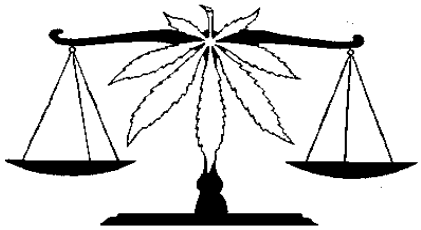
WRITTEN EVIDENCE FOR THE HOUSE OF LORDS SCIENCE AND TECHNOLOGY SELECT COMMITTEE

Sub-Committee I: Cannabis.

Submission of the Independent Drug Monitoring Unit (IDMU)

INDEPENDENT DRUG



MONITORING UNIT

The Independent Drug Monitoring Unit (IDMU) is an independent research consultancy conducting original research, including large-scale surveys of drug users, and providing expert evidence to the courts in criminal cases involving controlled drugs. We seek to provide independent and impartial advice and information on issues surrounding illegal drugs to all parties within the debate on drugs policy.

The main service provided by IDMU is expert evidence to the criminal courts on most aspects of drug misuse, including comment on consumption patterns, valuations, effects, paraphernalia and yields of cannabis cultivation systems. This is based on existing published studies and our own independent research projects.

IDMU is a commercial organisation not currently receiving any official or charitable funding. Research is currently funded as research/development expenditure paid for by fees derived from legal consultancy activities.

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This document has been prepared with the assistance of Sean Blanchard, an independent drugs researcher who is also co-author of Regular Users and other IDMU surveys, and Benjamin Ganley, freelance journalist.

Declaration of Interest

The majority of income of the Independent Drug Monitoring Unit is currently derived from consultancy in respect of criminal prosecutions of drug users, particularly cannabis offenders. Any relaxation in the policy of cannabis prohibition would have adverse implications for our future viability as a business.

TABLE OF CONTENTS

Continues

SECTION 1. INTRODUCTION

1.1 Terms of reference

Your Sub-Committee has invited evidence on the medical use of cannabis and its derivatives. In this report we have attempted to respond to some of your specific questions with data from our own research, and in some cases reviews of the relevant literature where this has been gathered, (where IDMU evidence has been provided for legal cases involving medical uses). Some references are given which were not in the BMA report on Therapeutic Uses of Cannabis (November 1997) - chiefly on traditional medical uses and other studies conducted prior to 1970. There are also other sources which may not have been previously brought to your attention. These reviews are not comprehensive, and do not cover important areas including multiple sclerosis, use as antiemetic/appetite stimulant e.g. in cancer chemotherapy and HIV, or reduction of intraocular pressure in glaucoma sufferers.

In order to reply coherently, we have begun with background information, based on our research and others', which gives the context in which your specific questions can be addressed. This is in: Section 1: Types of cannabis available, Section 2: Methods of use, Section 3: Consumption patterns of regular users, and Tables 1: Amounts smoked per day and 2: Cannabis use levels (percentiles).

Other areas which are relevant though not specifically requested are:

Section 7: Medical use in California

Briefly describes a recent social experiment in making cannabis widely available for medical purposes, with popular support, legal and medical controls on misuse, and a nascent system for production and distribution. Whatever the scientific or other evidence on which they based their vote, Californians devised a system which supports medical uses while maintaining prohibition on recreational use.

Section 8: Treatment of 'medicinal' cannabis users by the UK criminal justice system:

Your Lordships expressed an interest in this matter in a recent session. Data from our research, court experiences, and other sources.

Table 6: Outcomes of criminal prosecutions reported among medicinal users

Table 7: IDMU Medicinal Cannabis Cases

1.2 Specific Questions posed by the Committee

What are the physiological effects (immediate, long-term and cumulative), of taking cannabis, in its various forms?

What are the psychological effects?

Section 5: Effects of cannabis - effects of duration, dependence?, on driving.
Section 5.4: Health problems and benefits attributed to cannabis use.
Table 3: Reported health problems attributed to cannabis use.
Table 4: Reported health benefits attributed to cannabis use.
Table 5: Reasons for using cannabis.

Responses from our surveys of regular cannabis users - total 2794 respondents. Overwhelmingly the most common positive psychological effect reported by regular users is relaxation/stress relief, followed by mood elevation and increased sociability or personal development. Negative effects most commonly reported include memory problems, paranoia/anxiety, amotivation and respiratory problems. Significant associations between respondents reporting problems, levels of use,and related variables including duration of use, other drug use, spending, subjective ratings of drugs, methods of use etc. are summarised in the tables. The most common 'beneficial' physical effects are on pain relief and respiratory benefits, such as reduced asthma and drying of mucosae during colds and flu.

How do these effects vary with particular methods of preparation and administration?

Section 4: Methods of Ingestion. In our studies, an estimated 96.2% of cannabis use is by smoking, usually with tobacco, although 25% of respondents eat or drink it on occasions. Also, a small US study comparing the harmfulness of smoking methods is reviewed.

Smoked cannabis poses clear risks to physical health, as would smoking any substance, although this represents a rapid and controllable route of administration. The effects of oral cannabis preparations vary considerably, with a risk of overdose due to the slow onset of action. Many medicinal users report the effects of smoked cannabis to be more beneficial than oral cannabinoids, and it is possible that modulation of the effects of THC by 'minor' cannabinoids may reduce some of the unwanted side-effects or potentiate the therapeutic effect.

Our research provides the most comprehensive studies currently available of the dosages of cannabis/cannabinoids and methods of use among large samples of short and long-term cannabis users in the UK.

To what extent is cannabis addictive?
To what extent do users develop tolerance to cannabis?

Section 5.1: Effects of duration of use.
Table 2: Effects of duration of use on patterns of use.

A substantial proportion of users continue into middle age, and a greater proportion use the drug daily than with other controlled drugs. After approx. 2 years experimental and heavy use, average monthly use declines with age. The pattern of cannabis use among regular/long-term users is comparable to that of caffeine, with the average regular user consuming the drug on around 5-6 occasions per day.

What is the evidence that cannabis in its various forms has valuable medicinal actions?
In the treatment of which diseases?
How rigorous is the evidence?

Section 6: Medical uses of cannabis. Raw material vs. cannabinoid compounds. Literature reviews on historical uses, pain relief, anti-convulsant, stress and depression, asthma relief, opiate/ alcohol dependence.
Table 4: Reported health benefits attributed to cannabis use.

There is strong evidence that cannabinoids may be of benefit in the management of pain and spasticity in conditions such as spinal injury, arthritis and multiple sclerosis. Cannabinoids (Nabilone/Dronabinol) have been approved for medical use in treating the side-effects of cancer chemotherapy, as antiemetics and appetite stimulants. There is convincing evidence of bronchodilator activity, although smoking as a route of administration would not be a preferred route for asthmatics. There is conflicting evidence of the efficacy of cannabinoids in the treatment of glaucoma, epilepsy (particularly cannabidiol), and addiction to opiates and alcohol. Anecdotal evidence of anti-anxiety activity runs counter to the little scientific evidence available, although this may be attributable to differences in the effect of cannabis on naïve and experienced users.

1.3 General questions of the Committee - A Case for Change?

Is there a case for promoting clinical trials even if the current level of control is maintained?

Yes. There is substantial anecdotal evidence of health benefits from cannabis, and from some cannabinoids. Recent work on cannabinoid receptors suggests new lines of enquiry and provides a theoretical basis for several commonly-reported conditions. The Misuse of Drugs Act and other regulations were intended to permit research, but the present licensing system and policy has severely limited research opportunities, and should be reviewed. There is an urgent need for fundamental research and/or clinical trials for a variety of conditions. The risks of morbidity and mortality attributed to cannabinoids are surprisingly low, particularly in comparison to existing medications such as opiates, non-steroidal analgesics and benzodiazepines.

New research is now being published at an increasing rate, recent publications have indicated therapeutic potential of CBD as an antioxidant in the management of strokes[1], and reduction of tumours in breast cancer from anandamide[2], and also shown that cannabinoid receptors in the skin are activated by traumatic injury[3]. On the other hand, researchers have also reported gene mutation from cannabis smoke[4], and a review of cognitive effects in long term users concluded that cannabis may interfere with the 'filter' system used by the brain to keep out unwanted or irrelevant information[5]. Clearly the field of 'therapeutic' cannabis and cannabinoid research is advancing rapidly, with economic implications from the development of a new class of drugs. Should the UK maintain the hitherto strict regulatory regime, the opportunities for the British pharmaceutical industry to benefit from new product development could damage our international competitiveness.

How strong is the scientific evidence in favour of permitting medical use?

In some cases cannabis products may be more effective than other treatments. It would seem inhumane to completely block legal access to a substance which makes sick people feel better, when no better alternative is available, even if any beneficial effects were of unknown aetiology or of undetermined efficacy. Where the drug is of demonstrable benefit and alternative treatments are less effective or carry greater risks, a continued refusal to permit medicinal use, due to perceived risks of a change in public attitudes, appears unjustifiable both on moral and on public health grounds.

How strong is the scientific evidence in favour of maintaining prohibition of recreational use?

Some commentators would seriously argue that legalising the recreational use of cannabis would lead to a breakdown of society, others would counter that cannabis/hemp could 'save the world'. In our view, both these positions are equally erroneous.

The potential harmful effects of cannabis have, over the past century, been investigated far more thoroughly than potential benefits, with generally negative results. The main physical dangers associated with cannabis arise from smoking it, particularly mixed with tobacco in unfiltered cigarettes, leading to respiratory or cardiovascular problems. Psychological risks include anxiety/panic/paranoia attacks mainly among naïve users, and a risk of psychosis in a small number of predisposed individuals. Even if the worst plausible dangers were all proved, using cannabis would pose a lesser risk to health than many common sports, other recreational activities, legal drugs or products such as alcohol, tobacco, caffeine, sugar or saturated fats.

Governmental and medical reports, from several countries including the UK, have suggested that the harmful effects of a prohibition policy, on individuals and society, may be greater than the harmful effects of the drug. Prohibition, particularly the effects of arrest, may reinforce rather than deter drug use by reducing the options for full participation in society, including lost opportunities for employment, housing, foreign travel and to the users driving license as a result of a criminal record or positive urine sample.

Prohibition has created a confrontational atmosphere which stifles open debate and dissemination of information as to the real risks of using different drugs, and creates an incentive to experiment among teenagers keen to rebel against the strictures of their elders. A forbidden fruit, when no longer forbidden, loses much of its sweetness. Experience in the Netherlands and elsewhere does not suggest that a relaxation in the law leads to an increase of use over the longer term, and rates of drug use, including problem indicators, in Holland are lower than in the UK.

Scientific evidence is only one of a number of considerations which apply in formulating drug policy; public moral and political attitudes and international treaty obligations appear to take precedence over rational consideration of such evidence. Any decision as to the desirability and nature of law reform would need to take account of matters beyond the scope of this committee, including prevalence of use, effects on crime/driving, economic effects both direct (enforcement expenditure, tax revenues) and indirect (effect on manufacturing industry and employment of reduced acquisitive crime), international relations (including drug tourism) and social attitudes, as well as public health considerations and the proper constitutional role of the state in the control of individual behaviour.

The nature of any change in the law is critical, whether this involves an increase or reduction in penalties, rescheduling to Class C (de facto decriminalisation of possession), and/or the means of achieving a legitimate method of supply in a legalised market (e.g. taxation/regulation, licensing, coffee-shops, clubs or free-market solutions). Each of these options would create advantages and disadvantages which must be carefully weighed before any policy is adopted.

SECTION 2 TYPES OF CANNABIS AVAILABLE ON THE ILLICIT MARKET IN THE UK

2.1 Cannabis resin

2.1.1 The most common form of cannabis resin is of Moroccan/North African origin, also known as 'soap-bar' with a THC content typically between 4 and 7%. The resin appears in the UK in compressed bars, normally 250g/9oz.

2.1.2 The second most common form of resin is of Asian origin, being darker in colour and of soft, pliable consistency. Mostly from Pakistan or Afghanistan, it often appears in 1kg blocks wrapped in red cellophane. THC contents typically 4% to 10%, may also contain perfume agents such as caryophylline.

2.1.3 Other types of cannabis resin appear occasionally. Lebanese resin was the 'Market Leader' in the 1980s but is now rarely seen. Occasionally more exotic Himalayan varieties, with THC contents in the region of 10%, appear in small quantities.

2.1.4 In the Netherlands, coffee-shops supply a wide variety of cannabis resins and herbal cannabis, with prices linked to quality (i.e. lower qualities provide larger fixed-price 'deals'). The Netherlands has also started producing resin from domestically-produced crops. I know of one instance in the UK where resin produced from exceptional plants has approached a THC content of 60%.

2.1.5 The overall quality of imported cannabis and cannabis resin appears to have fallen in recent years, many users perceive cannabis resin as adulterated, and forensic analysis has discovered common contamination of resin of both major types with 'caryophylline' a constituent of cloves, also used in the perfume industry.

2.2 Herbal Cannabis

2.2.1 Until recently, most herbal cannabis in the UK was imported from Africa, the Far East and Caribbean, however home-produced cannabis may now represent the major source.

2.2.2 Imported cannabis appears in compressed blocks normally bearing seeds, and would typically have a THC content of 3-8%. Such material frequently appears in poor condition with mould and decomposition present (accelerated if damp - a potential risk for immuno-compromised individuals).

2.2.2 Home grown herbal cannabis falls into three basic categories. 'Hemp' is the fibre-producing variety which can be cultivated under licence for industrial uses, and would normally produce a THC content of under 0.5% (although some long-established cultivars, and individual plants, may produce higher or lower THC contents), and a relatively high CBD:THC ratio.

2.2.2 Until recent years, most domestically produced cannabis for drug content was derived from seeds in imported 'deals'. THC content would be from 1% to 8%, similar to imported cannabis.

2.2.3 In the past decade, commercial seed developers based in the Netherlands have developed a number of cultivars (e.g. 'Skunk', 'Northern Lights' and many others) suited for indoor growth by virtue of short stature (internodal lengths), and early flowering. THC contents are increased by preventing pollination of female plants by males, leading to 'sinsemilla' - development of extensive flowering tops. The THC contents of these varieties in ideal conditions vary considerably, from around 5% to 15%, with exceptional cases producing 20% THC. The cannabinoid spectrum of these plants also varies. I am not aware of any data available on the actual cannabinoid composition of different varieties, although CBD levels tend to be low or absent.

2.2.4 The THC contents associated with 'Skunk' cannabis should not be considered unusual, as similar potencies were reported from some imported material seized in the 1970s and 1980s. Furthermore, THC losses in storage and transportation can render imported cannabis significantly inferior to domestically-produced product.

2.3 Cannabis Oil

2.3.1 The legal position of liquid cannabis (also known as 'hash oil') is currently the subject of legal argument. This dark, viscous, liquid is prepared from solvent extraction of cannabis plants, and contains a high level of THC (10%-70%).

SECTION 3 CONSUMPTION PATTERNS OF REGULAR CANNABIS USERS

3.1 UK data

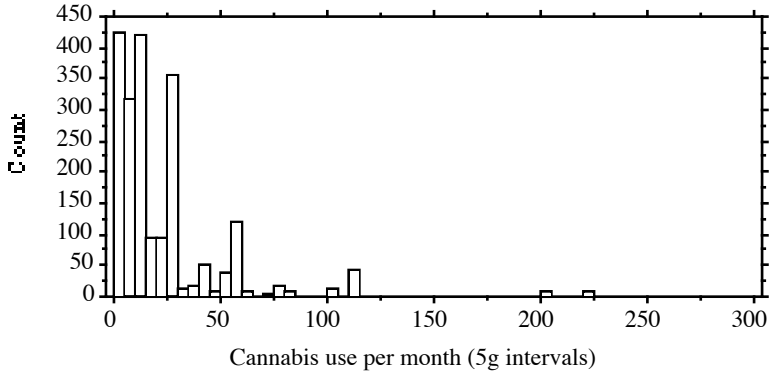
3.1.1 Our research into cannabis consumption[6] [7], was originally based on two surveys (1982 and 1984) of self-selected regular cannabis users, finding that the "average" (mean) cannabis usage was just over one ounce per month (29.3-29.9g). Both surveys showed very similar patterns, with a large number of relatively moderate users (median usage was 14g/month), but a smaller number of heavy and very heavy users (mean use for "more than daily" users was 65.8g), with the maximum usage of 150g, or just over 6 ounces, per month. Users of imported herbal cannabis had a higher mean consumption (57.1g/month) than users of resin.

3.1.2 Results from 'Regular Users', our 1994 survey of cannabis consumption[8], using data collected from 1333 drug users, from a UK pop festival in June 1994, and further samples distributed by direct mail and by snowballing, suggested very little difference from the 1984 figures. The overall mean monthly cannabis consumption of the respondents was 24.8g per month.

3.1.3 Consumption of cannabis by daily users averaged 34.8g per month, with mean purchase of 60.1g per month. These daily users averaged 7.7 "spliffs" per day, as against the overall average of 5.98 per day. The maximum accepted personal consumption (10 respondents) was 200-250g, or 7-9oz per month.

3.1.4 The 1994 and 1997 survey samples both showed similar mean cannabis usage (overall 24.8g, 23.92g respectively) and distributions, and were combined to form a total sample of 2469 users. The distribution of monthly consumption (fig 1) is shown below.

Fig 1 - Distribution of monthly cannabis use



3.1.5 As with our previous studies, the majority of cannabis users consume relatively modest amounts, although there are a minority of heavy users who consume substantially more than 'average'. The top credible consumption was 400g or approximately 1/2oz per day, by a grower who had produced 208 plants in his most recent crop. At 3%-15% THC, this could represent between 400mg and 2000mg THC per day. He reported 'memory loss' as a health problem and did not report any health benefits! There was a small cluster of 19 respondents in the range 200-250g (approx. 2oz per week), representing THC intakes of between 200mg and 1250mg per day. This

contrasts with the maximum reported cannabis use in the literature of 10g/day (McBride)[9] in the UK, and 50g per day (Schaeffer et al)[10] in the Caribbean (estimated at 4000mg THC/day based on determined 8% THC content).

3.1.6 Fairbairn's 1973 study of reefer content[11] quoted regular use by three groups of experimental subjects of (a) 2g to 6g of cannabis per day (mean 3.8g) (b) 0.1g to 1g per day (mean 0.3g), (c) 0.3g to 8.3g per day (mean 2.8g), some users smoking 10-20 reefers per day. The heaviest user in this study would have consumed 252g per month, consistent with the heaviest reported use from our surveys.

3.1.7 Caplin & Woodward[12], for the BBC's Drugwatch TV special, conducted a survey of drug users in 1984. The 'cannabis only' users spent an average £12 per week, representing 3.8g to 5.9g per week at 1984 prices[13]. The heaviest 8%, spending up to £30 per week, would have used 9.6g to 15.8g per week at 1984 prices. However, these did not include the "cannabis plus" (other drugs) users, who spent up to £200 per week in total. The Drugwatch study can be criticised on a number of grounds, as it asked viewers to write in for a detailed questionnaire following graphic portrayals of the problems associated with hard drug use. The overall response rate is not stated, (3000 questionnaires were distributed) although the "cannabis only" group constituted only 3% of the total sample.

3.1.9 McBride's recent study of cannabis use in 100 attenders at a drug and alcohol clinic in South Wales[14], found average cannabis use of 10.5g per week (approx. 45g per month) with the heaviest user reporting 70g per week at a cost of £250. McBride calculated, on the basis of responses to questions about the number of joints per "eighth" or "sixteenth", that users would consume 350mg of cannabis resin, or 620mg herbal cannabis, in a joint. Those who did not use tobacco consumed about 27% more cannabis or resin per cigarette or pipe than those who used a mix, although there was no difference in the overall cannabis usage between these two groups.

3.1.10 Approximately 2-5% of regular cannabis users purchase the drug on a 'less than monthly' basis[15], buying several ounces at a time to take account of bulk prices. The average quantity purchased per transaction increases sharply with the duration of use (particularly among users of over 20 years standing), and the proportion reported to be used personally is also highest amongst this age group.

3.2 World data

3.2.1 In countries where use of cannabis is traditional, and where plentiful supplies are cultivated locally, the amount consumed can exceed 2oz (56g) per day, e.g. Schaeffer[16], Carter[17]. Looking at the dosage of THC to which smokers were exposed, Rubin[18], Bowman & Pihl[19], and Beaubrun[20] found THC dosages of 60 to 420 mg/day, equivalent to smoking 4 to 28 grams (1/8oz to 1oz) of cannabis per day with 3% THC (allowing for wastage during smoking). Stephanis et alia[21] found that hashish users in Greece used an average of 7.48g (approx. 1/4 oz) per day.

3.2.2 To put these figures into perspective, a person who smokes 30 cigarettes per day will consume roughly 1 ounce (28g) of tobacco per day, as each filter cigarette contains approximately 800mg-1.0g of tobacco.

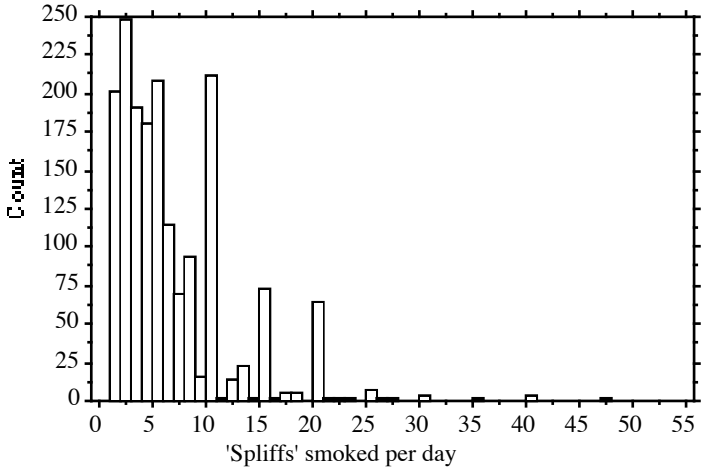
3.3 Composition of "Joints"

3.3.1 Published[22] and unpublished Home Office data[23] suggests that the average (mean) amount of cannabis (normally mixed with tobacco) in what they call a "reefer" cigarette is approximately 200mg. However, a crude average can represent either a broad or a narrow distribution of results. These, and other reports[24] have shown a very wide range of amounts of cannabis in a "joint", from a few milligrams to over one gram, with virtually all reports showing a significant minority of cigarettes containing over 300mg of cannabis. The main criticism of these reports is that they have only analysed cannabis reefers rolled with tobacco. Very few complete unsmoked reefers rolled with "home grown" appear in the samples.

3.3.2 Results from our 1994 survey[25] give similar distributions. By dividing the reported monthly cannabis use by the total number of pipes and reefers smoked, it was possible to arrive at a crude estimate of the amounts of cannabis in reefers. The mean amount was 155mg, with 10.6% of the estimates being over 300mg, 3.3% over 500mg, and 1.7% over 750mg.

3.3.3 From the combined 1994-97 surveys, the distributions of number of 'spliffs' (reefers) smoked per day are shown in fig 1 below.

Fig 2 - Distribution of number of 'spliffs' smoked per day



3.4 Eating and Drinking cannabis

3.4.1 Around 1 to 2% of users consume 50% or more of their cannabis in food or drink, and around 25% eat or drink their cannabis on occasions[26]. Consumption of cannabis in a tea is increasingly common, particularly among non-smokers seeking a medicinal benefit, and in West Indian (Ganja tea) and Asian communities (bhang).

3.4.2 Recipes for cannabis typically call for up to half an ounce or more of cannabis leaves[27], which can also be used as a salad vegetable. Cannabis tea is likely to require 2-3 grams of leaves per cup - a Brooke Bond tea bag contains just over 3 grams of tea[28].

3.5 Summary of consumption statistics

3.5.1 The equivalent consumption levels and 'reefers per day' of users at different percentiles of the above range is as shown in table 1 below. The top 4% would use 1oz per week or more (one user in 25), 1% would smoke 200-250g per month. The most commonly reported use was 28g, or one ounce per month, although median usage was equivalent to one eighth ounce per week.

Table 1

Cannabis Use Percentiles (1994-97 - *n* = 2469)						
Percentile	**Monthly use**	**Weekly use**	**Daily use**	**THC @ 3%**	**THC @ 15%**	**Joints per day**
50% (median)	14g	3.5g	0.5g	15mg	75mg	5
Top 25% (mode)	28g	7g	1g	30mg	150mg	10
Top 10%	56g	14g	2g	60mg	300mg	15
Top 5%	76g	19g	2.7g	81mg	405mg	17
Top 1%	200g	50g	7.1g	213mg	1065mg	23
Maximum	400g	100g	13.3g	400mg	2000mg	47

SECTION 4. METHODS OF CANNABIS INGESTION

4.1 Routes of administration

4.1.1 Most cannabis in the UK is consumed in hand-rolled cigarettes ("joints", "reefers" or "spliffs") combined with tobacco, accounting for over 70% of consumption[29 30]. Herbal cannabis is frequently smoked without added tobacco, accounting for about 5% of consumption, or smoked in pipes (16%). Either herbal cannabis or resin may be eaten by itself or in other food (4%). (By contrast, the most common form of marijuana consumption in the USA is the neat rolled cigarette). Cannabis resin accounts for around 60% of the total used, imported cannabis around 10%, and domestically-produced cannabis around 30%. Cannabis oil accounts for a small fraction of one percent of the market.

4.1.2 Cannabis can be smoked with or without tobacco in a pipe or water pipe ("bong"). Other methods of smoking without tobacco include 'hot knives' where a piece is crushed between red-hot blades and the vapours inhaled, or a coal is left to smoulder and the smoke collected in a glass, bottle or bucket before inhalation. Although smoking around 2-6 pipes per day would represent average consumption, a significant minority of users will consume in excess of 15 pipes per day.

4.1.3 Cannabis resin "joints" with tobacco contain on average approx. 150mg, resin, range around 50mg to 350mg. Herbal cannabis "joints" with tobacco contain an average of around 200mg cannabis, although amounts vary considerably. A minority of herbal cannabis users, mainly those who grow their own, smoke cannabis in neat cigarettes containing 500mg to 1g.

4.1.3 Cannabis Oil when smoked is commonly smeared on to a cigarette paper and tobacco then enclosed, or a drop is mixed with tobacco before the material is rolled in the paper. As it is inconvenient to smoke, many users of oil prefer to use it in cooking.

4.1.4 Use in oral preparations is limited by the lipid solubility of THC and other cannabinoids, requiring use of fats or alcohol to emulsify the drug into an edible form. The main problem is the risk of overdose, as the effects are slow to develop but can be intense.

4.1.5 The BMA report[31] on therapeutic uses referred to particulate studies of cannabis and tobacco cigarettes, originally published in 1982 by the National Institute on Drug Abuse in the USA. The cannabis used was of poor quality by today's standards (approx. 1% THC). It is by no means clear whether the composition of smoke from high potency cannabis would be similar to the cannabis used for that study, and I am unaware of any studies as to the content of smoke arising from cannabis resin in pipes or resin/tobacco reefers. Such research should be considered a priority.

4.1.6 A recent study of water pipes and other smoking paraphernalia found that an unfiltered pure cannabis cigarette was as effective a method of delivery as any of the devices tested, using criteria of THC dose to particulates and other potential carcinogens. However, one of the vapourisers tested did perform similarly. Most water pipes absorbed too much THC, leading the user to smoke more to achieve the desired 'high'.

4.2 Smoking

4.2.1 Methods of ingestion vary widely in prevalence across the globe. 77.6% of cannabis use in the UK is by smoking joints, the majority of which contain tobacco. Smoking in all its forms accounted for some 96.2% of our samples of methods.[32]

4.2.2 Whether cannabis smoke is more or less harmful than tobacco smoke is an argument that constantly rages between the extremes of the drug debate. It is, however, irrelevant, as all research indicates that both substances contain a variety of carcinogens such as polycyclic aromatic hydrocarbons as well as other noxious substances.

4.2.3 The preference for smoking as a method of ingestion may be a result of several different factors. Smoking cannabis produces noticeable effects far more immediately than when it is eaten or drunk. It is also consumed in small, discrete amounts over a mildly extended period of time. The dosage is easily controlled by self-titration. In contrast eating cannabis, whether raw or in preparations, predicates towards consuming the entire uncertain dosage at once. This can easily result in the consumption of less or more than required to achieve the desired effects.

4.2.4 Traditionally cannabis users have viewed the health risk of each method of ingestion to run from greatest to least in the following order: joint with tobacco, neat joint, pipe, water pipe, vaporiser and eaten. This has been based on observable differences in each method and on "common sense".

4.2.5 In a joint the entire matter is inhaled leaving very little residue other than a fine ash. This indicates that the user is ingesting all the compounds from the drug as well as those from the paper and tobacco. The smoke inhaled is of a reasonably high temperature, which increases as the joint is consumed and the cooling effect of the journey from tip to mouth is reduced.

4.2.6 Smoking cannabis in pipes immediately removes tobacco compounds, as well as those contained in the paper. A proportion of the tars and oils remain fixed to the inner surfaces of the pipe.

4.2.7 Water pipes have several advantages over other forms of smoking since a percentage of the tars and particulate matter are retained in suspension as the vapour passes through the reservoir, as well as on the inner surfaces of the pipe. Fairbairn's group postulated[33] that, since the natural inhibitor of THC action which is present in cannabis is water soluble, the use of water pipes will reduce its effects and in consequence maximise the psychoactive effect.

4.2.8 More recently the UK and US cannabis scenes have witnessed a growth in popularity of the vaporiser. Vaporisers are designed to heat the drug to the point at which the volatile cannabinoids are released without the plant material combusting. The desired result is to maximise the cannabinoids ingested without necessarily inhaling the particulates and tars.

4.2.9 Recent harm reduction research in America[34] has thrown doubt on the traditional beliefs concerning the health risks associated with the various forms of inhalation. Seven devices (a filtered joint, an unfiltered joint, a portable water pipe, a traditional bong, a battery operated water pipe, a vaporiser and a hybrid water pipe/vaporiser) were tested, and the amounts of cannabinoids and solid particulates delivered to the user were measured and compared. In all cases the devices used neat marijuana supplied by NIDA with a potency of 2.3% THC.

4.2.10 The researchers were surprised to discover that the water pipes were consistently outperformed by the unfiltered joint (with a ratio of 1 part cannabinoids to 13 parts tar) The best performing water pipe was matched by the filtered joint, both devices producing about 30% more tar per cannabinoids. The two vaporisers did better than the unfiltered joint, although the hybrid device only just so, while the pure vaporiser outperformed the joint by some 25%. However, the vaporiser produced much lower levels of THC and higher levels of non-psychoactive CBN than the other devices. While this might not be a problem for users whose primary purpose is medicinal the study was intended to aid harm reduction in recreational users, and so results were recomputed to provide a THC to particulates ratio. When this was done the pure vaporiser fell to a position below that of the unfiltered joint.

4.2.11 The researchers point out that no readings of the noxious gases produced in the burning of marijuana were measured. Gases such as hydrogen cyanide, volatile phenols, aldehydes and carbon monoxide are known to occur. Since water filtration has previously been shown to be effective at removing some of them, the team concluded that further research may indicate that the use of water pipes may offer a net health benefit.

4.2.12 In addition, THC transfer rates were computed to establish the smoking efficiency of the various devices. Again, the unfiltered joint performed surprisingly well and, along with the bong and the portable water pipe, delivered about 20% of the THC to the user. All the other devices had transfer rates less than one third as efficient as the top three devices.

4.2.13 The research was carried out in terms of harm reduction, with a view to reducing the amount of carcinogenic tars inhaled rather than non-carcinogenic cannabinoids. In consequence, the researchers reached the conclusion that the higher the ratio of THC to tars the better, since users normally regulated their doses based on how profound an effect they achieved rather than on the amount of cannabis consumed. Therefore, if a greater degree of "high" were obtained from a smaller amount of cannabis then the amount smoked would decrease proportionally.

4.2.14 This reasoning also leads to the conclusion that the higher the potency of the cannabis smoked the lower the amount smoked. The results were obtained with 2.3% THC cannabis, while commonly available cannabis on the street has higher levels of THC with no increase in tar levels. Had cannabis with a potency of 12-14% THC been used then, the researchers suggested, users would be able to reduce their inhalation of tar by a factor of five while still achieving the desired level of high.

4.3 Oral Use and Dosages

4.3.1 When cannabis is taken orally, the effects take much longer to develop and peak, (1-2 hours, as opposed to a few seconds), and subside more slowly. THC, not being water-soluble, must be taken with some fat, oil or alcoholic carrier to permit absorption into the blood. It is generally considered that up to three times as much cannabis is required when taken orally compared to smoking the drug, as evidenced by the equivalent analgesic efficacy of THC doses of 20mg taken orally[35] and 7.5mg smoked[36].

4.3.2 According to Parke-Davis[37] a 70kg man should require 4mg/kg, or 280mg (solid extract) as an effective dose. This would be consistent with

approximately one gram of quality cannabis tops (5-10% potency). Animal studies have suggested higher effective doses[38].

4.3.3 One would expect the user to achieve the most appropriate dose level over time through experience of the desired and the adverse effects. Apart from potentially disturbing psychological effects, the risks to physical health from overdose are not significant.

4.3.4 The BMA have called for further research on appropriate dosage regimens and routes of administration for cannabinoids. Oral preparations, aerosol inhalants, rectal suppositories and skin patches have been discussed.

4.3.5 The economic cost of producing synthetic THC (Dronabinol) is considerably higher than the cost of producing high-potency plants, solvent extraction of the THC and other cannabinoids, and separation via column chromatography. If licensing of preparations for medicinal use is to be considered, these should not be restricted to synthetic products where natural alternatives of known cannabinoid content can be provided more cheaply.

SECTION 5. EFFECTS OF CANNABIS - NEW RESULTS FROM IDMU USER SURVEYS

5.1 Effects of duration of use

5.1.1 The effects of cannabis differ between naïve and experienced users. Naïve users commonly feel either no effect, or alternatively experience intense effects which some find distressing, and which can lead to panic attacks. Many individuals discontinue use at such a point. Experienced users commonly report a sense of relaxation and calm, relief of stress and pain, and enhanced sociability. Tolerance develops both to physical and psychotropic effects, such that the 'high' is diminished, but can also be 'switched on and off' according to set and setting.

5.1.2 The scientific literature provides conflicting evidence of cognitive and psychomotor impairment. Commonly impairment is most marked in naïve users under acute intoxication, or with high doses arising from over-use of more potent preparations, whereas many daily users smoke relatively high doses without any noticeable effects on performance, even in studies involving very heavy chronic users.

5.1.3 Although the prevalence of cannabis use falls after age 30, the proportions reporting use to the British Crime Survey in the older age groups showed the greatest proportional increase during the period 1991-96[39 40], with lifetime prevalence doubling in the 40-44 age group (from 15% to 30%, also 8% higher than the 1991 35-39 year old cohort) and trebling (from 3% to 10%) in the 45-59 age group.

5.1.4 The proportions admitting cannabis use within the past year remained relatively stable between the two British Crime Surveys, when successive age cohorts are compared. Thus the relatively low levels of use by the over 30s appear to reflect a generational/cultural effect rather than substantial numbers of users giving up use.

5.1.5 Using the data generated by the IDMU surveys conducted between 1994 and early 1998, we sought to establish whether there is any evidence of increased or decreased levels of cannabis use as a function of the duration of use, and to plot the progression of use over time. Duration of cannabis use was established by subtracting age of first use from current age, and for analyses divided into 6 categories:

1 Missing values & errors
2. Used 0-1 years
3 Used 2-5 years
4 Used 5-10 years
5 Used 10-20 years
6 Used over 20 years

5.1.6 The typical pattern of use appears to be the 'up peak down' model identified by Cohen & Sas[41], whereby users experiment and use a variety of drugs increasingly heavily during the early part of a drug-using career, but after 5-10 years develop a settled pattern of use involving daily cannabis and occasional use of other drugs. There is little evidence for any further escalation after 2 years, indeed average monthly cannabis use declines thereafter with age. There is no evidence of increased levels of cannabis use over the longer term.

5.1.7 Differences manifest themselves in purchase patterns; longer-established users tend buy larger quantities at one time, leaving themselves open to charges of 'possession with intent' if arrested, even though a greater proportion of their purchases are intended for personal use. Users of over 20 years standing consume a greater proportion in pipes and eaten, and a lower proportion of tobacco 'joints'.

5.1.8 It is clear that a substantial proportion of cannabis users continue to use the drug well into middle-age, and that a greater proportion of cannabis users use the drug daily than with other controlled drugs. The pattern of use is broadly similar to that seen with caffeine, which is used several times per day by most UK citizens, and in many cases for similar reasons (relaxation, mental stimulation). Most users consume relatively small amounts - one gram per day or less, although a small number of very heavy users exist. (See Table 2 below).

5.2 Cannabis Dependence?

5.2.1 Recent developments in cannabinoid neurobiology have raised the question of cannabis addiction, on the basis of a common action of dopamine release mediated by μ-opioid receptors in the nucleus accumbens[42]. The action of THC and a synthetic cannabinoid were blocked by both cannabinoid antagonist and naloxone, whereas heroin activation of dopamine was blocked by naloxone only. This suggests the action of cannabis/ anandamide to take place 'upstream' of the opiate/endorphin system, possibly stimulating the release of endogenous opioids or altering receptor activity, which has implications both for the management of pain and for the treatment of addiction to other drugs. A neurochemical basis for cannabis withdrawal symptoms was also postulated by Fonseca et al[43], based on CRF release in the amygdala produced by administration of a cannabinoid antagonist to rats pre-treated with a potent cannabinoid agonist (many times more potent than THC).

5.2.3 Withdrawal symptoms from cannabis are reported as including irritability, restlessness, disturbed sleep and anxiety, although the reduction in plasma cannabinoid levels following cessation of use is more gradual than with opiates or stimulants.

5.3 Effects on driving

5.3.1 Evidence as to the effects on driving ability is inconclusive. While some studies have shown impairment of psychomotor function and procedures involving complex multitasking (e.g. among airline pilots), moderate doses of cannabis or THC show little or no effect on actual driving performance. Where some impairment in performance is demonstrated, the level of impairment is normally lower than that produced by alcohol intoxication at blood concentrations below present and proposed legal limits. As with other effects, the level of impairment is greatest among naïve users and/or inexperienced drivers.

5.3.2 The evidence from road accident casualties, and from our own surveys, does not lead to a conclusion that cannabis use is a major cause of road accidents, when compared to prevalence levels within the same age cohort. Our own 1994 survey found reported accident rates per 100,000km, among a survey sample mainly under 30 years old, not to be significantly higher than the national average from all drivers. However we do not yet consider this research to be conclusive, and ongoing studies are being undertaken.

Table 2 - Effects of duration of cannabis use on patterns of use						
Variable	Missing/ errors	Used 0-1 years	Used 2-5 years	Used 5-10 years	Used 10-20 years	Used over 20 years
	Mean	Mean	Mean	Mean	Mean	Mean
Count	n = 119	n = 73	n = 511	n = 1011	n = 812	n = 267
Age***	26.49	19.36	19.51	22.42	28.89	41.47
Age first cannabis use***	15.90	18.53	16.37	15.73	15.64	16.29
Cannabis monthly spending (1)†	57.53	29.51	47.61	94.78	68.80	67.18
Cannabis Rating	8.31	8.54	8.58	8.92	8.86	9.04
Cannabis amount per purchase*	9.75	4.96	11.36	15.19	24.29	55.60
Cannabis Purchase unit price*	29.95	17.87	36.79	48.65	67.34	80.77
Average % personal use*	76.74	65.68	68.09	68.51	69.16	77.36
Monthly cannabis use (g)	33.11	12.34	29.99	25.90	24.91	23.25
Monthly cannabis purchase	55.35	36.13	23.92	64.37	53.82	37.33
Monthly cannabis spending (2)	78.22	52.47	54.23	110.9	89.16	97.93
% soapbar resin use***	47.55	47.89	36.48	36.06	42.60	45.61
% 'unknown' resin*	28.75	41.39	30.74	21.54	23.92	27.84
% 'Thai bush' use*	17.17	31.43	15.45	16.43	10.45	6.94
% 'Skunk' use**	28.94	28.27	18.19	24.08	25.72	29.65
% 'unknown' bush*	20.86	32.46	29.49	21.46	20.07	17.23
% use tobacco reefers*	64.47	72.44	72.57	73.4	72.45	63.98
% use 'neat joints' **	19.33	5.77	4.97	4.45	4.60	7.52
% use water pipe	3.60	8.56	9.53	10.13	8.18	6.64
% use other pipe	4.40	5.87	6.34	5.56	7.47	10.56
Total pipes %	8.00	14.43	15.87	15.69	15.65	17.20
% eat neat***	0.07	0.77	1.17	1.17	1.06	3.80
% eat other food	1.73	3.23	2.19	1.93	2.50	3.66
% drinking	0	0	0.19	0.11	0.08	0.71
Total eat/drink %	1.80	4.00	3.55	3.21	3.64	8.17
% hot knives***	6.40	1.82	1.24	1.32	0.61	0.72
% other smoking	0	0.10	1.20	0.83	1.70	0.73
% other method	0.07	1.05	0.69	0.76	0.29	0.68
Error rate %	0.7%	1%	2%	5%	11%	4%
Reefers per day***	4.81	2.62	4.84	6.25	6.06	5.74
Pipes per day	1.38	0.91	1.98	2.75	2.61	2.85
No. of plants grown	12.82	2.76	19.08	13.08	27.02	30.43
% busted - cannabis***	25.0%	4.92%	14.2%	20.5%	34.5%	49.4%

82% of respondents answering the 'methods' questions correctly added up to 100%, 8 respondents (0.4%) gave totals in excess of 200%.

5.4 Health Problems & Benefits attributed to cannabis use

5.4.1 IDMU has conducted surveys since 1994 and developed a database (to June 1998) of 2794 drug users. Questions have included data on drug consumption patterns, attitudes to drugs, driving behaviour and contact with the law or treatment services. All of the users were asked whether they had experienced health problems or benefits as a result of using cannabis, and if so what problems or benefits were reported. The latter were open-ended 'write in' questions entered as summaries or quotes. These were subsequently consolidated into a number of different categories, e.g. 'amotivation' included quotes such as 'tiredness', 'laziness', 'missed lecture' etc. These categories were not mutually exclusive, as a proportion of respondents reported a number of problems and/or benefits, and a further proportion stated simply 'yes' to the general questions but listed no specific problems and/or benefits. As questions about each effect were not specifically asked, the prevalence of such effects within the user population is likely to be underestimated by these results.

5.4.2 Investigation of significant differences between respondents reporting the various problems and benefits and those not reporting such effects included consideration of the following variables (137 variables in total).

(a) Age, Initiation - age at first use of all drugs (tea/coffee, tobacco, alcohol, cannabis, amphet, cocaine, crack, heroin, LSD, mushrooms, ketamine, opium, ecstasy, barbiturates, tranquillisers & solvents), Duration of using all drugs (current age minus initiation age)

(b) Frequency of use of all drugs, and aggregate frequencies for different drug types (coded from 0 - non user to 4 - daily use for each drug)

(c) Monthly spending on all drugs, quantity normally purchased at one time

(d) Ratings of all drugs, plus 'soap bar' resin and 'skunk', (on a 0-10 scale)

(e) Use of cannabis (monthly use, spending, purchase, reefers/pipes per day, plus types of cannabis used, methods of using cannabis (as % of individual use) & number of plants grown)

(f) Quantitative caffeine, tobacco and alcohol consumption

5.4.3 In the tables below, only differences which were statistically significant, or approaching statistical significance ($p<0.1$), are listed. No statistically significant relationships were found where these are not specifically stated. Interpretation of results with marginal significance should be undertaken with caution, as on average 7 ostensibly 'significant' (@5%) relationships would be expected to arise for each tranche of 137 variables. In questions on initiation ages, monthly spending, purchase and duration of use of specific drugs, plus types of cannabis and methods of cannabis use, missing values are excluded from the analysis, i.e. comparisons are only valid between those reporting some use of/spending on that particular drug/variety/method. Frequency/probability of use data refers to all respondents (missing values coded as 'zero' i.e. non-user if space left blank).

Table 3

Reported Health Problems attributed to Cannabis Use *IDMU 1994-98 drug user surveys - combined data, n=2794*			
Problems	**No of reports**	**%**	**Comments/ Significant differences from other respondents** ***† - p<.01, * - p<.05, ** - p<.01, *** - p<.001***
All Problems	588	21.0%	Older initiation to mushrooms†, LSD†, barbiturates*, tranquillisers* & solvents† Higher frequency/ probability of using caffeine***, tobacco***, alcohol***, cannabis***, amphetamine*, cocaine, mushrooms**, heroin*, LSD†, ecstasy***, tranquilisers***, all aggregate frequencies***. Lower spending on solvents† Higher rating of caffeine*, lower ratings of tobacco**, cannabis*, barbiturates* and soap-bar resin***. Lower use of Lebanese resin† and African bush*, neat reefers**, pipes* cigarettes per day†, daily tea/coffee†, higher use of tobacco reefers†
Memory problems	170	6.1%	Higher frequency/probability of using caffeine†, tobacco***, cannabis***, amphet*, mushrooms*, heroin*, LSD†, ecstasy**, tranquillisers*, aggregate frequency all drugs***, legal drugs**, stimulants***, hallucinogens***, depressants†, illegal drugs exc. cannabis**. Longer duration of using heroin† Lower ratings of barbiturates* & soap-bar resin* Lower use of African bush†, cigarettes per day*
Paranoia	156	5.6%	Older initiation to caffeine†, base amphet* barbiturates* Higher frequency/probability of using caffeine*, cocaine*, crack†, ecstasy***, aggregate frequency all drugs**, legal drugs*, stimulants***, hallucinogens†, depressants*, illegal drugs exc. cannabis*. Longer duration of using barbiturates† & tranquillisers† Higher rating of caffeine*, lower ratings of tobacco**, alcohol†, amphet†, mushrooms†, LSD† & soap-bar resin*. More mushrooms gathered*, lower use of Lebanese resin† & pipes*, higher use of home-grown***, higher likelihood of injecting drug use**
Amotivation Included those reporting apathy, laziness and related effects.	133	4.8%	Older initiation to use of caffeine*, tobacco†, mushrooms†, crack**, solvents* Higher frequency/probability of using caffeine**, tobacco*, alcohol**, cannabis**, ecstasy**, tranquillisers***, aggregate frequency all drugs***, legal drugs***, stimulants*, hallucinogens**, depressants***, illegal drugs exc. cannabis**. Higher spending on barbiturates*** Lower ratings of tobacco*, cannabis†, higher rating of tranquillisers†. Higher use of tobacco reefers†, pipes†, fewer cigarettes† & cups of tea/coffee* per day.

Continues

Table 3 *Continued*

Reported Health Problems attributed to Cannabis Use *IDMU 1994-98 drug user surveys - combined data, n=2794*			
Problems	**No of reports**	**%**	**Comments/ Significant differences from other respondents** ***† - p<.01, * - p<.05, ** - p<.01, *** - p<.001***
Respiratory problems Included those reporting chest problems, asthma, cough, sore throat or other respiratory tract symptoms.	116	4.2%	Younger initiation to alcohol***, longer duration of using alcohol* and amphetamine†. Higher frequency/probability of using cannabis*, cocaine*, mushrooms†, tranquillisers†, aggregate frequency all drugs*, hallucinogens†, depressants†, illegal drugs exc. cannabis*. Lower ratings of tobacco** and amphet, higher rating of heroin† Lower use of Asian resin† and neat reefers†, higher probability of injecting drug use†
Anxiety/ panic	50	1.8%	Older initiation to tranquillisers* Higher frequency/probability of using caffeine† Longer duration of cannabis use*, amphet†, mushrooms†, LSD† and barbiturates* Higher spending on amphetamine†, ecstasy†, barbiturates*** and tranquillisers** Lower rating of cannabis†, soap bar resin**, higher barbiturate rating†
Cognitive problems Included those reporting confusion, difficulty in thinking, 'head f***ed' etc.	49	1.7%	Younger initiation to alcohol use†, longer duration of caffeine use* Higher frequency/probability of using tobacco†, cannabis*, legal drugs† Higher spending on mushrooms***, barbiturates*** and tranquillisers* Higher rating of caffeine*, fewer reefers per day† Older initiation to tea/coffee* and alcohol*, shorter duration of using tobacco†, alcohol*, cannabis† & amphet*
Overdose/ nausea	35	1.3%	Older initiation to tea/coffee* and alcohol*, shorter duration of using tobacco†, alcohol*, cannabis† & amphet* Lower rating of cannabis* Higher use of cannabis in food*, fewer reefers*, cigarettes* and cups of tea/coffee† per day.
Tobacco- related problems Included respiratory problems and/or nicotine addiction attributed to smoking cannabis/ tobacco mixtures	29	0.9%	Earlier initiation to alcohol* & tranquillisers**, later initiation to ecstasy† Higher frequency/probability of using cannabis†, and mushrooms* Higher rating of ketamine**, lower ratings of caffeine* & tobacco* Increased use of soap-bar resin†, and use in food†, lower use of African bush†

Continues

Table 3 *Continued*

Reported Health Problems attributed to Cannabis Use *IDMU 1994-98 drug user surveys - combined data, n=2794*			
Problems	**No of reports**	**%**	**Comments/ Significant differences from other respondents** ***† - p<.01, * - p<.05, ** - p<.01, *** - p<.001***
Dependence Included those reporting dependence, 'habit' or problems arising out of difficulties with supply	18	0.6%	Older**, earlier initiation to tobacco**, alcohol† Higher frequency/probability of using cannabis†, amphet†, cocaine†, LSD*, ecstasy*, tranquillisers†, aggregate frequency all drugs*, stimulants**, hallucinogens**, illegal drugs exc. cannabis** Longer duration of using caffeine*, tobacco***, alcohol†, cannabis**, amphet**, cocaine†, mushrooms*, LSD**, ecstasy***, tranquillisers* Higher spending on cannabis*, ecstasy*, barbirurates***, tranquilisers*** and solvents†. Lower ratings of tobacco† & alcohol* Greater purchasing of LSD*** and amphet** More reefers smoked per day†
Police/ law problems Included those attributing paranoia/ anxiety symptoms to the legal situation of cannabis	17	0.6%	Higher frequency/probability of using stimulants† Lower ratings of tobacco†, alcohol* and soap-bar resin* More mushrooms gathered*
Psychosis Included manic depression & schizophrenia	12	0.4%	Older***, later initiation to tobacco*, alcohol†, cannabis†, mushrooms***, LSD* and tranquillisers** Longer duration of using tobacco**, alcohol**, cannabis**, cocaine*, mushrooms** LSD† ecstasy† and barbiturates†
Other problems	18	0.6%	Older***, later initiation to cannabis**, cocaine*, mushrooms*, ecstasy*** and tranquillisers* Higher frequency/probability of using tobacco*, cocaine*, heroin**, tranquillisers**, aggregate frequency all drugs**, legal drugs†, stimulants†, depressants**, illegal drugs exc. cannabis* Longer duration of using tobacco**, alcohol**, cannabis* and LSD* Lower rating of soap-bar resin† More pipes† and cigarettes† smoked per day
194 individuals reported two or more health problems			

Aggregate problems: Significant relationship between aggregate problems and use of stimulants*, and to a lesser extent depressants (including alcohol)†. None of the other aggregate frequencies approached statistical significance.

Table 4

Reported Health Benefits attributed to Cannabis Use *IDMU 1994-98 drug user surveys - combined data, n=2794*			
Physical Health Benefits	**No of reports**	**%**	**Comments/ Significant differences from other respondents** ***† - p<.01, * - p<.05, ** - p<.01, *** - p<.001***
Pain relief	170	6.1%	Older**, later initiation to use of tobacco**, cannabis***, mushrooms** ecstasy* and tranquillisers**, earlier initiation to alcohol use† Longer duration of using alcohol***, cocaine*** barbiturates† and tranquillisers** Higher frequency/probability of using caffeine*, cannabis***, heroin† & tranquillisers* Higher spending on barbiturates†, lower on alcohol† Lower ratings of tobacco†, alcohol** and ecstasy* Greater quantity of mushrooms gathered***, increased proportion of use of 'other unknown' bush*, eaten neat* Greater daily caffeine consumption**, lower weekly alcohol units**
Respiratory benefit	67	2.4%	Higher frequency/probability of using cannabis† Shorter duration of using caffeine†, LSD†, solvents* Lower spending on alcohol*, higher on LSD* & ecstasy* Lower ratings of tobacco*, alcohol***, amphet†, cocaine* & tranquillisers†, higher rating of 'skunk'** Greater quantity purchased/gathered of ecstasy* and mushrooms* Greater proportion of use of skunk*, lower proportion of tobacco-reefers*, more reefers smoked per day**, fewer units alcohol per week†
Improved Sleep	46	1.6%	Later initiation to tobacco*, cannabis† and tranquillisers Higher frequency/probability of using alcohol†, cannabis* & depressants† Longer duration of caffeine use* Increased proportion of 'other/unknown' bush* Fewer reefers per day†
Manage Addiction	19	0.7%	Higher frequency/probability of using ecstasy†, tranquillisers**, aggregate frequency all drugs†, hallucinogens*, depressants†, illegal drugs exc. cannabis* Lower alcohol rating* More reefers smoked per day*, more cups tea/coffee per day*
Appetite/nausea	16	0.6%	Later initiation to tobacco†, tranquillisers† Lower frequency/probability of using alcohol†, mushrooms*, LSD*, ecstasy* and aggregate hallucinogens* Lower ratings of alcohol† and ecstasy† Increase quantity of cannabis purchased†, and spending on cannabis**, increased use of pipes*
Epilepsy/ anticonvulsant	8	0.3%	Lower frequency/probability of using alcohol†, amphet†, LSD*, stimulants†, hallucinogens†, depressants† & illegal drugs exc. cannabis* Longer duration of using alcohol† Lower ratings of cocaine*, opium*, ketamine* and ecstasy* Higher proportion of cannabis use as 'soap bar' resin†
Multiple Sclerosis	6	0.2%	Older**, Later initiation to tobacco* & cannabis*** Longer duration of using tobacco*, alcohol* & LSD†

Continues

Table 4 *Continued*

Reported Health Benefits attributed to Cannabis Use *IDMU 1994-98 drug user surveys - combined data, n=2794*			
Physical Health Benefits	**No of reports**	**%**	**Comments/ Significant differences from other respondents** ***† - p<.01, * - p<.05, ** - p<.01, *** - p<.001***
Glaucoma/ vision	3	0.1%	Older† Later initiation to using mushrooms*** and LSD*** Longer duration of alcohol use† Higher tobacco rating†
Other physical benefits	25	0.9%	Higher frequency/probability of using mushrooms† Longer duration of using amphet†, & barbiturates† shorter duration of caffeine† Lower ratings of tobacco*, alcohol**, soap-bar resin***, higher ratings of mushrooms* Lower proportion of use of 'other/unknown' resin*, higher use of pipes* Lower daily use of cigarettes*, weekly alcohol units†
42 individuals reported two or more physical benefits.			
Total Physical benefits	313	11.2%	Later initiation to tobacco* and cannabis** Higher frequency/probability of using cannabis***, tranquillisers*, lower LSD* Shorter duration of using caffeine†, longer for alcohol* Lower alcohol spending**, units per week*** Lower ratings of tobacco*, alcohol*** and ecstasy** Increased use of pipes†. More caffeine by those reporting only 1 or 2 physical benefits compared to more or none**

Mental health benefits	**No of reports**	**%**	**Comments/Significant differences to other respondents** ***† - p<.01, * - p<.05, ** - p<.01, *** - p<.001***
Relaxation/ stress relief	725	25.9%	Older*** Later initiation to use of tobacco*, cannabis*, amphet**, cocaine*, mushrooms**, LSD***, ecstasy* & tranquillisers** Higher frequency/probability of using caffeine***, tobacco***, alcohol***, cannabis***, amphet***, cocaine***, mushrooms*, crack†, ecstasy***, tranquillisers, all aggregate frequencies***, lower frequency/incidence of barbiturate use* Longer duration of using tobacco*, alcohol***, cannabis**, amphet*, mushrooms*, LSD*, ecstasy** and barbiturates* Higher spending on tobacco*, lower on amphet† & heroin†
Insight/ personal development	244	8.7%	Later initiation to use of caffeine† Higher frequency/probability of using caffeine***, tobacco**, alcohol†, cannabis***, cocaine†, mushrooms***, LSD**, ecstasy**, aggregate frequency all drugs***, legal***, stimulants**, hallucinogens***, illegal drugs exc. cannabis** Lower ratings of alcohol*, amphetamine*, ketamine**, higher rating of mushrooms† Greater quantity of cannabis purchased† Lower proportion of cannabis use involving Lebanese resin†, Asian resin*, other/unknown resin*, Thai bush*, Lower use of neat reefers*, water pipes†, other pipes† and eaten neat† More reefers smoked per day**

Continues

Table 4 *Continued*

Reported Health Benefits attributed to Cannabis Use *IDMU 1994-98 drug user surveys - combined data, n=2794*			
Mental health benefits	**No of reports**	**%**	**Comments/Significant differences to other respondents** ***† - p<.01, * - p<.05, ** - p<.01, *** - p<.001***
Antidepressant/ happiness	138	4.9%	Older* Later initiation to use of amphet*, cocaine**, mushrooms***, LSD*, ecstasy* Higher frequency/probability of using caffeine**, tobacco*, alcohol**, tranquillisers†, legal drugs***, stimulants†, depressants* and illegal drugs exc. cannabis*** Longer duration of using tobacco**, alcohol***, cannabis**, amphet†, opium**, LSD†, barbiturates†, & tranquillisers† Higher spending on opium** Higher ratings of caffeine*, cannabis*, mushrooms†, LSD***, lower rating of soap-bar resin* Higher proportion of cannabis use involving 'skunk'†, other/unknown bush** Fewer cups tea/coffee per day*
Cognitive benefit	81	2.9%	Later initiation to use of caffeine*, earlier alcohol† Lower frequency/probability of using tobacco** Longer duration of use of amphet†, opium*, ketamine†, heroin*, ecstasy* Lower ratings of tobacco**, alcohol*, cocaine† Lower proportion of 'other/unknown' resin†, higher proportion of 'skunk'* & other/unknown bush†
Creativity	65	2.3%	Later initiation to use of caffeine*, tobacco*, ecstasy† Higher frequency/probability of using caffeine*, cannabis**, mushrooms*, aggregate frequency all drugs*, legal drugs* Lower spending on alcohol*, higher on amphet* Lower rating of alcohol† Greater quantity purchased of amphet* and cocaine† Lower proportion of other/unknown resin† Higher proportion of use in pipes*** Fewer units alcohol per week*
Sociability	57	2.0%	Later initiation to use of amphetamine* Higher frequency/probability of using caffeine*, alcohol*, cannabis†, amphet*, cocaine*, LSD*, ecstasy***, aggregate frequency all drugs***, legal drugs**, stimulants***, hallucinogens**, depressants†, illegal drugs exc. cannabis** Higher ratings of caffeine**, cannabis*** and mushrooms* Greater quantity purchased of amphet* and cocaine† Higher cannabis spending** Lower proportion of use of soap-bar resin†
Sensory/ perception	46	1.6%	Later initiation to use of caffeine**, amphet† & solvents† Higher frequency/probability of using caffeine*, mushrooms**, LSD* and aggregate hallucinogens† Higher rating of mushrooms* Greater quantity of cannabis purchased*** Lower proportion of other/unknown resin† Higher proportion of cannabis use in tobacco reefers†, and eaten with food** Fewer reefers per day†

Continues

Table 4 *Continued*

Reported Health Benefits attributed to Cannabis Use *IDMU 1994-98 drug user surveys - combined data, n=2794*			
Mental health benefits	**No of reports**	**%**	**Comments/Significant differences to other respondents** ***† - p<.01, * - p<.05, ** - p<.01, *** - p<.001***
Reduce aggression	39	1.4%	Later initiation to use of alcohol*, earlier use of barbiturates** Lower frequency/probability of using alcohol*, higher incidence/use of solvents†, aggregate hallucinogens†, illegal drugs exc. cannabis† Shorter duration of use of solvents† Lower rating of opium* Lower proportion of cannabis as African bush† More reefers*** and pipes*** smoked per day
Spirituality	24	0.9%	Older** Later initiation to use of opium*, LSD†, ecstasy*** Higher frequency/probability of using cannabis*, cocaine*, mushrooms*, LSD*, ecstasy*, tranquillisers†, aggregate frequency all drugs†, stimulants**, hallucinogens**, illegal drugs exc. cannabis** Longer duration of use of tobacco**, alcohol**, cannabis**, amphet**, mushrooms* & LSD* Lower ratings of tobacco* and alcohol*, higher rating of mushrooms** More reefers† smoked per day
Sexuality	16	0.6%	Older*** Later initiation to use of tobacco*, cannabis*, amphet*, cocaine*, mushrooms**, crack*, LSD** & ecstasy*** Higher frequency/probability of using mushrooms* & crack† Longer duration of use of tobacco**, alcohol***, cannabis***, amphet**, cocaine**, mushrooms**, heroin**, LSD*, ecstasy†, barbiturates† * tranquillisers** Higher proportion of use of Asian resin†, other/unknown bush**, water pipes*, other pipes** eaten with food***
Other psychological benefits	38	1.4%	Later initiation to use of tranquillisers† & solvents** Higher frequency/probability of using tobacco*, cannabis*, amphet*, mushrooms**, LSD**, solvents*, aggregate frequency all drugs*, legal drugs†, stimulants† hallucinogens* and illegal drugs exc. cannabis† Longer duration of use of heroin* & barbiturates* Higher rating of caffeine*, lower rating of soap-bar resin† Lower proportion of use involving soap-bar resin†, higher proportion of other/unknown bush† More reefers smoked per day**
Total Psychological Benefits	1033	37.0%	Older***, Later initiation to use of caffeine*, amphet**, cocaine**, mushrooms***, crack†, LSD*, ecstasy***, tranquillisers* Higher frequency/probability of using caffeine***, cannabis***, cocaine***, mushrooms***, aggregate frequency all drugs***, legal drugs***, hallucinogens***, illegal drugs exc. cannabis***. Higher frequencies among those reporting only 1 or 2 psychological benefits compared to more or none for tobacco***, alcohol***, amphet***, ecstasy***, tranquillisers**, stimulants***, depressants*** Longer duration of use of tobacco**, alcohol***, cannabis**, amphet*, mushrooms*, LSD†, ecstasy* Lower rating of tobacco†, higher rating of cannabis† Higher cannabis purchase quantity**, fewer units of alcohol per week†
333 individuals reported two or more psychological benefits			

Continues

Table 4 *Continued*

Reported Health Benefits attributed to Cannabis Use *IDMU 1994-98 drug user surveys - combined data, n=2794*			
	No of reports	**%**	**Comments/Significant differences to other respondents** († - p<.01, * - p<.05, ** - p<.01, *** - p<.001)
All Health Benefits	**1616**	**57.8%**	Older***, later initiation to tobacco**, cannabis**, amphet***, cocaine***, mushrooms***, LSD***, ecstasy*** tranquillisers† & solvents* Higher frequency/probability of using caffeine***, tobacco***, alcohol**, cannabis***, amphet***, cocaine***, mushrooms***, heroin*, LSD***, ecstasy***, tranquillisers***, all aggregate use frequencies*** (all drugs, legal drugs, stimulants, hallucinogens, depressants, illegal exc. cannabis) Longer duration of using tobacco***, alcohol***, cannabis***, amphet***, cocaine**, mushrooms**, heroin** LSD*** and ecstasy† Lower monthly spending on alcohol***, mushrooms*, heroin†, solvents†, higher spending on cannabis† Lower ratings of tobacco***, alcohol***, amphet*, barbiturates*, tranquillisers† & soap-bar resin*, higher ratings of cannabis*** and mushrooms*** Greater amount purchased/gathered of ecstasy* and mushrooms* Lower use of Lebanese resin*, other/unknown resin**, African bush†, Thai bush†, with food†, and weekly alcohol intake***. Increased reefers per day***, number of plants grown* & tea/coffee daily**
Medicinal use as main reason for cannabis use	78	2.8%	Older (by average 5 years)*** Later initiation to using cannabis**, mushrooms**, ketamine†, ecstasy*** Lower frequency/probability of using alcohol**, ecstasy*, higher cannabis† and tranquilliser** frequency Longer duration of using tobacco***, alcohol***, cannabis***, amphet**, cocaine***, mushrooms*, heroin*, LSD***, ecstasy†, and barbiturates* Lower spending on barbiturates*, higher solvents*** Lower ratings of tobacco†, alcohol***, ecstasy* and solvents* Greater number of mushrooms gathered***, Higher use of 'other/unknown' herbal cannabis**, Higher use by eating 'neat'*** Higher daily tea/coffee, lower weekly alcohol intake

5.5 Reasons for using cannabis

5.5.1 Although 1616 individuals reported medicinal benefits, only 78 reported medicinal reasons (other than relaxation) as a primary motivation for using cannabis. No significant associations found.

Table 5

Reasons for using cannabis		
Reason	***n***	***%***
Relaxation	637	22.8%
Pleasure/recreation	628	22.5%
Social	225	8.1%
Mental benefit	184	6.6%
Comparative risk	137	4.9%
Coping/escape	83	2.9%
Spiritual	82	2.9%
Medicinal	78	2.8%
Political	66	2.4%
Habit	26	0.9%

SECTION 6 MEDICINAL USES OF CANNABIS - LITERATURE REVIEWS

6.1 General Observations

6.1.1 Research on therapeutic applications of cannabis has been effectively discouraged by the legal situation during the latter half of this century. Most medical research has concentrated on potential harmful effects, and much of the best research into therapeutic uses was conducted during the 1970s. Following discovery in recent years of a 'cannabis receptor', there has been increased interest in the therapeutic potential of cannabis and its analogues.

6.1.2 Much of the debate about therapeutic use of cannabis has centred on the reduction of the raw matter to its specific chemical compounds. Studies then try to determine the exact physiological and psychological effects of each constituent on its own. This is, of course, quite in keeping with accepted modern pharmaceutical and medical practice, but often results in scientists and medical experts rejecting the possible inclusion of cannabis derivatives in the pharmacopoeia, on the grounds that existing drugs are available with more precise or efficacious properties.

6.1.3 Such conclusions conflict with modern anecdotal reports citing cannabis in natural form as the most effective treatment in a variety of cases, as well as with long traditions of medical uses. It may be that each of the conditions treated is affected by a number of different compounds present in cannabis, both as agonises and antagonists. Many current pharmaceutical treatments rely on a cocktail of drugs to treat a single condition.

6.1.4 For example, the cannabimimetic effects of Δ^9THC are well documented and frequently cited as arguments against the use of cannabis in therapy. Yet as long ago as 1981 reports appeared citing the presence in raw cannabis of a water soluble inhibitor of the action of THC[44]. Similarly, CBD has been shown to reduce the anxiety caused by high-dosage Δ1THC[45]. It has been suggested that the use of such natural inhibitors in conjunction with the active derivatives might allow the unwanted cannabimimetic effects to be negated while preserving the desired therapeutic properties[46]..

6.1.5 The case against cannabis on the grounds of non-specific action is only valid within the context of a broader argument against alternative therapy in general. The modern NHS and those in private medicine are already moving towards acceptance and even support of alternative and complementary medicine. Many of the treatments in this sphere include the use of similar non-specific natural remedies.

6.1.6 In 1988, US Supreme Court Judge Francis L Young in a ruling[47] on a petition for the rescheduling of marijuana to allow medicinal use, held that such rescheduling should occur, finding that cannabis was “one of the safest therapeutically active substances known to man”. He approved cannabis for the treatment of glaucoma, multiple sclerosis and treatment of the side effects associated with cancer chemotherapy.

6.1.7 In a 1991 report[48], the World Health Organisation Expert Committee on Drug Dependence recommended that THC and related compounds be rescheduled from schedule 1 to schedule 2 of the Convention on Psychotropic Substances 1971. This effectively recognised the therapeutic value of cannabis compounds, would permit wider use in the treatment of organic diseases, and may lead to a dramatic increase in research devoted to

therapeutic applications. Discovery of the 'cannabis receptor' in the central nervous system and other areas[49] has led to an increase in recent research into the therapeutic applications of cannabinoids.

6.2 Medicinal uses

6.2.1 The medicinal uses of cannabis would fall into a number of categories:

6.2.2 Analgesic - This effect is now well-established and the BMA have recommended that some cannabinoids be available for prescription. (literature review below).

6.2.3 Anti-emetic - The use of cannabinoids (e.g. Nabilone) in treating the side-effects of cancer chemotherapy is well established, there is increasing evidence at to efficacy as an appetite stimulant in AIDS patients.

6.2.4 Anticonvulsant - first reported by O'Shaughnessy in 1838, there is substantial evidence for the efficacy of some cannabinoids (e.g. CBD) in treatment of epileptic disorders. As CBD has few psychotropic effects, there would appear to be no logical reason for preventing or discouraging research and/or clinical trials of this cannabinoid. (literature review below).

6.2.5 Anxiolytic - Relief of stress and relaxation is the most commonly-reported 'therapeutic' benefit by most users. However, stress levels can increase dramatically in naïve users exposed to the drug. (literature review below).

6.2.6 Bronchodilator - The BMA report covers potential use of cannabinoids in the treatment of asthmatic disorders. (literature review below)

6.2.7 Opiate/Alcohol dependence - There is limited evidence suggesting that high doses of cannabis may ameliorate the opiate withdrawal syndrome, and the anticonvulsant action of cannabinoids may assist during detoxification of individuals following withdrawal of opiates or alcohol. While there is anecdotal evidence of individuals successfully using cannabis as a long-term substitute for opiates or alcohol, the scientific evidence does not lead to great optimism for this aspect of potential treatment (literature reviews below).

6.3 Historical & Cultural Uses

6.3.1 Culpepper (1616-1654)[50] advocated the use of a decoction (tea) of the cannabis hemp root in the treatment of "the pains of the gout, the hard humours of knots in the joints, the pains and shrinkages of the sinews, and the pains of the hip." In other words, for what we would now class as arthritis.

6.3.2 Rubin[51] reviewed evidence of traditional medicinal usage of the plant from a variety of native cultures. The Pan Ts'oo Ching, a Chinese pharmacopoeia dating from the second century AD, stated that an infusion of cannabis "undoes rheumatism". Rabelais, the classical French author, physician and botanist suggested that the "root, boiled in water, softens hardened sinews, contracted joints ...(and) gouty swellings.

6.3.3 O'Shaughnessy[52], in the first modern (1837) treatise on the medicinal use of cannabis, described the widespread medicinal use of the drug in India, including cases where he had successfully used the drug for the relief of convulsions.

6.3.4 Mattison[53] reported of cannabis that "its analgesic virtue is shown in allaying the intense itching of eczema, so as to permit sleep." He cites clinical study of 1000 patients treated with cannabis as a hypnotic (sleep inducing agent) found complete success in 53% and partial success in 22% of cases. Reynolds[54] , personal physician to Queen Victoria, recommended cannabis for use in "senile insomnia".

6.3.5 Mikuriya[55] reviewing 19th Century and early 20th Century medical reports, quotes 1968 correspondence from Parke Davis[56], who produced medicinal cannabis products until the 1930s, suggesting that an effective dose of an alcoholic tincture was 1ml per kilo body weight, and of the solid extract (i.e. the purified cannabinoids) 4mg per kilo was required as an oral dose.

6.4 Cannabis and pain relief

6.4.1 A review of the use of cannabis as an analgesic (pain relief) agent was undertaken by Professor Rafael Mechoulam[57]. A number of researchers using Δ^9 *THC* injections in mice, with dosages of 5-80 mg/kg, have observed significant antinociceptive (pain relieving) activity against thermal, mechanical, electrical and chemical stimuli. In some cases the effect of cannabinoids was stronger than with opioid preparations, and other researchers noted a flat response curve (i.e. once the effective dose level is reached, further dose increases cause no additional effect). Other researchers have found cannabis to potentiate the analgesic effects of opiates[58]. Significant analgesia has been produced in animals with injections into the brain stem and spinal cord.[59 60]

6.4.2 The dosages required to produce detectable pain relief in animal models were substantially in excess of dosages encountered in normal social use (typically 0.1-1.0 mg/kg). The effective dose of THC in the early mouse studies (approx. 5mg/kg) would be the equivalent of an average 70kg man consuming 350mg THC, or smoking 10 grams of cannabis with a potency of 3.5%.

6.4.3 Mechoulam found inconclusive results on pain relief from human subjects, although the dosages in most studies were lower than those found effective in animal models. He concluded that there was "significant analgesic activity" from THC, remarking that the lack of any physical dependence was "a plus", although he was concerned about the "psychotomimetic" effects (i.e. the high) particularly for individuals unused to the drug. In an earlier review[61] Mechoulam had considered the traditional use of cannabis preparations as analgesic and anti-rheumatic agents to have "some modern substantiation".

6.4.4 Noyes et al[62] found a clear dose-related analgesic effect from oral administration of THC. In a second study[63] the analgesic effect was found to be six times as powerful as that of codeine, with 20mg THC producing significant pain relief for over 5 hours. He considered the side effects (sedation and light-headedness) to mitigate against wider clinical use. However, his subjects were inexperienced with marijuana use and as such may have found the psychological effects of the high more disturbing, and thus less tolerable, than experienced users. Milstein et al[64] found that experienced marijuana users exposed to approximately 7.5mg THC by inhalation, achieved a greater analgesic effect than naive subjects, and were less likely to report adverse side effects. Whether this increased response is due to more efficient inhalation techniques in the experienced group, or through a "reverse tolerance" whereby THC has a greater effect in habitués, is not clear.

6.4.5 In Judge Young's report[65] numerous cases histories were described outlining the use of cannabis to reduce muscle tension (spasticity) in individuals with multiple sclerosis or spinal injury. The potential efficacy of cannabis in treatment of MS is increasingly accepted by patients and medical practitioners alike. Ungerleider et al demonstrated clear dose-related reduction of spasticity with doses of 7.5 to 15mg THC[66].

6.4.6 Pertwee[67] reports a number of patients suffering spinal injury or multiple sclerosis claiming cannabis relieves spasticity and pain associated with muscle spasms more effectively than conventional muscle relaxants and with more tolerable side effects. Several clinical trials have supported these claims[68 69 70], indicating that oral THC or inhalation of cannabis smoke can relieve muscle pain and spasticity.

6.4.7 Cannabis was the treatment of choice for migraine in the last century, and a modern report[71] has supported the efficacy of the drug in this respect.

6.4.8 The BMA report made the following recommendations concerning cannabinoids and pain:

> *"The prescription of Nabilone, THC and other cannabinoids should be permitted for patients with intractable pain. Further research is needed into the potential of cannabidiol "*

6.4.9 Our own recent study of cannabis users[72] asked respondents to report any physical or mental health problems and/or benefits which they attributed to cannabis use. Thirty two individuals cited "pain relief" as the main benefit they received, the fourth most common benefit reported (after relaxation (n=89), stress relief (n=67) and improvements in personal development and outlook (n=36)). Two individuals specifically mentioned use of cannabis as a muscle relaxant.

6.5 Antiepileptic/Anticonvulsant effects

6.5.1 The anticonvulsant properties of cannabis were first described in 1837 by O'Shaughnessy[73], who described its successful use in treating spasms caused by tetanus and infantile convulsions. In 1960 an enquiry by the Ohio State Medical committee[74] took evidence from Prof. Miller of Edinburgh as to its effectiveness in treating 'inordinate muscular spasm' caused by tetanus, and from a Dr Kincaid on the successful treatment of fits in three persons suffering epilepsy, two of long term organic and one of traumatic origin, two other patients showed no improvement. In 1890 Reynolds[75], personal physician to Queen Victoria, who described its effectiveness in treating clonic and choreoid spasms of the epileptiform type, described it, for some patients, as 'the most useful agent with which I am acquainted' for treating 'attacks or violent convulsions...(which) may recur two or three times in the hour...may be stopped at once by a full dose of hemp'. However, he did not consider it appropriate for all patients, particularly those with severe epilepsy as a result of 'organic lesion or eccentric irritation'.

6.5.2 In 1949, Davis & Ramsey[76] tested two homologues of THC in a clinical trial on 5 institutionalised epileptic children, three responded as well as to previous therapy, with two virtually symptom free. The authors considered that the cannabinols deserved further trial in non-institutionalised epileptics.

6.5.3 In a 1950 paper, Loewe[77] considered a number of cannabinoids to show antiepileptic activity, and considered that these showed much greater potency

(up to 150 times) and an incomparably greater margin of safety than diphenylhydantoin.

6.5.4 Consroe et al[78] reviewed numerous animal experiments showing anticonvulsant or antiepileptic activity in rat, mouse, frog, cat, baboon and gerbil, some studies showing the development of tolerance to the anticonvulsive effects, and also experiments showing convulsant activity in rat, dog, monkey, cat and rabbit, several of which involved extremely high THC doses of 60-3600mg/kg. Their own experiments confirmed both anticonvulsant and convulsant activity, and recommended further research in this area. In a previous study the same author[79] found that a single epileptic patient receiving conventional anticonvulsant medication (phenobarbitone and diphenylhydantoin) was only able to control seizures when illicit marijuana was used (2-5g per day) in conjunction with the conventional drugs. In 1981, Consroe & Fish[80] considered Nabilone (a synthetic cannabinoid) to be 7.5 times as effective as THC in *provoking* convulsions in a hypersensitive rabbit model. CBD provoked no seizures.

6.5.6 In a double-blind clinical trial of CBD, Cunha et al[81] found it to be effective in abolishing or reducing seizures in 7 out of 8 subjects receiving 100mg daily, whereas only 1 out of 7 placebo controls reported any improvement. Concluded that CBD had a beneficial effect in patients suffering from secondary generalised epilepsy, who did not benefit from known antiepileptic drugs.

6.5.7 Karler & Turkanis[82] considered both Δ^9-THC and 11-hydroxy THC (metabolite) to have anticonvulsant activity, and noted that CBD prolonged the effects of common antiepileptic drugs such as phenobarbitone and diphenylhydantoin, suggesting that the effectiveness of these drugs could be increased in combination with CBD, and considered CBD to have the most promising antiepileptic potential of the cannabinoids. In a later study[83], the same authors suggested the widespread and specific anticonvulsant effects of stereoisomeric cannabinoids was evidence of a specific receptor, and considered CBD to be the most effective non-psychoactive agent, causing a depression of seizure spread. They considered the effect of THC to be attributable to the three major metabolites, with CBD showing a clear dose (brain concentration) response curve, whereas THC showed delayed responsiveness, consistent with the increase in metabolites following THC breakdown. There were considerable species differences in response between rat, mouse and frog. They concluded that CBD met all the requirements as a potentially useful drug in the treatment of epilepsy, being devoid of psychotoxicity, showing anticonvulsant selectivity, and appeared to be free of CNS excitatory effects characteristic of most anticonvulsants.

6.5.8 In a large-scale epidemiological study, Ng et al[84] found marijuana use to be protective against the development of first onset seizures, however there was no indication of the dosages used, differentiating only between 'ever' used and used within the previous 90 days.

6.5.9 A critical review of the accepted anticonvulsant activity of cannabinoids by Feeney et al[85], considered previous studies to be inconclusive, with most showing some reduction in seizure activity, although in some individual subjects the frequency or duration of seizures could be exacerbated. Further experiments on dogs, using daily doses of 0.5 to 5.0mg/kg THC, claimed to show a dose-related increase in duration of EEG seizure activity, with 20mg/kg showing the greatest increase (equivalent to 1.4g pure THC for a 70kg human, or 14g-28g of cannabis at 10% and 5% purity respectively).

They considered their data to show an increased risk of seizures in persons with pre-existing pathology. However these studies involved small numbers of animals, and CBD dosages failed to increase seizure activity significantly over controls, and the authors considered Cannabidiol (CBD) to be worthy of further study.

6.5.10 In a 1976 survey of epileptic patients, Feeney[86] found a number of marijuana users, most reporting no effect, one that symptoms decreased, one that marijuana 'caused' his seizures. In a later report, Feeney[87] considered THC to have both convulsant and anticonvulsant action, provoking symptoms including grand mal seizures in epileptic beagles, but blocking electroshock seizures in rats at comparable doses. Considered CBD to exert anticonvulsant effects with no convulsant or psychotropic action, and recommended clinical trials of CBD to test anticonvulsant action in epileptic humans.

6.5.11 Keeler & Riefler[88] reported a single case history of seizure-free epileptic finding symptoms recurring following a period of marijuana use, called attention to the risk of using marijuana for seizure-prone individuals. Perez Reyes et al[89] found an increase of EEG spikes following i.v. administration of 40mg cannabinol to a single 24 year old epileptic patient. Earlier case studies[90] included one epileptic whose seizures were considered to have been precipitated by an experimental exposure to cannabis extract.

6.5.12 Grinspoon[91], after reviewing other studies reported above, noted two case histories of individuals who had successfully used marijuana for treating epileptic symptoms, the first found marijuana abolished frequent petit-mal seizures which had been unresponsive to other medication, the other found that cannabis abolished grand-mal seizures, and substantially reduced petit mal seizures, enabling him to reduce his conventional medication by over 50%. The seizures returned during the patient's imprisonment on a marijuana cultivation charge.

6.5.12 Summary on anticonvulsant effects. The studies show that cannabis may have beneficial effects for some epileptic patients, primarily attributable to CBD and metabolites of THC. In particular, CBD appears to show the most consistent anticonvulsant action, and has been shown to increase the effectiveness of prescribed anticonvulsant medication. Most studies have reported the therapeutic effectiveness to differ between individuals or between different types of epilepsy, with some individuals receiving no benefit or adverse effects, while others can show a complete cessation of symptoms. If an individual has experienced a positive effect on the frequency and/or severity of symptoms following cannabis use, it is probable that the drug would have contributed to this effect. However, I would consider cannabis resin, with a relatively high CBD content, possibly to provide a greater benefit than indoor herbal cannabis, which typically has relatively low CBD.

6.6 Cannabis & Stress Relief/ Relaxation

6.6.1 In our recent surveys, relaxation and stress relief were overwhelmingly the most commonly perceived benefits of cannabis use. However, the Department of Health identifies panic attacks and anxiety as effects of acute cannabis intoxication, particularly among naive users, as justification for previous refusals to permit the prescribing of cannabis.

6.6.2 Recent advances in fundamental cannabinoid research have been interpreted as indicating a common modality of action of cannabis and opiate drugs, in

that naloxone (an opiate antagonist) blocks cannabinoid-induced dopamine release in the limbic system (a primitive brain structure associated with control of emotion and mood)[92],. A cannabinoid antagonist administered to rats, pre-treated with a powerful synthetic cannabinoid agonist, can precipitate corticotrophin releasing factor (CRF), which is held to be the mechanism responsible for mediating the psychological aspects of drug withdrawal symptoms, and leading to anxiety-type behaviours[93]. This was interpreted as demonstrating a cannabis withdrawal syndrome. However the potency of the synthetic cannabinoid used was many times that of THC, and the administration of an antagonist (blocker) would not effectively mimic the gradual decrease in plasma THC which occurs with cessation of normal use. The fact that a potent cannabis blocker caused anxiety symptoms in rats would be consistent with a general diminution of anxiety levels arising from cannabis use.

6.6.3 Laurie[94] reported that in a few cases 'anxiety, which may approach panic, often associated with a fear of death or an oppressive foreboding, is infrequently seen, usually giving way to an increasing sense of calmness... to euphoria'. Grinspoon refers to the initial state as a 'happy anxiety' where the experience is internally redefined as pleasurable. Rosenthal et al[95] report that panic reactions and anxiety are rare, and most commonly found with overdose (particularly from oral preparations), in naïve users, or in those who do not like the effects of marijuana, and attributed the incidence of anxiety reports with Marinol (dronabinol - pure THC) to the lack of CBD within the preparation. Mikuriya[96] considered that 'the power of cannabis to fight depression is perhaps its most important property'. Patients were reported to self-medicate with cannabis rather than use benzodiazepines as the former produced less dulling of mental activity. The authors cited one study where marijuana was found to increase anxiety in naïve users, but to decrease anxiety in experienced users, and another of 79 psychotics who used marijuana recreationally and reported less anxiety, depression, insomnia or physical discomfort[97]. They concluded that natural marijuana - containing CBD and THC - appeared more effective than THC alone in treating depression, and that patients suffering stress as a result of pain or muscle spasms would be most likely to be helped by the drug. They differentiated the use of cannabis to cope with everyday life stresses from the use of benzodiazepines in treating 'severe anxiety disorders' with an organic aetiology.

6.6.4 Bello[98] in a passionate treatise on the benefits of cannabis for physical and mental health, likened the anxiolytic effect of marijuana to a state of relaxed alertness brought on by 'balancing' the autonomic nervous system.

6.6.5 Explanations of the panic and anxiety experienced by some naïve users exposed to cannabis would include a low tolerance to the drug, and 'set and setting' i.e. a drug taken in the course of a laboratory experiment would provide different expectations of an experience to an informal party or gathering of friends. Secondly, the increase in heart rate can be interpreted by some older naïve users as a heart attack and cause panic attacks[99], this 'tachycardia' is normally associated with a reduction in blood pressure. Some individuals may be more susceptible to the effects of cannabis than others, and those whose initial experience is unpleasant may be more likely to discontinue use of the drug. By contrast, many first-time users fail to notice the influence of the drug.

6.6.6 Thompson & Proctor[100], treating withdrawal conditions, noted the synthetic cannabinoid pyrahexyl to produce significant increases in alpha brain waves, indicating increased relaxation, and Adams reported similar results[101].

However Williams et al found no significant increase in alpha activity either with pyrahexyl or smoked marijuana[102].

6.6.7 Davies et al[103], in a study of cancer patients, considered the management of stressful patients to have been improved by oral THC. However a study of intravenous THC used as a premedication for oral-facial surgery[104] found that patients showed pronounced elevation of anxiety, and considered noxious stimuli to be more painful. Mechoulam[105] considered a number of synthetic cannabinoids to be worthy of investigation as potential sedative-relaxants.

6.6.8 Musty[106] compared the effects of THC, CBD (cannabidiol) and diazepam (valium) on anxiety-related behaviours in mice. THC produced similar reductions in anxiety behaviours to diazepam, however the effect of CBD was more pronounced than either in measures of shock-avoidance, grooming and reduction of delirium tremens in alcohol-withdrawn mice. Both THC and CBD produced dose-related reductions in ulcer formation in stressed mice. However in all tests the CBD dosages used were higher than THC dosages.

6.6.9 Mechoulam reviewed studies of Nabilone (synthetic cannabinoid) on anxiety, finding two studies which suggested a superior effect on anxiety, mood and concomitant depression, whereas two other studies found little or no effect. Benowitz & Jones[107] reported initial tachycardia and hypertension in volunteer subjects administered up to 210mg THC per day, but found development of tolerance to tachycardia and CNS effects over the 20 day experiment, with blood pressure reduced and stabilised at around 95/65. Fabre & McLendon[108] reported a dramatic improvement in anxiety in the nabilone-treated group compared to placebo. Nakano et al[109] reported antianxiety effects of nabilone and diazepam in a controlled trial of experimentally-induced stress, but was unable to conclude which was more effective due to differences in dosage and metabolism. Hollister[110] reported these and other nabilone studies[111] indicating significant anti-anxiety effects of low doses, and commented on the scarcity of studies of potential anti-anxiety effects of cannabinoids.

6.7 Depression

6.7.1 Depression is a term used to describe a variety of different disorders characterised by lowering of mood, disinterest in ones surroundings or condition, fatigue, and loss of appetite and/or personal neglect. Only when depression is serious is it normally considered a psychiatric disorder requiring treatment. Most drug treatments for clinical depression involve use of tricyclic antidepressants (e.g. amitriptyline), monoamine oxidase inhibitors (e.g. isocarboxazid) or more recently fluotexine (Prozac), both of which boost levels of brain catecholamines (stimulant neurotransmitters including noradrenalin or serotonin).

6.7.2 Cannabis products have long been considered to be effective in the treatment of depressive disorders, in 1845 it was recommended for melancholia (with obsessive rumination) and mental disorder in general[112]. In 1947 Stockings[113] found improvements in 36 out of 50 depressed mental patients treated with a synthetic cannabinoid.

6.7.3 Bolls[114] reported a case of post-natal depression successfully treated by a large oral dose (4g of alcoholic cannabis tincture) and counselling. The subject reported anxiety at the peak of the drugs effect, however the study involved a single case, was not controlled under current scientific

methodology, and it could not now be concluded whether any recovery was due to the drug, the psychotherapy, or would have occurred in any event.

6.7.4 Kotin et al[115], in a double-blind experiment, found no effect on moderate to severe depression from relatively high doses (0.3mg/kg) of THC. Grinspoon considered cannabinoids to be of promise where depression is secondary to some life event (reactive depression) rather than a primary diagnosis, but did not consider general optimism about such treatment to be justified by the state of knowledge in 1977.

6.7.5 Regelson et alia[116] reported a number of significant effects in a controlled study of THC in terminal cancer patients, including a reduction in depression, greater emotional stability, more self-reliant/less dependent, less suspiciousness, increased forthrightness, less apprehension, more normal level of control and more tranquil/relaxed, however two patients who discontinued the study reported fear and anxiety, confused thinking and dissociation. The authors commented that such effects would appear to be confined to a susceptible population.

6.7.6 Grinspoon[117] considered some patients who fail to respond to traditional antidepressant drugs, or who find the side-effects of these unbearable, to have been helped by illicit marijuana use, quoting 3 case studies all involving long histories of severe clinical depression, all treated unsuccessfully with all types of antidepressive medication, and all now living normally through use of cannabis, twice daily in one case, on re-appearance of symptoms in the others, each attributing the improvement to greater self-insight, a reduction of a negative self-image, and/or a general euphoria arising from cannabis intoxication.

6.7.7 Conclusions re Anxiety & Depression: There is a great deal of anecdotal evidence to suggest that cannabis may have a beneficial effect on mood disorders such as mild anxiety or depression. However, the results of scientific studies are inconclusive, and the anecdotal reports cannot be reliably confirmed at the present time. In particular the human studies which have been cited in support of such psychological benefits either used synthetic cannabinoid homologues, or failed to use the double-blind experimental methodologies now required to eliminate possible bias in the experimenters or subjects.

6.7.8 Whereas experienced cannabis users quote 'relaxation' as the most commonly perceived health benefit derived from the drug, many novice users experience a severe bout of anxiety which can approach a panic attack. These are very rare among experienced users of the drug, and can often be attributed to a hostile environment and/or negative expectations of the drugs effects.

6.7.9 The effect of cannabis and cannabinoids is not adequately predictable for dosage regimes to be developed for the general population. Cannabis affects different people in different ways - one person may feel relaxed when the next might feel anxious and paranoid - and could not be used in the treatment of mental disorders without close monitoring of the effects on individual patients. However, where conventional medications have failed to control the symptoms adequately, there may be a case for trial use of cannabis to determine whether the drug could aid existing treatment or replace drugs with unwanted side effects.

6.7.10 The most recent research into cannabinoid neurochemistry provide qualified support for the view that cannabis drugs can promote relaxation and a less

stressful mental state. However whether this is a learned effect, or an effect of tolerance to the drug's effects and the avoidance of withdrawal (mediated by CRF release in the amygdala), cannot yet be determined.

6.7.11 I would not consider the case yet to be made for the widespread prescription of cannabis as an antidepressant or antianxiety medication. There is clearly a need for much additional research into the efficacy of cannabis on these conditions. Where many cannabis users report a general improvement in mood, others find the experience highly disturbing, and the risks of prescribing the drug to unsuitable individuals may well outweigh the potential benefits.

6.8 Therapeutic research in the treatment of Asthma

6.8.1 Cannabis and cannabis extracts have a long history in the treatment of asthma-related complaints, as long ago as 1695[118], including an enquiry by the Ohio State Medical Committee in 1860[119] where oral dosage of one grain of tincture every three hours produced "almost magical" relief from asthma symptoms. J. Russell Reynolds personal physician to Queen Victoria, writing in 1890[120] stated that "in some cases it relieves spasmodic asthma", and Mattison, in 1891, reported similar findings[121].

6.8.2 Modern research has tended to confirm traditional therapeutic use as an anti-inflammatory and bronchodilator agent. Vachon et al[122], using volunteer asthma patients, found that smoke from low-potency material (1.9% & 0.9% THC) showed highly significant bronchodilator effects, which did not appear to be dose related, lasting for up to 90 minutes after administration.

6.8.3 Tashkin et al[123] in double-blind experiments using smoked cannabis with 2% or 0% THC (0% - placebo - all cannabinoids extracted before administration), as well as 15mg synthetic THC administered orally, found increases in specific airway conductance (bronchodilation) with smoked and oral drug conditions, and concluded that the 0% THC placebo may contain some as yet unidentified bronchodilator, as there was no broncho-constriction, which might have been expected in asthmatics following inhalation of particulate matter. They concluded that THC was effective in relieving exercise-induced bronchospasm, with the duration of the bronchodilatory action lasting from 2hr to 4hr after administration. Oral THC produced significant, but less pronounced, effects. In 1977[124] the same team used aerosolised THC in 5mg and 20mg doses, producing similar and significant bronchodilation after all doses, with the lower dose producing fewer physical (tachycardia) or psychological (high) side effects than the higher dose or smoked marijuana. The effect was slower in onset but longer in duration than isoproterenol, a conventional bronchodilator agent. Williams et al[125] also concluded that THC and salbutamol (ventolin) were equally effective in improving ventilatory function 1 hour after administration by aerosol, with THC having the longer duration of action.

6.8.4 Abboud & Sanders[126] found that bronchodilator effects were unreliable when 10mg oral THC was used, some slight increase in airway conductance was noted although one patient developed severe bronchoconstriction.

6.8.5 Reviewing the evidence in 1986, Graham[127] concluded that THC is an active bronchodilator with a different mode of action from the common preparations such as salbutamol and terbutaline, and active when ingested orally or by inhalation. Oral use (2mg to 20mg in a sesame oil capsule) was slower in onset than inhalation, which although not ideal, due to the particulate matter in smoke, could produce swift relief from symptoms.

Higher amounts - i.e. 50-75mg of THC - showed a dose-related effect. Tests of CBN (600mg) and CBD (1200mg) showed these cannabinoids not to have bronchodilator activity. Prolonged administration produced no evidence of clinical tolerance to any of the actions of THC. Speculated that the action of THC may involve suppression of the release of endogenous substances causing asthma (e.g. SRS-A), rather than inhibiting their activity.

6.9 Cannabis and Opiate withdrawal

6.9.1 Cannabis has frequently been accused of leading its users to try harder drugs, specifically opiates. While there has never been any evidence of a causal relationship between cannabis use and heroin addiction, there is increasing evidence for some interrelationship between the effects of the two classes of drugs, and, paradoxically, for the efficacy of cannabis as an aid to opiate withdrawal. The fact remains, however, that research shows that up to two thirds of opiate users are also cannabis users[128] [129]. The following represents a review of the available literature, plus novel analyses of data gathered from my own surveys of regular cannabis users.

6.9.2 The effect of cannabis in reducing the severity of opiate withdrawal symtoms was widely-described in the 19th century. In the very first volume of the *Lancet,* Birch[130] reported using 300mg cannabis extract daily to treat withdrawal symptoms in a young opium (laudanum) user, noting "improved appetite and sound sleep", strengthened pulse and a complete physical recovery within 6 weeks. Mattison[131] recounted 10 years experience in treating opium and morphine addicts, and considered it to be 'an efficient substitute for the poppy. Its power in this regard has sometimes surprised me.' One long term morphine injector, with a habit broadly equivalent to over 2g per day of 'street' heroin was stated to have recovered with 10 doses of fluid extract of 'Indian hemp'. The author William Burroughs wrote in 1953[132]

> *"I once kicked a junk habit with weed (Marijuana). The second day off junk I sat down and ate a full meal. Ordinarily, I can't eat for 8 days after kicking a habit."*

6.9.3 Mikuriya[133] reports successful use of 120mg synthetic THC (dronabinol) per day (oral in sesame oil) to withdraw an patient from a 70mg/day methadone addiction. There have been a small number of reports of self-medication of cannabis by withdrawing addicts[134], and 'de-escalation', i.e. reducing opiate use in favour of cannabis use over the long term[135]. I have spoken with heroin addicts who had smoked very large quantities of cannabis during the acute withdrawal phase, reporting the symptoms to be more tolerable, thus enabling them to complete the detoxification period successfully.

6.9.4 Chesher et al[136] found that Δ^9 THC reduced the severity of a number of symptoms associated with the quasi-morphine withdrawal syndrome in rats, concluding that the effects were not due to sedation, that absence of naloxone activity indicated the effect to be independent both of the opiate receptor, and of dopaminergic neurotransmitter systems. A later study[137] found that cannabinol (CBN) was also effective in reducing such symptoms, but not cannabidiol (CBD). THC was also found to decrease naloxone-induced withdrawal symptoms in rats[138], and other studies have found similar effects in rats[139], mice[140], guinea-pigs and dogs[141]. Radouco-Thomas[142], studying hypersensitive mice, found morphine to show opposite effects between THC-pretreated and control mice, with substantial increase in locomotion

following the morphine administration in THC animals, and sedation in controls.

6.9.5 Pertwee[143] reviewed the interactions between opiate antagonists and cannabinoids, finding some attenuation of naloxone activity, and enhancement of morphine activity in a variety of laboratory animals. Recent research suggests that the activity of cannabis is caused by binding to a specific cannabinoid receptor[144], which would normally bind to an endogenous 'cannabinoid' inhibiting the metabolism of cyclic adenosine monophosphate (c-AMP)[145]. Cyclic AMP influences the degree to which the binding of neurotransmitters on opiate (and other) receptors causes the firing of the target neurones. Put simply, it affects the sensitivity of neurones to chemical stimuli. Cohen[146] considered the attenuation of opiate withdrawal symptoms by clonidine to be due to opening of potassium channels mediated by c-AMP in the *locus ceruleus* - a group of cells extending from the brainstem to the midbrain, close to the cerebellar peduncles and the vagal nucleus (which controls stomach activity), and which are closely exposed to substances within cerebrospinal fluid[147]. Gold and Miller[148] note that both morphine and THC caused similar changes in dopamine activity, and postulate that the reinforcing potential of both drugs had a common neurochemical basis.

6.9.6 In 1990 Navaratam[149], in a study of adjunctive drug use of 249 heroin users, discovered that two thirds of these were using cannabis as an adjunctive drug with the primary aim of increasing the euphoric effects of the heroin, only a minority used cannabis as a way of helping with withdrawal symptoms. Unlike heroin and benzodiazepines, alcohol and cannabis were usually only taken in the company of friends. The combined use of opiates and benzodiazepines in the last twelve months and last thirty days was higher than the combined use of opiates with alcohol or opiates with cannabis. Alcohol and cannabis, if used, were usually taken after opiate use, while benzodiazepines were used concomitantly with opiates.

6.9.7 In a recent UK study by Jackson[150] forty male clients from both non-statutory and statutory agencies in North Yorkshire were asked to complete a questionnaire concerning their cannabis use. The study included both current and ex-users of opiates and covered users of heroin as well as those using methadone. The clients were specifically invited to provide information about their adjunctive use of opiates and cannabis and its uses in dealing with opiate withdrawal, the availability of cannabis to heroin users and on the motivation to start using heroin during a perceived lack of cannabis.

6.9.8 The study indicated that opiate users combined cannabis with their use of heroin or methadone for specific reasons. Most frequently quoted was as an aid to sleeping, or as a replacement for benzodiazepines. There was little support for the idea that cannabis relieved the physical symptoms of opiate withdrawal (indeed, it was commonly seen as making things worse).

6.9.9 Cannabis was regarded favourably as treatment for the psychological aspects of the process, especially as an adjunct to methadone during withdrawal of heroin. In such cases it was seen as being able to help prevent the purchase of black market heroin by fulfilling some of the addict's mental needs.

6.9.10 Similarly, a study by Saxon[151] found methadone patients who were consistently THC positive had a smaller percentage of urines positive for other drugs.

6.9.11 With regard to the social aspect of cannabis/heroin interaction, the Jackson study suggested, perhaps surprisingly, that heroin users felt that the cannabis using society had cut them off in many ways. The respondents are reported as "feeling quite isolated from the cannabis using scene, all seeing it as a completely separate culture, with its own set of dealers and a closed door attitude to heroin users. The general view was that cannabis users did not associate themselves with harder (heroin, cocaine) drug users and would not welcome them into their circle, certainly not to the extent where heroin could be used in these circles."

6.9.12 The third major area of the study touches,on the 'gateway' theory. When asked if they knew people who had started using heroin as a result of the lack of cannabis, 63% said they knew of at least one person who had started this way (59% of these saying they knew some people and 33% knew lots of people). This was also confirmed by 16 of the 40 clients questioned having bought heroin themselves at times because there was no cannabis around. However, this does not necessarily support the contention that cannabis use *per se* predicates toward heroin use.

6.9.13 Di Chiara's recent paper[152] (among others) has excited much media attention with the revelation that Δ9-THC and heroin both affect the same area of the brain, boosting the levels of dopamine in the nucleus accumbens.

6.9.14 The popular press, broadsheet and tabloid alike, ran stories implying that the paper had somehow proven a physiological basis for 'escalation'. However, as the less populist journals such as the New Scientist pointed out, Di Chiara's paper itself stated that

> *"..both Δ9-THC and heroin can be added to the list of drugs of abuse (morphine, cocaine, amphetamine and nicotine) that increase DA transmission preferentially..".*

6.9.15 The New Scientist pointed out that the group's own previous research has also shown the same Dopamine surge with alcohol. As the editorial[153] explained:

> *"There are two problems with the idea that smoking cannabis may prime the brain for dependence on harder drugs. Number one: there is no direct evidence. Number two: if cannabis does behave this way, then by the researchers' own logic one would expect alcohol and nicotine to do the same, for all three substances push the same dopamine button in the brain by very similar chemical mechanisms."*

6.9.16 This view is upheld by such reports as Nace[154] where studies of 101 multi-drug using soldiers showed that prior to the onset of heroin addiction, relatively few differences in drug using patterns existed between those addicted to heroin and those not, the differences emerged after the initiation of heroin.

6.9.17 The theory of social escalation (that cannabis users turn to heroin because the drug scenes cross over, and that such progression disappears when the markets are separated) does not seem validated by the Jackson study. 75% of respondents claimed that it was harder to find cannabis to buy than heroin and nearly 95% of those expressing a view felt that cannabis and heroin were not sold by the same dealers.

6.9.18 These figures prompted the report to conclude that a significant section of the drug using population were finding it easier to buy hard drugs than cannabis.

Considering the fact that many hard drug users finance their habit through the sale of their drug of addiction, it was suggested that this could potentially lead to an increase in the incidence of hard drug abuse.

6.9.19 Certainly this contrasts starkly with figures from Holland[155] where the public at large view cannabis in a tolerant way and hence users of it are not subject to the problem of a criminal record or the stigma of treatment in a psychiatric hospital. This has resulted in fewer and fewer young people swapping from soft to hard drugs, the percentage of addicts younger than age 22 dropping from 14.4% in 1981 to 2.5% in 1991[156] . One conclusion must be that for a separation of drug markets to work and any escalation to end then a controlled and monitored distribution of the drugs provides a better framework for success.

6.9.20 Summary: The potential value of cannabis and cannabinoids as a substitute drug in the treatment of opiate and alcohol addiction has been reported since the 19th Century, and is briefly noted in the recent BMA report. There appears to be a growing body of scientific evidence suggesting a potential role for cannabinoids in alleviating opiate withdrawal symptoms, and there have been a number of anecdotal reports of effective substitution of alcohol with cannabis, but few controlled clinical studies have been performed.

6.9.21 There is increasing but conflicting anecdotal evidence of efficacy as an adjunctive drug or as a substitute for opiates. The evidence cannot be regarded as conclusive, but the common modality suggested by Di Chiara et al offers a theoretical basis both for common analgesic activity of THC and morphine, and for attenuation of opiate withdrawal symptoms by cannabis. There would appear to be sufficient evidence to justify further research in this area.

6.10 Uses of cannabis in treatment of alcoholism

6.10.2 Mattison[157] cited Dr Anslie's (Materia Medica 2nd vol.) as recommending use of cannabis for the relief of pains from chronic alcohol taking, and quoted several other physicians reporting efficacy in relieving delirium tremens. J. Russell Reynolds, Royal Physician, found treatment of alcoholic delirium with cannabis to be 'very uncertain, but occasionally useful'[158]. Allentuck, author of the medical aspect of the 1944 La Guardia report on marijuana, reported that preliminary experiments on treatment of alcoholism in private patients were sufficiently encouraging to merit further investigation[159].

6.10.3 In the 1960s the use of marijuana in the USA was the focus of a number of studies reviewed by Kaplan[160]. Blum found that 54% of regular (weekly) and 89% of daily marijuana users reported decreased alcohol consumption[161], Tart & Klein[162] found a general reduction in student alcohol use following increased marijuana use. A study of Stanford University students found 3% of marijuana users had increased liquor consumption compared to 32% who had decreased, and Halleck[163] reported that cases of alcohol poisoning were increasingly rare, attributing this to the rise in marijuana use on campus. Downs[164] reported sharp reductions of alcohol intake in marijuana users, resulting in improved physical and mental health. Kaplan also considered reduced availability of marijuana to risk wider use of more dangerous drugs and alcohol. The potential increase of alcohol use arising from a proposed ban on cannabis in India was also one of the reasons used by the British Raj to oppose any introduction of prohibition in the Indian Hemp Drugs Commission report of 1894.

6.10.4 One widely-quoted paper by Mikuriya[165] reported successful self-treatment of withdrawal symptoms of alcohol and subsequent rehabilitation in a 49 year old woman with a 35 year history of severe alcoholism. He considered that for selected alcoholics the substitution of smoked cannabis for alcohol may be of marked rehabilitative value, the absence of irritability of gastrointestinal symptoms on withdrawal to assist in rehabilitation, and that further clinical trials would be warranted. Scher[166] also proposed clinical trials following his clinical experience that marijuana and alcohol were mutually exclusive agents, and that considerably less of each would be used when used together than when each was used alone. Rosenberg et al[167] found cannabis not to be particularly effective, alone or in conjunction with disulfiram (antabuse), in inducing alcoholics to enter or remain in treatment. However the experiment used single doses of cannabis (approx. 20mg THC) and the findings would be of little relevance to daily cannabis users. Jones[168] found evidence suggesting some cross-tolerance between the effects of alcohol and cannabis, later confirmed by Hollister[169].

6.10.5 Thompson & Proctor[170] found that 59 alcoholic patients out of 70 had their withdrawal symptoms alleviated by administration of pyrahexyl, a synthetic cannabinoid, 11 patients showed no improvement.

6.10.6 Brecher[171] reviewing the issue in 1972, considered the evidence to suggest that marijuana smoking tended to replace alcohol drinking, but also noted then recent increases in popularity of alcoholic drinks among US youth. He quoted several individual testimonials, including Professor Lindesmith, Indiana University sociologist, from 1968:
"*...some pot smokers, both old and young, have developed an aversion to alcohol, regarding it as a debasing and degrading drug... Some of these people were heavy users of alcohol before they tried marijuana and feel that the latter saved them from becoming alcoholics."*"

6.10.7 More recently, Bello[172] reported the effect of increased cannabis use on reducing alcohol consumption among severe alcoholics, considering cannabis to 'ease the symptoms of withdrawal', although one habit was replacing another, and considered the gradual substitution of alcohol with marijuana to be of benefit to these drinkers.

6.10.8 Hoffman et al[173] found evidence to suggest that ethanol withdrawal symptoms are mediated by changes to NMDA (n-methyl-d-aspartate) receptor metabolism, and the BMA reported a synthetic cannabinoid[174] to be a potent NMDA antagonist[175], which would counteract excessive NMDA-ergic activity associated with convulsive disorders[176]. The well-established anticonvulsant effect of cannabidiol (CBD) may offer some relief from the acute withdrawal symptoms (delirium tremens) in the most severe alcoholics.

6.10.9 In a longitudinal study in Norway, Hammer & Vaglum[177] failed to find any evidence of increased alcohol use among those who had ceased using cannabis. Although significantly higher consumption of alcohol was found in past cannabis users than non-users, the highest levels were found among the current cannabis users.

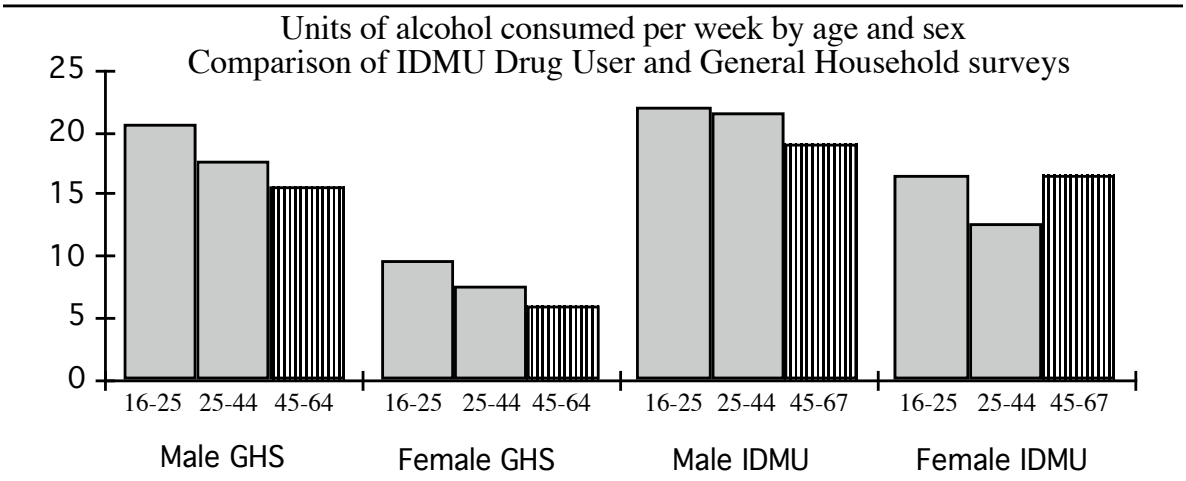
6.10.10 Our own research[178] suggests there to be more negative attitudes to alcohol among daily cannabis users than among less frequent users, although the differences in reported alcohol consumption among the different cannabis-using groups failed to achieve statistical significance.

(a) There were weak negative correlations between cannabis use indices and alcohol frequency-of-use and spending data.

(b) The amount of cannabis used per month correlated negatively with all alcohol use indices, suggesting that heavier cannabis users may use alcohol slightly less frequently, drink and spend less, and have more negative attitudes to alcohol.

(c) Respondents as a whole showed a lower proportion of abstainers, and a higher proportion of heavy drinkers (especially among women) than those of comparable age groups as quoted by Alcohol Concern[179]. Abstainers from alcohol may be less likely to have tried illicit drugs. The abstention rate was 3 times higher among women over 25 than among the younger women. None of these statistics give any indication as to whether alcohol consumption had changed following use of cannabis.

(d) It is possible to compare the alcohol consumption of IDMU respondents with that of a comparable age cohort from the 1996-97 General Household Survey data[180]. For each age group the consumption of respondents was higher than the GHS 'control' sample. This difference was increasingly marked in the older age groups, although overall use in each sample declined with age. There was a notable sex difference, with female IDMU respondents drinking twice as much as the national average, whereas male respondents drank one third more. This difference was more marked at younger and older age groups (See fig 2 below).



6.10.11 The dataset for the '45-67' IDMU age cohort was considerably smaller (57 male, 28 female) than for the other age groups, and these results should be interpreted with caution. The 'Regular Users' population may indicate a lower rate of abstentionism, and slightly higher numbers of heavy drinkers, among the cannabis-users than in the population as a whole. These results may be attributable to the greater 'deviance' of older drug users, particularly women, from the norms of their contemporaries, compared to the 'normalisation' of drug use among the young.

6.10.12 There is some historical and scientific evidence to suggest cannabis or cannabinoids may have potential therapeutic uses in the treatment of alcoholism, particularly during the acute withdrawal stage. However, any such use, or use as a drug of substitution, could not become generally accepted within medical opinion without properly conducted research including clinical trials.

SECTION 7. LEGALISING MEDICAL USE - THE CALIFORNIAN EXPERIENCE

7.1 Brief history of reform

7.1.1 In 1996 the state of California passed the Compassionate Use Act, (Health and Safety Code 1132.5). "To ensure that seriously ill Californians have the right to obtain and use marijuana for medical purposes where the medical use has been recommended by a physician". This had been proposed by petition of over 20,000 people, and passed with 56% of the state vote, in a referendum known as Proposition 215, or The Medical Use of Marijuana Initiative. The state of Arizona passed a similar law at the same time.

7.1.2 The code provides that State possession and cultivation laws "shall not apply to a patient, or a patient's primary care giver, who possesses or cultivates marijuana for the personal medical purposes of the patient, upon the written or oral recommendation or approval of a physician".

7.1.3 The law is specifically about raw herbal cannabis (marijuana). It does not appear to apply to THC or other extracts or synthetics. (dronabinol is available on prescription). Permitting cultivation potentially removed the problems of obtaining supplies. Permitting the assistance of a 'primary caregiver' was an essential element, allowing access to the drug for people too sick to grow or obtain it, or who lived in inconvenient locations such as nursing homes.

7.1.4 Among members of Cannabis Buyers Clubs, the most common reasons given for medical use included anorexia, nausea, vomiting, insomnia, depression, anxiety/panic attacks, arthritis and other pain relief, AIDS related illnesses, muscle spasm, and harm reduction (reducing or controlling other drug or alcohol abuse)[181].

7.1.5 Briefings to District Attorneys, police, and doctors suggested that a doctor must have approved the marijuana use, but need not have issued a formal written prescription. The amount must be appropriate to the patients medical needs - possession for sale, and sale, remain crimes in any circumstance. In Californian law, possession of under 28.5 grams (1oz) is usually deemed to be for personal use, and dealt with by a written citation and confiscation, which would still apply in all non- medical cases.

7.1.6 Codes of practice were produced in several areas for police, doctors, and care givers. In February 1997 the State Attorney General (who campaigned against the Proposition) issued detailed guidelines[182] for law enforcement officials, on enforcing laws against marijuana in the light of the changes. This suggested that suspects claiming medical necessity would have to be:

i/ California residents who were seriously ill,
ii/ had been examined by a doctor, who had determined that their health would benefit from marijuana use,
iii/ should not be engaged in conduct that endangers others, such as driving a car,
iv/ should not be involved in any diversion for non-medical purposes, such as furnishing to friends or using strictly for recreation, and
v/ should not possess or grow more than needed for personal medical use. - It was suggested that one plant would produce one pound of marijuana, or 1,000 'joints', and that therefore "one can argue that two or more plants would be cultivation of more than necessary for

personal medical use." Alternatively, possession of more than 28.5 grams might be more than personally medically necessary.

vi/ If a suspect claimed to be a primary caregiver they must have been specifically designated by the patient, in advance, and have specific knowledge of the doctor's recommendation.

7.1.7 Some police forces issued medical marijuana user photo-ID cards to patients after checking their doctors recommendations, to avoid them having to prove their case repeatedly.

7.1.8 Also in February, the San Francisco Department of Public Health issued guidelines for dispensing medical marijuana[183], including standard forms for doctors' recommendations and nominating 'primary care-givers', and a code of practice for dispensing centres, mostly concerned with very careful record-keeping.

7.1.9 In July 1998 Oakland City Council adopted a limit of 24oz (1 1/2lb or 680g), or 100 plants, on the amount of marijuana to be allowed for medicinal use by any one patient[184]. This was based on the amount needed for 3 months supply (a typical growth cycle), by patients in receipt of medicinal marijuana in the wake of the Randall case[185] (see below), smoking 10 pure cannabis cigarettes per day each containing 0.9g of cannabis with 2% THC.

7.2 U.S. Government and medical marijuana

7.2.1 The US Federal government opposed Proposition 215 before and after it was voted into law, arguing that it was against national and international law to allow possession or cultivation of cannabis for any purpose. This opinion has been challenged in the US courts on several grounds, and is currently being disputed. It seems very likely that in the long term Federal law will override the State legislation, and the Compassionate Use Act will be overturned.

7.2.2 All uses of cannabis were effectively banned in the USA from 1937, under the Marijuana Tax Act. The Controlled Substances Act 1972 is similar in outline to British drug control laws; it places cannabis and its derivatives in Schedule I, among the drugs which 'have no accepted medical use in the United States and have a high abuse potential'. There are five schedules, substances in the lowest can be distributed without a prescription but only by a pharmacist.

7.2.3 There have been occasional attempts and recommendations to re-introduce the medical use of marijuana, e.g. California Research Advisory Panel 1970, compassionate Investigative New Drug status until 1991, numerous local and federal court cases. In 1977, a glaucoma sufferer, Robert Randall, was acquitted of growing cannabis plants, on appeal, on the defence of medical necessity. He successfully petitioned the federal government to provide him with legal marijuana to preserve his eyesight. He was eventually entered on a research project, and was provided with a regular supply of government-grown, ready-rolled, neat marijuana 'joints' of a standardised strength from the National Institute on Drug Abuse's research centre. He is still smoking them regularly to this day. Several other individuals later obtained supplies from the government, for various ailments, in each case after long court cases and negotiations. The requirement in general was to prove medical needs which could not satisfactorily be met by other drugs, or by synthetic cannabinoids. The Randall case established a precedent that herbal cannabis, smoked, could be more effective in treating some conditions than extracts or cannabinoids.

7.2.4 The same ready-made 'joints' were available to suitably qualified researchers in the US from the early 1970's on. The synthetic cannabinoid Marinol (dronabinol) was made available for research and a limited range of prescriptions in 1985. Other cannabinoids have been available for research through NIDA. In 1988, the Drug Enforcement Administration's chief administrative law judge recommended reclassifying marijuana so that it could be prescribed, but no action was taken.

7.3 Distributing medical cannabis - Buyers Clubs

7.3.1 The validity of sales by non-profit clubs, often co-operatives, acting as 'primary care givers' or cannabis dispensaries, was unclear in the law. Several were shut, and some re-opened, in legal actions in the early months after the Act was passed. In March 1997 the Superior Court in San Francisco ruled that such a club could be legal, if members had each designated the club as primary care giver, it was non-profit, each person treated had a doctors recommendation, and they kept detailed records of what was dispensed to whom. This was overturned on appeal by Federal authorities, and at the end of May 1998 several clubs were closed down by court orders. Others have shut voluntarily pending legal appeals. At the same time the State Attorney General has brought another case that the clubs do not qualify as 'primary care givers' under the Act.

7.3.2 Some of the cannabis buyers clubs had existed before the law was passed, and played a large part in the campaign for Proposition 215. Several were linked with existing AIDS and cancer-victim activist groups. There were over 30 such clubs in early 1998, the largest with over 9,000 members. Many people who were too sick to obtain or grow their own claimed that the clubs were their only potential source of marijuana. Cannabis was grown by club members, and sold in small amounts to other members, without profit, as smokeable marijuana, powdered in capsules, tea, or cookies, usually but not always for the patient to take away.

7.3.3 Two ethnographers had a Drug Policy Foundation research grant to analyse 12,000 intake forms from one buyers club, with the goal of determining the distribution of disease categories and demographic characteristics of members. However, the club was raided in March 1996, temporarily shut down, and the records remain sealed. Instead, the researchers investigated the way members used the club, and the impact of its closing, by interviews and observations[186]. Respondents reported highly positive health benefits from marijuana itself, and even greater benefits from the social aspects of the clubs, which they described as providing important emotional support groups, of therapeutic value to the sick and terminally ill.

7.3.4 The position of individuals or their care-givers who can provide their own medical marijuana, remains unclear: They are not breaking California laws at present, but they are breaking Federal law.

7.3.5 A document released by the California Medical Association in January 1998 invoked the Federal law and told physicians in the state to steer clear of prescribing marijuana. The federal 'Drugs Czar' had suggested publicly that they might lose their licences to prescribe common drugs if they co-operated with proposition 215.

7.3.6 In late May 1998, the Mayor, City Supervisors, District Attorney and Public Health Director of San Francisco were proposing a new bill to establish a model for the distribution of marijuana to medically ill patients, who would

no longer be able to obtain supplies when the clubs were banned[187] . They felt that without the co- operation of most doctors, or the club distribution network, the law would be almost impossible to implement, even if it was legitimate under federal law. At one point it was seriously suggested by these officials that the City and County public health service should grow and distribute the marijuana, or make arrangements with existing medical clinics to do so. Another suggestion was that police could provide confiscated marijuana to qualified patients.

7.3.6 At the same time, police, prosecutors and lawmakers from all over California met in Sacramento to consider strategies for fully implementing Proposition 215. They concluded that it would be impossible without the co-operation of the federal government, which they were very unlikely to get. Federal agency representatives did not attend.

7.3.6 Many of the participants, including the California Medical Association, concluded that a necessary first step would be to persuade the federal government to reclassify marijuana from Schedule I to Schedule II. A Schedule II designation would allow physicians to directly prescribe marijuana to patients, removing the need for private dispensaries.

7.4 Problems and benefits of the Californian model

7.4.1 The fact that Proposition 215 got on the ballot at all, and was then passed by 56% of the vote, indicates a wide public acceptance of the use of marijuana for medical purposes. It is an issue in this year's local elections for Governor, State Attorney-General, and Mayor of San Francisco, with most candidates supporting some level of medical use, even when they are hostile to this particular way of providing it. In Oregon a similar referendum has qualified for the ballot, in Nevada a similar petition failed to achieve the required number of signatures in two small rural districts.

7.4.2 The Act supports medical use of herbal cannabis (marijuana). It does not affect the possibility of using derivatives or synthetic cannabinoids if they are appropriate. This recognises that marijuana is by far more easily available, already being used illegally in some cases, and cheaper. There is extensive anecdotal evidence that it is more effective in some illnesses. The effects of marijuana are undoubtedly different from those of any single derivative and there seems no reason to doubt the views expressed by individual patients that smoked cannabis is more effective and easier to control. Similar control might be achieved by inhalers or other routes using synthetic or extracted cannabinoids.

7.4.3 The Act supports cultivation for personal medical use. This is the most obvious way to provide cannabis, a common plant which can be grown easily almost anywhere. It avoids patients having to add to the criminal economy, and is cheaper for them. However, it provides uncertain doses of a complex drug with variable effects. This could be mitigated in monitored, larger scale, or collective production: fine quality control on plant products, though perhaps not to pharmacologists' standards, is well established in the food, beverage and tobacco industries.

7.4.4 'Primary care givers' were authorised to possess or grow cannabis for others' personal medical use. This made access to the drug possible for people too sick to grow or go out and get their own, or who lived where home cultivation was impractical, such as in hospices.

7.4.5 Methods of certifying and monitoring medical use were put in place. Police and prosecutors' responses to the legal change were devised. No doubt they will be extensively tested in the local courts.

7.4.6 Only small numbers of patients have the wherewithal, patience, and knowledge to regularly grow enough of their own cannabis plants, of the right quality, for their medical needs. In some cases pollen or moulds might exacerbate medical problems. Buying from the illegal market offers risks of arrest, (though not prosecution), lack of availability when needed, and of poor quality and prices. Distribution from police seizures, or cultivation and distribution by medical services, have been suggested but met legal, political, moral and practical difficulties.

7.4.7 The co-operative Buyers Clubs offered one workable method of producing and distributing enough marijuana for medical needs, without a surplus available for diversion. They could also have been used for quality and dosage control. Their legal position was at best ambiguous. Their development was ad hoc and in some cases illegal. As well as extreme hostility by Federal and some State law officials, they were damaged by personality politics and, especially, by over enthusiastic promotion by some advocates of legal marijuana. Nevertheless, the clubs were so successful that the State authorities have had to consider taking over their role now that they have been shut down.

SECTION 8. TREATMENT OF 'MEDICINAL' CANNABIS USERS BY THE UK CRIMINAL COURTS

8.1 Overview

8.1.1 In consideration of the illegal nature of cannabis for many patients already self-medicating with the drug, the BMA recommended in November 1997:

> *"While research is underway, police, the courts and other prosecuting authorities should be aware of the medicinal reasons for the unlawful use of cannabis by those suffering from certain medical conditions for whom other drugs have proved ineffective."*

8.1.2 I am not aware of any separate notification of 'medicinal' defences to the Home Office or Scottish Office allowing any national statistics to be determined. We are drawing on 3 main sources for information on how the courts are currently responding to medicinal uses defences:

(1) Reports from survey respondents citing medicinal reasons as a motivation for use, who have been 'busted', giving outcomes where stated.

(2) Previous cases involving medicinal use, outcomes where known.

(3) Press and internet reports.

8.2 IDMU user surveys

8.2.1 In the combined 1994-1998 sample, some 70 respondents reported medicinal use as a major motivation for using cannabis. Of these, 27 (39%) had been 'busted' for cannabis offences.

8.2.2 Table 6 below presents, where stated, the results of prosecutions, and conditions involved, for respondents indicating both medicinal use and a cannabis 'bust'. The quantities of drugs involved in each case and whether medical use was raised during proceedings is not known.

8.2.3 The most common disposal was by way of fine, and I note that the heaviest fines levied were against users whose medicinal need was vague or questionable. However the 18 month sentence imposed for simple possession where cannabis was used for pain in arthritis might not suggest a lenient attitude by the courts.

8.2.4 The proportion cautioned at 22% was well below the national average, and the 'bust rate' for 'medicinal' was about 50% higher than the rest of the sample. These may reflect institutional scepticism at claims of therapeutic benefit, or merely be a function of the higher average age of this subgroup of users, leading to an increased risk of detection, and a perhaps greater reluctance on the part of the police to caution more mature offenders compared to younger people.

Table 6

IDMU Drug User Surveys 1994-98
Outcomes of criminal prosecutions reported among medicinal users who reported one or more cannabis 'busts'

Sentence Type	n	%	Offence/comments
Total Respondents	27	100%	0.97% of total sample, 39% of 'medicinal' users
Cautioned	6	22%	5 x possession only (depression/asthma; depression/stress/pain; stroke victim (carer); muscle relaxant; back pain/muscle relaxant) 1x possession + production
Conditional Discharge	3	11%	2x possession, (asthma/pain/stress; general health) 1x production & possession (not stated)
Fine	12	44%	£25 (possession cannabis + amphet - sleep/pain), £30 (possession - asthma/pain/stress), £30 (possession - not stated), £50 (import - arthritis/pain), £60 (possession/production - pain), £65 (possession - alcoholism/depression), £75 (importation - 'severe illness'), £80 (possession with intent - pain/asthma), £125 (production/possession - depression) £200 (possession - 'health'), £650 (possession, production, possession with intent - insomnia) Amount unknown (possession - pain/arthritis).
Community Service Order	2	7%	180hr (possession - back pain/insomnia) 80hr (pain/asthma)
Suspended Sentence	2	7%	4mth susp 2 yr. (possession with intent - migraine) Unknown (possession with intent - pain/asthma)
Immediate custody	2	7%	9mth (poss. 1967 - glaucoma/asthma), 18mth (possession - pain/arthritis)
Unknown/Other outcome	3	11%	Result unknown (condition not stated), Result unknown ('asthma'), 'Didn't get caught' ('incurable disease')

8.3 IDMU case records

8.3.1 The main service provided by IDMU is expert evidence to the criminal courts on most aspects of drug misuse, including comment on consumption patterns, valuations, effects, paraphernalia and yields of cannabis cultivation systems. Just under 10% of referrals to our agency involve a claim of medicinal cannabis use, where comment is sought on scientific and other evidence as to the potential therapeutic use in specific conditions. In order to filter out bogus medical defences, the instructing solicitor is required to provide evidence of a 'relevant medical condition' before any comment on medicinal uses can be offered. The conditions encountered in cases and referrals to date are summarised below.

Table 7.1

IDMU Medicinal Cannabis Cases 1 - Conditions encountered in referrals		
Condition	***n***	**%**
Pain Relief	24	60%
Addiction to alcohol/heroin	4	10%
Spasm/Cerebral palsy	3	7.5%
Asthma	3	7.5%
Insomnia	3	7.5%
Stress relief	2	5%
Antidepressant	2	5%
Epilepsy	2	5%
Multiple Sclerosis	2	5%
Huntingdon's Chorea	1	2.5%
HIV	1	2.5%
Condition not stated	3	7.5%
Total cases (8.5% of total IDMU enquiries)	40	100%

8.3.2 The vast majority of cases have involved pain relief and/or spinal injury, there have been a limited number of other conditions. Several cases have involved more than one condition and thus columns cannot be added together to produce totals.

8.3.2 In most of our cases the defendant is charged with possession of cannabis or cannabis resin with intent to supply, including a substantial number of cultivation cases. The nature of our service inevitably over represents the borderline between personal use and supply - defendants who are cautioned do not need expert evidence. The medicinal issue is commonly raised as an explanation of amounts possessed, or used as mitigation during sentencing where there is a guilty plea to possession and/or production/cultivation.

8.3.5 Medical evidence, where substantiated, is frequently accepted by the court or the Crown. The evidence commonly results in a plea bargain and non-custodial sentence, although 'possession with intent' charges are commonly pursued on users with more than a few days supply, or more than a handful of cannabis plants. Although the courts can show compassion in some cases, there is considerable variation in outcomes and sentencing for similar offences. The outcome and sentencing is very much affected by the attitudes of individual judges.

8.3.6 In my experience, juries are more likely to acquit defendants in borderline cases or even with larger quantities where there is convincing medical evidence, given similar circumstances concerning paraphernalia.

Table 7.2

IDMU Medicinal Cannabis Cases 2 - Disposal of cases			
Disposals	**Number**	**% of cases**	**Comments**
Case not pursued beyond initial enquiry	6	15%	Legal aid not awarded or other expert used
Supply charges withdrawn	8	20%	300 plants (pain/arthritis) 2.3kg outdoor homegrown (pain) 30 plants (alcoholism) 20 plants (HIV) 120 plants (pain) 150 plants (pain/oral use) 450g resin (opiate withdrawal) 14 plants (pain)
Supply dismissed/ no case to answer	4	7.5%	6 large plants (spinal injury), 300g 'homegrown' (Asthma), 2oz Resin (spinal injury) 40 plants (pain)
Acquitted by jury of supply charges	6	15%	85 plants (spinal injury) 8oz resin + 80 plants (epilepsy) 97g resin (arthritis) 82 plants (stress relief) 247g resin (Pain) 100g herbal (pain)
Acquitted by jury of all charges (necessity)	2	5%	1. MS - possession/supply of spouse - other expert used, 2 . Pain/spinal injury - 18 plants - judge held necessity to apply where there is 'no alternative way to avoid death or serious injury'
Plead guilty (inc. production/ social supply)	5	12.5%	2000 small plants (pain) 500g herbal (asthma) 2oz resin (pain/asthma)
Convicted by Jury/Sheriff	7	17.5%	50 plants (epilepsy) 200g oil (pain/opiate addiction) 4oz resin (pain) 8oz resin (pain) 225 plants (alcoholism) 85 plants (pain) 120 plants (pain/alcohol)
Hung juries/retrials	2	5%	97g resin (spinal injury - acq) 120 plants (pain/alcohol - con)
Live cases awaiting trial	4	10%	
Outcome/Sentence unknown	9	22.5%	
Total cases	40	100%	8.5% of total IDMU enquiries

8.3.7 Some judges appear more willing to forego custodial sentences where there is persuasive evidence of medicinal use. Other judges take a harder line, particularly in Scotland where custodial sentences are common for minor cultivation offences even where supply charges have been discontinued, and in a case at Northampton where the defendant's acquittal by a jury on a charge of possession of 97g resin with intent (following an initial hung jury and retrial), was followed by a large fine (£1000) on the charge of simple possession, to which the defendant had already pleaded guilty.

Table 7.3

IDMU Medicinal Cannabis Cases 3 - Sentencing of offenders			
Sentence	**Number**	**% of cases**	**Comments**
Conditional/ Absolute discharges	5	12.5%	2.3kg homegrown (pain) 300 plants (pain) 80 plants (epilepsy) 2x spouses of accused growers
Probation	2	5%	Unknown - 247g resin poss. only 2yrs - prod 30 plants (alcoholism)
Fine	4	10%	Costs only - possession 8oz resin/production 80 plants following supply acquittal (epilepsy); £1000 for possession of 97g resin following jury acquittal on intent charge (pain), £300 for production of 85 plants after jury acquittal on intent (pain/spinal injury), £200+ costs for production 6 plants after supply dismissed by Sheriff (pain/spinal injury)
Suspended sentences	3	7.5%	2000 cuttings (pain), social supply of resin (pain) 20 plants (HIV)
Community Service Order	3	7.5%	50hr - 30g herbal (pain/insomnia) 150hr - 14 plants (pain), unknown - 30 plants (alcoholism)
Immediate custody	7	17.5%	3yr - cultivation 220 plants (alcoholism) 12mth 40 plants with intent (pain) 9mth small cupboard production only (pain); 9mth - 40 plants in greenhouse - production only (pain/spinal injury); 9mth - 80 plants (pain) 6mth - social supply 3oz resin unknown - 50 plants (epilepsy)
Live cases still awaiting trial	4	10%	
Result/Sentence unknown	9	22.5%	
Total cases	40	100%	8.5% of total IDMU enquiries

8.4 Press and Internet Reports

8.4.1 It is easy to point to some of the recent sentencing of medicinal users in the UK as indications of compassion and understanding entering the judiciary with regard to such cases. However, within the context of chronically or terminally ill person self-medicating, one should not underestimate the psychological and physiological damage caused by the stress of a police raid, arrest and subsequent court case, regardless of outcome. When cases take a long time to come to court the stress and foreboding are prolonged and, since the medicine which they had relied on is no longer available to them, in such cases the patient is probably more vulnerable and less able to cope with their illness than before.

8.4.2 The stress may even be exacerbated by the fact that there is even less consistency in UK sentences for medicinal cannabis use than there is for cases involving recreational use. In consequence the patients have very little certainty in approaching their trial as to what sentence they may receive or, indeed, what plea they may be able to enter.

8.4.3 In June 1998 Colin Davies, a former joiner who had suffered serious spinal injuries falling 60ft from a bridge in 1994, was acquitted by a jury in Manchester Crown Court of charges of cultivation after representing himself with a defence of necessity[188].

8.4.4 However, at Maidstone Crown Court in 1997 Andrew Betts, Britain's only sufferer of Familial Mediterranean Fever, an inherited and non-fatal condition, was conditionally discharged for two years after appearing on charges of cultivating 45 cannabis plants at his home. Despite having been the sole subject of licensed cannabis tests at Hammersmith Hospital in west London, which enabled him to halve his daily intake of morphine and left him no longer clinically depressed, Betts was forced to plead guilty after Mr Recorder Peter Morgan ruled that his defence of necessity or duress could not be put before a jury[189].

8.4.5 In 1998 Margaret Startin, a mother of two who cares for her chronically arthritic 54-year-old husband, was fined after police raided her home in Cannock and found plants growing under lights in the loft. At Stafford Crown Court she admitted possessing cannabis with intent to supply and was fined £500 and ordered to pay £1,123 costs. Her husband was fined £250 after he admitted growing the drug[190] .

8.4.6 Those who have been driven to use cannabis because they see it as the only efficacious treatment for their illness seem likely to continue to use it if they can despite the legal consequences.

8.4.7 In March Richard Gifford, a liver transplant patient and former Royal Engineer, received a two year conditional discharge for growing 12 cannabis plants in his back garden. Despite this he 'pledged to carry on smoking the drug: "While I am still alive, I intend to carry on using it," he said'[191] .

8.4.8 Davies, too, stated that he would not stop medicating himself: "I will carry on smoking cannabis," he was quoted saying. "It helps the terrible pain I get from my injuries. I feel vindicated that the jury has listened to me." This prompts the question of the validity or purpose of repeated prosecutions of medicinal cannabis users with no likelihood of forcing them to cease their use of the drug.

8.4.9 One aspect of note in the medical cases reported in the UK press is that they are primarily involved with patients who grow their own cannabis. This may be because it is easier to conceal the drug itself as a small package of herbal cannabis or cannabis resin than to successfully hide the cultivation of a number of plants for a period of months. However, it may indicate that medicinal cannabis users are simply more likely to grow their own plants. There are many reasons for medicinal users to do so. They can be guaranteed of the purity of the drugs they use. They can avoid contact with dealers and the associated drugs scene. They can afford to medicate themselves as and when needed at a fraction of the cost of commercially available cannabis. They can avoid having to search for sources of their medication. All these might be seen as aspects of harm reduction in the case of non-recreational drug users.

8.4.10 It is fairly clear that many of those prosecuted feel it to be iniquitous that it is through their determination to avoid being involved in a drugs subculture or to buy in to the criminal industry they have been branded as criminals.

8.4.12 Colin Davis is quoted as saying "I read about cannabis as a relief from pain and I actually went out and bought some off the streets. ...I did not like having to do that so I decided to have a go at growing some for my own use on my own property. I did it behind my own front door, there was no interference with anyone else. I now find myself here and I feel terrible."

8.4.13 By being forced to relinquish their own supply users are forced into the very behaviour that their cultivation of cannabis was intended to avoid. In the case of Richard Gifford the report stated that he had "been buying it on the streets since the police cut down his twelve 8ft plants.".

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