Cancer Prevention: the gap between what we know and what we do

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WILL IT BE THE MAD COW BEEF, THE HORMONE CHICKEN, OR THE MERCURY FISH?

UM... I THINK I'LL GO WITH THE VEGETARIAN DISH.

PESTICIDE OR HEPATITIS?
IRRITABLE BOWEL SYNDROME
Global Trends
Global Trends

- Increasing population
- Aging
- Increasing incidence rates
- 10.3 million cases in 1996 → 14.7 million cases in 2020
## Cancer as a Cause of Death in the World: 1985 & 2015

<table>
<thead>
<tr>
<th>Cause of Death as % of all deaths</th>
<th>Developing Countries</th>
<th>Developed World</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1985(%)</td>
<td>2015(%)</td>
</tr>
<tr>
<td>Cancer</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Total Deaths (millions):</td>
<td>37.9</td>
<td>47.8</td>
</tr>
<tr>
<td>Cancer Deaths (millions):</td>
<td>2.7</td>
<td>6.7</td>
</tr>
</tbody>
</table>

Adapted from Bulatao & Stephens, (1990); Mosley, et al. (1993)
Food, Nutrition and the Prevention of Cancer: a global perspective
International Comparison for Incidence and Death Rates for All Cancers for Males, 2001

Note: Rates have been age-standardised to the World Standard Population.
International Comparison for Incidence and Death Rates for All Cancers for Females, 2001

Note: Rates have been age-standardised to the World Standard Population.
Leading Causes of Death in the US
Percent of All Causes of Death, 1975 vs 2000

Heart Disease, Cancer, Cerebrovascular, Accidents, Pneumonia & Influenza, Chronic Lung Disease, Other Causes

Death by Cancer versus Heart Disease, Percent of All Causes of Death
Australia, 1992-2002

Cause of Cancer Deaths -- Males
New Zealand, 1999

Percentage (%)

- Lung
- Prostate
- Large Bowel
- Stomach
- Melanoma
- Pancreas
- Non-Hodgkins Lymphoma
- Leukemia
- Brain
- Oesophagus
- Other

Cause of Cancer Deaths -- Females
New Zealand, 1999

- Breast
- Lung
- Large Bowel
- Ovary
- Stomach
- Pancreas
- Non-Hodgkins Lymphoma
- Leukemia
- Melanoma
- Brain
- Other

Percentage (%)

Maori and Non-Maori Cancer Rates
New Zealand, 1999

* Rates per 100 000 and age-standardised to Segi’s world population
Average Years of Life Lost from Cancer, USA

Percentage of Years of Potential Life Lost from Selected Causes, Australia, 2002

Years of Potential Life Lost from Cancer
Australia, 2002

Disease Burden Associated with Cancer For Females Australia, 1996

Note: YLL is years of life lost due to premature mortality; YLD is years of ‘healthy’ life lost due to disability. 
Disease Burden Associated with Cancer
For Males
Australia, 1996

Note: YLL is years of life lost due to premature mortality; YLD is years of ‘healthy’ life lost due to disability.
They've finally made nutrition labels that everyone can understand.

"Eat too much of this stuff and you'll die."
We know that a diet higher in vegetables and fruit is associated with a reduced risk of cancer - as well as CHD
When no one was looking, Konor would secretly sprinkle on a few sprouts.
*Includes all respondents 18 and older who report they are not consuming five or more servings of fruits and vegetables a day.


Source: Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention, access at:

http://www.cdc.gov/nccdphp/brfss/index.htm
Vegetable Intake Per Day by Age
New Zealand, 1995

Fruit Intake Per Day by Age
New Zealand, 1995

Vegetable and Fruit Consumption Per Day
Australia, 1989-1999

Note: The data given are for fresh fruit and vegetables plus the fresh equivalent weight of produce used in processing, such as canning and juice. The data include allowances for non-commercial production, such as fruit and vegetables grown at home.

Source: ABS Cat. No. 4306.0 (various years).
Transport

Food in the US travels 1300 miles and changes hands six times before being consumed

Hendrickson, USDOE, 1969
The Packer, 1992

Increased durability means reduced palatability and nutritional value

Kloppenberg et al. 1996

Nutrient losses are important, even with excellent storage, particularly Vitamin C, carotenoids, riboflavin, Vitamin E

Bender and Bender, 1997
We know that avoiding excessive sun exposure reduces the risk of melanoma and other skin cancers.
Melanoma Incidence in the US, 1973-2000

Trends and Predictions for Melanoma Incidence Rates, New Zealand

Men

Women

Key:  
- 15-24 year olds  
- 25-44 year olds  
- 45-64 year olds  
- 65-74 year olds  
- 75 years & older

Incidence and Death Rates for Melanoma Australia, 1989-1999

**Notes**
1. Melanoma is classified according to the ICD-10 code: C43.
2. The incidence and death rates were age-adjusted using the total Australian population as at 30 June 1991.

**Sources:** AIHW National Cancer Statistics Clearing House Database and State and Territory cancer registries.
We know that physical activity reduces risk of several cancers, particularly colon cancer, as well as obesity and heart disease
Lack of Participation in Physical Activity, USA

*Includes all respondents 18 and older who report no leisure-time physical activity during the past month.


Source: Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention, access at: http://www.cdc.gov/nccdphp/brfss/index.htm
Level of Physical Activity among Young People in New Zealand, 1997-2000

Note: Young people refers to persons age 5-17 years old.

- Sedentary (no activity in last 2 weeks):
  - All young people: 8%
  - Boys: 9%
  - Girls: 8%

- Relatively inactive (< 2.5 hours in last week):
  - All young people: 22%
  - Boys: 19%
  - Girls: 27%

- Relatively active (2.5 - <5 hours in last week):
  - All young people: 25%
  - Boys: 22%
  - Girls: 27%

- Highly active (5+ hours in last week):
  - All young people: 45%
  - Boys: 37%
  - Girls: 51%

inactive young people = 30% (210,000)
27% of boys
36% of girls

active young people = 70% (500,000)
73% of boys
64% of girls
Level of Physical Activity among Adults
New Zealand, 1997-2000

Note: Adults refers to persons age 18 years and older.
Proportion of Adults with Insufficient or No Physical Activity, Australia 1997, 1999, 2000

Notes
1. Age-standardised to the 2001 Australian population.
2. People aged 18–75 years.
3. ‘Insufficient physical activity’ is less than 150 minutes or less than five sessions of physical activity in the previous week.

In primitive times, lack of food gave languishing bodies to death; now, on the other hand, it is abundance that buries them.

Lucretius: De Rerum Natura V., 1097: (50BC)

*Body mass index of 25.0 kg/m² or greater.

Proportion of 25-64 year-olds who are considered overweight, Australia, 1980-1999

Notes
1. Persons were classified overweight if they had a body mass index (BMI) ≥ 25; BMI is calculated as weight/height^2.
2. Includes only persons living in capital cities or urban areas.
3. The proportions were age-adjusted using the total Australian population as at 30 June 1991.

Physical Activity in Adults, USA

• Approximately 15% of U.S. adults engage regularly (3 times a week for at least 20 minutes) in vigorous physical activity during leisure time.

• Approximately 22% of adults engage regularly (5 times a week for at least 30 minutes) in sustained physical activity of any intensity during leisure time.

• About 25% of adults report no physical activity in their leisure time.

• Physical inactivity is more prevalent among women, among Blacks and Hispanics, among older adults, and among the less affluent.
Physical Activity in Adults, New Zealand

• Between 10 and 15% of adults are sedentary.
• The highest levels of physical activity are among those aged 15-24 years (65%) and those aged 65-74 years (68%).
• Maori women are as active as Maori men (68% active).
• A lower level of education was associated with lower participation in physical activity. Those who had no educational qualifications were more likely to be sedentary than those with school and post-school qualifications.
Physical Activity in Adults, Australia

• About 1/3rd of Australians are at increased risk due to their sedentary lifestyle. Physical inactivity is more prevalent among older persons, those belonging to lower socio-economic groups, and persons from non-English speaking backgrounds.

• Data from the 1999 National Physical Activity Survey indicate that 60% of males and 54% of females exercise at a ‘sufficient’ level, i.e. they obtain some of the health benefits attributed to physical activity.
Physical Activity in Adolescents & Young Adults, USA

• Only about 50% of U.S. young people (ages 12-21 years) regularly participate in vigorous physical activity
• 25% report no vigorous physical activity
• About 14% of young people report no recent vigorous or light to moderate physical activity. This indicator of inactivity is higher among females and particularly among African-American females
• Participation in all types of physical activity declines strikingly as age or grade in school increases
Physical Activity in Children & Adolescents, New Zealand

• 66% of young people are active (2.5 hours physical activity per week)

• Almost all young people (92%) take part in some **sport or physical activity** (but not necessarily more than 2.5 hours per week). Participation is high for both boys (93%) and girls (91%).
We know that screening and early detection reduce markedly the risk of dying from cancer.

Percentage of women 40 years of age and older who report having a mammogram within the past 2 years

Participation by Women Aged 50-69 Years in BreastScreen Australia by region, 2001-02

Source: AIHW analysis of BreastScreen Australia data.
Participation by Women Aged 50-69 Years in BreastScreen Australia by socio-economic status, 2001-02

Source: AIHW analysis of BreastScreen Australia data.
Incidence and Death Rates for Breast Cancer Australia, 1989-1999

New cases and deaths per 100,000 females

Notes
1. Breast cancer is classified according to the ICD-10 code: C50.
2. The incidence and death rates were age-adjusted using the total Australian population as at 30 June 1991.

Sources: AIHW National Cancer Statistics Clearing House Database and State and Territory cancer registries.
Flexible Sigmoidoscope
Recent Flexible Sigmoidoscopy Prevalence Among Adults 50 Years and Older, US, 1997-2002

*A flexible sigmoidoscopy or colonoscopy within the past five years. Note: Data from participating states and the District of Columbia were aggregated to represent the United States.

Colorectal Cancer Incidence 1973-2000

Colorectal Cancer: Males
New Zealand, 1980-1999

Colorectal Cancer: Males 35-64 years old New Zealand, 1980-1999

Colorectal Cancer: Males 65-74 years old
New Zealand, 1980-1999

Colorectal Cancer: Females New Zealand, 1980-1999

Incidence and Death Rates for Colorectal Cancer, Australia 1989-1999

Notes
1. Colorectal cancer is classified according to the ICD-10 codes: C18–C21.
2. The incidence and death rates were age-adjusted using the total Australian population as at 30 June 1991.

Sources: AIHW National Cancer Statistics Clearing House Database and State and Territory cancer registries.
Cost per Year of Life Saved

- Mandatory motorcycle helmets $2,000
- Colorectal cancer screening $25,000
- Breast cancer screening $35,000
- Dual airbags in cars $120,000
- Smoke detectors in homes $210,000
- School bus seat belts $1,800,000

from John Bond, M.D.
Screening for Colorectal Cancer

- “At risk” - those >50yr  80 million
- Screened per year
  - colonoscopy  2.0m
  - sigmoidoscopy  4.5m
  - FOBT  9.5m
  - DCBE  0.1m
- TOTAL PROCEDURES  16.1m

NAMCS; NHAMCS;NHDS;NHIS;BRFSST; etc. - from William Grady M.D.
We know that tobacco causes a major increase in risk of several different cancers as well as heart and lung disease
......and therefore a big increase of dying young and in pain
Cigarette Smoking among Adults 18 and Older in the US, 1965-2001

Tobacco Consumption Per Person Aged 15 Years and Older, New Zealand 1970-1998

Source: New Zealand Official Yearbook 2000
Proportion of Persons Aged 14 Years and Older who Smoke Daily, Australia, 1985-2001

Incidence and Death Rates for Cancer of the Trachea, Bronchus, and Lung Australia, 1989-1999

Notes
1. Cancer of the trachea, bronchus and lung is classified according to the ICD-10 codes: C33–C34.
2. The incidence and death rates were age-adjusted using the total Australian population as at 30 June 1991.

Sources: AIHW National Cancer Statistics Clearing House Database and State and Territory cancer registries.
Prevalence of Current Cigarette Smoking Among Adults 18 and Older in the US, 2002

*The percentage of all adults in each state/area who reported having smoked >100 cigarettes during their lifetimes and who currently smoke every day or some days.

Source: The Morbidity and Mortality Weekly Report, 52(53);1277-1280, (CDC 2004).

Source: SEER 9 areas and NCHS public use data file. Rates are age-adjusted to the 2000 US standard million population by 5-year age groups. Regression lines are calculated using the Joinpoint Regression Program.
Consumption of Chewing Tobacco and Snuff

*Includes both dry and moist snuff.

Source: U.S. Department of Agriculture

— By Don Shopland
Trends in US Cigar Consumption

Billions of cigars*

*Includes both large and small cigars sold for domestic consumption.

Source: U.S. Department of Agriculture tables, 1999 preliminary data: access at www.econ.ag.gov/Briefing/tobacco/
Cigar Smoking among Men
US - 1990-1996

Source: Cigars: Health Effects and Trends (National Cancer Institute Smoking Monograph 9).
Cigar Smoking among Women
US - 1990-1996

Source: Cigars: Health Effects and Trends (National Cancer Institute Smoking Monograph 9).

*Smoked cigarettes on one or more of the 30 days preceding the survey.
Percent Change in Cancer Incidence, 1992-2000
Numbers (burden) vs Rates (risk), All Ages, USA

Although there is still a great deal to learn about the causes and prevention of cancer, we do not yet put into practice much that we already know.

Use of Pharmacologic Treatments for Smoking Cessation - 1984-1998 - US

Estimated assisted quit attempts (millions)

Aid (date approved)
- Inhaler (March 1998)
- Zyban (May 1997)
- Nasal spray (August 1996)
- Patch (January 1992)
- Gum (February 1984)

Colorectal Cancer: Females 35-64 years old
New Zealand, 1980-1999

Colorectal Cancer: Females 65-74 years old New Zealand, 1980-1999