Comprehensive cancer care networking (CCCN) in the Czech Republic (2014 -> 2017)

Data-based integration of the CCCN and population-based screening to the e-Health system

CanCon
Cancer Control Joint Action

Institute of Biostatistics and Analyses
Masaryk University, Brno, Czech Republic

www.iba.muni.cz

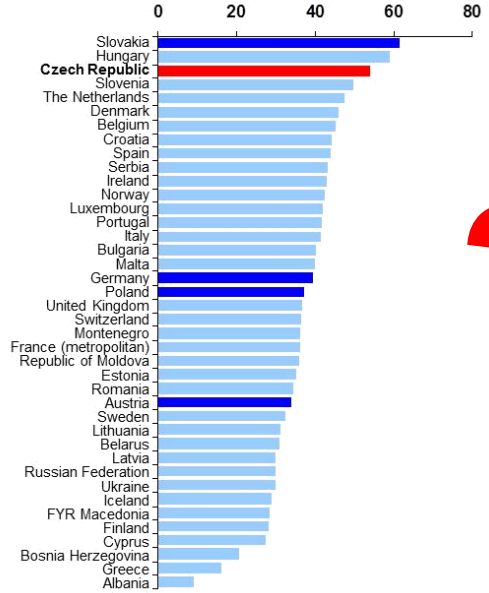
Czech cancer care in 2013: many challenges

Opportunistic cancer screening

? **Population-based interventions**

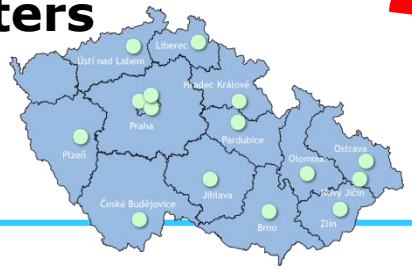
2013

High and growing cancer incidence



? **Management of growing burden**

Regional set of cancer centers



? **Equal access to high quality care**

Pilot CCCN -> Main PRINCIPLES adopted

Common information system

Organized structure (multi-tier model)

Implemented cancer management protocols

Multidisciplinary assessment of patients (CCs boards)

Common governance including control (QA/QC indicators)

Quantified and mapped collaboration with neighboring regions

Emphasis on complexity of the system: process and segment coverage

CCC(s)

CCCN(s)

Pilot CCCN -> Main BARRIERS to overcome

LEGAL BACKGROUND

FUNCTIONAL E-HEALTH

Personal data protection

Legislation allowing data centralization

Comprehensive registries

Representative cancer care model

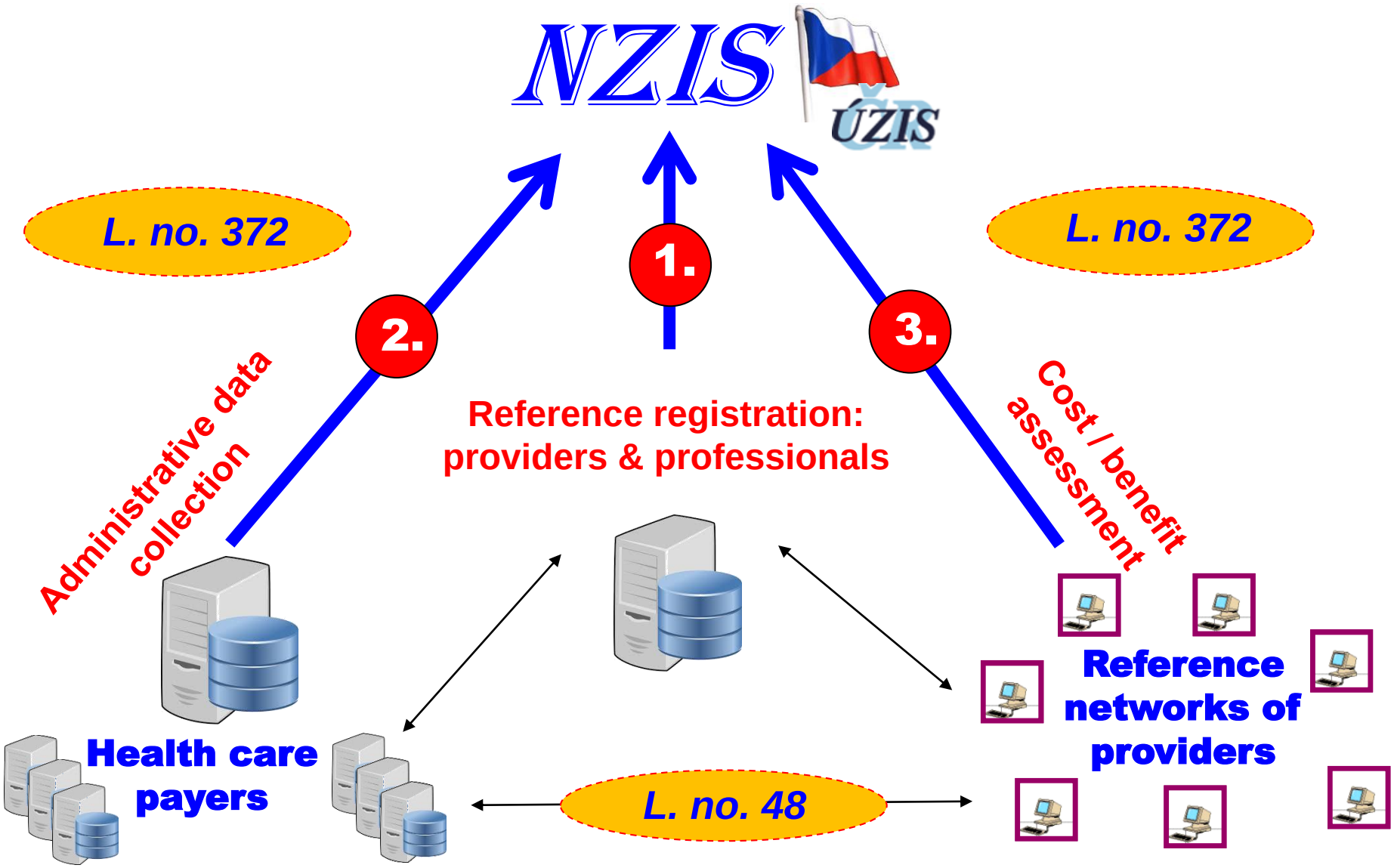
Support of stakeholders and payers

Certified reorganization

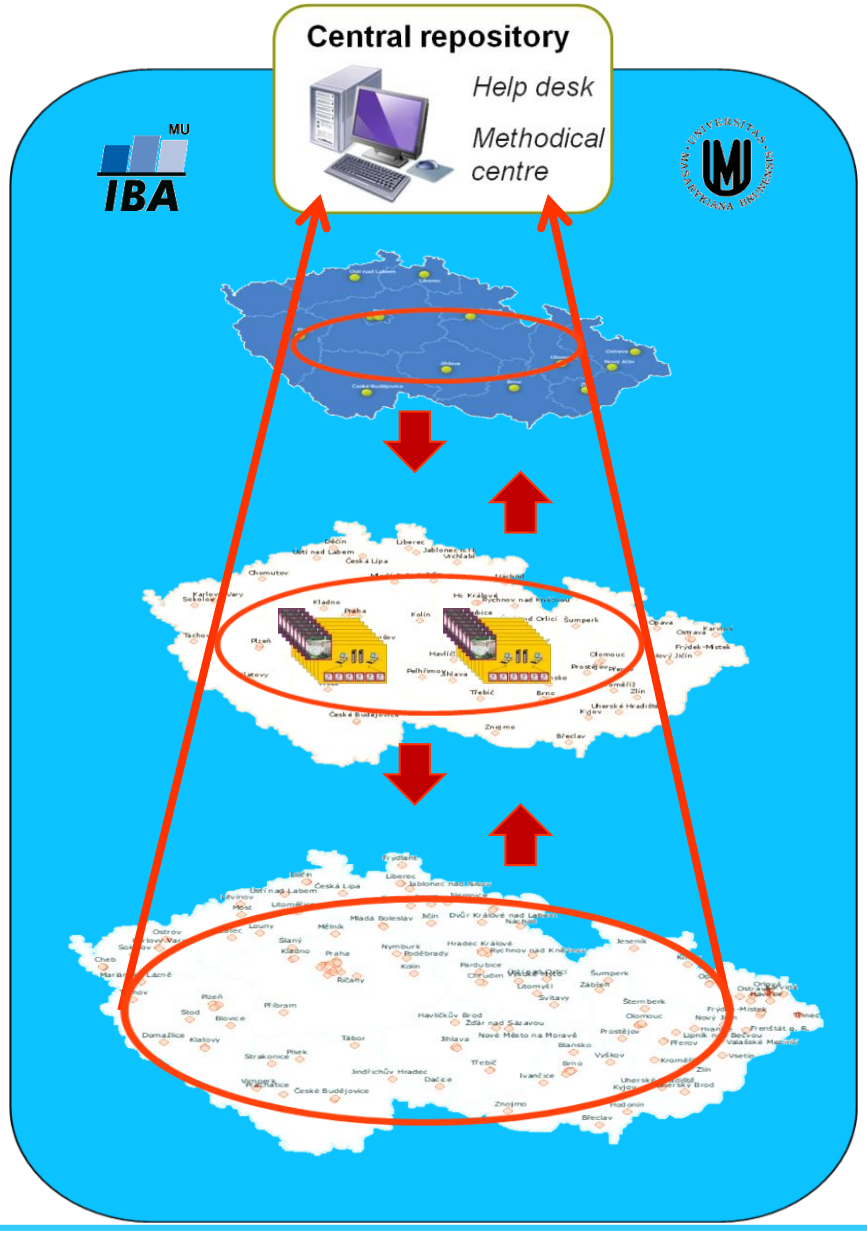
Functional reimbursement mechanisms

Effective QA/QC system

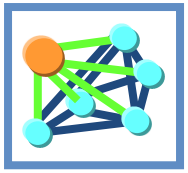
Pilot CCCN -> Czech legislative experience



Pilot CCCN -> IT infrastructure for monitoring of cancer care



Cancer centres network as a regional managing system



Epidemiology Population-based registries

Population and treatment burden
National Cancer Registry

Hospitals Specialized registries

Hospital information systems
Local and national registries

Monitoring of health care EHR

Primary care (GPs, gynaecologists)
Hospital care
Specialized care and cancer centres

REPORTS

Equity of health care

Structure of health care

Results of health care

Quality of health care

Distribution of health care

Volume of health care

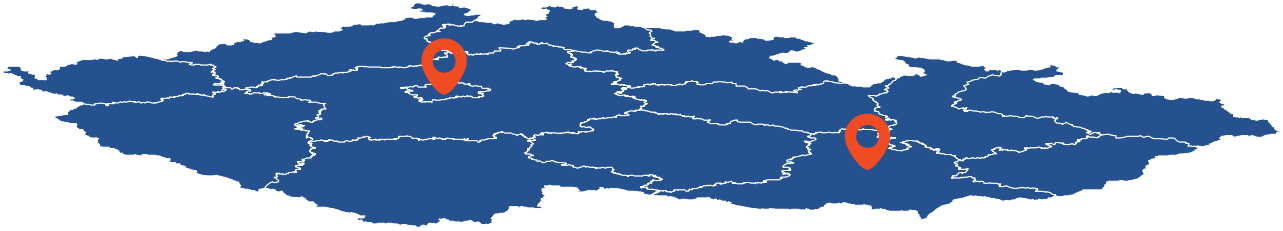
Data validation

Sustainable CCCN implementation?

Both central a local solution strategy must be employed!

National Institute for Health Informatics
and Statistics, Ministry of Health, Prague

Legislative rules establishing CCCN



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Executive data-based platform of cancer care piloting CCCN

Established Pilot CCCN

- written agreement
- CCCN structure
- CCCN territory

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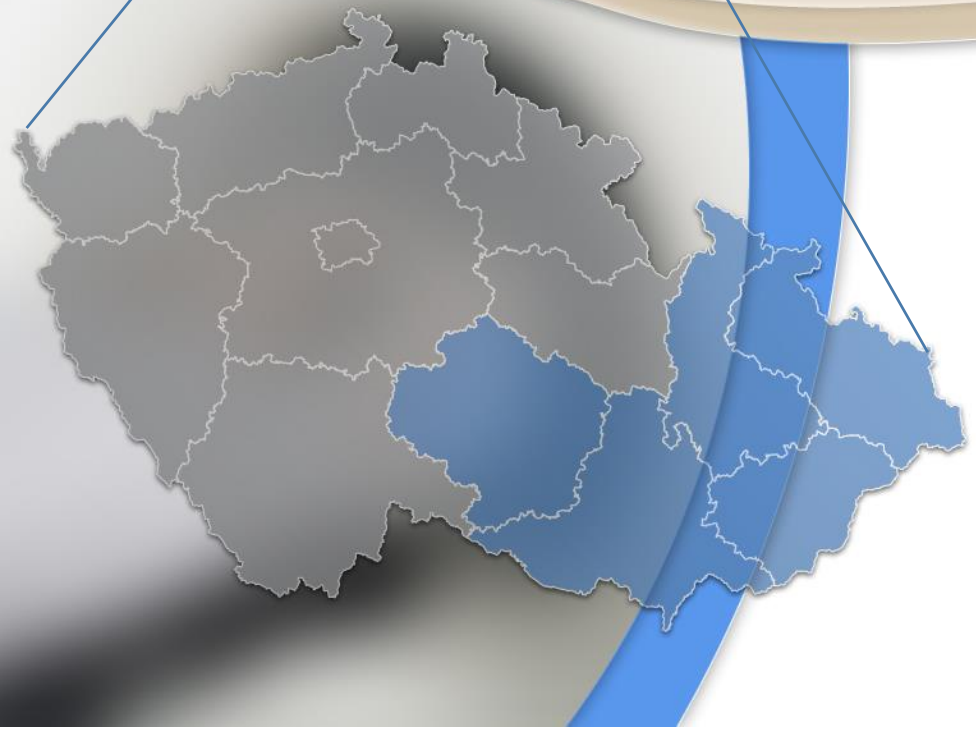
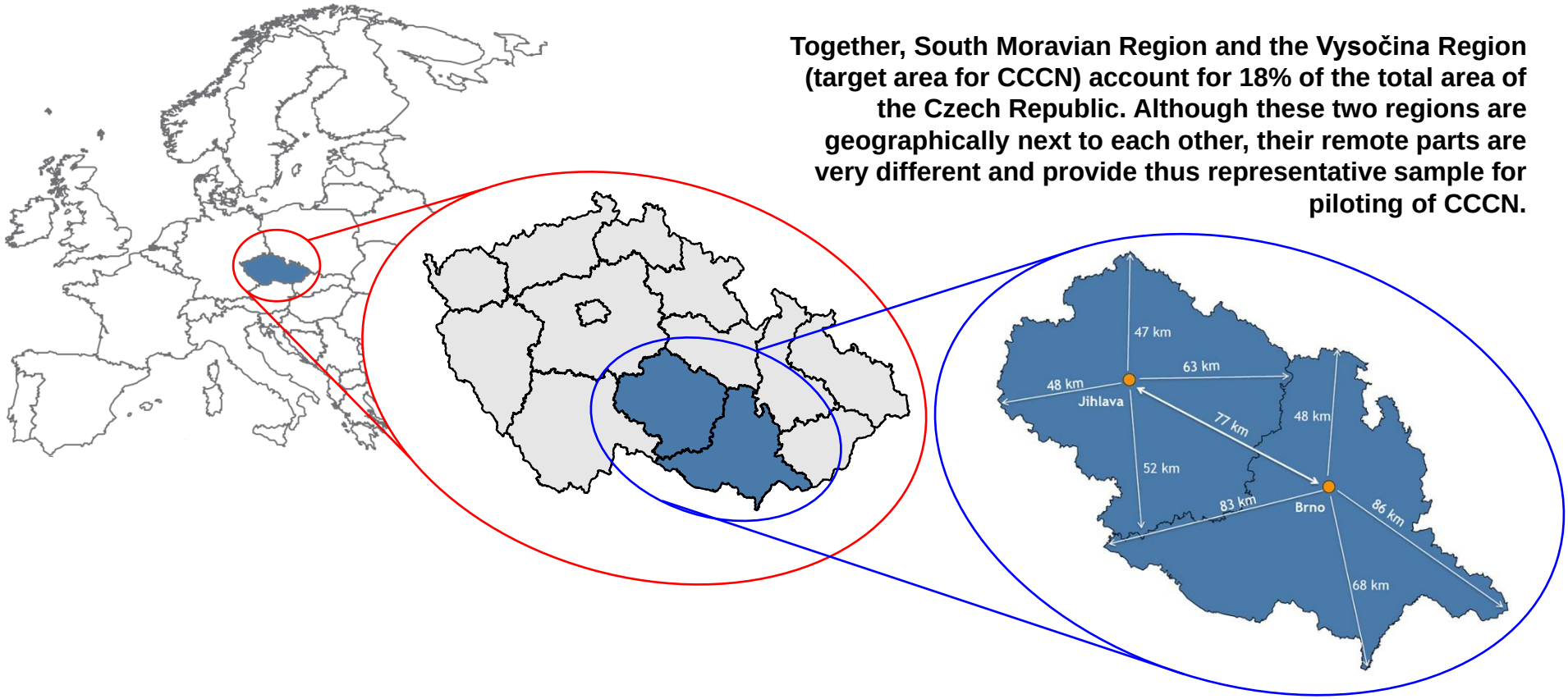


Spatially closed, geographically interconnected regions

Fully representative demographic, social and epidemiologic attributes

Sufficient demographic mass of people (patients)

Target area of CCCN



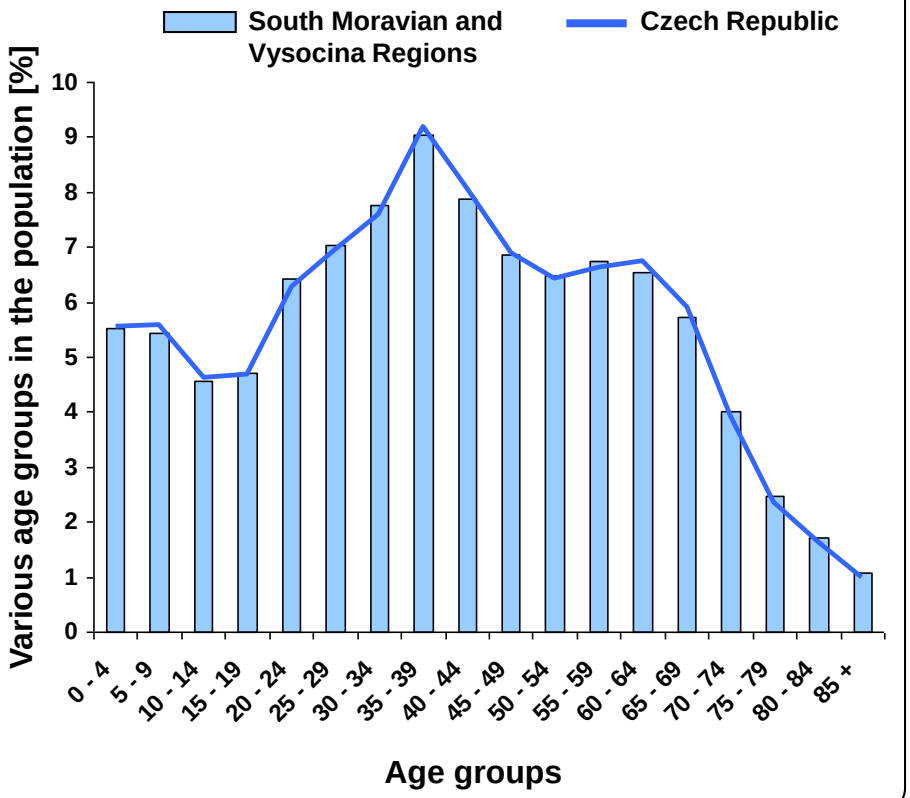
Together, South Moravian Region and the Vysočina Region (target area for CCCN) account for 18% of the total area of the Czech Republic. Although these two regions are geographically next to each other, their remote parts are very different and provide thus representative sample for piloting of CCCN.

	South Moravian Region	Vysočina Region	Both regions
Population (as of 31/12/2015)	1 175 025	509 475	1 684 500
Area (km2)	7 195	6 796	13 991
Population density (per km2)	163	75	120
Number of districts	7	5	12
Number of municipalities	673	704	1 377
Total length of roads and motorways (km, estimation)	4 500	5 000	9 500
Total length of railway network (km, estimation)	800	650	1 450

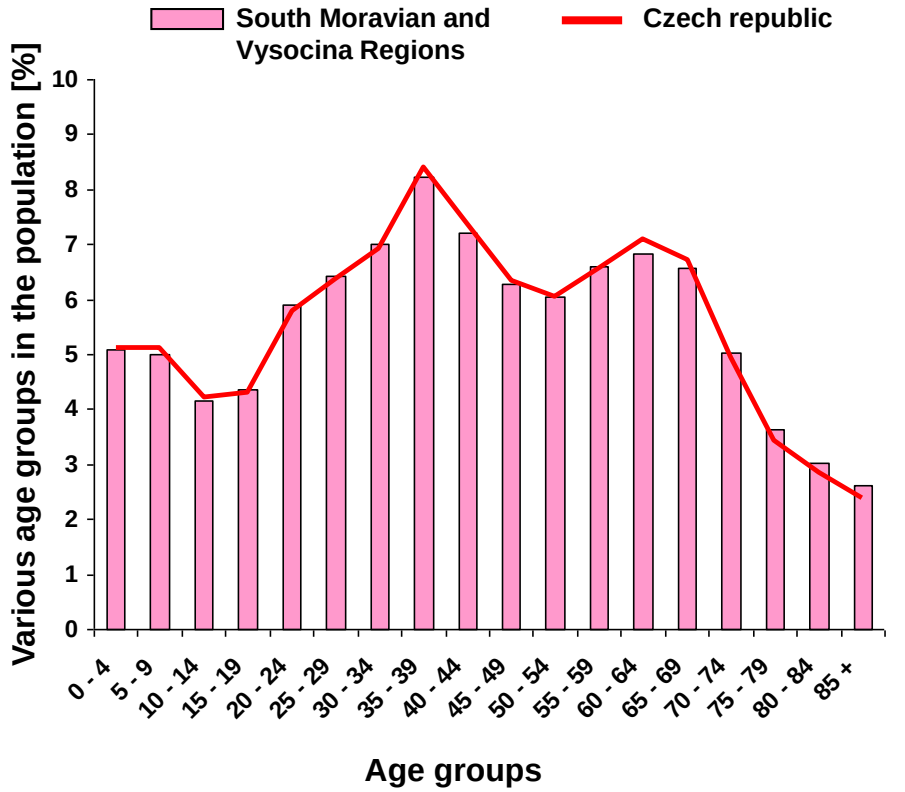
Demography in the CCCN area (2015) – benchmarking

The distribution of age groups in the population

Men

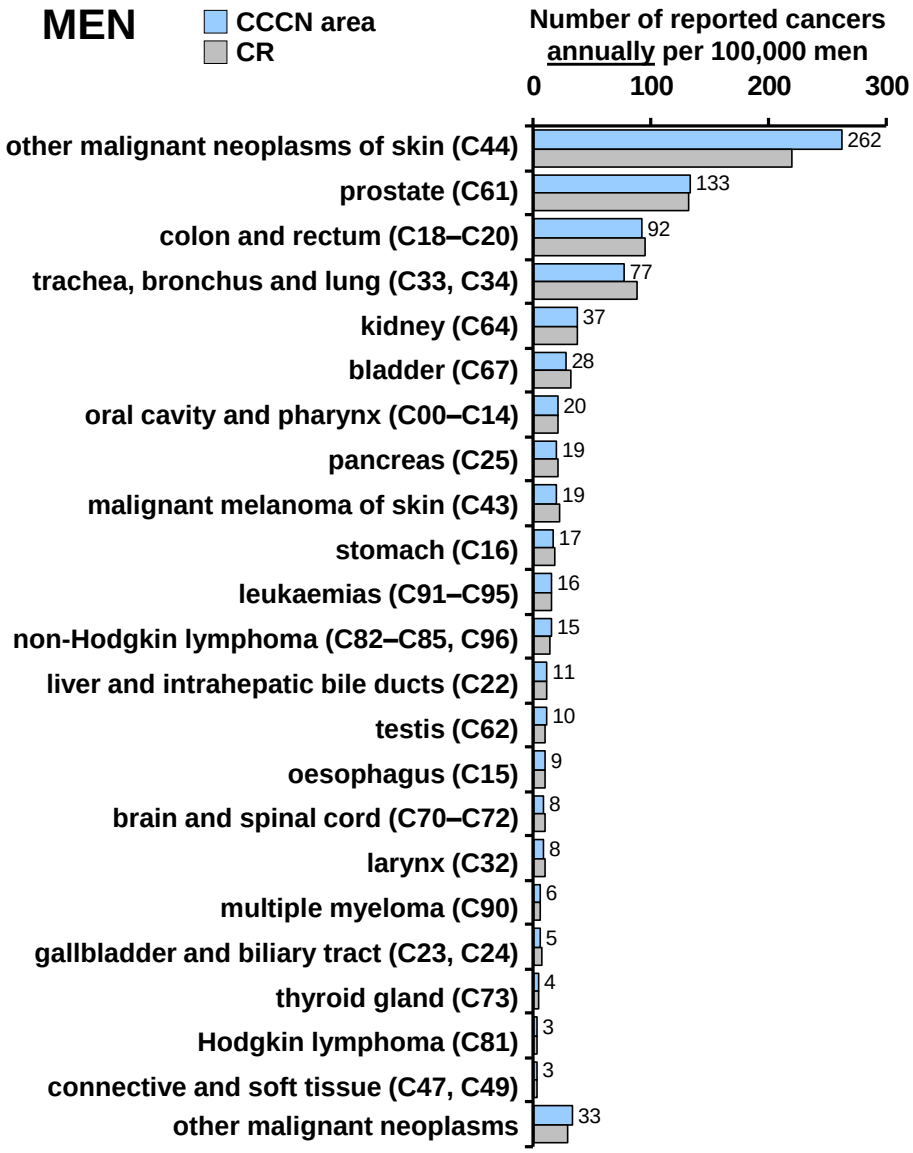


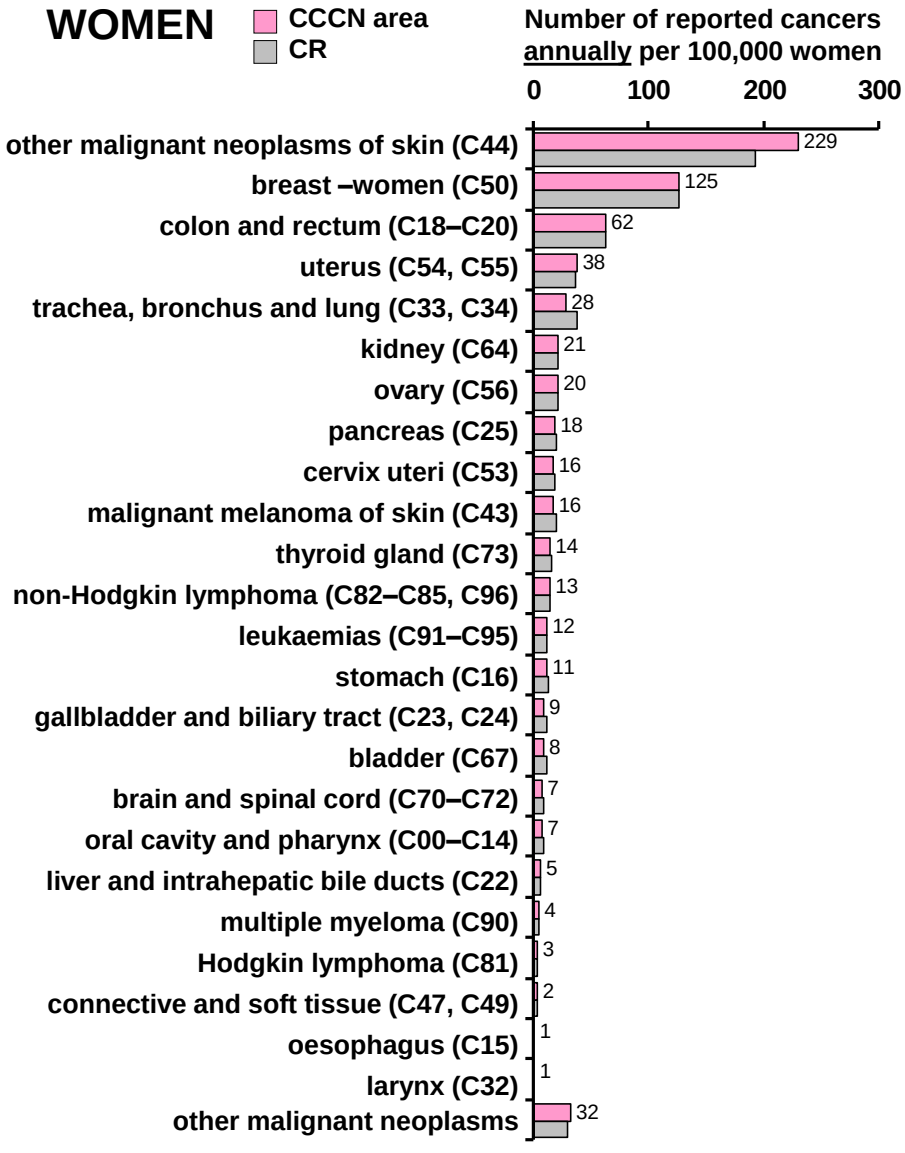
Women



Source: The Czech Statistical Office

Cancer incidence (2013–2015) – benchmarking





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Source: Czech National Cancer Registry (IHIS CR)

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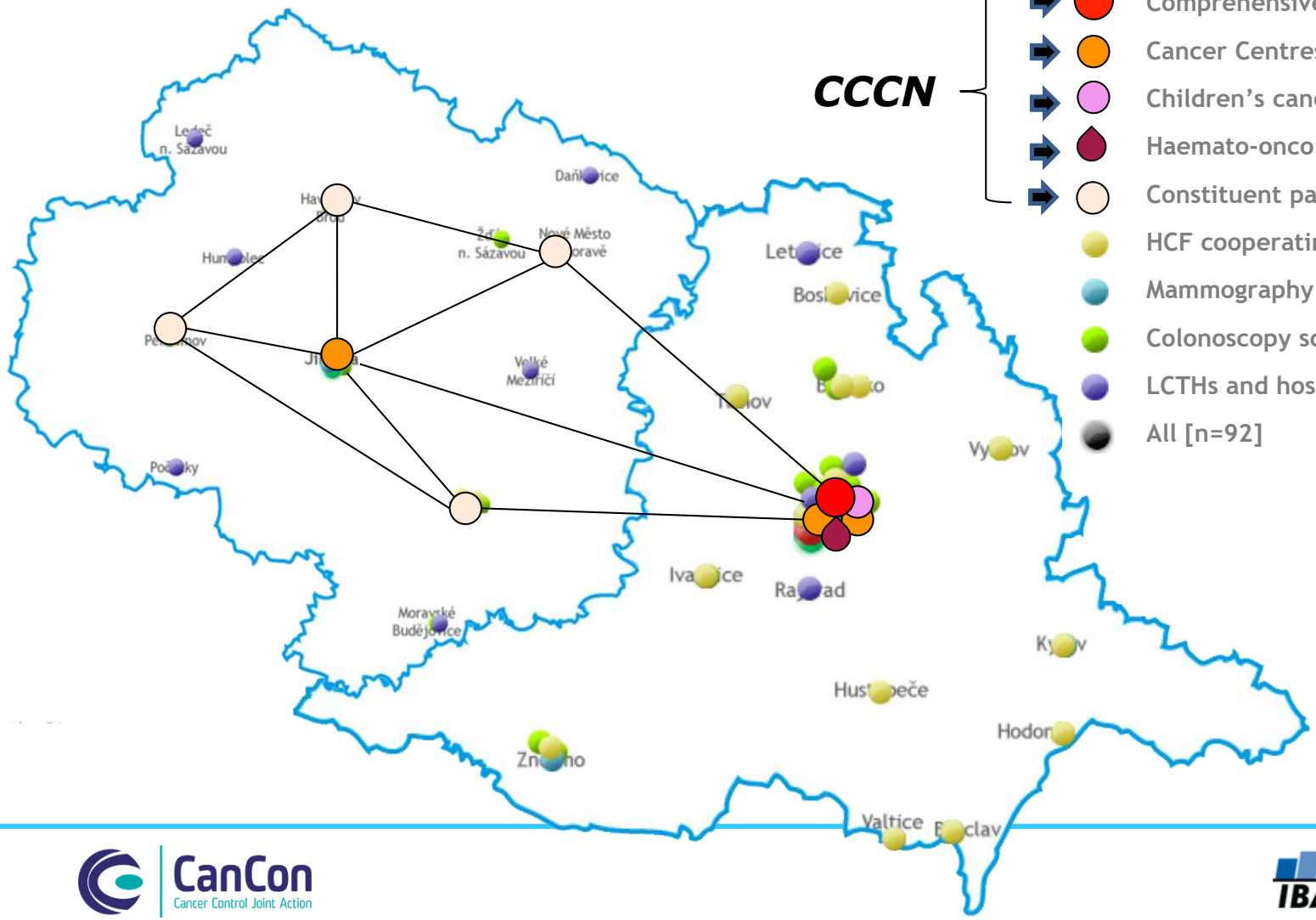
Pilot CCCN: South Moravian Region and Vysocina Region – cancer care infrastructure –

www.onconet.cz



Type of health care facility

CCCN

- Comprehensive Cancer Centre [n=1]
- Cancer Centres [n=3]
- Children's cancer centres [n=1]
- Haemato-oncology centres [n=1]
- Constituent parts of CCCN [n=4]
- HCF cooperating with CCs [n=20]
- Mammography screening centres [n=13]
- Colonoscopy screening centres [n=29]
- LCTHs and hospices [n=20]
- All [n=92]

Practical implementation = contract partners

On the below day, month and year, the participants, healthcare providers:

hereinafter referred to as "Providers"

and with the participation of the founder

Kraj Vysočina (Vysočina Region)

hereby and duly enter into this

Cooperation Agreement

of

Cooperating Cancer Care Network (KOS) Vysočina

Preamble:

The concept of cancer care development, better availability and the quality of cancer care are t
main priorities of the European health policy for the period 2014–2020. The main objectives of t
policy and related projects have been defined pursuant to the outcomes of the large all-Europe
project EPAAC (European Partnership for Action against Cancer). In the field of cancer c
organization, the main current challenge is the transition from solitary comprehensive cancer cent
to regional or trans-regional networks of comprehensive cancer care. Methodical preparation of t
transformation and its piloting is one of the key tasks of the current all-European program CANC
(Cancer Control Joint Action; http://www.cancercontrol.eu) in which the Czech Republic also plays
important role. Based on its infrastructure readiness and unique information system, the Cze
Republic was chosen as a pilot model for the implementation of the above transformation, usin
model of selected regions. The Vysočina Region has been identified as one of them; it can
therefore, stated that the transformation of cancer care organization in this region will fulfil one
the strategic objectives of the all-European policy in this area. Methodological findings from this pi
could be presented to the entire community and raise the prestige of the cancer care organizatior
model areas.

Assumptions for the functional comprehensive cancer care network

Common governance – given structure –

– multidisciplinary assessment

The main prerequisites for the successful establishment and sustainability of the comprehensive cancer care network are as follows:

1. Respect for the existing facilities and infrastructures. The establishment of a network of centres does not infer their forcible merger or cancellation; on the contrary, the functional network aims to maximize the use of available capacities and know-how throughout the region.
2. Evolutionary, rather than revolutionary, transition of the entire network to full functionality. Individual capacities gradually optimise on the basis of mutual cooperation so that, for example, the changes in the place of providing certain services are gradual and acceptable also for patients already treated.
3. Contract-based cooperation. A prerequisite for the network functionality is to conclude mutual agreements between participating providers of cancer health services, which define the mutual obligations and respect for the main principles of the network functioning.
4. Reasonable degree of centralization of services. Functional network of centres should be able to centralize treatment requiring highly specialized care and treatment of rare diseases. On the contrary, other care components and dispensary care must be optimally stratified so as to enhance its availability to patients.

Mandatory attributes of the functional comprehensive cancer care network

1. Contract-based cooperation of involved providers and members of the network
2. A single management system including common rules especially in the control and due management of care availability and quality.
3. Acceptance of common protocols (diagnostic and clinical standards), at least in the management of major cancer diagnoses
4. Clearly declared system of care organization, arranged in "layers" defining which services are centralized and which are not. Care availability model.
5. A common information system and common reporting for diagnostic and clinical data.
6. Established system of multidisciplinary assessment of clinical cases, including subsequent decisions on the manner of treatment and its location within the network.
7. Ability to communicate with neighbouring regions, to set up and map collaboration, and quantify the migration of patients.

In accordance with the European idea of developing cancer care and taking into account the assumptions for the functional network of comprehensive cancer care, the Parties to this agreement intend to commence the transformation of cancer care organization, which will contribute to the development of cancer care in the region and bring about improvement in its availability and quality. The aim of the cooperation of Providers of cancer care, which will be based on a contractual consideration of the mandatory attributes of the functional comprehensive cancer care network according to the rules adopted within the all-European project, is to standardize and unify the provision of health services in the field so that Providers duly render their services under a unified methodological guidance, in a comparable manner and with comparable results. Furthermore, the aim of the collaboration is also to ensure information exchange and facilitate the implementation of the principles of good practice and evidence-based medicine.

ment is binding upon the Parties concerned, i.e. Providers; the statutory bodies of the said
are responsible for its due observance. Participation of the Vysočina Region is determined
us as a founder of some Providers and will consist in supporting the declared cooperation
pplication of its legal powers – initiation and draft of measures that are discussed and
by the competent authorities of the region, incorporation of the proposed concept into
ocuments of the region.

Part 1 General provisions - the rights and obligations of Providers

ndertake to:

tively participate in the activities of KOS, create conditions for the participation of their
presentatives in working meetings of expert committees and for the activities of KOS,
pecially to send their representatives to the meetings of expert committees for the
cessary duration, provide technical support for meetings of expert committees.
legate qualified representatives to various expert committees.
here to the procedures determined by the oncology expert group (OOS) when providing
re to patients with cancer, so that these procedures correspond to the principles of
idence-based medicine, subject to the fulfilment of appropriate professional level in
cordance with the provisions of §4, subparagraph 5 of Act No. 372/2011 Coll., on Health
rvices and Conditions of Their Provision (Act on Health Services), as amended. Integrate
ese procedures, including the opinions of expert committees, into the controlled
cumentation for clinical practice and require their observance on the part of employees.
tively collaborate on creating a single information system to standardize and unify the
livery of health services in the field, and commence negotiations for that purpose after
ning this agreement without undue delay, and conclude an agreement on the analysis of
nical data with the Masaryk University in Brno (MU Brno), which will process the data of
oviders in full accord with Act No. 101/2000 Coll. and respect that the clinical data is the
operty of care providers. The purpose of the stated data processing is to obtain
formation to analyse and compare health services in the area of cancer care, and acquaint
oviders with the outcomes, which will enable them to manage and organize cancer care
thin the KOS, improve efficiency and bring about better results.
spital Jihlava, through the head of KOC, in collaboration with OOS and MU Brno, shall
sure the availability of reports and overviews created for Providers.
point a representative for the performance of this agreement, who will be responsible for
e mediation, application and observance of the mentioned medical procedures and
ligations arising from this agreement (usually the Deputy Director for Medical Care, or the
rector). A list of these responsible persons and their deputies is attached to this agreement
d shall be periodically updated (see Annex 1).
ow their professionals to put forward proposals for the attention of the respective expert
mmittees for amending treatment practices and protocols.
otivate their representatives to work within the KOS, particularly to remunerate them for
ccessful fulfilment of extra important working tasks in the amount determined according
their participation in the KOS activities and pursuant to agreements with other Providers
and chairman of the OOS. Pay the necessary expenses related to the participation of their
representatives in the expert groups.

Common protocols –

– QA/QC standards – common information system

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Pilot CCCN in global view

CCC
Masaryk Memorial Cancer Institute
www.mou.cz

Project coordination

Project coordination

Institute of Biostatistics and Analyses
www.iba.muni.cz

CCCN information system
ICT background
Data analyses

CC FN Brno
www.fnbrno.cz

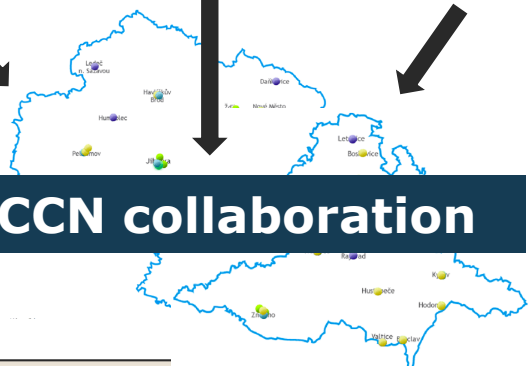
CC FNuSA
www.fnusa.cz

Project coordination

Project coordination

CC Jihlava
www.nemji.cz

Region Vysocina
- coordinating cancer centre -



CCCN collaboration

Masaryk University Faculty of Medicine
www.med.muni.cz

Education – Training
Certification
Research

Examples of outcomes I.

Mapping and re-organization of cancer care infrastructure

On-line CCCN management: www.onconet.cz

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Comprehensive cancer centers

Hospital facilities in general

Supportive and palliative centers

Screening centers

Primary care specialists

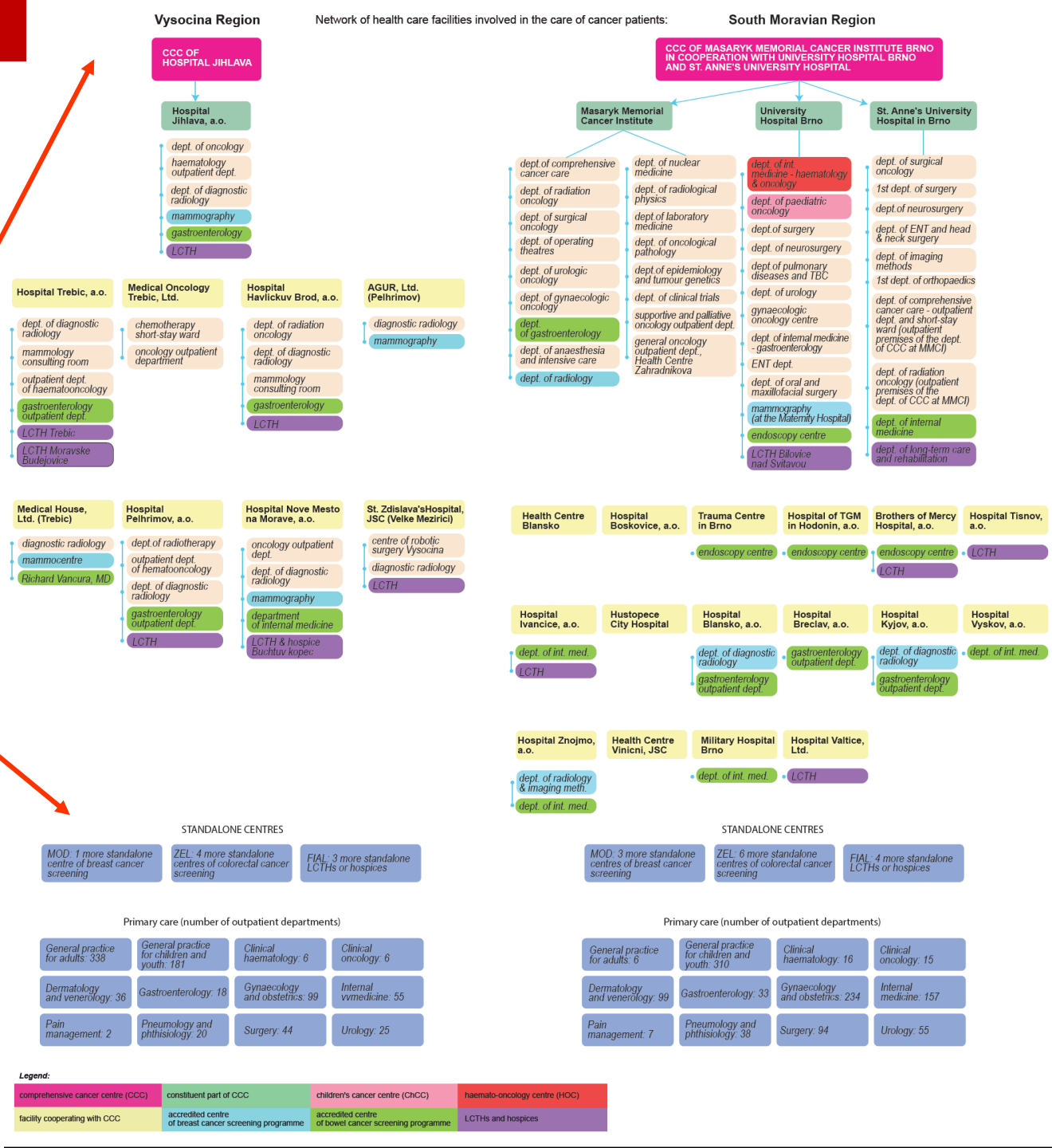
Diagrams of cancer care available for each region

PDF download

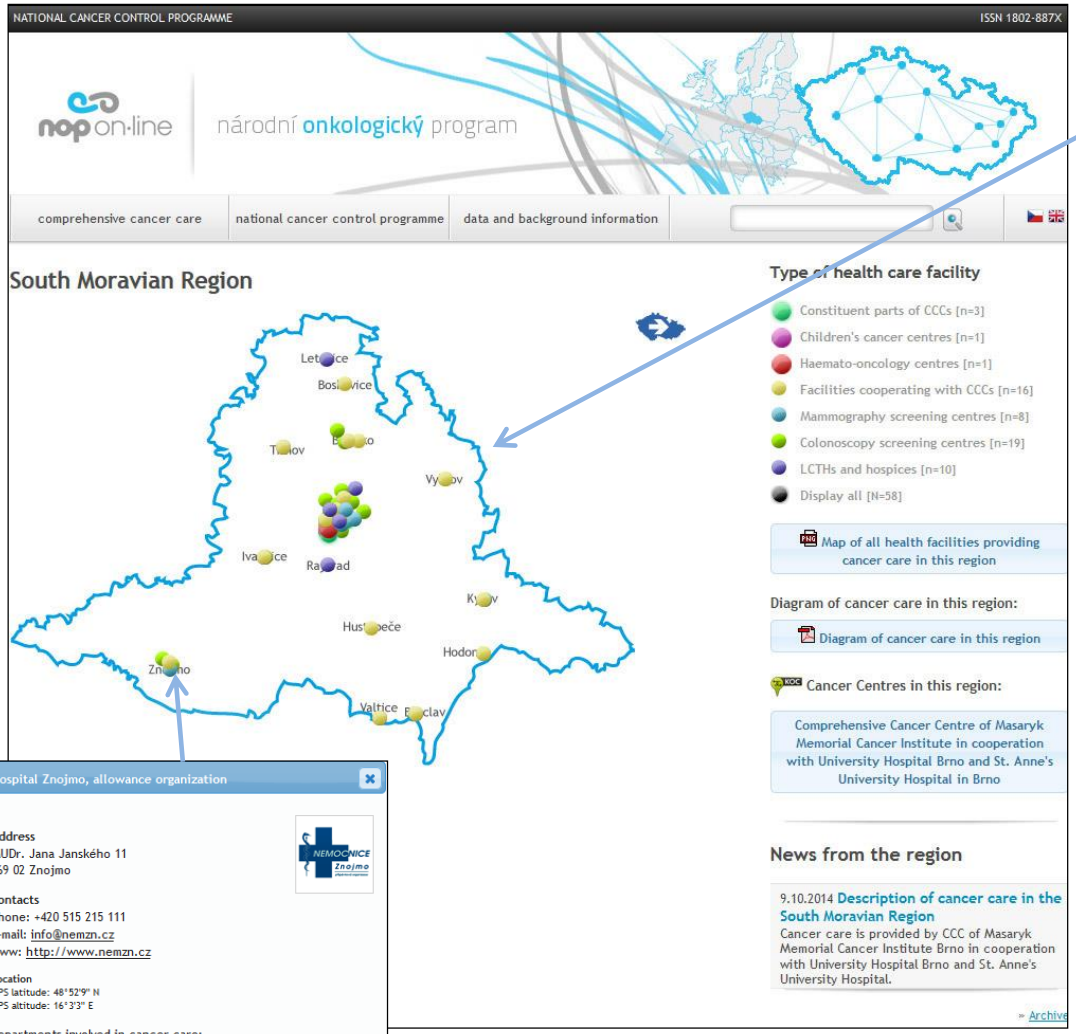
Regional models of cancer care, presenting professionals and navigating patients

Interactive maps

Access points



Regional models of cancer care



Map of facilities involved in comprehensive cancer care

Types and numbers of facilities

Diagram of cancer care

Link to a regional Cancer Centre

Regional news

Detail of a health care facility

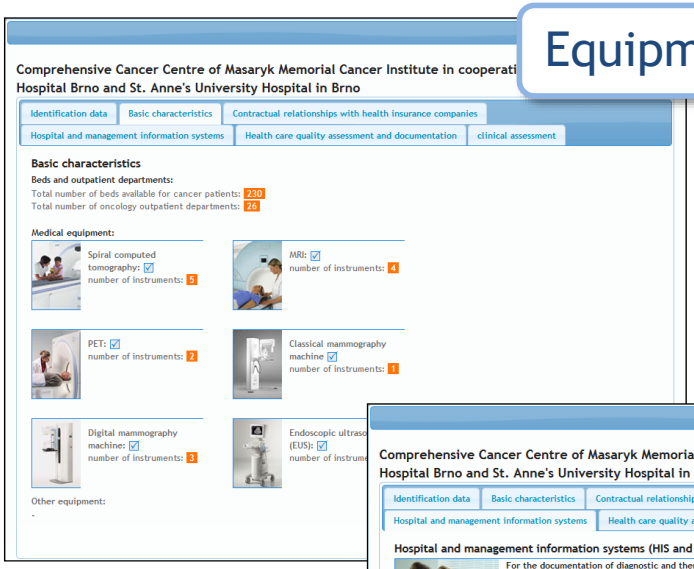
Cancer Centres On-line

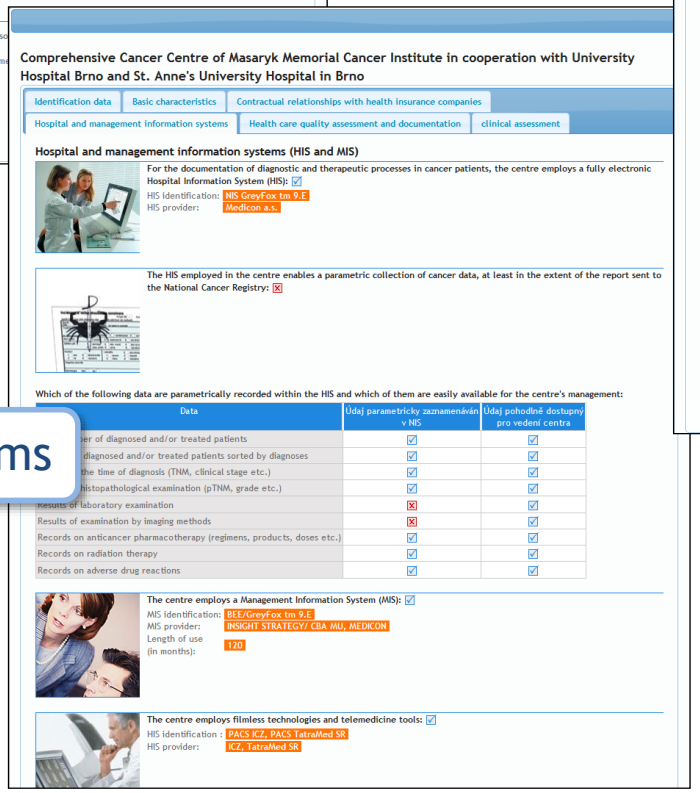
Equipment characteristics

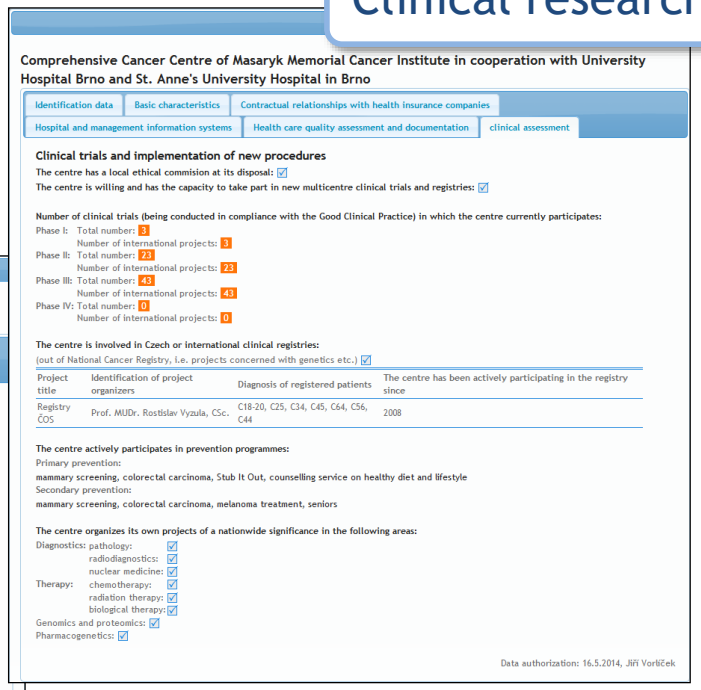
Clinical research

Information systems

...and more







Examples of outcomes II.

Data processing and reporting

- performance - patients' flow - equity - QA/QC system

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Population level: epidemiology

Hospital-based information systems

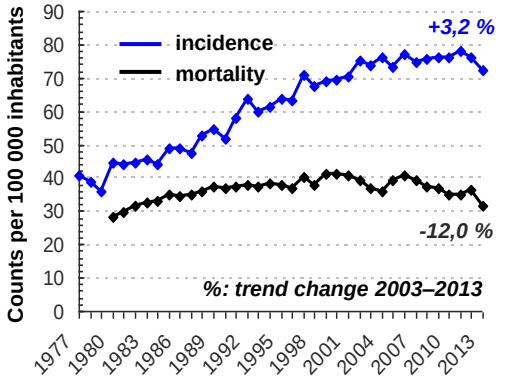
Predictions of cancer burden

Indicators of CCCN functionality

Examples of reporting generated by the Czech National Cancer Control System: I. Population level

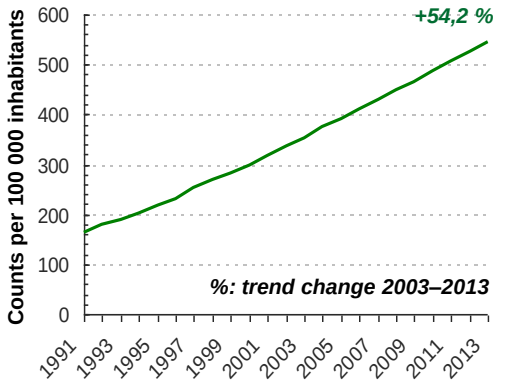
Model diagnosis: colorectal cancer – ***CCCN area***

Main trends: incidence & mortality



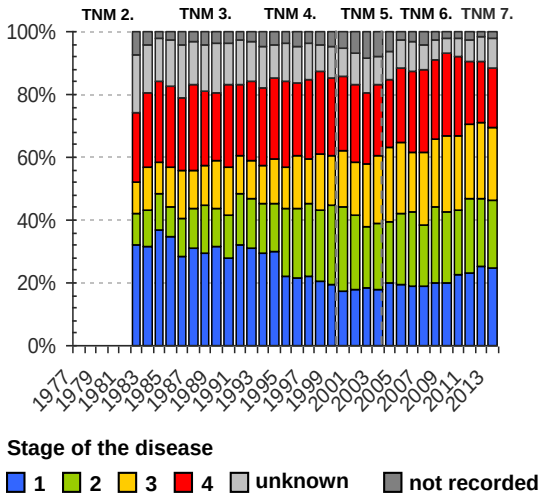
	Incidence	Mortality
Absolute counts in 2013	1 213	528
Counts per 100 000 in 2013	72,2	31,4

Main trends: prevalence



	Prevalence (31.12.2013)
Absolute counts	9 176
Counts per 100 000	546,5

Clinical stages: primary diagnosis



Survival of patients in time trends

Colorectal carcinoma (C18-C20)	5yr relative survival (95% IC)	
	2001–2006	2007–2012
All patients	58.3 (56.3–60.2)	68.2 (66.4–70.0)
stage 1	87.0 (82.4–90.5)	94.2 (89.6–96.8)
stage 2	72.3 (68.3–75.9)	84.2 (80.4–87.3)
stage 3	50.6 (46.9–54.2)	66.7 (63.5–69.7)
stage 4	12.0 (9.7–14.6)	15.8 (13.6–18.2)

Stochastic predictions of incidence and prevalence

Colorectal carcinoma (C18-C20)	Predictions for 2016	
	Incidence	Prevalence
Stage I	**312** (272; 352)	**3636** (3498; 3774)
Stage II	**282** (243; 321)	**2817** (2695; 2939)
Stage III	**329** (287; 371)	**2575** (2458; 2692)
Stage IV	**267** (230; 304)	**1308** (1225; 1391)
Stage unknown	**56** (35; 78)	**526** (475; 577)
TOTAL	**1246** (1165; 1327)	**10862** (10624;11100)

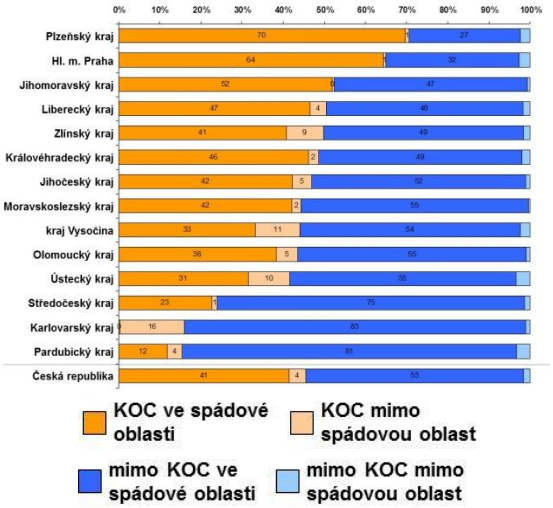
Stochastic predictions of therapeutic burden

Colorectal carcinoma (C18-C20)	Newly treated patients in 2016
Stage I	**272** (234; 310)
Stage II	**263** (248; 300)
Stage III	**306** (266; 346)
Stage IV – incidence	**178** (147; 209)
Disseminated relapses / progressions	**234** (199; 269)
TOTAL	**1253** (1172; 1334)

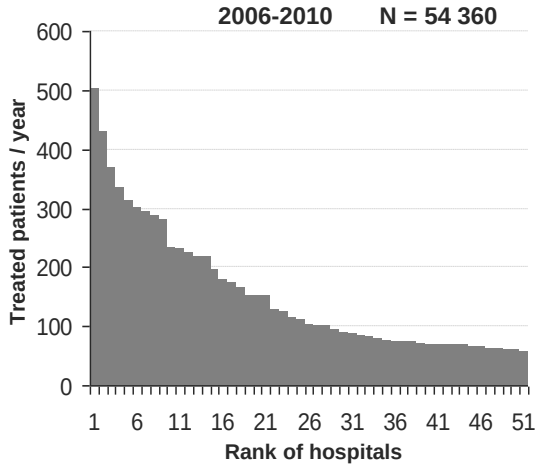
Examples of reporting generated by the Czech National Cancer Control System: II. Hospital level

Model diagnosis: colorectal carcinoma – ***CCCN area***

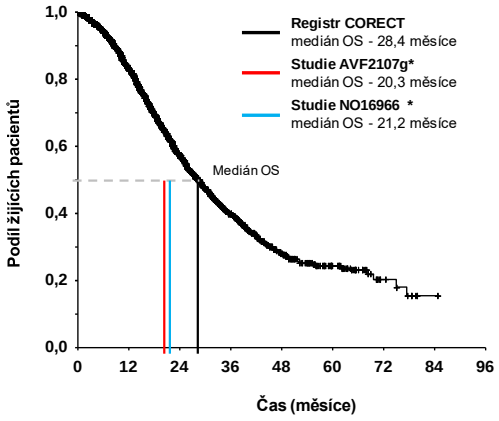
Distribution of care among regions/centers



Volume of primary care: capacity of CCCN

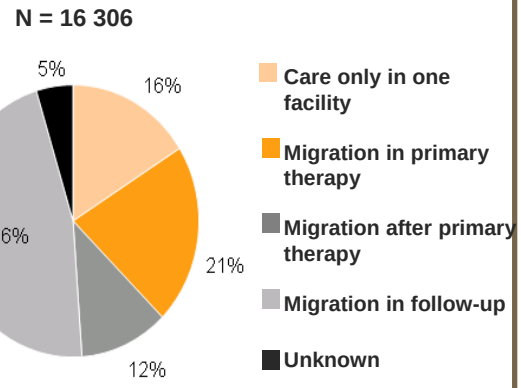


Benchmarking of outcome measures: Survival after given medication vs. EBM trials

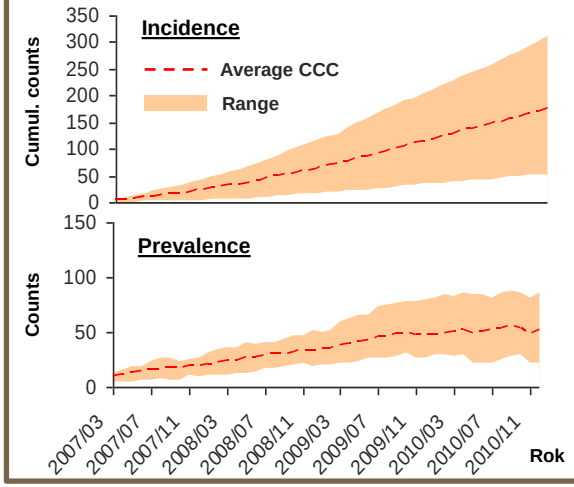


Migration of patients

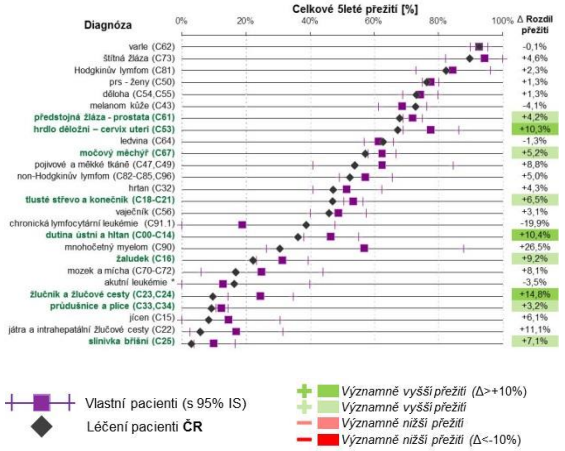
/Example of one CCC/



Incidence and prevalence of treated CRC patients: benchmarking

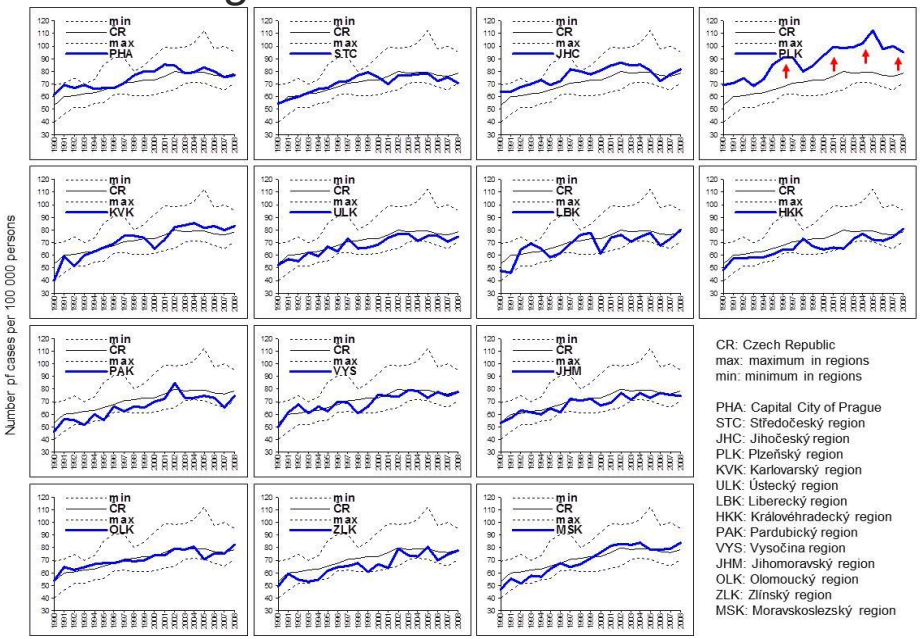


Benchmarking of outcome measures: 5yr survival – population comparisons

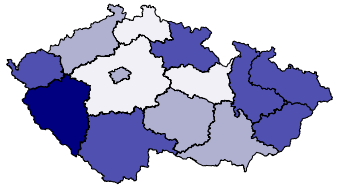


Examples of reporting: Predictive mapping of cancer burden

Model diagnosis: colorectal carcinoma



CRC (C18 – C20)	INCIDENCE (95 % CI)	PREVALENCE (95 % CI)
	---------- Prediction: 2016 ----------	
Stage I	**2050** (1903; 2197)	**21 376** (21 136; 21 616)
Stage II	**1951** (1844; 2057)	**19 104** (18 877; 19 331)
Stage III	**2117** (2010; 2226)	**15 114** (14 912; 15 316)
Stage IV	**1631** (1359; 1903)	**7083** (6945; 7221)
TOTAL	**8037** (7298; 8777)	**65 331** (64 911; 65 751)



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 Fínek[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

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Example of reporting: clinical outcome assessment

Model diagnosis: colorectal carcinoma

Contents lists available at ScienceDirect

Cancer Epidemiology

The International Journal of Cancer Epidemiology, Detection, and Prevention

journal homepage: www.cancerepidemiology.net

Trends in stage-specific population-based survival of cancer patients in the Czech Republic in the period 2000–2008

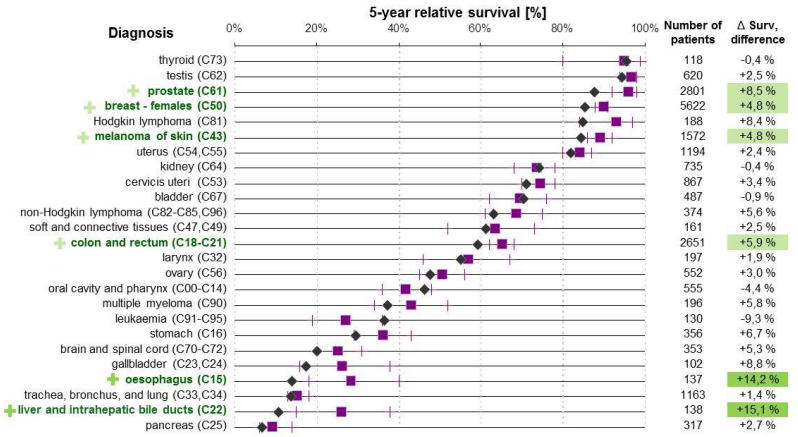
Tomáš Pavlík [a], Ondřej Májek [a], Tomáš Büchler [b], Rostislav Vyzula [c], Jiří Petera [d], Miroslav Ryska [e], Aleš Ryška [f], David Cibula [g], Marko Babjuk [h], Jitka Abrahámová [b], Jiří Vorlíček [c], Jan Mužík [a], Ladislav Dušek [a,*]

Population-based monitoring

CRC: 5-yr relative survival

	Cohort 1990–1994	Cohort 1995–1999	Period 2005–2009	Period 2010–2014
Stage 1	64,9 %	76,2 %	87,6 %	91,8 %
Stage 2	48,4 %	62,9 %	73,7 %	79,4 %
Stage 3	40,0 %	41,8 %	54,5 %	62,2 %
Stage 4	12,0 %	10,7 %	13,9 %	16,2 %
Total	47,9 %	51,7 %	59,4 %	65,4 %

Hospital-based benchmarking



Examples of outcomes III.

Population-based screening launched in 2014

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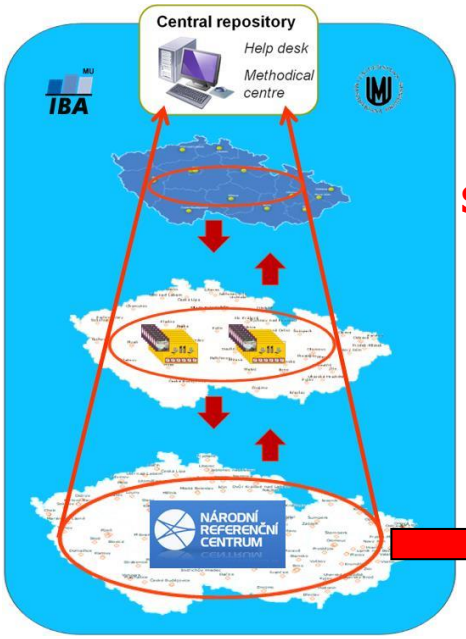
Information system for cancer screening

Call - recall control system

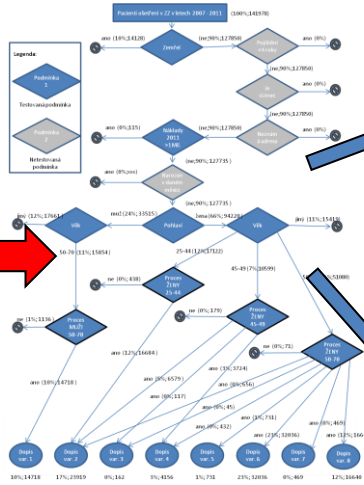
Reached coverage

Q/QC program

Management of population-based screening

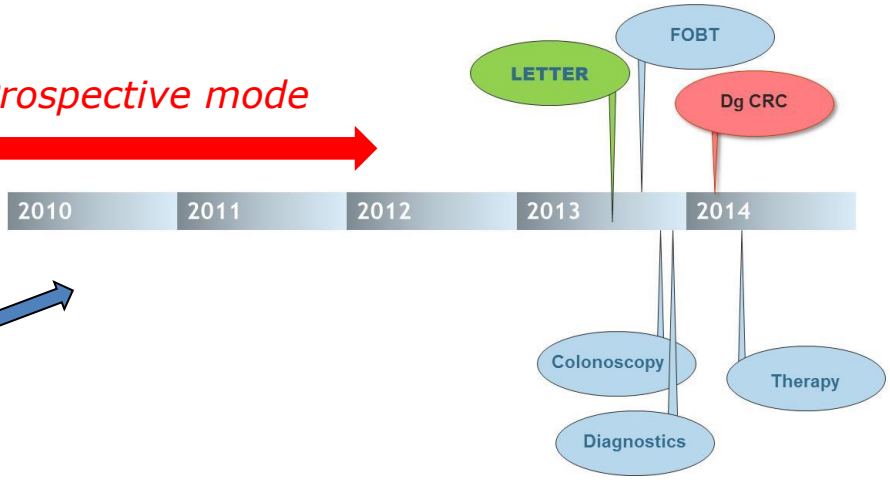


Selection of people to be addressed

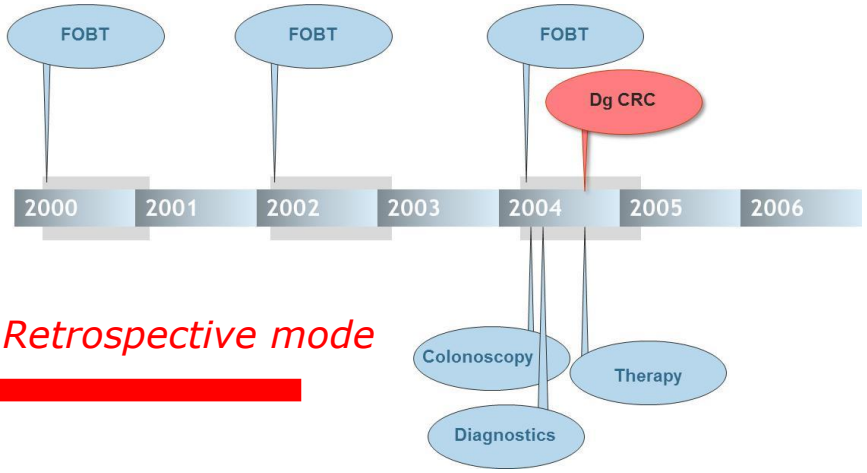


Backward monitoring

Prospective mode



Retrospective mode



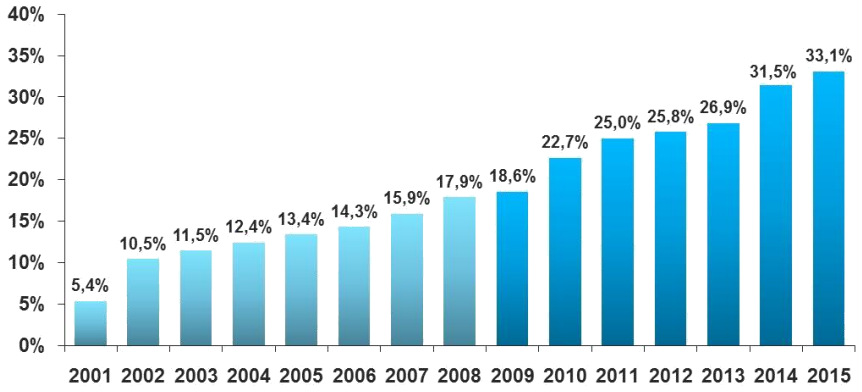
Czech PB screening: system of „birthday" invitation driven by health care payers.

Population – based screening: response of the population

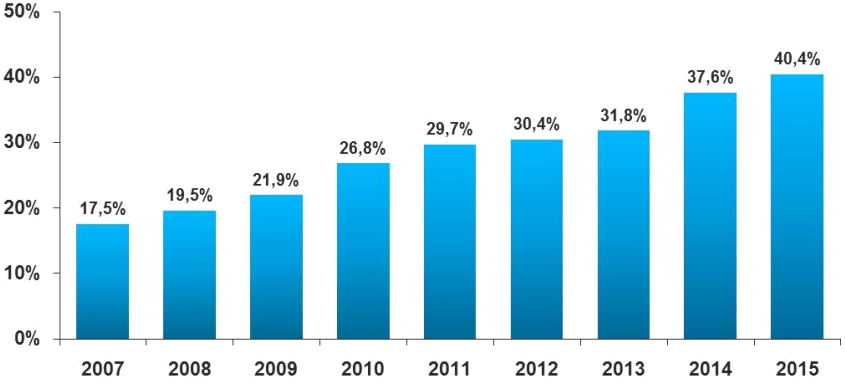
Colorectal cancer screening

FOBT & primary scr. colonoscopy

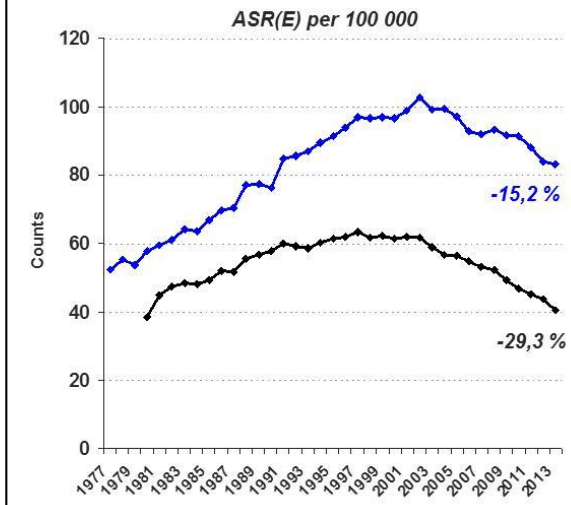
Overal coverage (age category 50+)

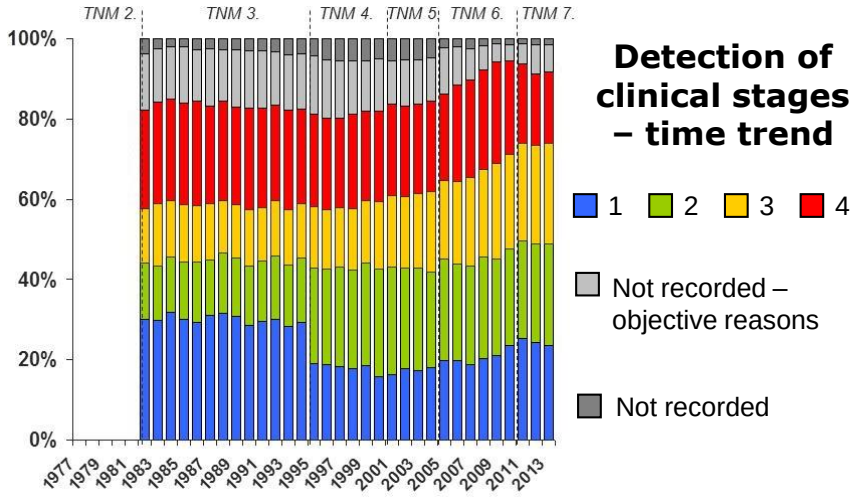


Overal coverage (age category 50 - 69)



Colorectal cancer epidemiology





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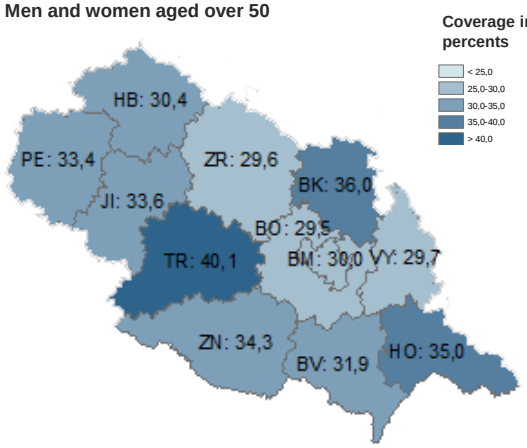
Examples of reporting generated by the Czech National Cancer Control System: Screening program

Model diagnosis: colorectal cancer – ***CCCN area***

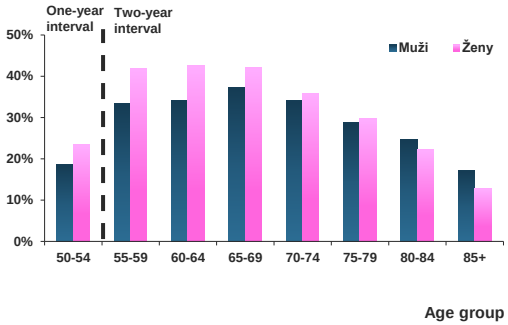
CRC screening: regional coverage

Men and women aged over 50



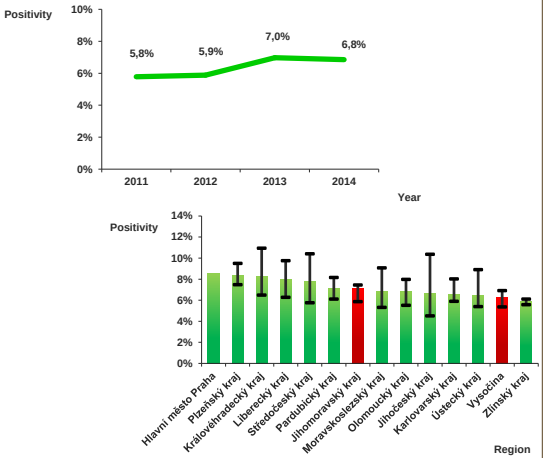
CRC screening: age-specific coverage

Coverage by screening



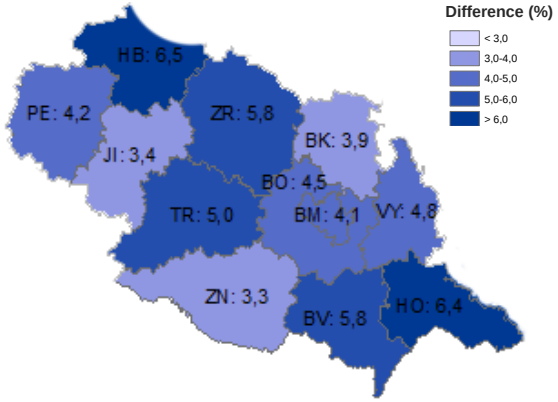
FOBT positivity: time trend and regional

Men and women aged over 50



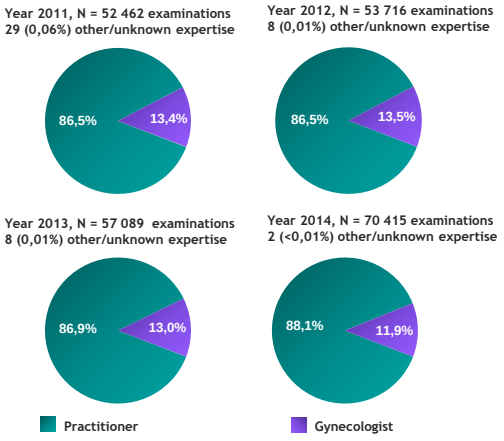
Coverage in time trend: 2013 vs. 2014

Men and women aged over 50



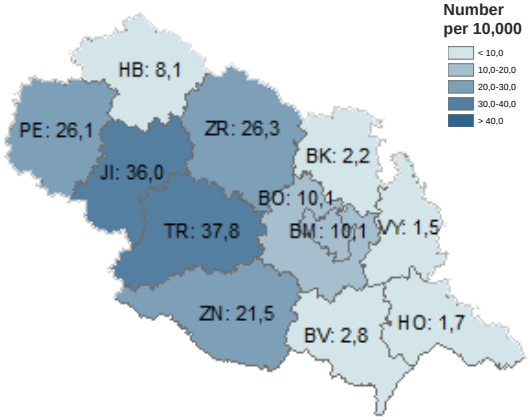
Share of primary care specialists

Women aged over 50



Primary screening Colonoscopy – regional coverage

Men and women aged over 50



FUTURE STEP

“Export“ of the CCCN model to the whole country -> changes in the National Cancer Control Plan

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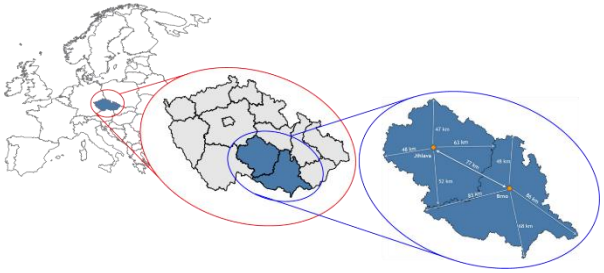
Promotion of CCCN outcomes

Workshops and conferences

Revision of the National Cancer Control Plan

New norms of the Ministry of Health

Results and quality of cancer care in the Vysočina Region: launch of the CCCN pilot model
Jihlava (CZE), 30 September 2016



Press conference for regional and national media

Workshop for health care professionals and policy makers

Results and quality of cancer care in the Vysočina Region: launch of the CCCN pilot model

Jihlava (CZE), 30 September 2016

Jiří Běhounek, MD
Governor of the Vysočina Region
Workshop opening, welcome

Prof. Jan Žaloudík, MD, PhD
Senate of the Parliament of the CR
Can Czech regions serve as a model of modern design of cancer care in the European Union?

Lukáš Velev, MD, MHA
Director of the Hospital Jihlava
A new model of cancer care organisation in the Vysočina Region

Lubomír Slavíček, MD, PhD
Cancer Care Department, Hospital Jihlava
Introduction of the Comprehensive Cancer Centre of the Hospital Jihlava

Assoc. Prof. Ladislav Dušek, PhD
Masaryk University / IHIS CZ
Cancer care in the Vysočina Region and its results according to recent national and international data

Jan Mužík, PhD
Masaryk University / IHIS CZ
Indicators of health status of the Vysočina Region population available online – a new reporting tool developed by IHIS CZ