CRC screening in the Era of informatics: can data-based knowledge enhance coverage?

MU IBA
Institute of Biostatistics and Analyses
Masaryk University

NÁRODNÍ REFERENČNÍ CENTRUM
National Reference Center
Health Care Payers

Data -> Information -> Impact -> Effect?

Disease diagnostics

Screening performance

Screening efficacy & safety

Screening effectiveness

..... follow-up

QA & QC

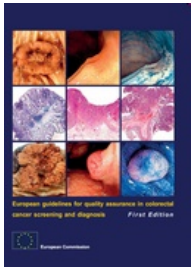
Compliance

Cancer burden

Target population

Epidemiology
Population risk assessment

European Council (2003/878/EC)
+ European Guidelines (2010)



+ Communication

!

Key problem: standardization of EHR

Clinical stage: 4, evaluated .....

Cl. st. 4, ...

Advanced disease ~~IV~~.

CS: -> diagnostic imaging: IV

Cl. staging:

I. ○ II. ○ III. ◉ IV. ○

T:

T1 ☐ T2 ☐ T3 ☑ T4 ☐

Date: _ _ / _ _ / _ _ _ _

Follow-up cotrol

Yes/date ◉ No/why ○

EUnetHTA – collaboration via Europe
EUnetHTA FINAL TECHNICAL REPORT - YEARS 2006-2008

Electronic health care records – where are you?

SCREENING PROGRAMME

SEPARATED KEY INFORMATION SOURCES

?

NON-STANDARDIZED INFORMATION SYSTEMS

Solution? Multi-level information system

Monitoring of Population Cancer Burden

- epidemiology of cancer in target population
- evaluation of screening programs impact

Source of data: CZECH NATIONAL CANCER REGISTRY
13 regional data collection points / 57 district points
annual no. of records: 8,093 colorectal cancer cases in 2009

Performance & Quality Monitoring of Health Care Facilities

- performance indicators at screening centres
- detection of cancer and precancerous lesions

Source of data: RECOMMENDED HEALTH CARE FACILITIES
160 centres (summer 2011)
annual no. of records: 22,227 preventive colonoscopies in 2010

Clinical Monitoring using Health-Care Administrative Data

- population-based performance indicators
- monitoring of programs accessibility by target population
- assessment of programs cost-effectiveness

Source of data: HEALTH INSURANCE COMPANIES – NATIONAL REFERENCE CENTRE
8 health insurance companies / 4,400 general practitioner offices, 1,200 gynaecologist offices
annual no. of records: 521,000 FOBTs performed in 2010

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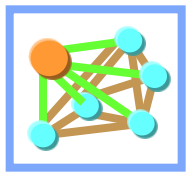
Five principal outcomes from the system



Population reporting

1) Cancer burden (description & prediction)

2) Regional monitoring, equity of care

-> Population risk analyses

Data-based networking of the diagnostic centers

3) Performance indicators

4) Quality indicators

-> Management decision support

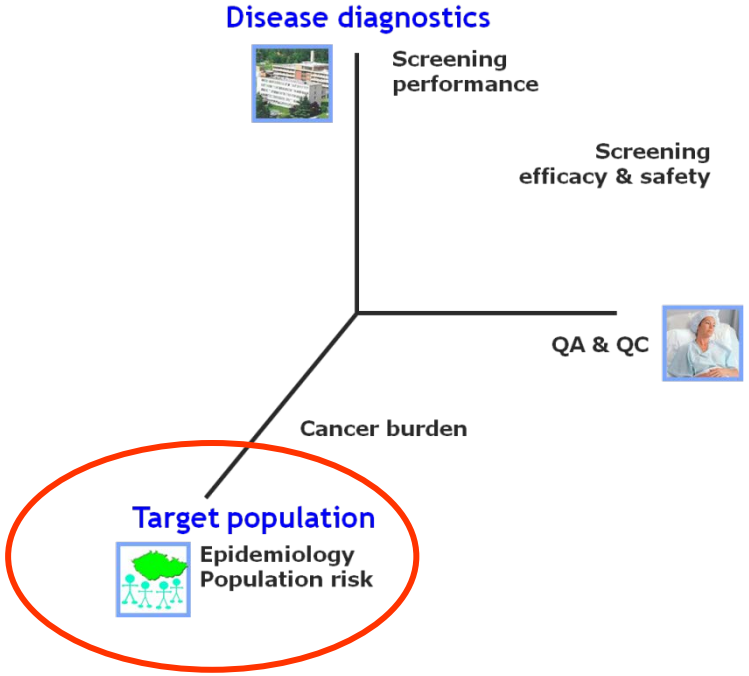
Clinical monitoring

5) Patient flow, follow-up support

-> Real world evidence

Data -> information -> impact

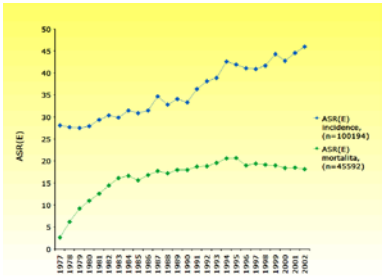
Population-based monitoring



Introducing the Czech National Cancer Registry

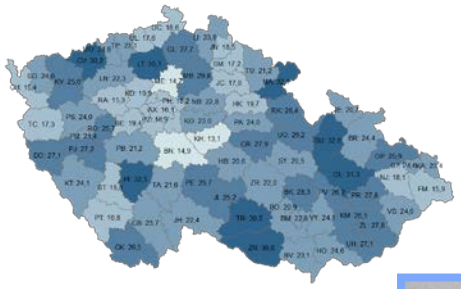
CNCR

Standardized and validated data, collected since 1977



> 1 700 000 cases

-> Morphology
-> TNM, staging
-> Therapeutic strategy
-> Overall survival
-> Death reasoning

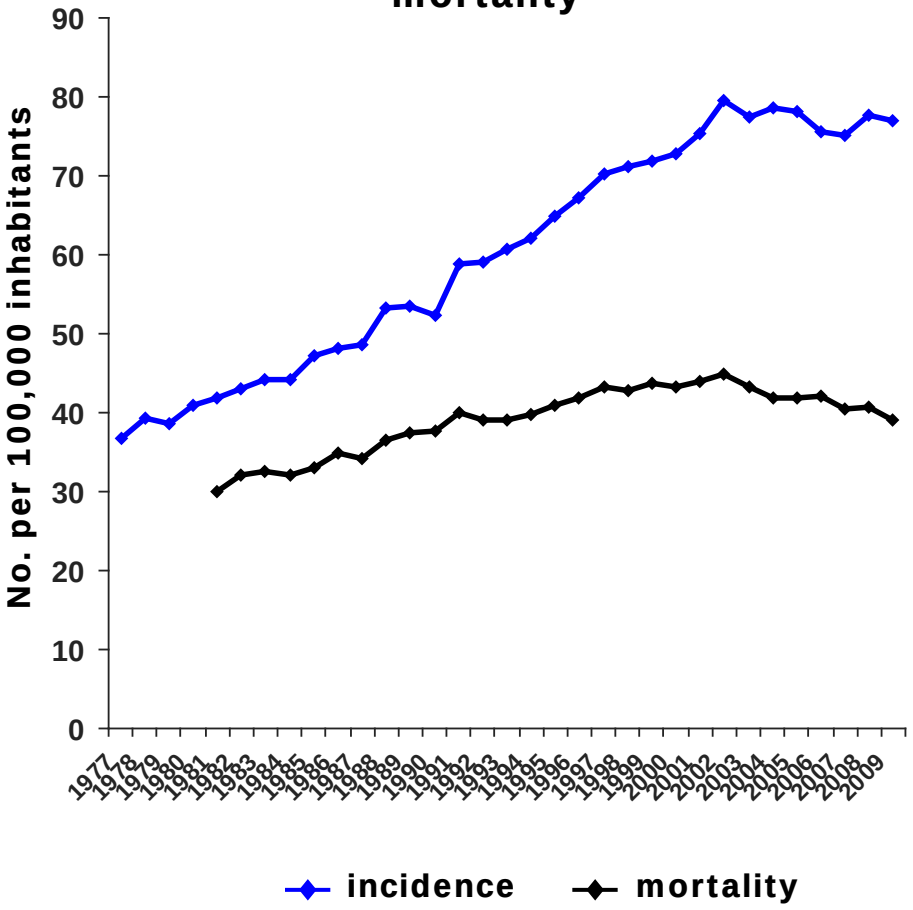


Regions

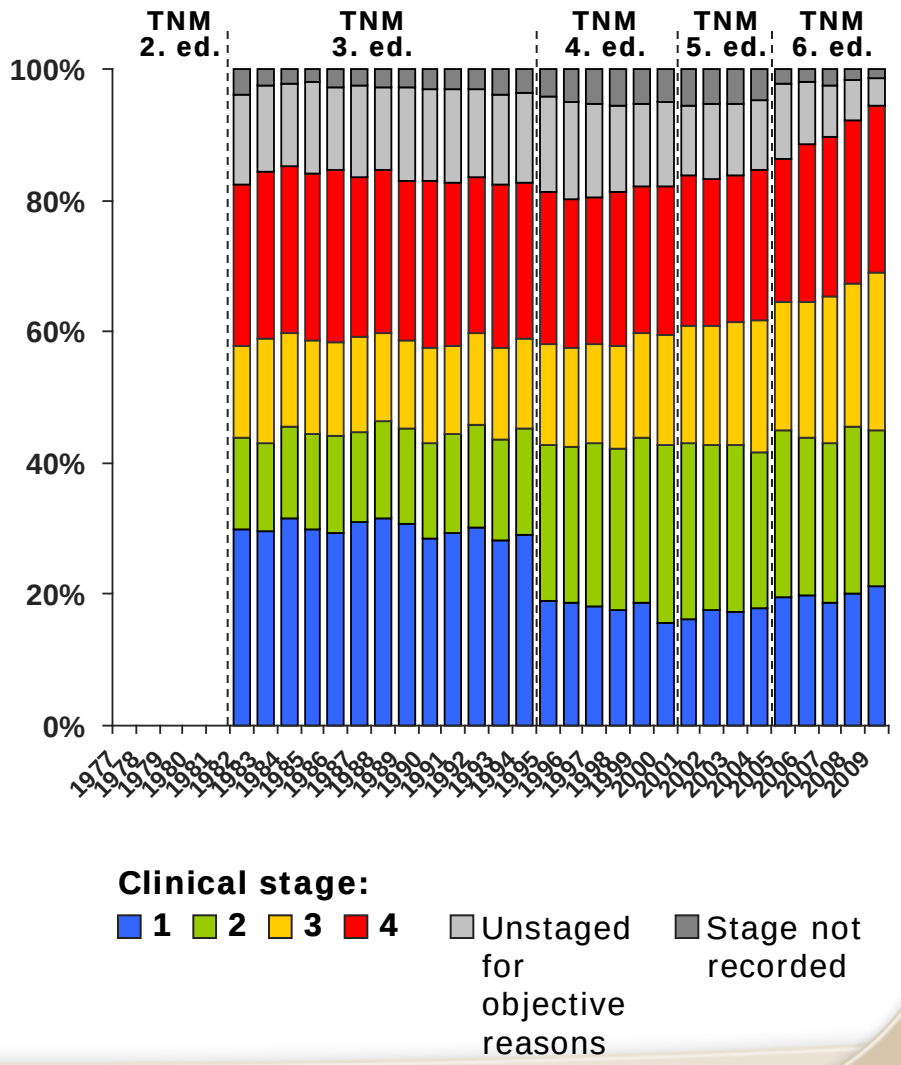
Diagnostic centers

Population – based monitoring: examples

Time-related trends: incidence and mortality



Incidence stratified according to clinical stage



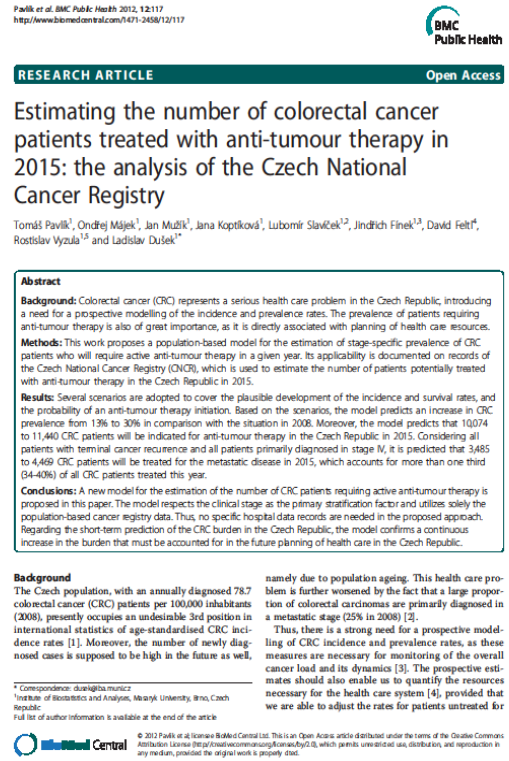
Population – based monitoring: examples

INCIDENCE

Colorectal carcinoma (C18-C20)	Predicted values for 2012	
	Incidence[1]	(90% CI)
Stage I	1696	(1520; 1870)
Stage II	2014	(1835; 2192)
Stage III	2090	(1940; 2239)
Stage IV	1971	(1826; 2114)
Stage unknown for objective reasons[2]	605	(474; 736)
Stage unknown without stated reason[2]	197	(153; 240)
TOTAL	8573	(7748; 9391)

PREVALENCE

Colorectal carcinoma (C18-C20)	Predicted values for 2012	
	Prevalence	(90% CI)
Stage I	16 192	(15 900; 16 484)
Stage II	15 617	(15 338; 15 896)
Stage III	10 698	(10 464; 10 932)
Stage IV	6 824	(6 637; 7 011)
Stage unknown for objective reasons	3 297	(31 66; 3 428)
TOTAL	52 628	(51 505; 53 751)



Pavlík et al. BMC Public Health 2012, 12:117
http://www.biomedcentral.com/1471-2458/12/117

BMC Public Health

RESEARCH ARTICLE Open Access

Estimating the number of colorectal cancer patients treated with anti-tumour therapy in 2015: the analysis of the Czech National Cancer Registry

Tomáš Pavlík[1], Ondřej Májek[1], Jan Mužík[1], Jana Koptíková[1], Lubomír Slavíček[1,2], Jindřich Finek[1,3], David Feltl[4], Rostislav Vyzula[1,5] and Ladislav Dušek[1*]

Abstract

Background: Colorectal cancer (CRC) represents a serious health care problem in the Czech Republic, introducing a need for a prospective modelling of the incidence and prevalence rates. The prevalence of patients requiring anti-tumour therapy is also of great importance, as it is directly associated with planning of health care resources.

Methods: This work proposes a population-based model for the estimation of stage-specific prevalence of CRC patients who will require active anti-tumour therapy in a given year. Its applicability is documented on records of the Czech National Cancer Registry (CNCR), which is used to estimate the number of patients potentially treated with anti-tumour therapy in the Czech Republic in 2015.

Results: Several scenarios are adopted to cover the plausible development of the incidence and survival rates, and the probability of an anti-tumour therapy initiation. Based on the scenarios, the model predicts an increase in CRC prevalence from 13% to 30% in comparison with the situation in 2008. Moreover, the model predicts that 10,074 to 11,440 CRC patients will be indicated for anti-tumour therapy in the Czech Republic in 2015. Considering all patients with terminal cancer recurrence and all patients primarily diagnosed in stage IV, it is predicted that 3,485 to 4,469 CRC patients will be treated for the metastatic disease in 2015, which accounts for more than one third (34-40%) of all CRC patients treated this year.

Conclusions: A new model for the estimation of the number of CRC patients requiring active anti-tumour therapy is proposed in this paper. The model respects the clinical stage as the primary stratification factor and utilizes solely the population-based cancer registry data. Thus, no specific hospital data records are needed in the proposed approach. Regarding the short-term prediction of the CRC burden in the Czech Republic, the model confirms a continuous increase in the burden that must be accounted for in the future planning of health care in the Czech Republic.

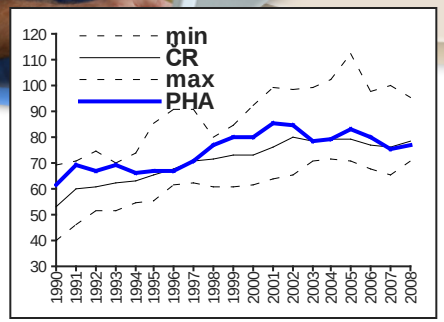
Background

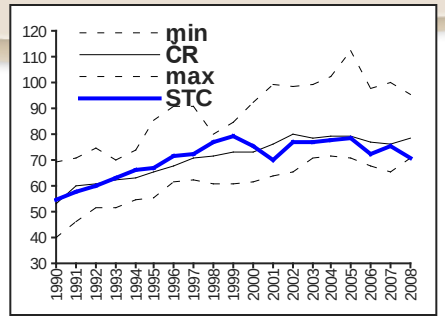
The Czech population, with an annually diagnosed 78.7 colorectal cancer (CRC) patients per 100,000 inhabitants (2008), presently occupies an undesirable 3rd position in international statistics of age-standardised CRC incidence rates [1]. Moreover, the number of newly diagnosed cases is supposed to be high in the future as well, namely due to population ageing. This health care problem is further worsened by the fact that a large proportion of colorectal carcinomas are primarily diagnosed in a metastatic stage (25% in 2008) [2].

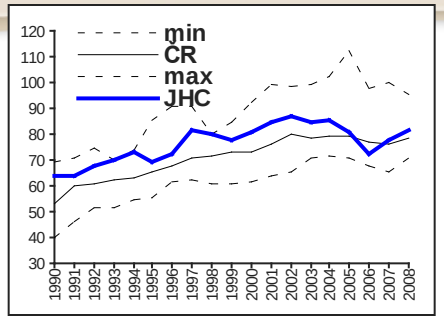
Thus, there is a strong need for a prospective modelling of CRC incidence and prevalence rates, as these measures are necessary for monitoring of the overall cancer load and its dynamics [3]. The prospective estimates should also enable us to quantify the resources necessary for the health care system [4], provided that we are able to adjust the rates for patients untreated for

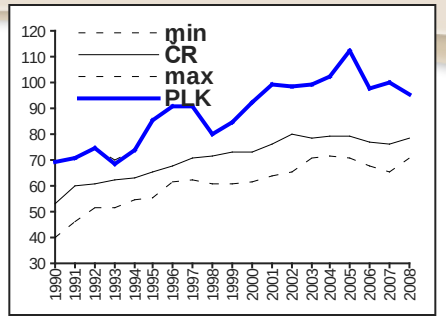
* Correspondence: dusek@iba.muni.cz
[1]Institute of Biostatistics and Analyses, Masaryk University, Brno, Czech Republic
Full list of author information is available at the end of the article

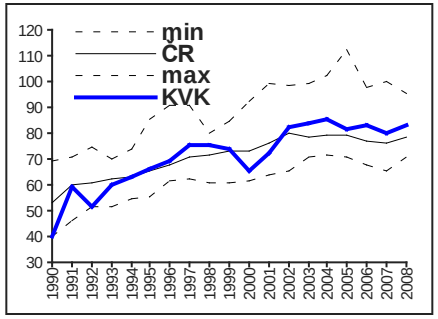
Population – based monitoring: examples

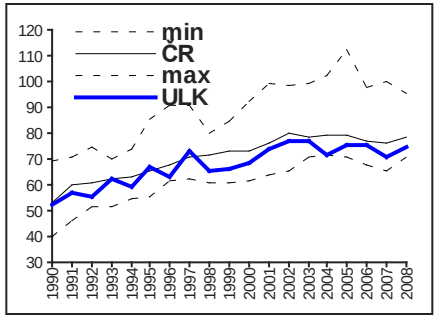


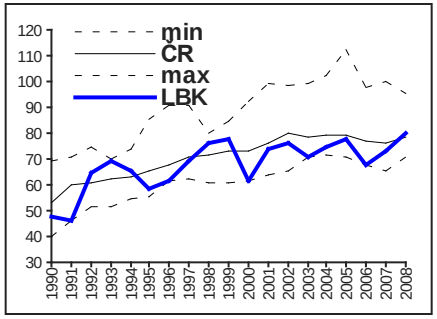


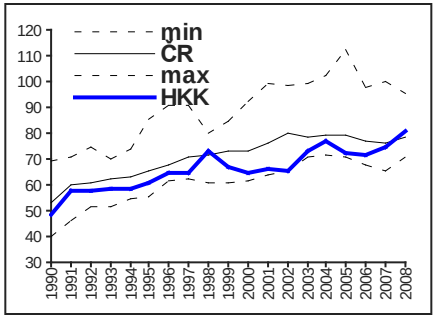


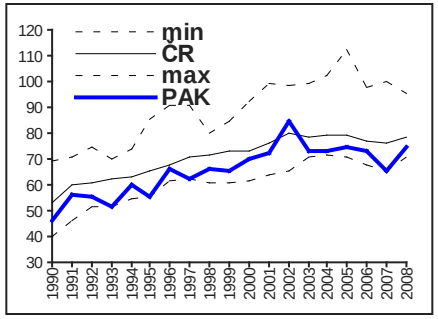


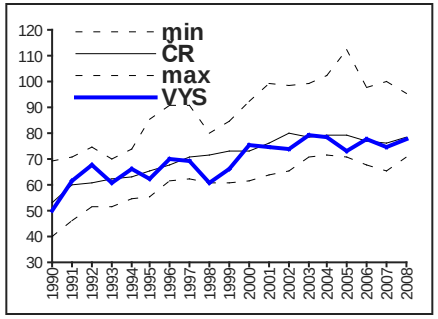


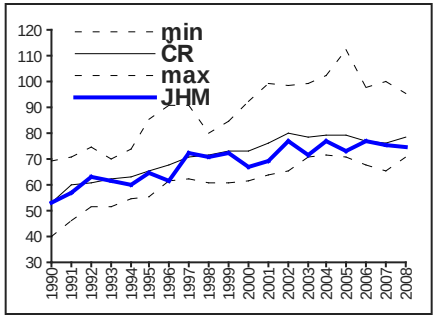


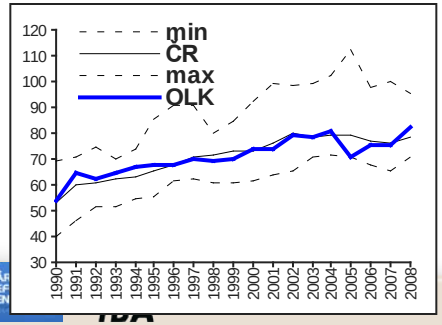


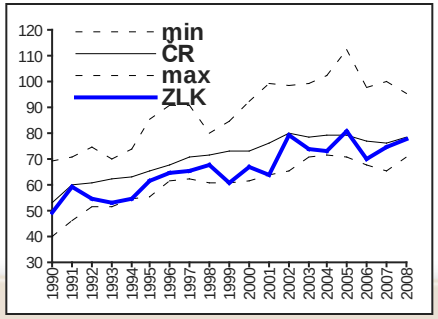


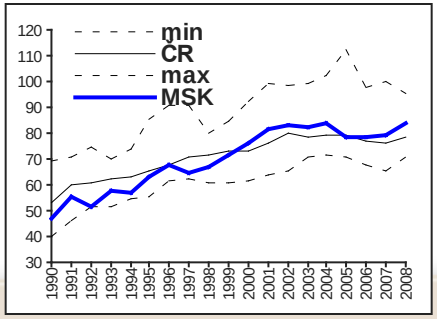












Number pf cases per 100 000 persons

CR: Czech Republic
max: maximum in regions
min: minimum in regions

PHA: Capital City of Prague
STC: Středočeský region
JHC: Jihočeský region
PLK: Plzeňský region
KVK: Karlovarský region
ULK: Ústecký region
LBK: Liberecký region
HKK: Královéhradecký region
PAK: Pardubický region
VYS: Vysočina region
JHM: Jihomoravský region
OLK: Olomoucký region
ZLK: Zlínský region
MSK: Moravskoslezský region

Communication based on open reporting in analytical portals

- About project
- News
- Epidemiological analyses
- Publications, reports
- Software SVOD
- Analytic tools tutorial

Epidemiological analyses

- Incidence and mortality
- Time trends
- Regional overview
- Age analyses
- Clinical stages
- International data
- Comparative standards
- Comprehensive overview

http://www.svod.cz

Communication based on open reporting in analytical portals

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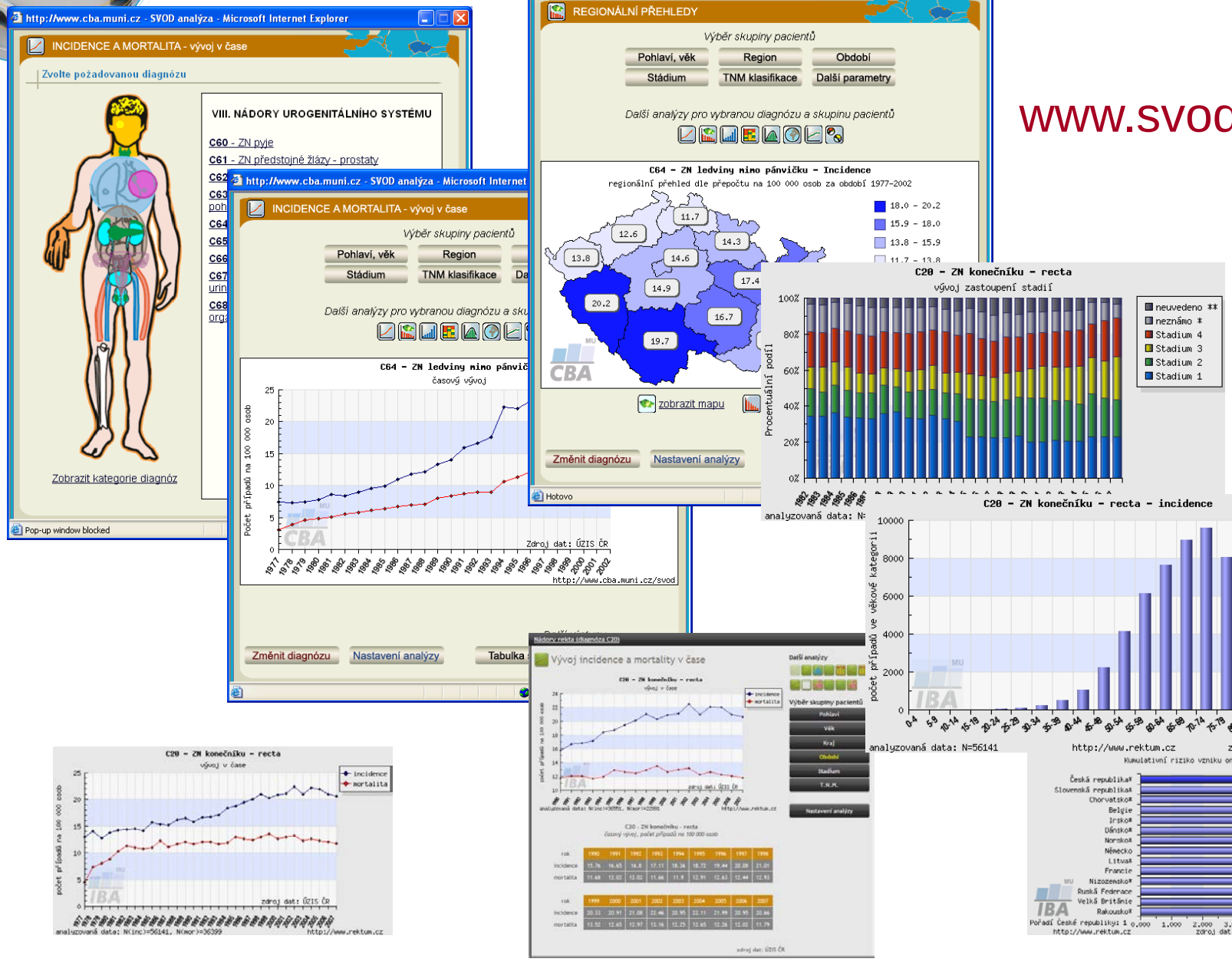
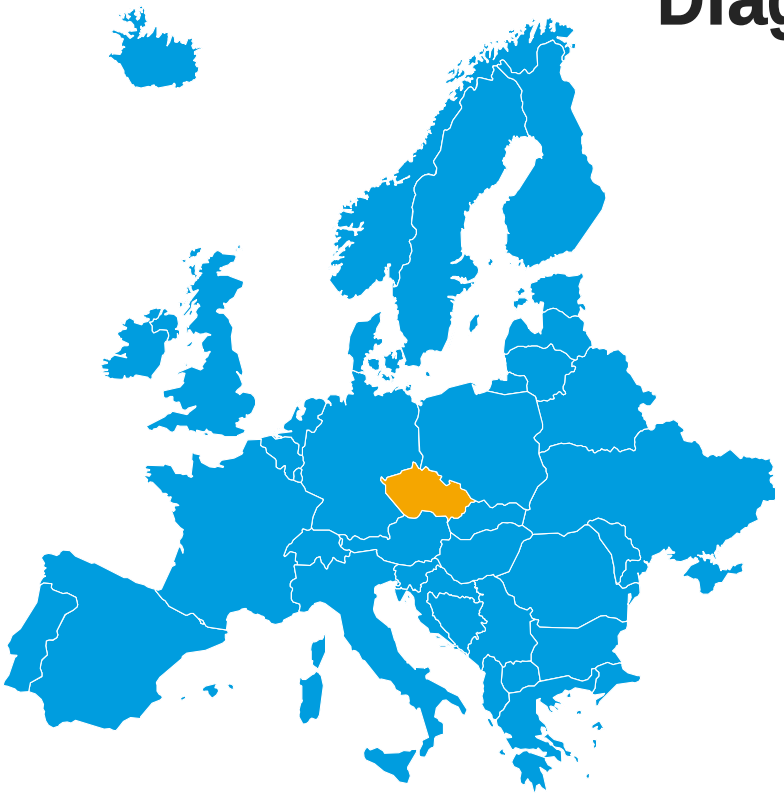
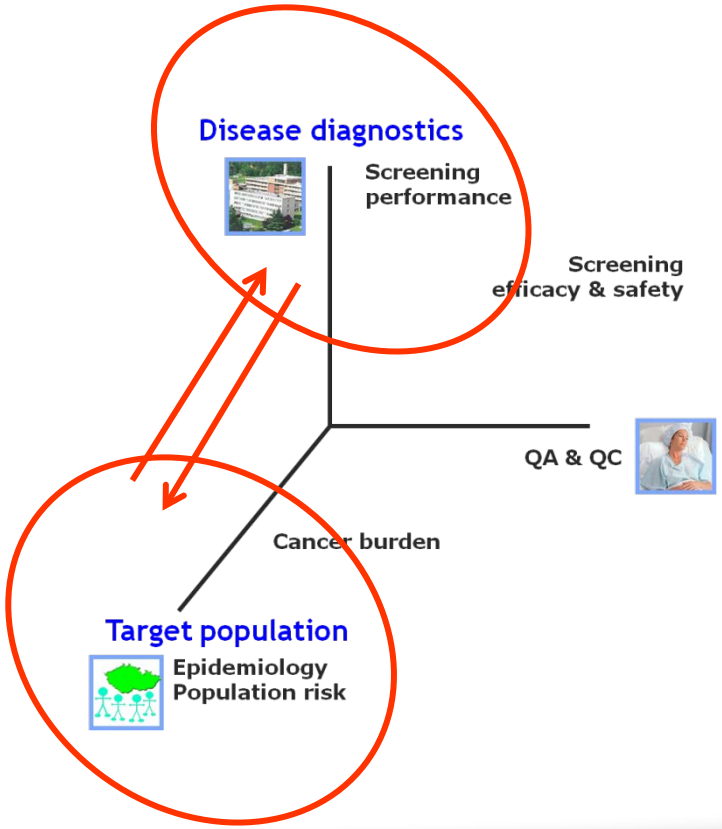


Data -> information -> impact



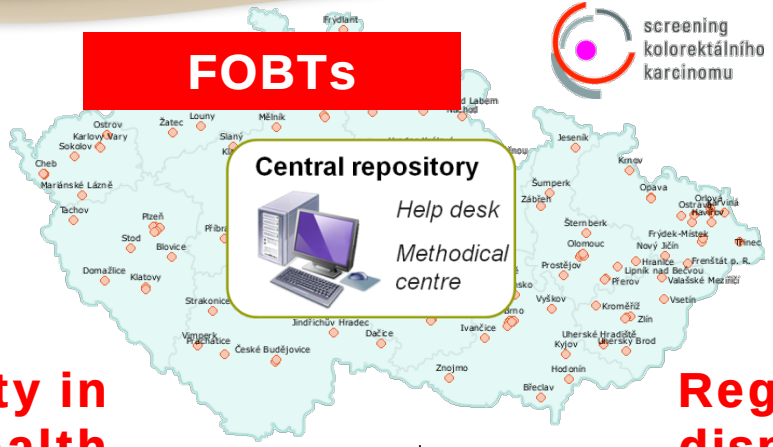
Diagnostic monitoring



Finally resulting three key data sources……

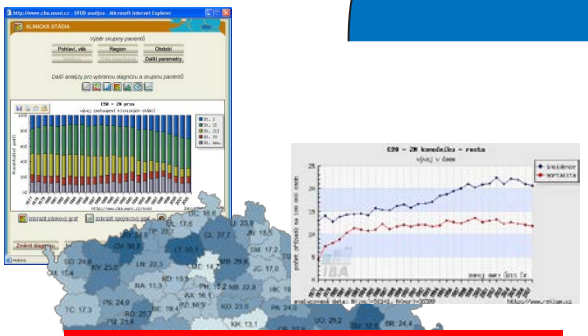
FOBTs

screening kolorektálního karcinomu

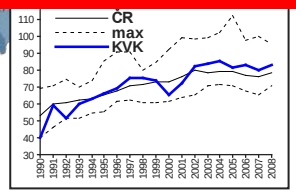


Equity in health

Regional disparities

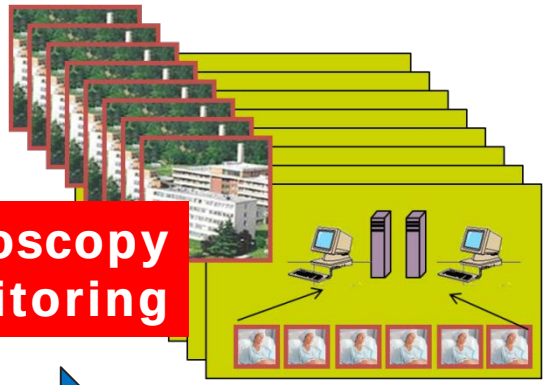


Cancer burden



160 **colonoscopy centers**

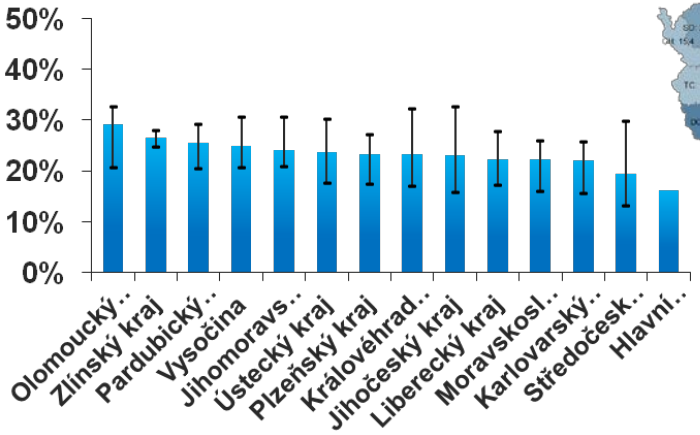
- local data collection -

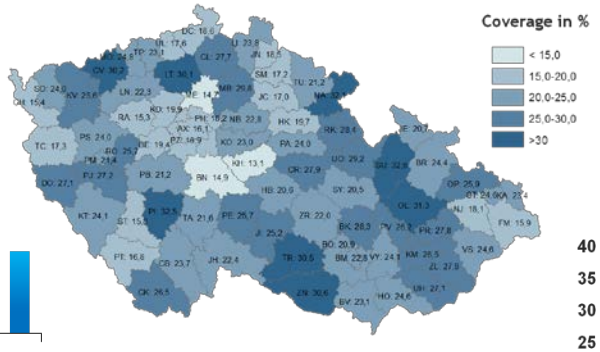


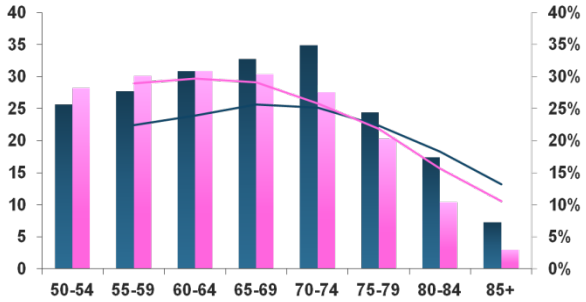
Colonoscopy monitoring

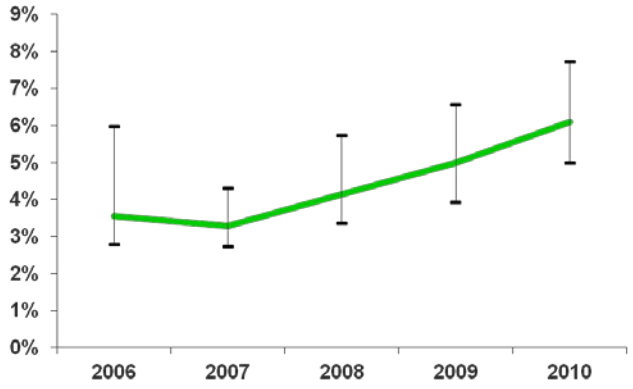
…. and finally reachable results

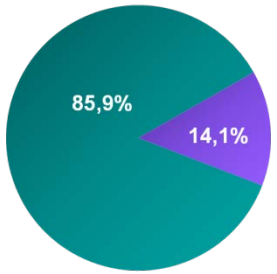
13.1 % 22.7 % 32.6 %











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Data -> information -> impact

Clinical monitoring and follow-up support

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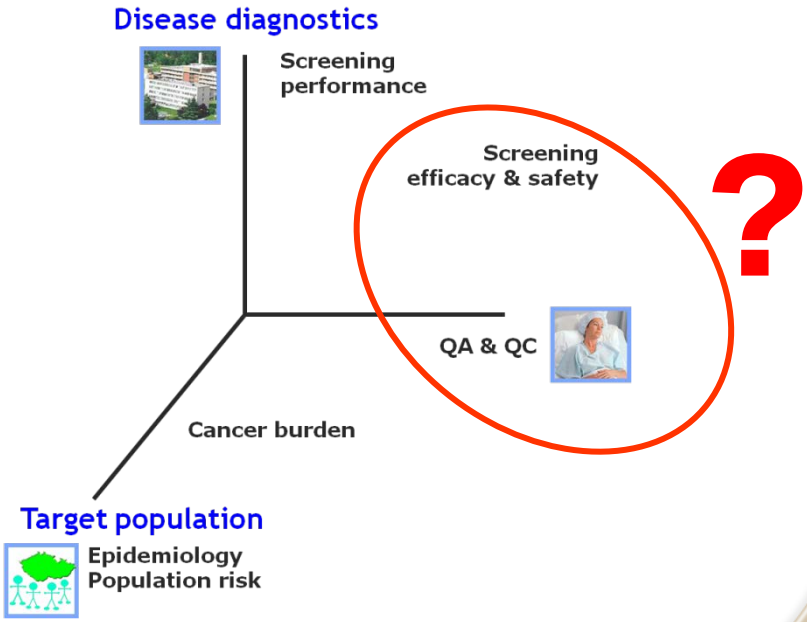

Can data-based knowledge enhance coverage?