Effect of measures for improvement of the colorectal cancer screening in the Czech Republic

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European Colorectal Cancer Days, Brno 2012
Patients aged >50 had 6-10% risk of CRC
Patients aged <50 had risk 2% of CRC

Jellema P, BMJ 2010
**Table:**

<table>
<thead>
<tr>
<th>Country</th>
<th>Five-Year Relative Survival Rate (Male)</th>
<th>Five-Year Relative Survival Rate (Female)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan (1999-2004)</td>
<td>62.0</td>
<td>66.0</td>
</tr>
<tr>
<td>Iceland (2003-2008)</td>
<td>57.0</td>
<td>62.2</td>
</tr>
<tr>
<td>United States (2000-2005)</td>
<td>55.9</td>
<td>65.1</td>
</tr>
<tr>
<td>Finland (2002-2007)</td>
<td>57.0</td>
<td>62.2</td>
</tr>
<tr>
<td>New Zealand (2002-2007)</td>
<td>59.6</td>
<td>62.3</td>
</tr>
<tr>
<td>Canada (2000-2005)</td>
<td>59.6</td>
<td>62.3</td>
</tr>
<tr>
<td>Sweden (2003-2008)</td>
<td>57.9</td>
<td>64.5</td>
</tr>
<tr>
<td>Korea (2001-2006)</td>
<td>59.1</td>
<td>65.2</td>
</tr>
<tr>
<td>Netherlands (2001-2006)</td>
<td>58.4</td>
<td>58.4</td>
</tr>
<tr>
<td>Norway (2001-2006)</td>
<td>56.9</td>
<td>59.0</td>
</tr>
<tr>
<td>OECD</td>
<td>56.3</td>
<td>57.9</td>
</tr>
<tr>
<td>France (1997-2002)</td>
<td>56.6</td>
<td>58.5</td>
</tr>
<tr>
<td>Denmark (2002-2007)</td>
<td>54.2</td>
<td>54.8</td>
</tr>
<tr>
<td>Ireland (2001-2006)</td>
<td>50.7</td>
<td>51.5</td>
</tr>
<tr>
<td>United Kingdom (2001-2006)</td>
<td>50.1</td>
<td>51.5</td>
</tr>
<tr>
<td>Czech Republic (2001-2006)</td>
<td>45.6</td>
<td>48.5</td>
</tr>
<tr>
<td>Poland (2002-2007)</td>
<td>39.3</td>
<td>34.7</td>
</tr>
</tbody>
</table>

**Sources:** OECD Health Care Quality Indicators Data 2009 (age standardised to the International Cancer Survival Standards population and 95% confidence intervals)
Czech colorectal cancer screening program

Since 2000

- two step program:
  - **gFOBT** performed by GPs
  - **colonoscopy** if FOBT positive

Target population:

- asymptomatic population age 50 + older

2009: Critical review of the program = suboptimal outcomes
Czech CRC screening program, 2009….2012

Since 2009: **NEW DESIGN**

- **50-54 years** .................gFOBT or **iFOBT annualy** (GP + **GYN**)

- **since age 55** .................FOBT biennaly (GP+GYN)

or option:  ...**primary screening colonoscopy** (10 years period)
Effects of measures for improvement

**Methods: data collection and use**

- Data registered by providers
- Data collected by sick funds
- Data centralized by National Reference Center
- Data processed and analysed by Institute for Biostatistics and Analysis
- Data used, assessed and presented by providers
Effects of measures for improvement

Methods: data collection and use

- Number of FOBT performed by GPs and by gynaecologists
- FOBT positivity rate
- Number of primary screening colonoscopies performed
- Regional differences in screening uptake
- Regional differences in FOBT positivity rate
- Data collected by gastroenterologists
Effects of measures for improvement

Results
CRC screening 2000-2010

Number of persons examined with FOBT in years

Source: NRC
FOBT performance 2010

Number of FOBT

- FOBT + and -
- 81561 FOBT lab based
- 81733 FOBT lab based / + analyzators

2010, Source of data: NRC
## Coverage of target population by FOBT

<table>
<thead>
<tr>
<th>Age group</th>
<th>Number of FOBT performed</th>
<th>Screening interval</th>
<th>Number of persons</th>
<th>Target population 2010</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2009</td>
<td>2010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-54</td>
<td>73 203</td>
<td>92 331</td>
<td>1 rok</td>
<td>92 331</td>
<td>672 545</td>
</tr>
<tr>
<td>55-59</td>
<td>86 020</td>
<td>108 334</td>
<td></td>
<td>194 354</td>
<td>754 341</td>
</tr>
<tr>
<td>60-64</td>
<td>87 353</td>
<td>113 353</td>
<td></td>
<td>200 706</td>
<td>743 870</td>
</tr>
<tr>
<td>65-69</td>
<td>67 746</td>
<td>84 252</td>
<td></td>
<td>151 998</td>
<td>552 120</td>
</tr>
<tr>
<td>70-74</td>
<td>42 761</td>
<td>55 341</td>
<td>2 roky</td>
<td>98 102</td>
<td>383 827</td>
</tr>
<tr>
<td>75-79</td>
<td>31 722</td>
<td>37 384</td>
<td></td>
<td>69 106</td>
<td>313 367</td>
</tr>
<tr>
<td>80-84</td>
<td>17 573</td>
<td>20 895</td>
<td></td>
<td>38 468</td>
<td>231 966</td>
</tr>
<tr>
<td>85+</td>
<td>7 922</td>
<td>9 539</td>
<td></td>
<td>17 461</td>
<td>154 546</td>
</tr>
<tr>
<td>Total</td>
<td>414 300</td>
<td>521 429</td>
<td></td>
<td>862 526</td>
<td>3 806 582</td>
</tr>
</tbody>
</table>
The difference between men and women is increasing.
In 2010 the coverage in men was 20.9% while in women 24.1%.
# Total coverage
(Primary screening colonoscopy + FOBT)

<table>
<thead>
<tr>
<th>Age group</th>
<th>FOBT</th>
<th>PSC 2009</th>
<th>PSC 2010</th>
<th>PSC total</th>
<th>Total PSC + FOBT</th>
<th>Target population 2010</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-54</td>
<td>92 331</td>
<td>63</td>
<td>238</td>
<td></td>
<td>92 331</td>
<td>672 545</td>
<td>13,7%</td>
</tr>
<tr>
<td>55-59</td>
<td>194 354</td>
<td>311</td>
<td>1 274</td>
<td>1 585</td>
<td>195 939</td>
<td>754 341</td>
<td>26,0%</td>
</tr>
<tr>
<td>60-64</td>
<td>200 706</td>
<td>294</td>
<td>1 188</td>
<td>1 482</td>
<td>202 188</td>
<td>743 870</td>
<td>27,2%</td>
</tr>
<tr>
<td>65-69</td>
<td>151 998</td>
<td>160</td>
<td>717</td>
<td>877</td>
<td>152 875</td>
<td>552 120</td>
<td>27,7%</td>
</tr>
<tr>
<td>70-74</td>
<td>98 102</td>
<td>71</td>
<td>303</td>
<td>374</td>
<td>98 476</td>
<td>383 827</td>
<td>25,7%</td>
</tr>
<tr>
<td>75-79</td>
<td>69 106</td>
<td>43</td>
<td>126</td>
<td>169</td>
<td>69 275</td>
<td>313 367</td>
<td>22,1%</td>
</tr>
<tr>
<td>80-84</td>
<td>38 468</td>
<td>3</td>
<td>36</td>
<td>39</td>
<td>38 507</td>
<td>231 966</td>
<td>16,6%</td>
</tr>
<tr>
<td>85+</td>
<td>17 461</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>17 467</td>
<td>154 546</td>
<td>11,3%</td>
</tr>
<tr>
<td>Total</td>
<td>862 526</td>
<td>946</td>
<td>3 887</td>
<td>4 532</td>
<td>867 058</td>
<td>3 806 582</td>
<td>22,8%</td>
</tr>
</tbody>
</table>
Primary screening colonoscopy

10.2 PSC / 10 000 persons in 2010 = 0.7% of all primary tests

Colorectal Cancer Screening
Regional variations in FOBT coverage

Coverage: 22.7% (Variability in regions 16.1-29.3%)
District variability in FOBT coverage

Coverage: 22.7% (Variability in districts 13.1-32.6%)
FOBT positivity in regions

Total positivity (2010): 6.1% (variability in regions: 5.0-7.7%)
FOBT positivity in districts

Total positivity 6.1% (in districts 3.7-12.1%)
FOBT positivity increase

**g-FOBT:** 3.9%
Gynaecologists in screening since 2009

FOBT positives and negatives

2009
n = 411 266 FOBTs

2010
N = 519 715 FOBTs

Women 57.5% of all persons examined

96.4%

3.6%

Women 59.1% of all persons examined

91.7%

8.3%

General practitioner

Gynaecologist (incl. 2009)
Gynaecologists in screening since 2009

WOMEN IN SCREENING

2009
N = 236,663 FOBTs

2010
N = 306,928 FOBTs

93.8% GP

6.2% Gynaecologist

85.9% GP

14.1% Gynaecologist
Coverage of women population

Total coverage of women (2009-2010): 24.0%
Coverage by GP 21.5%, by gynaecologist 2.5%

FOBT positivity rate: gynaecologists 8.6% v. 5.1% GPs
Key results

• In general measures adopted in 2009 in Czech CRC screening program increased in 48% the uptake of target population compare to situation in 2008.

• Adoption of annual FOBT testing in age period 50-55 had positive impact on CRC screening.

• Introduction of iFOBT significantly improved the adherence of population and PC physicians.

• Gynaecologists contributed significantly to higher uptake for CRC screening in women age 50-65 (14%).

• Introduction of primary screening colonoscopy had a marginal effect on CRC screening uptake (0.7%).
Discussion:
Critical issues in Czech CRC screening

- Variability in FOBTs used /cut off
- Adherence of targeted population
- Quality/capacity of colonoscopy
- Marketing of program
- Personalised Invitation System
### 2012: FOBTs in use in the CR

<table>
<thead>
<tr>
<th>FOBT</th>
<th>EBM</th>
<th>Adherence</th>
<th>POCT</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Auto reading</th>
<th>Cut off</th>
<th>Expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>g- FOBT</td>
<td>3 RT</td>
<td>+/-</td>
<td>YES</td>
<td>19-50%</td>
<td>&gt; 90%</td>
<td>NO</td>
<td>NO</td>
<td>1 EUR + GP fee</td>
</tr>
<tr>
<td>Immuno FOBT Qualitative</td>
<td>+++</td>
<td>YES</td>
<td>&gt; gFOBT</td>
<td>NO</td>
<td>NO</td>
<td>1 EUR + GP fee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immuno FOBT Quantitative</td>
<td>+++</td>
<td>YES</td>
<td>&gt; gFOBT</td>
<td>YES</td>
<td>YES</td>
<td>3 EUR + GP fee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immuno FOBT Quantitative</td>
<td>1 RT</td>
<td>?</td>
<td>NO</td>
<td>&gt; gFOBT</td>
<td>YES</td>
<td>YES</td>
<td>1-3 EUR + logistics + GP fee</td>
<td></td>
</tr>
</tbody>
</table>

**Sensitivity** = the proportion of actual positives which are correctly identified as such by test (depends on number of samples, frequency of tests, cut off).

**Specificity** = the proportion of negatives which are correctly identified by test as negative.

**Cut Off** = a threshold value for a quantity (from which the result is positive).
Evidence in favour of the substitution of gFOBT by iFOBT is increasing, the gain being more important for high-risk adenomas than for cancers.

- Easier sampling and analysis
- No lifestyle restrictions
- iFOBT: higher sensitivity and equivalent specificity
- The automated reading technology in iFOBT allows choosing the positivity rate associated with an ideal balance between sensitivity and specificity.

The Czech Society of GP recommends to terminate the use of gFOBT before the end of 2012.
Optimal FOBT

- Without diet restriction
- Simple (user friendly) quantitative sampling
- Easy logistics (POCT?)
- Automatic reading

**Cut off** options with regards to
- national standardization
- optimal sensitivity and specificity
- safety, capacity and cost/benefit
- risk groups (men, seniors, diabetics)

➢ Quantitative iFOB tests
**FOBT: Cut off optimalization**

<table>
<thead>
<tr>
<th>CUT OFF</th>
<th>Number of colonoscopies</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>high</td>
<td>↓</td>
<td>↓</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>low</td>
<td>↑</td>
<td>↑</td>
<td>↓</td>
<td>↓</td>
</tr>
</tbody>
</table>

- Chen, 2007: 100 – 150ng/ml faecal hemoglobin
- Rossum, 2009: 75 ng/ml for the Netherland
  200ng/ml where CS capacity is insuff.

- Suggested cut off 75ng/ml would mean FOBT positivity rate 12-16% compare to 4% with gFOBT resp. current 6% with iFOBT.

- The *waiting time for colonoscopy* is increasing…. (safety, capacity, costs)

*European guidelines for quality assurance in colorectal cancer screening and diagnosis - First edition, 2009*
Population based v. organized screening

- Programs using invitation system show higher adherence of target population
- Central invitation is the only way how to get participation over 50%.
- Invitation via GP offices increases the adherence rate in 8% (UK)
FOBT: test distribution

- in practices (GPs, gyneacologists)

- central invitation with direct mailing the sample devices

CZECH PROGRAM: letters administered by sick funds (different for all three programs) will invite people to GPs (gynaecologists, mamma centrum) since 2013.
Thank you for your attention

www.wonca2013.com