IS TOBACCO BREAKING YOUR HEART

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In the 20th century, the tobacco epidemic killed 100 million people worldwide.

During the 21st century, it could kill one billion.

Tobacco causes 1 in 10 deaths worldwide.
Tobacco the no 1 global preventable killer

The only consumer product to kill half the people who use it –

CVD leading cause of death - tobacco second only to hypertension

Passive smoking third preventable cause of death after smoking and alcohol
Smoking kills 655,000 people a year, from many different diseases.

- 285,000 cancer*
- 113,000 respiratory
- 74,000 other
- 183,000 vascular (heart disease, stroke and other diseases of the arteries and veins)

*includes 190,000 (85%) of the 224,014 lung cancer deaths

www.deathsfromsmoking.net
Smoking prevalence tracker 2017

Age Group

Headline Data

- Smoking Prevalence: 17.5%
- E Cigarette Use: 5.7%
- Roll Your Own (RYO): 29.2% (% of Smokers using RYO)

Socio-Economic Group

- AB: 10.8%
- C1: 13.5%
- C2: 24.9%
- DE: 20.1%
- F: 11.2%
Smokers under 40 are 5 x more likely to have a heart attack

Smoking doubles the risk, the presence of another major risk factor is estimated to quadruple the risk ($2 \times 2$). The presence of two other risk factors with smoking results in approximately eight times the risk ($2 \times 2 \times 2$) of persons with no risk factors.
Relative risk and excess death rate from CAD among men by age group.

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Relative Risk</th>
<th>Excess Death Rate</th>
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<tbody>
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<td>35–39</td>
<td>3.3</td>
<td>20.5</td>
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<td>6.3</td>
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<td>45–49</td>
<td>5.5</td>
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<td>64–69</td>
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<td>70–74</td>
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<td>75–79</td>
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<tr>
<td>80+</td>
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</table>
Relative risk and excess death rate from CAD among men by age group.

Figure 6.1 Relative risk and excess death rate for coronary heart disease among men, by age group.


Note: Data are from the American Cancer Society’s Cancer Prevention Study II; data table for above data found below.
Women have lower absolute rates of CHD than men until menopause. However, cigarette smoking has been associated with higher RR of MI and higher CHD mortality among women than among men.
Relative risk and excess death rate from CAD among men by age group

Studies show increased risk of CHD at all levels of cigarette smoking
Increased risks even for persons who smoked < than five cigarettes per day
Further increase in CHD risk with more cigarettes smoked per day up to about 25 cigarettes; risk increased relatively little even with further increases in cigarette consumption
Relative risk and excess death rate from CAD among men by age group

Figure 6.3 Dose-response relationship between number of cigarettes smoked per day and relative risk of ischemic heart disease
Atherosclerosis

Cigarette smoking accelerates atherosclerosis.

Smoking is associated with an increased risk - acute myocardial infarction, sudden death and stroke.

It aggravates stable angina pectoris, intermittent claudication and vasospastic angina, rethrombosis after thrombolysis and restenosis after angioplasty.
Peripheral Arterial disease

- Smokers have 10-16 x the risk of developing PAD
- 75-98% PAD is caused by smoking leads to claudication, gangrene and may necessitate amputation
- Smokers are 5 times more likely to develop and Abdominal aortic aneurysm

Gangrene of the toes due to PVD.
Brain

Smoking increases the risk of Stroke

SHS increases the risk of stroke

Smoking increases the risk of cognitive disorders such as dementia and depression
Nicotine

Burning tobacco releases nicotine - has a similar effect to heroin and cocaine – the WHO say its more addictive

Nicotine is a sympathomimetic releases catecholamines locally from neurons and systemically from the adrenal gland. This increases heart rate and blood pressure

Nicotine may also contribute to endothelial dysfunction, lipid abnormalities, and insulin resistance. Tobacco plants have been genetically modified to increase the amount of nicotine burning tobacco releases
Carbon Monoxide

CO exposure aggravates ischemia in people with vascular disease.

- CO exposure in people with coronary disease resulted in more exercise-induced ventricular dysfunction and an increase in frequency of ventricular arrhythmias during exercise.
- Long-term CO exposure in smokers results in greater red blood cell mass and reduced oxygen carrying capacity of red blood cells, resulting in relative hypoxemia.
- Increased RBC masses increases blood viscosity and may contribute to hypercoagulation in smokers.
Oxidants

Oxides of nitrogen and many free radicals from both the gas and tar phases of cigarette smoke
Depletes antioxidants

Oxidant stress contributes to several potential mechanisms of CVD, including inflammation, endothelial dysfunction, lipid abnormalities such as oxidation of low-density lipoprotein LDL, and platelet activation.
Metals

Aluminum, cadmium, copper, lead, mercury, nickel, and zinc

Catalyze the oxidation of cellular proteins
This reaction may lead to structural damage, endothelial dysfunction, and detachment of endothelial cells from the walls of blood vessel
Carcinogens

Cigarettes contain over 4,000 chemicals including proteolytic enzymes that bind DNA and cause genetic mutations.

Aromatic hydrocarbons such as benzopyrene irreversibly bind DNA may kill the cell or inhibit programmed cell death and induce cancer.

Nitrosamines are produced during the curing process. Arsenic, cyanide, formaldehyde, urea, etc. are also found.

Tobacco crops contain uranium, radium, lean polonium, and radon. Smoking average 1.5 packs per day gives a radiation dose of 60-160 mSv/year, compared to living near a nuclear power plant (0.0001 mSv/year).
Potential sites of actions and mechanisms of effects of smoking

In smokers, response in coronary blood flow to increased myocardial demand is impaired (i.e., reduced coronary vasodilatory reserve). Smoking plays a direct role by constricting coronary arteries through nicotine-mediated action on α-adrenergic receptors and by induction of endothelial dysfunction by nicotine and oxidizing chemicals.
Smokers under 40 are 5 x more likely to have a heart attack

Smoking increases platelet reactivity /thrombogensis (lower NO, increased TXA

Increases fibrinogen, CRP, leucocyte levels and activates monocytes

Vasoconstriction and alters coronary flow reserve

Carbon monoxide – increases RCM, cholesterol levels of WBC and reduces the oxygen carrying capacity of the blood
Smoking: Role in the Pathogenesis of Cardiovascular Events

- Endothelial dysfunction
- Increased hematologic thrombogenicity
- Enhanced inflammatory response
- Oxidative modification
Benefits of quitting

In 72 hours BP and pulse decrease and smell and taste improve
Within a few weeks lung function improves and platelet function normalises
Within a year the risk of IHD halves
Within 5-15 years the risk of IHD is reduced nearly to that of a never smoker
Benefits of quitting

Among smokers who had MI or angiographically documented CHD, people who stop smoking have a substantially lower rate of reinfarction than those who continue to smoke.

The risk of stroke declines among smokers who have stopped smoking for two years and is similar to that of lifetime nonsmokers after five years of abstinence from smoking.
Deforestation

600 Million trees felled yearly - risks desertification and erosion
In 1 year in Malawi tobacco caused 26% deforestation
Cleared to grow crops build curing barns to dry tobacco
Climate change

Deforestation – greenhouse effect

Burning trees releases more CO$_2$

Smoking releases 2.6 billion Kg CO$_2$ and 2.5 billion kg methane
Pollution

Pesticides – Imidaloprid, Chlorpyrifos, methly bromide etc
ozone depleting toxin to birds insects and fish found in ground water in the US and else where
Block CNS some associated with birth defects can cause respiratory problems and skin irritation
Pollution- green tobacco sickness

Nicotine absorbed through the skin – nausea, weakness, dizziness abdominal cramps fluctuation in the BP and pulse
A quarter of tobacco pickers have suffered from GTS at least once and children particularly susceptible
Pollution

Slurries plastics solvents
Cigarette filters are of cellulose acetate take up to 12 years to decompose
An estimated 4.5 trillion cigarette ends discarded and believed to kill many animals and fishes
Most littered item in the world accounts for 28% of all marine pollution
Pollution

Cigarette butts account for 70-90% of all urban street litter. 200 million butts are dropped every day in the UK – equivalent to 122 tons of rubbish. In Ireland – it’s one of the most common items of litter.
Pollution

Tobacco litter leaches into soil and water – cadmium, arsenic, lead can contaminate water. Children ingesting tobacco can lead to nausea, vomiting, irregular heart rates and seizures.
Actions - Protect

Continue to reduce smoking prevalence
- Smoking cessation at every opportunity,
- Education and awareness – targeting high risk groups,
- Extend tobacco free areas,
- Tax increases especially on Roll your own
- Every contact counts - interventions and ensure all CV risk factors treated aggressively
Actions - Protect

Environmental tax – polluter pays
Liter levy 50 cent per pack could raise over 125 million
Use for smoking cessation, remove litter and raise awareness of health consequences and environmental harm
I miss my lung, Bob.

Protect our health and Environment
Benefits of quitting

After 9 weeks, participants had cut their smoking in half, average levels of carbon monoxide declined by about 17%, Total cholesterol and LDL ("bad") cholesterol levels fell. HDL cholesterol rose, and the blood's capacity to transport oxygen also improved,

According to previous research, reducing total cholesterol by up to 9% and reducing LDL cholesterol by just 1% can lower a person's risk of heart disease.
Smoking ban

• Cardia study has shown a 25% reduction in the incidence in CVD in areas of the United States that have the indoor smoking ban (25 states have a complete ban)

• Two effects protecting non smokers from second hand smoke and by changing behavior – people living in these areas are less likely to smoke and ore likely to try and quit if they do smoke