instance, how long it has taken for cannabis to be reclassified. Another major difference between the A/B/C system and what I am proposing is that the scale of harm would include legal drugs, to provide familiar anchors for the interpretation of risk. There is already discussion about classification schemes with various European agencies and it would be good to have consensus across Europe in terms of the approach adopted

**How will penalties be decided upon if all drugs lie on a single scale of harm?**

I recognise the convenience of the A/B/C system for application of the law. But a continuous scale produces problems only if sentencing for possession and use of drugs is regarded as the right way to tackle the drug misuse. Many consider supply to be the real evil. The production, distribution, pricing, advertising and supply of illegal drugs, as well as most education about them, are in the hands of criminals. Users are, to a large extent, victims of this crime.

**Are there any feasible alternatives to putting alcohol and tobacco into the drug act?**

An alternative that has not been fully explored, but which might be feasible, is to put these legal substances into the Medicines Act. If alcohol were to be regulated under the Medicines Act, the content, labelling and advertising would come under much stricter controls. The tobacco and nicotine content of cigarettes would be necessarily regulated, as would the promotion of these dangerous substances.

**What is the difference in the way people learn about the use of alcohol as opposed to the use of other drugs?**

Most children secure a good deal of their education about alcohol use from their parents. Most parents surely hope that their children will develop a sensible attitude to the eventual moderate social use of alcohol. Good parents consider it part of their parental duty and responsibility to educate their children in its use, and they do it by a mixture of warning, control and example. I am not saying that children always follow their parents' advice, but at least the educational process is more or less explicit, and is based on the knowledge that use of alcohol in moderation after a certain age is both legal and socially acceptable. This provides a good example of the way in which parents can deal with education about substance use.

By comparison, most children derive their "education" about illegal drugs from their friends, from the grapevine, from pop culture, from unreliable sources on the Internet, and, even worse, from pushers and suppliers. We now have a new generation of parents, roughly half of whom have used illegal drugs. Is it so outrageous to suggest that they could also play a role in education about the use of presently illegal drugs?

I firmly believe that, rather than pursuing an uncompromising approach to the regulation of illegal social drugs, we should identify the greatest problems to society posed by drug use (including the two great legal killers, alcohol and tobacco) and concentrate resources on reducing the harm that they cause. The protection and education of young people would be very high on my list of priorities in this respect.

**If we can rationally consider new approaches to tackling alcohol while it is legal, why is it not possible to extend that approach to other drugs?**

The fact that alcohol is legal facilitates new approaches to tackling the undoubted problems associated with its use. The very fact that illegal drugs are illegal (even though very freely available and widely used) makes it difficult to approach education and regulation openly and rationally. Government and non-governmental agencies find it hard to give advice and guidance about what is, after all, a crime. The statistics for illegal activities like gambling and prostitution are poor. The same applies to illegal gambling and prostitution: because they are outside the law, it is therefore more difficult to gather and analyse evidence about them and to approach control rationally. Paradoxically, prohibition makes sensible control more difficult. The American experiment with alcohol prohibition proved that it is not the answer to the alcohol problem. Yet we continue to pursue that strategy for illegal social drugs.

**What is the difference between how you regulate individuals and corporate organisations?**

Regulating corporate behaviour should surely be distinct from regulating individuals, although the one can affect the other. In the case of tobacco and alcohol, regulatory strategy is largely directed at the industry – both through taxation and through regulation of advertising, product quality and supply. Such tools are powerful but the government cannot use them to influence the supply and use of heroin, cocaine or other illegal drugs, merely because they are illegal.



## REFERENCES

### REFERENCES - DAVID NUTT

- Nutt, DJ & Peters, TJ. (1994) Alcohol: the drug. In: British Medical Bulletin. Alcohol and Alcohol Problems 50(1): 5-17. - Nutt, DJ. (1999) Alcohol and the brain: pharmacological insights for psychiatrists. British Journal of Psychiatry 175: 114-119.- Lingford-Hughes A & Nutt DJ. The neurobiology of addiction and implications for treatment. Br J Psychiatry 2003 Brit J Psychiatry 182: 97-100

### REFERENCES - LESLIE IVERSEN

IVERSEN, LL (2000). *The Science of Marijuana*, Oxford University Press, New York.

Iversen, LL (2001). *Drugs- A Very Short Introduction*, Oxford University Press, New York.

### REFERENCES - IAN GILMORE

Murray JL, Lopez AD, eds. The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020. Cambridge, MS: Harvard University Press, 1996.

White IR, Altmann DR, Nanchahal K. Alcohol consumption and mortality: modelling risks for men and women at different ages. BMJ 2002;325:191

### REFERENCES – COLIN DRUMMOND

McCloud, A., Barnaby, B., Omu, N., Drummond, C. & Aboud, A. (2003) The relationship between alcohol misuse and suicidality in a psychiatric population: findings from and inpatient prevalence study. British Journal of Psychiatry, submitted.

Barnaby, B., Drummond, D.C., McCloud, A., Omu, N. & Burns, T. (2003) Substance misuse in psychiatric inpatients: comparison of a screening questionnaire survey with case notes. *British Medical Journal*, 327, 783-784.

Drummond, D.C., Phillips, T., Coulton, S., Barnaby, B., Keating, S., Sabri, R. & Moloney, J. (2003) Saturday Night and Sunday Morning: the 2003 twenty-four hour national survey of alcohol-related attendances at accident and emergency departments in England. Final report to the Cabinet Office.

### REFERENCES - JONATHAN CHICK

SIGN Guideline on Managing Alcohol Problems In Primary Care. Released on 22 Sept 2003 ([www.sign.ac.uk](http://www.sign.ac.uk)). Slattery J, Chick J, Cochrane M, Craig I, Godfrey C, Kohli H, et al. (2003) Prevention of Relapse in Alcohol Dependence. Health Technology Assessment Report 3. Glasgow: Health Technology Board for Scotland; 2003. ([www.htbs.co.uk](http://www.htbs.co.uk)) Baker A, Rooney C (2002) Recent trends in alcohol-related mortality *Office of National Statistics*

### REFERENCES - CHRISTINE GODFREY

Buck, D., Godfrey, C. and Sutton, M. Economic and other views of addiction: implications for the choice of alcohol, tobacco and drug policies, *Drug and Alcohol Review*, 1996, 15: 357-368.

Ludbrook, A., Godfrey, C., Wyness, L., Parrott, S., Haw, S., Napper, M. & van Tiljlingen, E. *Effective and Cost-Effective Measures to Reduce Alcohol Misuse in Scotland*. Scottish Executive Health Department: Edinburgh, December 2001.

Godfrey, C. Modelling drug markets: empirical evidence available from economic studies. In EMCDDA Scientific Report: Expert Meeting on Drug Markets and Modelling, 23-24<sup>th</sup> October 2000. EMCDDA 2001. [http://www.emcdda.org/situation/methods tools/ tser economic aspects.shtm1#M](http://www.emcdda.org/situation/methods%20tools/tser%20economic%20aspects.shtm1#M)

### REFERENCES – VIRGINIA BERRIDGE

Robert B. Voas, A. Scott Tippetts, James C. Fell, Assessing the effectiveness of minimum legal drinking age and zero tolerance laws in the United States – Accident Analysis & Prevention 35 (2003) 579-587, Pergamon



# APPENDICES

I. BIOGRAPHIES OF SPEAKERS

II. PARTICIPANTS ATTENDING SEMINAR III

III. THE BECKLEY FOUNDATION



## BIOGRAPHIES OF SPEAKERS

### VIRGINIA BERRIDGE

BA, PhD, HonMFPHM, FRHistS

London School of Hygiene and Tropical Medicine, University of London

Virginia Berridge is Professor of History at the London School of Hygiene and Tropical Medicine, University of London. She is head of the History Group and of the newly established Centre for History in Public Health. Her research interests range from smoking, illicit drugs, alcohol and HIV/AIDS, to the recent history of public health. Her publications include *Opium and the People: Opiate use and drug control policy in nineteenth and early twentieth century England* (Free Association Books, London, 1999, second edition); *AIDS in the UK: The Making of Policy 1981-1994* (Oxford University Press, 1996); *Health and Society in Britain since 1939* (CUP/The Economic History Society, New Studies in Economic and Social History, 1999) and *Poor Health, Social Inequality Before and After the Black Report* (London, Frank Cass, 2002).

### COLIN BLAKEMORE

PhD, ScD, FIBiol, FMedSci, FRS

Waynflete Professor of Physiology, University of Oxford

Director of the Oxford Centre for Cognitive Neuroscience

Chairman of the British Association for the Advancement of Science

Chief Executive of the Medical Research Council (MRC)

A brain scientist and science communicator, Colin is director of the Oxford Centre for cognitive Neuroscience and Chairman of the British Association for the Advancement of Science. He has held the Waynflete Chair of Physiology at Oxford University since 1979 and is currently President of the Physiological Society and President of the new Biosciences Federation. Recently Colin has been appointed to the prestigious position of Chief Executive of the Medical Research Council (MRC).

Colin Blakemore studied medical sciences at Cambridge, completed a PhD at the University of California, Berkeley, taught at Cambridge for 11 years, and in 1979 took up the Chair of Physiology at the University of Oxford.

He has received many prizes for his research, which has been concerned with vision and the early development of the brain. He is also passionately committed to the public communication of science and won the Royal Society Michael Faraday Medal in 1989. He is a frequent broadcaster on radio (including the BBC Reith Lectures) and television (including the Royal Institution Christmas lectures and *The Mind Machine*, a 13-part series on brain and mind). He has also written widely for the general public: his most recent book is *The Oxford Companion to the Body*. He has contributed to the national debate on drugs, arguing that assessment of harm should be soundly based on scientific evidence, and that we must contemplate more radical approaches to the problem.

HAZEL BLEARS  
Minister of State for Crime Reduction, Policing and Community Safety  
Former Minister of Public Health  
Sponsor Minister for Alcohol Strategy

Hazel Blears was elected MP for Salford in May 1997. She was appointed Minister of State for Crime Reduction in June 2003. Previously she had been Parliamentary Under Secretary of State for Public Health.

Before her appointment at the Department of Health, Ms Blears was Principal Solicitor for Manchester City Council. She was PPS for Rt. Hon Alan Milburn when he was a Minister of State at the Department of Health in 1998 and when he was Chief Secretary, HM Treasury between January and October 1999. Ms. Blears worked as a solicitor for Rossendale Council between 1981 and 1983 and for Wigan council between 1983 and 1985. She was a Salford City Councilor between 1984 and 1992 and was chair of Salford Community Health Council from 1992 to 1996.

JONATHAN CHICK  
PhD, FRCPsych, FRCPE  
Psychiatrist, Senior Lecturer, Edinburgh University

Jonathan Chick read Natural Science with Psychology at Cambridge University, and Medicine at Edinburgh University. He was a former Member of the Scientific Staff, Medical Research Council Unit for Epidemiological Studies in Psychiatry. He is now a Consultant Psychiatrist with the Alcohol Problems Service, Edinburgh; Senior Lecturer, Department of Psychiatry, University of Edinburgh.

Research interests: epidemiology of drinking problems; early detection and intervention for problem drinkers; stress and substance misuse in professions; biological markers of alcohol use; outcome and costs of alcoholism treatment; pharmacotherapy; motivational interviewing; health benefits of moderate drinking.

Advisor on several World Health Organisation projects and leader of eight large randomised controlled trials of treatment for alcohol problems, one of which (brief intervention in general hospitals) was recently in the three most quoted studies in the world literature on alcoholism treatment.

2002: Elected Honorary Life Fellow, Society for the Study of Addiction. 2002-3 Chairman of the SIGN Guidelines Group on Managing Alcohol Problems in Primary Care and the NHS Scotland Health Technology Board Assessment of Treatments to Prevent Relapse in Alcohol Dependence.

COLIN DRUMMOND  
MB, ChB, MD, FRCPsych  
Professor of Addiction Psychiatry, St George's Medical School, London

Colin Drummond is Professor of Addiction Psychiatry and Consultant Psychiatrist at St George's Hospital Medical School, where he has been since 1993. Before that he was Lecturer and later Senior Lecturer in Addiction Behaviour at the Addiction Research Unit, National Addiction Centre, Institute of Psychiatry from 1987. He is a fellow of the Royal College of Psychiatrists and his doctorate was on the subject of alcohol and public health.

Research interests include evaluation of addiction treatment approaches and psychological theories of addiction. He currently holds several research grants including a multicentre trial of CBT in addiction, and a trial of screening and intervention for alcohol problems in primary care. He is an Assistant Editor of the journal *Addiction*. He has published papers on a wide range of topics including drug and alcohol policy. He has been closely involved in providing advice to government on alcohol and drug misuse strategy. He is a member of the Alcohol Concern group commissioned by the Department of Health to produce proposals for a national alcohol strategy, and the National Treatment Agency working group.

IAN GILMORE  
Registrar, Royal College of Physicians  
Consultant Physician and Professor of Medicine, Royal Liverpool University Hospital

Professor Ian Gilmore is consultant physician and hepatologist at the Royal Liverpool University Hospital, having trained at King's College, Cambridge and St Thomas' Hospital. He was an MRC Training Fellow at St Thomas's Hospital and later a MRC Travelling Fellow at the University of California, San Diego. His clinical and research interests have been in various aspects of liver disease.

He also holds the position of Registrar of the Royal College of Physicians, and chaired the working party that produced the report '*Alcohol – can the NHS afford it? Recommendations for a coherent hospital strategy*' in 2001. He sits on the external advisory group to the Cabinet Office for their alcohol harm reduction strategy that is under development.

CHRISTINE GODFREY  
Professor of Health Economics at the University of York

Christine Godfrey is a Professor of Health Economics at the University of York. She has been researching into the economics of alcohol, tobacco and illicit drugs for the last 18 years. She was the President of the Society for Study of Addiction between 1998 and 2002. She is currently a non-executive member of the Board of the Health Development Agency, and a member of the Expert Committee on Drug Dependence of the World Health Organization.

Current research projects include the UK Alcohol Treatment Trial, the National Evaluation of Smoking Cessation Services, and UKCBTMM, a randomised controlled trial of cognitive behaviour therapy for people receiving methadone maintenance.

LESLIE IVERSEN  
PhD, FRS  
Visiting Professor of Pharmacology, University of Oxford  
Director of the Wolfson Centre for Age-Related Diseases at King's College,  
University of London

Leslie Iversen is Director of the Wolfson Centre for Research on Age-Related diseases at Kings College London, Visiting Professor at the Department of Pharmacology, University of Oxford, and founder of the pharmaceutical company Panos Therapeutics Ltd. He was previously Director of the Neuroscience Research Centre set up by the international pharmaceutical company Merck & Co. Inc. in Harlow, Essex (1983-1995). He was Director of the UK Medical Research Council Neurochemical Pharmacology Unit in Cambridge (1970-1983).

He is interested in understanding how drugs work in the nervous system and in the molecular basis of nervous system disorders, and is particularly known for his work on the chemical messengers used for communication between nerve cells. He is the author of several books and of more than 350 scientific publications and is a Fellow of the Royal Society of London and a Foreign Associate of the National Academy of Sciences, USA. He acted as the specialist adviser to the House of Lords Science & Technology Committee's enquiry into cannabis, and his most recent books are *"The Science of Marijuana"*, Oxford University Press, 2000 and *"A Very Short Introduction to Drugs"*, Oxford University Press, 2001.



DAVID NUTT  
DM, FRCP, FRCPsych, FmedSci  
University of Bristol, Psychopharmacology Unit, School of Medical Sciences

David Nutt is currently Professor of Psychopharmacology, Head of the Department of Clinical Medicine and Dean of Clinical Medicine and Dentistry, based at the University of Bristol.

He received his undergraduate training in medicine at Cambridge and Guy's Hospital, and continued training in neurology to MRCP. After completing his psychiatric training in Oxford, he continued there as a lecturer and then later as a Wellcome Senior Fellow in Psychiatry. He then spent two years as Chief of the Section of Clinical Science in the National Institute of Alcohol Abuse and Alcoholism in NIH, Bethesda, USA. On returning to England in 1988 he set up the Psychopharmacology Unit in Bristol, an interdisciplinary research grouping spanning the departments of Psychiatry and Pharmacology.

He is currently a member of the Advisory Council on the Misuse of Drugs, the Chair of the Technical Committee of the ACMD, the Committee on Safety of Medicines, and the MRC Neuroscience Advisory Board. In addition, he is advisor to the British National Formulary, the editor of the Journal of Psychopharmacology and the Past-President of the British Association of Psychopharmacology

MIKE TRACE

Since leaving a secondment to the United Nations Office on Drugs and Crime in January 2003, Mike Trace has been working as an independent consultant. From June 2001 to November 2002, he was the Director of Performance at the National Treatment Agency for Substance Misuse, a special health authority charged with overseeing the expansion and improvement of the substance abuse treatment sector in England.

Previous to this, he managed projects tackling drug-related offending for many years. From 1987 to 1995 he was Head of the Criminal Justice Service at The Cranstoun Projects, one of the largest independent sector providers of drug services. In 1986 he worked for the California Youth Authority on rehabilitation for drug-using offenders in the USA. He was a member of the Criminal Justice Working Group of the Advisory Council on the Misuse of Drugs (ACMD) from 1992 to 1995 and has been a full member of ACMD since 1996. From 1995 to 1997, he was Chief Executive of the Rehabilitation of Addicted Prisoners Trust (RAPT) and Chair of the Criminal Justice Forum of the Standing Conference on Drug Abuse.

Mike Trace has chaired United Nations technical committees on the drugs issue and was for 2 years Chairman of the European Monitoring Centre for Drugs and Drug Addiction, where he was responsible for overseeing the collection and analysis of objective, reliable information concerning drugs and drug addiction at a European level.



## PARTICIPANTS AT SEMINAR III

### CHAIRMEN

Lord Wilson of Dinton	<i>Master of Emmanuel College, Cambridge. Former Secretary of the Cabinet and Head of the Home Civil Service</i>
Sir Michael Rawlins	<i>Professor of Clinical Pharmacology, University of Newcastle, Chairman The National Institute for Clinical Excellence, Chair Advisory Council on Misuse of Drugs</i>

### PARTICIPANTS

Eric Appleby	<i>Chief Executive, Alcohol Concern</i>
Lord Avebury	<i>Liberal Democrat Peer</i>
Prof. Virginia Berridge	<i>Professor of History, London School of Hygiene and Tropical Medicine</i>
Prof. Colin Blakemore	<i>Waynflete Professor of Physiology, University of Oxford Chief Executive of the Medical Research Council (MRC)</i>
Ian Blair	<i>Deputy Commissioner of the Metropolitan Police</i>
Hazel Blears MP	<i>Minister of State for Crime Reduction. Sponsor Minister for Alcohol Strategy</i>
David Cameron MP	<i>Shadow Deputy Leader of the House of Commons and former Member of Home Affairs Select Committee</i>
Dr. Jonathan Chick	<i>Senior Lecturer in Psychiatry, Edinburgh University</i>
Dr. Mark Collins	<i>Associate Medical Director, The Priory, Roehampton</i>
Jean Coussins	<i>Chief Executive, the Portman Group</i>
Dr. Claire Craig	<i>Director Foresight, Office of Science and Technology, Department of Trade and Industry</i>
Prof. Colin Drummond	<i>Professor of Addiction Psychiatry, St. George's Medical School, London</i>
Alex Eavis	<i>Raconteur and researcher for the Beckley Foundation</i>
Dr. Michael Farrell	<i>Consultant Psychiatrist, National Addiction Centre</i>
Prof. Cindy Fazey	<i>Professor of International Drug Policy, University of Liverpool</i>
Rudi Fortson	<i>Barrister-at-Law, and Author of 'Misuse of Drugs Act'</i>

Prof. Ian Gilmore	<i>Registrar, Royal College of Physicians, chaired Royal College of Physician's Report on Alcohol</i>
Dr. Eilish Gilvarry	<i>Chair, Substance Misuse Faculty, Royal College of Physicians</i>
Prof. Christine Godfrey	<i>Professor of Health Economics, University of York</i>
Prof. Mike Gossop	<i>Head of Research, National Addiction Centre</i>
Tony Hall	<i>Head of Drugs Legislation, Drugs Strategy Directorate, Home Office</i>
Cathy Hamlyn	<i>Head of Sexual and Substance Misuse, Department of Health</i>
Judith Hind	<i>Substance Misuse, Alcohol Policy Advisor, Department of Health</i>
Prof. Leslie Iversen	<i>Professor of Pharmacology, University of Oxford</i>
Helen Judge	<i>Deputy Head, Strategic Policy Team, Home Office</i>
Robert Kitchen	<i>Police Federation of England and Wales</i>
Richard Kramer	<i>Head of Policy, Turning Point</i>
Nigel Lawrence	<i>Violent Crime Section, Home Office</i>
Dr. Anne Lingford-Hughes	<i>Division of Psychiatry, University of Bristol</i>
Peter Lilley, P.C., MP	<i>Former Conservative Minister. Author 'Common Sense on Cannabis'</i>
Charlie Lloyd	<i>Joseph Rowntree Foundation</i>
Sarah MacLean	<i>Department of Education and Skills</i>
Lord Mancroft	<i>Spokesman on drugs in the House of Lords. Chairman of the Drug and Alcohol Foundation</i>
Dr. Jane Marshall	<i>Consultant Psychiatrist, National Alcohol Unit</i>
Andrew McNeill	<i>Institute of Alcohol Studies</i>
Prof. Marsha Morgan	<i>Reader in Medicine, Royal Free Hospital Medical School</i>
Sir Keith Morris	<i>Former Ambassador to Columbia</i>
Amanda, Lady Neidpath	<i>Director, the Beckley Foundation</i>
Prof. David Nutt	<i>Professor of Psychopharmacology, University of Bristol</i>
Rachel O'Brien	<i>Director of External Affairs, Institute for Public Policy Research</i>

Prof. Noel Olsen	<i>Chairman, Alcohol Education and Research Council</i>
Prof. Martin Plant	<i>Alcohol &amp; Health Research Trust, University of the West of England</i>
Fredrick M.D. Polak	<i>Consultant Psychiatrist, Member of the Board of the Netherlands Drug Policy Foundation</i>
Dr. Mark Prunty	<i>Senior Medical Officer, Department of Health</i>
Sir David Ramsbotham	<i>Chairman, Chatham House drugs debate. Former Head of Prisons Inspectorate</i>
Dr. Guy Ratcliffe	<i>Executive Director, Medical Council on Alcohol</i>
Lord Rea of Eskdale	<i>Labour Peer, former GP</i>
Prof. Trevor Robbins	<i>Professor of Cognitive Neuroscience, University of Cambridge</i>
Ian Robinson	<i>Chief Executive, European Association of the Treatment of Addiction</i>
Dewi Roberts	<i>Representative of Richard Brunston, Chief Constable of North Wales</i>
Viscountess Runciman	<i>Chairman, Independent Inquiry into the Misuse of Drugs Act 1971</i>
Chris Saint	<i>Secretary of Advisory Council on Misuse of Drugs, Home Office</i>
Jeremy Sare	<i>Advisory Council on the Misuse of Drugs Secretariat, Home Office</i>
Prof. John Shepherd	<i>Professor of Surgery, University of Wales</i>
Prof. Dai Stephens	<i>Professor Experimental Psychology, University of Sussex</i>
Andy Stonard	<i>Chief Executive, Rugby House</i>
Dr. Simon Strickland	<i>Strategy Unit, Cabinet Office</i>
Dr. Carol Sweetenham	<i>Leader of Alcohol Harm Reduction Project, Strategy Unit, Cabinet Office</i>
Jan van der Tas	<i>Netherlands Drug Policy Foundation, Former Netherlands Ambassador</i>
Mike Trace	<i>Former Director of Performance, National Treatment Agency and Deputy Drug Tsar</i>
Roger Warren-Evans	<i>Secretary of the Angel Declaration, and Socialist Civil Liberties Association</i>



# THE BECKLEY FOUNDATION

The Beckley Foundation is a charitable trust set up to promote the investigation of consciousness from the perspectives of science, health, politics and history.

The Foundation has a particular interest in the comparative study of changes in consciousness brought about by such diverse activities as meditation and some forms of exercise, as well as by the use of legal and illegal psychoactive substances.

The main scientific objective of the Foundation is to research the neurophysiology underlying changes in consciousness, in order to better understand how to:

- \* address mental health issues, including depression, anxiety and stress;
- \* elevate creativity, awareness and positive mood;
- \* ameliorate mental and physical illness, and comfort the dying;
- \* encourage the avoidance of those practices that lead to poor health and addiction.

The main social objective is to promote public health by supporting world-class scientific research into consciousness and its modulation from a multi-disciplinary perspective; and by disseminating the information to academics, policy-makers and the public.

Key aspects of the Foundation's activities are to commission research and reports, and organise seminars and conferences, where leading experts from a wide range of disciplines can analyse and explore the social and health implications of the latest scientific knowledge.



