Colorectal cancer screening
From raising awareness and overcoming taboos to program design and cost effective program implementation

Thursday, November 3, 2016
13:50-15:20, Room 353
Panellists

- **Heather Bryant**, Vice President Cancer Control
  Canadian Partnership Against Cancer (session facilitator)
- **Candice Anderson**, Program Manager, Screening and Early Detection
  Canadian Partnership Against Cancer
- **Durado Brooks**, Managing Director, Cancer Control Intervention
  American Cancer Society, Inc.
- **Samir Gupta**
  Veterans Affairs San Diego Healthcare System, University of California San Diego
- **Iris Lansdorp-Vogelaar**
  Erasmus MC Cancer Institute
- **Nereo Segnan**
  Centro di Riferimento per l'Epidemiologia e la Prevenzione Oncologica in Piemonte
- **Carlo Senore**
  Centro di Riferimento per l'Epidemiologia e la Prevenzione Oncologica in Piemonte
Presentation Overview and Objectives

- Burden worldwide
- Contributing factors
- Eligible population
- Fundamental strategies

Context

- Test options
- Efficacy
- Cost effectiveness and Resource availability

Testing

- Patient preferences
- Overcoming taboos
- Integrating prevention

Strategies

- Underserved population

Addressing Inequities

- 80% by 2018 initiative
- Lessons learned
- Future directions

Future Opportunities

- 80% by 2018 initiative
- Lessons learned
- Future directions
Colorectal Cancer and Screening
*Setting the Context*
Global Burden of Colorectal Cancer

- Third most common cancer in men and second in women worldwide
- Almost 55% of the cases occur in more developed regions
- Wide geographical variation in incidence although patterns are similar in men and women
- Fourth leading cause of cancer-related deaths in the world

Source: Globocan 2012 (IARC)
Global Trends of Colorectal Cancer

• Burden expected to increase by 60% by 2030

• Clear marker of cancer transition
  – Countries undergoing rapid societal/ economic changes show rapid increases in cancers more frequent in high-income countries

• Incidence and mortality rates are still rising in many low-income and middle-income countries

• Stabilising or decreasing trends seen only in highly developed countries where rates remain among the highest in the world

Contributing Factors

• **Modifiable risk factors**
  – Heavy alcohol consumption, poor diet, red and processed meats, obesity, physical inactivity, smoking

• **Family history of colorectal cancer or adenomatous polyps**

• **Personal history of inflammatory bowel disease**

• **Age (50+)**

• **Inherited syndromes**
  – Familial adenomatous polyposis (FAP), Gardner syndrome, Lynch syndrome, Turcot syndrome, Peutz-Jeghers syndrome, MUTYH-associated polyposis

Source: American Cancer Society (2016)
Screening Strategies

- Faecal immunochemistry test (FIT)
- Faecal occult blood test (FOBT)
- Multi-target stool DNA test (FIT-DNA)
- Colonoscopy
- Flexible sigmoidoscopy
- CT colonography
Screening Guidelines

- **Faecal test (gFOBT, FIT, FIT-DNA)**
  - Every 1 to 2 years
  - Generally recommended as primary screening modality
  - Follow-up colonoscopy

- **Colonoscopy**
  - Every 10 years
  - Generally recommended as follow-up diagnostic rather than primary screen

- **Flexible sigmoidoscopy**
  - Every 5 years
  - May be used in combination with FIT

- **CT colonography (virtual colonoscopy)**
  - Every 5 years
  - Limited availability

Sources: US Preventive Services Task Force; American Cancer Society; Canadian Task Force on Preventive Health Care
Colorectal Cancer Screening

The Tests – Efficacy, Cost, Resource Availability
META-ANALYSIS OF FOBT (Hemoccult) RCTs

<table>
<thead>
<tr>
<th></th>
<th>%</th>
<th>RR</th>
<th>CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality reduction among subjects randomized to screening</td>
<td>16</td>
<td>0.84</td>
<td>0.78 - 0.90</td>
</tr>
<tr>
<td>Mortality reduction adjusted for participation</td>
<td>25</td>
<td>0.75</td>
<td>0.66 - 0.84</td>
</tr>
</tbody>
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20% INCIDENCE REDUCTION WITH REHYDRATED HEMOCCULT AT 18-YEAR FOLLOW-UP

Table 3. Test Performance of G-FOBT Versus I-FOBT (≥ 100 ng/mL)

<table>
<thead>
<tr>
<th>Test performance</th>
<th>G-FOBT</th>
<th>I-FOBT</th>
<th>Difference a</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>95% CI</td>
</tr>
<tr>
<td>Participation rate b</td>
<td>4836</td>
<td>46.9</td>
<td>(46.0–47.9)</td>
</tr>
<tr>
<td>FOBT-positive patients</td>
<td>117</td>
<td>2.4</td>
<td>(2.0–2.9)</td>
</tr>
<tr>
<td>Complete follow-up of FOBT-positive patients c</td>
<td>103</td>
<td>88.0</td>
<td>(82.2–93.0)</td>
</tr>
<tr>
<td>Detection rate intention to screen d</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All polyps and cancer</td>
<td>80</td>
<td>0.8</td>
<td>(0.6–0.9)</td>
</tr>
<tr>
<td>All adenomas and cancer</td>
<td>72</td>
<td>0.7</td>
<td>(0.5–0.9)</td>
</tr>
<tr>
<td>All advanced adenomas and cancer e</td>
<td>57</td>
<td>0.6</td>
<td>(0.4–0.7)</td>
</tr>
<tr>
<td>Cancer</td>
<td>11</td>
<td>0.1</td>
<td>(0.0–0.2)</td>
</tr>
<tr>
<td>≥1 adenoma ≥10 mm</td>
<td>41</td>
<td>0.4</td>
<td>(0.3–0.5)</td>
</tr>
<tr>
<td>≥1 adenoma with high-grade dysplasia</td>
<td>3</td>
<td>0.0</td>
<td>(0.0–0.1)</td>
</tr>
<tr>
<td>≥1 adenoma with a villous component ≥20%</td>
<td>2</td>
<td>0.0</td>
<td>(0.0–0.0)</td>
</tr>
<tr>
<td>Detection rate per protocol f</td>
<td></td>
<td></td>
<td></td>
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<td>(0.0–0.0)</td>
</tr>
</tbody>
</table>
Immunochemical tests are currently the test of choice for population screening

Recommendations

4.1 Guaiac-based faecal occult blood tests have proven characteristics that make them suitable for population screening. They lack the analytical specificity and sensitivity of immunochemical tests, their analysis cannot be automated and the concentration at which they turn from negative to positive cannot be adjusted by the user. For these reasons guaiac-based tests are not the preferred test for a modern population screening programme, although depending on local labour costs, the mechanism of kit distribution and collection and reduced sample stability in immunochemical testing, they might prove more practicable and affordable than immunochemical testing (I - B).

4.2 Immunochemical tests have improved test characteristics compared to conventional guaiac-based tests. They are analytically and clinically more sensitive and specific, their measurement can be automated and the user can adjust the concentration at which a positive result is reported. Immunochemical tests are currently the test of choice for population screening; however, individual device characteristics including, ease of use by the participant and laboratory, suitability for transport, sampling reproducibility and sample stability are all important when selecting the iFOBT most appropriate for an individual screening programme (II - A).
Flexible sigmoidoscopy versus faecal occult blood testing for colorectal cancer screening in asymptomatic individuals (Review)

Holme Ø, Brethauer M, Fretheim A, Odgaard-Jensen J, Hoff G

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Screening n/N</th>
<th>Control n/N</th>
<th>Risk Ratio M-H, Random 95% CI Weight</th>
<th>Risk Ratio M-H, Random 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Flexible sigmoidoscopy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atkin 2010</td>
<td>706/57099</td>
<td>1818/112939</td>
<td>31.6 % 0.77 [0.70, 0.84]</td>
<td></td>
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<tr>
<td>Hoff 2009</td>
<td>123/13653</td>
<td>362/1092</td>
<td>15.8 % 1.02 [0.83, 1.25]</td>
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<tr>
<td>Schoen 2012</td>
<td>1012/77445</td>
<td>1287/77455</td>
<td>32.3 % 0.79 [0.72, 0.85]</td>
<td></td>
</tr>
<tr>
<td>Segnan 2011</td>
<td>251/17136</td>
<td>306/17136</td>
<td>19.9 % 0.82 [0.70, 0.97]</td>
<td></td>
</tr>
<tr>
<td>This Evensen 1999</td>
<td>2/400</td>
<td>10/399</td>
<td>0.5 % 0.20 [0.04, 0.90]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td><strong>165733</strong></td>
<td><strong>249021</strong></td>
<td><strong>100.0 % 0.82 [0.74, 0.90]</strong></td>
<td></td>
</tr>
</tbody>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atkin 2010</td>
<td>221/57099</td>
<td>637/112939</td>
<td>47.3 % 0.69 [0.59, 0.80]</td>
<td></td>
</tr>
<tr>
<td>Hoff 2009</td>
<td>241/3653</td>
<td>99/41092</td>
<td>5.5 % 0.73 [0.47, 1.14]</td>
<td></td>
</tr>
<tr>
<td>Schoen 2012</td>
<td>252/77445</td>
<td>341/77455</td>
<td>37.7 % 0.74 [0.63, 0.87]</td>
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</tr>
<tr>
<td>Segnan 2011 (1)</td>
<td>65/17136</td>
<td>83/17136</td>
<td>9.2 % 0.78 [0.57, 1.08]</td>
<td></td>
</tr>
<tr>
<td>This Evensen 1999</td>
<td>1/400</td>
<td>3/399</td>
<td>0.3 % 0.33 [0.03, 3.18]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
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<td><strong>249021</strong></td>
<td><strong>100.0 % 0.72 [0.65, 0.79]</strong></td>
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</table>

**INCIDENCE REDUCTION 18%**

**MORTALITY REDUCTION 28%**
Flexible Sigmoidoscopy SCREENING

European Code against Cancer, 4th Edition: Cancer screening☆

Paola Armaroli, Patricia Villain, Eero Suonio, Maribel Almonte, Ahti Anttila, Wendy S. Atkin, Peter B. Dean, Harry J. de Koning, Lena Dillner, Rolando Herrero, Ernst J. Kuipers, Iris Lansdorp-Vogelaar, Silvia Minozzi, Eugenio Paci, Jaroslaw Regula, Sven Törnberg, Nereo Segnan

- Incidence reduction (subjects undergoing screening)
  32% (RR, 0.68; 95%CI: 0.47–0.89)

- Mortality reduction (subjects undergoing screening)
  50% (RR, 0.50; 95%CI: 0.35–0.64)

Protection maintained over 11 years

level of evidence: I.
Colonoscopy SCREENING

Incidence and mortality reduction are higher for distal than for proximal CRCs

some studies showing no effect on proximal colon


Evidence supporting the choice of starting age and screening interval is still limited

Data suggest added value of colonoscopy versus sigmoidoscopy, especially for prevention of deaths from cancer of the proximal colon, which should be elaborated in further research and weighed against the higher costs, complexity, discomfort, complication rates, and high quality capacities and quality assurance needed,\textsuperscript{64-67} as well as possible differences in compliance.  \textsuperscript{Brenner H, et al BMJ 2014}
Cost-effectiveness of CRC screening

Based on Lansdorp-Vogelaar et al. Epi Rev 2011
Preferred strategy for CRC screening?

<table>
<thead>
<tr>
<th>Study: First Author, Year (Reference No.)</th>
<th>Willingness-to-Pay for a LYG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$10,000/LYG</td>
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<tr>
<td>Frazier, 2000 (35)</td>
<td>No screening</td>
</tr>
<tr>
<td>Khandker, 2000 (37)</td>
<td>No screening</td>
</tr>
<tr>
<td>Song, 2004 (20)</td>
<td>gFOBT</td>
</tr>
<tr>
<td>Vijan, 2007 (23)</td>
<td>gFOBT</td>
</tr>
<tr>
<td>Wagner, 1995 (18)</td>
<td>No screening</td>
</tr>
<tr>
<td>Zauber (MISCAN), 2009 (22)</td>
<td>gFOBT</td>
</tr>
<tr>
<td>Zauber (SimCRC), 2009 (22)</td>
<td>COL</td>
</tr>
<tr>
<td>Zauber (CRC-SPIN), 2009 (22)</td>
<td>COL</td>
</tr>
</tbody>
</table>

Source: Lansdorp-Vogelaar et al. Epi Rev 2011
Cost-effectiveness of newly developed tests

- FIT
  - Cost-effective: 3*
  - Not cost-effective: 4

- Stool DNA
  - Cost-effective: 5
  - Not cost-effective: 0

- CTC
  - Cost-effective: 6
  - Not cost-effective: 2#

* FIT was not cost-effective because considerably higher reimbursement rate for FIT compared to gFOBT
# In these studies colonoscopy was still the preferred strategy at a willingness-to-pay threshold of $100,000/LYG

Source: Lansdorp-Vogelaar et al. Epi Rev 2011
Cost-effectiveness if limited colonoscopy resources

Source: Wilschut et al. JNCI 2011
Conclusions: Cost-effectiveness of CRC screening

- CRC screening cost-effective compared with no screening, but no screening method can be identified as the preferred strategy.
- Factors other than cost-effectiveness, such as population preferences and colonoscopy resources, should be used for screening decisions.
- FIT with a high cut-off good option in case of limited colonoscopy resources.
- Newly developed screening tests of stool DNA testing, CTC, and capsule endoscopy are not yet cost-effective.
Discussion Questions

USPSTF recommendation:
- “there is convincing evidence that screening for colorectal cancer provides substantial benefit for adults aged 50 to 75 years”
- “the USPSTF acknowledges that there is no “one size fits all” approach to colorectal cancer screening and seeks to provide clinicians and patients with the best possible evidence about the various screening methods”

Question: CT colonography and stool DNA screening are included in the recommendation and therefore need to be reimbursed according to Affordable Care Act. Is this a good or a bad development?
Colorectal Cancer Screening

The Strategies – Patient Preferences, Overcoming Taboos, Integrating Prevention
Dutch pilot studies on CRC screening adherence

Source: Hol et al, Gut 2010; Stoop et al, Lancet Oncol 2010
RCT of competing CRC strategies in US

Source: Inadomi et al., Arch Intern Med 2012
However, longer term follow-up...

On the other hand in the Netherlands...

Adherence

<table>
<thead>
<tr>
<th>Round</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Round 1</td>
<td>62.6%</td>
</tr>
<tr>
<td>Round 2</td>
<td>63.2%</td>
</tr>
<tr>
<td>Round 3</td>
<td>68.3%</td>
</tr>
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</table>

Source: Kapidzic, Am J Gastro 2014
<table>
<thead>
<tr>
<th>SCREENING ARM</th>
<th>Invited</th>
<th>Attended (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIT by mail</td>
<td>2266</td>
<td>682 (30.1)</td>
</tr>
<tr>
<td>FIT by GP or screening facility</td>
<td>5893</td>
<td>1654 (28.1)</td>
</tr>
<tr>
<td>Once-only sigmoidoscopy</td>
<td>3650</td>
<td>1026 (28.1)</td>
</tr>
<tr>
<td>Sigmoidoscopy + biennial FIT</td>
<td>10867</td>
<td>3049 (28.1)</td>
</tr>
<tr>
<td>Patient’s choice</td>
<td>3579</td>
<td></td>
</tr>
<tr>
<td>FIT</td>
<td></td>
<td>522 (14.6)</td>
</tr>
<tr>
<td>Sigmoidoscopy</td>
<td></td>
<td>448 (12.5)</td>
</tr>
<tr>
<td>Total</td>
<td>26255</td>
<td>7381 (28.1)</td>
</tr>
</tbody>
</table>

Segnan et al. Journal of the National Cancer Institute 2005; 97(5)
Offering people a choice for colorectal cancer screening

Carlo Senore,1 Andrea Ederle,2 Luca Benazzato,2 Arrigo Arrigoni,3 Marco Silvani,1 Alberto Fantin,2 Mario Fracchia,3 Paola Armaroli,1 Nereo Segnan1

Uptake of faecal immunochemical test screening among nonparticipants in a flexible sigmoidoscopy screening programme

Lieke Hol1, Ernst J. Kuijpers1,2, Marjolein van Ballegooijen3, Anneke J. van Vuuren1, Jaqueline C.Y. Reijerink4, Dick J.F. Habbema3 and Monique E. van Leerdam1
Proportion of regular attendees over 4 screening rounds
FIT screening – age 50 to 74

60% of people participating in each round
They’ll never do it.

It’s just too gross.
Physician versus patient perception

  - Of PCP’s, 56% identified patient embarrassment or anxiety as a barrier
  - Fewer than 1% of adults identified this as their reason for not being current with screening
Attitudes Toward Colorectal Cancer Screening Tests -
Canadian survey, 2008

- I'm afraid the tests to detect colorectal cancer are painful: Strongly agree 10%, Moderately agree 17%, Strongly and Moderately agree 28%
- The idea of the test just grosses me out: Strongly agree 12%, Moderately agree 15%, Strongly and Moderately agree 27%
- I am not convinced that the tests can deliver accurate results: Strongly agree 8%, Moderately agree 15%, Strongly and Moderately agree 23%
- I am scared to take the test for colorectal cancer: Strongly agree 8%, Moderately agree 11%, Strongly and Moderately agree 19%
- The time and effort needed to prepare for colorectal tests is too much of a hassle: Strongly agree 7%, Moderately agree 12%, Strongly and Moderately agree 19%
- I'd be embarrassed to talk to my doctor about testing for colorectal cancer: Strongly agree 5%, Moderately agree 6%, Strongly and Moderately agree 11%
Launch of Colonversation

www.colonversation.ca
Figure 3 | Complete strategy for eliminating cancer. The complete strategy for the elimination of cancer requires early detection, treatment and prevention.
Diet

Smoking prevention and cessation

Physical exercise

SCREENING
Multiple outcomes
Which setting?
lifestyles and cancer screening

Example: Piedmont screening programs (population 4,400,000 around 500,000 tested each year):

around 50-65% of 50-69 yrs old women are screened every 2 years
around 50% of women 25 - 65 years old are screened every 3-5 years for cervical cancer
around 30-40% of men and women are screened for colorectal cancer at 58-60 years with FS or FIT. The FIT cohort is screened up to 70 years every two years
Cancer screening and the Teachable Moment (TM) Theory

naturally occurring life transitions or health events thought to motivate individuals to spontaneously adopt risk-reducing health behaviors

taking advantage of these events might increase the effectiveness of self directed and low-intensity interventions that are also low in cost and amenable to widespread dissemination

TMs can increase perceptions of personal risk and outcome expectancies, prompt strong affective or emotional responses, and redefine self-concept or social role

TMs might be an unique opportunity to combine efforts to early detection of cancer among asymptomatic subjects as well as to communicate health education messages to a wide audience

operational features of already established preventive services → favorable cost–effectiveness ratio
Population based cancer screening programmes as a teachable moment for primary prevention interventions. A review of the literature

Carlo Senore *, Livia Giordano, Cristina Bellisario, Francesca Di Stefano and Nereo Segnan

Epidemiologia dei Tumori II, AOU S Giovanni Battista – CPO Piemonte, Torino, Italy

ESPERIENZE DI INTEGRAZIONE TRA SCREENING DEI TUMORI E PREVENZIONE PRIMARIA: UNA RASSEGNA
INTEGRATING CANCER SCREENING AND PRIMARY PREVENTION: A REVIEW

Livia Giordano,1 Nereo Segnan,1 Maria Piera Mono,1 Federica Gallo,1 Cristina Bellisario,1 Carlo Senore1

1 AOU Città della salute e della scienza, Centro di riferimento per l'epidemiologia e la prevenzione oncologica in Piemonte, Torino

Corrispondenza: Livia Giordano, livia.giordano@cpo.it
Aims and Methods

Review available evidence concerning interventions combining cancer screening and primary prevention interventions, aimed at promoting the adoption of healthy lifestyles.

Studies of primary prevention interventions, focused on lifestyle associated risks, were included if: (1) they had been implemented in the context of established screening programs or of pilot screening projects; (2) the study design included a comparison group; (3) the intervention aimed at promoting change of single or multiple behavioral risk factors.

MEDLINE and Cochrane library electronic data-bases were searched using broad search criteria, including PubMed “related articles” for the papers meeting the selection criteria.

10 articles included (8 retrieved in the first review).
Findings

Tailored interventions were shown to be effective in prompting the adoption of healthier dietary patterns in the short term (+17% after 6 weeks and +7% after 6 months for brief counselling; 34% after 3 months, 8% after 8 months and 22% after 12 months for intensive counselling) but they did not increase smoking quitting rates and showed a limited impact on physical activity.

Endoscopic CRC screening might pose specific challenges: patients detected with an adenoma tended to feel no need to modify their lifestyle, as if the test result, indicating a clean colon, together with the reassurance offered by professionals during the process, could be interpreted as a validation of the current lifestyle → importance of the assessment of effectiveness of strategies aimed at promoting behavioral change by making explicit the connection between lifestyle and CRC or adenoma incidence and recurrence.
Flexible Sigmoidoscopy SCREENING

- Incidence reduction (subjects undergoing screening)
  \[32\% \text{ (RR, 0.68; 95\%CI: 0.47–0.89)}\]

- Mortality reduction (subjects undergoing screening)
  \[50\% \text{ (RR, 0.50; 95\%CI: 0.35–0.64)}\]

European Code against Cancer, 4th Edition: Cancer screening☆

Paola Armaroli\textsuperscript{a}, Patricia Villain\textsuperscript{b}, Eero Suonio\textsuperscript{b}, Maribel Almonte\textsuperscript{b}, Ahti Anttila\textsuperscript{c}, Wendy S. Atkin\textsuperscript{d}, Peter B. Dean\textsuperscript{b}, Harry J. de Koning\textsuperscript{e}, Lena Dillner\textsuperscript{f}, Rolando Herrero\textsuperscript{b}, Ernst J. Kuipers\textsuperscript{g}, Iris Lansdorp-Vogelaar\textsuperscript{e}, Silvia Minozzi\textsuperscript{a}, Eugenio Paci\textsuperscript{h}, Jaroslaw Regula\textsuperscript{i}, Sven Törnberg\textsuperscript{j}, Nereo Segnan\textsuperscript{a,*}

level of evidence: I.
Cancer preventability estimates for diet, nutrition, body fatness, and physical activity (http://www.wcrf.org)

<table>
<thead>
<tr>
<th>Appropriate behaviours</th>
<th>USA</th>
<th>UK</th>
<th>Brazil</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foods containing fibre</td>
<td>11</td>
<td>12</td>
<td>11</td>
<td>n/a</td>
</tr>
<tr>
<td>Red meat</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Processed meat</td>
<td>12</td>
<td>10</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Alcoholic drinks</td>
<td>5</td>
<td>7</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Physical activity (colon)</td>
<td>15</td>
<td>12</td>
<td>15</td>
<td>7</td>
</tr>
<tr>
<td>Body fatness</td>
<td>16</td>
<td>14</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Totals</td>
<td>47</td>
<td>45</td>
<td>41</td>
<td>22</td>
</tr>
</tbody>
</table>

*Updated estimates of cancer preventability (PAF%) by appropriate diet, nutrition, physical activity, and body fatness in four countries*
Prevention of Colorectal cancer

Primary Prevention intervention at screening age

Primary Prevention intervention Life-course

Screening intervention

*Updated estimates of cancer preventability (PAF%) by appropriate:
- diet,
- nutrition,
- physical activity,
- body fatness

(http://www.wcrf.org)
## Prevention of Colorectal cancer: impact of Behavioural Changes and Screening

Cumulative incidence (0-74) in High Income: 3400 per 100,000 (Globocan 2012)

<table>
<thead>
<tr>
<th></th>
<th>Prevented cancer per 100,000</th>
<th>PAF(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC*</td>
<td>1,530</td>
<td>45</td>
</tr>
<tr>
<td>Screening</td>
<td>867</td>
<td>26</td>
</tr>
<tr>
<td>Screening + BC*</td>
<td>2,007</td>
<td>59</td>
</tr>
</tbody>
</table>

*Updated estimates of cancer preventability (PAF%) by appropriate:

- diet,
- nutrition,
- physical activity,
- body fatness

(http://www.wcrf.org)
Prevention of Colorectal cancer: impact of Behavioural Changes (BC) and Screening by % coverage

<table>
<thead>
<tr>
<th>Coverage</th>
<th>0,00</th>
<th>0,25</th>
<th>0,45</th>
<th>0,60</th>
<th>0,80</th>
<th>1,00</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,00</td>
<td>0,00</td>
<td>0,08</td>
<td>0,14</td>
<td>0,18</td>
<td>0,24</td>
<td><strong>0,30</strong></td>
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<tr>
<td>0,25</td>
<td>0,11</td>
<td>0,18</td>
<td>0,23</td>
<td>0,27</td>
<td>0,33</td>
<td><strong>0,38</strong></td>
</tr>
<tr>
<td>0,45</td>
<td>0,20</td>
<td>0,26</td>
<td><strong>0,31</strong></td>
<td>0,35</td>
<td>0,39</td>
<td><strong>0,44</strong></td>
</tr>
<tr>
<td>0,60</td>
<td>0,27</td>
<td>0,32</td>
<td><strong>0,37</strong></td>
<td>0,40</td>
<td>0,45</td>
<td><strong>0,49</strong></td>
</tr>
<tr>
<td>0,80</td>
<td>0,36</td>
<td>0,41</td>
<td>0,45</td>
<td>0,48</td>
<td>0,51</td>
<td>0,55</td>
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<tr>
<td>0,90</td>
<td>0,41</td>
<td>0,45</td>
<td>0,49</td>
<td>0,51</td>
<td>0,55</td>
<td>0,58</td>
</tr>
<tr>
<td>1,00</td>
<td><strong>0,45</strong></td>
<td>0,49</td>
<td>0,52</td>
<td>0,55</td>
<td>0,58</td>
<td><strong>0,62</strong></td>
</tr>
</tbody>
</table>
Insights from focus groups on primary prevention interventions in the setting of organised breast cancer screening

Conway et al, BMC Public Health, 2016

there is still a need for robust public health communications before the messages based on the epidemiology of breast cancer risk are incorporated as every day, ‘common sense’ aspects of people’s understanding of cancer risk

the provision of clear information that illustrates the scientific evidence about the link between lifestyle factors and breast cancer risk has the potential to increase credibility of advice
Discussion

Few studies are available assessing the interaction between primary and secondary prevention.

It is important to evaluate the effectiveness of strategies aimed at promoting behavioral change by making explicit the connection between lifestyle and CRC or adenoma incidence and recurrence.

Interventions focused on the cognitive components of behaviors may not be sufficient to induce and sustain the adoption of new habits.

A broader view taking into account context-related factors might enhance the impact of these interventions.
Colorectal Cancer Screening
Addressing Inequities
**Inequities: Definition**

“Health inequities are *avoidable* inequalities in health between groups of people within countries and between countries”

  - Arise from inequalities within and between societies
  - Occur because social and economic conditions impact risk for illness and actions taken to prevent or treat illness.

**Potentially avoidable inequalities that impact risk for cancer, and cancer prevention and treatment likely exist**

- **Exposures and lifestyle factors**
  - Smoking (a CRC risk factor) is more common among socially deprived in United States

- **Differential uptake of treatment and screening**
  - In United States, African Americans with late stage cancer less likely to receive specialty consultation

Inequities in proportion up-to-date with CRC screening: the US example

<table>
<thead>
<tr>
<th>Race</th>
<th>Income, % Federal Poverty Level</th>
<th>Residence</th>
<th>Insurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>58.4% 57.9%</td>
<td>NH Whites</td>
<td>&gt;400%</td>
</tr>
<tr>
<td>Black</td>
<td>49.5% 48.3%</td>
<td>Hispanic</td>
<td>60.3%</td>
</tr>
<tr>
<td>Asian</td>
<td>59.6%</td>
<td>&gt;251%–400%</td>
<td>53.0%</td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td>41.5%</td>
<td>139%–250%</td>
<td>&lt;139%</td>
</tr>
<tr>
<td>NH Whites</td>
<td>66.0%</td>
<td>US Born</td>
<td>48.3%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>59.9%</td>
<td>&gt;10 yrs</td>
<td>63.0%</td>
</tr>
<tr>
<td>NH Whites</td>
<td>66.0%</td>
<td>&lt;10 yrs</td>
<td>58.7%</td>
</tr>
</tbody>
</table>

Inequities in CRC screening participation worldwide

Little known

• Survey of and review of organized CRC screening programs worldwide found fewer than half measured participation differences by socioeconomic status and/or ethnicity

When measured, participation differences by socioeconomic gradient appear to be substantial

• Among those measuring participation by socioeconomic status, 90% reported lower participation among lower socioeconomic groups

• Reports were from Australia, Canada, Denmark, France, Italy, Slovenia, Spain, UK, US
  • Absolute differences varied from small (5%) to large (35%), varying by country and socioeconomic status measure

Source: de Klerk CM, Gupta S, Dekker E, Essink-Bot ML. Socioeconomic and ethnic inequities within organized colorectal cancer screening programs worldwide. Submitted.
Mechanisms of inequities

Unequal access

• In US, screening rates lower for individuals with no health coverage or non-private health coverage

Equal access, but unequal chance of completion secondary to:

• Health literacy
• Language
• Knowledge regarding screening
• Variation in fear and fatalism towards cancer
• Test acceptability

Strategies for addressing inequities

1) Measure potential inequities
   • Socioeconomic status, literacy, race/ethnicity, geographic location

2) Anticipate and address barriers that create inequities
   • Offer acceptable tests
   • Address fears and misconceptions
     • Recognize that some populations require more robust interventions to achieve equal chance of participation
   • Address literacy and language
     • Example: wordless instructions

Ultimate goal is equity in chance to benefit from screening, not just equal chance to be offered

A challenge is that the metric for equity in chance to benefit uncertain. Consider:

- Screening participation rate
- Stage specific incidence/mortality
- Rate of informed choice to participate or refuse

Source: Essink-Bot ML, Dekker E Lancet. 2016 Feb 20;387(10020):724-6
Discussion Questions

The Strategies

• What is the optimal strategy?
  – One-size-fits-all? Sequential offering of tests? Choice of tests?

• Is colorectal cancer screening still considered taboo?

Anticipating and Addressing Challenges to Screening Underserved Populations

• For those with established programs, are you measuring inequities, and are inequities being observed and addressed?

• What are the challenges in measuring and addressing inequities?

• What are the political and social challenges associated with targeting specific populations for special interventions to address inequities?
Colorectal Cancer Screening
Where do we go from here? Lessons Learned and Future Considerations
Where do we go from here?

80% by 2018: A Public Health Initiative for the 21st Century

What is 80% by 2018?

Goal: Increase US CRC screening rate from 65% in 2012 (baseline year) to 80% by the end of 2018.

- Goal was established by the National Colorectal Cancer Roundtable – a consortium of more than 100 organizations funded by the American Cancer Society (ACS) and the US Centers for Disease Control and Prevention (CDC).
- 80% = screening by any recommended test within appropriate interval (FIT in past 1 year, colonoscopy in past 10 years,...). Test use differs by system, resources,..
- Estimated that reaching 80% by 2018 will result in 277,000 cases prevented and 203,000 lives saved by 2030
80% by 2018: Why Now?

• CRC screening has prevented 550,000 CRC deaths in the US over past 2 decades – but after years of rapid rise, screening rates reaching a plateau

• Increased attention on CRC screening in Quality Improvement programs in many sectors (private insurance, Medicare, Veterans Admin, safety net clinics,...) – but lack of a visible national goal or public attention to the issue

• Changes in US healthcare system, including Affordable Care Act

• Engagement and endorsement of US Assistant Secretary of Health (Dr. Howard Koh)

• CDC funding for state-based screening programs
80% by 2018: How Will We Get There?

Strategic Plan Goals

1. Move **Target Population** to Action
2. Use **Systems** (providers, payers, employers) to promote and support screening
3. Use **Policy** to increase access and remove barriers to screening
4. Develop a **Process** to measure and maintain momentum
80% by 2018: Progress to Date

Target Population

- Research
- Tested messages
- Communication guides
- Celebrity engagement
- Multimedia executions
- Integrated marketing
Where do we go from here?

80% by 2018: Progress to Date

- **Systems***
  - Process and Quality Improvement
  - Strategies for Hospitals, Insurers
  - Employer Engagement
  - Medical Neighborhoods

*Some of these steps and processes are unique to the United States due to the lack of a coordinated system of care or organized national screening program.

US systems that are at or near 80% screening (Kaiser, Veterans system) have organized screening programs similar to those seen in many European countries.
80% by 2018: Progress to Date

Policy

- Increase Access to Screening
- Eliminate Barriers
- State Roundtables and Coalitions
80% by 2018: Progress to Date

Process

1200 + and counting!
80% by 2018: Progress to Date

Process

- Screening Rates are Increasing!
80% by 2018: Progress to Date

Process

- Hall of Fame
- National Achievement Awards
- Blogs, newsletters
80% by 2018: Next Steps

Process

- Pursuing financial support
- Continue partner recruitment
- New tools and resources for hospitals, insurers, state coalitions, evaluation
- Celebrate successes
- Planning for 2019 and beyond – maintaining the momentum
Colorectal Cancer Screening

Panel Reflection – Key Learnings, Future Directions
Discussion Questions

• What are the future directions in some of the regions not discussed?
• What steps need to be taken by a region/nation to plan and implement an effective screening initiative for their population?