IARC’s stock take of CRC Screening in Europe

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Possible conflicts of interest

• None related to this presentation
General descriptive information

**Site Specific Questionnaires** to collect information on

- Program status and organization
- Screening tests, eligibility, screening interval, further assessment
- Legislation, financing, costs
- IT, QA programs, linkage with cancer registries
CRC Screening Programs in the EU 2007

Left: CRC Screening Programs in the EU 2016
- Population-based, Nationwide
  - Rollout complete
  - Rollout ongoing
  - Piloting
  - Planning
- Population-based, Regional
  - Rollout complete
  - Rollout ongoing
- Non-Population-based programmes
  - Red
  - No programme

Right: CRC Screening Programs in the EU 2007
<table>
<thead>
<tr>
<th>Category</th>
<th>1st Report</th>
<th>2nd Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population based</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>Rollout complete</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Rollout ongoing</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Pilot</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Planning</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Non-pop. based</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>No program</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Data Incomplete</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>
Tests Used for CRC Screening
In the EU Member States
Quantitative Standardized Data collection

**Site Specific Tables** on annual aggregated data stratified by age groups & initial vs subsequent screening

- Screening tests
- Further assessment recommendations
- Further assessment compliance
- Outcome of further assessment
  - Detection rates
  - Positive predictive values
Colorectal Cancer Screening
Examination Coverage
by Programme Specific Age Range

Standardized data collection allowed to achieve comparable estimates of screening performance, showing for example disparities in examination coverage across EU member states.
Estimate key quality indicators

Key determinants of quality and impact recommended in the European QA guidelines

Suitable for comparison between Member States

Standard definitions and formulas
## Performance indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participation rate</strong></td>
<td>Subjects personally invited for screening in the reference year screened by June 30th of the following year / Total number of subjects personally invited in the reference year.</td>
</tr>
<tr>
<td>(organized programs only)</td>
<td></td>
</tr>
<tr>
<td><strong>Positivity rate (PR)</strong></td>
<td>Subjects with a positive test / Total number of screenees with adequate samples (positive + negative tests).</td>
</tr>
<tr>
<td><strong>Detection rate (DR)</strong></td>
<td>Screenees detected with the specific lesion / Total number of screenees with adequate samples (positive + negative tests).</td>
</tr>
<tr>
<td><strong>Positive predictive value (PPV)</strong></td>
<td>Screenees with the lesion of interest / Total number of screenees undergoing colonoscopy assessment following a positive primary screening test.</td>
</tr>
</tbody>
</table>
Positivity and DR Programs using faecal tests
## Performance of endoscopy programs

<table>
<thead>
<tr>
<th>Country</th>
<th>Type</th>
<th>Age Range</th>
<th>Gender</th>
<th>N complete TCs</th>
<th>N TCs</th>
<th>TC completion rate %</th>
<th>N screenees</th>
<th>N adenomas</th>
<th>DR %</th>
<th>N advanced adenomas</th>
<th>DR %</th>
<th>N CRCs</th>
<th>CRC DR %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Italy (Piedmont)</strong></td>
<td>Sigmoidoscopy</td>
<td>55-59 years</td>
<td>Women</td>
<td>369</td>
<td>391</td>
<td>94,4%</td>
<td>5567</td>
<td>468</td>
<td>8,4%</td>
<td>165</td>
<td>3,0%</td>
<td>14</td>
<td>2,5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Men</td>
<td>670</td>
<td>702</td>
<td>95,4%</td>
<td>5996</td>
<td>954</td>
<td>15,9%</td>
<td>385</td>
<td>6,4%</td>
<td>25</td>
<td>3,8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td>1039</td>
<td>1093</td>
<td>95,1%</td>
<td>11563</td>
<td>1422</td>
<td>12,3%</td>
<td>550</td>
<td>4,8%</td>
<td>39</td>
<td>3,4</td>
</tr>
<tr>
<td><strong>Poland</strong></td>
<td>Colonoscopy</td>
<td>55-59 years</td>
<td>Women</td>
<td>2311</td>
<td>2402</td>
<td>96,2%</td>
<td>2402</td>
<td>477</td>
<td>19,9%</td>
<td>83</td>
<td>3,5%</td>
<td>8</td>
<td>3,3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Men</td>
<td>2326</td>
<td>2375</td>
<td>97,9%</td>
<td>2375</td>
<td>786</td>
<td>33,1%</td>
<td>154</td>
<td>6,5%</td>
<td>8</td>
<td>3,4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60-64 years</td>
<td>Women</td>
<td>2276</td>
<td>2365</td>
<td>96,2%</td>
<td>2365</td>
<td>522</td>
<td>22,1%</td>
<td>100</td>
<td>4,2%</td>
<td>14</td>
<td>5,9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Men</td>
<td>2107</td>
<td>2170</td>
<td>97,1%</td>
<td>2170</td>
<td>833</td>
<td>38,4%</td>
<td>196</td>
<td>9,0%</td>
<td>21</td>
<td>9,7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td></td>
<td>9020</td>
<td>9312</td>
<td>96,9%</td>
<td>9312</td>
<td>2618</td>
<td>28,1%</td>
<td>533</td>
<td>5,7%</td>
<td>51</td>
<td>5,5</td>
</tr>
<tr>
<td><strong>Czech Republic</strong></td>
<td>Colonoscopy</td>
<td>50-59 years</td>
<td>Women</td>
<td>698</td>
<td>727</td>
<td>96,0%</td>
<td>727</td>
<td>124</td>
<td>17,1%</td>
<td>25</td>
<td>3,4%</td>
<td>4</td>
<td>5,5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Men</td>
<td>805</td>
<td>810</td>
<td>99,4%</td>
<td>810</td>
<td>252</td>
<td>31,1%</td>
<td>73</td>
<td>9,0%</td>
<td>6</td>
<td>7,4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60-69 years</td>
<td>Women</td>
<td>1109</td>
<td>1142</td>
<td>97,1%</td>
<td>1142</td>
<td>255</td>
<td>22,3%</td>
<td>69</td>
<td>6,0%</td>
<td>7</td>
<td>6,1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Men</td>
<td>1119</td>
<td>1134</td>
<td>98,7%</td>
<td>1134</td>
<td>420</td>
<td>37,0%</td>
<td>128</td>
<td>11,3%</td>
<td>13</td>
<td>11,5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70-74 years</td>
<td>Women</td>
<td>228</td>
<td>241</td>
<td>94,6%</td>
<td>241</td>
<td>66</td>
<td>27,4%</td>
<td>23</td>
<td>9,5%</td>
<td>4</td>
<td>16,6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Men</td>
<td>236</td>
<td>243</td>
<td>97,1%</td>
<td>243</td>
<td>78</td>
<td>32,1%</td>
<td>28</td>
<td>11,5%</td>
<td>2</td>
<td>8,2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td></td>
<td>4195</td>
<td>4297</td>
<td>97,6%</td>
<td>4297</td>
<td>1195</td>
<td>27,8%</td>
<td>346</td>
<td>8,1%</td>
<td>36</td>
<td>8,4</td>
</tr>
</tbody>
</table>
Second EUSR - Key Recommendations

- Efforts need to be made to ensure consistency and enhanced quality & comparability of data
- Reference standards for quality and process indicators at the EU level should be developed and adopted
- Population-based cancer registries should be strengthened; future reports to reflect detection modes and stage distribution of cancers
- Screening monitoring should be continuous and the updating of the status report should be periodic, at regular intervals
The Cancer Screening in Five Continents (CanScreen5) project of the International Agency for Research on Cancer (IARC) aims to collect information on the characteristics and performance of cancer screening programmes across the globe in a harmonized manner and to disseminate the information for improved programme management and informed policy-making. The core objective of CanScreen5 is to encourage and support countries to collect and use cancer screening data for effective programme evaluation and quality improvement. The CanScreen5 website is a global repository of information on cancer screening programmes.

http://canscreen5.iarc.fr
Contact: canscreen5@iarc.fr
Colorectal cancer screening fact sheet

Colorectal cancer accounts for 10.2% (1.8 millions new cases) of the global cancer incidence and 9.2% (881 000 deaths) of the global cancer mortality (Source: GLOBOCAN 2018). This fact sheet presents the programme, screening status, and the organization of the screening programme according to the most up-to-date information received. The year of data collection may differ across the countries.

### Protocol used

<table>
<thead>
<tr>
<th>Country</th>
<th>Initiation year</th>
<th>Screening test</th>
<th>Target age (years)</th>
<th>Screening interval (years)</th>
<th>Population-based?</th>
<th>Examination coverage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>2003</td>
<td>FIT</td>
<td>49-60</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>2009</td>
<td>FIT</td>
<td>50-74</td>
<td>2</td>
<td>FIT in Flanders:</td>
<td>46.7</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>2008</td>
<td>FIT</td>
<td>50-69</td>
<td>2</td>
<td></td>
<td>5.6</td>
</tr>
<tr>
<td>Croatia</td>
<td>2009</td>
<td>FIT</td>
<td>50-69</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyprus</td>
<td>2008</td>
<td>FIT</td>
<td>50-69</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Czechia</td>
<td>2000</td>
<td>FIT</td>
<td>50-74</td>
<td>2 (55+ FIT)</td>
<td>FIT in Calvados:</td>
<td>33.9</td>
</tr>
<tr>
<td>Denmark</td>
<td>2016</td>
<td>FIT</td>
<td>50-69</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estonia</td>
<td>2014</td>
<td>FIT</td>
<td>50-69</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>2008</td>
<td>gFOBT</td>
<td>50-69</td>
<td>2</td>
<td>gFOBT</td>
<td>16.5</td>
</tr>
<tr>
<td>France</td>
<td>2016</td>
<td>gFOBT</td>
<td>50-74</td>
<td>2</td>
<td>FIT in Calvados:</td>
<td>23.7</td>
</tr>
<tr>
<td>Germany</td>
<td>1974</td>
<td>gFOBT</td>
<td>50-74</td>
<td>1 (50-54 gFOBT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greece</td>
<td>2008</td>
<td>Coloscopy</td>
<td>50-70</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>2008</td>
<td>FIT</td>
<td>50-70</td>
<td>2</td>
<td></td>
<td>26.3</td>
</tr>
<tr>
<td>Ireland</td>
<td>2012</td>
<td>FIT</td>
<td>60-69</td>
<td>2</td>
<td></td>
<td></td>
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<tr>
<td>Italy</td>
<td>1982</td>
<td>FIT</td>
<td>50-69</td>
<td>2</td>
<td></td>
<td>26.3</td>
</tr>
<tr>
<td>Latvia</td>
<td>2009</td>
<td>gFOBT</td>
<td>50-74</td>
<td>1</td>
<td></td>
<td>26.3</td>
</tr>
<tr>
<td>Lithuania</td>
<td>2009</td>
<td>FIT</td>
<td>50-74</td>
<td>2</td>
<td></td>
<td>53.1</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>2016</td>
<td>FIT/Coloscopy</td>
<td>55-74</td>
<td>2</td>
<td></td>
<td>26.5</td>
</tr>
<tr>
<td>Malta</td>
<td>2013</td>
<td>FIT</td>
<td>55-66</td>
<td>2</td>
<td></td>
<td>26.5</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2014</td>
<td>FIT</td>
<td>55-75</td>
<td>2</td>
<td></td>
<td>26.5</td>
</tr>
<tr>
<td>Poland</td>
<td>2012</td>
<td>Coloscopy</td>
<td>55-64</td>
<td>10+</td>
<td></td>
<td>26.5</td>
</tr>
<tr>
<td>Portugal</td>
<td>2009</td>
<td>gFOBT</td>
<td>50-70</td>
<td>2</td>
<td></td>
<td>26.5</td>
</tr>
<tr>
<td>Romania</td>
<td>2009</td>
<td>FIT</td>
<td>60-69</td>
<td>2</td>
<td></td>
<td>26.5</td>
</tr>
<tr>
<td>Slovakia</td>
<td>2012</td>
<td>FIT</td>
<td>50-69</td>
<td>2</td>
<td></td>
<td>26.5</td>
</tr>
<tr>
<td>Slovenia</td>
<td>2009</td>
<td>FIT</td>
<td>50-74</td>
<td>2</td>
<td></td>
<td>47.1</td>
</tr>
<tr>
<td>Spain</td>
<td>2012</td>
<td>FIT</td>
<td>50-69</td>
<td>2</td>
<td></td>
<td>26.5</td>
</tr>
<tr>
<td>Sweden</td>
<td>2008</td>
<td>gFOBT</td>
<td>50-69</td>
<td>2</td>
<td></td>
<td>26.5</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2006</td>
<td>gFOBT/Flexible</td>
<td>60-74</td>
<td>2</td>
<td>gFOBT</td>
<td>42.6</td>
</tr>
</tbody>
</table>

For further details please contact us at cancercare@iarc.fr
Or visit our website: http://cancercare.iarc.fr
All continents, Colorectal Cancer Screening (FIT), Screen positivity rate (%), All reported ages

Continent: All
Focus on: Countries
Cancer sites: Colorectum
Indicator: Screen positivity rate (%)
Protocol: FIT
Sex: Both
Age groups: All reported ages

Countries: Hungary, Ireland, Netherlands, Czechia, Spain, Lithuania, Slovenia, Italy, Malta
Data submission by data providers

Validation by IARC secretariat & Scientific committee

Send back for modifications

Validation by data provider

Data published online

IARC secretariat involved at all steps
Data collection and analysis

Efforts needed to ensure consistency and to enhance quality of collected data
- Standard data collection forms
- Aggregated quantitative data
- Completeness of data

Harmonize data collection, enhancing comparability of data collected from various programs
- Standardized definition of variables
- User’s guide/glossary
Detection rate of advanced adenomas - age 60-69

<table>
<thead>
<tr>
<th>Country</th>
<th>Men</th>
<th>Women</th>
<th>FIT Positivity cut-off (μg Hb/ gr. faeces)</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>1.47</td>
<td>1.00</td>
<td>France 180</td>
</tr>
<tr>
<td>Italy</td>
<td>1.03</td>
<td>0.97</td>
<td>Italy, Spain 20</td>
</tr>
<tr>
<td>Slovenia</td>
<td>1.59</td>
<td>1.24</td>
<td>Slovenia 20 (2 samples)</td>
</tr>
<tr>
<td>Spain</td>
<td>2.26</td>
<td>1.38</td>
<td></td>
</tr>
</tbody>
</table>

Ratio of advanced to low-risk adenomas:

France Calvados Men 29 / 3668
France Calvados Women 20 / 5130
Italy Men 3622 / 336874
Italy Women 2197 / 398270
Slovenia Men 1021 / 37089
Slovenia Women 524 / 47808
Spain Men 1368 / 45205
Spain Women 676 / 55851
Using monitoring information

- Disseminate information
  Learning from other programs

- Assist countries in organising health information system
  Screening registries

- Improve program management and inform policy making
Data availability

21 programs

18 programs

12 programs

7 programs

21 programs

18 programs

12 programs

7 programs

Jane Zapka, Stephen H. Taplin, Rebecca Anhang Price, Caroline Cranos, Robin Yabroff

JNCI Monogr 2010;40;58-71 Modified

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Determining key benchmarks and quality indicators to quantify equity, benefits and harms.

Model development

Capacity building

Implementation of the improved screening programme

Monitoring, collecting data

Road map, solutions for improved screening

Evaluation, estimating the harms and benefits and optimization

Identifying barriers

The project was launched in September 2015 and will continue to August 2020.

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Indicators monitored by the tools

- Invitation/examination coverage
- Participation (first invitation; previous non-attenders; previous attenders)
- Positivity rate
- Compliance with TC referral
- Completion rate of assessment TC
- Detection rates (CRC stage)
- Positive predictive values
- Treatment (endoscopic excision of Advanced adenomas or CRC)
- Complications of TC (with/without findings)

Stratified by screening protocol, age, sex, screening history

Available in CanScreen5 and Eutopia; available in Eutopia only
Open issues

How to monitor opportunistic screening
Interaction with organised programs

Defining relevant indicators to compare performance of different screening protocols
Potential role of modeling in selecting/defining relevant indicators

Different level of implementation and organization of cancer screening in different countries
Type of data
Rules and organisation of data collection
Data validation
The variability in the results of quality indicators highlights the importance of continuous monitoring, as well as the need to promote quality improvement efforts, as recommended in the EU guidelines.

The implementation of screening registries, ensuring availability of data for the entire screening process, represent a priority in screening programs management.
Conclusions

The results of the II EUSR are showing that monitoring of quantitative indicators of screening performance is feasible.

Web tools are available, to support data collection and analysis following established standards, allowing also for data transfer and sharing.
Conclusions

As long as data collection on cancer screening is aimed to support monitoring and evaluation, it could be useful to plan such function as a service for all users and institutions in Europe and abroad.

The necessary infrastructure to support systematic monitoring efforts at the European level, or in other continents/WHO regions, as initiated by IARC, might require a limited amount of resources.
Main collaborating institutions

- International Agency for Research on Cancer, Lyon, France (coordination)
- CPO Piemonte, University Hospital “Città della Salute e della Scienza”, Turin, Italy
- Finnish Cancer Registry, Mass Screening Registry, Helsinki, Finland


Scientific Committee L Altenhofen, R Ancelle-Park, N Ascunce, H de Koning, E Lynge, O Májek, F Nicula, J Patnick, J Regula, S Törnberg, M Zappa

Over 80 Data providers from all 28 EU Member States
Thank you to

Partha Basu
Andre Carvalho
Screening Unit IARC

Nereo Segnan
Antonio Ponti
CPO Piemonte

Mariano Tomatis
Thank you for your attention

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Detection rate of CRC
age 60-69

1.3 %
2.3 %

FIT Positivity cut-off (μg Hb/ gr. faeces)
France 180
Italy, Spain 20
Slovenia 20 (2 samples)
Regional versus national data

Participation

Positivity rate

PPV Advanced adenomas