EE600

Optimising colorectal cancer screening in the Czech Republic: Cost-effectiveness of lowering the starting age to 45 and introducing an upper limit

NATIONAL SCREENING CENTRE

Ondřej **Ngo**[a,b], Kateřina **Hejcmanová**[a,b], Štěpán **Suchánek**[c], Renata **Chloupková**[a,b], Ladislav **Dušek**[a,b], Miroslav **Zavoral**[c], Bohumil **Seifert**[d], Karel **Hejduk**[a,b], Ondřej **Májek**[a,b]

[a]Institute of Biostatistics and Analyses, Faculty of Medicine, Masaryk University, Brno, Czech Republic;
[b]National Screening Centre, Institute of Health Information and Statistics of the Czech Republic, Prague 2, Czech Republic;
[c]Military University Hospital, 1st Faculty of Medicine, Charles University, Prague, Czech Republic;
[d]Institute of General Practice, 1st Faculty of Medicine, Charles University, Prague, Czech Republic;

Ondrej.Ngo@uzis.cz

Objectives

- Colorectal cancer (CRC) is one of the leading causes of cancer-related deaths in the Czech Republic
- CRC screening programme was initiated in 2000 in the Czech Republic.
- Programme with personal invitations was set up in 2014.
- People aged over 50 years can choose between a quantitative faecal immunochemical test (FIT) biennially or a colonoscopy every 10 years.
- The study aimed to assess the **cost-effectiveness of CRC screening strategies** in the Czech Republic, focusing on **lowering the starting age to 45 years and introducing an upper age limit.**

Materials and Methods

Data sources for statistical analysis

- **Patient-level data from National registries of the Czech National Health Information System** (Czech National Cancer Registry, National Registry of Reimbursed Health Services) were used for data analysis.

Strategies considered in the cost-effectiveness assessment

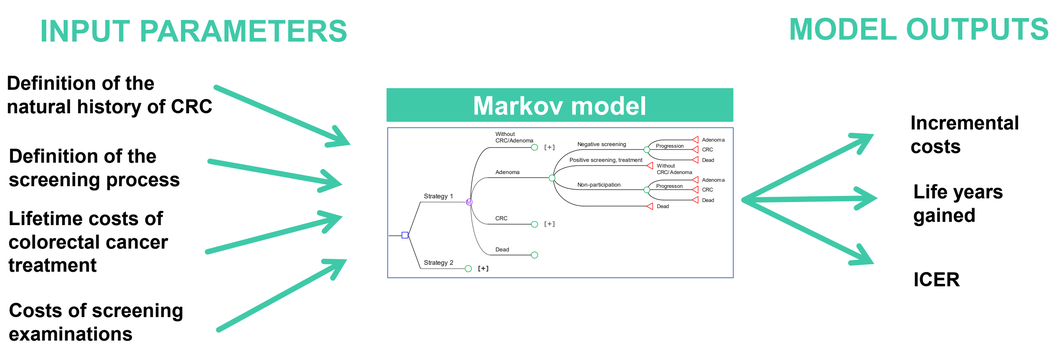
- A **Markov model** was developed from the healthcare payer perspective to compare strategies (focusing on the FIT test, which is predominantly used in the target population), with attention to the starting age of 45 and an upper limit of 74 years:
  - Model of the natural history of CRC (**no screening**),
  - **FIT every 2 years from age 50 to 84 years,**
  - **FIT every 2 years from age 50 to 74 years,**
  - **FIT every 2 years from age 45 to 74 years.**

Estimating the lifetime costs of colorectal cancer treatment

- Average annual costs of treatment (according to phases of the disease – initial, continuous, terminal) were estimated by comparing the cost of all health care for cases and controls (persons without CRC).
- Using the overall survival of patients with CRC, the lifetime cost of cancer treatment was estimated (with an annual discount factor of 3%).

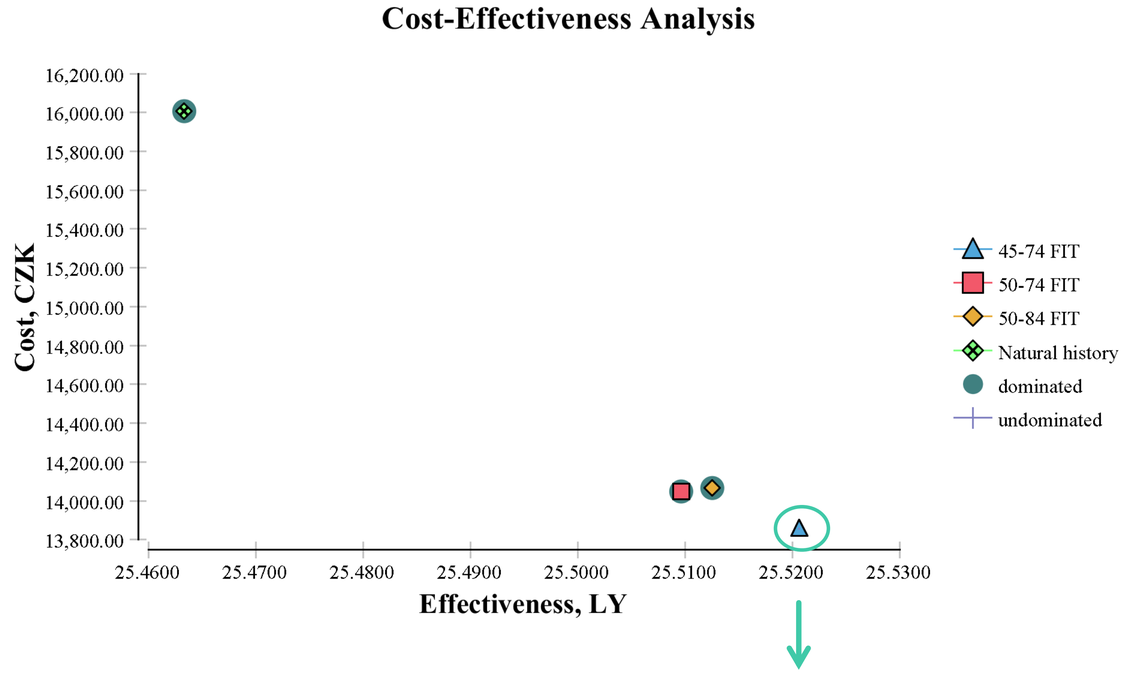
Markov model

- Based on national data and the literature, the natural history of the disease was modelled.
- In addition to the lifetime costs of CRC treatment, the model incorporated costs associated with screening examinations and follow-up care.
- According to national data, colonoscopy compliance was estimated at 60%, while the participation rate in screening was assumed to be 45%.
- Parameters related to the accuracy of screening modalities were derived from the literature.



Results

- All **CRC screening strategies were cost-effective compared to no screening**, with increased screening costs offset by reductions in treatment expenses.



The biennial FIT strategy for individuals aged 45–74 was found to be the most effective and least costly compared to others.

- Offering biennial FIT screening to individuals aged 50–74 and 45–74 years reduced average costs per person by over 75 EUR and 85 EUR, respectively.
- The corresponding life-years gained per person were approximately 0.05 (biennial FIT 50–74 years) and 0.06 (biennial FIT 45–74 years). Among the compared strategies, **initiating screening at age 45 was the most cost-effective and cost-saving option**, providing meaningful health benefits while remaining economically sustainable.

Strategy (compared to no screening)	Incremental costs (per person)	Life years gained (per person)	Cost per year of life (ICER)
Biennial FIT 45–74	**-86.0 EUR**	**0.057**	**Strategy dominates (more effective, lower costs)**
Biennial FIT 50–74	**-78.4 EUR**	**0.046**	**Strategy dominates (more effective, lower costs)**
Biennial FIT 50–84	**-77.6 EUR**	**0.049**	**Strategy dominates (more effective, lower costs)**

Conclusion

- CRC screening in the Czech Republic is **cost-effective.**
- The findings support lowering the **starting age to 45 years and upper limit 74 years**, aligning with international trends and providing adjustments to national screening policies.

Thanks to the numerous collaborators and stakeholders, including general practitioners, gastroenterologists, for their invaluable contributions.