To prevent: to stop from happening

• “Una mela al giorno leva il medico di torno”
• “An apple a day keeps the doctor away”
• “An ounce of prevention is worth a pound of cure”
• “A stitch in time saves nine”
PREVENTIVE HEALTH CARE IN LATER LIFE

Christopher Patterson
Department of Medicine
Faculty of Health Sciences
Objectives

- Review determinants of health
- Examine concepts of Preventive Health Care
- Identify effective preventive manoeuvres
- Discuss challenges to implementation, especially patient factors
Is it too late to begin prevention?

- Seniore is 78 years old
- Seniora is 74 years old
Is it too late to begin prevention?

- Seniore is 78 years old
- Seniora is 74 years old
- How long do they have to live?
An Italian woman aged 74 has 15.9 years of life expectancy (WHO)
An Italian man aged 78 years has a 9.7 year life expectancy (WHO)
What do they risk?

- Sun exposure: causes skin cancers
- Tobacco smoking: causes heart disease, lung cancer, chronic bronchitis, peripheral vascular disease, cancers of the mouth, tongue and oesophagus
- Smoking: a risk factor for osteoporosis, low back pain, bladder cancer, stroke
Epidemiological triangle

Host

Agent

Environment
Determinants of population health

- Biology (genetic and physiological)
Progeria: (Hutchinson-Guilford syndrome)
Determinants of population health

- Biology (genetic and physiological)
- About 30% of an individual’s life expectancy is determined by genetics
Determinants of population health

- Biology (genetic and physiological)
- Social environment (education, literacy, income, shelter)
The social environment  
( WHO 2002 )

<table>
<thead>
<tr>
<th></th>
<th>Sierra Leone</th>
<th>Afghanistan</th>
<th>Italy</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult literacy (m/f) %</td>
<td>51/23</td>
<td>51/21</td>
<td>99/98</td>
<td>n/a</td>
</tr>
<tr>
<td>% Reaching grade 5</td>
<td>n/a</td>
<td>49/0</td>
<td>96</td>
<td>99</td>
</tr>
<tr>
<td>Telephones per 100</td>
<td>2</td>
<td>0</td>
<td>142</td>
<td>101</td>
</tr>
<tr>
<td>Average income ’03 $</td>
<td>150</td>
<td>250</td>
<td>21,560</td>
<td>23,930</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>30.4/35.7</td>
<td>41.9/43.8</td>
<td>76.0/82.0</td>
<td>76.4/81.8</td>
</tr>
<tr>
<td></td>
<td>Russian federation</td>
<td>USA</td>
<td>Canada</td>
<td>Italy</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------</td>
<td>------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>Males</td>
<td>50.2</td>
<td>9.2</td>
<td>2.2</td>
<td>1.5</td>
</tr>
<tr>
<td>Females</td>
<td>14.1</td>
<td>2.7</td>
<td>0.8</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Determinants of population health

- Biology (genetic and physiological)
- Social environment (education, literacy, income, shelter)
- Physical environment (toxins, hazards)
Road deaths per 100,000 population in 2003

Source: IRTAD 30/2005
Deaths resulting from falls: Canada

- Deaths 1997-99
- Deaths 2000-02

<table>
<thead>
<tr>
<th>Age group</th>
<th>1997-99</th>
<th>2000-02</th>
</tr>
</thead>
<tbody>
<tr>
<td>65-69</td>
<td>215</td>
<td>265</td>
</tr>
<tr>
<td>70-74</td>
<td>297</td>
<td>356</td>
</tr>
<tr>
<td>75-79</td>
<td>445</td>
<td>585</td>
</tr>
<tr>
<td>80-84</td>
<td>659</td>
<td>806</td>
</tr>
<tr>
<td>85+</td>
<td>1593</td>
<td>2098</td>
</tr>
</tbody>
</table>
Determinants of population health

- Biology (genetic and physiological)
- Social environment (education, literacy, income, shelter)
- Physical environment (toxins, hazards)
- Lifestyle (nutrition, substances, protective devices, sexual practices, risk tolerance)
Influence of lifestyle on mortality
Determinants of population health

- Biology (genetic and physiological)
- Social environment (education, literacy, income, shelter)
- Physical environment (toxins, hazards)
- Lifestyle (nutrition, substances, protective devices, sexual practices, risk tolerance)
- Physical activity “fitness”
Physical fitness

• Very heavy exercise
Physical fitness

• Very heavy exercise

• *No helmet!* !!!!
Determinants of population health

- Biology (genetic and physiological)
- Social environment (education, literacy, income, shelter)
- Physical environment (toxins, hazards)
- Lifestyle (nutrition, substances, protective devices, sexual practices, risk tolerance)
- Physical activity “fitness”
- AND….Health (illness) care
## Health care spending and life expectancy (2002 international $)

<table>
<thead>
<tr>
<th>Country</th>
<th>GNI</th>
<th>% GDP spent on health</th>
<th>Health care expenditure per person/year</th>
<th>Life expectancy (M)</th>
<th>Life expectancy (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sierra Leone</td>
<td>150</td>
<td>2.9</td>
<td>30.4</td>
<td>30.4</td>
<td>35.7</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>250</td>
<td>8.0</td>
<td>41.9</td>
<td>41.9</td>
<td>43.8</td>
</tr>
<tr>
<td>Italy</td>
<td>21,560</td>
<td>8.5</td>
<td>2166</td>
<td>76.0</td>
<td>82.0</td>
</tr>
<tr>
<td>Canada</td>
<td>23,930</td>
<td>9.6</td>
<td>2931</td>
<td>76.4</td>
<td>81.8</td>
</tr>
<tr>
<td>USA</td>
<td>36,056</td>
<td>14.6</td>
<td>5274</td>
<td>75.0</td>
<td>80.0</td>
</tr>
</tbody>
</table>
Concepts of Prevention

- Prevention or delay of premature death from preventable disease
- Improvement of quality of life by reducing disabling disease
- Reduction of hazardous lifestyles
- Improving self perceived health
Concepts of Prevention

• Prevention or delay of premature death from preventable disease
Principal causes of death

Graphique 7
Principales causes de décès chez les aînés canadiens, 1980 et 1996
Décès pour 100 000 habitants


Causes of death by age and sex

Répartition des décès selon la cause, le sexe et le groupe d’âge, Québec, 2002

(a) Hommes

(b) Femmes

Source : Institut de la statistique du Québec

Concepts of Prevention

• Prevention or delay of premature death from preventable disease
• Improvement of quality of life by reducing disabling disease
Reducing disabling disease

- Preventing strokes CVAs
- Preventing fractures
- Reducing osteoarthritis
Concepts of Prevention

• Prevention or delay of premature death from preventable disease
• Improvement of quality of life by reducing disabling disease
• Reduction of hazardous lifestyles
History of Preventive Health Care

• Why didn’t you come sooner?
• American insurance industry 20th century: the “annual physical”
• The Executive Physical (1960-75)
• The birth of Evidence Based preventive health care: Canadian Task Force on the Periodic Health Examination (1979) US Preventive Services Task Force, UK National Health Service etc
Canadian Task Force on Preventive Health Care

• To make recommendations (Clinical Practice Guidelines) to Primary Care Physicians on what to include and exclude from the periodic health examination

• Systematic evidence review

• Internal and external peer review

• Recommendations graded according to strength of evidence
Some definitions:

- Health Promotion: the process of enabling people to increase control over, and to improve, their health (WHO)
- Screening: a population approach which aims to reach all individuals at risk for a specific condition
- Case finding: identifies individuals at risk for or having asymptomatic disease during specific or opportunistic encounters
More definitions

- **Primary prevention**: prevents disease before it occurs by immunization or lifestyle counselling.
- **Secondary prevention**: (a) early detection of subclinical disease to prevent disability by screening or case finding (b) prevention of recurrent disease (e.g., stroke, MI).
- **Tertiary prevention**: minimizes disability and handicap from established disease (equivalent to treatment or therapeutic care).
Primary prevention: Examples where evidence for counselling is good or fair

- about safe driving
- against tobacco use
- for prudent diet
- about alcohol
- about injury prevention
- about domestic water temperature, smoke detectors
An example where counselling might have helped.
Counselling for safe driving
Smoking and lung cancer (men, women)

- Italy
- Spain
- Canada
Counselling to reduce smoking

• Good evidence of efficacy
• Counselling alone can persuade about 15% of smokers to stop
• Adding nicotine replacement can increase this to 30%
• Health risks improve rapidly, normalize by 20 years
• Coordinated policy desirable (e.g. banning in public places, negative advertising)
The Prudent Diet: each day

- Avoid excessive energy intake
- 5-10 fruit or vegetable portions
- Limit fat to < 30% total
- Fibre > 20 gm
- Calcium 1500mg
- Vitamin D 5ug

- NOT THIS >>>>>>>>>>>>>>>>>>>>>>>
Effectiveness of poliomyelitis inoculation (WHO 2004)

![Graph showing poliomyelitis global annual reported incidence and POL3 coverage, 1980-2004](image)
Inoculations: good or fair evidence

- Influenza inoculation (annual strain specific)
- Pneumococcal inoculation (every 10 years)
- Tetanus inoculation (every 10 years or once after age 65)
Should we screen?

- Good screening test?
- Adverse effects?
- Early treatment effective?
- Reduces burden of illness
- Preclinical phase?
- Burden of illness?
- Natural history known?
- Reduces burden of illness
Examples of manoeuvres for which there is good (A) or fair (B) evidence

<table>
<thead>
<tr>
<th>Condition</th>
<th>Manoeuvre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual impairment</td>
<td>Snellen sight card</td>
</tr>
<tr>
<td>Hearing impairment</td>
<td>Whisper test or audioscope</td>
</tr>
<tr>
<td>Cancer of cervix</td>
<td>Papanicolau smear</td>
</tr>
<tr>
<td>Rupture of abdominal aortic aneurysm</td>
<td>Ultrasound (men 65-75)</td>
</tr>
</tbody>
</table>
Examples of manoeuvres for which there is good (A) or fair (B) evidence

<table>
<thead>
<tr>
<th>Condition</th>
<th>Manoeuvre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke (ictus) myocardial infarction</td>
<td>Measure blood pressure</td>
</tr>
<tr>
<td>Colon cancer</td>
<td>Fecal occult blood or colonoscopy</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>Clinical exam, mammogram</td>
</tr>
<tr>
<td>Frailty</td>
<td>Functional assessment</td>
</tr>
</tbody>
</table>
FRAILTY: A BALANCE
**POSITIVE**
- Robust health
- Supportive environment
- Adequate financial resources

**NEGATIVE**
- Chronic illness
- Preexisting disabilities
- Poor social supports
- Inadequate financial resources
- Acute illness
FRAILTY

Normal health \leftrightarrow Frailty

\rightarrow Increasing disability
\rightarrow Long term care
\rightarrow Death

Death
Effectiveness of preventive primary care outreach

Ploeg et al. Can Fam Phys 2005;51:1244
Effectiveness of preventive primary care outreach

Ploeg et al. Can Fam Phys 2005;51:1244

**Table 4. Odds ratios for mortality**

<table>
<thead>
<tr>
<th>AUTHOR</th>
<th>INTERVENTION n/N</th>
<th>CONTROL n/N</th>
<th>ODDS RATIO 95% CONFIDENCE INTERVAL</th>
<th>WEIGHT %</th>
<th>ODDS RATIO (95% CONFIDENCE LIMITS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tellies and Moore, 1979†</td>
<td>24/170</td>
<td>42/169</td>
<td></td>
<td></td>
<td>3.2 (0.76, 1.26)</td>
</tr>
<tr>
<td>Hendrickson et al., 1984‡</td>
<td>56/200</td>
<td>75/200</td>
<td></td>
<td></td>
<td>5.6 (0.69, 1.02)</td>
</tr>
<tr>
<td>Wetten et al., 1984нат</td>
<td>88/577</td>
<td>105/571</td>
<td></td>
<td></td>
<td>8.2 (0.72, 0.98)</td>
</tr>
<tr>
<td>Stenson and Storvuo, 1988†</td>
<td>262/777</td>
<td>391/777</td>
<td></td>
<td></td>
<td>18.3 (0.91, 1.11)</td>
</tr>
<tr>
<td>Corrigan and Demopoulos, 1990†</td>
<td>66/272</td>
<td>54/267</td>
<td></td>
<td></td>
<td>5.1 (1.26, 1.89)</td>
</tr>
<tr>
<td>McKee et al., 1990‡</td>
<td>16/151</td>
<td></td>
<td></td>
<td></td>
<td>1.9 (0.63, 0.22, 1.25)</td>
</tr>
<tr>
<td>Clarke et al., 1992‡</td>
<td>70/261</td>
<td>60/262</td>
<td></td>
<td></td>
<td>5.4 (1.23, 1.83)</td>
</tr>
<tr>
<td>Hell et al., 1992‡</td>
<td>14/181</td>
<td>18/186</td>
<td></td>
<td></td>
<td>1.5 (0.90, 0.37, 1.71)</td>
</tr>
<tr>
<td>Pethy et al., 1992‡</td>
<td>67/369</td>
<td>86/256</td>
<td></td>
<td></td>
<td>6.5 (0.70, 0.49, 1.00)</td>
</tr>
<tr>
<td>Watson et al., 1992‡</td>
<td>10/249</td>
<td>18/248</td>
<td></td>
<td></td>
<td>1.5 (0.55, 0.25, 1.19)</td>
</tr>
<tr>
<td>Van Beurden et al., 1993‡</td>
<td>42/292</td>
<td>58/288</td>
<td></td>
<td></td>
<td>4.3 (0.80, 0.51, 1.25)</td>
</tr>
<tr>
<td>Wagner et al., 1994‡</td>
<td>17/625</td>
<td>23/407</td>
<td></td>
<td></td>
<td>2.2 (0.70, 0.20, 1.32)</td>
</tr>
<tr>
<td>Burton et al., 1997†1</td>
<td>296/2105</td>
<td>454/2090</td>
<td></td>
<td></td>
<td>27.9 (0.84, 0.07, 0.97)</td>
</tr>
<tr>
<td>Hay et al., 1998‡</td>
<td>5/289</td>
<td>22/410</td>
<td></td>
<td></td>
<td>1.0 (0.46, 0.18, 1.20)</td>
</tr>
<tr>
<td>Lovett et al., 1998µ</td>
<td>1/101</td>
<td>2/100</td>
<td></td>
<td></td>
<td>0.2 (0.59, 0.06, 4.54)</td>
</tr>
<tr>
<td>Bulley et al., 2000‡</td>
<td>7/72</td>
<td>3/69</td>
<td></td>
<td></td>
<td>0.5 (2.14, 0.56, 7.97)</td>
</tr>
<tr>
<td>Hubert et al., 2001‡</td>
<td>12/250</td>
<td>18/253</td>
<td></td>
<td></td>
<td>1.6 (0.67, 0.22, 1.40)</td>
</tr>
<tr>
<td>Needham et al., 2001†</td>
<td>1/50</td>
<td>5/50</td>
<td></td>
<td></td>
<td>0.2 (0.25, 0.04, 1.59)</td>
</tr>
<tr>
<td>Schnader et al., 2001¶</td>
<td>40/520</td>
<td>47/411</td>
<td></td>
<td></td>
<td>4.8 (0.77, 0.51, 1.18)</td>
</tr>
</tbody>
</table>

* n/N = number dying/number studied.
Inclusion of Preventive Health Manoeuvres in Primary Care
(Simulated patient-male aged 70:Hutchison et al CMAJ 1998;158:185)

<table>
<thead>
<tr>
<th>Grade of Evidence</th>
<th>Examples</th>
<th>Proportion included</th>
</tr>
</thead>
<tbody>
<tr>
<td>A,B-should be included</td>
<td>Visual acuity, hearing, influenza inoculation, Counseling seat belt etc.</td>
<td>.37 (+/- 0.16)</td>
</tr>
</tbody>
</table>
### Inclusion of Preventive Health Manoeuvres in Primary Care

(Simulated patient-male aged 70: Hutchison et al CMAJ 1998;158:185)

<table>
<thead>
<tr>
<th>Grade of Evidence</th>
<th>Examples</th>
<th>Proportion included</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, B—should be included</td>
<td>Visual acuity, hearing, influenza inoculation,</td>
<td>.37 (+/- 0.16)</td>
</tr>
<tr>
<td></td>
<td>Counseling seat belt etc.</td>
<td></td>
</tr>
<tr>
<td>C—Evidence lacking</td>
<td>Serum cholesterol, digital rectal examination</td>
<td>.24 (+/- 0.19)</td>
</tr>
</tbody>
</table>
Inclusion of Preventive Health Manoeuvres in Primary Care
(Simulated patient-male aged 70:Hutchison et al CMAJ 1998;158:185)

<table>
<thead>
<tr>
<th>Grade of Evidence</th>
<th>Examples</th>
<th>Proportion included</th>
</tr>
</thead>
<tbody>
<tr>
<td>A,B-should be included</td>
<td>Visual acuity, hearing, influenza inoculation, Counseling seat belt etc.</td>
<td>.37 (+/- 0.16)</td>
</tr>
<tr>
<td>C-Evidence lacking</td>
<td>Serum cholesterol, digital rectal examination</td>
<td>.24 (+/- 0.19)</td>
</tr>
<tr>
<td>D,E-should NOT be included</td>
<td>Chest X-ray, urine analysis, sputum cytology</td>
<td>.18 (+/-0.19)</td>
</tr>
</tbody>
</table>
## Recall of Preventive Health Manoeuvres

(926 Primary care Patients: Chambers & Patterson 2000)

<table>
<thead>
<tr>
<th>Manoeuvre</th>
<th>Reported in patient record %</th>
<th>Patient self report %</th>
<th>Agreement (kappa) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual acuity</td>
<td>20</td>
<td>35</td>
<td>0.19 (.12,.25)</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>80</td>
<td>95</td>
<td>0.24 (.17,.32)</td>
</tr>
<tr>
<td>Clinical breast exam</td>
<td>51</td>
<td>51</td>
<td>0.33 (.21,.45)</td>
</tr>
<tr>
<td>Mammogram</td>
<td>76</td>
<td>47</td>
<td>0.47 (.33,.66)</td>
</tr>
<tr>
<td>Papanicolau smear</td>
<td>26</td>
<td>17</td>
<td>0.46 (.32,.60)</td>
</tr>
</tbody>
</table>
Why don’t people follow advice?

• Personality (risk tolerance)
• Personal beliefs
• Inconvenience
• Fear
• Discomfort
• Costs
• Forgetting
Factors in patients/care recipients affecting adherence to Preventive Health Care recommendations

• Gender

• Osteoporosis: prospective series at Mayo clinic n=59

• None of the men who sustained wrist fractures followed up with bone density testing

Cuddihy et al. Osteoporosis Int 2004;15:695
Factors in patients/care recipients affecting adherence to Preventive Health Care recommendations

- Culture
- *Health Maintenance Organization in Israel*
  - n=205 x 74.5 years
- Visual assessment: 78%
- Fecal occult blood: 87%
- Influenza inoculation: 81%
- Calcium supplementation 60%

Factors in patients/care recipients affecting adherence to Preventive Health Care recommendations

• Costs
• Costs of investigations if not covered by insurance
• Costs of medications

Cuddihy et al. Osteoporosis Int 2004; 15:695
Factors in patients/care recipients affecting adherence to Preventive Health Care recommendations

• Age

• Some studies find that adherence is better or no worse with advancing age
  Durham et al. Gerontologist 1991;31:603

• Others report that adherence is worse with older age
  Slymen et al. int J Epidemiol 1996;25:411
Factors in patients/care recipients affecting adherence to Preventive Health Care recommendations

• Beliefs
• Effect may be positive or negative
• Lack of concern about seriousness of condition
• Confidence in person who recommends
## Factors which affect adherence


<table>
<thead>
<tr>
<th>Predictor</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of psychological problems, particularly depression</td>
<td>van Servellen et al.,\textsuperscript{51} Ammassari et al.,\textsuperscript{52} Stilley et al.\textsuperscript{53}</td>
</tr>
<tr>
<td>Presence of cognitive impairment</td>
<td>Stilley et al.,\textsuperscript{53} Okuno et al.\textsuperscript{54}</td>
</tr>
<tr>
<td>Treatment of asymptomatic disease</td>
<td>Sewitch et al.,\textsuperscript{55}</td>
</tr>
<tr>
<td>Inadequate follow-up or discharge planning</td>
<td>Sewitch et al.,\textsuperscript{55} Lacro et al.\textsuperscript{56}</td>
</tr>
<tr>
<td>Side effects of medication</td>
<td>van Servellen et al.,\textsuperscript{51}</td>
</tr>
<tr>
<td>Patient’s lack of belief in benefit of treatment</td>
<td>Okuno et al.,\textsuperscript{54} Lacro et al.\textsuperscript{56}</td>
</tr>
<tr>
<td>Patient’s lack of insight into the illness</td>
<td>Lacro et al.,\textsuperscript{56} Perkins\textsuperscript{57}</td>
</tr>
<tr>
<td>Poor provider–patient relationship</td>
<td>Okuno et al.,\textsuperscript{54} Lacro et al.\textsuperscript{56}</td>
</tr>
<tr>
<td>Presence of barriers to care or medications</td>
<td>van Servellen et al.,\textsuperscript{51} Perkins\textsuperscript{57}</td>
</tr>
<tr>
<td>Missed appointments</td>
<td>van Servellen et al.,\textsuperscript{51} Farley et al.\textsuperscript{58}</td>
</tr>
<tr>
<td>Complexity of treatment</td>
<td>Ammassari et al.\textsuperscript{52}</td>
</tr>
<tr>
<td>Cost of medication, copayment, or both</td>
<td>Balkrishnan,\textsuperscript{59} Ellis et al.\textsuperscript{60}</td>
</tr>
</tbody>
</table>
Strategies to improve adherence with recommendations

• Individual plan and counselling
• Telephone call follow up (by medical technician)
  • Mohler P. Fam Med 1995;27:117
• Regular group visits
• Letters—probably not!
  • Ornstein S et al. J Fam Pract 1993;36:195
Did we meet our objectives?

- Review determinants of health
- Examine concepts of Preventive Health Care
- Identify effective preventive manoeuvres
- Discuss challenges to implementation, especially patient factors
A better, longer life with…
Useful resources

• Canadian Task Force on Preventive Health Care:  ctfphc.org (great links; many of my references)
• Agency for Healthcare Research and Quality (USA):  Ahrq.gov
Secondary Prevention: good evidence

E.g. After Myocardial infarction

- ASA
- Beta adrenergic blockers
- ACE inhibitors
- HMG CoA inhibitors (statins)
Secondary Prevention: good evidence

*E.g. After Myocardial infarction*

- ASA {50% adherence}
- Beta adrenergic blockers {30-50%}
- ACE inhibitors {25-50%}
- HMG CoA inhibitors (statins) {<50%}
Deaths from malignancies: rate per 100,000 per year in men
Years of potential life lost
History of Preventive Health Care

• Antiquity: biblical kashrut laws (diet)
• Lime juice against scurvey (vitamin C)
• Vaccination prevents small pox (inoculation)
• Hand washing prevents puerperal fever
• Clean water prevents cholera
• Smoking and lung cancer
3 trajectories of chronic illness

Figure 3

Chronic Illness in the Elderly Typically Follows Three Trajectories:

1. Mostly cancer
   - High
   - Mostly cancer
   - Death
   - Time
   - Short period of evident decline

2. Mostly heart and lung failure
   - High
   - Mostly heart and lung failure
   - Death
   - Time
   - Long-term limitations with intermittent serious episodes

3. Mostly frail and senescent
   - High
   - Mostly frail and senescent
   - Prolonged disability
   - Time
   - Low
## Life expectancy and health expenditure (2002 Internationalized $)

<table>
<thead>
<tr>
<th></th>
<th>Sierra Leone</th>
<th>Afghanistan</th>
<th>Cuba</th>
<th>Italy</th>
<th>Canada</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Life expectancy</strong></td>
<td>30.4</td>
<td>41.9</td>
<td>74.7</td>
<td>76.0</td>
<td>76.4</td>
<td>75.0</td>
</tr>
<tr>
<td></td>
<td>35.7</td>
<td>43.8</td>
<td>79.0</td>
<td>82.0</td>
<td>81.8</td>
<td>80.0</td>
</tr>
<tr>
<td><strong>% GDP</strong></td>
<td>2.9</td>
<td>8.0</td>
<td>7.5</td>
<td>8.5</td>
<td>9.6</td>
<td>14.6</td>
</tr>
<tr>
<td><strong>Dollar amount</strong></td>
<td>27</td>
<td>34</td>
<td>236</td>
<td>2166</td>
<td>2931</td>
<td>5274</td>
</tr>
</tbody>
</table>
Table 6. Mortality summary odds ratio and 95% confidence intervals by length of follow up

<table>
<thead>
<tr>
<th>Length of Follow Up (mo)</th>
<th>Number of Studies</th>
<th>Total Sample Size</th>
<th>Heterogeneity P Value</th>
<th>Summary Odds Ratio (95% Confidence Limits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>2</td>
<td>1123</td>
<td>.99</td>
<td>1.00 (0.57, 1.77)</td>
</tr>
<tr>
<td>12</td>
<td>11</td>
<td>5714</td>
<td>.80</td>
<td>0.80 (0.66, 0.96)</td>
</tr>
<tr>
<td>24</td>
<td>11</td>
<td>13,426</td>
<td>.87</td>
<td>0.76 (0.70, 0.87)</td>
</tr>
<tr>
<td>36</td>
<td>7</td>
<td>4688</td>
<td>.20</td>
<td>0.90 (0.75, 1.06)</td>
</tr>
<tr>
<td>48</td>
<td>2</td>
<td>5749</td>
<td>.15</td>
<td>0.90 (0.76, 1.04)</td>
</tr>
</tbody>
</table>
Traffic deaths in Canada

![Graph showing traffic death rates by age group and gender in Canada. The graph plots the rate per 100,000 population across different age groups (Under 1, 1-4, 5-14, 15-24, 25-44, 45-64, 65 and over) for both males and females. The rates peak in the 15-24 age group for both genders, with males showing a slightly higher rate. The graph also highlights the differences between males and females across various age groups.]
Before we discuss screening, how do we arrive at recommendations?
Levels of Recommendation

- A: Good evidence to include
- B: Fair evidence to include
- C: contradictory or marginal evidence; may be recommended on other grounds
- D: Fair evidence to exclude
- E: Good evidence to exclude
- I: Insufficient evidence to make a recommendation
The Public Health environment 2002 (WHO)

<table>
<thead>
<tr>
<th></th>
<th>Sierra Leone</th>
<th>Afghanistan</th>
<th>Italy</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate sanitation %</td>
<td>39</td>
<td>8</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Inoculation DPT 3 %</td>
<td>70</td>
<td>54</td>
<td>96</td>
<td>91</td>
</tr>
<tr>
<td>Inoculation Polio %</td>
<td>60</td>
<td>54</td>
<td>97</td>
<td>88</td>
</tr>
</tbody>
</table>
### The social environment 2002 (WHO)

<table>
<thead>
<tr>
<th>Country</th>
<th>Adult literacy (m/f) %</th>
<th>Children reaching grade 5</th>
<th>Telephones per 100</th>
<th>Annual income Int $</th>
<th>Life expectancy (m/f)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sierra Leone</td>
<td>51/23</td>
<td>n/a</td>
<td>2</td>
<td>150</td>
<td>30.4/35.7</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>51/21</td>
<td>49/0</td>
<td>0</td>
<td>250</td>
<td>41.9/43.8</td>
</tr>
<tr>
<td>Italy</td>
<td>99/98</td>
<td>96</td>
<td>142</td>
<td>21,560</td>
<td>76.0/82.0</td>
</tr>
<tr>
<td>Canada</td>
<td>99</td>
<td>99</td>
<td>101</td>
<td>23,930</td>
<td>76.4/81.8</td>
</tr>
</tbody>
</table>
Deaths from malignancies: rate per 100,000 per year in women

[Bar chart showing death rates from malignancies for different causes and countries, with the x-axis representing All CA, Breast, Lung, and Colon, and the y-axis representing the rate per 100,000 per year.]
Deaths from acute myocardial infarction, other ischemia & stroke rate per 100,000 per year in women.
<table>
<thead>
<tr>
<th></th>
<th>Italy</th>
<th>Russian Federation</th>
<th>Sierra Leone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>76.0</td>
<td>58.9</td>
<td>30.4</td>
</tr>
<tr>
<td>Females</td>
<td>82.0</td>
<td>72.2</td>
<td>35.7</td>
</tr>
<tr>
<td>Age</td>
<td>Canada</td>
<td>Italy</td>
<td>Cuba</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>70-74</td>
<td>13.0</td>
<td>12.6</td>
<td>13.4</td>
</tr>
<tr>
<td>Males</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>16.3</td>
<td>15.9</td>
<td>15.4</td>
</tr>
<tr>
<td>80-84</td>
<td>7.4</td>
<td>7.1</td>
<td>8.1</td>
</tr>
<tr>
<td>Males</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>9.5</td>
<td>8.8</td>
<td>9.2</td>
</tr>
<tr>
<td></td>
<td>Canada</td>
<td>Italy</td>
<td>Cuba</td>
</tr>
<tr>
<td>-----------</td>
<td>--------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td><strong>Males</strong></td>
<td>76.4</td>
<td>76.0</td>
<td>74.7</td>
</tr>
<tr>
<td><strong>Females</strong></td>
<td>81.8</td>
<td>82.0</td>
<td>79.0</td>
</tr>
</tbody>
</table>
Graphique 13
Causes de décès pour lesquels les taux de mortalité et les différences de mortalité selon le revenu ont augmenté ; taux comparatifs de mortalité (TCM), selon le quintile de revenu du quartier, Canada, 1971 à 1996

A - Cancer du poumon, femmes
B - Maladies infectieuses
C - Affections mal définies

D - Troubles mentaux
E - Diabète, hommes
F - Diabète, femmes

Note : Les maladies infectieuses incluent les occurrences de maladie pour 1985, qui avaient été classées « maladies métaboliques » à l'origine.

Sources des données : base canadienne de données sur la mortalité et registres hypothétiques d'affaires : rectifications détaillées du numéro du recensement.

# Health Care Workers per 100,000 population by country

<table>
<thead>
<tr>
<th></th>
<th>United Kingdom</th>
<th>Canada</th>
<th>Spain</th>
<th>USA</th>
<th>Italy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physicians</td>
<td>166</td>
<td>209</td>
<td>319</td>
<td>548</td>
<td>606</td>
</tr>
<tr>
<td>Nurses</td>
<td>496</td>
<td>1009</td>
<td>361</td>
<td>772</td>
<td>446</td>
</tr>
<tr>
<td>Pharmacists</td>
<td>58</td>
<td>79</td>
<td>76</td>
<td>68</td>
<td>109</td>
</tr>
<tr>
<td>Age</td>
<td>Italy</td>
<td>Russian Federation</td>
<td>Sierra Leone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>--------</td>
<td>--------------------</td>
<td>--------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70-74</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>12.6</td>
<td>9.0</td>
<td>7.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>15.9</td>
<td>11.8</td>
<td>9.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80-84</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>7.1</td>
<td>5.7</td>
<td>4.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>8.8</td>
<td>6.5</td>
<td>5.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Effects of immunization: poliomyelitis
The social environment: clean water
Effects of immunization: poliomyelitis
McMaster University 1883
Ranked most innovative last 11 years

• Founded 1883
• Hamilton 1930
• Medical School Founded 1966
• Renamed the Michael G DeGroote School 2003
• Class size 138
• MD in 3 years
Mortality rate from falls: Canada

[Graph showing the mortality rate from falls in Canada across different age groups (65-69, 70-74, 75-79, 80-84, 85+). The graph compares the mortality rate for the years 1997-1999 and 2000-2002.]
Controversial manoeuvres

• Prostate cancer
• Cognitive impairment
• Depression
• Elder abuse
Consequences of falls: Canada

- Major joint and femur: 57%
- Femur or pelvis: 19%
- Upper limb: 6%
- Other injuries: 6%
- Lower limb: 3%
- Spine: 2%
- Thoracoabdominal: 2%
- Intracranial: 2%
- Hip and thigh: 2%
- Open Wound: 1%
## Fall related injuries 1999
Province of Alberta, Canada

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Death Rate</th>
<th>Hospitalization Rate</th>
<th>Emergency Department Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>65-69</td>
<td>5.46</td>
<td>588.60</td>
<td>2552.06</td>
</tr>
<tr>
<td>70-74</td>
<td>7.90</td>
<td>892.30</td>
<td>3403.39</td>
</tr>
<tr>
<td>75-79</td>
<td>22.04</td>
<td>1622.12</td>
<td>4820.58</td>
</tr>
<tr>
<td>80-84</td>
<td>30.16</td>
<td>3111.46</td>
<td>7637.48</td>
</tr>
<tr>
<td>85-89</td>
<td>34.99</td>
<td>5118.21</td>
<td>10951.17</td>
</tr>
<tr>
<td>90+</td>
<td>101.53</td>
<td>8579.55</td>
<td>16428.06</td>
</tr>
</tbody>
</table>