Monitoring of equity in access to CRC screening and CRC care: two sides of the same coin

Ondřej MÁJEK

Institute of Biostatistics and Analyses, Masaryk University

screening kolorektálního karcinomu

Institute of Biostatistics and Analyses, Masaryk University, Brno

Introduction

- Cancer screening programmes are effective in reducing cancer burden
- Continuous monitoring should be included to ensure high-quality cancer screening (benefits > harms)
- How should we set the health services?
  - understand the cancer burden
  - promote equity (population-based approach)
  - optimise the human, physical, technical and financial resources (already available & build capacity)
  - treatment services must be available

Albreht et al.: European Guide for National Quality Control Programmes

Sources of data for colorectal cancer screening information support

MONITORING OF CANCER BURDEN

- Epidemiology of cancer in target population
- Long-term impact indicators

Source of data: CZECH NATIONAL CANCER REGISTRY

MONITORING OF SCREENING PROCESS USING CLINICAL DATA

- Early performance indicators at screening centres
- Detection of cancer and precancerous lesions in screening

Source of data: SCREENING CENTRES

MONITORING OF SCREENING PROCESS USING ADMINISTRATIVE DATA

- Population-based early performance indicators
- Monitoring of programmes accessibility by target population

Source of data: HEALTH INSURANCE COMPANIES – NATIONAL REFERENCE CENTRE

Information Support Provider
MASARYK UNIVERSITY, INSTITUTE OF BIOSTATISTICS AND ANALYSES

Understanding the cancer burden

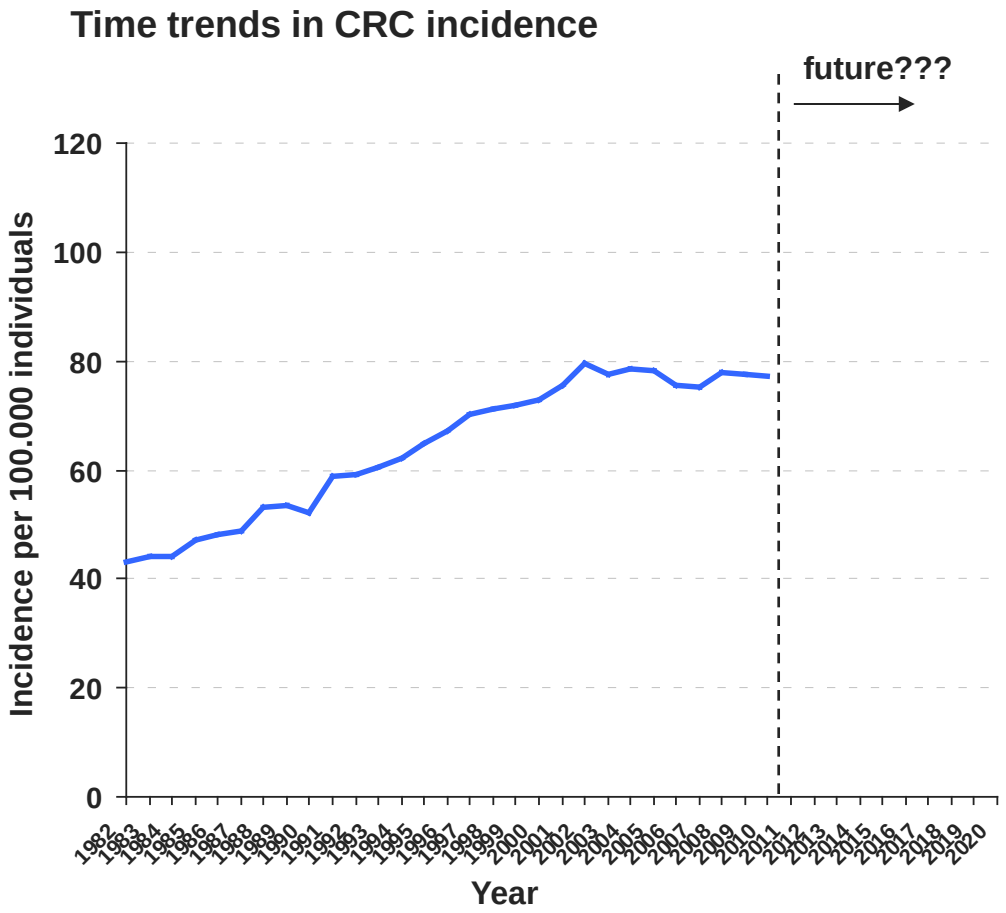
(to population and healthcare system)

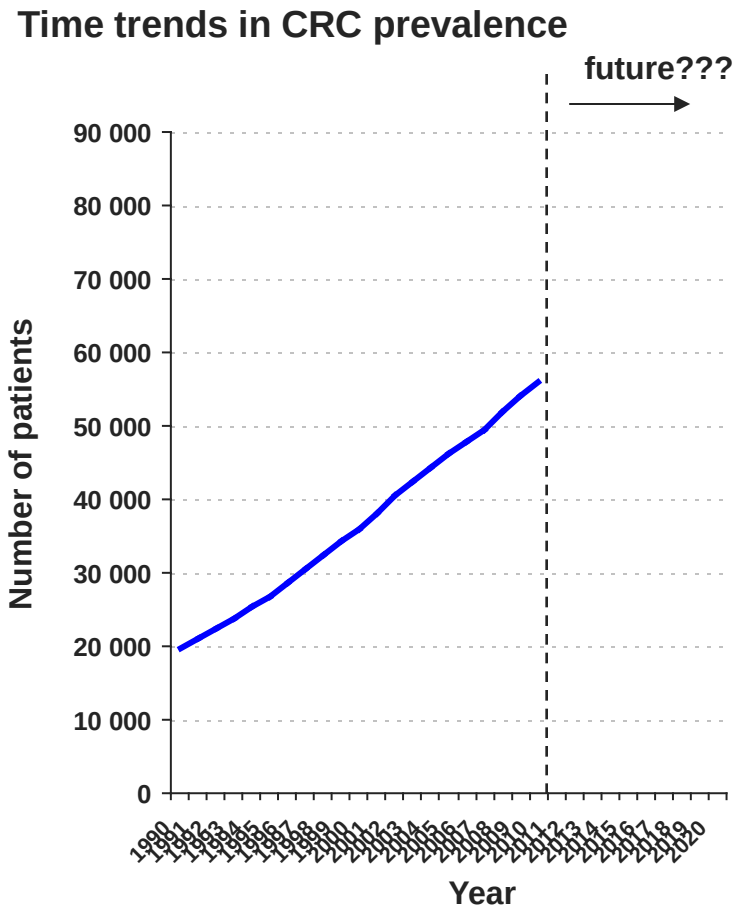
screening
kolorektálního
karcinomu

IBA

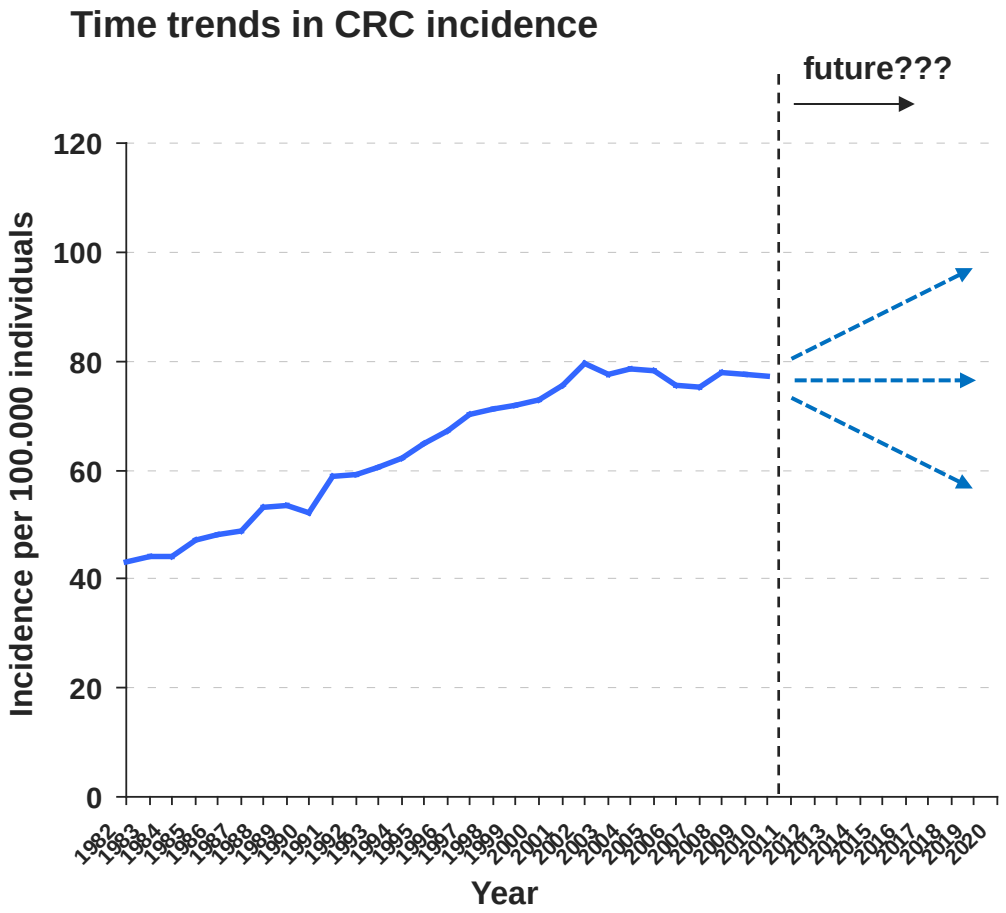
UNIVERSITAS MASARYKIANA BRUNENSIS

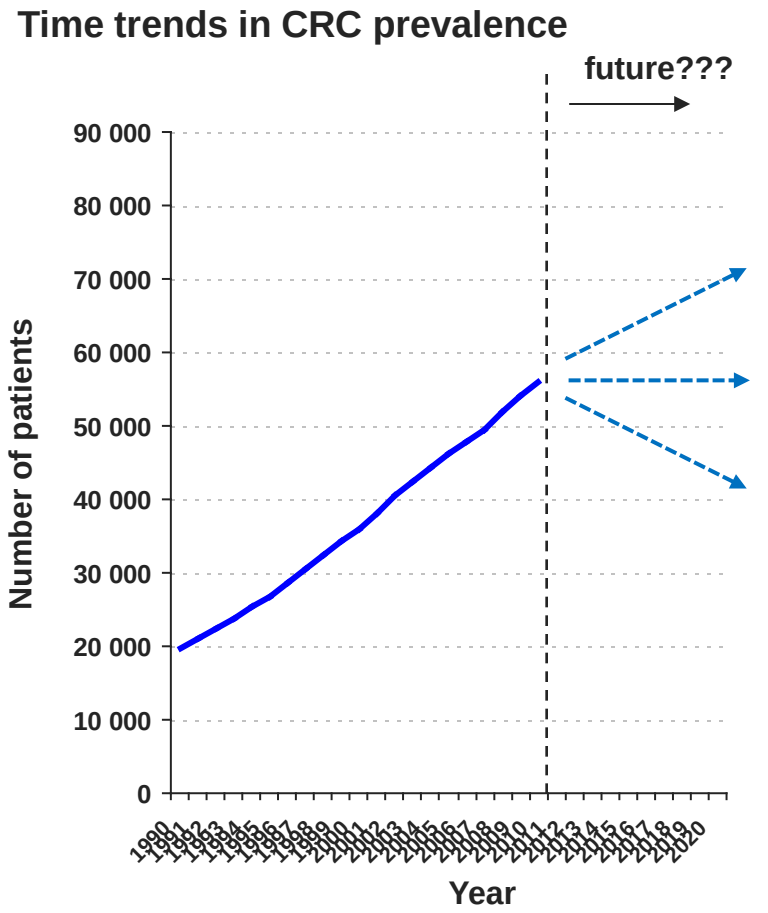
Future prediction of CRC incidence and mortality



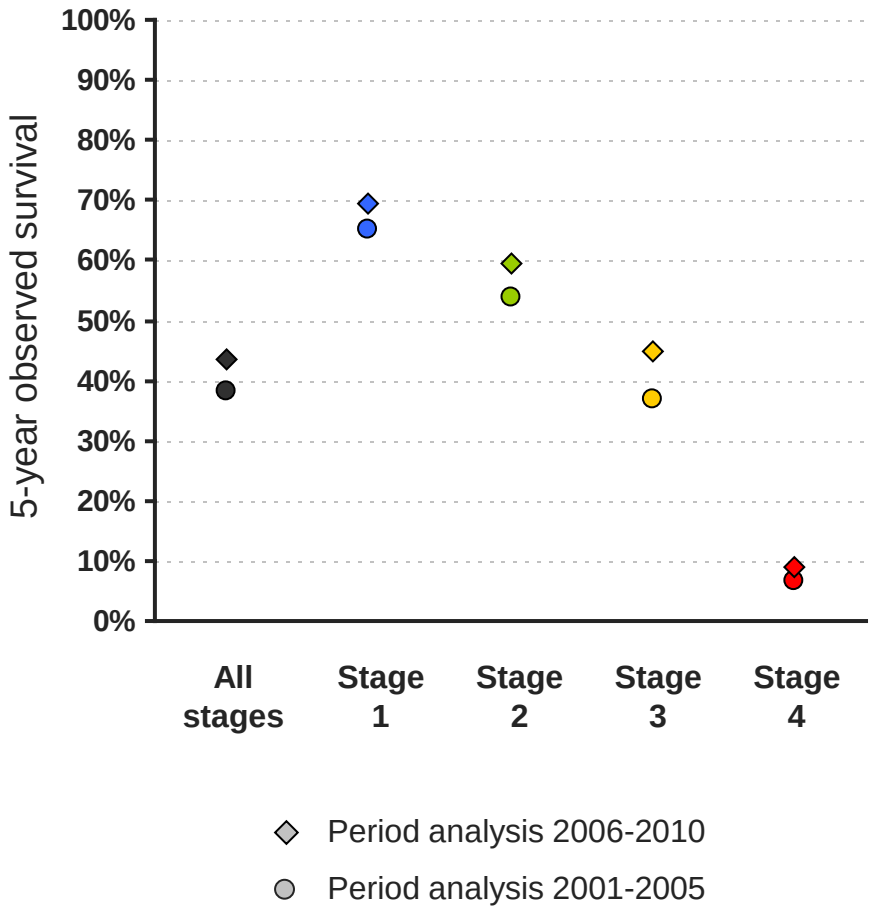


Future prediction of CRC incidence and mortality





Time trend in 5-year observed survival of CRC patients



Colorectal cancer	5-year observed survival (95% confidence interval) period analysis	
	2001-2005	2006-2010
All patients	38.1 (37.7-38.5)	43.4 (43.0-43.8)
Stage 1	65.2 (64.1-66.2)	69.5 (68.6-70.4)
Stage 2	53.9 (53.0-54.7)	59.4 (58.5-60.2)
Stage 3	36.8 (35.8-37.8)	44.7 (43.8-45.6)
Stage 4	6.7 (6.3-7.2)	9.1 (8.6-9.6)

Source: Czech National Cancer Registry

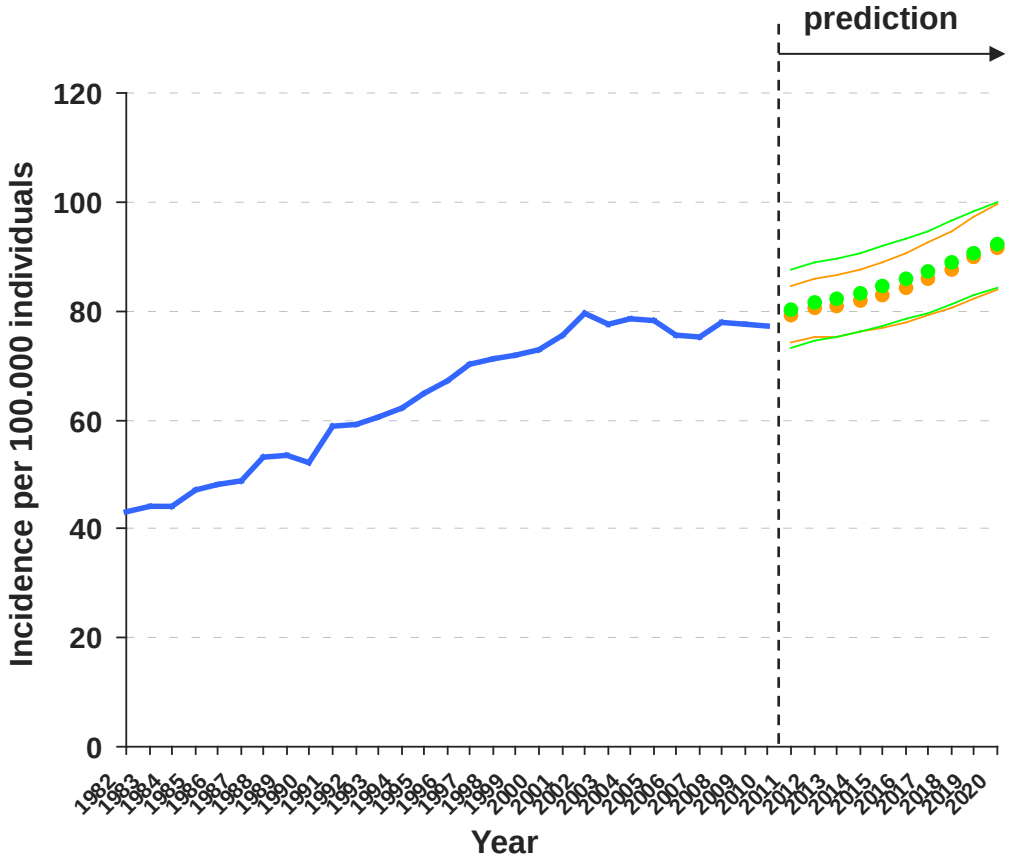
Different scenarios in predictive modelling

- Predictive modelling allows to consider different scenarios of future development of population characteristics → this leads to diverse predictions of incidence, prevalence and number of potentially treated patients

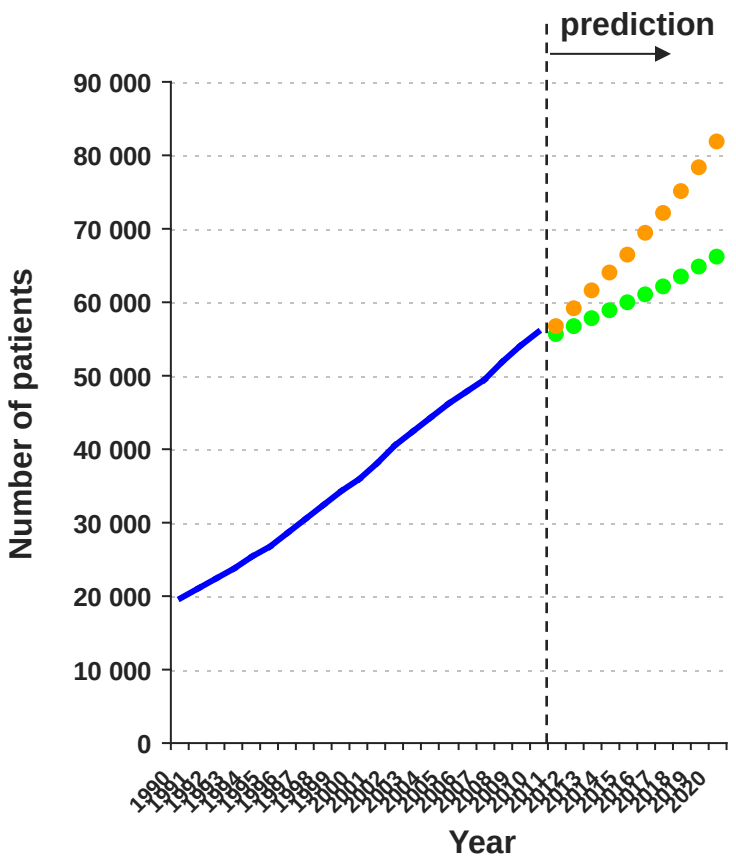
Cancer incidence (period 2011-2020)	**Survival of cancer patients (period 2011-2020)**	
	Survival in 2011-2020 unchanged from values observed in 2010	**Assumed improvement in survival**
Incidence rate extrapolated based on data from 2001-2010	Scenario 1	Scenario 2
Assumed stable incidence (based on years 2006-2010)	Scenario 3	Scenario 4

Future prediction of CRC incidence and mortality

Time trends in CRC incidence



Time trends in CRC prevalence



CRC incidence and prevalence predictions

C18-C20	Incidence – year 2015		Incidence – year 2020	
Stage	**n**	**90% CI**	**n**	**90% CI**
1	2166	2017 - 2316	2609	2398 - 2819
2	1930	1823 - 2037	1971	1829 - 2114
3	2341	2209 - 2473	2802	2611 - 2993
4	2151	2002 - 2301	2362	2145 - 2579
Unknown	292	185 - 400	177	91 - 263
Total	**8880**	**8236 - 9527**	**9921**	**9074 - 10 768**

C18-C20	Prevalence – year 2015		Prevalence – year 2020	
Stage	**n**	**90% CI**	**n**	**90% CI**
1	21 387	21 146 - 21 628	27 242	26 971 - 27 513
2	18 936	18 710 - 19 162	21 336	21 096 - 21 576
3	15 476	15 271 - 15 681	21 295	21 055 - 21 535
4	8329	8179 - 8479	9840	9677 - 10 003
Unknown	2484	2402 - 2566	2157	2081 - 2233
Total	**66 612**	**66 187 - 67 037**	**81 870**	**81 399 - 82 341**

What about number of patients to be treated?

Number of patients treated with CRC - predictions

C18-C20 Year 2015	Newly diagnosed cancer patients	Recurrences from previous years	Disseminated recurrences from previous years
Stage1	1915 (1783 - 2047)	798 (752 - 844)	
Stage 2	1803 (1703 - 1903)	1015 (963 - 1067)	
Stage 3	2196 (2072 - 2320)	1339 (1279 - 1399)	
Stage 4	1444 (1344 - 1544)	661 (619 - 703)	1779 (1710 - 1848)
Stage unknown	68 (43 - 94)	22 (14 - 30)	
Total	**7426 (6945 - 7908)**	**3835 (3733 - 3937)** **13 040 (12 852 - 13 228)**	**1779 (1710 - 1848)**

C18-C20 Year 2020	Newly diagnosed cancer patients	Recurrences from previous years	Disseminated recurrences from previous years
Stage1	2306 (2120 - 2492)	997 (945 - 1049)	
Stage 2	1841 (1709 - 1975)	1058 (1004 - 1112)	
Stage 3	2628 (2449 - 2808)	1729 (1661 - 1797)	
Stage 4	1585 (1440 - 1731)	815 (768 - 862)	1797 (1727 - 1867)
Stage unknown	41 (21 - 61)	16 (9 - 23)	
Total	**8401 (7739 - 9067)**	**4615 (4503 - 4727)** **14 813 (14 613 - 15 013)**	**1797 (1727 - 1867)**

Monitoring of cancer screening: equitable coverage and quality

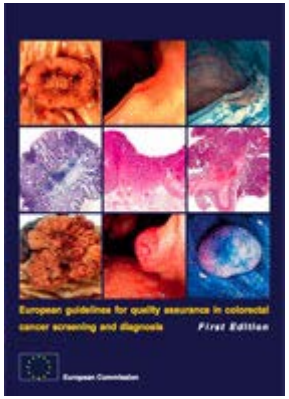
screening kolorektálního karcinomu

IBA

UNIVERSITAS MASARYKIANA BRUNENSIS

Early performance indicators

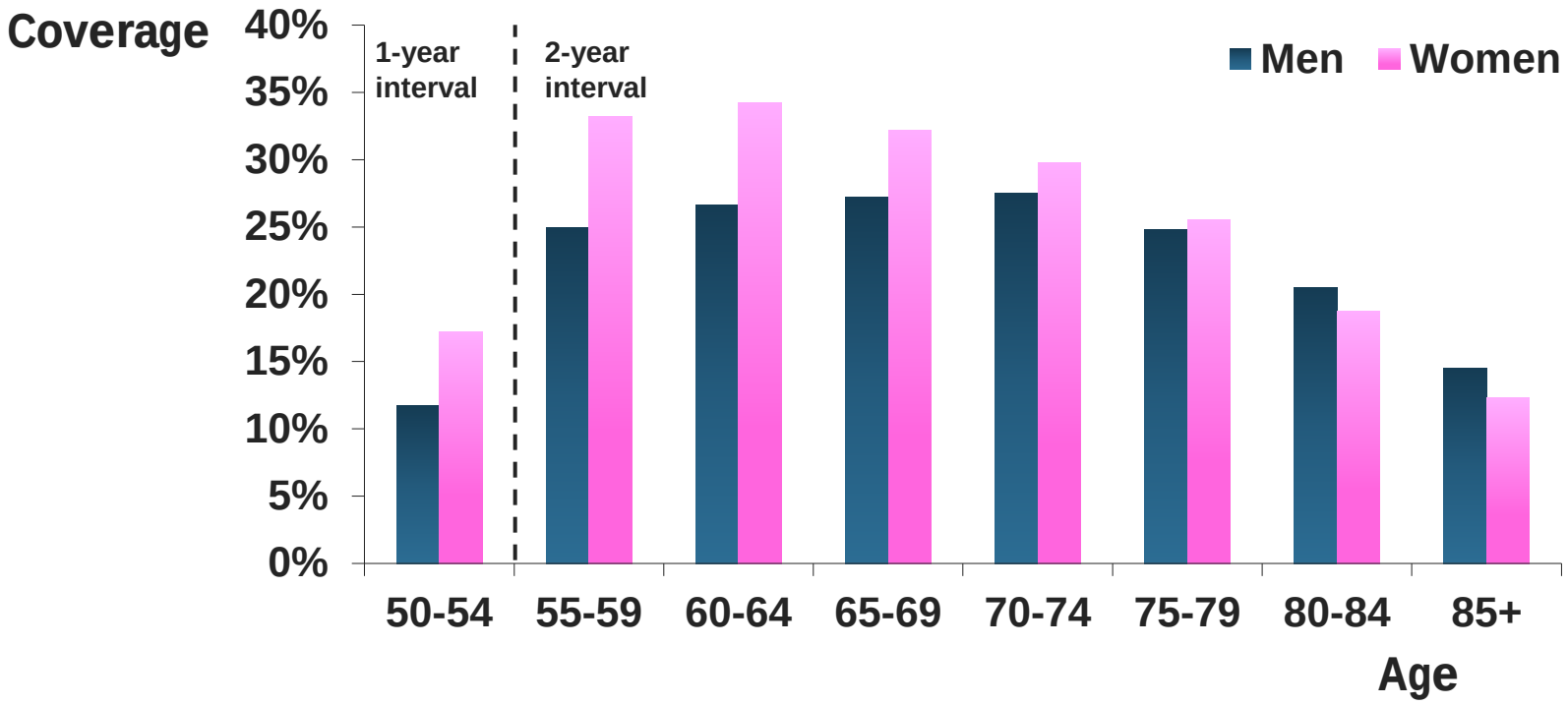
- **Programme coverage and uptake**
  - **Coverage by invitation**
    Recommendation: 95%
  - **Coverage by examination**
  - **Uptake (participation) rate**
    Recommendation : 45% / 65%



Source: European Guidelines Chapter 3

Coverage by FOBT screening by age

2011-2012, N = 986 111 examinations, source of data: NRC



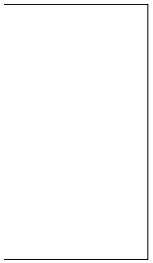
Total coverage of Czech population (2011-2012): 25.5%

Coverage by FOBT screening by district

2011-2012, N = 986 111 examinations, source of data: NRC

Ind

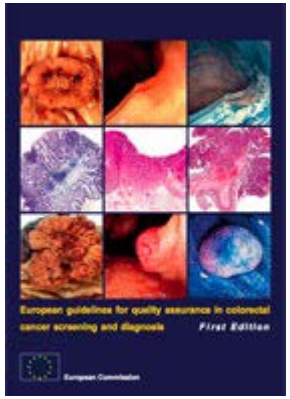
rage in
ents



Total coverage (2011-2012): 25.5 % (range in districts: 16.0-38.9 %)

Early performance indicators

- **Outcomes with colonoscopy (CS) as primary screening test**
  - **Inadequate CS rates**
  - **Complete CS rate**
  - **Positive CS rate**
  - **Detection rates of CS screening programmes**
  - **Referral to follow-up colonoscopy after CS**
  - **Follow-up colonoscopy compliance rate after screening CS**
  - **Completion of follow-up colonoscopy after CS**
  - **Endoscopic complications of CS screening programmes**
    Recommendation : monitor the rate carefully



Source: European Guidelines

Early performance indicators

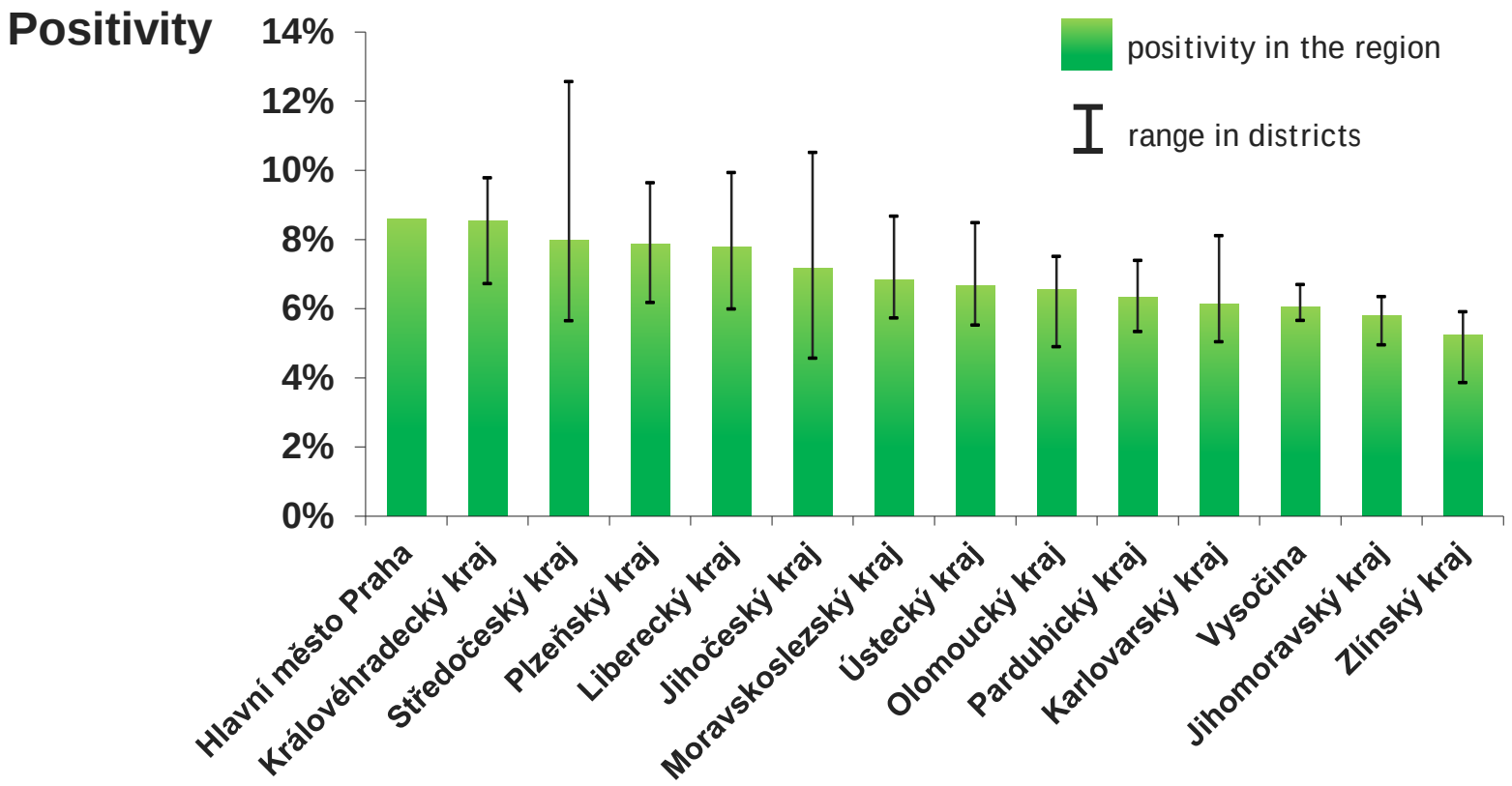
- **Outcomes with FOBT for primary screening**
  - **Inadequate FOBT rate**
  - **Positive FOBT rate**
  - **Referral to follow-up colonoscopy after FOBT**
  - **Follow-up colonoscopy compliance rate**
  - **Completion of follow-up colonoscopy after FOBT**
    Recommendation : 90% / 95%
  - **Detection rates of FOBT screening programme**
  - **Stage of screen-detected cancers**
    Recommendation : favourable compared to clinically diagnosed
  - **Positive predictive values for FOBT screening programmes**
  - **Endoscopic complications in FOBT screening programme**
    Recommendation : monitor the rate carefully

Source: European Guidelines

FOBT positivity in regions

2012, N = 551 883 examinations, source of data: NRC

Individuals aged over 50

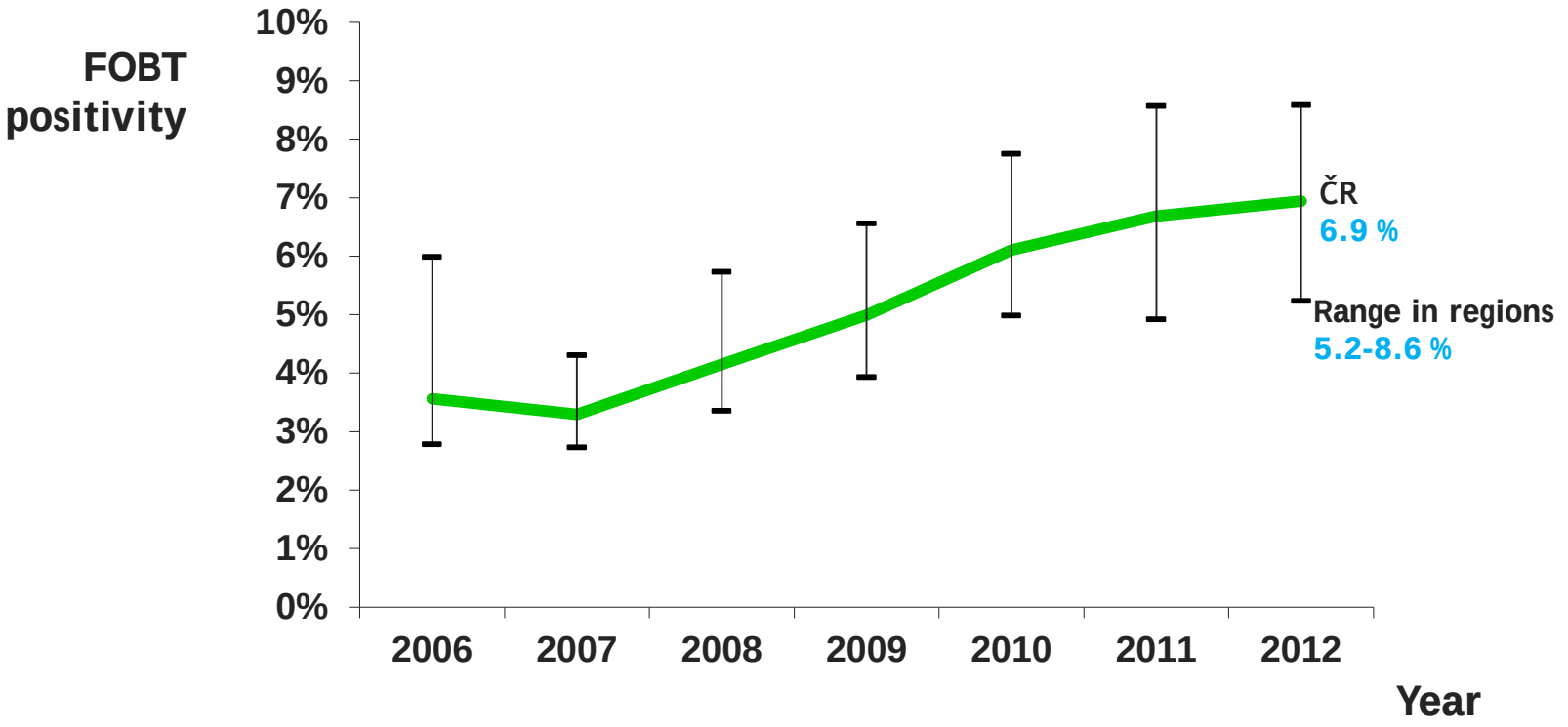


Total positivity (2012): 6.9 % (range in regions: 5.2-8.6 %)

Time trends in FOBT positivity

Source of data: NRC

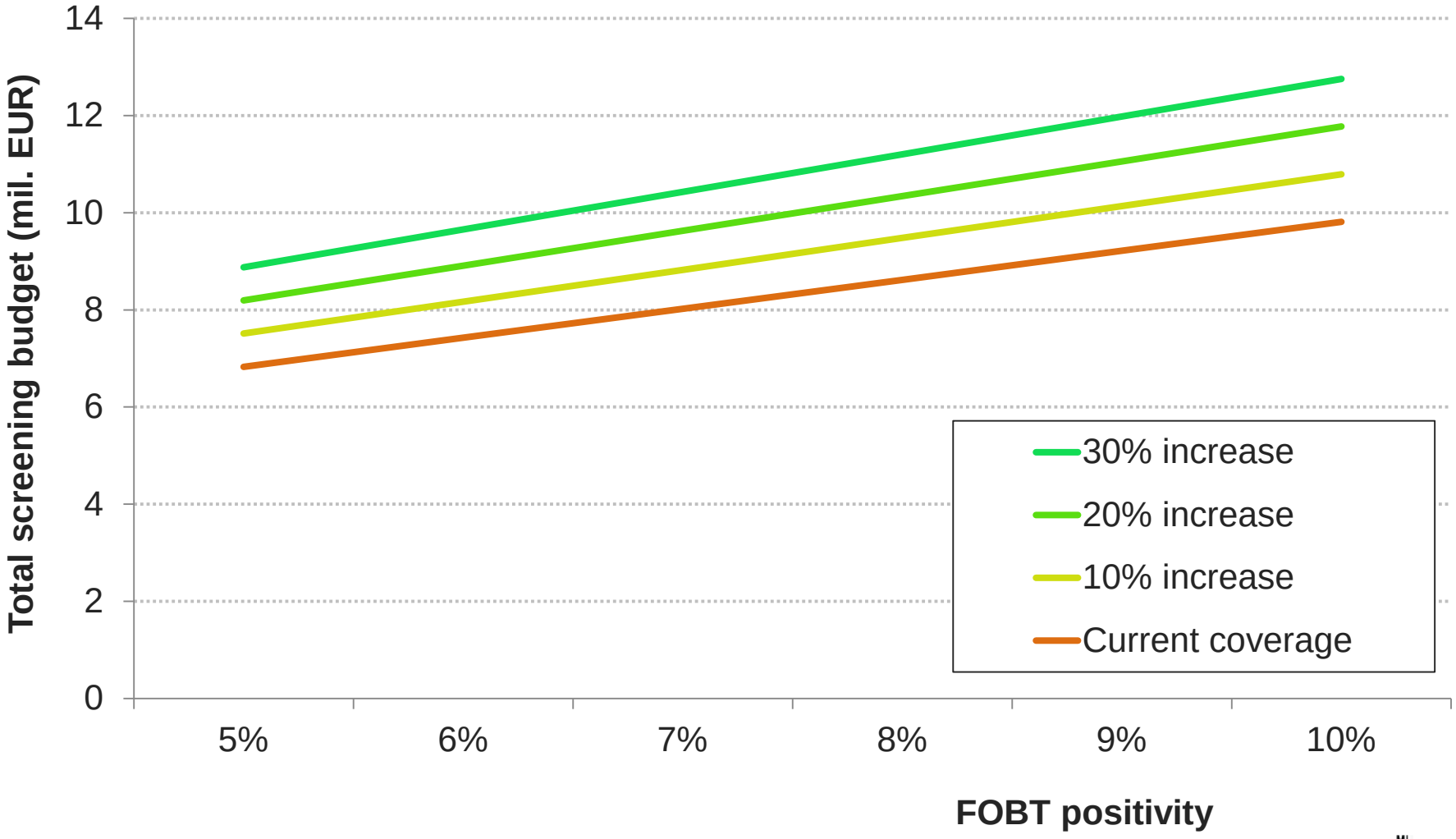
Individuals aged over 50



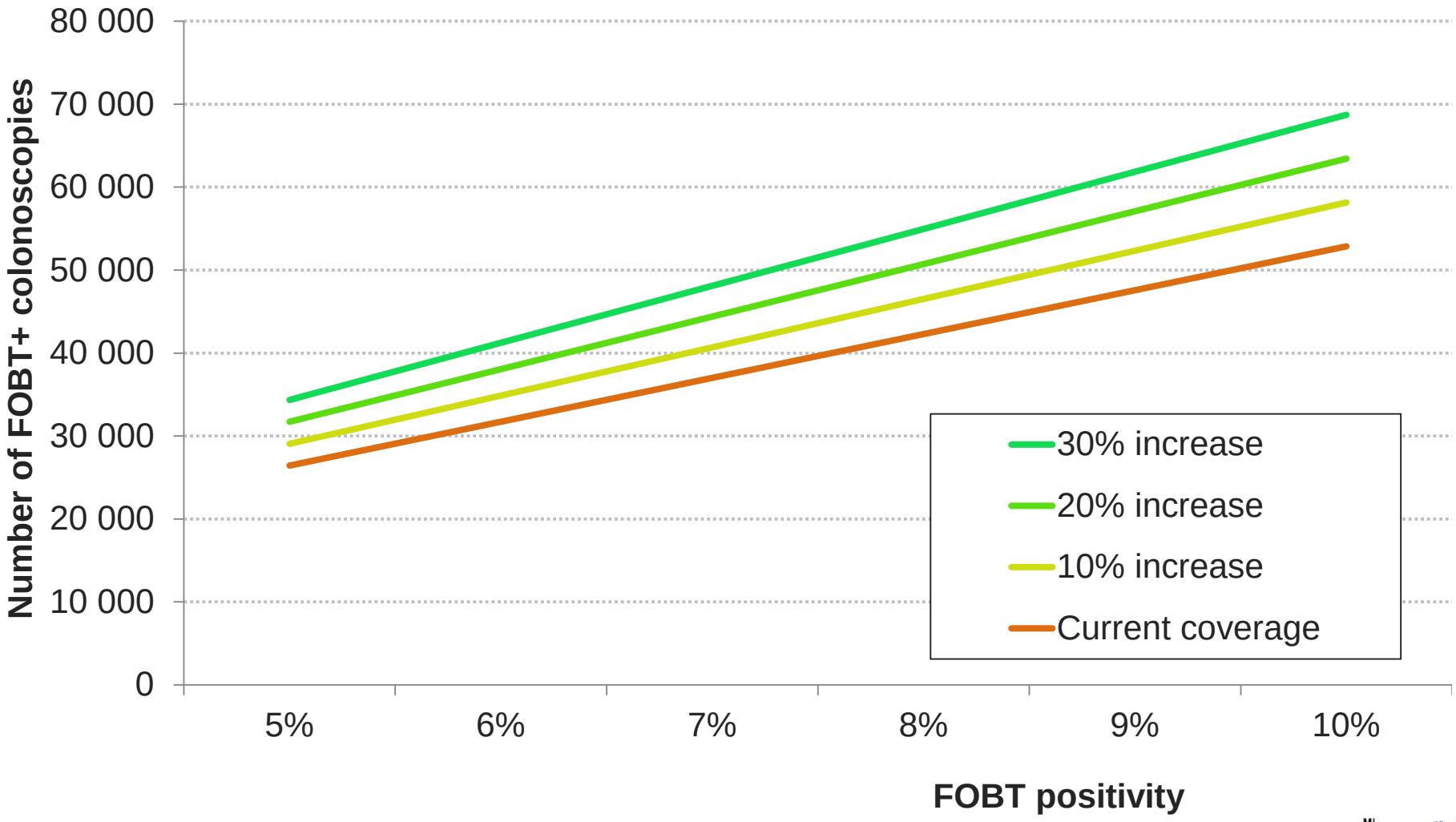
Optimisation of resources: capacity of the network

screening kolorektálního karcinomu

Changing system: impact on budget

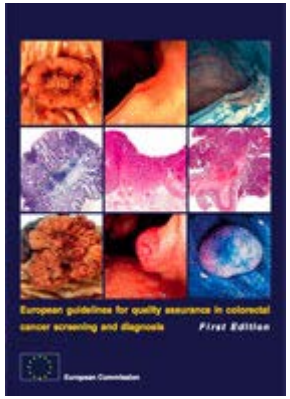


Changing system: impact on colonoscopy volume



Early performance indicators

- **Screening organisation**
  - **Time interval between completion of test and receipt of results**
  - **Time interval beteen positive test and follow-up colonoscopy**
    Recommendation : 90% / 95% within 31 days
  - **Time interval between positive endoscopy and start of definitive management**
  - **Time interval between consecutive primary screening tests**



Source: European Guidelines

Waiting time for FOBT+ colonoscopy

Year	FOBT+ colonoscopies	% recorded FOBT date	Average waiting time (months)
2006	5 334	94%	0,82
2007	5 679	92%	0,89
2008	7 458	96%	0,90
2009	11 711	96%	0,94
2010	18 327	95%	1,12
2011	20 132	94%	1,17
2012	21 137	95%	1,17
2013	21 837	95%	1,27

Waiting time for FOBT+ colonoscopy in regions, 2012

Region	FOBT+ colonoscopies	% recorded FOBT date	Average waiting time (months)
Pardubický	1542	100%	0,92
Vysočina	882	83%	0,93
Olomoucký	1698	98%	1,00
Ostravský	2732	100%	1,11
Zlínský	1430	99%	1,12
Plzeňský	1281	98%	1,12
Praha - východ	1720	92%	1,25
Královéhradecký	1347	82%	1,26
Praha - jih	1232	94%	1,35
Praha - západ	1259	93%	1,38
Karlovarský	711	99%	1,38
Jihomoravský	2240	100%	1,51
Ústecký	1150	99%	1,52
Jihočeský	1539	99%	1,66
Liberecký	1074	78%	1,67
Total	**21 837**	**95%**	**1,27**

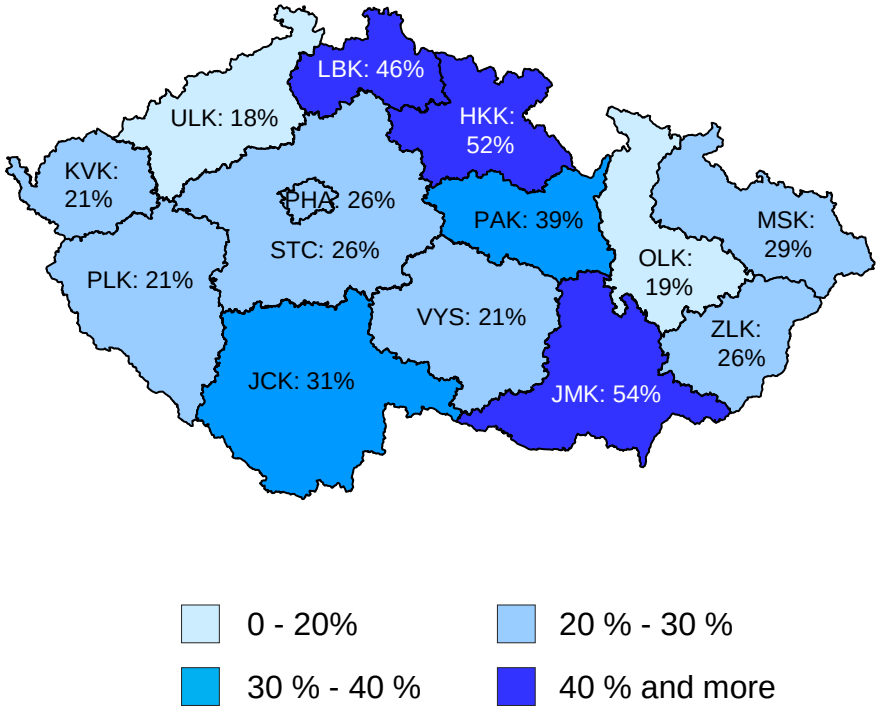
Availability of the treatment

screening
kolorektálního
karcinomu

Number of patients initiating treatment: comparison of reality in CORECT registry and predictions - year 2012

Regions	No. of patients initiating treatment: CORECT registry[A]	Prediction[B]
PHA + STC	179 (26%)	700 (656; 744)
JCK	59 (31%)	193 (170; 216)
PLK + KVK	65 (21%)	315 (286; 344)
ULK	43 (18%)	235 (210; 260)
LBK	57 (46%)	124 (106; 142)
HKK	83 (52%)	159 (138; 180)
PAK	54 (39%)	140 (121; 159)
VYS	31 (21%)	151 (131; 171)
JMK	178 (54%)	329 (299; 359)
OLK	37 (19%)	191 (168; 214)
ZLK	44 (26%)	171 (149; 193)
MSK	115 (29%)	392 (359; 425)
Czech Republic	**945 (30%)**	**3100 (3008; 3192)**

Percentage of predicted number of patients, who initiated treatment



[A] Number of patients in registry and percentage of predicted number of patients.

[B] Estimate is accompanied with 90% confidence interval.

Conclusion

screening
kolorektálního
karcinomu

Conclusions

- System is changing
  - ageing population
  - trends in risk factors (period & cohort effects)
  - improved survival
  - organisation of the programme
  - performance parameters of screening process
- Good data are needed for planning and monitoring
  - to ensure accessible and high quality health services and thus promote equity
- Cancer prevention is not only screening testing
  - primary, secondary and tertiary prevention

ACKNOWLEDGEMENT

- **Screening colonoscopy centres, for participation at data collection**

screening kolorektálního karcinomu

- **Providers of administrative and cancer registry data**

ÚZIS ČR

KSRZIS

NÁRODNÍ REFERENČNÍ CENTRUM