Cancer Control - the role of Surveillance

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Overview of presentation

- Define Cancer Control
- Discuss what we need for surveillance
- Present examples
  - Lung
  - Breast
  - Cervix
  - Colorectum
  - Prostate
- Conclude on what we need
Cancer Control

Defined by WHO as an integrated approach to:

- Prevention
- Early diagnosis and screening
- Treatment
- Rehabilitation
- Palliative care
Surveillance in Cancer Control

- Impact of prevention interventions
- Effectiveness of screening
- Application of evidence-based therapy
- Effectiveness of new therapy
- Utilization of supportive and palliative care
Intervention

Modify Intervention

Surveillance

Change in incidence or mortality
Indicators of success

Outcome:
- Incidence
- Mortality

Process:
Indicators that the intervention has resulted in a relevant change at the population level
Data required for Surveillance in Cancer Control

For Prevention:
- Risk factors
- Incidence
- Mortality
Data required for Surveillance in Cancer Control

For Screening:
- Details on target group
- Compliance of target group
- Quality of screening tests
- Staging
- Incidence
- Mortality
Data required for Surveillance in Cancer Control

For Therapy:
- Staging
- Treatment

Role of electronic health record?
- Disease free survival
- Relative survival
- Mortality
Data required for Surveillance in Cancer Control

For Supportive and Palliative Care:

- Number of programmes
- Coverage of population
- % Patients Cancer pain free
Breast Cancer

- Level 1 evidence for mammography screening in women aged 50-69
- Level 1 evidence for efficacy of adjuvant chemotherapy and tamoxifen
IARC Working Group, 2002

Women aged 50–69:
- Mammography alone: 0.75 (0.67, 0.85)

Women aged 40–49:
- Mammography alone: 0.81 (0.65, 1.01)
- All valid trials: 0.88 (0.74, 1.04)
Time before screening effect seen

- In randomized trials: 5-7 years
- In the population: at least 10 years

Because:
  - Most deaths after screening starts due to pre-existing cancers
  - Compliance with screening increases slower than in trials
Paper in NEJM by Berry et al, 2005

- Based on assumptions of efficacy
- Assumed effect of screening and treatment largely additive
- Only able to accommodate modeled effects by assuming that, in the absence of screening and improved treatment, breast cancer mortality would have risen
Other Explanation for trends

- Timing of recent fall compatible with improvements in therapy
- Timing and lack of effect in some countries is not compatible with an effect of mammography screening
- Lack of fall prior to 1990 suggests that early detection is not effective in the absence of effective treatment
Trends in Breast Cancer mortality within Canada
Coverage achieved in Canada, 1998-99 (smear within the last 3 years)

<table>
<thead>
<tr>
<th>Age</th>
<th>Self-reported use</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>80%</td>
</tr>
<tr>
<td>30-39</td>
<td>86%</td>
</tr>
<tr>
<td>40-49</td>
<td>82%</td>
</tr>
<tr>
<td>50-59</td>
<td>77%</td>
</tr>
<tr>
<td>60-69</td>
<td>60%</td>
</tr>
<tr>
<td>Total (20-69)</td>
<td>79%</td>
</tr>
</tbody>
</table>

Reduction in cervix cancer mortality achieved, 1950-99

<table>
<thead>
<tr>
<th>Country</th>
<th>Recommended Age</th>
<th>Frequency</th>
<th>Mortality Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>20-64</td>
<td>1-3-yearly</td>
<td>78%</td>
</tr>
<tr>
<td>Finland</td>
<td>30-59</td>
<td>5-yearly</td>
<td>80%</td>
</tr>
<tr>
<td>U.S.A.</td>
<td>18-70+</td>
<td>1-3-yearly</td>
<td>78%</td>
</tr>
</tbody>
</table>
Vaccination against HPV

- Proportion of target group vaccinated
- HPV infection rates after 5, 10, 15 years
- If infected, which HPV types?
- Rate of CIN 2+ at 25, 30, 35 years
- Rate of invasive cancer cervix at 40, 45, 50 years etc

Controls?
Prevention of Colorectal cancer

- Limited evidence for efficacy of chemoprevention with NSAIDS
- Sufficient evidence for physical activity
- Sufficient evidence for weight reduction
- Limited evidence for fruit and vegetable consumption
- Inconsistent evidence for other dietary changes
- Probable effect of HRT
Randomized trials of FOBT have shown 20% reduction in colorectal cancer mortality
These trials achieved compliance of 70%

- General population pilot studies suggest less compliance than in trials (50%)
- There are not yet enough endoscopists for population-based programmes in Canada
- Results of flexible sigmoidoscopy trials expected soon
- It is possible that prevention would do as well
Reasons for fall in prostate cancer mortality

- Screening - unlikely
- Improved therapy
  If life is prolonged by hormone therapy, there is a greater probability that a competing cause of death (e.g. heart disease, other cancer), will cause death

The majority of men with prostate cancer die with, not from their disease
## Estimated effect of available cancer control strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco control</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>Dietary modification</td>
<td>25%</td>
<td>20%</td>
</tr>
<tr>
<td>Infection Control</td>
<td>15%</td>
<td>20%</td>
</tr>
<tr>
<td>Screening</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>Cervix</td>
<td>80%</td>
<td>90%</td>
</tr>
<tr>
<td>Breast</td>
<td>0%</td>
<td>25%</td>
</tr>
<tr>
<td>Treatment</td>
<td>0%</td>
<td>25%</td>
</tr>
</tbody>
</table>
Time for cancer control measures to achieve an important impact

**Prevention:**
- Tobacco control: 30 years
- Dietary modification: 10-50 years
- Infection control: 40 years

**Screening:** 10 years

**Treatment:** 5 years
Obstacles to surveillance

- Time to outcome
- Absence of routinely collected data on process measures
- Privacy concerns
- Difficulties in obtaining informed consent
Evaluating new approaches

We plan Sentinel Surveillance Centres, where the following can be piloted:

- Collecting risk factors
- Collecting stage
- Collecting treatment data
- Improving compliance to screening
Essential features of Sentinal Centres

- Population based
- Collaboration of oncologists obtained
- All degrees of severity of disease recorded
- Linked to cancer registry
- Buy in from primary care practitioners
Conclusions

- Trends in outcome measures are difficult to interpret, and delayed.
- Inferences drawn from process measures are likely to be more timely.
- But data on process measures are not usually collected in sufficient detail.
- We need to invest resources in piloting the collection of process measures.