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Czech National Coordination Centre for Prevention of Serious Diseases, CZ.03.2.63/0.0/0.0/15_039/0006904
Data Warehouse for Screening Programmes, CZ.03.2.63/0.0/0.0/15_039/0007216

Information support for planning and evaluation of cancer screening in the Czech Republic

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Information support for planning and evaluation of cancer screening in the Czech Republic

INTRODUCTION

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NSC NATIONAL SCREENING CENTRE

ÚZIS ČR

National organised cancer screening programmes in the Czech Republic

All three internationally recommended cancer screening programmes are implemented in the Czech Republic. All three programmes have a safety and quality control system, data facilities and data auditing in place. The programmes are fully **covered by public health insurance** and health insurance companies also **invite citizens to be screened** on the basis of a single standardised system. The **unified information system** for screening programmes is based on the infrastructure of the National Health Information System.

Mamo.cz

Breast Cancer Screening Programme

- Since 2002
- Women aged over 45 years
- Mammography every 2 years

www.mamo.cz

kolorektum

Colorectal Cancer Screening Programme

- Since 2000
- Men and women aged over 50 years
  - 50–54 years – FOBT every year
    OR screening colonoscopy every 10 years
  - over 55 years – FOBT every 2 years
    OR screening colonoscopy every 10 years

www.kolorektum.cz

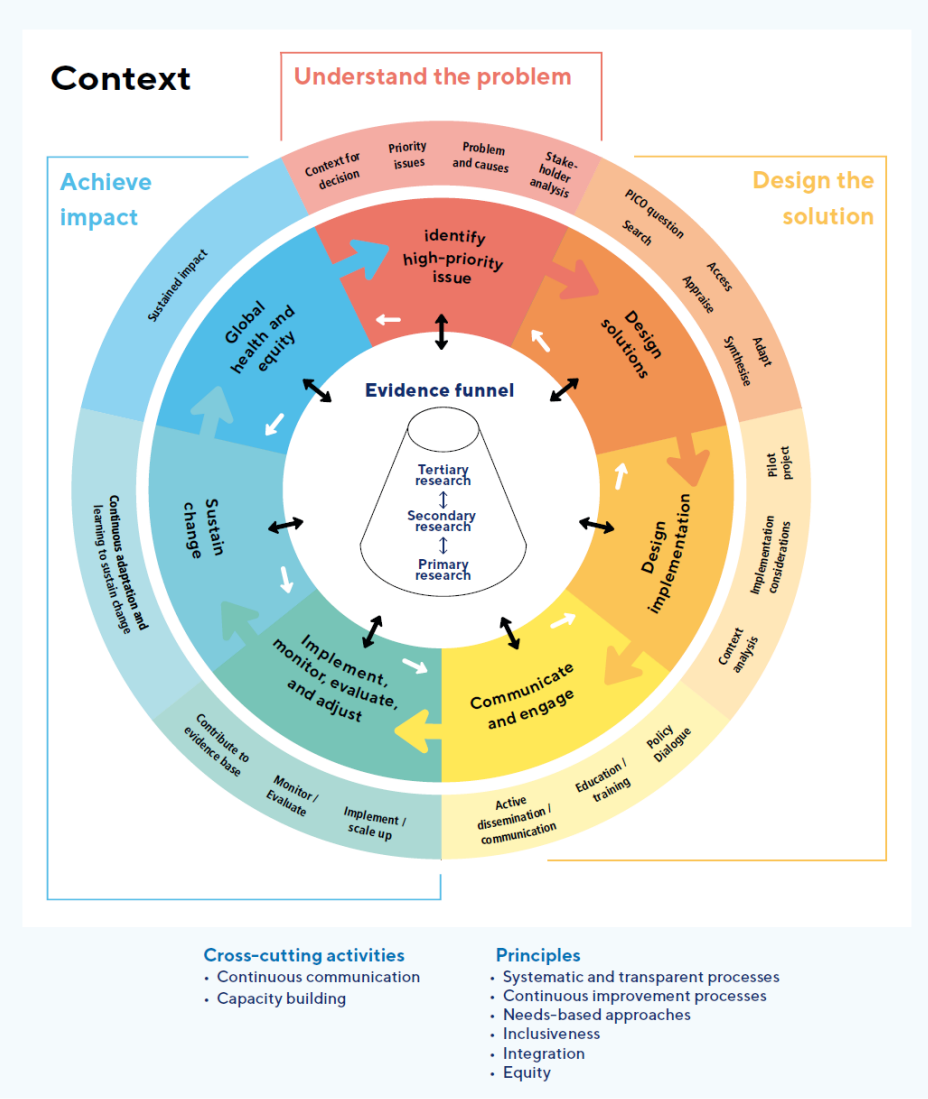
CERVIX

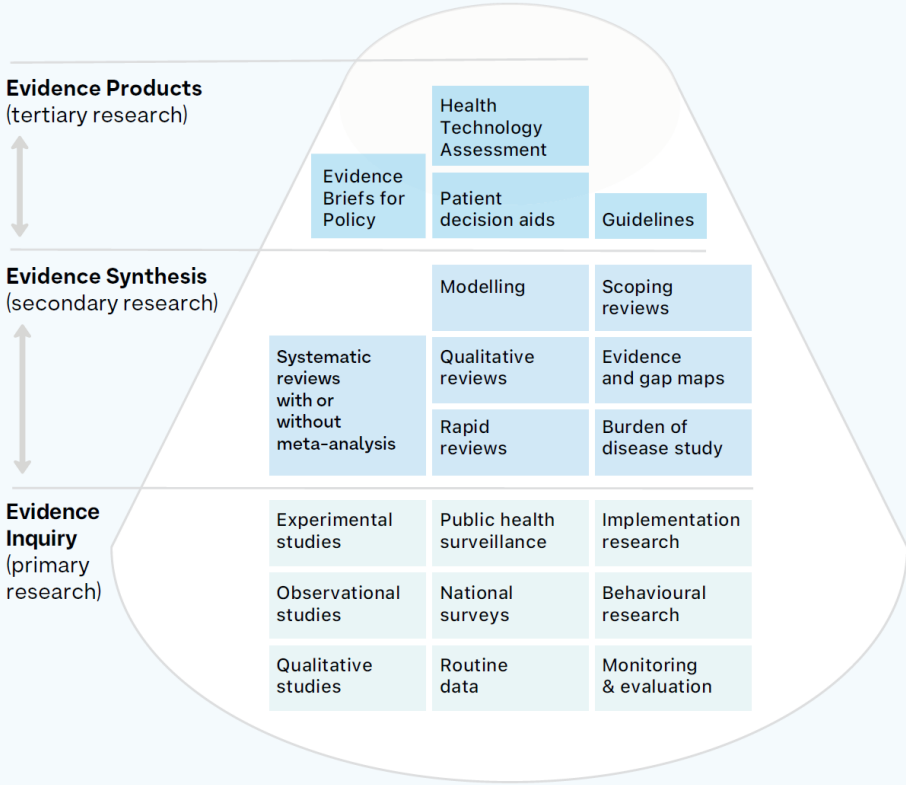
Cervical Cancer Screening Programme

- Since 2008
- All adult women
- Annual pap smear
- Women aged 35 and 45 years with negative cytology: HPV-DNA detection (since 2021)

www.cervix.cz

Using evidence for impact in health systems





adapted from Reveiz 2020

Evidence, policy, impact. WHO guide for evidence-informed decision-making. Geneva: World Health Organization; 2021. Licence: CC BY-NC-SA 3.0 IGO.

Role of the Czech National Screening Centre

NSC NATIONAL SCREENING CENTRE

General information

- Part of the Institute of Health Information and Statistics of the Czech Republic
- NSC closely cooperates with the Ministry of Health, universities, professional societies, health insurance companies, healthcare providers, etc.
- Activities are anchored in strategic tools
  - National Strategy for Health Protection and Promotion and Disease Prevention – Health 2020 - Action Plan: Development of health screening programs in the Czech Republic
  - Strategic Framework for Health Care Development in the Czech Republic by 2030 – Health 2030 – Specific Objective: Disease prevention, promotion and health protection and increasing health literacy
  - Recovery and Resilience Facility – through Increasing the resilience of healthcare services: strengthening cancer screening programmes

Key activities

- **Knowledge translation: bridging the gap between evidence and practice, life-cycle of screening programmes**
- **Establish data warehouse for implementation of screening programmes**
- Methodological and personnel background to support early detection of the disease
- Implementation research pilot projects
- Support of newly developed screening programs (early detection of lung cancer, SMA/SCID newborn screening)

https://nsc.uzis.cz

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DATA SOURCES FOR CANCER SCREENING EVIDENCE

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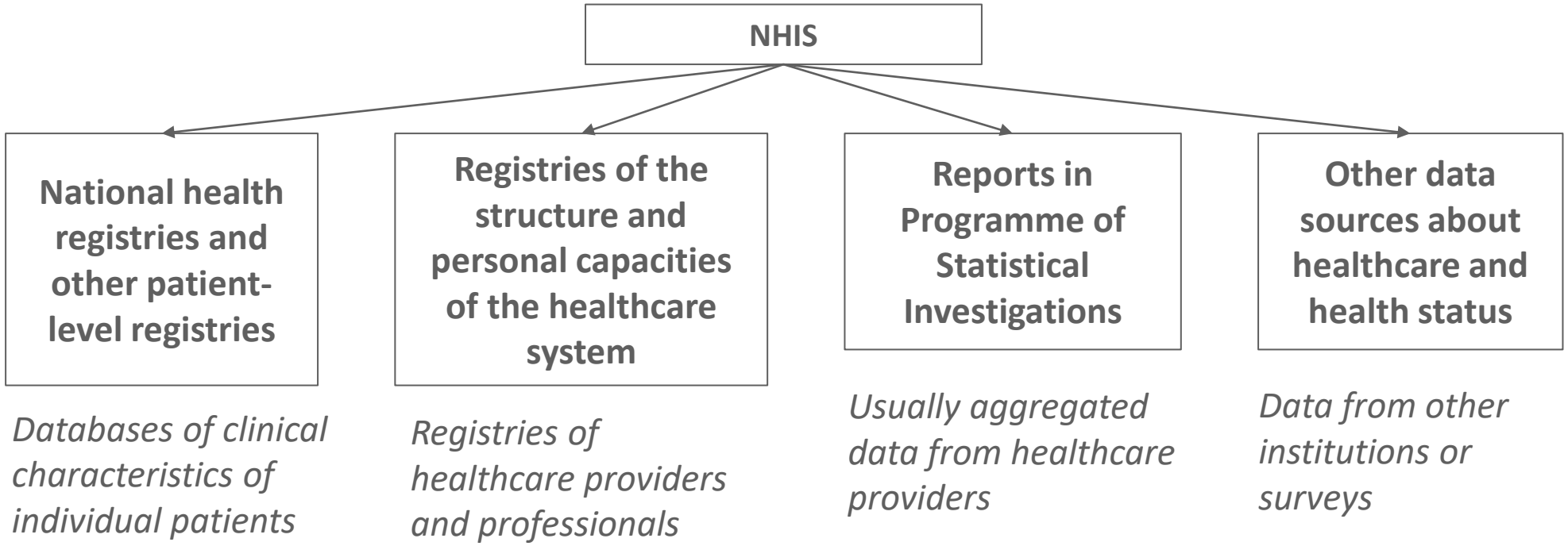
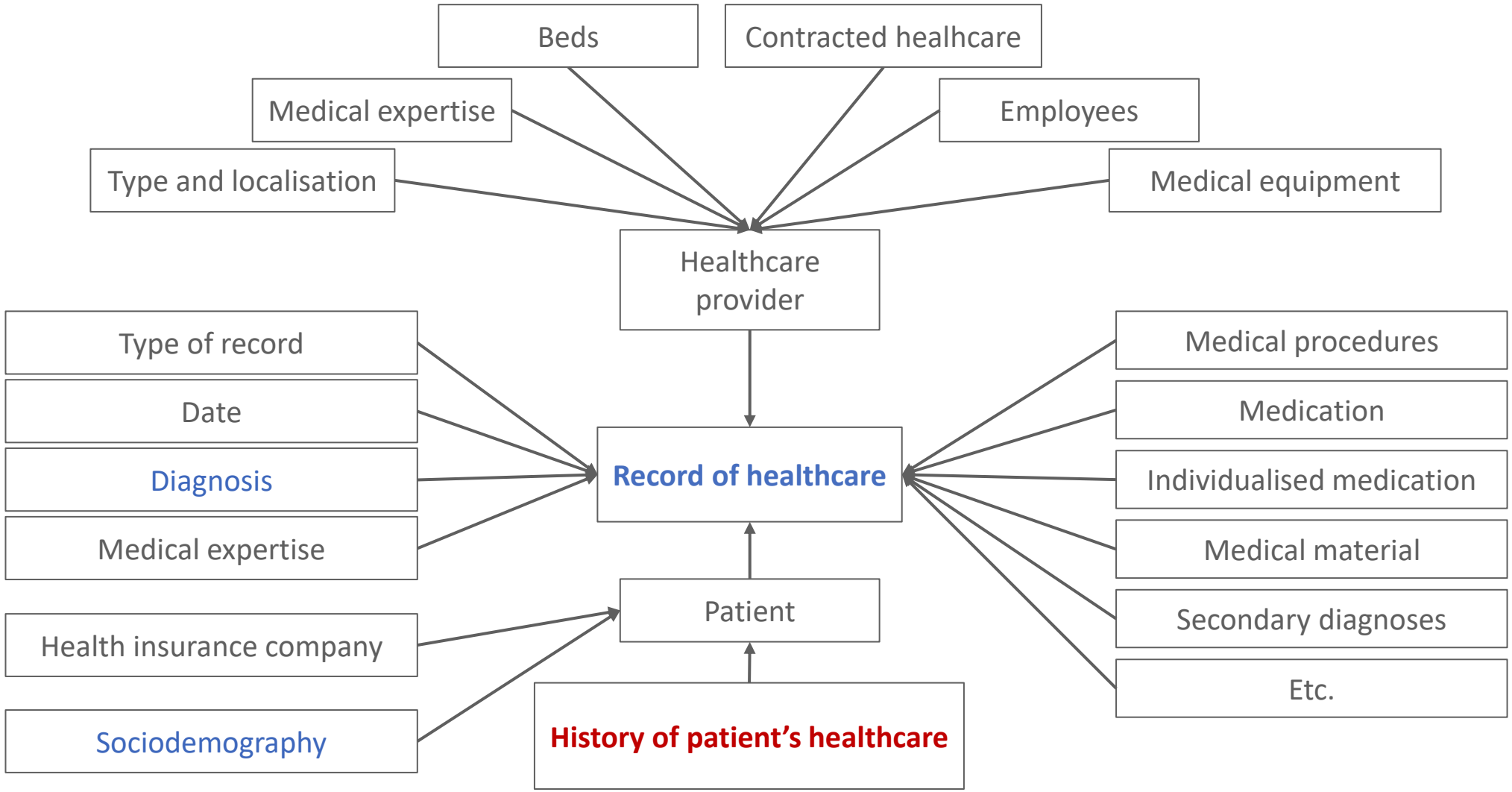
Czech National Health Information System (NHIS)

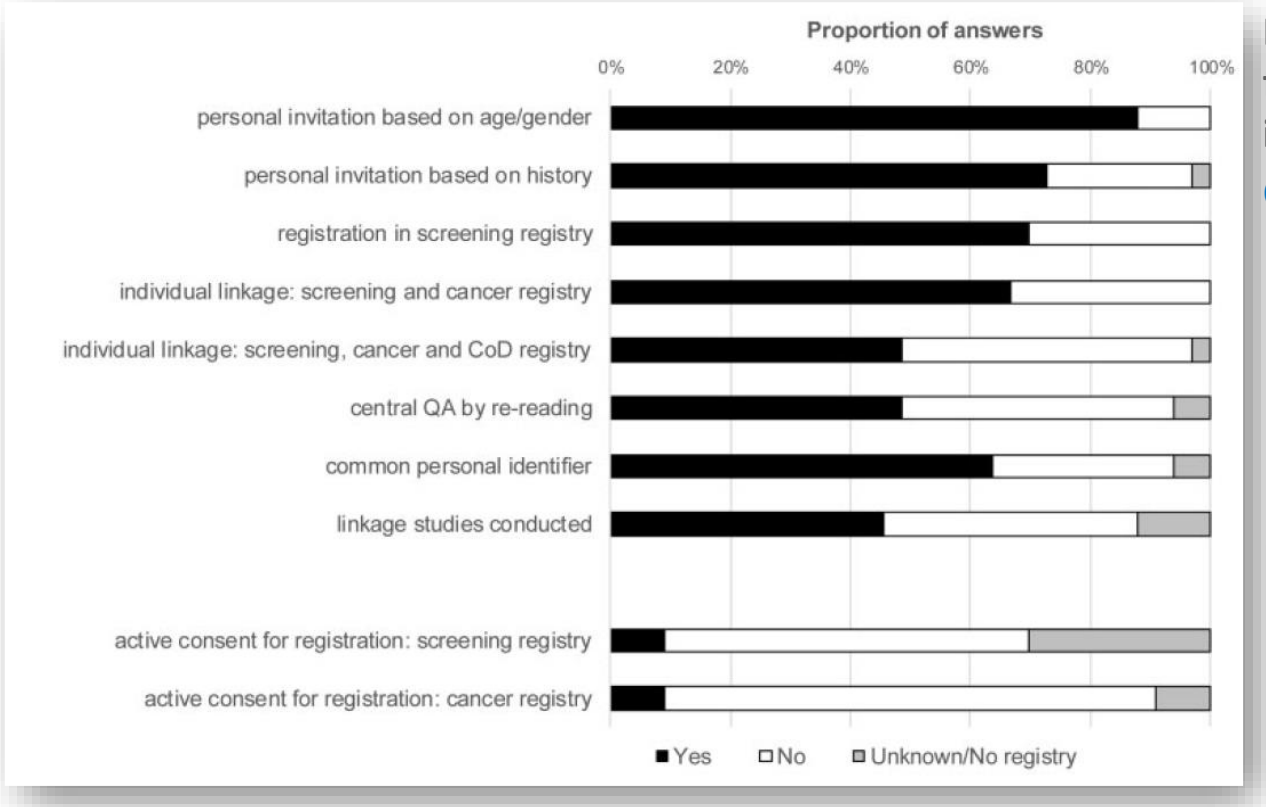
- since April 2012, the National Health Information System (NHIS) has been defined in § 70 par 1 of the Act No. 372/2011 Coll., on Health Services and Conditions of Their Provision (Act on Health Services)
- the administration of the National Health Information System (NHIS) has been delegated by the Ministry of Health of the Czech Republic to the Institute of Health Information and Statistics of the Czech Republic (UZIS)



Data structure of National Registry of Reimbursed Health Services: strengthening public health reporting through secondary use of reimbursement data



Linkage as a basis for evaluation and monitoring

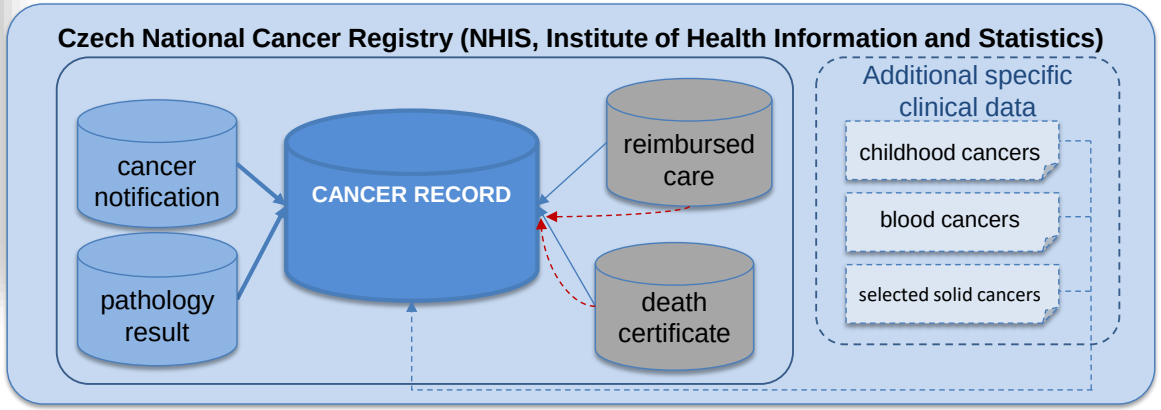


Májek O, Anttila A, Arbyn M, van Veen EB, Engesæter B, Lönnberg S. The legal framework for European cervical cancer screening programmes. European journal of public health. 2019 Apr 1;29(2):345-50.

Key elements of legal framework for cervical screening in 33 responding countries

Only half of countries were able to perform linkage studies

Linkage is nowadays key part of the National Health Information system and the innovated Czech National Cancer Registry



Prevention → Screening → Diagnosis → Treatment → Aftercare → End-of-life care

Datasets for cancer screening evaluation

Data for primary public health research and reporting

Data analysis – quality assurance information system

UZIS/NSC data warehouse for screening

National Health Information System

NOR

...

NRHZS

national health registries

Health insurance companies

Healthcare providers

Pilot projects (research) databases

New data collections

Pilot project 1

Pilot project 2

...

External sources

Sociodemography (CZSO)

Academic databases

Breast cancer screening

...

Data sources for monitoring of cancer screening programmes

Monitoring of cancer burden

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

SOURCE: CZECH NATIONAL CANCER REGISTRY, ÚZIS ČR

Monitoring of screening process using clinical data

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

SOURCE: CANCER SCREENING PROVIDERS, ÚZIS ČR AND MASARYK UNIVERSITY

Monitoring of screening process using administrative/registry data

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

SOURCE: DATA FROM HEALTH INSURANCE COMPANIES, NATIONAL REGISTRY OF REIMBURSED HEALTH SERVICES, ÚZIS ČR

The National Screening Centre, ÚZIS ČR is the guarantor of the data and information basis of cancer screening programmes

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The combination of all three components creates a comprehensive information system that enables a comprehensive evaluation of all aspects of the performance, quality and cost of the screening process.

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EXAMPLES OF INFORMATION SUPPORT FOR CANCER SCREENING PROGRAMMES

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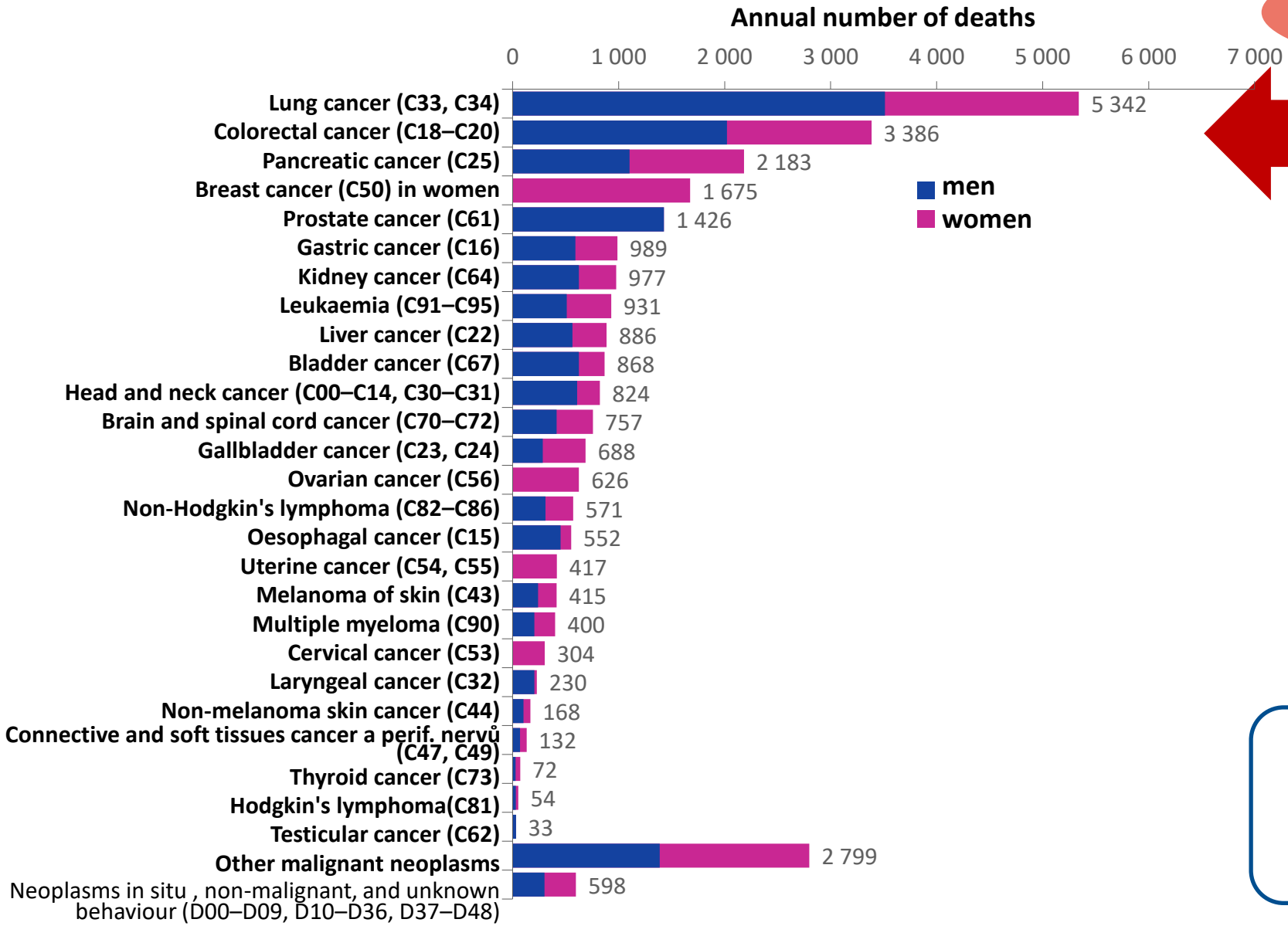
Cancer mortality in the Czech Republic in 2016–2020

Identify high-priority issue



Source: Czech Statistical Office

Several preventable tumour entities still present significant part of cancer burden in the Czech Republic

Colorectal Cancer Screening Programme

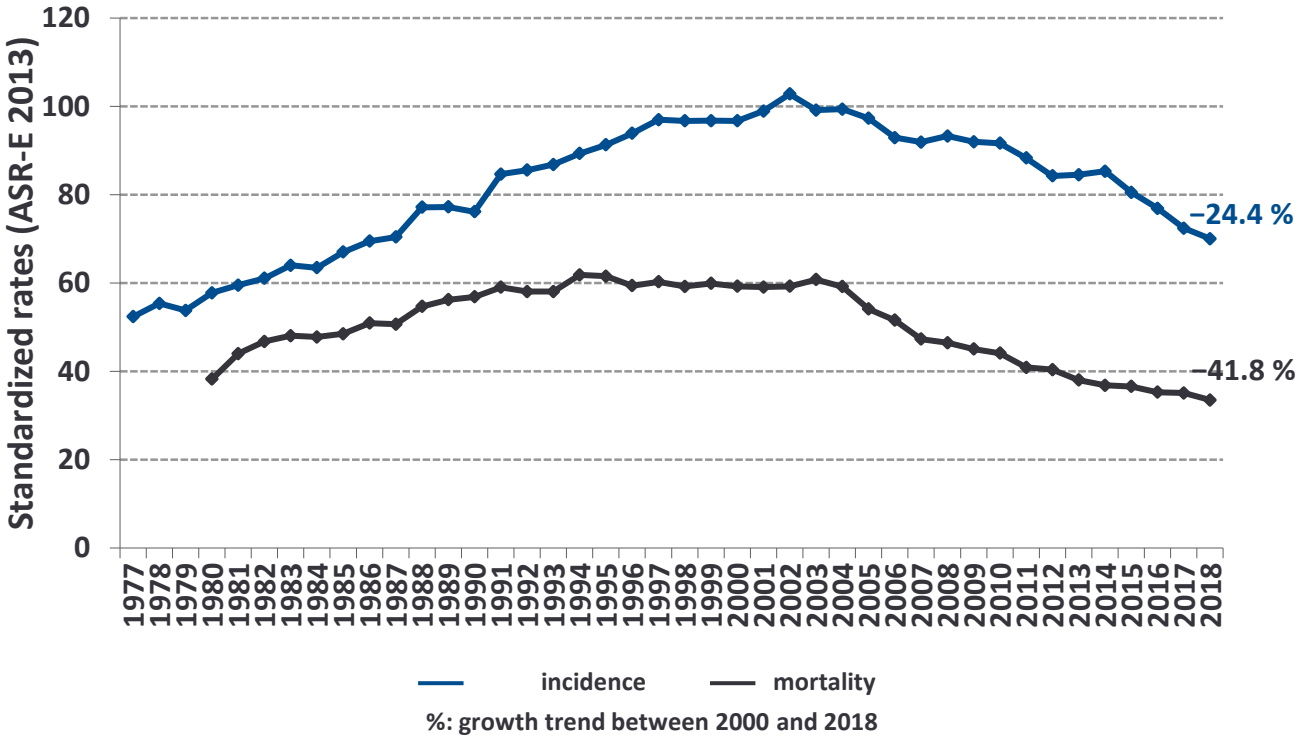
Implement, monitor, evaluate, and adjust

- **Launch of the programme**
  - Screening programme has been in place since 2000
  - Quality assurance guidelines were enacted in 2009
  - Programme with centralised invitations was set up in 2014
- **Target population**
  - Men an women aged over 50 years
- **Screening test**
  - 50 – 54 years - FIT every year
  - Over 55 years – FIT every 2 years
  - Alternatively, screening colonoscopy every 10 years
- **Screening process**
  - GP or primary care gynaecologist – FIT or screening colonoscopy referral
  - Certified colonoscopy centres
  - Centralised invitation of non-attenders
- **Governance and coordination**
  - Colorectal Cancer Screening Committee of the Ministry of Health
  - Colorectal Cancer Screening Board, Czech Society of Gastroenterology, Society for Gastrointestinal Oncology
- **Monitoring and evaluation**
  - National Screening Centre, Institute of Health Information and Statistics of the Czech Republic
  - Institute of Biostatistics and Analyses, Faculty of Medicine, Masaryk University

Colorectal cancer burden and coverage by screening examination

PROMISING RESULTS

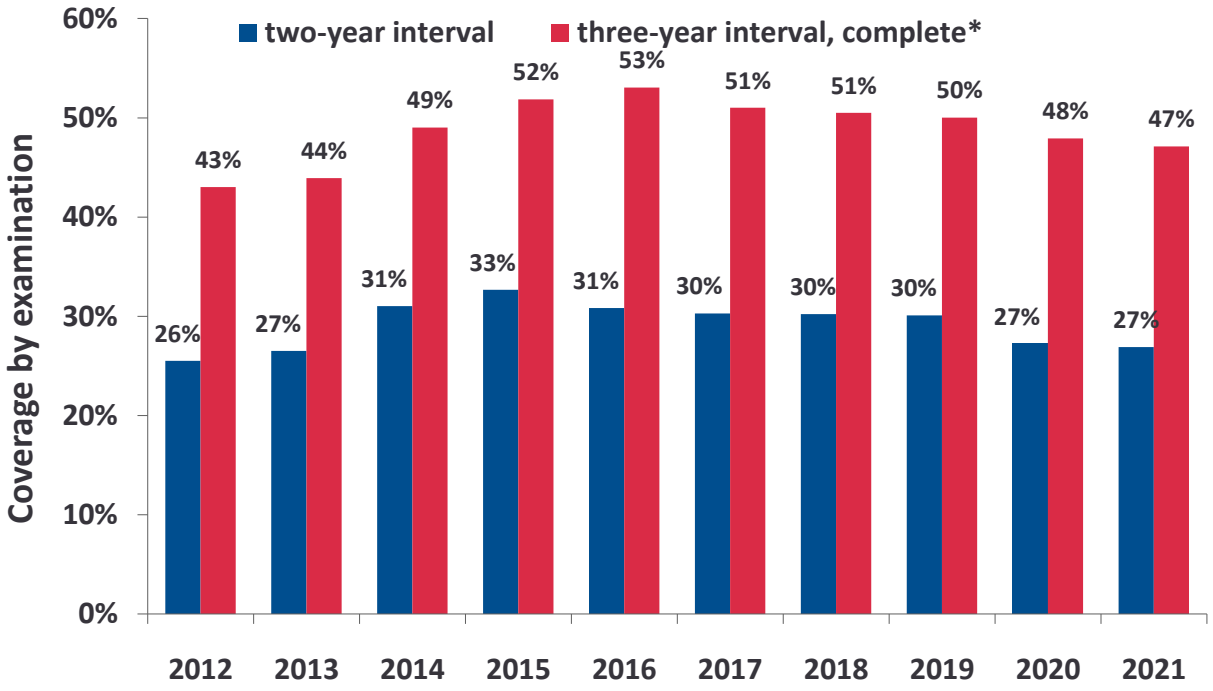
Colorectal cancer trends of incidence and mortality
(Age-standardized European rates (ASR-E): rates per 100,000 inhabitants)
Source: Czech National Cancer Registry, ÚZIS



%: growth trend between 2000 and 2018

ROOM FOR IMPROVEMENT

Coverage by colorectal cancer screening examinations, individuals aged over 50 years
Source: Nat Reg Reimbursed Health Services, ÚZIS



* The three-year interval also includes diagnostic examinations (FOBT and colonoscopy).

In the past 10 years, the incidence and mortality rates of colorectal cancer have decreased substantially.
Coverage by colorectal cancer screening examinations at the two-year interval has been around 30 %,
the coverage at the three-year interval by all associated examinations is almost 50 %.

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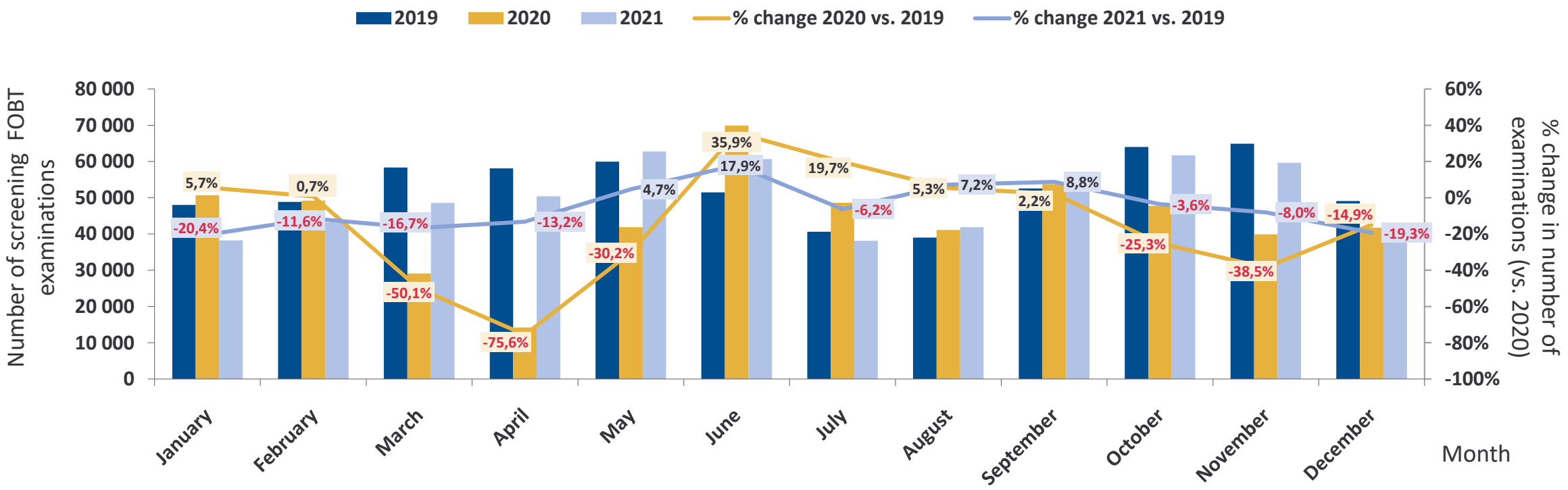
Potential impact of COVID-19 pandemic in the Czech Republic: volume of screening FOBT

Screening FOBT
(2019—2021, men and women 50+)
Source: National Registry of Reimbursed Health Services, ÚZIS



In 2020, **16.8% less** screening FITs were performed compared to 2019. Largest decrease was recorded in April 2020 (-75.6%).
In 2021, **5.2% less** screening FITs were performed compared to 2019. Largest decrease was recorded in December 2021(-19.3 %).

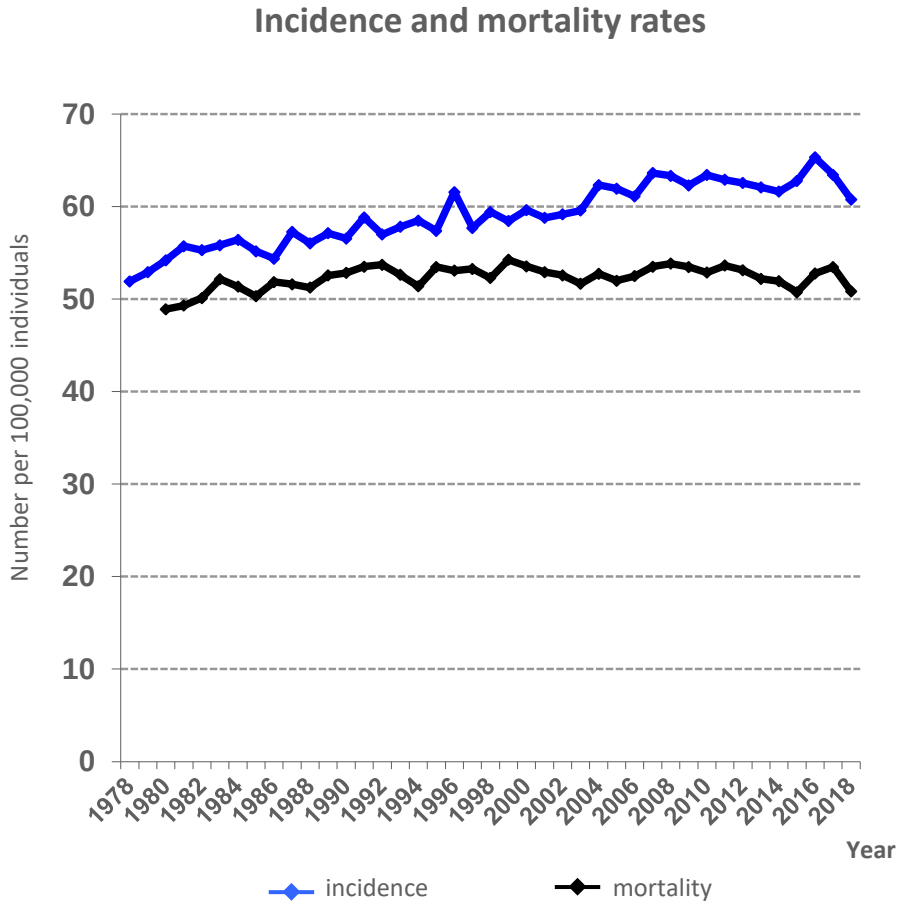
Current and future evaluation plans

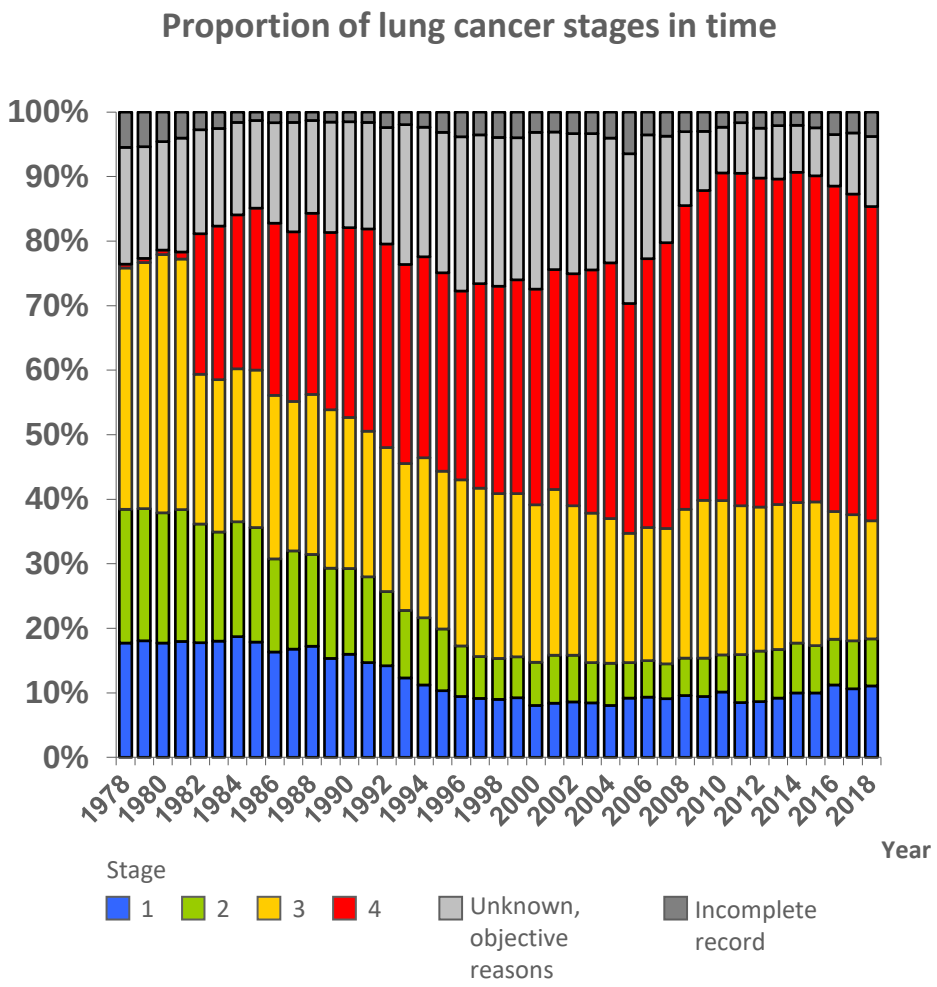
Facilitated by the linkages within the data warehouse

- Evaluation of pathways, case-control audit
- Model-based optimization
  (cost-of-illness and cost-effectiveness)
- Implementation research, qualitative and behavioural aspects
- Sharing of data, empowering stakeholders

Time trends in lung cancer burden (C33, C34)

Identify high-priority issue





Source: Czech National Cancer Registry, ÚZIS, Czech Statistical Office

Due to high incidence and late detection of lung cancer, secondary prevention seems to be a promising way to decrease lung cancer burden

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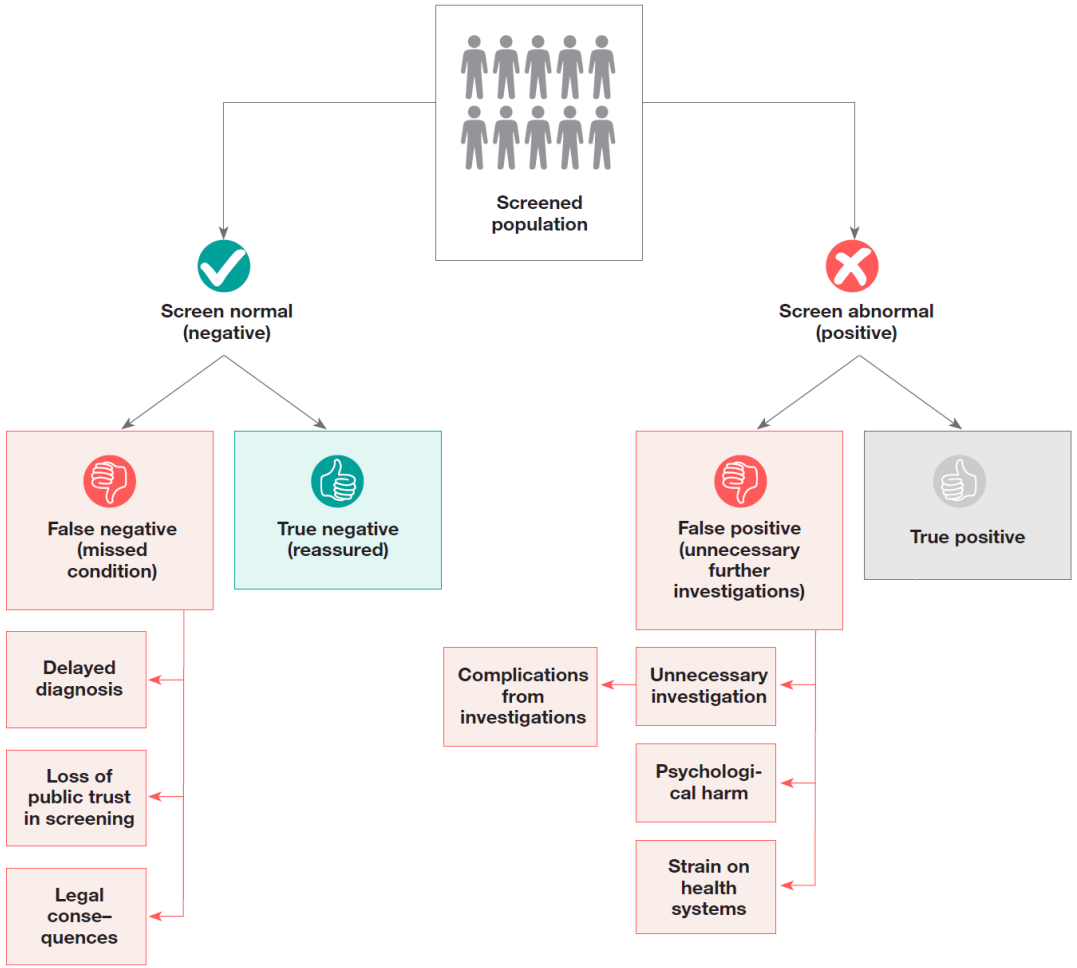
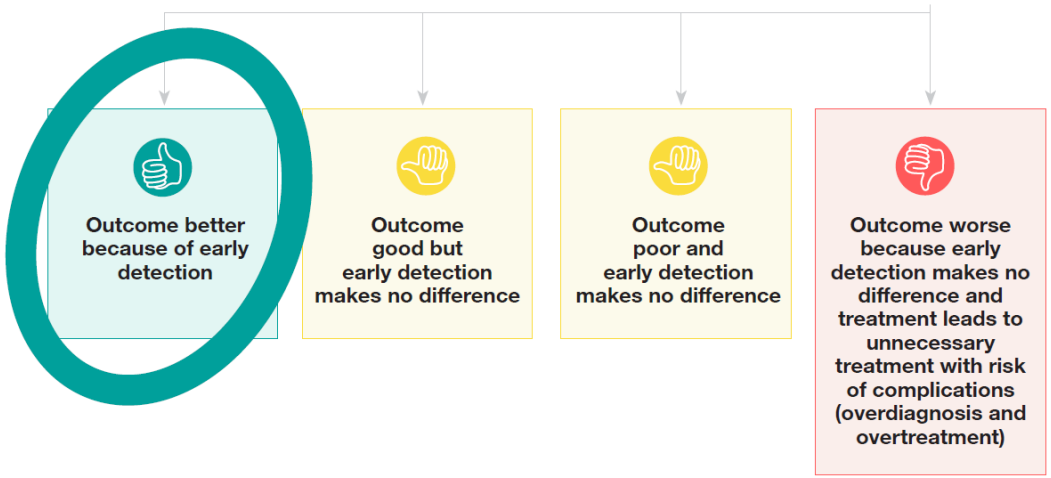
Net benefit? Possible outcomes from a screening programme





Screening programmes: a short guide. Increase effectiveness, maximize benefits and minimize harm. Copenhagen: WHO Regional Office for Europe; 2020. Licence: CC BY-NC-SA 3.0 IGO.

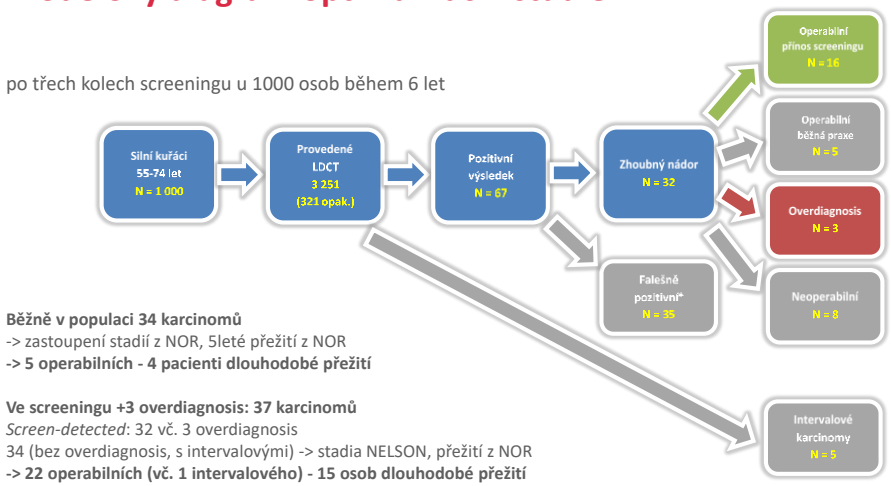
Model assessment of a potential programme

Design solutions and implementation

HTA and evidence brief

Target disease for early detection → **Assumed strategy for screening process** → **Goals and reasoning for programme's benefits** → **Benefits and harms** → **Implementation and monitoring**

Modelový diagram optimalizační studie



Preparatory work started in 2019

- Multi-stakeholder engagement
- Structure of population (heavy smokers) and its lung cancer burden
- Model flow-chart of benefits and harms
- Cost of illness study (linking cancer registry and reimbursed care)
- Simplified analysis of costs per life-years gained
- Strategy and implementation guidelines for **population pilot project**

Population pilot programme for lung cancer early detection

KARCINOM PLIC
PROGRAM ČASNÉHO ZÁCHYTU

- **Launch of the programme**
  - Since 2022 (5-years' population pilot programme)
- **Target population**
  - Men and women aged 55-74 years
  - with smoking history (at least 20 pack-years), former of current smokers
- **Test**
  - low-dose CT (LDCT), repeated after one year initially, then after 2 years
- **Process**
  - GPs offer the programme and refer patients to pneumologist
  - Pneumologists perform complex pulmonary examinations, refer patients for LDCT and navigate them in the health care system
  - LDCT is provided only at certified radiological departments
- **Governance and coordination**
  - Committee for Preparation of the Lung Cancer Early Detection Programme of the Ministry of Health
  - Certification Committee for Lung Cancer LDCT Centres of the Ministry of Health
- **Monitoring and evaluation, still part of implementation research endeavour**
  - National Screening Centre, Institute of Health Information and Statistics of the Czech Republic

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FUTURE CHALLENGES

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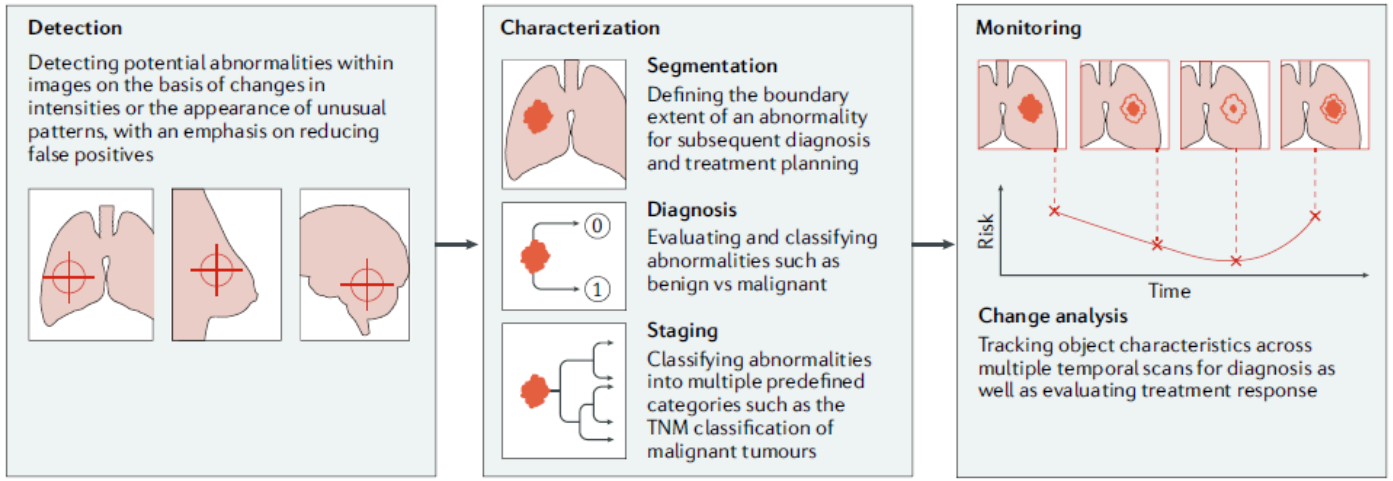
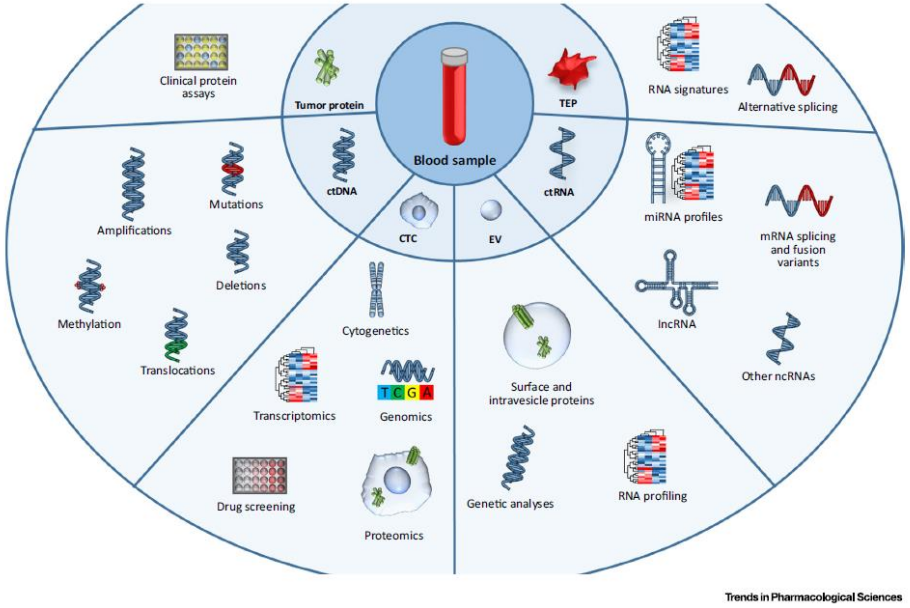
Future of screening and early detection?

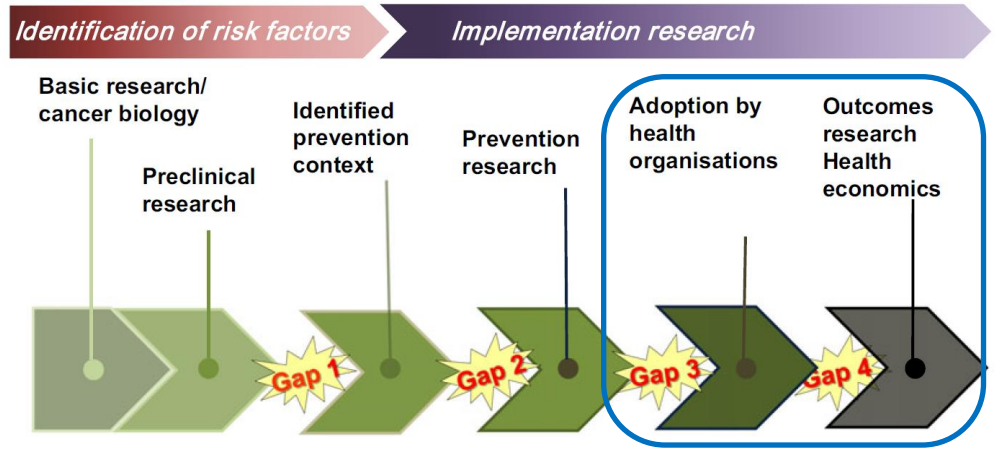


Impact of artificial intelligence on clinical tasks based on imaging



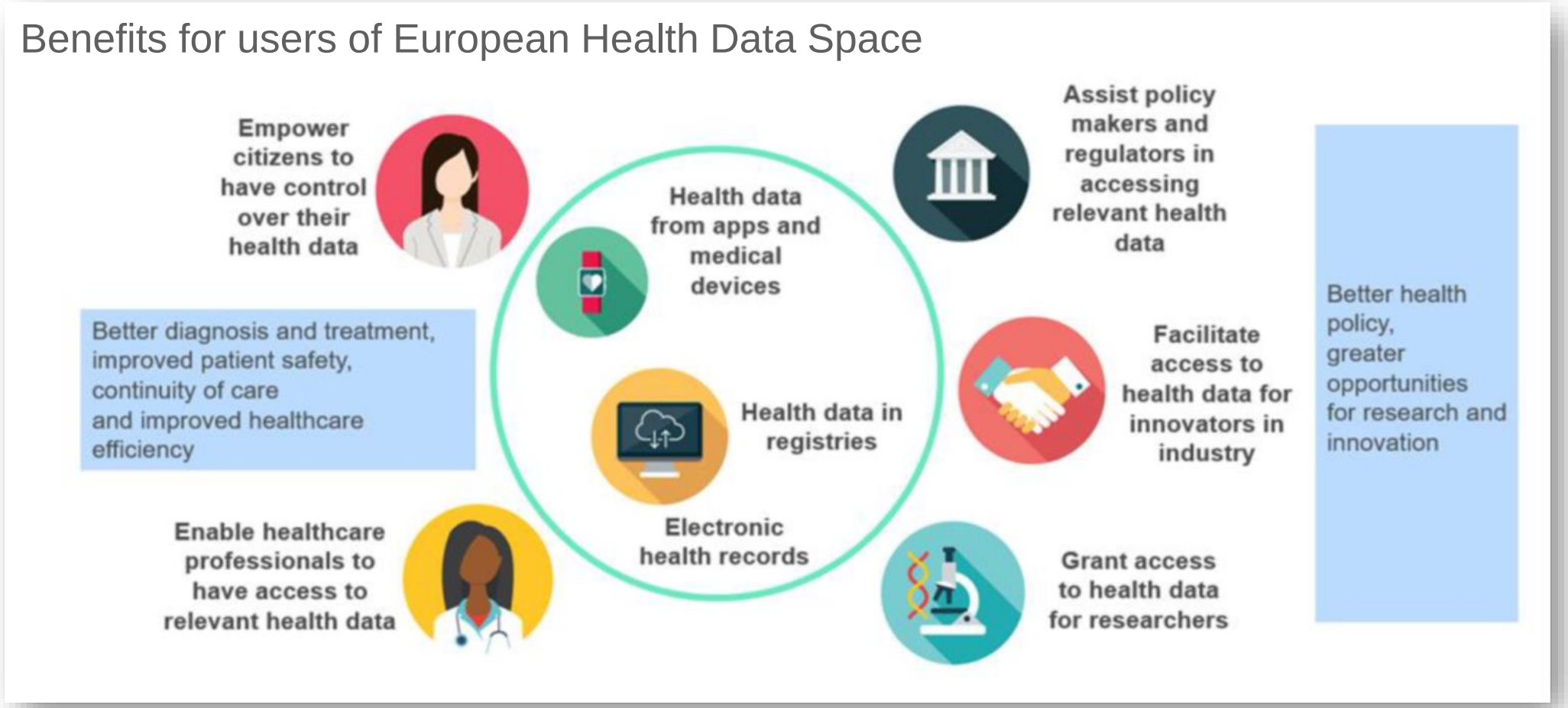
Parts of tumour ‘circulome’: source of tumour biomarkers

TRANSLATIONAL/IMPLEMENTATION RESEARCH, quick adoption of safe, effective and cost-effective methods in health systems



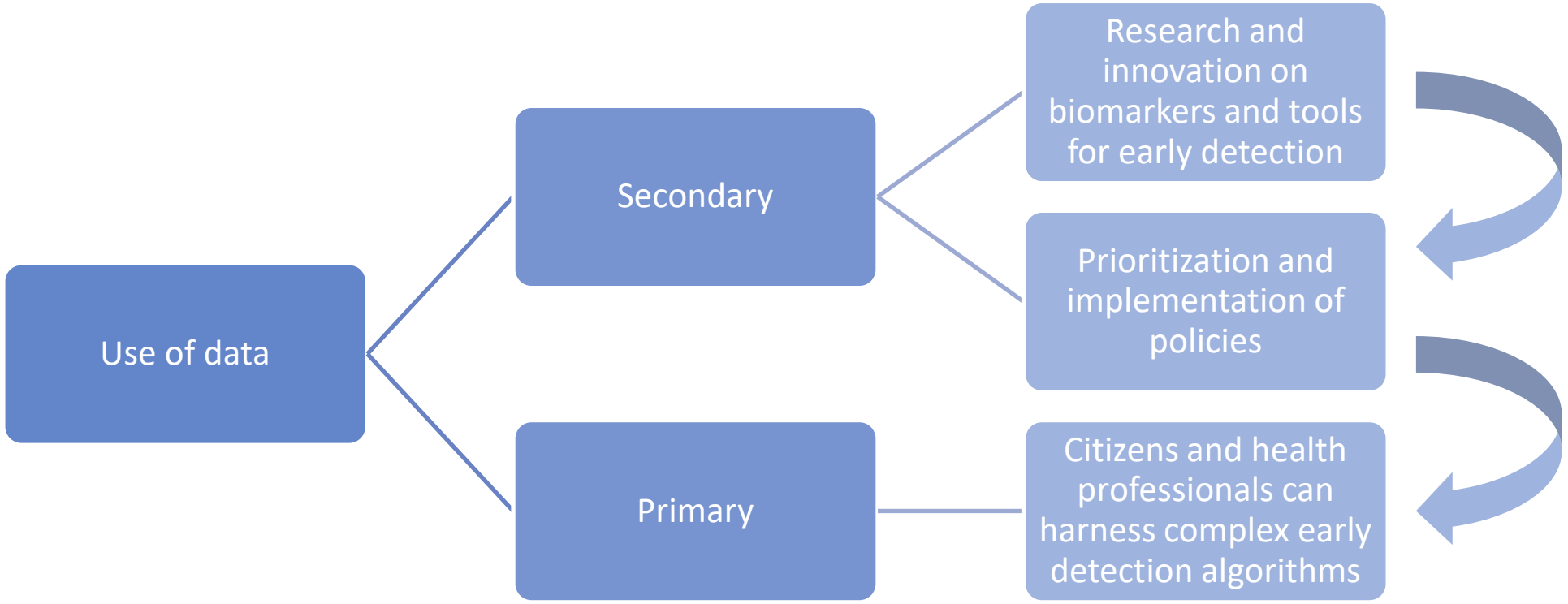
HOSNY, Ahmed, et al. Artificial intelligence in radiology. *Nature Reviews Cancer*, 2018, 18.8: 500-510. DE RUBIS, Gabriele; KRISHNAN, Sabna Rajeev; BEBAWY, Mary. Liquid biopsies in cancer diagnosis, monitoring, and prognosis. *Trends in pharmacological sciences*, 2019, 40.3: 172-186. RINGBORG, Ulrik. Translational cancer research–a coherent cancer research continuum. *Molecular oncology*, 2019, 13.3: 517-520.

Policy initiatives needed to support the use of data



COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL A European Health Data Space: harnessing the power of health data for people, patients and innovation

Cancer screening can benefit from all kinds of improved use of data



Importance of international collaboration

- **Setting of standards**
  - Council recommendation
  - European guidelines and Quality assurance schemes
  - Sharing of data (primary use, secondary use, European systems)
- **Supporting national implementation**
  - sharing of experience
  - tools for national planning and implementation
- **Research support and collaboration**
- **Support awareness of citizens**

Thank you for your attention!

Thanks to numerous collaborators at UZIS and expert committees