The effect of diet and lifestyle on heart disease, stroke and dementia

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UNITED KINGDOM 1950–2003: Males & Females
All vascular mortality at ages 35–69

*Mean of annual rates in the seven component 5-year age groups
Source: WHO mortality & UN population estimates
Epidemiology of stroke

Stroke is the 3rd most common cause of death

Stroke is the most important single cause of disability in the elderly

80% of strokes are due to cerebral infarction

>75% of stroke victims are elderly people
Major modifiable risk factors

Tobacco
Blood pressure
Blood lipids
Obesity
Unhealthy diet
Physical inactivity
Effects of cessation at various ages

• On average, for men born 1900-1930, cigarette smokers lost about 10 years.

• But, cessation at ages 60, 50, 40 or 30 gained about 3, 6, 9 or the full 10 years
Tobacco
Blood pressure
Blood lipids
Obesity
33,000 IHD deaths at ages 40-89: age-specific risks vs. usual SBP

<table>
<thead>
<tr>
<th>Age at risk</th>
<th>Effect of 10 mmHg ↓ SBP</th>
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<tbody>
<tr>
<td>80-89</td>
<td>18% ↓ risk</td>
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<tr>
<td>70-79</td>
<td>23% ↓ risk</td>
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<td>40-49</td>
<td>31% ↓ risk</td>
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11,000 stroke deaths at ages 50-89: age-specific risks versus usual SBP

Usual systolic blood pressure (mmHg)

120
140
160
180

Hazard ratio
(floating absolute risks & 95% CI)

Age at risk
80-89
70-79
60-69
50-59

Effect of 10 mmHg ↓ SBP
18% ↓ risk
29% ↓ risk
35% ↓ risk
39% ↓ risk

Usual systolic blood pressure (mmHg)
Lifestyle approaches to reducing blood pressure

- Weight loss
- Physical activity
- Reduce alcohol
- Reduce salt
- Increase fruit and vegetable consumption
IHD mortality (33 744 deaths) versus usual total cholesterol

<table>
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<th>Age at risk</th>
<th>1 mmol/L ↓ total cholesterol</th>
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<tr>
<td>80-89</td>
<td>15% ↓ risk</td>
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<tr>
<td>50-59</td>
<td>42% ↓ risk</td>
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<tr>
<td>40-49</td>
<td>56% ↓ risk</td>
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Usual total cholesterol (mmol/L)

Hazard ratio (floating absolute risks & 95% CI)
IHD mortality (3020 deaths) versus usual (a) HDL cholesterol; (b) non-HDL cholesterol; and (c) total/HDL cholesterol by age at risk

Hazard ratio (and 95% CI)

Usual HDL (mmol/L)

Usual non-HDL (mmol/L)

Usual total/HDL

1.33 units ↓ total/HDL

31% ↓

40% ↓

44% ↓
Stroke mortality (11 663 deaths) versus usual total cholesterol by age

Age at risk: HR (95% CI) per 1mmol/L ↓:

- 80-89: 1.10 (1.05-1.16)
- 70-79: 1.15 (1.09-1.20)
- 60-69: 0.94 (0.90-0.99)
- 40-59: 0.84 (0.78-0.91)
Stroke mortality (11,663 deaths) versus usual total cholesterol by baseline SBP

![Graph showing the relationship between baseline SBP (mmHg) and usual total cholesterol (mmol/L), with hazard ratios and 95% CIs for different cholesterol levels.]

- **Baseline SBP (mmHg):**
  - 185+ 1 mmol/L ↓ total cholesterol
  - 165-184 10% ↑ risk
  - 145-164 42% ↓ risk
  - <145 15% ↑ risk

**Notes:**
- Hazard ratio (floating absolute risks & 95% CI)
Lifestyle approaches to reducing cholesterol

• Weight loss

• Reduce intake of saturated fat

• Reduce intake of trans fat

• Reduce intake of dietary cholesterol

• Increase intake of unsaturated fat
Mean (SE) changes in blood total cholesterol concentration associated with replacing dietary saturated fat by polyunsaturated and monounsaturated fats and with reducing dietary cholesterol

Clarke, R. et al. BMJ 1997;314:112
BMI and vascular disease: main mechanisms known, and largely reversible

Hazards largely or wholly accounted for by blood pressure, cholesterol and diabetes

More body fat causes:

- Higher blood pressure
- Higher "bad" cholesterol
- More likelihood of diabetes
- Lower "good" cholesterol

Each makes vascular death more likely
Epidemiology of dementia

Prevalence:
1 in 14 at age 65 years
1 in 6 at age 80 years

Affects about 700,000 in the UK

Affects about 24M world-wide

Lifetime risk: 1 in 5
Risk factors for dementia

- Age,
- education,
- ApoE genotype,
- smoking,
- high blood pressure,
- high cholesterol
- High homocysteine levels
Homocysteine and risk of dementia

Seshadri et al. 2002 NEJM
Folic acid and prevention of cognitive decline: FACIT study

Randomized double blind trial (n=818)

Randomly allocated to 0.8 mg/d folic acid or placebo for 3 years

Population
50-70 y
Elevated homocysteine ($\geq 13$ $\mu$mol/L)

Cognitive tests
5 domains assessed before and after treatment
Strictly standardized

Durga et al. 2007 Lancet
Age and cognitive decline

FACIT: Effect of folic acid vs. placebo

adjusted for baseline performance
Prevention: Personal choices

- Take moderate physical activity for 30 minutes on most days
- Avoid tobacco use and exposure to environmental smoke
- Choose a diet rich in fruit and vegetables and potassium, and avoid saturated fat, trans fats and salt
- Maintain a normal body weight, and if overweight, lose weight by increasing physical activity and reducing calories