

# **Epidemiology and prevention of smoking**

# Why is tobacco a public health priority?



Tobacco is the second major cause of death in the world. It is currently responsible for the death of one in ten adults worldwide (about 5 million deaths each year). If current smoking patterns continue, it will cause some 10 million deaths each year by 2020. Half the people that smoke today -that is about 650 million people- will eventually be killed by tobacco.

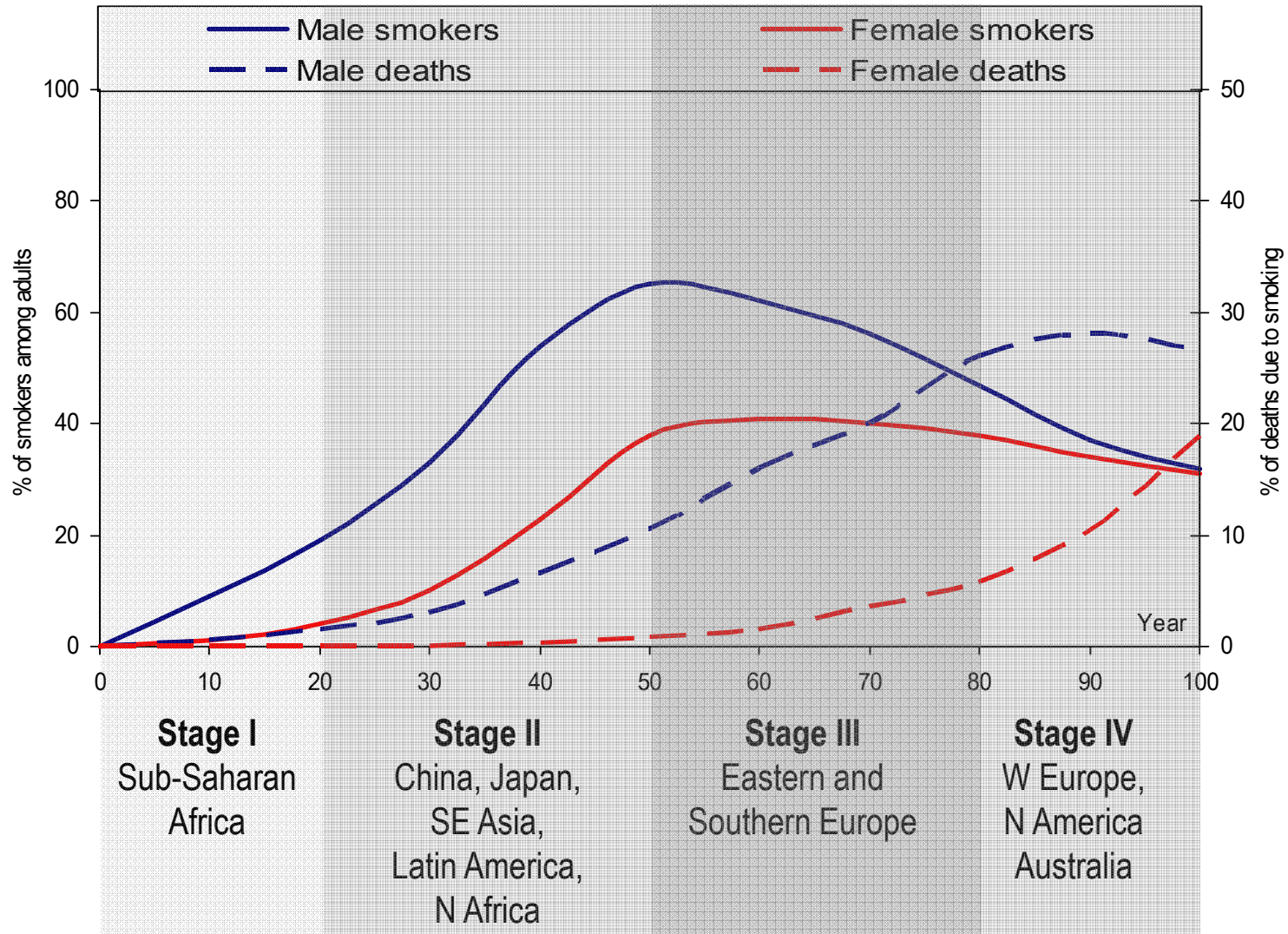
[More information](#)

<http://www.tobaccoatlas.org/consumption.html>

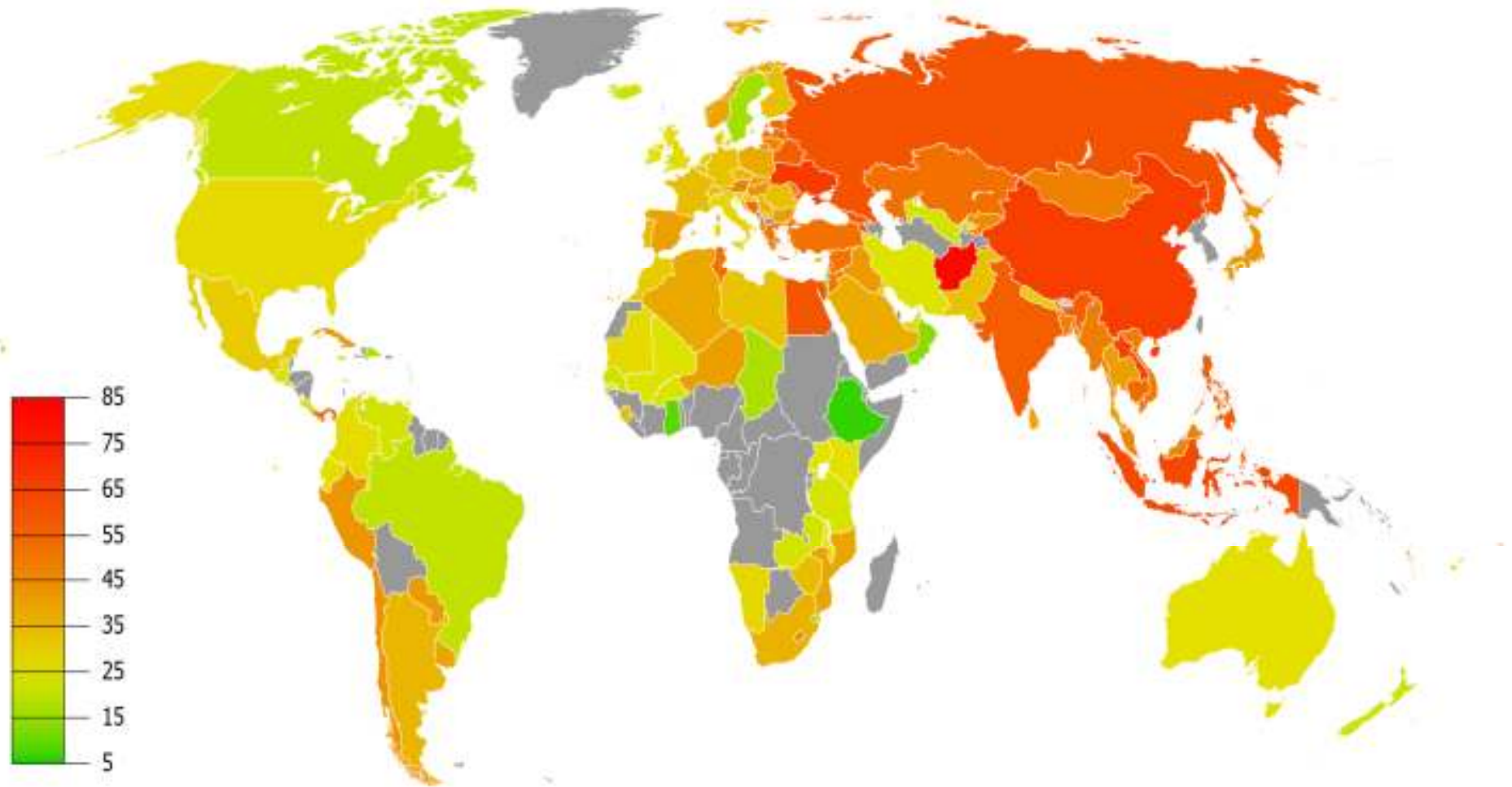
# Facts on smoking

- 1 billion smokers worldwide
- One-third of the adult global population are smokers
- 5 million people die every year because of smoking-related diseases, this figure will have doubled by 2030
- 75% of smokers want to quit
- 2% of smokers quit each year

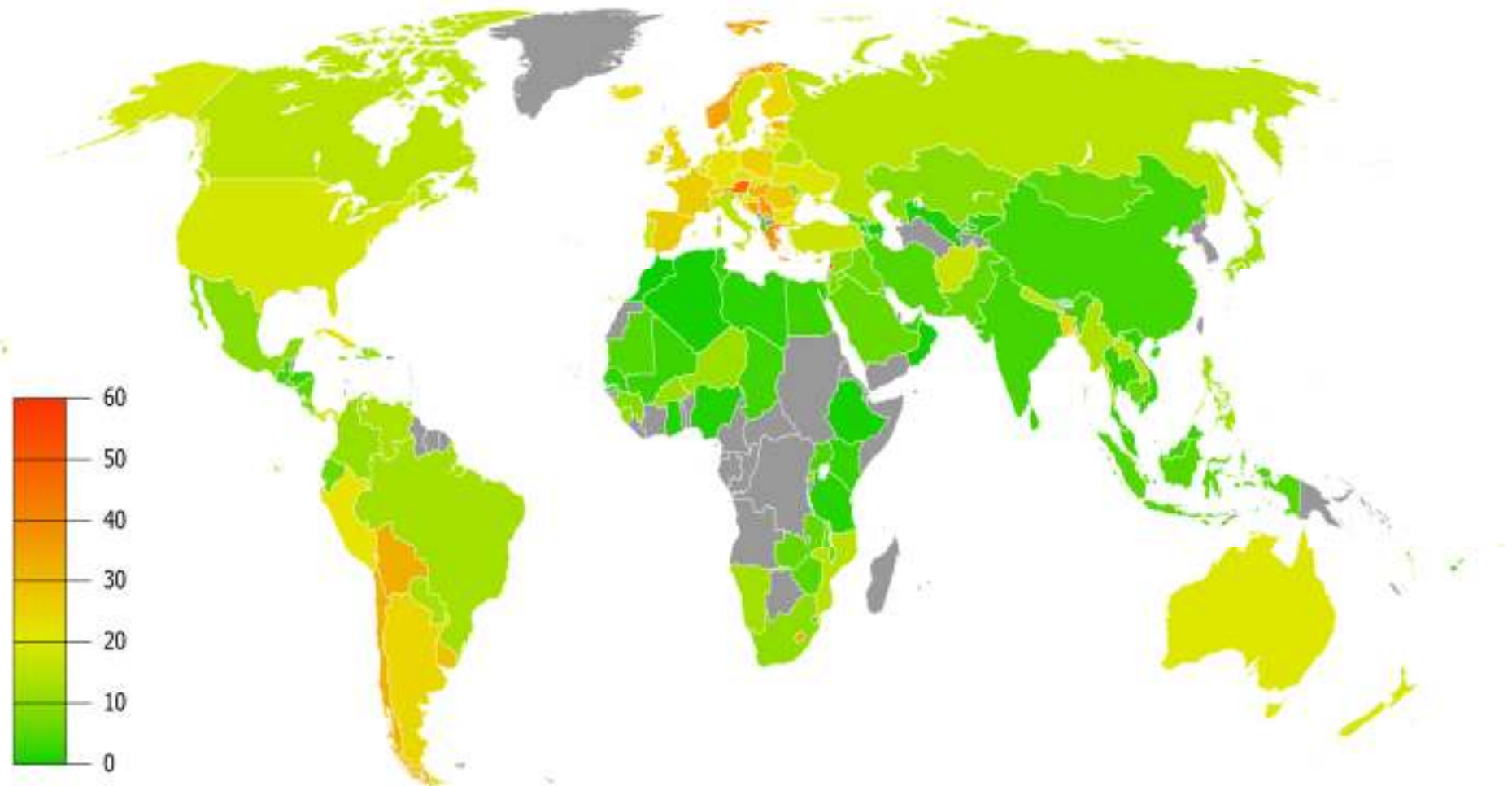
# The smoking epidemic



# Percentage of males smoking any tobacco product, 2009

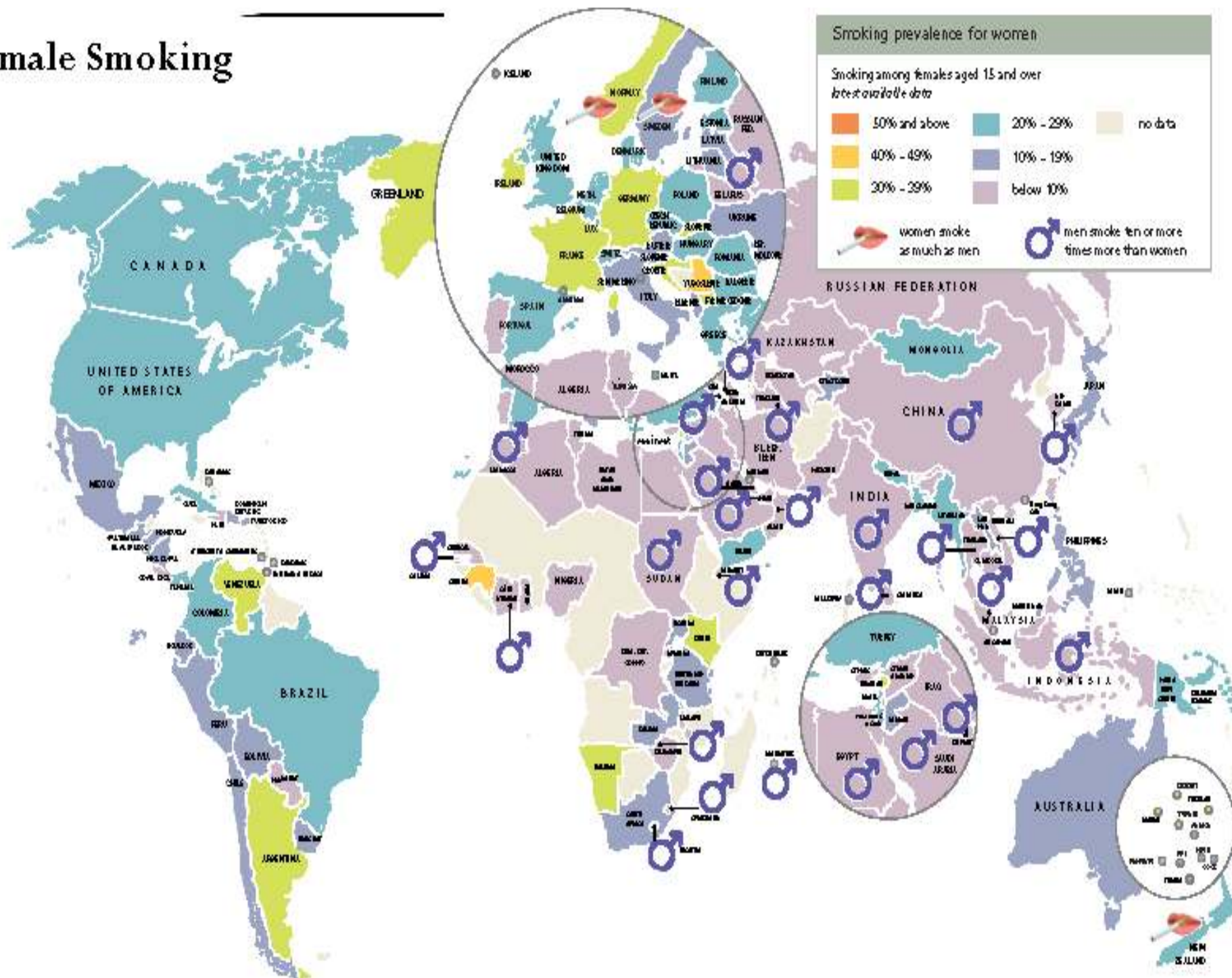


# Percentage of females smoking any tobacco product, 2009





# Female Smoking



# Smoking during pregnancy



- Smoking has adverse effects on unborn child
- 20-30% of smoking women quit in pregnancy
- Smoking cessation programmes are effective
- NRT is assumed to be safe
- Bupropion and varenicline are contra-indicated

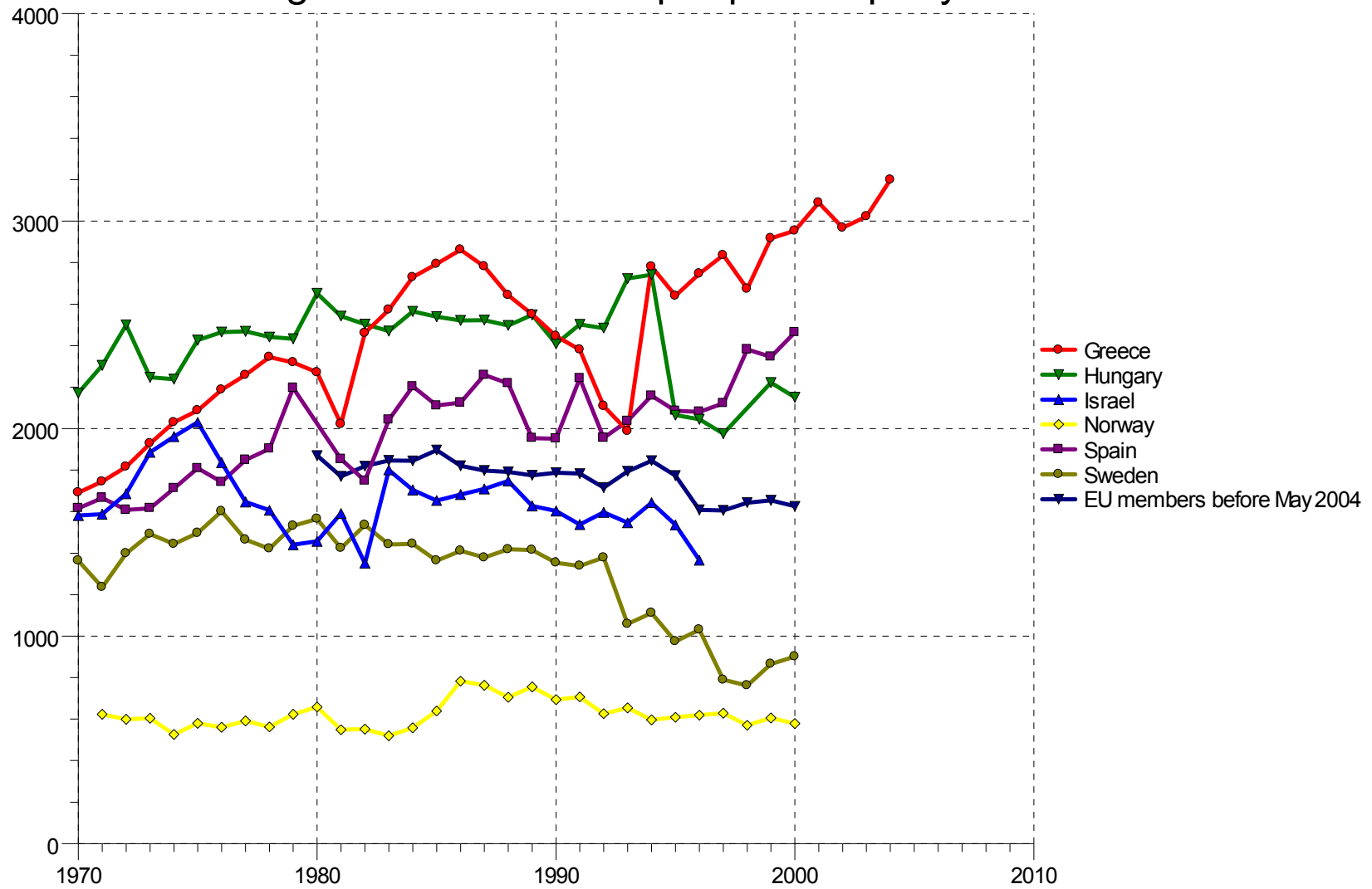


- Post-partum follow up reduces the 70% relapse rate

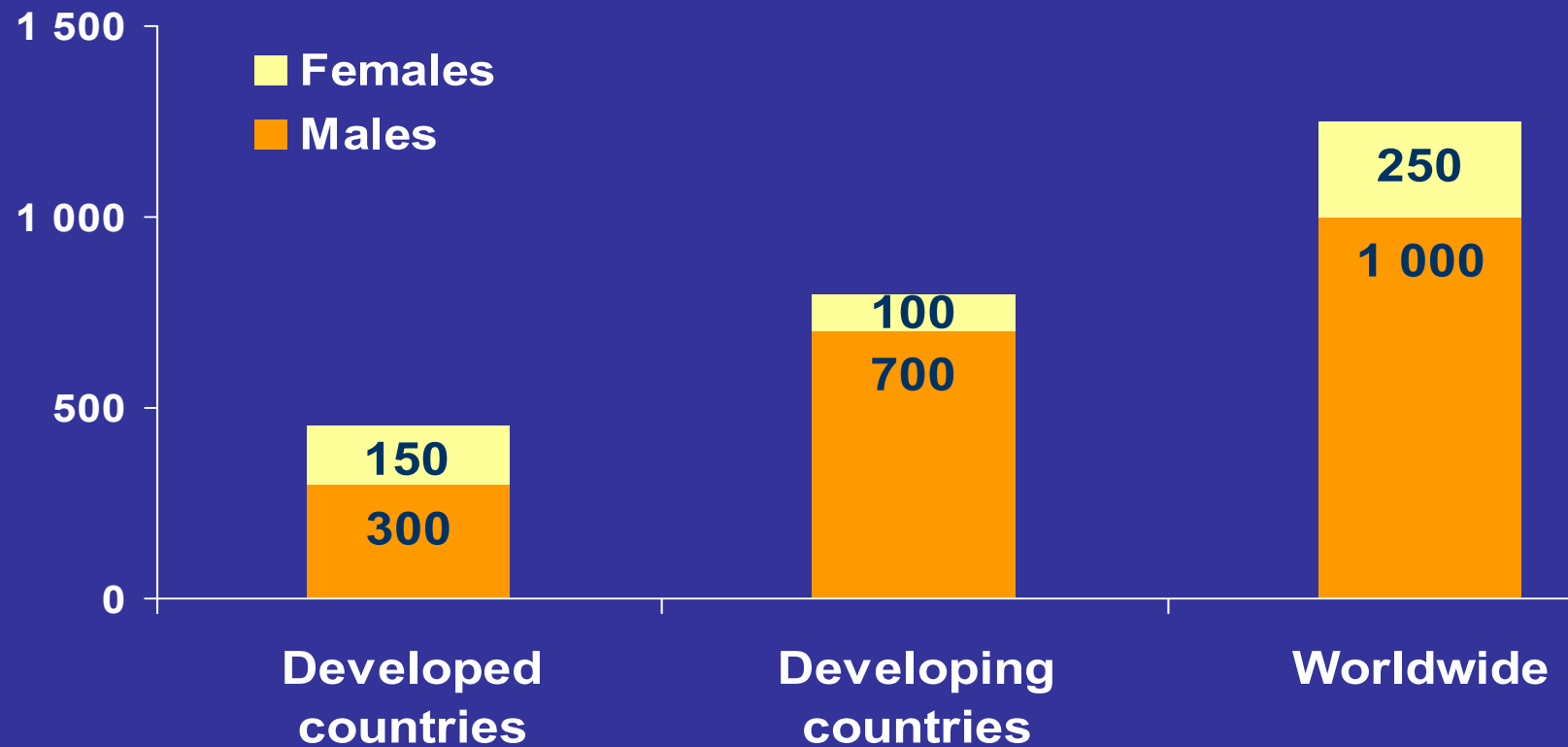
Pregnancy is often a trigger for quitting



# Number cigarettes consumed per person per year

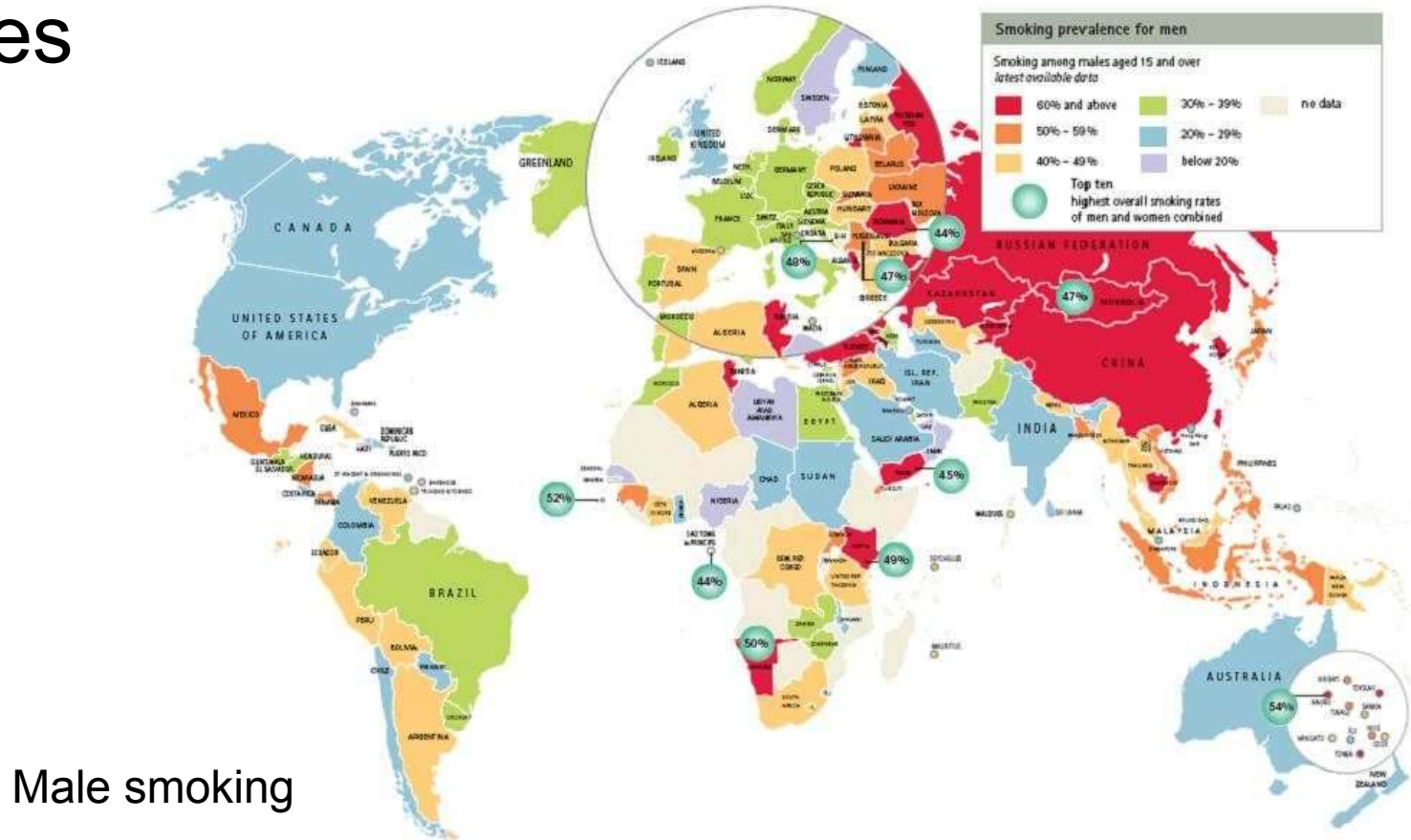


# Number of smokers



# Change in the smoking epidemic

- 75% of smokers live in low or middle income countries



# Smoking in adolescents

**50%**

of young people  
who continue to  
smoke will die  
from smoking



World Health Organization. The Tobacco Atlas. [http://www.who.int/tobacco/statistics/tobacco\\_atlas/en](http://www.who.int/tobacco/statistics/tobacco_atlas/en)

Every day, up to 100,000 young people globally  
become addicted to tobacco

# Commercial Tobacco Contents



4000 Chemicals



40 Cancer causing agents



500 Poisons












# Chemical Box

## What's in Tobacco?



- ★ Tar: black sticky substance used to pave roads
- ★ Nicotine: Insecticide
- ★ Carbon Monoxide: Car exhaust
- ★ Acetone: Finger nail polish remover
- ★ Ammonia: Toilet Cleaner
- ★ Cadmium: used batteries
- ★ Ethanol: Alcohol
- ★ Arsenic: Rat poison
- ★ Butane: Lighter Fluid

# Nicotine

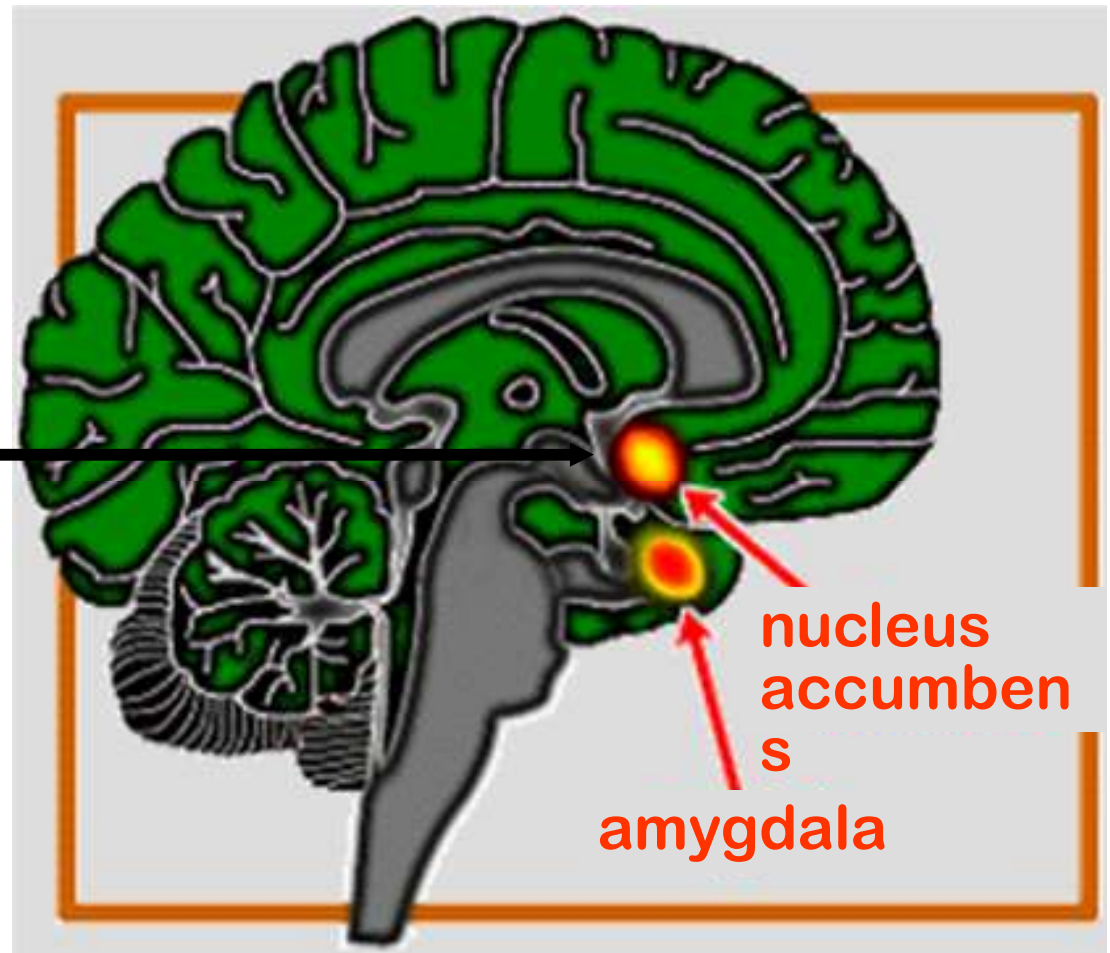
-  Poisonous
-  More addictive than cocaine and heroine
-  So powerful that farmers can't use it to kill insects
-  Legal addiction
-  Use results in emotional dependence
  -  Mood leveler
  -  Users rely on it to control emotional responses to everyday life

# Nicotine dependence

- Addiction/dependence
  - can't stop when you want to
  - continue use, despite clear evidence of harm
  - clear withdrawal symptoms
    - nicotine: depressed mood, insomnia, irritability, difficulty concentrating
- *but* no intoxication
  - unlike cocaine, heroin, alcohol




# Nicotine action

- Accelerates release of neurotransmitter dopamine in the brain's NA\* & increases metabolism in NA
- dopamine ~ pleasure, emotions, addiction ... "reward system"



\*NA = nucleus accumbens

# Carbon Monoxide

-  The compound in car exhaust that causes death
-  Causes shortness of breath
-  Reduces the amount of oxygen blood can carry



# Tar









Sticky Residue that stains the fingers and teeth.



Contains benzopyrene, one of the deadliest cancer causing agents known.

# Chemicals

-  Acetone: fingernail polish remover
-  Ammonia: floor/toilet cleaner
-  Cadmium: batteries
-  Arsenic: rat poison
-  Methane: cow manure fumes
-  Formaldehyde: preserver of dead bodies

# Metals



Aluminum



Silver



Magnesium



Lead



Zinc



Copper



Silicon



Mercury



Titanium



Heavy metals

# Health risks of smoking

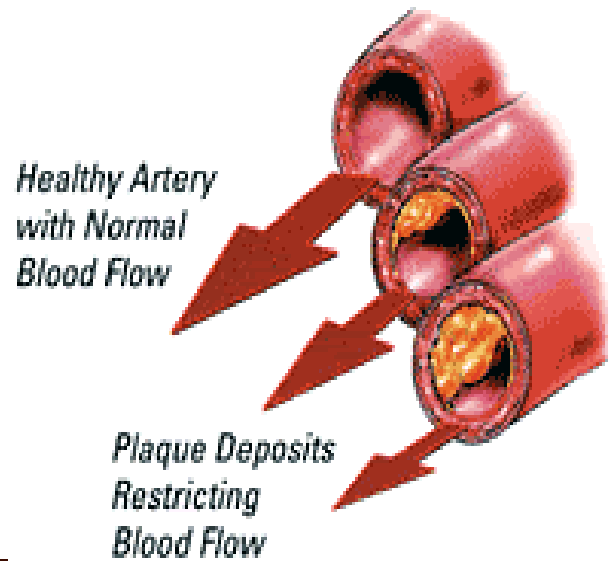
- Principal fatal diseases caused by smoking are cancer, COPD and CVD
- In addition, smoking is an important cause of morbidity
- Risks are dose and duration dependent
- On average, cigarette smokers lose 7.5 years of life

## Diseases Caused by Smoking: CPSII Study: Men

	<i>Standardised mortality per 100,000 per year</i>			
	<i>Life-long nonsmoker</i>	<i>Current cigarette smoker</i>	<i>Relative risk</i>	<i>Attributable %</i>
<b>Cancer</b>				
Lung	<b>24</b>	<b>537</b>	<b>22.4</b>	<b>87</b>
Upper respiratory	<b>1</b>	<b>27</b>	<b>24.5</b>	<b>89</b>
Bladder	<b>18</b>	<b>53</b>	<b>2.9</b>	<b>36</b>
Pancreas	<b>18</b>	<b>38</b>	<b>2.1</b>	<b>25</b>
Oesophagus	<b>9</b>	<b>68</b>	<b>7.6</b>	<b>66</b>
Kidney	<b>8</b>	<b>23</b>	<b>3.0</b>	<b>37</b>
Ischaemic heart	<b>500</b>	<b>970</b>	<b>1.9</b>	<b>22</b>
Aortic aneurysm	<b>24</b>	<b>98</b>	<b>4.1</b>	<b>48</b>
Stroke	<b>147</b>	<b>328</b>	<b>2.2</b>	<b>27</b>
COPD	<b>39</b>	<b>378</b>	<b>9.7</b>	<b>72</b>
<b>All diseases</b>	<b>788</b>	<b>2520</b>	<b>3.2</b>	<b>40</b>



# Arteriosclerosis & Atherosclerosis

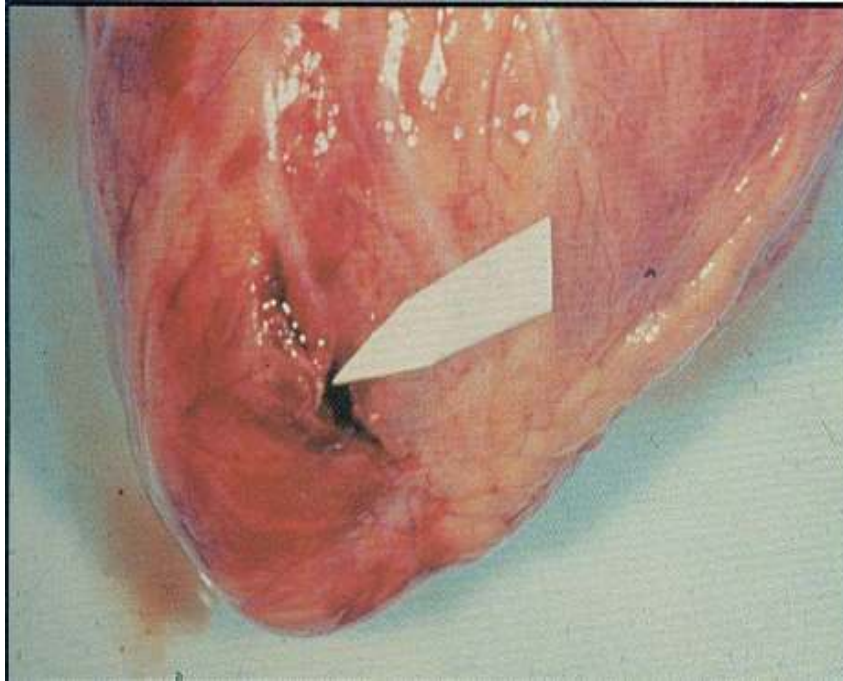


*Healthy artery*



*Damaged artery*

# Heart Attack



*Torn heart wall: Result of over-worked heart muscle*

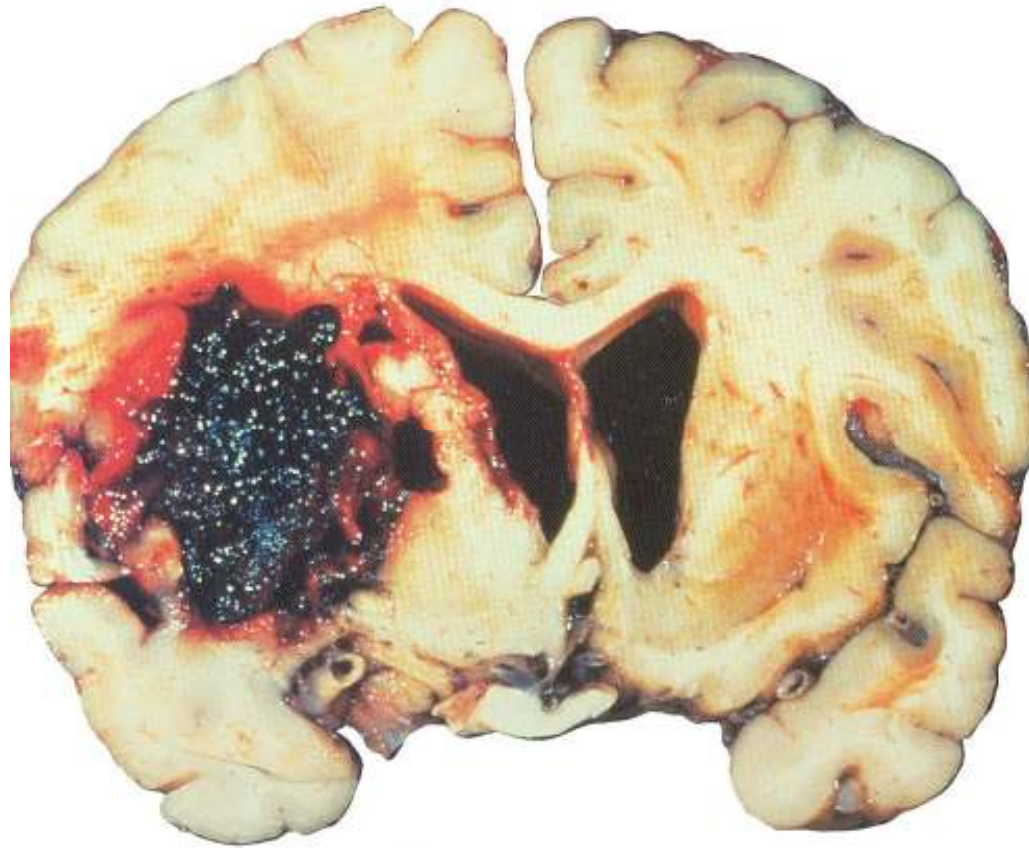
Smokers are twice as likely as Nonsmokers to have a heart attack

***Quitting smoking rapidly reduces the risk of coronary heart disease***

# Peripheral Vascular Disease



# Stroke



*This brain shows stroke damage, which can cause death or severe mental or physical disability*

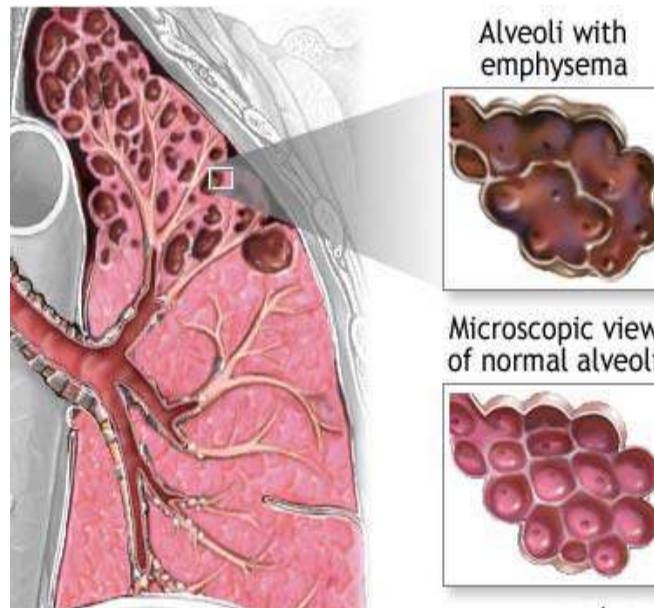


# Emphysema

*Healthy lung*



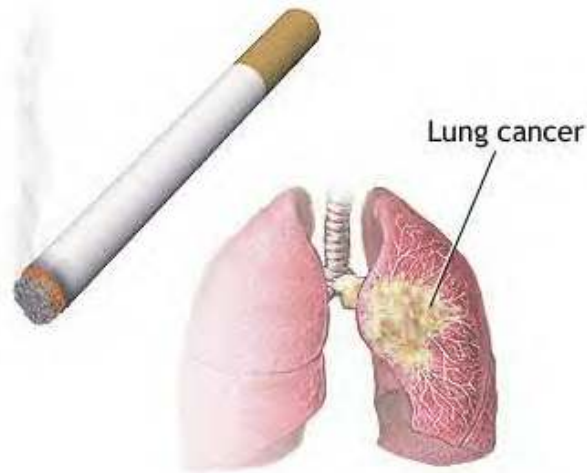
*Emphysematic lung*





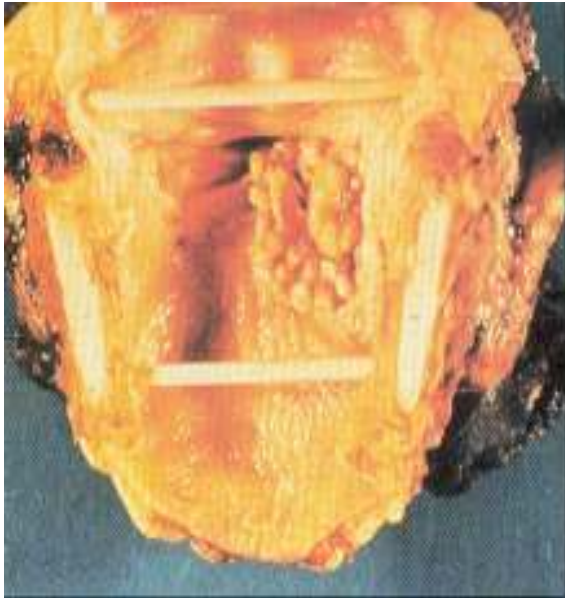
# Lung Cancer

*The uncontrolled growth of abnormal cells in lung*



*Lung cancer kills more people than any other type of cancer*

# Laryngeal Cancer



## Symptoms:

- ◇ Persistent hoarseness
- ◇ Chronic sore throat
- ◇ Painful swallowing
  - ◇ Pain in the ear
- ◇ Lump in the neck



*Over 80% of deaths from laryngeal cancer are linked to smoking*

# Dental Problems



*Above: Cavities*

*Below: Gingivitis*

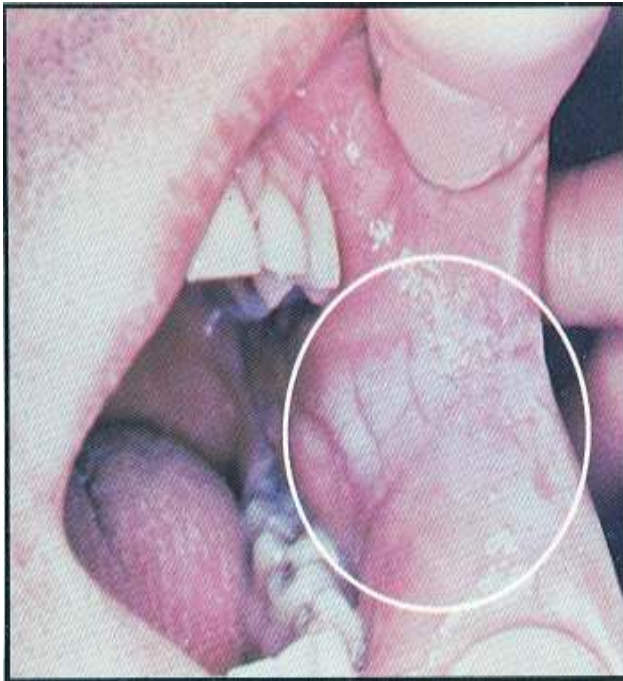


*Overall poor oral health*

## *Common Consequences:*

- ◊ *Stained teeth*
- ◊ *Gum inflammation*
- ◊ *Black hairy tongue*
- ◊ *Delayed healing of the gums*

# Oral cancer



*Leukoplakia*



*Oral cancer*



# Fetal Damage

## Fetal Smoking Syndrome:

- ◇ Birth defects
- ◇ Premature stillbirth
- ◇ Low birthweight
- ◇ Prone to Sudden Infant Death Syndrome
- ◇ Lowered immune capacity



# Secondhand smoke



He has his daddy's eyes  
and his momma's lungs.

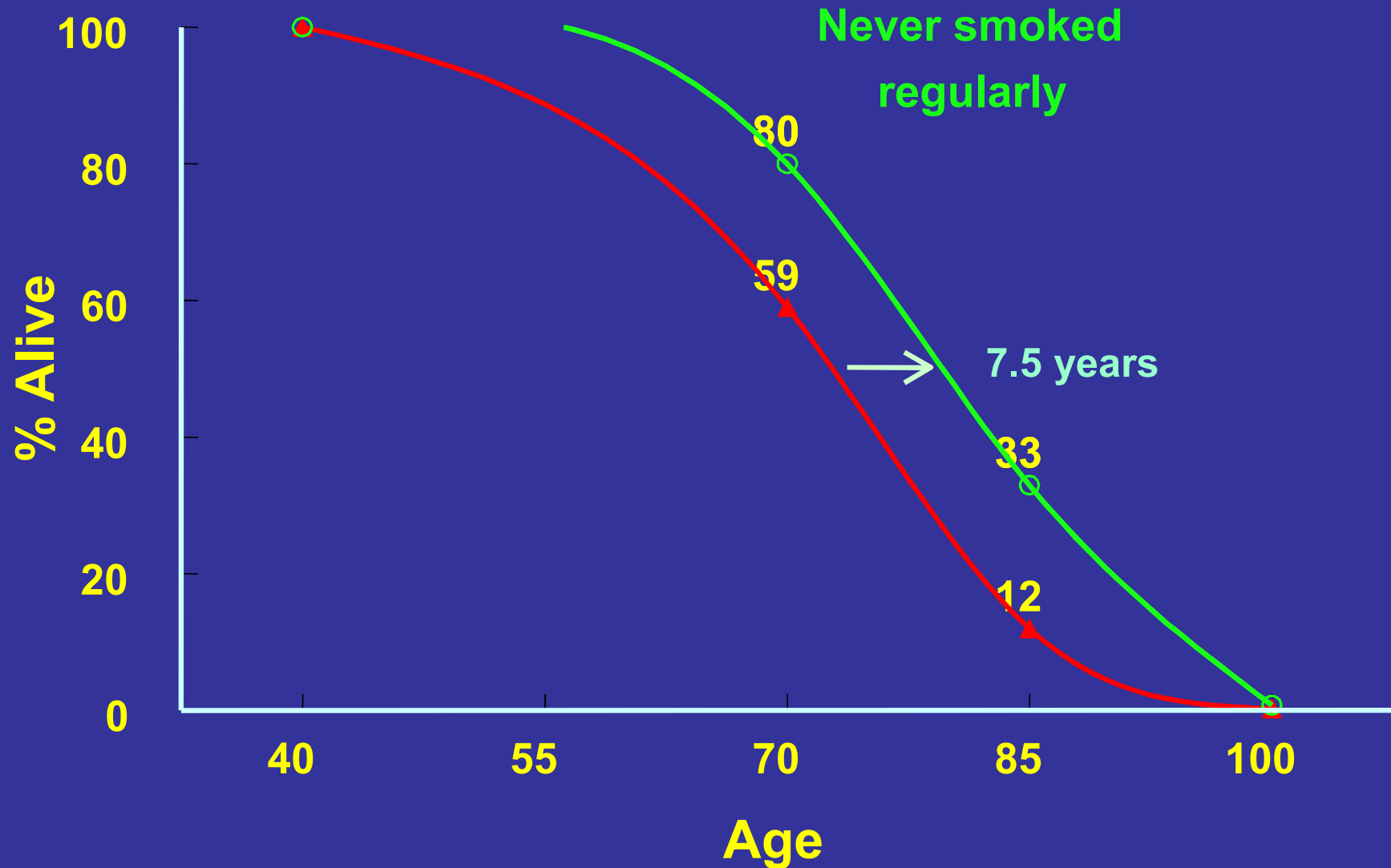
Secondhand Smoke Kills.

# Health effects of ESE in children

- Sudden Infant Death Syndrome (SIDS)
- Acute Respiratory illnesses
- Chronic respiratory symptoms
- Reduced lung function growth
- Asthma and exacerbation of asthma symptoms
- Acute and chronic middle ear disease

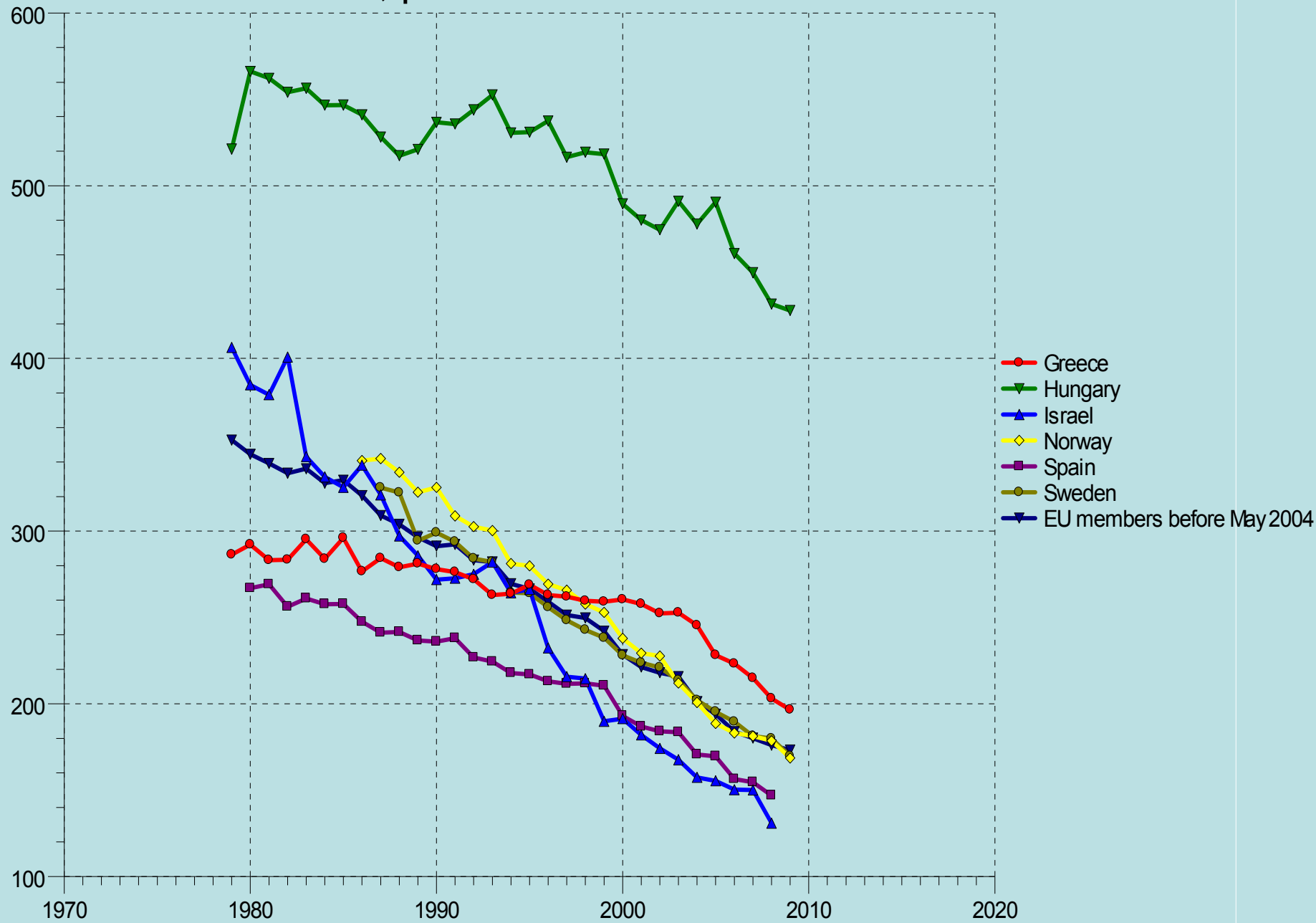


# Overall risk to smokers and never-smokers



Doll et al BMJ 1994

# SDR, selected smoking related causes, per 100000



# **Recommendations of the Framework Convention on Tobacco Control (FCTC) to combat worldwide tobacco use I.**

## **1. Protection from exposure to tobacco smoke**

1. In all public areas
2. At the workplace
3. In public institutions

## **2. Measures to reduce the supply of tobacco products**

1. Combating illicit trade
2. Protection of youth (prohibition of sales to minors)
3. Special license to be able to sell tobacco products
4. Provision of economically viable alternatives for members of the tobacco industry

# **Recommendations of the Framework Convention on Tobacco Control (FCTC) to combat worldwide tobacco use II.**

## **3. Measures to reduce demand for tobacco products**

1. Tax (price) increase
2. Regulation of the composition of tobacco products and the disclosure thereof
3. Labeling of products with messages informing about adverse health effects on at least 30% of the principal display areas
4. Prohibition of direct and indirect promotion and advertising
5. Prevention of nicotine dependence
  1. Health education programs in schools and kindergartens
  2. Development of a peer-education network
  3. Programs to promote a smoke-free lifestyle at the workplace, at sporting facilities and in health care institutions
6. Support for smoking cessation

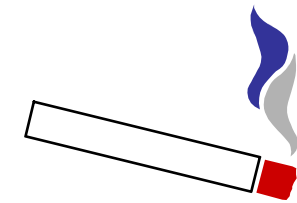
# Effective government policy

- Bans on tobacco advertising and sponsorship
- Regular price rises
- Stronger public health warning labels
- Smoking bans in all public places

“Support for smoke free policies increases among smokers and non-smokers alike once the policies are introduced”

# Effect of taxation on smoking

Smoking goes down  
as prices go up



# Public health warnings





# Recommendations of the Framework Convention on Tobacco Control (FCTC) to combat worldwide tobacco use III.

## Helping to quit

- A. Smoking habits of patients should be routinely assessed
- B. Cessation should be recommended (minimal/brief intervention)
- C. Supportive facilities should be maintained: special advisory services to help quit
- D. Pharmaceutical options:
  - a) **NRT** = Nicotine Replacement Therapy: patches, gum, nasal-spray, inhaler, tablet, sweet
  - b) **Bupropion** (decreases psychological effects of withdrawal)
  - c) **Rimonabant** – cannabis receptor inhibitor, also may inhibit post cessation weight gain (still under research)
  - d) **Varenicline** (partial agonist of the  $\alpha 4\beta 2$  nicotinic ACh receptor)
- E. „Quitlines” (over-the-phone guidance)
- F. Community programs and campaigns: „Quit and Win!”

# The 5 'A's

**A**

*Ask*

*Assess*

*Advise*

*Assist*

*Arrange*



# The Fagerström test

1. How soon after you wake up do you smoke your first cigarette?
  - After 60 minutes (0 points)
  - 31-60 minutes (1 points)
  - 6-30 minutes (2 points)
  - Within 5 minutes (3 points)
2. Do you find it difficult to refrain from smoking in places where it is forbidden?
  - No (0 points)
  - Yes (1 points)
3. Which cigarette would you hate most to give up?
  - First in the morning (1 points)
  - Any other (0 points)
4. How many cigarettes per day do you smoke?
  - 10 or less (0 points)
  - 11-20 (1 points)
  - 21-30 (2 points)
  - 31 or more (3 points)
5. Do you smoke more frequently during the first hours after awakening than during the rest of the day?
  - No (0 points)
  - Yes (1 points)
6. Do you smoke even if you are so ill, that you are in bed most of the day?
  - No (0 points)
  - Yes (1 points)

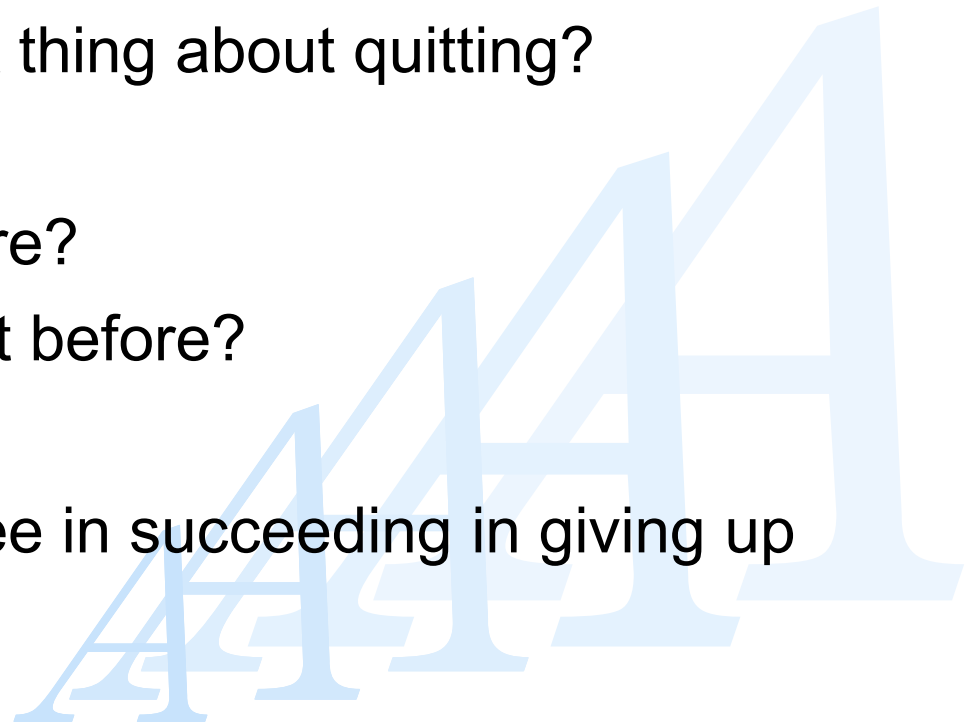
# Evaluating the Fagerström test

- 0-2 points: Very low dependence
- 3-4 points: Low dependence
- 5 points: Medium dependence
- 6-7 points: High dependence
- 8-10 points: Very high dependence

# The 5 'A's

## **ASK** about smoking status

- How do you feel about your smoking?
- Have you thought about quitting?
- What would be the hardest thing about quitting?
- Are you ready to quit now?
- Have you tried to quit before?
- What helped when you quit before?
- What led to any relapse?
- What challenges do you see in succeeding in giving up smoking?



# The 5 'A's

## **ASSESS** motivation and nicotine dependence

- What is the positive side of smoking?
- What are the downsides to smoking?
- What do you fear most when quitting?
- How important is quitting to you right now?
- What reasons do you have for quitting smoking?

On a scale of 1-10, how interested are you in trying to quit?

- What would need to happen to make this a score of 9 or 10?
- or What makes your motivation a 9 instead of a 2?

# The 5 'A's

## **ASSESS** motivation and nicotine dependence

- What would be the hardest thing about quitting?
- What are the barriers to quitting?
- What situations are you most likely to smoke?
- Ask about any previous quit attempts:  
What happened/caused you to restart smoking?

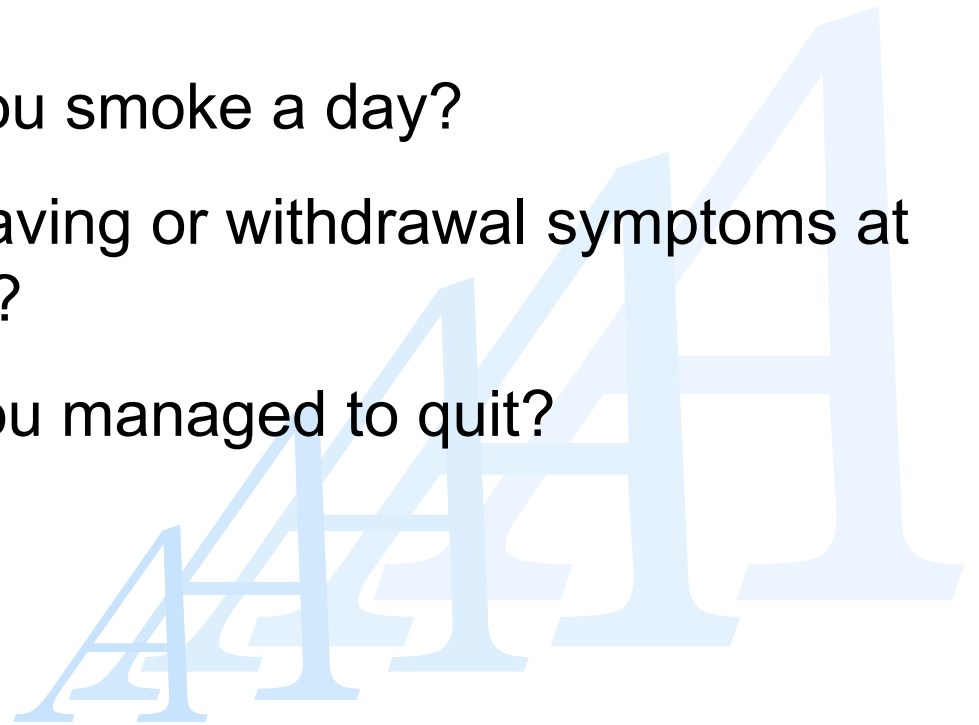
Scale of 1-10, how confident do you feel in your ability to quit?

- What would need to happen to make this a score of 9 or 10?

# The 5 'A's

## **ASSESS** motivation and nicotine dependence

- How many minutes after waking do you have your first cigarette?
- How many cigarettes do you smoke a day?
- Did you experience any craving or withdrawal symptoms at any previous quit attempts?
- What is the longest time you managed to quit?





# The 5 'A's

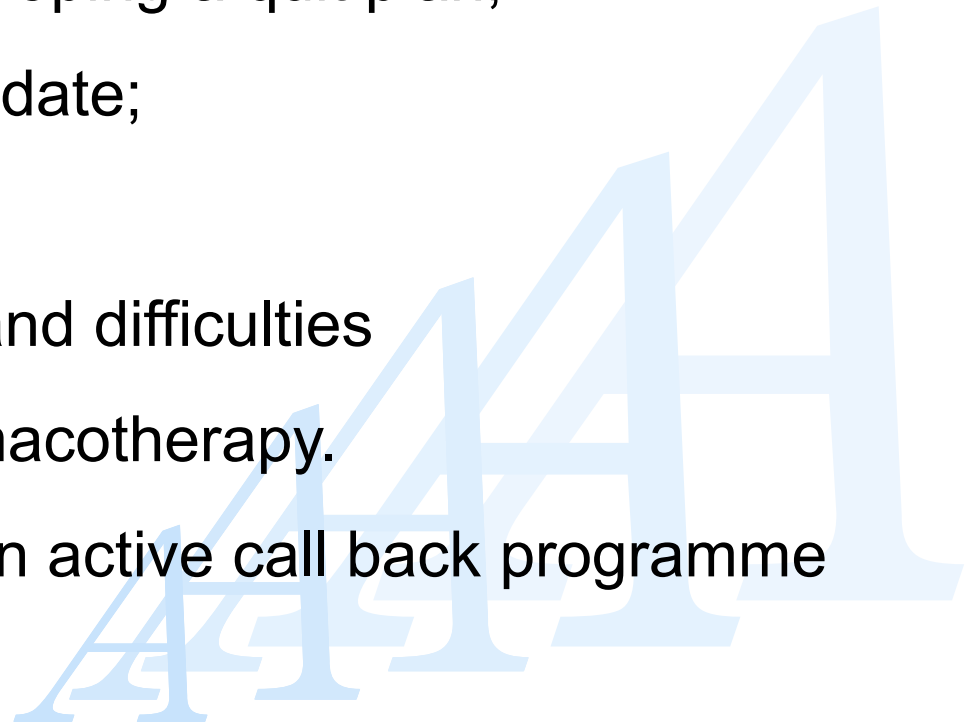
## **ADVISE** on coping strategies

- Recommend total abstinence - not even a single puff
- Drinking alcohol is strongly associated with relapse
- Inform friends and family and ask for support
- Consider writing a 'contract' with a quit date
- Removal of cigarettes from home, car and workplace;
- Give practical advice about coping with withdrawal  
Withdrawal symptoms occur mostly during the first two weeks  
Relapse after this time relates to cues or distressing events.
- Remind patients of the health benefits of quitting

# The 5 'A's

## **ASSIST** the quit attempt

- Provide assistance in developing a quit plan;
- Help a patient to set a quit date;
- Offer self-help material;
- Explore potential barriers and difficulties
- Review the need for pharmacotherapy.
- Refer to a quitline and/or an active call back programme



# The 5 'A's

## **ARRANGE** follow up

- Offer a follow up appointment within 7 days
- Affirm success when you next see the patient
- Reinforce successful quitting: positive feedback helps sustain smoking cessation.
- Don't talk about 'failure', 'relapse' is very common
- Help the patient work out 'what went wrong this time' and how they prevent a relapse next time.

# Nicotine withdrawal: duration



**2** days

Lightheadedness

**1** week

Sleep disturbance

**2** weeks

Poor concentration  
Craving for nicotine

**4** weeks

Irritability or aggression  
Depression  
Restlessness

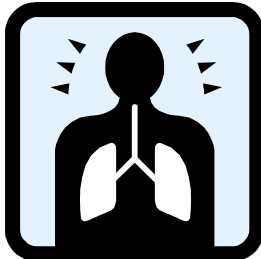
**10** weeks

Increased appetite

# Nicotine withdrawal: the 4 'D's



**Drink water slowly**



**Deep breathe.**



**Do something else (eg exercise)**



**Delay acting on the urge to smoke**

# Pharmacotherapy

Pharmacotherapy + behavioural counselling improves long-term quit rates



Smokers of 10 or more cigarettes a day who are ready to stop should be encouraged to use pharmacological support as a cessation aid

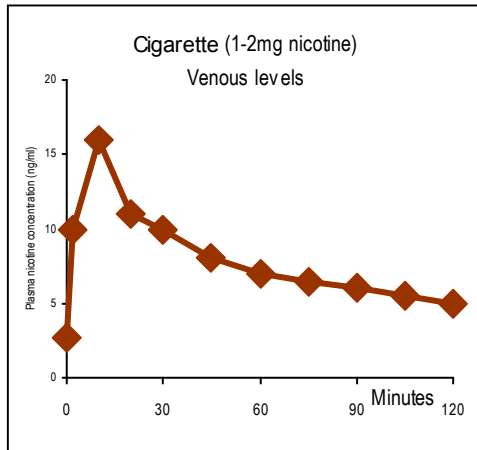
# Nicotine replacement

- Begin NRT on the quit date, (apply patches the night before)
- Use a dose that controls the withdrawal symptoms
- NRT provides levels of nicotine well below smoking
- Prescribe in blocks of two weeks
- Arrange follow up to provide support
- Use a full dose for 6 to 8 weeks then stop  
or reduce the dose gradually over 4 weeks.

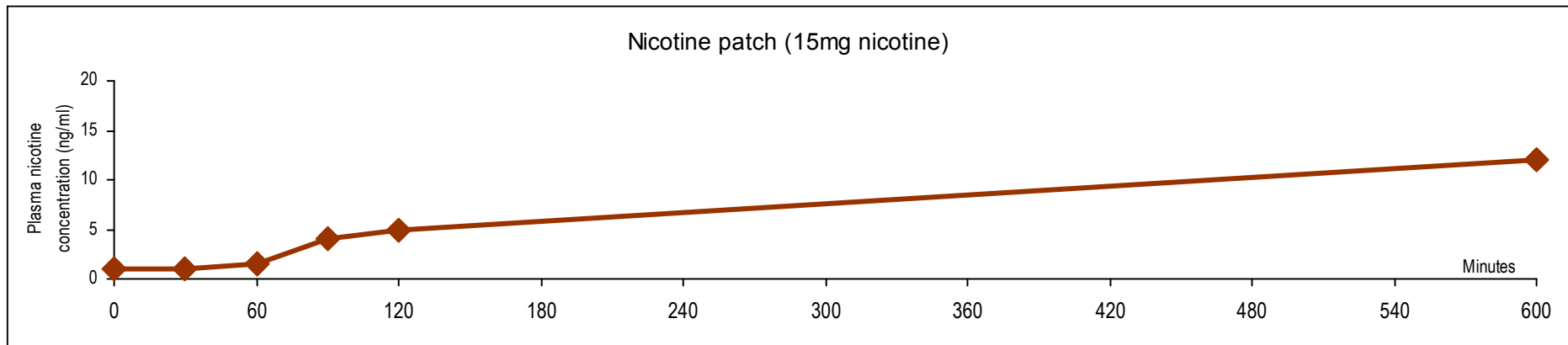
NRT increases the odds of quitting about 1.5 to 2 fold



# NRT: Nicotine patches

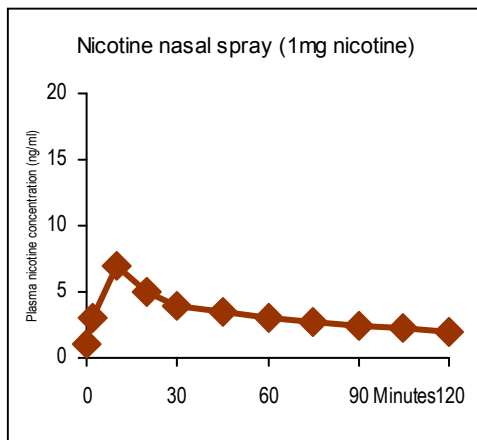
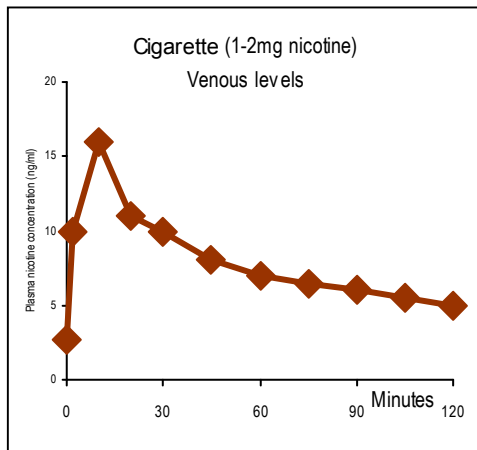


- Patches provide a slow, consistent release of nicotine throughout the day
- Available in various shapes and sizes,
- Common side effects with patches include skin sensitivity and irritation



NRT increases the odds of quitting about 1.5 to 2 fold

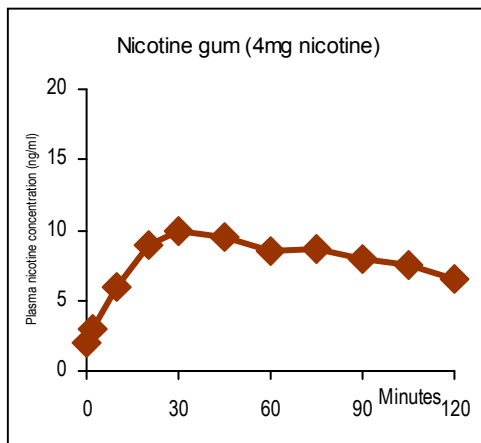
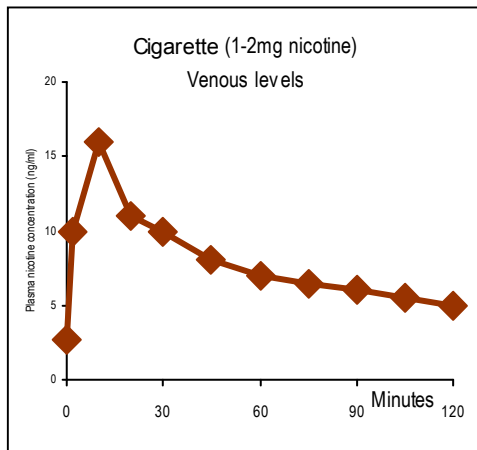
# NRT: Nicotine nasal spray



- Nasal sprays more closely mimic nicotine from cigarettes
- Common side effects with nasal sprays include nasal and throat irritation, coughing and oral burning

NRT increases the odds of quitting about 1.5 to 2 fold

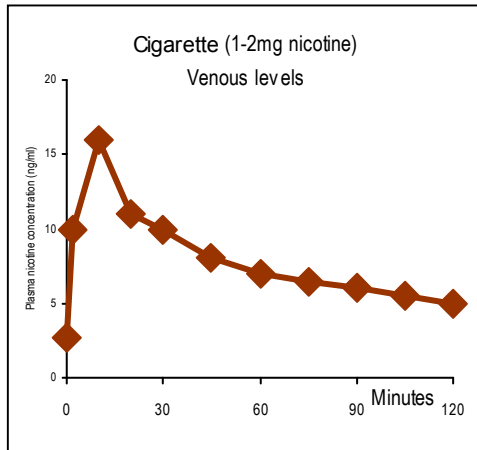
# NRT: Nicotine gum



- Instruct the patient to 'chew and park'
- Absorption may be impaired by coffee and some acidic drinks
- Common side effects with gum include gastrointestinal disturbances and jaw pain
- Dentures may be a problem!

NRT increases the odds of quitting about 1.5 to 2 fold

# NRT: Nicotine lozenges



- Nicotine tablets deliver 2-mg or 4-mg dosages of nicotine over 30-minutes
- Common side effects with gum include burning sensations in the mouth, sore throat, coughing, dry lips, and mouth ulcers

NRT increases the odds of quitting about 1.5 to 2 fold

# Bupropion

- Begin bupropion a week before the quit date
- Normal dose 150mg bd, (reduce in elderly, liver/renal disease)
- Contra-indicated in patients with epilepsy, anorexia nervosa, bulimia, bipolar disorder or severe liver disease.
- The most common side effects are insomnia (up to 30%), dry mouth (10-15%), headache (10%), nausea (10%), constipation (10%), and agitation (5-10%)
- Interaction with antidepressants, antipsychotics and anti-arrhythmics

Bupropion increases the odds of quitting about 2 fold

# Nortryptiline

- Tri-cyclic antidepressant
- Not licensed for smoking cessation
- Low cost
- Side-effects include sedation, dry mouth, light-headedness, cardiac arrhythmia
- Contra-indicated after recent myocardial infarction

Nortryptiline increases the odds of quitting about 2 fold

# Varenicline

- Begin varenicline a week before the quit date, increasing dose gradually.
- Alleviates withdrawal symptoms, reduces urge to smoke
- Common side effects include: nausea (30%), insomnia, (14%), abnormal dreams (13%), headache (13%), constipation (9%), gas (6%) and vomiting (5%).
- Contra-indicated in pregnancy
- New drug

Varenicline increases the odds of quitting about 2.5 fold



# Health benefits of smoking cessation

- Increased longevity
- Stabilisation of lung cancer risk (but not absolute decline)
- Heart disease risk declines towards non-smoker level over 10 years
- Accelerated decline in lung function reduced
- Improved reproductive health
- Improved recovery from surgery

# The benefits of quitting



## Within hours.....

**8** hours

Nicotine and carbon monoxide levels halved,  
Blood oxygen levels return to normal

**24** hours

Carbon monoxide eliminated from the body

**48** hours

Nicotine eliminated from the body,  
Taste buds start to recover

# The benefits of quitting



## Within months .....

**1** month

Appearance improves  
– skin loses greyish pallor, less wrinkled  
Regeneration of respiratory cilia starts  
Withdrawal symptoms have stopped

**3-9** months Coughing and wheezing decline

# The benefits of quitting



## Within years .....

**5** years

The excess risk of a heart attack reduces by half

**10** years

The risk of lung cancer halved



**Richard Doll (1912-2005), who stopped smoking cigarettes at age 37, photographed aged 91 at the 2004 BMJ press conference on the 50-year results from his study of British doctors**

Michael Crabtree, copyright Troika Photos

# Withdrawal Symptoms

<b>Anxiety 87% *</b>	<b>Irritability 80% *</b>
<b>Difficulty Concentrating 73% *</b>	<b>Restlessness 71%</b>
<b>Tobacco Cravings 62%</b>	<b>Gastrointestinal Problems 33%</b>
<b>Headaches 24%</b>	<b>Drowsiness 22%</b>

# Managing withdrawal

- Exercise
- Reduce or avoid caffeine or other stimulants
- Relax before going to bed
- Make your bedroom quiet
- Keep a bedtime routine
- Drink plenty of water
- Use cough drops to relieve throat irritation

# Practical advices

1. Set an exact date you will stop smoking and stick to it!
2. Rid your environment of the smell of smoke by cleaning the house and washing all textiles (curtains, table cloths, covers). Don't forget to do the same in your car.
3. Let those around you know about your goal and ask for support.
4. Try to substitute the movement habits of smoking by something else like chewing gum or carrying some nuts and seeds around to snack on if need be.
5. Drink plenty of water!
6. Become or stay physically active. It will help against withdrawal symptoms and post-cessation weight gain.
7. No exceptions! There is absolutely no life situation or circumstance that can only be solved through lighting up.
8. Reward yourself! Put aside the money you would normally spend on cigarettes and buy something you've always wanted to but couldn't.
9. Try to maintain a healthy diet with plenty of fruits and vegetables to avoid weight gain!
10. Count the days!
11. Develop a positive attitude towards your own health and be proud of every smoke-free day you've accomplished!