

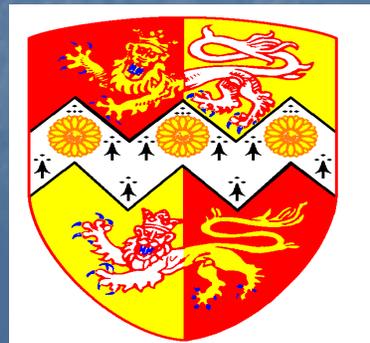
# Diabetes and Smoking

Isn't it obvious that it's a bad thing?

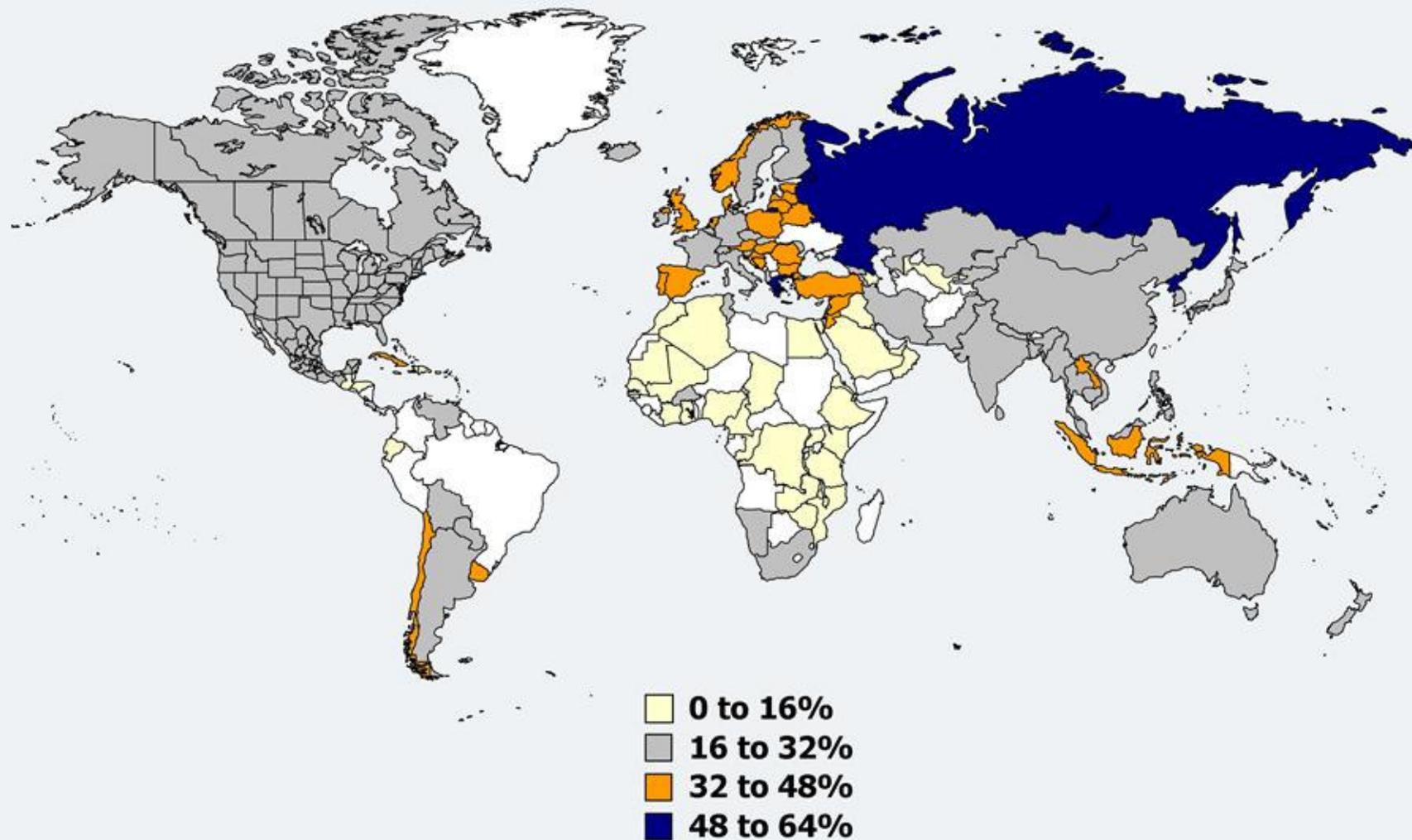
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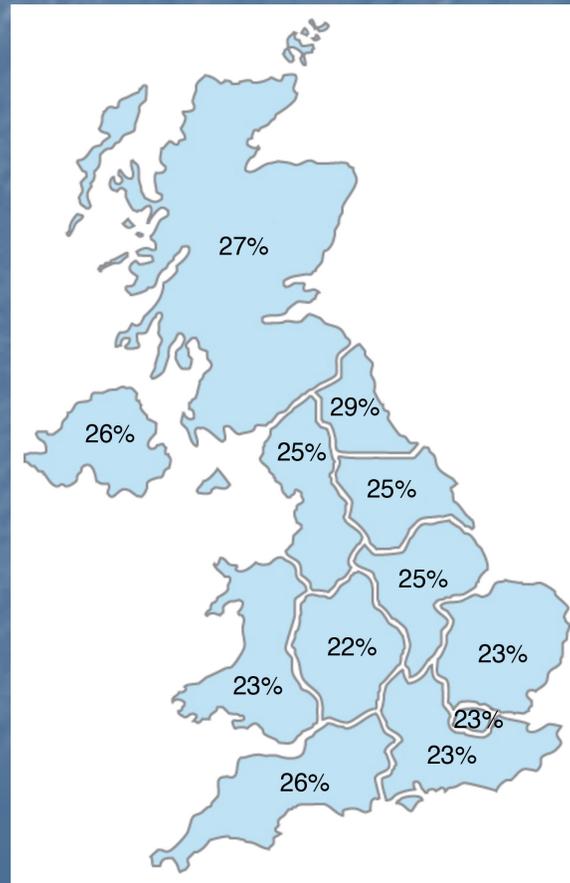


# Adult Prevalence of Smoking, 2005



SOURCE: Kaiser Family Foundation, Global Health Facts, based on data from WHO, World Health Statistics 2009, available at: <http://www.who.int/whosis/en/>.

# What about the UK?



# What about the UK?

- In 2007, 21 per cent of adults aged 16 and over in England reported smoking, compared with 22% in 2006 and 39% in 1980
- Men are more likely to smoke than women (22% vs 19%)
- Almost a third of pupils (32 per cent) aged 11 to 15 in England in 2008 reported having tried smoking at least once and 6 per cent were regular smokers (smoking at least one cigarette a week). Girls were more likely to smoke than boys; 11% vs 8%

# What about the UK?

- 69% of adults aged 16 and over in the UK in 2008/09 reported that they do not allow smoking at all in their home
- 81% agree with the smoking ban in public places

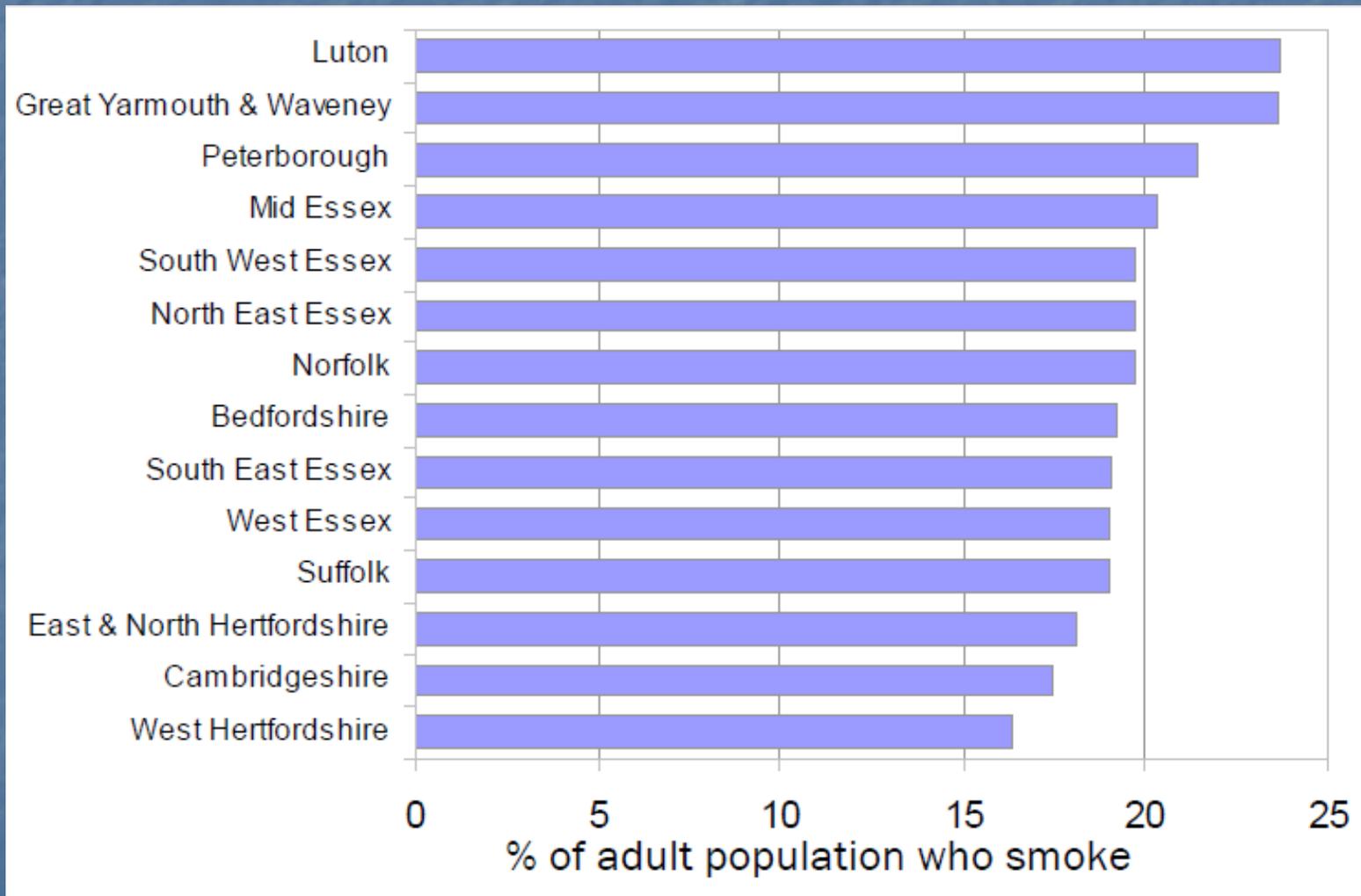
# What about the UK?

- 80% of smokers start before the age of 19
- 33% of men and 29% of women aged 20-24 years
- 23% of men and 21% of women are smokers
- Smoking behaviour is strongly related to socio-economic status

# What about the UK?

- Around 83,900 deaths (18 per cent of all deaths of adults aged 35 and over) in England in 2008 were estimated to be caused by smoking
- 230 deaths a day
- 84% of lung cancer deaths, 84% of COPD deaths and 17% of IHD are estimated to be caused by smoking
- 50% of current smokers will die from smoking-related diseases if they do not quit

# What About Norfolk?



# In the USA

- 435,000 people die prematurely per year
- Smoking causes 1 in 5 deaths
- The chance that a smoker will die prematurely from a smoking related complication is about 50%

Benowitz NL NEJM 2010;362(24):2295-2303

Doll R, Peto R et al BMJ 2004;328:1519

# Economic Impact in the UK

- Around 440,900 hospital admissions among adults aged 35 and over are estimated to be attributable to smoking. This accounts for 5 per cent of all hospital admissions in this age group
- In general treating smoking-related disease costs the NHS £5.2 billion per year (5.5% of the entire NHS budget)

# Disappointing But True

- The vast majority of smokers in the world know that smoking is bad for them – yet they continue
- Why?
- Because it is highly addictive and the biology, behaviour, and psychology of addiction is very complex indeed

# What's Known?

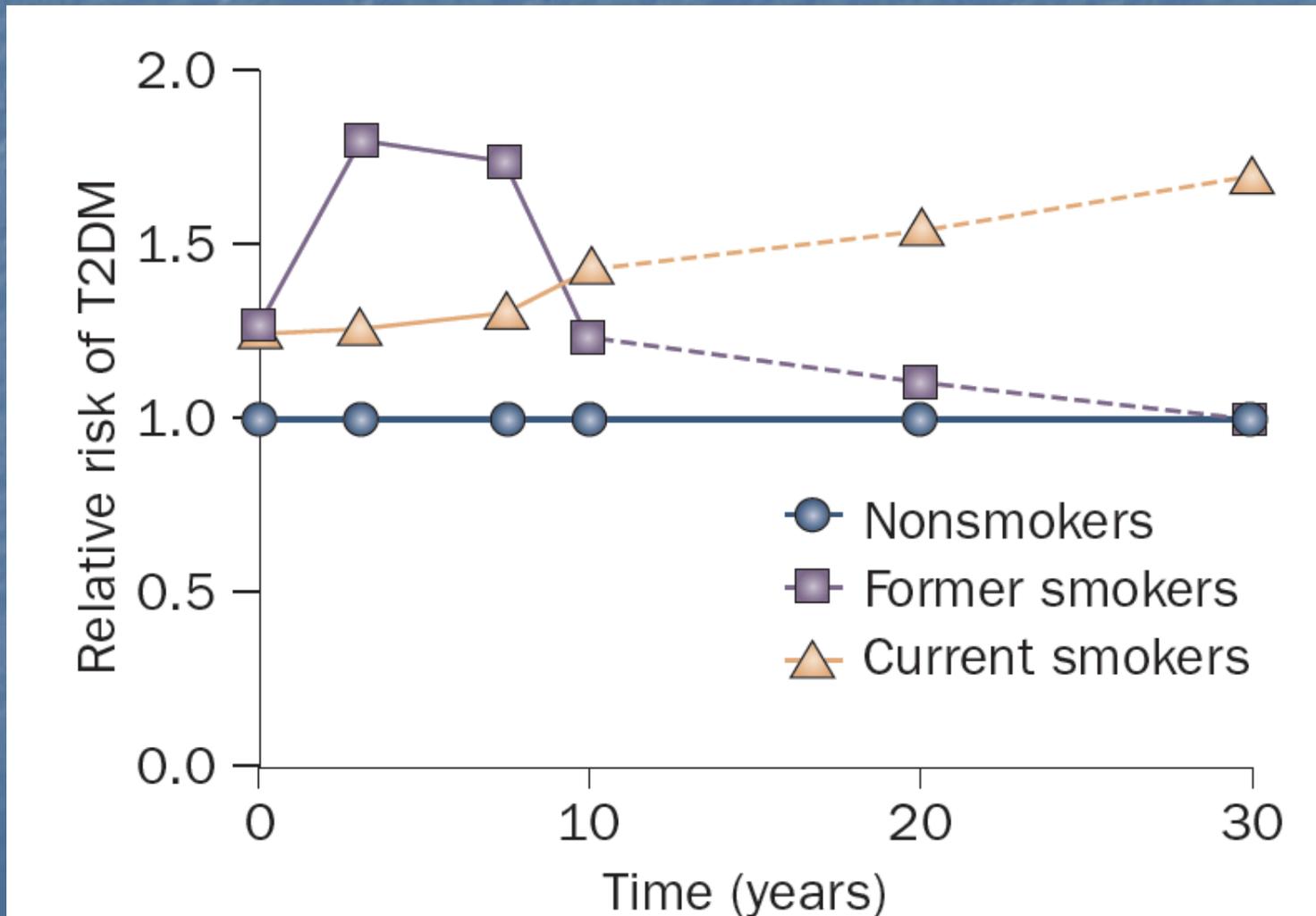
- About 10% of smokers think about stopping sometime in the next 6 months – up to 67% claim they want to stop
- Of those only 10% use pharmacotherapy
- There is a dose-response direct link between smoking and the risk of developing T2DM

<http://www.ic.nhs.uk/statistics-and-data-collections/health-and-lifestyles/smoking/statistics-on-smoking-england-2009>

Gallus S et al Archives Int Med 2009;169(20):1927-1938

Willi C et al JAMA 2007;298:2654-2664

# Relative Risk of Developing T2DM



# Pardon?

- Smoking increases the risks of developing T2DM by between 55 and 71%
- This was especially true in men
- Is it because of the associated unhealthy lifestyle?

# The Arguments Against Smoking

- Direct or passive tobacco smoke remains one of the greatest preventable causes of ill health and premature death around the world
- It makes no difference when the tobacco exposure occurs in life – in utero, as a child or as an adult – in ALL circumstances, it is harmful

# The Arguments Against Smoking

- Exposure in utero has negative effects on foetal growth – especially on male offspring
- These children are more likely to be smokers
- Adolescent smoking can affect organ development, especially the lungs – especially in girls

Xu B et al Soc Biol 1998;45:273-277

Buka SL et al Am J Psychiatry 2003;160:1978-84

Gold DR et al NEJM 1996;335:931-937

# The Arguments Against Smoking

- Longer term, these offspring have an increased mortality – especially in males
- Smoking makes PVD, CHD, diabetes, COAD all have worse outcomes
- Stopping smoking at any age has significantly measurable physical benefits

Nilsson PM et al Scand J Public Health 2006;34:660-664

Nilsson PM et al Diabetes Metab 2004;30:261-268

# The Things That Make the Most Difference

- Smoking OR 2.87
- Raised ApoB/ApoA1 ratio OR 3.25
- History of hypertension OR 1.91
- Diabetes OR 2.37
- Abdominal obesity OR 1.12
- Psychosocial factors OR 2.67
- Daily fruit and veg intake OR 0.7
- Regular alcohol consumption OR 0.9
- Regular physical activity OR 0.86

# The Interheart Study

- Looked at over 15,000 individuals and found a linear relationship between MI risk and number of cigarettes smoked

# Smoking and Hypertension

- Everyone with hypertension should stop smoking because it accelerates cardiovascular disease rates
- In hypertensive patients smoking increases the risk of
  - cardiovascular mortality by 89%
  - non-cardiovascular mortality by 68%
  - CHD incidence by 87%
  - CCF by 214%

# Smoking and Diabetes

- Everyone with diabetes should stop smoking because it accelerates cardiovascular disease rates
- Current smoking is a significant risk factor for CHD and CVS mortality with a 50% - 100% increase in event rates in smokers

# Diabetes and Psychiatry

- Schizophrenia is associated with 2-3 times higher levels of diabetes than the rest of the population – a relationship first described in 1922
- This may be related to lifestyle – poor nutrition, lack of exercise, etc
- Recent finger pointing at conventional and 'atypical' antipsychotics

Meduna F et al *Arch Neurol Psychiatry* 1942;47:38–52

Braceland F et al *Am J Psychiatry* 1945;102:108–110

Barnett AH et al *J Psychopharm* 2007;21:357-373

# Lifestyle and Diet

- Poverty and poor access to good nutrition are associated with Type 2 diabetes
- Individuals take in fewer calories, but they take in a higher proportion of fat with less fruit and vegetables, and less minerals and vitamins
- Little exercise, with high smoking rates
- This is a pattern seen in schizophrenia

Brown et al. *Psychol Med.* 1999;29:697–701  
Newcomer. *CNS Drugs.* 2005;19(Suppl 1):1–93

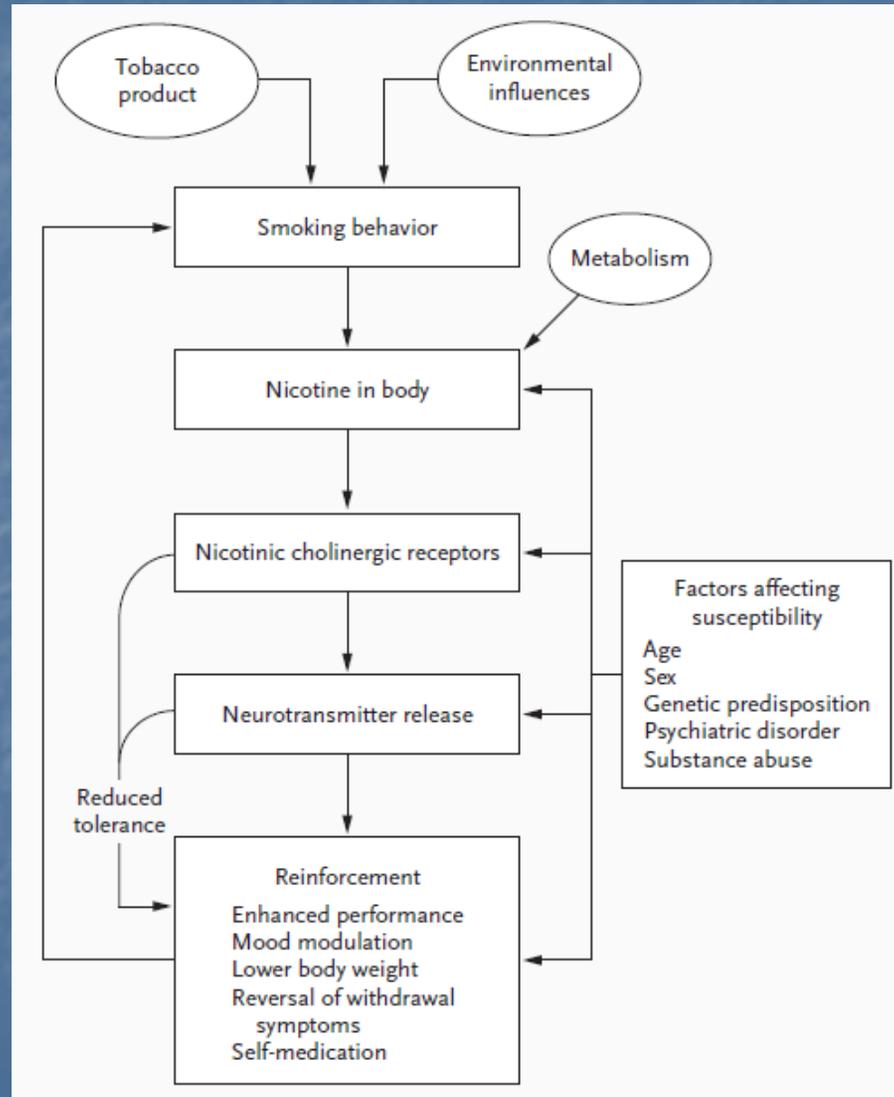
# Why is Tobacco Smoke Addictive?

- Over 4000 different agents are emitted from a burning cigarette
- Nicotine is the main addictive chemical
- It's addictive properties are due to it's interaction with the nicotinic acetylcholine receptors

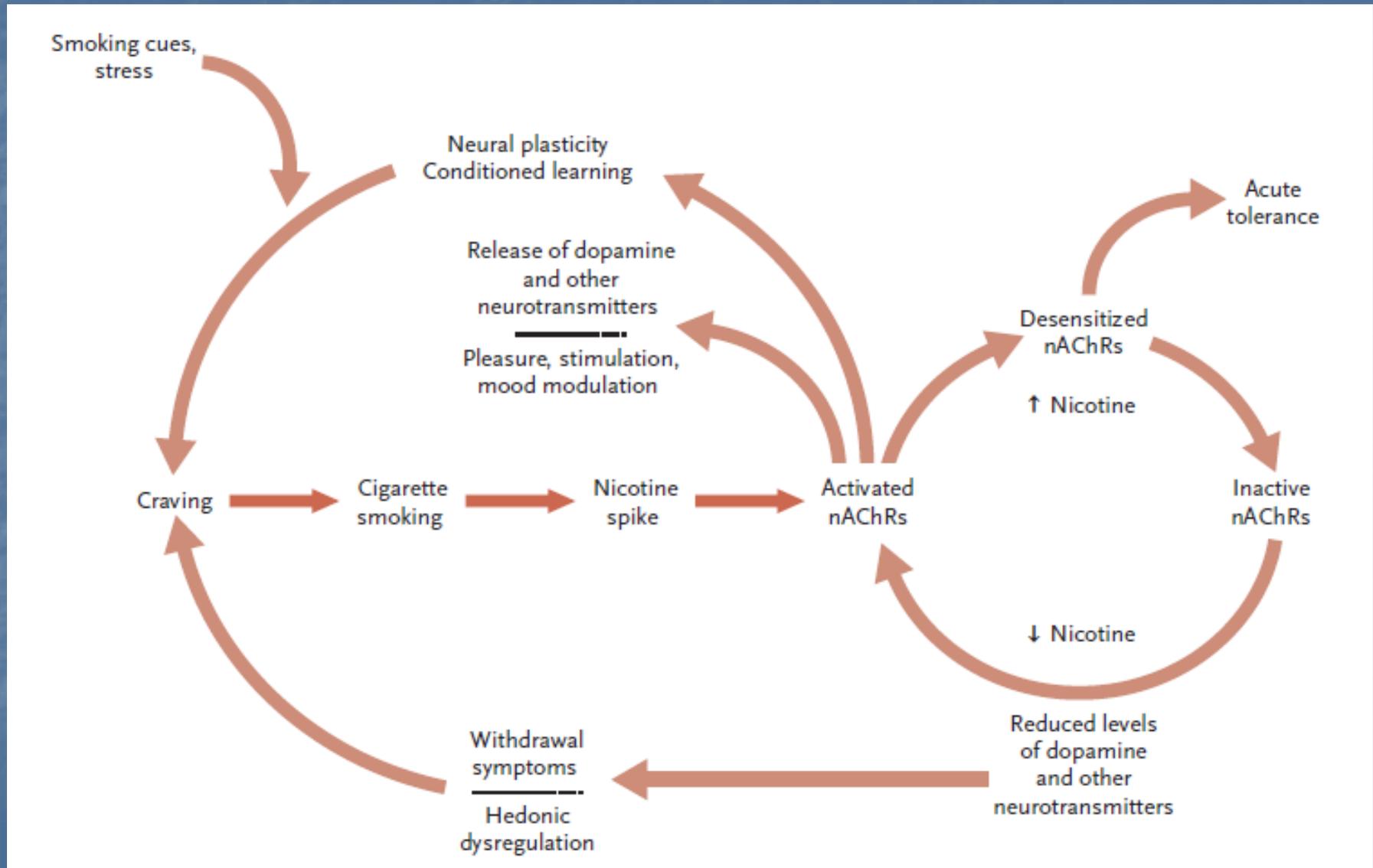
# Why is Tobacco Smoke Addictive?

- Activation of the nicotinic acetylcholine receptor leads to release of those lovely mood enhancers
  - Dopamine
  - Norepinephrine
  - Acetylcholine
  - $\beta$ -endorphines
  - etc
- These lead to the feelings of 'pleasure' associated with smoking or withdrawal symptoms

# The Biology of Nicotine Addiction



# Molecular and Behavioural Aspects



# Is it Worthwhile Getting Older People to Stop?

- Is a smoker stops at age 35, they will gain between 6.9 and 8.5 added years (if male) and between 6.1 and 7.7 years (if female)
- If the smoker stopped at 65, then men would gain between 1.4 and 2.0 years, with women gaining 2.7 to 3.7 years

# Is it Worthwhile Getting Older People to Stop?

- Stopping reduces the risk of CAD and CV death, as well as COPD
- It also improves QOL

# How to Help People to Stop

- Tobacco industry regulation, including:
  - Health warnings on tobacco products
- Reduced access to tobacco
  - Increased tax on tobacco products
- Public health campaigns & policies
  - Development of Regional Tobacco Policy Manager role
  - Anti-smoking media campaigns
  - Smoking bans in enclosed public places
    - Republic of Ireland in 2005
    - Scotland in March 2006
    - Wales and Northern Ireland in April 2007
    - England in July 2007

# How to Help People to Stop

- Simple messages at every opportunity anytime they meet an HCP
- Group sessions are better than 1 to 1 or self help

# How Successful is Will Power?

- Between  $\frac{2}{3}$  and  $\frac{3}{4}$  of ex-smokers stop unaided

# Ways to Reduce the Cravings

- NRT has been about since the 1970's
- Bupropion (Zyban) has been about since the late 1990's
- Varenicline (Champix) has been about since 2006
- Others use acupuncture, hypnotherapy, etc but these are less well proven

# A Warning....

- In pharmaceutical company sponsored studies, the quit rate was more than double the rates of cessation in non-industry funded studies (51% quit vs 22%)

# Change in the License

- In February 2010, NRT had a change in its license to include an indication of “harm reduction”, since it has become widely accepted that there are no circumstances in which it is safer to smoke than to use NRT

Drug safety update, MHRA 2010;3(7):6

<http://www.mhra.gov.uk/Publications/Safetyguidance/DrugSafetyUpdate/CON071085>

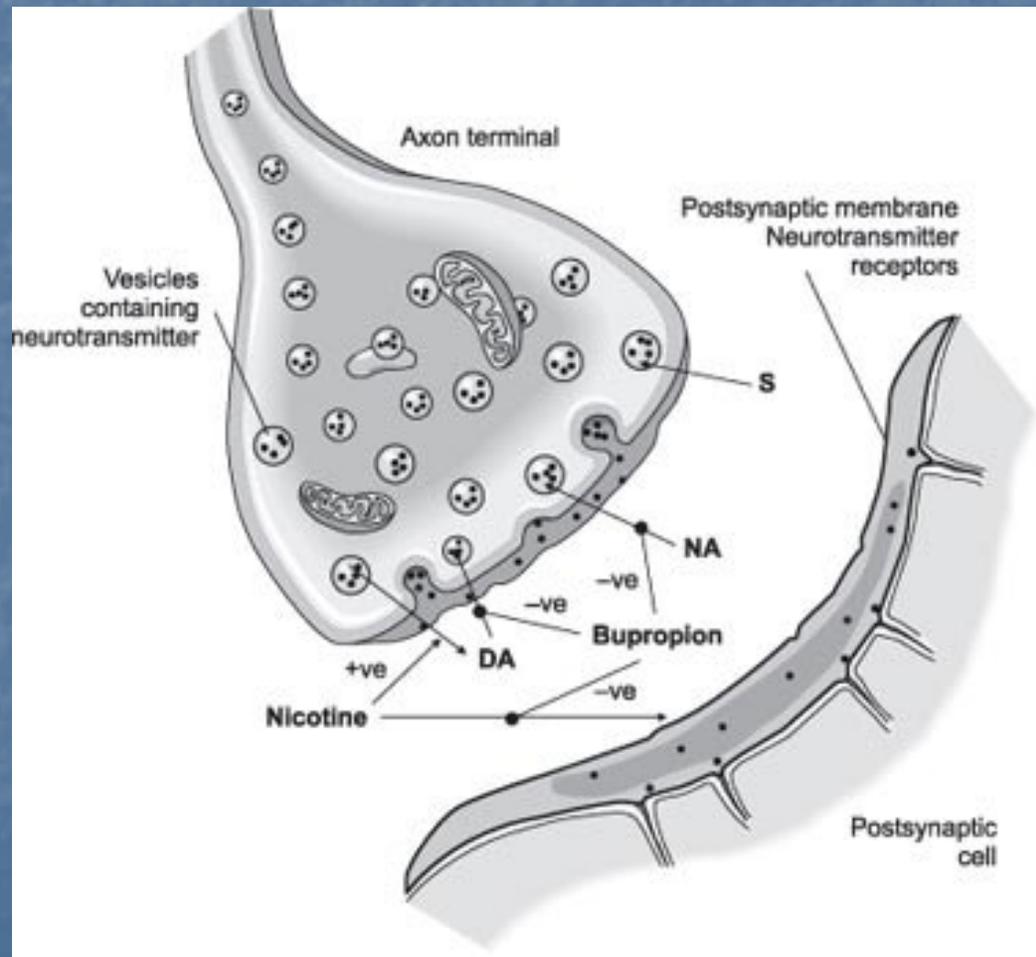
# What about NRT?

- NICE recommends that combination NRT be given to increase the chances of successfully quitting
- 10mg inhalers or 4mg gum have the highest levels of success – at least a 50% reduction in consumption compared with baseline

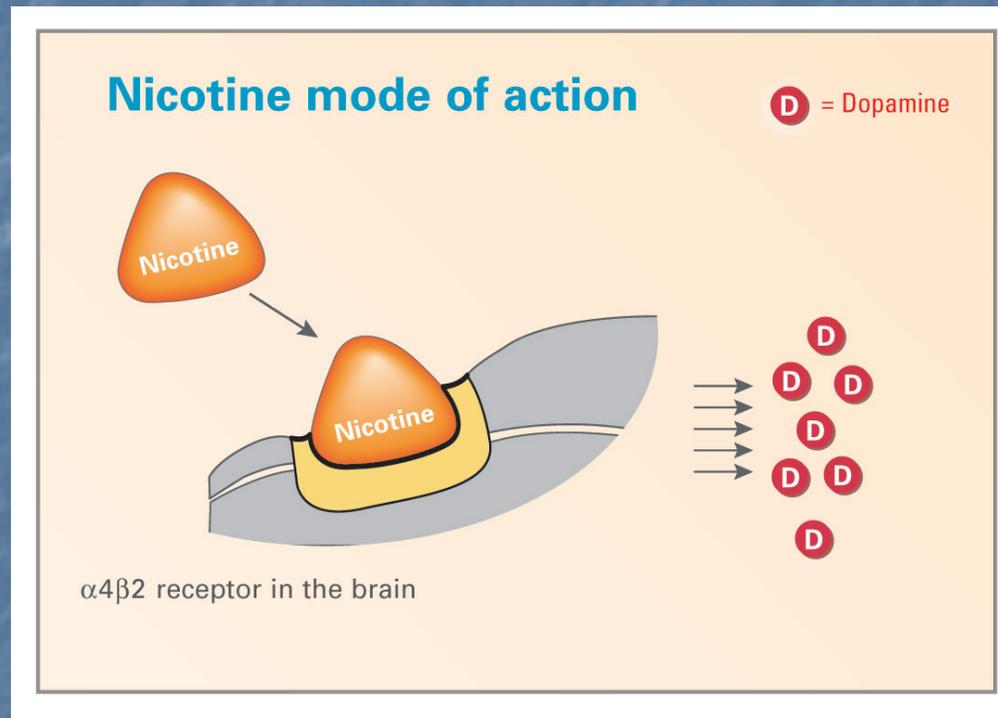
<http://www.nice.org.uk/guidance/index.jsp?action=byID&o=11925>

Kralikova E et al BMC Public Health 2009;9;433

# How Does Zyban Work?

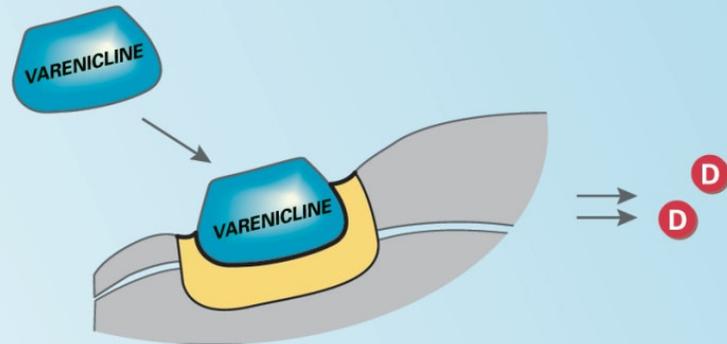


# How Does Champix Work?



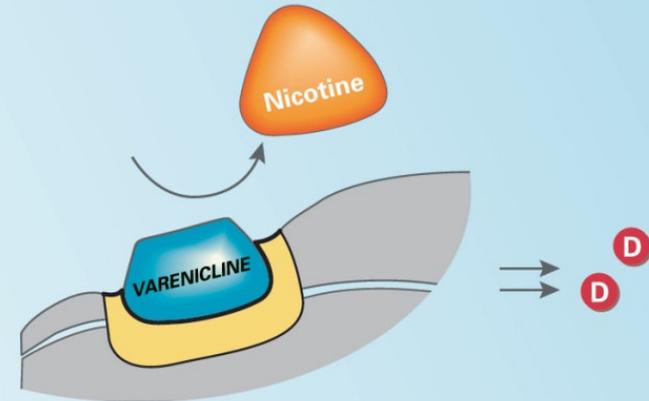
# How Does Champix Work?

## Varenicline mode of action



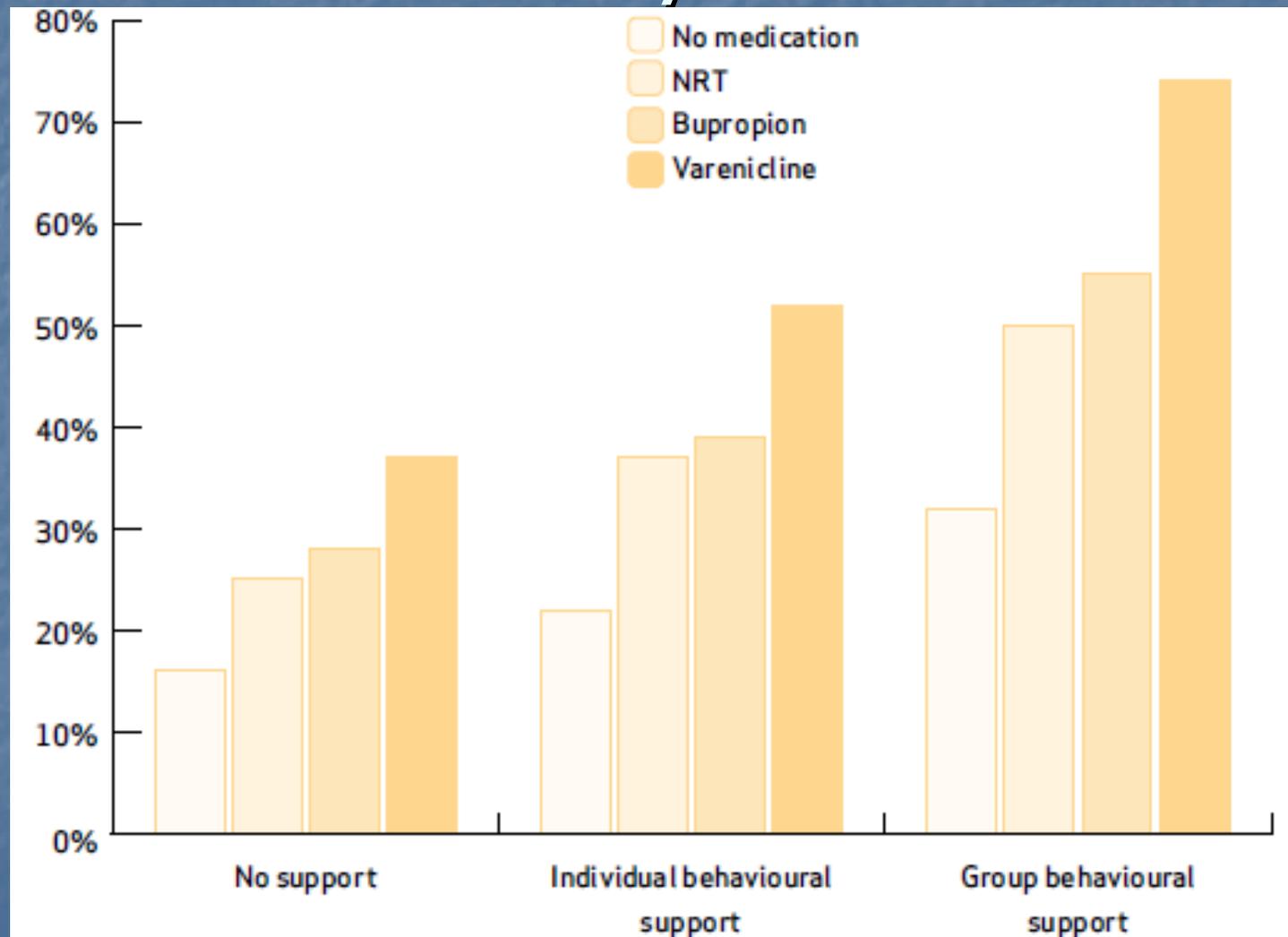
$\alpha 4 \beta 2$  receptor in the brain

## Varenicline with nicotine



$\alpha 4 \beta 2$  receptor in the brain

# Do They Work?



# Do They Work?

Four-week quit rates	No medication	NRT	Bupropion	Varenicline
No support	16%	25%	28%	37%
Individual behavioural support	22%	37%	39%	52%
Group behavioural support	32%	50%	55%	74%

# Extended use of Nicotine Patch Improves Abstinence Rates

- Compared with short term use (16 weeks), extended use (24 weeks) of the patch doubles abstinence rates

# Having Said That.....

- Varenicline has a higher quit rate than other treatments
  - 59% using Varenicline
  - 50% on Zyban
  - 45% on NRT
  - 42% on willpower

# What About the Suicide Risk?

- Both varenicline and bupropion (but not NRT) have been associated with "changes in behaviour, agitation, depressed mood, suicidal ideation, and attempted and completed suicide
- A recent UK based study of over 80,000 people showed no evidence of increased suicide risk with either drug (although there *may* be an increased risk of self harm)

# Are They Safe in CHD?

- Yes
  - varenicline seems to be reasonably safe in patients with chronic, stable CHD without a history of depression or psychiatric disease

# Newer Developments

- The early trials of preventative immunisation to reduce cravings have been encouraging
- But the best way remains a combination of group CBT and counselling as well as pharmacology

	<b>Behavioural therapy</b>	<b>Brief advice</b>	<b>No treatment</b>
<b>Medication</b>	30%	20%	10%
<b>Placebo</b>	15%	10%	5%

# Who Would I Not Say Anything To?

- Those who are terminally ill or other life threatening condition

**Any Questions?**