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towards improved cancer screening
Parameters for monitoring
EU-TOPIA workshop on monitoring
Screening and its predictors

Population
- Background risk
- Awareness

Screening programme
- Test, age range, frequency
- Coverage
- Participation

Cancer care
- Treatment
- Complications
- Follow-up management
- Quality-of-life

Test characteristics
- Sensitivity
- Specificity
- Complications

Detectable disease
- Symptoms
- Diagnosis
- Treatment

Screening test
- Earlier diagnosis and treatment

COSTS
- Less severe consequences
- LYs gained

Gain in QoL
- Towards improved cancer screening
European guidelines for quality assurance in colorectal cancer screening and diagnosis

First Edition

European Commission
## List of recommended data tables to be produced by CRC screening programmes

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Targeted</td>
</tr>
<tr>
<td>2.</td>
<td>Eligible</td>
</tr>
<tr>
<td>3.</td>
<td>Invited</td>
</tr>
<tr>
<td>4.</td>
<td>Screened/tested at first screening and at subsequent screening episodes</td>
</tr>
<tr>
<td>5.</td>
<td>Inadequate tests</td>
</tr>
<tr>
<td>6.</td>
<td>Positive test or screening</td>
</tr>
<tr>
<td>7.</td>
<td>Follow-up colonoscopy examination attended (diagnostic assessment and/or treatment)</td>
</tr>
<tr>
<td>8.</td>
<td>Negative follow-up colonoscopy examination (diagnostic assessment and/or treatment)</td>
</tr>
<tr>
<td>9.</td>
<td>Positive follow-up colonoscopy examination (diagnostic assessment and/or treatment)</td>
</tr>
<tr>
<td>10.</td>
<td>Lesion detected (at least one)</td>
</tr>
<tr>
<td>11.</td>
<td>Adenoma detected (at least one)</td>
</tr>
<tr>
<td>12.</td>
<td>Non-advanced adenoma detected (at least one)</td>
</tr>
<tr>
<td>13.</td>
<td>Advanced/high-risk adenoma detected (at least one)</td>
</tr>
<tr>
<td>14.</td>
<td>Cancer detected by stage</td>
</tr>
</tbody>
</table>
Early performance indicators

1. Coverage by invitation
2. Coverage by examination
3. Uptake (participation) rate
4. Inadequate test rate
5. Positivity rate
6. Referral to follow-up colonoscopy
7. Follow-up colonoscopy compliance rate
8. Follow-up colonoscopy outcome
9. Completion of follow-up colonoscopy
10. Detection rates
11. Stage distribution of screendetected cancers
12. Positive predictive value
13. Complication rates of screening and FU
Screening organisation indicators

1. Interval between test and results
2. Interval between positive test and colonoscopy
3. Interval between positive endoscopy and care
4. Interval between consecutive primary tests
Long-term impact indicators

1. Interval cancers
2. CRC incidence rates
3. Rates of advanced stage disease
4. CRC mortality rates
EU-TOPIA objectives

• To systematically evaluate and quantify the harms and benefits of running programmes for breast, cervical, and colorectal cancer in all European countries, and identify ways to improve health outcomes and equity for citizens.

• To provide national, regional, and local policymakers with expertise and tools to evaluate and quantify their cancer screening programmes.
Panel discussion

• Long-term goal of screening is to reduce cancer incidence and mortality
• Harms missing from current priority list
• Parameters most influential for long-term goal are:
  – Examination coverage
  – Detection rate
  – Interval cancers
  – Stage of diagnosis

• Most important harms include overdiagnosis, complications and false-positive tests
Health policy cycle

I. Determine key indicators & benchmarks

II. Monitor: collect data on indicators

III. Model development

IV. Evaluation: estimate benefits & harms and optimize

V. Identify barriers

VI. Develop roadmaps

Capacity building

Implementation of the road maps
Phases

• Phase 1: steps of the health policy cycle (monitoring, evaluation and barrier analysis) for four exemplary countries: Finland, Slovenia, Italy and the Netherlands.

• Phase 2: organize interactive workshops for delegates from all 28 EU states and 11 associated countries to build capacity to conduct cancer screening evaluation independently.
Step I: Determine key indicators & benchmarks

• Harmonize indicators across cancer sites and prioritize key indicators for screening effectiveness

• Approach:
  – Performe literature review to identify key indicators & benchmarks previously developed
  – Survey for Delphi study to determine 10 most important indicators
  – Deplhi panel and new vote on 10 most important indicators
Outcomes of literature review

- Key indicators mostly in line to those of EU quality assurance guidelines

Table 3A. Program indicators for all screening types. See section 3.3 Program and test indicators for further information.

<table>
<thead>
<tr>
<th>Program indicators</th>
<th>Definition</th>
<th>Calculation</th>
<th>Further specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target age</td>
<td>Age range of persons targeted to screening</td>
<td>starting age (years) and stopping age (years)</td>
<td>By calendar period, if needed</td>
</tr>
<tr>
<td>Screening interval</td>
<td>Time between regular invitations</td>
<td>years or months</td>
<td>Program recommended interval</td>
</tr>
<tr>
<td>Coverage by invitation</td>
<td>Proportion of persons invited at least once in a given time frame</td>
<td>N invited N target population</td>
<td>Coverage: Invited at least once in a given time frame (past one, three, five, and ten years) by age by gender</td>
</tr>
<tr>
<td>Coverage by examination</td>
<td>Proportion of persons examined at least once in a given time frame</td>
<td>N examined N target population</td>
<td>Annually by age by gender by testing setting</td>
</tr>
</tbody>
</table>

EU·TOPIA
Additional indicators identified

• Demography
• Epidemiology
• Test characteristics
• Costs

→ Go to eu-topia.org/downloads for complete list and description of indicators
Outcomes of first Delphi survey

1. Screening attendance
2. Detection rate
3. Cause-specific mortality
4. Interval cancer rate
5. Distribution of cancers by mode of detection
6. Screening coverage
7. Adherence to diagnostic follow-up after positive test
8. Adherence to treatment after diagnosis
9. Cancer incidence
10. Invitation coverage
Panel discussion

• Long-term goal of screening is to reduce cancer incidence and mortality
• Harms missing from current priority list
• Parameters most influential for long-term goal are:
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  – Detection rate
  – Interval cancers
  – Stage of diagnosis

• Most important harms include overdiagnosis, complications and false-positive tests
## Outcomes of second Delphi survey (after panel)

<table>
<thead>
<tr>
<th>Question</th>
<th>Round 2</th>
<th>Round 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval cancer rate</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Detection rate</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Cancer-specific mortality</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Screening coverage</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Screening participation</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Cancer incidence</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Adherence to diagnostic follow-up</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Invitation coverage</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Adherence to treatment</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Mode of detection</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>
Why monitoring is important: signaling

- Outcomes of FIT screening as expected from pilot studies and as observed in national program
Why monitoring is important: trouble shooting

![Graph showing detection rate (%)]

- Detection rate (%) vs. Positivity rate (%)
- Red squares represent Pilot
- Blue diamonds represent Programme
- Towards improved cancer screening

Programme
- Positivity rate (%)
- Detection rate (%)

Pilot
- Positivity rate (%)
- Detection rate (%)

Graph shows a positive correlation between Positivity rate and Detection rate.
Why monitoring is important: improvement

• After change in cut-off programme is now performing as anticipated
Conclusions

• Monitoring is important to determine performance of screening programmes:
  – Long-term goals of screening of reducing cancer incidence and mortality can only be achieved in a well-functioning programme

• Indicators for incidence and mortality reduction in the long-term are essential, but require long follow-up

• In the mean time, most important short-term indicators for programme performance are:
  – Participation / coverage / adherence
  – Detection rate
  – Interval cancers
  – Stage of diagnosis
Thank you

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