Comprehensive Cancer Care Networking (CCCN) as effective cancer management model: pilot project of the Czech Republic (2014 -> 2017)

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

www.iba.muni.cz
Czech cancer care in 2013: many challenges

- High and growing cancer incidence
- Regional set of cancer centers
- Opportunistic cancer screening
- Management of growing burden
- Population-based interventions
- Equal access to high quality care
Pilot model of the 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: controlled patient pathways

CC(s) -> Evolutionary – step by step – transformation -> CCCN(s)
Pilot CCCN -> Main BARRIERS to overcome

- Legislation allowing data centralization
- Representative cancer care model
- Support of stakeholders and payers
- Functional reimbursement mechanisms
- Comprehensive registries
- Personal data protection
- Certified re-organization
- Effective QA/QC system

LEGAL BACKGROUND

FUNCTIONAL E-HEALTH

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Pilot CCCN -> IT infrastructure for cancer care networking

Central repository

Help desk
Methodical centre

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

Equity of health care
Structure of health care
Results of health care

Quality of health care

REPORTS

Data validation

Quality of health care

Volume of health care

Distribution of health care

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Cancer Control Joint Action
Complexity of the CCCN = complexity of its ICT background

SEGMENT VIEW

Prevention screening ➔ Primary care ➔ Diagnostics & therapy ➔ Follow-up Supportive care ➔ Palliative care

INDIVIDUAL VIEW

Diagnostics ➔ Therapy ➔ Supportive care ➔ Palliative care
Established Pilot CCCN
- written agreement
- CCCN structure
- CCCN territory

Spatially closed, geographically interconnected regions

Fully representative demographic, social and epidemiologic attributes

Sufficient demographic mass of people (patients)
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.

<table>
<thead>
<tr>
<th></th>
<th>South Moravian Region</th>
<th>Vysočina Region</th>
<th>Both regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (as of 31/12/2015)</td>
<td>1 175 025</td>
<td>509 475</td>
<td>1 684 500</td>
</tr>
<tr>
<td>Area (km²)</td>
<td>7 195</td>
<td>6 796</td>
<td>13 991</td>
</tr>
<tr>
<td>Population density (per km²)</td>
<td>163</td>
<td>75</td>
<td>120</td>
</tr>
<tr>
<td>Number of districts</td>
<td>7</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Number of municipalities</td>
<td>673</td>
<td>704</td>
<td>1 377</td>
</tr>
<tr>
<td>Total length of roads and motorways (km, estimation)</td>
<td>4 500</td>
<td>5 000</td>
<td>9 500</td>
</tr>
<tr>
<td>Total length of railway network (km, estimation)</td>
<td>800</td>
<td>650</td>
<td>1 450</td>
</tr>
</tbody>
</table>
Demography in the CCCN area (2015) – benchmarking

The distribution of age groups in the population

**Men**

- Various age groups in the population [%]

**Women**

- Various age groups in the population [%]

Source: The Czech Statistical Office

Source: Czech National Cancer Registry (IHIS CR)
Pilot CCCN: South Moravian Region and Vysocina Region – cancer care infrastructure –

www.onconet.cz

Type of health care facility

- 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]
Pilot CCCN in institutional view

CCCN collaboration

Masaryk Memorial Cancer Institute
www.mou.cz

CC FN Brno
www.fnbrno.cz

CC FNuSA
www.fnusa.cz

CC Jihlava
www.nemji.cz
Region Vysocina - coordinating cancer centre -

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

CCCN information system
ICT background
Data analyses

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

Education – Training Certification Research
Practical implementation: written agreement

Common governance – given structure –

- multidisciplinary assessment

Common protocols –  
- QA/QC standards – common information system

Preamble:
The concept of cancer care development, better availability and the quality of cancer care are main priorities of the European health policy for the period 2014–2020. The main objectives of this policy and related projects have been defined pursuant to the outcomes of the large all-European project ERAC (European Partnership for Action against Cancer). In the field of cancer care, the main current challenge is the transition from solitary comprehensive cancer center to regional or trans-regional networks of comprehensive cancer care. Methodological preparation of this transition 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 an important role. Based on its infrastructure readiness and unique information system, the Czech Republic was chosen as a pilot model for the implementation of the above transformation, using a model of selected regions.

Assumptions for the functional comprehensive cancer care network

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 the Parties for the development 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 and medical staff deliver services under a unified methodological guidance, in a comparable manner and with comparable results. Furthermore, the aim of the collaboration is to also ensure information exchange and facilitate the implementation of the principles of good practice and evidence-based medicine.

Part 1 General provisions - the rights and obligations of the Providers undertake to:

- actively participate in the activities of KOS, create conditions for the participation of representatives in working meetings of expert committees and for the activities of KOS, particularly to send their representatives to the meetings of expert committees for the necessary duration, provide technical support for meetings of expert committees, negotiate with representatives of various expert committees,

here to the procedures determined by the oncology expert group (OGS) when providing care to patients with cancer, so that these procedures correspond to the principles of evidence-based medicine, subject to the fulfillment of appropriate professional level in accordance with the provisions of 5, paragraph 3 of Act No. 372/2011 Coll., on Health care and Conditions of Their Provision (Act on Health Services), as amended. Integrate procedures, including the opinions of expert committees, into the controlled documentation for clinical practice and require their observance on the part of employees.

The cooperation of the Parties is focused on creating a single information system to standardize and unify the delivery of health services in the field and, where applicable, negotiate with relevant secretaries for that purpose after negotiating an agreement without undue delay, and conclude an agreement on the analysis of digital data with the University Hospital in Brno (MU Brno), which will process the data of patients in full accordance with Act No. 101/2000 Coll. and respect that the clinical data is the property of care providers. The purpose of the stated data processing is to obtain formation to analyze and compare health services in the area of cancer care, and in cooperation with the providers, which will enable them to manage and organize cancer care within the KOS, improve efficiency and bring about better results.

The cooperation of the Parties is focused on creating a single information system to standardize and unify the delivery of health services in the field and, where applicable, negotiate with relevant secretaries for that purpose after negotiating an agreement without undue delay, and conclude an agreement on the analysis of digital data with the University Hospital in Brno (MU Brno), which will process the data of patients in full accordance with Act No. 101/2000 Coll. and respect that the clinical data is the property of care providers. The purpose of the stated data processing is to obtain formation to analyze and compare health services in the area of cancer care, and in cooperation with the providers, which will enable them to manage and organize cancer care within the KOS, improve efficiency and bring about better results.
Practical implementation: common governance

- Management coordination and leadership
  - Network managerial board
  - Network governance, financial management
  - Involvement of stakeholders, patients

- Cancer care standards and pathways
  - Standardization of protocols and procedures
  - Multidisciplinary tumor assessment
  - Quality control with clinical feedback
  - Research activities

- Independent evaluation team
  - QA/QC control
  - Quality and performance evaluation
    - Management of ICT background
    - QA/QC, reporting, predictions
Examples of outcomes I.

ICT background and e-communication tools

www.onconet.cz

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

Information systems

Clinical research

...and more
Examples of outcomes II.

Data processing and reporting
- performance - patients’ flow - equity - QA/QC system

Population level: epidemiology
Hospital-based information systems

Predictions of cancer burden
Indicators of CCCN functionality
## CCCN pilot: performance, quality and outcome assessment

<table>
<thead>
<tr>
<th>Equity Performance</th>
<th>Epidemiological registries</th>
<th>Hospital data /EHR/</th>
<th>Specialized registries (surveys)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CCCN coverage in catchment area</td>
<td>Access to CCCN entry points Consumption rates</td>
<td>Social &amp; demographic typology of treated patients</td>
</tr>
<tr>
<td></td>
<td>Volume of care</td>
<td></td>
<td></td>
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<tr>
<td>(Re)distribution of care</td>
<td>Pathways: primary and follow-up care</td>
<td>Pathways: specific therapeutic procedures / drugs</td>
<td></td>
</tr>
<tr>
<td>Inter-regional migration for care</td>
<td>Performance of tumor management teams</td>
<td></td>
<td></td>
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<tr>
<td>Patient pathways</td>
<td>No. of patients enrolled</td>
<td>Hospitalization-related safety and outcome measures</td>
<td>Time aspects of diagnostics, staging, follow-up</td>
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<tr>
<td></td>
<td>Patient flow</td>
<td></td>
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<tr>
<td>Standardized protocols</td>
<td>Population-based reference: mortality and survival</td>
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<td></td>
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<tr>
<td>Safety, efficacy Outcomes</td>
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**CanCon**

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

Model diagnosis: colorectal cancer – CCCN area

**Main trends: incidence & mortality**

<table>
<thead>
<tr>
<th>Year</th>
<th>Incidence</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980</td>
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<tr>
<td>1983</td>
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<td>2001</td>
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<tr>
<td>2004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td></td>
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</tbody>
</table>

**Main trends: prevalence**

<table>
<thead>
<tr>
<th>Year</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td></td>
</tr>
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<td>1986</td>
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<tr>
<td>2007</td>
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<tr>
<td>2010</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
</tr>
</tbody>
</table>

**Stochastic predictions of incidence and prevalence**

<table>
<thead>
<tr>
<th>Colorectal carcinoma (C18-C20)</th>
<th>Predictions for 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Incidence</td>
</tr>
<tr>
<td><strong>Stage I</strong></td>
<td>312 (272; 352)</td>
</tr>
<tr>
<td><strong>Stage II</strong></td>
<td>282 (243; 321)</td>
</tr>
<tr>
<td><strong>Stage III</strong></td>
<td>329 (287; 371)</td>
</tr>
<tr>
<td><strong>Stage IV</strong></td>
<td>267 (230; 304)</td>
</tr>
<tr>
<td><strong>Stage unknown</strong></td>
<td>56 (35; 78)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1246 (1165; 1327)</td>
</tr>
</tbody>
</table>

**Stochastic predictions of therapeutic burden**

<table>
<thead>
<tr>
<th>Colorectal carcinoma (C18-C20)</th>
<th>Newly treated patients in 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage I</strong></td>
<td>272 (234; 310)</td>
</tr>
<tr>
<td><strong>Stage II</strong></td>
<td>263 (248; 300)</td>
</tr>
<tr>
<td><strong>Stage III</strong></td>
<td>306 (266; 346)</td>
</tr>
<tr>
<td><strong>Stage IV</strong> - incidence</td>
<td>178 (147; 209)</td>
</tr>
<tr>
<td>Disseminated relapses / progressions</td>
<td>234 (199; 269)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1253 (1172; 1334)</td>
</tr>
</tbody>
</table>
### Estimating the number of colorectal cancer patients treated with anti-tumour therapy in 2015: the analysis of the Czech National Cancer Registry

**Background:** Colorectal cancer (CRC) represents a serious health care problem in the Czech Republic, introducing a need for a prospective modeling of the incidence and prevalence rates. The prevalence of patients requiring anti-tumour therapy is 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 scenario, the model predicts an increase in CRC prevalence from 1.9% in 2014 to 2% in 2015 compared with the situation in 2008. Moreover, this 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 III, it is projected that 14,492 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. It models the clinical stage as the primary stratification factor and utilizes solely the population-based cancer registry data. As no specific hospital data records are needed in the proposed approach. The main advantage of the CRC model is the presented continuous increase in the burden of CRC that must be accounted for in the future planning of health care in the Czech Republic.

### Table: Incidence and Prevalence of Colorectal Cancer (2016)

<table>
<thead>
<tr>
<th>Stage</th>
<th>INCIDENCE</th>
<th>PREVALENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(95% CI)</td>
<td>(95% CI)</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Stage I</td>
<td>2050 (1903; 2197)</td>
<td>21 376 (21 136; 21 616)</td>
</tr>
<tr>
<td>Stage II</td>
<td>1951 (1844; 2057)</td>
<td>19 104 (18 877; 19 331)</td>
</tr>
<tr>
<td>Stage III</td>
<td>2117 (2010; 2226)</td>
<td>15 114 (14 912; 15 316)</td>
</tr>
<tr>
<td>Stage IV</td>
<td>1631 (1359; 1903)</td>
<td>7083 (6945; 7221)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>8037 (7298; 8777)</td>
<td>65 331 (64 911; 65 751)</td>
</tr>
</tbody>
</table>
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

Incidence and prevalence of treated CRC patients: benchmarking

Migration of patients
/Example of one CCC/

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

Benchmarking of outcome measures: 5yr survival – population comparisons

Volume of primary care: capacity of CCCN

N = 16 306

Care only in one facility
Migration in primary therapy
Migration after primary therapy
Migration in follow-up
Unknown

N = 54 360

Registr CORECT
medián OS - 28,4 měsíce
Studie AVF2107g*
medián OS - 20,3 měsíce
Studie NO16966*
medián OS - 21,2 měsíce

Prevalence
Counts
Cumul. counts

Rok

Vol. of primary care: capacity of CCCN

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

Incidence

Average CCC

Range

Rok

Counts

0 50 100 150 200 250 300 350
0 12 24 36 48 60 72 84 96

0,0
0,2
0,4
0,6
0,8
1,0

Medián OS

Registr CORECT
medián OS - 28,4 měsíce
Studie AVF2107g*
medián OS - 20,3 měsíce
Studie NO16966*
medián OS - 21,2 měsíce

Medián OS

Čas (měsíce)

Registr CORECT
medián OS - 28,4 měsíce
Studie AVF2107g*
medián OS - 20,3 měsíce
Studie NO16966*
medián OS - 21,2 měsíce

Čas (měsíce)
Example of reporting: clinical outcome assessment

Model diagnosis: colorectal carcinoma

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

Tomáš Pavlík, Ondřej Májek, Tomáš Büchler, Rostislav Vyzula, Jiří Petera, Miroslav Ryska, Aleš Ryška, David Cibula, Marko Babjuk, Jiřka Abrahámová, Jiří Vorlíček, Jan Mužík, Ladislav Dušek

Population-based monitoring

**CRC: 5-yr relative survival**

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>64.9 %</td>
<td>76.2 %</td>
<td>87.6 %</td>
<td>91.8 %</td>
</tr>
<tr>
<td>Stage 2</td>
<td>48.4 %</td>
<td>62.9 %</td>
<td>73.7 %</td>
<td>79.4 %</td>
</tr>
<tr>
<td>Stage 3</td>
<td>40.0 %</td>
<td>41.8 %</td>
<td>54.5 %</td>
<td>62.2 %</td>
</tr>
<tr>
<td>Stage 4</td>
<td>12.0 %</td>
<td>10.7 %</td>
<td>13.9 %</td>
<td>16.2 %</td>
</tr>
<tr>
<td>Total</td>
<td>47.9 %</td>
<td>51.7 %</td>
<td>59.4 %</td>
<td>65.4 %</td>
</tr>
</tbody>
</table>

Hospital-based benchmarking
Examples of reporting generated by the Czech National Cancer Control System: III. Screening program

*Model diagnosis: colorectal cancer – CCCN area*

**CRC screening: regional coverage**

Men and women aged over 50

Coverage in percents:
- < 25.0
- 25.0-30.0
- 30.0-35.0
- 35.0-40.0
- > 40.0

- HB: 30.4
- PE: 33.4
- ZR: 29.6
- Ji: 33.6
- BK: 36.0
- TR: 40.1
- BO: 29.5
- BM: 30.0
- Vy: 29.7
- ZN: 34.3
- BV: 31.9
- HO: 35.0

**CRC screening: age-specific coverage**

Coverage by screening:
- One-year interval
- Two-year interval

<table>
<thead>
<tr>
<th>Age group</th>
<th>Coverage by screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-54</td>
<td>50.0%</td>
</tr>
<tr>
<td>55-59</td>
<td>45.0%</td>
</tr>
<tr>
<td>60-64</td>
<td>40.0%</td>
</tr>
<tr>
<td>65-74</td>
<td>35.0%</td>
</tr>
<tr>
<td>75-84</td>
<td>30.0%</td>
</tr>
<tr>
<td>85+</td>
<td>25.0%</td>
</tr>
</tbody>
</table>

**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

- Year 2011, N = 52 462 examinations
  - 29 (0.06%) other/unknown expertise
  - Coverage: 86.5% for Practitioner, 13.5% for Gynecologist

- Year 2012, N = 53 716 examinations
  - 8 (0.01%) other/unknown expertise
  - Coverage: 86.5% for Practitioner, 13.5% for Gynecologist

- Year 2013, N = 57 089 examinations
  - 5 (0.01%) other/unknown expertise
  - Coverage: 86.9% for Practitioner, 13.1% for Gynecologist

- Year 2014, N = 70 415 examinations
  - 2 (<0.01%) other/unknown expertise
  - Coverage: 88.1% for Practitioner, 11.9% for Gynecologist

**Primary screening Colonoscopy – regional coverage**

Men and women aged over 50

- Number per 10,000
  - < 10,0
  - 10,0-20,0
  - 20,0-30,0
  - > 30,0

- New percentages compared to previous years:
  - > 6.0
  - 5.0-6.0
  - 4.0-5.0
  - 3.0-4.0
  - < 3.0
SW Moravia CCCN in its web portal

Regions of CCCN pilot model

Vysočina Region

General characteristics: an overview of history and demography

The Vysočina Region is an administrative unit of the Czech Republic, located on the border of historical regions of Bohemia and Moravia. The Vysočina Region is divided into five districts, namely: Havičkův Brod District, Jihlava District, PešťovDistrict, Třebíč District and Zďár nad Sázavou District.

The Vysočina Region was established on 1 January 2000 by the Fundamental Law No. 347/1997 Coll. by joining three districts of the former South Moravian Region, one district of the former East Bohemian Region, and one district of the former South Bohemian Region. Since the very beginning, the newly created region had to face many problems that emerged from an artificial connection of areas that had formerly belonged to three various regional centres. The declared "natural catchment area" of Jihlava, the newly created capital of the Vysočina Region, was a wishful thinking rather than reality. All these problems affected health care as well, including cancer care. The doctrine imposed by former regional management, who intended to develop five equal regional hospitals that would compete with each other, also had a negative impact on the development of network of health care providers and mutual relations. This trend was enforced even in 2008 – at the time when Comprehensive Cancer Centres were being developed – and a gradual change has been under way only in recent years.

The Vysočina Region has 510,520 inhabitants, out of which 253,218 (49.6%) are men and 257,302 (50.4%) are women (data from 2013 census). Population of the Vysočina Region accounts for about 5% of the entire population of the Czech Republic. The population density is very low, with the number of inhabitants per square kilometer (75.1) hardly reaching 57% of the national average. A dispersed settlement is a characteristic feature of the Vysočina Region: there is a large number of small municipalities.

Comprehensive cancer care

The comprehensive cancer care works very well in the Vysočina region: from preventive screening programmes to diagnosis, treatment and follow-up. The Comprehensive Cancer Centre is located in Hospital Jihlava, which therefore serves as the catchment centre for a more demanding and specialised cancer care, whereas other regional hospitals largely contribute to the basic care.

Authorities of the Vysočina Region established five regional hospitals, which provide cancer care in various extent and volume. This structure is supplemented by a private outpatient facility focused on medical oncology in Třebíč, as well as numerous smaller private facilities, which deal primarily with cancer diagnosis, prevention, and palliative care. At the time of development of cancer care in the Vysočina Region, it was necessary to take into account that the region actually has no natural catchment centre such as a university hospital or central hospital, and that subjects dealing with cancer care were

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### Examples of the CCCN assessment. I. Coverage of TM teams

**Place of treatment of all malignant neoplasms (C00–C97) without C44 from the South-West Moravian region**

<table>
<thead>
<tr>
<th>Region of residence:</th>
<th>Malignant neoplasms (MN) in %</th>
<th>Annual average number of MN in SW Moravia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vysočina region</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006–2007</td>
<td></td>
<td>N = 2,152</td>
</tr>
<tr>
<td>2011–2012</td>
<td></td>
<td>N = 2,194</td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td>N = 2,228</td>
</tr>
<tr>
<td><strong>South Moravian region</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006–2007</td>
<td></td>
<td>N = 4,424</td>
</tr>
<tr>
<td>2011–2012</td>
<td></td>
<td>N = 4,727</td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td>N = 4,784</td>
</tr>
<tr>
<td><strong>CCCN: Vysočina + South Moravia</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014–2015</td>
<td></td>
<td>N = 6,998</td>
</tr>
</tbody>
</table>

**Place of therapy:**
- Purple: treated in separated CC in the region (prior to the CCCN establishment)
- Light blue: treated in other CC (out of the region - prior to the CCCN establishment)
- Dark blue: treated in other hospital in the region
- Gray: treated in other hospital in other region

Data: Czech National Cancer Registry
Examples of the CCCN assessment. II. Patient pathways

Patient pathways:
I. Vysočina region → South Moravian region
II. South Moravian region → Vysočina region
III. Vysočina region CCCN healthcare facilities → HJI
IV. HJI → Vysočina region CCCN healthcare facilities
V. Distribution among Vysočina healthcare facilities
VI. Distribution within cluster of Brno cancer centers

Healthcare facilities in the CCCN:
- Jihlava Hospital (HJI)
- Hospital in Nové Město na Moravě (HNM)
- Hospital Havlíčkův Brod (HHB)
- Hospital Pelhřimov (HPE)
- Hospital Třebíč (HTR)
- The University Hospital Brno (UHB)
- Masaryk Memorial Cancer Institute (MMCI)
- St. Anne’s University Hospital (SAUHB)

8 574 annually - unique patients hospitalised for cancer in 2014/2015

- 60.3% patients with one hospitalisation for cancer in 2014/2015
- 39.7% patients with two or more hospitalisations for cancer in 2014/2015
CONCLUSIONS & FUTURE STEPS

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

Promotion of CCCN outcomes
Workshops and conferences
Revision of the National Cancer Control Plan
New norms of the Ministry of Health
Lessons learned and future challenges


2. Standardization of cancer management protocols and sharing of clinical experience. Standards for multidisciplinary tumor assessment groups.

3. Management of rising cancer prevalence - optimization of cancer patient pathways in the system, role of different segment of care.

4. Financial management of innovative therapies (modes of risk sharing, rare cancer treatment, …)
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Thank you very much for your attention