

**From substance use, misuse to dependence.  
You, your friends & colleagues & your patients.**

Anne Lingford-Hughes  
Professor of Addiction Biology.  
Hon Consultant Psychiatrist, CNWL

Imperial College  
London

Central and North West London   
NHS Foundation Trust

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- Alcohol and/or drug abuse is very common and many of the patients you have already seen will have been abusing alcohol and/or drugs. Doctors often have the impression that these patients are difficult to treat and do not get better. This is frequently not the case.
- Whatever area of medicine you go into, some of your patients will have alcohol and/or drugs problems affecting the condition you are treating.

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- Many of the principles described today will also apply to other behaviours that start out pleasurable but become 'controlling' e.g. eating, exercise.
- You are entering an 'at risk' profession for drug and alcohol problems.
  - This could apply to you directly or one of your friends or colleagues.

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some newspapers don't get it

A drug is any chemical you take that affects the way your body works

www.metro.co.uk

### Alcohol and cigs 'worse than drugs'

BY ANNE CAMPBELL

ALCOHOL and cigarettes are more harmful than several class A drugs, a new study shows.

In a controversial league table, experts rank alcohol as the fifth most dangerous 'drug' - ahead of ketamine, speed and ecstasy.

Tobacco is rated even more addictive than heroin.

The rankings, published today in the Lancet medical journal, were compiled by a team of addiction specialists.

They are calling for the A, B and C grades of dangerous substances to be scrapped in favour of a classification system that accurately represents drugs and their side-effects.

While heroin and cocaine - both class A drugs - topped the table, rather than

4-methylthioamphetamine - known as flatties - fell well down the scale based on physical harm, addictiveness and social risk. Cannabis, recently downgraded to class C, was in the middle and rated more dangerous than ecstasy and LSD but less harmful than tobacco.

Experts said they were not calling for tobacco and alcohol to be banned but wanted to show how they compared.

Prof David Nutt, who led the study at Bristol University, said a major flaw of existing classifications was that isolated cases of unpleasant responses to drugs were allowed to dictate policy.

"A more scientific view is that these risks have to be assessed in conjunction

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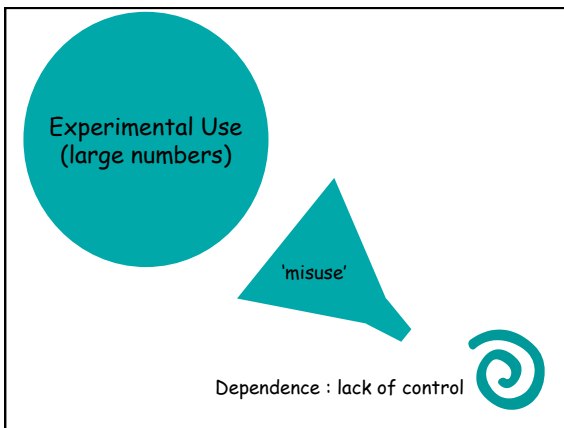
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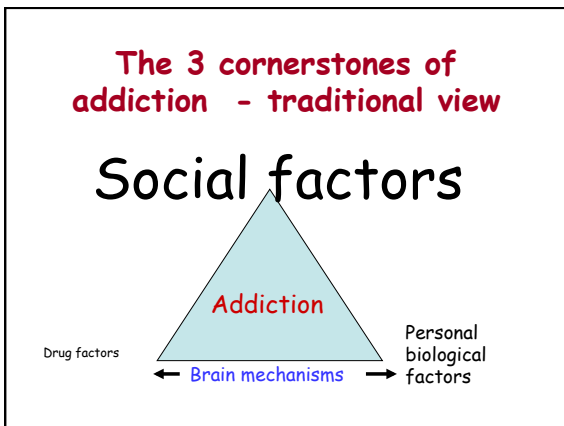
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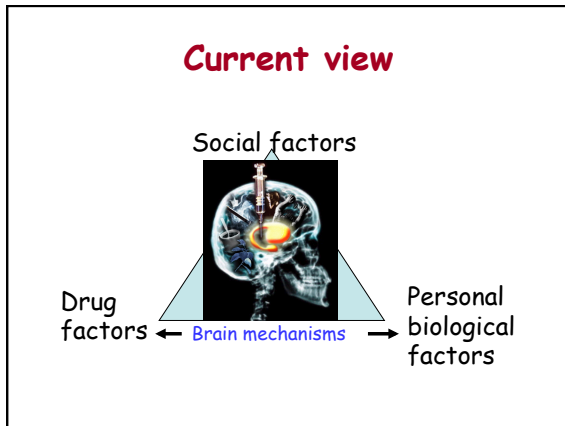
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Some key aspects of brain chemistry.

Dopamine  
opioid  
GABA-benzodiazepine.

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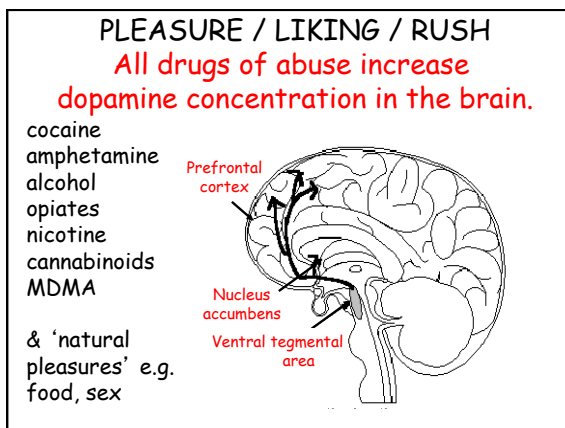
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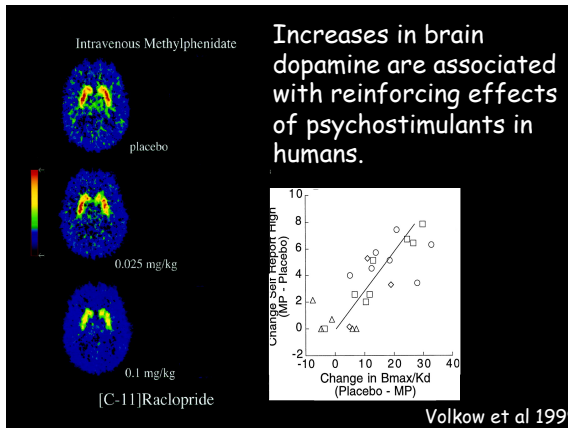
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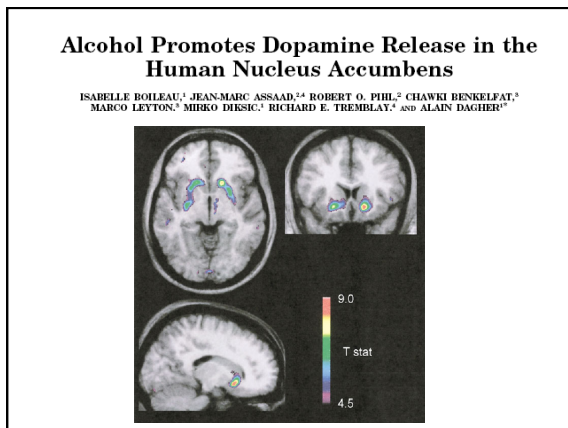
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What happens when this dopaminergic system is continuously or stimulated often ?

The brain gets depleted in dopamine and dopaminergic function is reduced.

: associated with irritability, low mood

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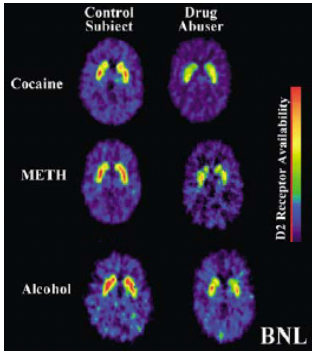
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Measuring dopamine D2 receptor levels in addiction :

Reduced levels have been found

Although some recovery may be seen, this is generally not complete, even after many months.

Cause or consequence ?



BNL

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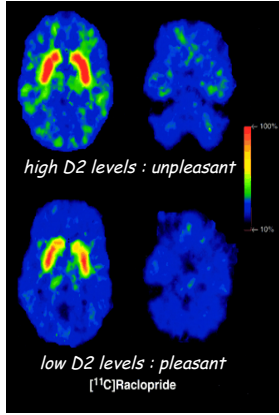
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Lower levels of dopamine D2 receptors are associated with 'liking' the effects of a psychostimulant

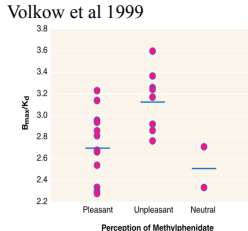


high D2 levels : unpleasant

low D2 levels : pleasant

[<sup>11</sup>C]Raclopride

Volkow et al 1999



Perception of Methylphenidate	B <sub>max</sub> /Kg
Pleasant	2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.0, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8
Unpleasant	2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.0, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8
Neutral	2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.0, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8

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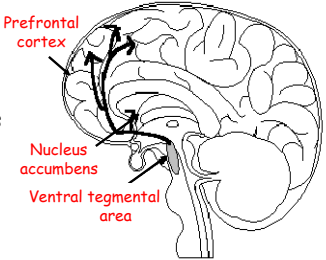
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**PLEASURE / LIKING / RUSH**

All drugs of abuse increase dopamine concentration in the brain.

Dopamine system is modulated by other neurotransmitters

Opioids - 'endorphin rush'




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The dopamine reinforcement pathway: where substances of misuse interact.

The diagram shows the Ventral Tegmental Area (VTA) at the top. A GABA neuron (represented by a circle) inhibits a DA neuron (represented by a circle). The DA neuron projects to the Nucleus accumbens. A red arrow points to the GABA neuron, indicating inhibition. A red arrow points to the DA neuron, indicating excitation.

- opiates ( $\mu$ )
- alcohol
- nicotine
- cannabis

All inhibit GABA neuron via  $\mu$  opioid receptor leading to increased DA-ergic neuronal firing.

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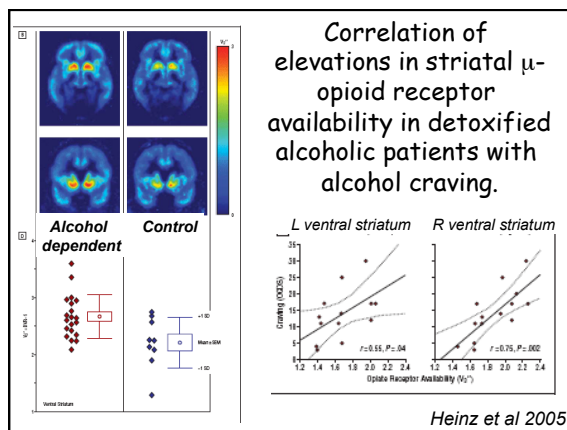
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The opioid receptor in addiction.

- Increase in opioid receptor availability in subjects recently detoxified from
  - Opioids — ?
  - Alcohol — related to craving
  - Cocaine — related to craving

Suggesting that changes in the opioid system play a fundamental role in addiction and possibly craving

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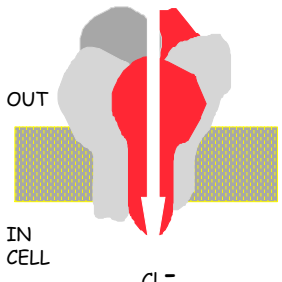
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**The GABA-benzodiazepine [GABA<sub>A</sub>] receptor complex.**



This receptor is the brain's major inhibitory system.

Acutely, alcohol increases activity of this system leading to :  
reduced anxiety, ataxia, slurred speech, disinhibition, sedation, reduced levels of consciousness.

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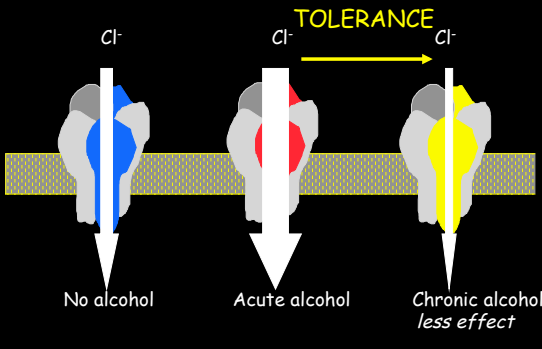
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**The GABA<sub>A</sub> receptor & alcohol**



**TOLERANCE**

Cl<sup>-</sup> Cl<sup>-</sup> Cl<sup>-</sup>

No alcohol Acute alcohol Chronic alcohol  
*less effect*

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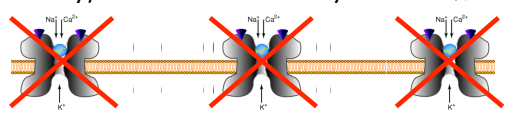
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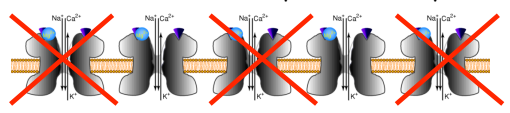
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**Glutamate : 'excitatory system'**

Acutely, alcohol inhibits this system : NMDA



Chronic alcohol leads to receptor up-regulation - associated with impaired memory



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### Alcohol withdrawal

- increased excitation → ↑  $Ca^{2+}$  flux  
- glutamate NMDA receptor
- decreased inhibition →  
- GABA-ergic activity

Leads to :

- neuronal hyperexcitability
- seizures
- cell death

Treat with benzodiazepines to enhance GABA-ergic function

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### Alcohol withdrawal in the hippocampus leads to cell death.



Hippocampus bathed in alcohol : cells are alive.

When the alcohol is removed, cells in the hippocampus die due to influx of  $Ca^{2+}$

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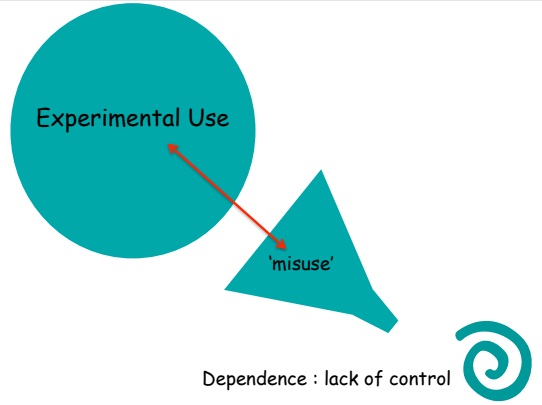
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Experimental Use

'misuse'

Dependence : lack of control

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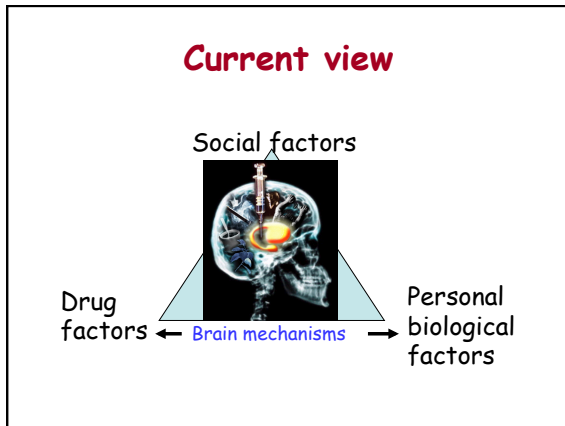
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When does alcohol / drug use become a problem?

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**Drug harms**

- **from the drug**
  - acute toxicity
  - chronic effects
  
- **from the route of use**
  - infections
  - skin lesions
  - lung disease - cannabis
  
- **from addiction to the drug**

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**Relative harms**

Index of toxicity = deaths per million users

heroin >>> cocaine > amph - MDMA - Cannabis

**20,000** - 170 - 70 - 50 - 5

1 in 50 heroin users die of drug

King L ACMD report 2008

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**Don't believe everything you read in the press!**

**Media bias – the Betts effect**

Distorted? a quantitative exploration of drug fatality reports in the popular press

Alasdair J.M. Forsyth \*

International Journal of Drug Policy 12 (2001) 435–453

... comparing 'official' toxicological statistics for a single country (Scotland) with the reporting of drug deaths in that country's most popular newspapers over a given time period (the 1990s).

Drug	Toxicological statistics (n)	Newspaper reports (n)	Toxicology to newspaper ratio
All cases	2255	546	4.1
Aspirin/Salicylate	12	0	—
Paracetamol	265	0	265.1
Diazepam	481	10	48.1
Tenoxicam	369	25	15.1
Morphine	431	6	72.1
Amphetamines	36	13	3.1
Cocaine	30	4	8.1
Heroin/Diamorphine	342	75	5.1
Methadone	460	29	16.1
Ecstasy/MDMA	28	26	1.1

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**The Misuse of Drugs Act 1971**

	<b>Class A</b>	<b>Class B</b>	<b>Class C</b>
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The original intention of the MDA was to have a system of relative based harm against which penalties would be applied (penalty fits the crime).

The Act states that:

*'Her Majesty may [...] make such amendments in Schedule 2 to this Act as may be requisite for the purpose of adding any substance or product to, or removing any substance or product from ...'*

i.e. changes can be made as the evidence of relative harm becomes clearer.

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	Possession:	Dealing:
<b>Class A</b> Ecstasy, LSD, heroin, cocaine, crack, magic mushrooms, amphetamines (if prepared for injection).	Up to seven years in prison or an unlimited fine or both.	Up to life in prison or an unlimited fine or both.
<b>Class B</b> Amphetamines, Cannabis, Methylphenidate (Ritalin), Pholcodine, naphyrone (NR61).	Up to five years in prison or an unlimited fine or both.	Up to 14 years in prison or an unlimited fine or both.
<b>Class C</b> Tranquilisers, some painkillers, Gamma hydroxybutyrate (GHB), Ketamine.	Up to two years in prison or an unlimited fine or both.	Up to 14 years in prison or an unlimited fine or both.

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### Temporary Class Drugs

The Misuse of Drugs Act 1971 has been amended to enable the Home Secretary to place a new psychoactive substance causing sufficient concern about its potential harms under temporary control by invoking a temporary class drug order. This new power is available from 15 November 2011.

**What are the temporary control provisions under the Misuse of Drugs Act 1971?**  
The new key provisions are:

- the Home Secretary may make a temporary class drug order if:
  1. the drug is not already controlled under the Act (as a Class A, B or C); and
  2. the Advisory Council on the Misuse of Drugs has been consulted, and determined that the order should be made, or the Home Secretary has received a recommendation from the Advisory Council that the order should be made, on the basis that it appears to the Home Secretary that:

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## Why reclassify drugs?

- Current classification of drugs arbitrary and illogical
  - what's an A B or C drug?
    - undermines education messages
    - unfair penalties
    - no external reference e.g. alcohol
    - impairs research and treatment
- Harms can be measured
  - more scientific/rational classifications
- Could lead to better and fairer laws and improved educational messages
- But no agreed way of doing this -

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## The nine parameters

Parameter		
Physical harm	One	Acute
	Two	Chronic
	Three	Intravenous harm
Dependence	Four	Intensity of pleasure
	Five	Psychological dependence
	Six	Physical dependence
Social harms	Seven	Intoxication
	Eight	Other social harms
	Nine	Health-care costs

**Table 1: Assessment parameters**

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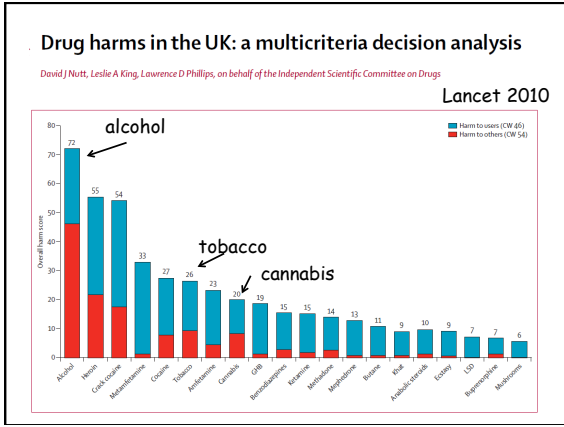
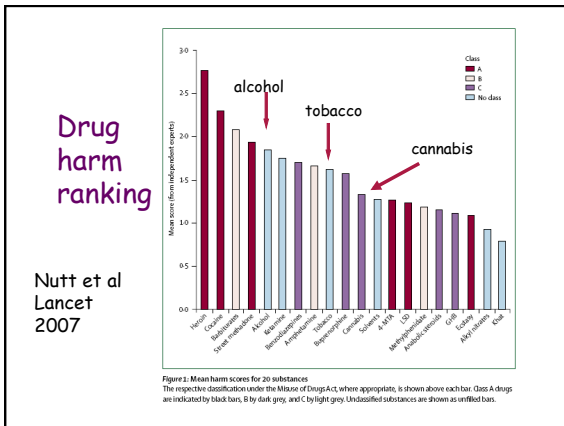
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### Heroin teenager's death exposes drug menace gripping Shetland

drug harms in the real world

The problem is that cannabis is now so hard to get hold of that a lot of my friends have just gone straight on to smack



### Heroin teenager's death exposes drug menace gripping Shetland

#### Dangers of prohibition?



By John D. Stewart  
A young woman in Shetland, Scotland, died of a heroin overdose last week, exposing a drug menace gripping the islands. Louise, 17, was found dead in her bedroom on Monday. Her death is the latest in a series of similar cases in the region.

The problem is that cannabis is now so hard to get hold of that a lot of my friends have just gone straight on to amphetamine.

© 2011 BBC News. August 10, 2011

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### The £12 party drug ketamine killed my lovely Louise - please don't let it be your child next



Over the past three months, Louise has been with me, quiet but for the most part happy. She had been diagnosed with a serious mental health condition.

© 2011 MailOnline

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### A Randomized Trial of an N-methyl-D-aspartate Antagonist in Treatment-Resistant Major Depression

Carlson A. Zarate, Jr, MD, Jasharan B. Singh, MD, Paul J. Carlson, MD, Nancy E. Brutsche, MSN, Rebeca Amat, PhD, David A. Luckenbaugh, MA, Dennis S. Charney, MD, Hussaini K. Manji, MD, FRCP

**Conclusions:** Robust and rapid antidepressant effects resulted from a single intravenous dose of an N-methyl-D-aspartate antagonist; onset occurred within 2 hours post-infusion and continued to remain significant for 1 week.

**Trial Registration:** clinicaltrials.gov Identifier: NCT00088699.

Arch Gen Psychiatry. 2006;63:856-864

### Ketamine 'acts like magic drug on depression'

By DAVID HAZEL, REPORTER  
Last updated at 11:32 AM on 28th August 2010

Ketamine, the dance club drug known as Special K, may also help to relieve depression, according to researchers who have investigated the effects.

The drug quickly induces the regeneration of synaptic connections between nerve cells in the brain, a drug

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- BBC Radio 5 Live
- Victoria Derbyshire interviews a patient entering rehab



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• The very qualities that make a good doctor, such as empathy and attention to detail, can also make him or her vulnerable to stresses and burnout or to turning to drugs or alcohol.

• Be sensitive to the needs of your colleagues and encourage them to seek help if you are concerned about their health.

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**Nihilism surrounding treating substance misuse - is it justified?**

- Success rates in treating chronic physical ill health
  - Hypertension, diabetes, asthma
  - Genetic vulnerability, life-style, behaviour
  - No 'cures' but effective treatments are available.

McLellan

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**Nihilism surrounding treating substance misuse - is it justified?**

- "Success rates" for HT, diabetes, asthma
  - Adherence to medication ~30-60%
  - Adherence to diet/exercise ~30%
  - Retreated in 12mo - 30-80%
- Success rates (median, %, @6mo)
  - Alcohol 50 (40-70)
  - Nicotine 30 (20-40)
  - Opioid 60 (50-80)
  - Cocaine 55 (50-60)

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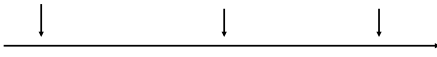


### Exercise

1) Think of a significant change you have made in the last few years.  
Eg given up a habit, started a hobby, moved home

2) Draw line, and mark on this

- a) when you made the change
- b) when you decided to make the change
- c) when you first started thinking about the change



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**Counselling for burnout in Norwegian doctors: one year cohort study**  
Karin E. Isaksson RN, medical doctor;<sup>1,2</sup> Tore Gude, professor;<sup>1,2</sup> Reidar Tysse, associate professor;<sup>2</sup> Olaf G. Aasland, director, professor<sup>1,2</sup>

**Alcohol consumption and alcohol counselling behaviour among US medical students: cohort study**  
Erica Frank, professor and Canada research chair, professor and senior adviser;<sup>1,2</sup> Lisa Elin, senior associate faculty;<sup>1</sup> Timothy Naimi, medical epidemiologist;<sup>2</sup> Robert Brewer, medical epidemiologist<sup>2</sup>

**Five year outcomes in a cohort study of physicians treated for substance use disorders in the United States**  
A Thomas McLellan, chief executive officer;<sup>1</sup> Gregory S Skipper, medical director;<sup>2</sup> Michael Campbell, research scientist;<sup>2</sup> Robert L DuPont, president<sup>1</sup>

**Characteristics and outcomes of doctors in a substance dependence monitoring programme in Canada: prospective descriptive study**  
Joan M Brewster, assistant professor;<sup>1</sup> Michael Kaufmann, medical director;<sup>2</sup> Sarah Hutzinson, senior director, information management;<sup>2</sup> Cynthia MacWilliam, associate director<sup>2</sup>

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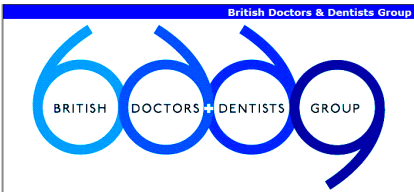
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**British Doctors & Dentists Group**

[Home](#) [Information](#)

**Updated 20<sup>th</sup> November 2011**

The **British Doctors' and Dentists' Group**, formed in 1975, is a mutual support society for doctors and dentists who are recovering, or wish to recover, from addiction to or dependency on alcohol or other drugs.

Membership is restricted to qualified medical and dental practitioners, and medical and dental students at the discretion of local secretaries, and normal medical ethics regarding confidentiality apply strictly within the group.

There are over 1,000 members in the UK and local groups are located in:-

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### Alcohol consumption and alcohol counselling behaviour among US medical students: cohort study

Erica Frank, professor and Canada research chair, professor and senior adviser,<sup>1,2</sup> Lisa Elon, senior associate faculty,<sup>3</sup> Timothy Naimi, medical epidemiologist,<sup>4</sup> Robert Brewer, medical epidemiologist<sup>4</sup>

- 78% of medical students reported drinking in last month
- 33% reported excessive drinking
  - People in this group were less likely to counsel patients about alcohol misuse or see it as relevant

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### You & Alcohol

- As a medic you have responsibility to offer treatment to people with alcohol problems.
- For you as an individual
  - You may be putting your career at risk
    - GMC
  - You may be using excess alcohol to deal with stress/depression/anxiety etc.
    - Get help

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### GMC, (student) Doctors and Substances.

- Although 'recreational use' of illicit **drugs** may not influence your practice it is a criminal offence and therefore you can be 'struck off'
- This is different to **alcohol**; recreational use is OK but if becomes a 'problem' the GMC will be involved

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### WRAP UP

- **Have fun**
- **Look out for each other**
- **If in trouble talk to someone**

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