The causes of cancer: how much can be attributed to causes that we can modify?

David Whiteman  B Med Sc, MBBS (Hons), PhD, FAFPHM

Head, Cancer Control Group
Outline

The burden of cancer

Strategies for cancer control

Estimating the 'preventable fraction'

8 ways to prevent cancer

Summary
Fatal burden of disease, Australia 2003

- Cardiovascular: 32%
- Injuries: 29%
- Diabetes: 16%
- Chronic respiratory: 6%
- Neurological: 4%
- Other: 3%
How does Australia compare internationally?

Incidence rate
How does Australia compare internationally?

Mortality-to-incidence ratio
Diagnoses of cancer over time in Australia

Number of cases

- Males
- Females

Rate (per 100,000)

New cases per 100,000

Number of new cases
Deaths from cancer over time in Australia

Number of deaths

Rate (per 100,000)

Deaths per 100,000

Number of deaths

Deaths per 100,000

Males

Females
The top 10 cancers for Australian men

Number of cancers diagnosed 2010

- Prostate (C61)
- Skin - melanoma (C43)
- Bronchus - lung (C34)
- Colon (C18, C19)
- Rectum (C20)
- Kidney (C64-C66)
- Bladder (C67)
- UPS (C80)
- Pancreas (C25)
- Stomach (C16)
The top 10 cancers for Australian women

Number of cancers diagnosed 2010

- Breast (C50)
- Colon (C18, C19)
- Skin - melanoma (C43)
- Bronchus & lung (C34)
- Endometrial (C54, C55)
- Thyroid (C73)
- Rectum (C20)
- UPS (C80)
- Ovary (C56)
- Pancreas (C25)
Outline

- The burden of cancer
- Strategies for cancer control
- Estimating the ‘preventable fraction’
- 8 ways to prevent cancer
- Summary
Strategies for cancer control

Primary prevention
Secondary prevention
Tertiary prevention

Causal factors
Screening
Therapies

Birth
Onset of cancer
Diagnosis of cancer
Death
The causes of cancer – generally speaking
The causes of cancer - specifically

International Agency for Research on Cancer

World Health Organization
# The causes of cancer - specifically

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cancers caused</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>Oral cavity, Pharynx, Larynx, Colon, Rectum, Liver, Breast</td>
</tr>
<tr>
<td>Tobacco</td>
<td>Oral cavity, Pharynx, Larynx, Oesophagus, Lung, Stomach, Liver, Pancreas, Colorectal, Bladder, Kidney, Cervix, Ovary, Leukaemia</td>
</tr>
<tr>
<td>Obesity</td>
<td>Breast (post-menopausal), Colorectum, Endometrium, Gallbladder, Kidney, Oesophageal (adeno), Pancreas</td>
</tr>
<tr>
<td><strong>Diet</strong></td>
<td>Colorectal</td>
</tr>
<tr>
<td></td>
<td>– Inadequate Fibre</td>
</tr>
<tr>
<td></td>
<td>– Red &amp; Processed Meat</td>
</tr>
<tr>
<td><strong>Diet</strong></td>
<td>– Inadequate Fruit*</td>
</tr>
<tr>
<td></td>
<td>– Inadequate Vegetables</td>
</tr>
<tr>
<td>Radiation</td>
<td>– UV (sun+solaria)</td>
</tr>
</tbody>
</table>
The causes of cancer - specifically

Factor

**Breastfeeding** < 12 months

**Hormones** – OCP

**Hormones** – HRT

**Infections**
- HPV:
- EBV:
- Hep B:
- Hep C:
- H. pylori:
- HIV:
- HHV8:

**Inadequate Physical Activity**

**Radiation** – Ionising
Some methodology

“The population attributable fraction is the proportion by which the incidence rate of the outcome among the entire population would be reduced if the exposure were eliminated.”

Last, Dictionary of Epidemiology 3rd Edition.

\[
\text{PAF} = \frac{I_p - I_0}{I_p}
\]
Force of morbidity

Cases of cancer

Rate ratio

60% 40%

"healthy weight"  "overweight"

© Queensland Institute of Medical Research | 19
Number of excess cases in population attributable to exposure
N=20

PAF = \frac{\text{Number of excess cases}}{\text{Total number of cases}} = \frac{20}{120} = 16.7\%
## Overview of estimation process

<table>
<thead>
<tr>
<th>Task</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess causality</td>
<td>WCRF, IARC, (USPSTF)</td>
</tr>
<tr>
<td>Obtain prevalence data</td>
<td>Australian National Health Survey</td>
</tr>
<tr>
<td></td>
<td>Other national collections</td>
</tr>
<tr>
<td></td>
<td>Population-based epi studies</td>
</tr>
<tr>
<td></td>
<td>Grey literature</td>
</tr>
<tr>
<td>Obtain risk estimates</td>
<td>WCRF, IARC, meta-analyses</td>
</tr>
<tr>
<td>Generate PAF estimates</td>
<td>Standard formulae</td>
</tr>
</tbody>
</table>
International comparisons

Australia

UK

DIETARY ITEMS
- Fruit and veg
- Meat
- Fibre
- Fruit
- Vegetables

Number of cancer cases

Number of cancer cases

* radon and background radiation only
## Alcohol

<table>
<thead>
<tr>
<th>Cancers considered</th>
<th>Oral cavity and pharynx Oesophagus (SCC) Colon Rectum Liver Larynx Breast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of exposure in Australian population: (aged 18 yrs and over)</td>
<td>53% Men 40% Women 2001 <em>National Health Survey</em></td>
</tr>
</tbody>
</table>
Alcohol – intake in Australian males
### How many cancers in Australia are due to alcohol?

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PAF</td>
<td>Excess Cancers</td>
</tr>
<tr>
<td>Oral cavity and pharynx</td>
<td>38%</td>
<td>534</td>
</tr>
<tr>
<td>Oesophagus (SCC)</td>
<td>36%</td>
<td>101</td>
</tr>
<tr>
<td>Colon</td>
<td>12%</td>
<td>669</td>
</tr>
<tr>
<td>Rectum</td>
<td>16%</td>
<td>394</td>
</tr>
<tr>
<td>Liver</td>
<td>16%</td>
<td>159</td>
</tr>
<tr>
<td>Larynx</td>
<td>22%</td>
<td>119</td>
</tr>
<tr>
<td>Breast</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>3%*</td>
<td>1977</td>
</tr>
</tbody>
</table>

* % of all cancers diagnosed in 2010, in adults (25+ yrs), excluding SCC and BCC of the skin
<table>
<thead>
<tr>
<th>Cancer Site</th>
<th>Men PAF</th>
<th>Men Excess Cancers</th>
<th>Women PAF</th>
<th>Women Excess Cancers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral cavity and pharynx</td>
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<td>Colon</td>
<td>12%</td>
<td>669</td>
<td>4%</td>
<td>198</td>
</tr>
<tr>
<td>Rectum</td>
<td>16%</td>
<td>394</td>
<td>5%</td>
<td>75</td>
</tr>
<tr>
<td>Liver</td>
<td>16%</td>
<td>159</td>
<td>5%</td>
<td>17</td>
</tr>
<tr>
<td>Larynx</td>
<td>22%</td>
<td>119</td>
<td>8%</td>
<td>7</td>
</tr>
<tr>
<td>Breast</td>
<td>-</td>
<td>-</td>
<td>6%</td>
<td>829</td>
</tr>
<tr>
<td>Total</td>
<td>3%*</td>
<td>1977</td>
<td>3%*</td>
<td>1228</td>
</tr>
</tbody>
</table>

* % of all cancers diagnosed in 2010, in adults (25+ yrs), excluding SCC and BCC of the skin
How many cancers in Australia are due to **alcohol**?

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Men PAF</th>
<th>Men Excess Cancers</th>
<th>Women PAF</th>
<th>Women Excess Cancers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral cavity and pharynx</td>
<td>38%</td>
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* % of all cancers diagnosed in 2010, in adults (25+ yrs), excluding SCC and BCC of the skin
Alcohol – intake in Australian males
Alcohol – revised intake in Australian males
### How many cancers in Australia are due to alcohol?

<table>
<thead>
<tr>
<th>Tumour Site</th>
<th>Primary Analysis</th>
<th>Redistribute equally</th>
<th>Redistribute proportionally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral cavity and pharynx</td>
<td>PAF 31%</td>
<td>PAF 32%</td>
<td>PAF 32%</td>
</tr>
<tr>
<td>Oesophagus (SCC)</td>
<td>PAF 25%</td>
<td>PAF 26%</td>
<td>PAF 26%</td>
</tr>
<tr>
<td>Colon</td>
<td>PAF 8%</td>
<td>PAF 9%</td>
<td>PAF 9%</td>
</tr>
<tr>
<td>Rectum</td>
<td>PAF 12%</td>
<td>PAF 13%</td>
<td>PAF 13%</td>
</tr>
<tr>
<td>Liver</td>
<td>PAF 13%</td>
<td>PAF 13%</td>
<td>PAF 13%</td>
</tr>
<tr>
<td>Larynx</td>
<td>PAF 20%</td>
<td>PAF 21%</td>
<td>PAF 21%</td>
</tr>
<tr>
<td>Breast</td>
<td>PAF 6%</td>
<td>PAF 7%</td>
<td>PAF 7%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2.8%</strong></td>
<td><strong>3.0%</strong></td>
<td><strong>3.0%</strong></td>
</tr>
</tbody>
</table>
Overweight, Obesity, and Mortality from Cancer in a Prospectively Studied Cohort of U.S. Adults

Eugenia E. Calle, Ph.D., Carmen Rodriguez, M.D., M.P.H., Kimberly Walker-Thurmond, B.A., and Michael J. Thun, M.D.
How does excess body fat cause cancer?

Target cell

- Reduced repair and control
- Increased cell turnover

- Metabolic pathways
- Hormonal pathways

- Oesophagus
- Endometrium Breast

Tumour development
How many cancers in Australia are due to **obesity**?

<table>
<thead>
<tr>
<th>Cancers considered</th>
<th>Oesophagus (<em>adenocarcinoma only</em>)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Colon</td>
</tr>
<tr>
<td></td>
<td>Rectum</td>
</tr>
<tr>
<td></td>
<td>Gall bladder</td>
</tr>
<tr>
<td></td>
<td>Pancreas</td>
</tr>
<tr>
<td></td>
<td>Breast (post-menopausal)</td>
</tr>
<tr>
<td></td>
<td>Endometrium</td>
</tr>
<tr>
<td></td>
<td>Ovary</td>
</tr>
<tr>
<td></td>
<td>Kidney</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prevalence of obesity in Australian population:</th>
<th>52% men</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>37% women</td>
</tr>
<tr>
<td></td>
<td><em>(2001 National Health Survey)</em>.</td>
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</tbody>
</table>
How many cancers in Australia are due to **obesity**?

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<tr>
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<th>Men</th>
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<td>PAF</td>
<td>Excess Cancers</td>
<td>PAF</td>
<td>Excess Cancers</td>
</tr>
<tr>
<td>Oesophagus (adeno)</td>
<td>32%</td>
<td>182</td>
<td>29%</td>
<td>33</td>
</tr>
<tr>
<td>Colon</td>
<td>14%</td>
<td>780</td>
<td>6%</td>
<td>320</td>
</tr>
<tr>
<td>Rectum</td>
<td>7%</td>
<td>186</td>
<td>3%</td>
<td>44</td>
</tr>
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<td>46</td>
</tr>
<tr>
<td>Kidney</td>
<td>20%</td>
<td>340</td>
<td>17%</td>
<td>171</td>
</tr>
<tr>
<td>Total</td>
<td>3%*</td>
<td>1632</td>
<td>5%*</td>
<td>2288</td>
</tr>
</tbody>
</table>

* % of all cancers diagnosed in 2010, in adults (25+ yrs); excluding SCC and BCC of the skin
### How many cancers in Australia are due to obesity?

<table>
<thead>
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<th>Men</th>
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<tbody>
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* % of all cancers diagnosed in 2010, in adults (25+ yrs), excluding SCC and BCC of the skin
### How many cancers in Australia are due to obesity?

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Men</th>
<th>Women</th>
<th>PAF</th>
<th>Excess Cancers</th>
<th>PAF</th>
<th>Excess Cancers</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

* % of all cancers diagnosed in 2010, in adults (25+ yrs); excluding SCC and BCC of the skin
Obesity Trends Among U.S. Adults

1985

- No Data
- <10%
- 10%–14%
- 15%–19%
- 20%–24%
- 25%–29%
- ≥30%
Obesity Trends Among U.S. Adults

1990

No Data          <10%           10%–14% 15%–19%           20%–24%          25%–29%           ≥30%
Obesity Trends Among U.S. Adults

1995

No Data  <10%  10%-14%  15%-19%  20%-24%  25%-29%  ≥30%
Obesity Trends Among U.S. Adults

2000

- No Data
- <10%
- 10%–14%
- 15%–19%
- 20%–24%
- 25%–29%
- ≥30%
Obesity Trends Among U.S. Adults

What Obesity Epidemic?

2005
Does losing weight reduce risk of cancer?
Effects of bariatric surgery on cancer incidence in obese patients in Sweden (Swedish Obese Subjects Study): a prospective, controlled intervention trial


www.thelancet.com/oncology

1016/S1470-2045(09)70159-7
Cancer incidence in females. The graph shows the time course of non-surgery patients compared to surgery patients. The hazard ratio (HR) is 0.58 (95% CI 0.44-0.77) with a p-value of 0.0001.
Cancer incidence
Males

HR 0.97 (95% CI 0.62–1.52)
p=0.90

Follow-up time (years)
Cumulative cancer incidence

Surgery patients
Non-surgery patients

Control
Surgery
<table>
<thead>
<tr>
<th>Cancers considered</th>
<th>Colon (C18, C19) and rectum (C20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of exposure in Australian population:</td>
<td>Daily use</td>
</tr>
<tr>
<td></td>
<td>• 14% of men</td>
</tr>
<tr>
<td></td>
<td>• 8% of women</td>
</tr>
<tr>
<td></td>
<td>• <em>Varies +++ with age</em></td>
</tr>
<tr>
<td></td>
<td>(Australian Cancer Study controls)</td>
</tr>
</tbody>
</table>
Aspirin – how the story took hold

Long-term effect of aspirin on colorectal cancer incidence and mortality: 20-year follow-up of five randomised trials

Peter M Rothwell, Michelle Wilson, Carl-Eric Elwin, Bo Norrving, Ake Algra, Charles P Warlow, Tom W Meade

Summary

Background: High-dose aspirin (≥500 mg daily) reduces long-term incidence of colorectal cancer, but adverse effects might limit its potential for long-term prevention. The long-term effectiveness of lower doses (75–300 mg daily) is unknown. We assessed the effects of aspirin on incidence and mortality due to colorectal cancer in relation to dose, duration of treatment, and site of tumour.
~25-30% reduced deaths from CRC with aspirin
Aspirin – get more data on all outcomes!

Short-term effects of daily aspirin on cancer incidence, mortality, and non-vascular death: analysis of the time course of risks and benefits in 51 randomised controlled trials

Peter M Rothwell, Jacqueline F Price, F Gerald R Fowkes, Alberto Zanchetti, Maria Carla Roncaglioni, Gianni Tognoni, Robert Lee, Jill F F Belch, Michelle Wilson, Ziyah Mehta, Tom W Meade

Summary

Background Daily aspirin reduces the long-term risk of death due to cancer. However, the short-term effect is less certain, especially in women, effects on cancer incidence are largely unknown, and the time course of risk and benefit in primary prevention is unclear. We studied cancer deaths in all trials of daily aspirin versus control and the time course of effects of low-dose aspirin on cancer incidence and other outcomes in trials in primary prevention.
Aspirin – cancers vs other outcomes

<table>
<thead>
<tr>
<th>Events/participants</th>
<th>ARR per 1000 patients per year</th>
<th>Odds ratio (95% CI)</th>
<th>PInteraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–2.9 years</td>
<td>445/17745</td>
<td>0.06</td>
<td>1.01 (0.88–1.15)</td>
</tr>
<tr>
<td>3.0–4.9 years</td>
<td>193/16463</td>
<td>2.19</td>
<td>0.81 (0.67–0.98)</td>
</tr>
<tr>
<td>≥5 years</td>
<td>131/4444</td>
<td>4.80</td>
<td>0.70 (0.56–0.88)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Major vascular events</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0–2.9 years</td>
<td>481/17745</td>
<td>2.04</td>
<td>0.82 (0.72–0.92)</td>
</tr>
<tr>
<td>3.0–4.9 years</td>
<td>241/16477</td>
<td>0.10</td>
<td>1.00 (0.84–1.20)</td>
</tr>
<tr>
<td>≥5 years</td>
<td>153/4404</td>
<td>0.99</td>
<td>0.93 (0.74–1.16)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Major extracranial bleeds</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0–2.9 years</td>
<td>142/17745</td>
<td>1.33</td>
<td>1.95 (1.47–2.59)</td>
</tr>
<tr>
<td>3.0–4.9 years</td>
<td>45/16555</td>
<td>0.59</td>
<td>1.37 (0.87–2.14)</td>
</tr>
<tr>
<td>≥5 years</td>
<td>16/4595</td>
<td>0.96</td>
<td>0.63 (0.34–1.16)</td>
</tr>
</tbody>
</table>

Figure 5: Summary of meta-analyses of the effect of aspirin on risks of incident cancer, major vascular events, and major extracranial bleeds during six randomised trials of daily low-dose aspirin versus control in primary prevention of vascular events, stratified by period of trial follow-up (0–2.9, 3.0–4.9, ≥5 years). The number of participants at the start of each period was based on the number of individuals surviving free of the relevant outcome event at the start of the period, such that only first events of each type were included. The statistical significance of the interaction between the treatment effect and the period of follow-up was derived from a Cox model in which time was included as a continuous variable. ARR=absolute reduction in risk.
Aspirin – get more data on *rarer cancers!*

**Effects of regular aspirin on long-term cancer incidence and metastasis: a systematic comparison of evidence from observational studies versus randomised trials**

Anneleen M Algra, Peter M Rothwell

**Summary**

**Background** Long-term follow-up of randomised trials of aspirin in prevention of vascular events showed that daily aspirin reduced the incidence of colorectal cancer and several other cancers and reduced metastasis. However, statistical power was inadequate to establish effects on less common cancers and on cancers in women. Observational studies could provide this information if results can be shown to be reliable. We therefore compared effects of aspirin on risk and outcome of cancer in observational studies versus randomised trials.
Compare RCT vs observational studies for non-CRC cancer effects

<table>
<thead>
<tr>
<th>Case-control studies</th>
<th>Randomised trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum reported use</td>
<td></td>
</tr>
<tr>
<td>Colorectal cancer</td>
<td>175/17116 (OR 0.61 (0.55-0.67))</td>
</tr>
<tr>
<td>Others cancers</td>
<td></td>
</tr>
<tr>
<td>Biliary</td>
<td>5/418 (OR 0.57 (0.32-0.88))</td>
</tr>
<tr>
<td>Oesophageal</td>
<td>310/2307 (OR 0.58 (0.44-0.76))</td>
</tr>
<tr>
<td>Gastric</td>
<td>376/3600 (OR 0.60 (0.46-0.93))</td>
</tr>
<tr>
<td>Breast</td>
<td>1394/22046 (OR 0.81 (0.71-0.93))</td>
</tr>
<tr>
<td>Lung</td>
<td>1209/11683 (OR 0.84 (0.66-1.08))</td>
</tr>
<tr>
<td>Prostate</td>
<td>1016/7837 (OR 0.86 (0.69-1.08))</td>
</tr>
<tr>
<td>Haematological</td>
<td>374/5482 (OR 0.90 (0.71-1.14))</td>
</tr>
<tr>
<td>Pancreatic</td>
<td>117/1619 (OR 1.02 (0.83-1.26))</td>
</tr>
<tr>
<td>Bladder</td>
<td>26/2805 (OR 1.04 (0.77-1.41))</td>
</tr>
<tr>
<td>Gynaecological</td>
<td>477/5650 (OR 1.06 (0.83-1.36))</td>
</tr>
<tr>
<td>Renal</td>
<td>213/2868 (OR 1.06 (0.89-1.26))</td>
</tr>
<tr>
<td>Any use</td>
<td></td>
</tr>
<tr>
<td>Colorectal cancer</td>
<td>12679/34544 (OR 0.76 (0.64-0.87))</td>
</tr>
<tr>
<td>Others cancers</td>
<td></td>
</tr>
<tr>
<td>Biliary</td>
<td>105/667 (OR 0.75 (0.64-0.97))</td>
</tr>
<tr>
<td>Oesophageal</td>
<td>501/3794 (OR 0.78 (0.65-0.93))</td>
</tr>
<tr>
<td>Gastric</td>
<td>1923/3470 (OR 0.71 (0.55-0.92))</td>
</tr>
<tr>
<td>Breast</td>
<td>672/21065 (OR 0.88 (0.72-0.95))</td>
</tr>
<tr>
<td>Lung</td>
<td>557/16867 (OR 0.90 (0.76-1.06))</td>
</tr>
<tr>
<td>Prostate</td>
<td>418/13563 (OR 0.94 (0.82-1.08))</td>
</tr>
<tr>
<td>Haematological</td>
<td>207/41591 (OR 1.01 (0.96-1.06))</td>
</tr>
<tr>
<td>Pancreatic</td>
<td>538/2289 (OR 1.07 (0.96-1.19))</td>
</tr>
<tr>
<td>Bladder</td>
<td>128/4924 (OR 1.07 (0.93-1.22))</td>
</tr>
<tr>
<td>Gynaecological</td>
<td>230/9729 (OR 0.97 (0.88-1.09))</td>
</tr>
<tr>
<td>Renal</td>
<td>118/4594 (OR 1.38 (1.11-1.71))</td>
</tr>
</tbody>
</table>

Figure 3: Summary estimates from meta-analyses of the associations between aspirin use and risk of cancer from case-control studies compared with summary estimates of the effect on risk of fatal cancers from meta-analysis of trials of aspirin versus control

Estimates from case-control studies based on any use of aspirin are compared with estimates from randomised trials based on all patients randomly assigned to treatment groups irrespective of scheduled duration of trial treatment. Estimates for maximum reported use in case-control studies are compared with estimates from randomised trials based on all patients randomly assigned to treatment groups with scheduled duration of trial treatment of 5 years or more. Haematological cancers include lymphoma, leukaemia, and myeloma. For gynaecological cancers, only studies of ovarian and endometrial cancers were found. Numbers of deaths and patients given in the analyses of randomised trials are adjusted for the 2:1 randomisation ratio in two of the trials, but odds ratios (ORs) and 95% CI are calculated based on the actual numbers.
## Aspirin

<table>
<thead>
<tr>
<th>Cancer Site</th>
<th>Men PF</th>
<th>Prevented</th>
<th>Women PF</th>
<th>Prevented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colorectal (C18-C20)</td>
<td>2%</td>
<td>195</td>
<td>2%</td>
<td>131</td>
</tr>
<tr>
<td>Oesophagus (C15)</td>
<td>6%</td>
<td>35</td>
<td>7%</td>
<td>8</td>
</tr>
</tbody>
</table>
• **Considerations:**
  
  – Australian prevalence data not readily available.
  
  – Jury still out on effective dose and frequency of aspirin for cancer prevention.
  
  – *Adverse effects* of aspirin use not considered.
1. Maintain a healthy weight
2. Exercise regularly
3. Don’t smoke
4. Eat a healthy diet
5. Alcohol in moderation, if at all
6. Sun protection
7. Protect yourself from STI
8. Get screening tests

Graham Colditz MBBS PhD
Washington University, St Louis
1. Maintain a healthy weight
2. Exercise regularly
3. Don’t smoke
4. Eat a healthy diet
5. Alcohol in moderation, if at all
6. Sun protection
7. Protect yourself from STI
8. Get screening tests

TIPS
• Choose small portions and eat slowly
• Eat diet rich in fruits, vegetables and whole grains
• Integrate physical activity into your life

FOR PARENTS / GRANDPARENTS
• Limit children’s TV and computer time
• Encourage healthy snacking on fruits and vegetables
• Encourage activity during free time
1. Maintain a healthy weight
2. Exercise regularly
3. Don’t smoke
4. Eat a healthy diet
5. Alcohol in moderation, if at all
6. Sun protection
7. Protect yourself from STI
8. Get screening tests

TIPS
• Choose activities you enjoy – walking, gardening etc
• Make exercise a habit
• Exercise with others – helps motivation!

FOR PARENTS / GRANDPARENTS
• Play active games with kids
• Play outside!
• Walk to school
1. Maintain a healthy weight
2. Exercise regularly
3. Don’t smoke
4. Eat a healthy diet
5. Alcohol in moderation, if at all
6. Sun protection
7. Protect yourself from STI
8. Get screening tests

TIPS
• Keep trying! Most people take 6 or 7 attempts to quit
• Talk to your GP for help
• Join a quit-smoking program

FOR PARENTS / GRANDPARENTS
• Try to quit as soon as possible
• Don’t smoke in home or car
• Talk to kids about dangers of smoking
1. Maintain a healthy weight
2. Exercise regularly
3. Don’t smoke
4. Eat a healthy diet
5. Alcohol in moderation, if at all
6. Sun protection
7. Protect yourself from STI
8. Get screening tests

TIPS
• Fruit and veg at every meal – e.g. fruit on cereal
• Choose chicken, fish or beans instead of red meat
• Choose whole-grain cereal, brown rice over refined products

FOR PARENTS / GRANDPARENTS
• Limit fast food and processed snacks
• Limit fizzy drinks
1. Maintain a healthy weight
2. Exercise regularly
3. Don’t smoke
4. Eat a healthy diet
5. Alcohol in moderation, if at all
6. Sun protection
7. Protect yourself from STI
8. Get screening tests

TIPS
• Choose non-alcoholic beverages at meals and parties.
• Avoid occasions centred around alcohol.
• Talk to GP if you feel you have a problem with alcohol

FOR PARENTS / GRANDPARENTS
• Avoid making alcohol an essential part of family gatherings.
• Discuss the dangers of drug and alcohol abuse with children.
1. Maintain a healthy weight
2. Exercise regularly
3. Don’t smoke
4. Eat a healthy diet
5. Alcohol in moderation, if at all
6. Sun protection
7. Protect yourself from STI
8. Get screening tests
1. Maintain a healthy weight
2. Exercise regularly
3. Don’t smoke
4. Eat a healthy diet
5. Alcohol in moderation, if at all
6. Sun protection
7. Protect yourself from STI
8. Get screening tests

TIPS
• Practice safe sex

FOR PARENTS / GRANDPARENTS
• Vaccinate boys and girls against HPV
• Discuss safe sex

http://www.siteman.wustl.edu/contentpage.aspx?id=4514
1. Maintain a healthy weight
2. Exercise regularly
3. Don’t smoke
4. Eat a healthy diet
5. Alcohol in moderation, if at all
6. Sun protection
7. Protect yourself from STI
8. Get screening tests

TIPS

• Women: Pap tests; mammography
• Men and women: FOBT
• Skin exams for high-risk people
The burden of cancer

Strategies for cancer control

Estimating the ‘preventable fraction’

8 ways to prevent cancer

Summary
How much cancer can we prevent?

- **13 exposures – combined PAF* 32% in 2009 (excl. BCC and SCC)**
  - ≈ 37,000 cancers (or 100 per day)
  - 33% in men
  - 31% in women

- **Exposures with highest PAFs:**
  - **Men:**
    - Tobacco (16%), UVR (7%), alcohol (3%)
  - **Women:**
    - Tobacco (11%), UVR (5%), overweight/obesity (4%)
How many of the top 10 cancers could we prevent?

Number of cancers diagnosed 2010

- Prostate (C61)
- Skin - melanoma (C43)
- Bronchus - lung (C34)
- Colon (C18, C19)
- Rectum (C20)
- Kidney (C64-C66)
- Bladder (C67)
- UPS (C80)
- Pancreas (C25)
- Stomach (C16)

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How many of the top 10 cancers could we prevent?

Number of cancers diagnosed 2010

- **Prostate (C61)**: 0% (all blue)
- **Skin - melanoma (C43)**: 70% (70% blue, 30% red)
- **Bronchus - lung (C34)**: 86% (86% blue, 14% red)
- **Colon (C18, C19)**: 42% (42% blue, 58% red)
- **Rectum (C20)**: 43% (43% blue, 57% red)
- **Kidney (C64-C66)**: 39% (39% blue, 61% red)
- **Bladder (C67)**: 34% (34% blue, 66% red)
- **UPS (C80)**: 0% (0% blue, 100% red)
- **Pancreas (C25)**: 31% (31% blue, 69% red)
- **Stomach (C16)**: 53% (53% blue, 47% red)

**Men**
How many of the top 10 cancers could we prevent?

Number of cancers diagnosed 2010

Breast (C50)
Colon (C18, C19)
Skin - melanoma (C43)
Bronchus & lung (C34)
Endometrial (C54, C55)
Thyroid (C73)
Rectum (C20)
UPS (C80)
Ovary (C56)
Pancreas (C25)

Women
How many of the top 10 cancers could we prevent?

Number of cancers diagnosed 2010

- **Breast (C50)**: 23%
- **Colon (C18, C19)**: 26%
- **Skin - melanoma (C43)**: 54%
- **Bronchus & lung (C34)**: 78%
- **Endometrial (C54, C55)**: 33%
- **Thyroid (C73)**: 0%
- **Rectum (C20)**: 23%
- **UPS (C80)**: 0%
- **Ovary (C56)**: 7%
- **Pancreas (C25)**: 28%

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Stop smoking!
Start exercising!
Lose weight!
Slip! Slop! Slap!
Drink less!

And for goodness sake ...

**SEE YOUR GP!**
Acknowledgements

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Public Health Committee

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Nirmala Pandeya
Susan Peters

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Louise Wilson

Advisors
Christopher Bain
Max Parkin
Prostate and Breast cancer trends in Australia

Rate (per 100,000)

- Prostate cancer in males
- Breast cancer in females

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Bowel cancer trends in Australia
Melanoma trends in Australia