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Servizio nazionale di registrazione dei tumori
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Indicators for breast cancer

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Introduction

Indicators based on cancer registry data in Switzerland

The indicators serve as measuring instruments for assessing cancer burden, prevention and care in Switzerland. They fulfil the purposes defined in the Federal Act on the Registration of Cancerous Diseases (CRA), Article 2:

a. to observe the development of diseases according to Article 1;
b. to develop and implement prevention and screening measures and to monitor their effectiveness;
c. to evaluate the quality of care, diagnosis and treatment;
d. to support care planning and research.

Importance of indicators

Firstly, the indicators make it possible to objectively monitor the burden and development of cancer in adults in Switzerland. By analysing and publishing these indicators, patients, healthcare providers and political decision-makers can observe and assess cancer development in Switzerland. This promotes transparency in the healthcare system and creates a basis for well-founded decisions.

Secondly, medical care can be evaluated with a population-based approach and thus provide a basis for evidence-based quality assurance in the area of diagnosis and treatment. The indicators help to identify deviations from established treatment standards. This is particularly important in the field of oncology, where a high quality of treatment is directly linked to patients' chances of survival and quality of life.

Thirdly, indicators contribute to research and further development in oncology. They provide valuable data that can be used for scientific studies and health policy issues, for example. They enable evaluations of prevention and screening measures, evaluations for care planning and research. Progress in cancer diagnosis and cancer treatment as well as preventive measures for cancer are thus promoted.

Definition of indicators

Indicators for specific cancers (e.g. breast cancer) as well as general indicators applicable to various cancer types are defined. The indicators are based on the national cancer data set, which consists of data collected in the cantonal cancer registries for adult cancer cases and data collected in the national childhood cancer registry for children and adolescent cancer cases. The indicators are defined in a step-by-step process. A pre-selection of certain indicators is made through a comprehensive literature review, including national and international guidelines for clinical decisions, such as ESMO (European Society for Medical Oncology) or German S3-Guidelines. Existing indicators from other countries, particularly Germany, and indicators used for certifying tumour centres (e.g. Deutsche Krebsgesellschaft (DKG)) are also reviewed. Furthermore, indicators are shared with the cantonal cancer registries and the childhood cancer registry for comment. Indicators for specific cancers are discussed with experts from the relevant medical societies.

The orientation towards already internationally and nationally established similar indicators offers the possibility of being able to compare the results provided by cancer registration data with data collected in hospitals or of other countries. With the help of a precise comparison of the variables available in

the national cancer data dictionary and the variables required for calculating the indicators, practicable indicators were identified.

The current selection should not be regarded as definitive, but rather as evolving based on the international treatment guidelines and the needs and development of cancer care and research. The year of incidence of the tumour and the validity of the guidelines must be considered in the evaluations. This document is therefore updated on a regular basis.

Indicators can be grouped in different categories:

1. Indicators to observe the development of cancer
2. Indicators to evaluate prevention and screening measures and to monitor their effectiveness
3. Indicators to evaluate the quality of care
4. Indicators to evaluate the quality of diagnosis
5. Indicators to evaluate the quality of treatment

Use of indicators

Some indicators such as incidence or mortality are already calculated for the annual national cancer statistics. Other indicators have not yet been analysed at national level.
The indicators can be used for various analyses and publications:

- The national cancer monitoring and statistics of the Federal Statistical Office (e.g. stage distribution)
- The Swiss Cancer Report of the Federal Statistical Office
- Detailed standardised national analyses with publication on the NACR website (e.g. several indicators to certain cancer types)
- The triennial health report on cancer with detailed analyses on relevant health policy questions (e.g. evaluation of the treatment quality)
- Research projects (e.g. evaluation of screening programs)
- Comparison of national results with analyses of other data (e.g. cantonal cancer registry data, hospital data or international data).

For further information about analyses and publications of cancer registry data, please see https://nkrs.ch/en/statistics-and-reports.

General

1 Incidence	
Indicator to observe the development of cancer	
Objective:	Monitoring the incidence and trends of breast tumours
Inclusion criteria:	- ICD code = C50 and D05 (separately) - Only primary tumours (C50) according to ENCR rules for multiple primaries (1) - Only precancerous lesions (D05) diagnosed without or before a diagnosis of an invasive breast cancer
Calculation:	- Number and rate per 100,000 person-years per incidence year/period (crude, age-standardised)
Variables:	- 2.3.1 Date of incidence - 3.3 ICD code
Stratification:	- By sex (1.2 Sex) - By region (1.8 Canton number, 1.9 FSO City/Municipality number) - By nationality (1.11 Nationality) - By age at incidence (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	
Literature:	- Incidence is published in the "Swiss Cancer Report" (2), by the NACR (3) and the Federal Statistical Office (FSO) (4)

2 Mortality

Indicator to observe the development of cancer	
Objective:	Monitoring the mortality and trends of breast cancer
Inclusion criteria:	- ICD code = C50
Calculation:	- Number and rate per 100,000 person-years per incidence year/period (crude, age-standardised)
Variables:	- Cause of death statistics from the Federal Statistical Office is used
Stratification:	- By sex - By age at death - By time period - By region - By nationality
Remarks:	
Literature:	- Mortality is published in the "Swiss Cancer Report" (2), by the NACR (3) and the Federal Statistical Office (FSO) (4)

3 Survival

Indicator to observe the development of cancer

Objective:	Monitoring the observed and relative survival
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	- Observed and relative 1, 5, 10 and 15-year survival proportions (crude, age-standardised)
Variables:	1.13 Vital status 1.14.1 Date for vital status (age in days "age_fu") 2.3.1 Date of incidence 3.3 ICD code
Stratification:	- By sex (1.2 Sex) - By region (1.8 Canton number, 1.9 FSO City/Municipality number) - By nationality (1.11 Nationality) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM) - By Charlson Index (10.14 Charlson index (supplementary data)) - By screening program available (yes/no)
Remarks:	
Literature:	- Survival is published by the NACR (3) and in the "Swiss Cancer Report" (2) - International comparison with many countries possible, e.g. with the report "Cancer in Germany" of the Society of Epidemiological Cancer Registries (GEKID) and the Centre for Cancer Registry Data (ZfKD) at the Robert Koch Institute (p.88)(5,6), the Cancer System Quality Index 2021 from Ontario/Canada (p. 22)(7) and a population-based study of 8 cancer registries in Italy (8)

4 Prevalence

Indicator to observe the development of cancer

Objective:	Monitoring the prevalence of breast cancer
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	- Estimated number of prevalent subjects or estimated proportion of prevalent subjects (number per 100'000 inhabitants) 0-1, 1-2, 2-5, 5-10, 0-2, 0-5, 0-10 years since diagnosis
Variables:	- 2.3.1 Date of incidence - 1.13 Vital status - 1.14.1 Date for vital status (age in days "age_fu") - 3.3 ICD code
Stratification:	- By sex (1.2 Sex) - By region (1.8 Canton number, 1.9 FSO City/Municipality number) - By nationality (1.11 Nationality) - By age (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	
Literature:	- Prevalence is published in the "Swiss Cancer Report" (2), by the NACR (3) and the Federal Statistical Office (FSO) (4)

5 Age at diagnosis

Indicator to observe the development of cancer

Objective:	Monitoring the age distribution at time of diagnosis in patients with breast tumours
Inclusion criteria:	- ICD code = C50 and D05 (separately) - Only primary tumours (C50) according to ENCR rules for multiple primaries (1) - Only precancerous lesions (D05) diagnosed without or before a diagnosis of an invasive breast cancer
Calculation:	1) Mean and median age at time of diagnosis 2) Distribution of age at diagnosis in age groups (in 5-year age groups; 0-54, 55-64, 65-74, 75+ years; other categories to be defined)
Variables:	- 2.3.1 Date of incidence - 2.4 Age at incidence - 3.3 ICD code
Stratification:	- By sex (1.2 Sex) - By region (1.8 Canton number, 1.9 FSO City/Municipality number) - By nationality (1.11 Nationality) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	- If there are enough cases, an extension of the age groups to 85-89Y, 90-94Y and ≥95Y to take into account the oldest old may be useful due to increasing life expectancy (9)
Literature:	- Median age of onset and cases per age group are published in the "Swiss Cancer Report" (2) and the Federal Statistical Office (FSO) (4)

6 Age at death

Indicator to observe the development of cancer

Objective:	Monitoring the age distribution at time of death in patients with breast cancer
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	1) Mean and median age at time of death 2) Distribution of age at death in age groups (in 5-year age groups; 0-54, 55-64, 65-74, 75+ years; other categories to be defined)
Variables:	- Cause of death statistics from the Federal Statistical Office is used
Stratification:	- By sex - By time period - By region - By nationality
Remarks:	- If there are enough cases, an extension of the age groups to 85-89Y, 90-94Y and ≥95Y to take into account the oldest old may be useful due to increasing life expectancy (9)
Literature:	- Median age at death is published in the "Swiss Cancer Report" (2) and the Federal Statistical Office (FSO) (4)

Diagnostics

7 Stage distribution at diagnosis	
Indicator to observe the development of cancer	
Objective:	To show the stage distribution at the time of diagnosis in breast cancer patients and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 und D05 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	- Distribution of UICC stages 0-IV at time of diagnosis
Variables:	2.3.1 Date of incidence 3.3 ICD code 4.17 TNM stage group 4.3 cT 4.4 cN 4.5 cM 4.7 y-Prefix of pTNM 4.8 pT 4.10 pN 4.13 pM
Stratification:	- By sex (1.2 Sex) - By region (1.8 Canton number, 1.9 FSO City/Municipality number) - By nationality (1.11 Nationality) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	- Possibly in addition to the UICC stage, evaluation according to "extent of disease" (local, (locally advanced), regional (pN), metastatic), as this classification is frequently used internationally (10) - Incidence by stage is included in the indicator “incidence”
Literature:	- International comparison with many countries possible, e.g. with the report "Cancer in Germany" of the Society of Epidemiological Cancer Registries (GEKID) and the Centre for Cancer Registry Data (ZfKD) at the Robert Koch Institute (p.88) (5,6) the Cancer System Quality Index 2021 from Ontario/Canada (p.22) (7) and a population-based study of eight cancer registries in Italy (8)

8 Method of first detection

Indicator to observe the development of cancer

Objective:	To show the proportion of first detection methods
Inclusion criteria:	- ICD code = C50 and D05 (separately) - Only primary tumours (C50) according to ENCR rules for multiple primaries (1) - Only precancerous lesions (D05) diagnosed without or before a diagnosis of an invasive breast cancer
Calculation:	Numerator: 1) 2.6 Method of first detection = 1 (Clinical symptoms) 2) 2.6 Method of first detection = 2 (Incidental discovery) 3) 2.6 Method of first detection = 3 (Organised screening program) 4) 2.6 Method of first detection = 4 (Opportunistic screening) 5) 2.6 Method of first detection = 5 (Self-examination) 6) 2.6 Method of first detection = 6 (Death with autopsy) or 7 (Death without autopsy) 7) 2.6 Method of first detection = 8 (Other) 8) 2.6 Method of first detection = 9 (Unknown)
	Denominator: ICD code = C50, D05 (separately analysed)
Variables:	2.3.1 Date of incidence 2.6 Method of first detection 3.3 ICD code
Stratification:	- By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM) - By nationality (1.11 Nationality)
Remarks:	
Literature:	

9 First detection in an organised screening program

Indicator to evaluate prevention and screening measures and to monitor their effectiveness

Objective:	To show the proportion of breast tumour diagnosis with first detection in an organised screening program
Inclusion criteria:	- ICD code = C50 and D05 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1) - Only precancerous lesions (D05) diagnosed without or before a diagnosis of an invasive breast cancer
Calculation:	Numerator: 2.6 Method of first detection = 3 (Organised screening programs)
	Denominator: ICD code = C50, D05 (together and separately analysed) AND Sex = female AND Age at incidence= 18.250-25.185days (50-69 years) AND canton number = XX (depending on established organised screening programs in the period under observation)
Variables:	1.2 Sex 1.8 Canton number 2.3.1 Date of incidence 2.6 Method of first detection 3.3 ICD code
Stratification:	- By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM) - By cantons that offer organised screening programs (1.8 canton number) - By nationality (1.11 Nationality) - By marital status (1.12 Marital status)
Remarks:	
Literature:	- Swiss Cancer Screening: Overview of breast cancer screening programs (11)

10 Histological confirmation of the diagnosis	
Indicator to evaluate the quality of diagnosis	
Objective:	To show the proportion of breast cancer cases with histological confirmation of the diagnosis and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: Diagnostic method(s) used = biopsies: 24 (biopsy of the primary tumour), 20 (biopsy unspecified), 21 (biopsy/resection locoregional, without histology of primary tumour), 22 (Biopsy/resection of the metastasis, without histology of the primary tumour), 23 (biopsy/resection locoregional or of the metastasis, without histology of the primary tumour)
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 2.8 Diagnostic method(s) used 3.3 ICD code
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	- According to The National Cancer Data Dictionary V1.3 (12) the NACR does not receive a date for neither variable 2.7 Most valid basis of diagnosis nor variable 2.8 Diagnostic method(s) used. Therefore, it is not possible to determine with certainty whether this is a pre-therapeutic histological diagnostic confirmation or a histological examination of the surgical specimen.
Literature:	- Platform § 65c: QI 2 - Pre-therapeutic histologic confirmation, goal: As many patients as possible with pre-therapeutic histologic confirmation by punch or vacuum biopsy for first intervention and primary disease invasive breast carcinoma and/or DCIS (13) - Indicator sheet breast DKG, German Society of Senology: Indicator 13 - Pretherapeutic histologic confirmation (14) - Comparison to proportion of cases with histological diagnosis basis of the incidence years 2006-2011 in Switzerland possible (15) - DKG / German Society for Senology (indicator evaluation 2023 - annual report of the certified breast cancer centres): pre-therapeutic histological confirmation: median of 99.13% in indicator year 2021 (target ≥90%) (p.24) (16)

11 Invasive cancer by morphology

Indicator to observe the development of cancer

Objective:	To show the distribution of morphological types of invasive breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Distribution of the following morphological groups: - Invasive carcinoma of the breast NST (8500/3) - other ductal neoplasms: 8507/3 Invasive micropapillary carcinoma 8510/3 Medullary carcinoma n.a. 8513/3 Atypical medullary carcinoma n.a. 8201/3 Cribiform carcinoma n.a. 8211/3 Tubular adenocarcinoma - Mucinous adenocarcinoma (8480/3) - Lobular carcinoma n.a. (8520/3) - Mixed neoplasms: 8522/3 Invasive ductal and lobular carcinoma 8523/3 Invasive ductal carcinoma mixed with other carcinoma types (e.g. with mucinous Ca, tubular Ca, cribiform Ca, colloid Ca) (C50.-) 8524/3 Invasive lobular carcinoma mixed with other types of carcinomas (e.g. mucinous, tubular, cribiform, etc.) (C50.-) - Papillary neoplasia: 8503/3 Papillary carcinoma n.e.c., intraductal papillary adenocarcinoma with invasion 8504/3 Intracystic carcinoma n.e.c., encapsulated papillary Ca with invasion 8509/3 Solid papillary Ca with invasion - Paget's disease: 8540/3 Paget's disease of the breast/nipple 8541/3 Paget's disease with invasive ductal carcinoma 8543/3 M. Paget's disease with non-invasive intraductal carcinoma - Metaplastic carcinoma n.a. (8575/3) - Other metaplastic carcinomas 8070/3 Squamous cell carcinoma 8560/3 Adenosquamous carcinoma 8571/3 Adenocarcinoma with cartilage and bone metaplasia, metaplastic Ca with chondroid or osseous differentiation 8572/3 Adenocarcinoma with spindle cell metaplasia, fibromatosis-like metaplastic Ca 8032/3 Spindle cell carcinoma 8982/3 Myoepithelial carcinoma - Neuroendocrine carcinoma n.e.c. (NEC) (8246/3)

	- Other neuroendocrine carcinomas: 8240/3 Neuroendocrine tumour grade 1 (NET1) 8249/3 Neuroendocrine tumour grade 2 (NET2) 8013/3 Large cell neuroendocrine carcinoma 8041/3 Small cell neuroendocrine carcinoma - Rare and salivary gland-like tumours: 8550/3 Acinus cell carcinomas 8200/3 Adenoid cystic carcinoma 8502/3 secretory/juvenile breast carcinoma 8430/3 Mucoepidermoid carcinoma 8525/3 Polymorphic low-grade adenocarcinoma, terminal ductal adenocarcinoma - Apocrine adenocarcinoma (8401/3) - Other rare invasive carcinomas: 8022/3 Pleomorphic carcinoma 8035/3 Carcinoma with osteoclast-like giant cells 8290/3 Oncocytic (adeno) carcinoma 8314/3 Lipid-rich carcinoma 8315/3 Glycogen-rich carcinoma 8410/3 Adenocarcinoma of the sebaceous gland / sebaceous Ca 8470/3 Mucinous cystadenocarcinoma 8983/3 Adenomyoepithelioma with carcinoma 8562/3 Epithelial-myoepithelial carcinoma - Phyllodes tumours: 9020/3 Malignant phyllodes tumour of the breast, malignant cystosarcoma phyllodes, low grade periductal stromal tumour (very rare; no TNM class) - Angiosarcoma (9120/3) - Other mesenchymal tumours: 8850/3 Liposarcoma 8890/3 Leiomyosarcoma 8900/3 Rhabdomyosarcoma 9180/3 Osteosarcoma - Unspecific morphology 8010/3 Carcinoma 8140/3 Adenocarcinoma 8800/3 Sarcoma - Clinical diagnoses 8000/3 Malignant neoplasia 8530/3 Inflammatory carcinoma - Other morphologies
Variables:	- 3.3 ICD code - (3.4 ICD-O Topography) - 3.5 ICD-O Morphology - 3.6.1 ICD-O Behaviour

Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	- Morphological classification of the WHO Classification of Tumours, 5th edition is used (17)
Literature:	- Institute for Quality Assurance and Transparency in Health Care Germany: Federal evaluation of breast surgery: Percentage frequency of selected morphologies (p.82) (18)

12 Precancerous lesions by morphology

Indicator to observe the development of cancer

Objective:	To show the distribution of morphological types of precancerous breast lesions and to evaluate changes over time
Inclusion criteria:	- ICD code = D05 - Only precancerous lesions (D05) diagnosed without or before a diagnosis of an invasive breast cancer
Calculation:	Distribution of the following morphological groups: - DCIS: 8500/2 CIS intraductal/ductal intraepithelial neoplasia (DCIS) -pleomorphic LCIS: 8519/2 Pleomorphic lobular carcinoma in situ (pleomorphic LCIS) - papillary: 8503/2 Non-invasive intraductal papillary adenocarcinoma, ductal papillary CIS, intraductal papilloma with ductal Ca in situ 8504/2 Non-infiltrating intracystic carcinoma 8509/2 Solid papillary Ca in situ - LCIS: 8520/2 Lobular carcinoma in situ/lobular intraepithelial neoplasia grade 3 (LCIS; LIN2; LIN3), intraductal papilloma with lobular Ca in situ - Unspecific morphologies 8010/2 Carcinoma in situ 8140/2 Adenocarcinoma in situ - Other morphologies
Variables:	3.3 ICD code (3.4 ICD-O Topography) 3.5 ICD-O Morphology (3.6.1 ICD-O Behaviour)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	- Morphological classification of the WHO Classification of Tumours, 5th edition is used (17)
Literature:	- Institute for Quality Assurance and Transparency in Health Care Germany: Federal evaluation of breast surgery: Percentage frequency of selected morphologies (p.82) (18)

13 Proportion of precancerous lesions

Indicator to observe the development of cancer	
Objective:	To show the proportion of precancerous lesions among all breast tumours and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 and D05 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1) - Only precancerous lesions (D05) diagnosed without or before a diagnosis of an invasive breast cancer
Calculation:	Numerator: ICD code = D05
	Denominator: ICD code = D05, C50
Variables:	- 2.3.1 Date of incidence - 3.3 ICD code
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	
Literature:	

14 Invasive cancer in patients with previous precancerous lesions	
Indicator to observe the development of cancer	
Objective:	To show the proportion of invasive breast cancer in patients with previous precancerous breast lesions and to evaluate changes over time
Inclusion criteria:	- ICD code = D05 - Patients with precancerous breast lesions (D05) without or before a diagnosis of an invasive breast cancer - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: Number of Patient Identifier from Denominator AND ICD code = C50 AND age at incidence of C50 > age at incidence of D05
	Denominator: ICD code = D05
Variables:	2.3.1 Date of incidence 2.4 Age at incidence 3.3 ICD code (3.4 ICD-O Topography, 3.5 ICD-O Morphology, 3.6.1 ICD-O Behaviour) Patient identifier
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	
Literature:	

15 Bilateral breast cancer

Indicator to observe the development of cancer

Objective:	To show the proportion of patients with synchronous and metachronous bilateral breast cancer
Inclusion criteria:	- ICD code = C50
Calculation:	Numerator: 1) Synchronous (diagnosed no more than 4 months after the initial diagnosis): Cases with the same patient identification number, but different case number (exemplary 1, 2) and different laterality with age at incidence for case number "1" maximum 4-month time interval to case number "2" 2) Metachronous (diagnosed no earlier than 4 months after the initial diagnosis): Cases with the same patient identification number, different case number (exemplary 1, 2) and different laterality with age at incidence for case number "1" over a 4-month time interval to case number "2" 3) Synchronous or metachronous
	Denominator: ICD code = C50
Variables:	2.11 Case number 2.3.1 Date of incidence 2.4 Age at incidence 3.3 ICD code (3.4 ICD-O Topography, 3.5 ICD-O Morphology, 3.6.1 ICD-O Behaviour) 3.8 Laterality Patient identifier
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	- There are different definitions of when bilateral breast cancer is considered synchronous or metachronous (see literature). The time periods vary from 3 to 12 months. When defining this indicator, however, not only the international standard but also Swiss registration practice is decisive to be able to conduct reliable evaluations, which defines a metachronous tumour to be diagnosed at least four months after a first tumour.
Literature:	- Population-based study of the registry of canton Zurich: 4.3% patients with unilateral breast cancer developed a second malignant tumour of the opposite breast (19) - Retrospective study in Italy and meta-analysis of 56 women with bilateral breast cancer. Definition synchronous: within 4 months after diagnosis of primary breast cancer. Definition metachronous: more than 4 months after the diagnosis of primary breast cancer (20)

	- Retrospective study in Sweden of 6,550 women with bilateral breast cancer between 1970-2000. Definition synchronous: within 3 months of diagnosis of primary breast cancer. Definition metachronous: more than 3 months after the diagnosis of primary breast cancer (21) - Between 1973 and 2014, a total of 11,177 women with bilateral breast cancer in the SEER database. Definition synchronous: within one year of the diagnosis of primary breast cancer. Definition metachronous: more than one year after the diagnosis of primary breast cancer (22)

16 Oestrogen receptor status	
Indicator to observe the development of cancer	
Objective:	To show the distribution and the proportion of a positive oestrogen receptor status in breast cancer and evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: 1) Qualitative: Oestrogen receptor status = 333 (receptor status positive), 1-100 (positive percentage values) 2) Quantitative: Oestrogen receptor status = 0-100 (percentage value % in steps of 5 or 10)
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 3.3 ICD code 5.1.1 Oestrogen receptor status
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	- According to the National Cancer Data Dictionary V1.3 (p.115) (12) if quantitative (percentage %) and qualitative (positive/negative) information are available, the quantitative information should be recorded. In some cases, however, only qualitative information is available
Literature:	- According to S3 guideline for breast cancer: low positive = 1-9%, positive ≥ 10% (p.115) (23)

17 Progesterone receptor status	
Indicator to observe the development of cancer	
Objective:	To show the proportion of a positive progesterone receptor status in breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: 1) Qualitative: Progesterone receptor status = 333 (receptor status positive), 1-100 (positive percentage values) 2) Quantitative: Progesterone receptor status = 1-100 (percentage value % in steps of 5 or 10)
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 3.3 ICD code 5.1.2 Progesterone receptor status
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	- According to the National Cancer Data Dictionary V1.3 (p.117) (12) if quantitative (percentage %) and qualitative (positive/negative) information are available, the quantitative information should be recorded. In some cases, however, only qualitative information is available.
Literature:	- According to the S3 guideline for breast cancer: low positive = 1-9%, positive ≥ 10% (p.115) (23)

18 Hormone receptor status

Indicator to observe the development of cancer

Objective:	To show the proportion of a positive hormone receptor status in breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: Oestrogen receptor status = 333 (receptor status positive), 1-100 OR/AND Progesterone receptor status = 333 (receptor status positive), 1-100
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 3.3 ICD code 5.1.1 Oestrogen receptor status 5.1.2 Progesterone receptor status
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	- According to the National Cancer Data Dictionary V1.3 (p.117) (12) if quantitative (percentage %) and qualitative (positive/negative) information are available, the quantitative information should be recorded. In some cases, however, only qualitative information is available
Literature:	- According to S3 guideline for breast cancer: low positive = 1-9%, positive ≥ 10% (p.115) (23)

19 Her2 receptor status	
Indicator to observe the development of cancer	
Objective:	To show the proportion of positive Her2 receptor status in breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: Her2 receptor status = 1 (overexpressed/amplified)
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 3.3 ICD code 5.1.3 Her2 receptor status
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	
Literature:	- Her2 overexpression in approx. 15-20% of all primary cases of breast cancer (24)

20 Tumour proliferation labelling	
Indicator to observe the development of cancer	
Objective:	To show the distribution of Ki-67 expression in breast cancer and evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	- Tumour proliferation labelling = 0-100 (percentage value % in steps of 5 or 10)
Variables:	2.3.1 Date of incidence 3.3 ICD code 5.1.4 Tumour proliferation labelling status
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	
Literature:	- According to the S3 guideline on breast cancer: "The experts emphasised that [due to the heterogeneous methodological approach] it is not possible to specify generally valid Ki-67 thresholds for prognosis, prediction and monitoring." (S.119) (23)

21 Triple-negative breast cancer	
Indicator to observe the development of cancer	
Objective:	To show the proportion of triple-negative breast cancer and evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: Oestrogen receptor status = 222 (receptor status negative), 0 AND progesterone receptor status = 222 (receptor status negative), 0 AND Her2 receptor status = 2 (HER2 gene not overexpressed or amplified)
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 3.3 ICD code 5.1.1 Oestrogen receptor status 5.1.2 Progesterone receptor status 5.1.3 Her2 receptor status
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	- According to the National Cancer Data Dictionary V1.3 (p.117) (12) if quantitative (percentage %) and qualitative (positive/negative) information are available, the quantitative information should be recorded. In some cases, however, only qualitative information is available.
Literature:	- Triple-negative breast cancer accounts for 15-20% of all invasive breast cancer cases and is considered one of the most heterogeneous and aggressive subtypes of breast cancer (25)

Treatment

22 Treatment decision at a tumour board

Indicator to evaluate the quality of care

Objective:	To show the proportion of cases with treatment decision at a tumour board and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: Basis of first treatment complex decision = 1 (tumour board)
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 3.3 ICD code 7.1 Basis of first treatment complex decision
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM) - By Nationality (1.11 Nationality)
Remarks:	- In the National Cancer Data Dictionary V1.3 (12) only the first tumour board is recorded
Literature:	- Indicator sheet breast DKG, German Society of Senology: Indicators 1 and 2 - Postoperative and pre-therapeutic case discussion (14) - Q-Label: Proportion of cases with pre-therapeutic discussion of the therapy concept in all new cases, proportion of cases with discussion at the post-operative tumour board in all new breast cancer cases. In accordance with the guidelines for the certification of breast centres by the Swiss Cancer League and the Swiss Society of Senology: All new cases with histopathological findings of class B3 (=benign lesions with uncertain biological potential) and higher are presented at the pre-therapeutic tumour board with pathology findings. All patients with malignant findings are discussed at the tumour board after the operation. Otherwise, a reason for non-presentation must be provided (p.11) (26) (Note: The National Cancer Data Dictionary V1.3 (12) does not explicitly distinguish between preoperative and postoperative tumour boards, but all patients with malignant findings should receive at least one tumour board discussion). - According to the European Society of Breast Cancer Specialists/Advanced Breast Cancer Global Alliance quality indicators for metastatic breast cancer care: The aim is to discuss 99% (minimum standard: 50%) of cases of patients with advanced breast cancer at a tumour board (27)

	- DKG / German Society for Senology (Evaluation of indicators 2023 - Annual report of the certified breast cancer centres): Postoperative tumour conference: median of 90% in indicator year 2021 (p.12, Pre-therapeutic case discussion: median of 90% in indicator year 2021 (p.13) (16)

23 Surgical treatment	
Indicator to observe the development of cancer	
Objective:	To show the proportion of surgical treatment in breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: First treatment complex code(s): Surgery = Z85._, Z00.R2, Z00.R1, Z00.R2, Z00.R8, Z00.RD, Z00.RE, Z00.RF, Z00.RG, Z00.RH, Z00.RI, Z00.RK, Z00.RN, Z00.RU, Z00.RV, (Z86.30, Z86.40)
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 3.3 ICD code 7.4 First treatment complex code(s)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	
Literature:	- Institute for Quality Assurance and Transparency in Health Care Germany: Surgical treatments for invasive carcinoma in primary disease (p. 79) (18)

24 Types of surgical treatment	
Indicator to observe the development of cancer and to evaluate the quality of treatment	
Objective:	To show the distribution of the surgical procedures in breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1) - Only cases with surgery: First treatment complex code(s) = Z85.__, Z00.R2, Z00.R1, Z00.R2, Z00.R8, Z00.RD, Z00.RE, Z00.RF, Z00.RG, Z00.RH, Z00.RI, Z00.RK, Z00.RN, Z00.RU, Z00.RV, (Z86.30, Z86.40)
Calculation:	Distribution of different types of surgical treatments: 1) Breast-conserving surgery: First treatment complex code(s) = Z85.A1 (Partial mastectomy), Z00.R8 (Minor surgical procedure on tumour n.d. (for cancer registration only)), Z00.RD (Local excision n.d. (for cancer registration only)) 2) Nipple/skin-preserving mastectomies with immediate reconstruction: First treatment complex code(s) = Z85.A2.XX (Skin-sparing mastectomy), Z85.A3.XX (Nipple-sparing mastectomy) 3) Total mastectomies (without immediate reconstruction): First treatment complex code(s) = Z85.A4 (Simple mastectomy), Z85.A5 (Modified radical mastectomy), Z85.A6.11 (Radical mastectomy, without partial chest wall resection), Z85.A6.12 (Radical mastectomy, with partial chest wall resection), Z85.A0 (Mastectomy, without specification) 4) Other surgeries/unknown
Variables:	2.3.1 Date of incidence 3.3 ICD code 7.4 First treatment complex code(s)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	
Literature:	- Q-Label: Proportion of breast-conserving operations in all operations taking into account tumour size and proportion of mastectomies in all new breast cancer cases operated on (26) - Institute for Quality Assurance and Transparency in Health Care Germany: Surgical treatments for invasive carcinoma in primary disease (p. 79) (18)

25 Resection status after first surgery	
Indicator to evaluate the quality of treatment	
Objective:	To show the proportion of patients without detectable local residual tumour after surgery in breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: Resection margin invasive tumour ≠ 0
	Denominator: ICD code = C50 AND Resection margin invasive tumour ≠ 98.0, 99.0 AND First treatment complex code(s): Surgery = Z85.__, Z00.R2, Z00.R1, Z00.R2, Z00.R8, Z00.RD, Z00.RE, Z00.RF, Z00.RG, Z00.RH, Z00.RI, Z00.RK, Z00.RN, Z00.RU, Z00.RV, (Z86.30, Z86.40)
Variables:	2.3.1 Date of incidence 3.3 ICD code 6.3 Resection margin invasive tumour (6.4 Resection margin associated in-situ tumour) 7.4 First treatment complex code(s)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	
Literature:	- Q-Label: According to the guidelines for the certification of breast centres by the Swiss Cancer League and the Swiss Society of Senology: Proportion of R0/R1 resections in all invasive tumours after completion of surgery for primary carcinomas and locoregional recurrences to be operated on (without DCIS), limit value R0 resections 95% (p.13) (26)

26 Sentinel lymph node removal	
Indicator to evaluate the quality of diagnosis	
Objective:	To show the proportion of sentinel lymph node removal in breast cancer
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: Number of examined sentinel lymph nodes = 1-98
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 3.3 ICD code 6.6 Number of examined sentinel lymph nodes
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	
Literature:	

27 Radiotherapy	
Indicator to observe the development of cancer	
Objective:	To show the proportion of radiotherapy in breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: First treatment complex code(s): Radiotherapy = Z92.2, Z92.21.00 Z92.22.1, Z92.22.00, Z92.24, Z92.24.00, Z92.24.04, Z92.24.09, Z92.25.00, Z92.26.00, Z92.41, Z92.29.00, Z92.29.01, Z92.29.40, Z92.27.23, Z92.28.24, (Z92.28.71), Z92.29.1, Z92.29.40, Z92.4, Z92.41
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 3.3 ICD code 7.4 First treatment complex code(s)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	
Literature:	

28 Radiotherapy after breast-conserving therapy for invasive breast cancer	
Indicator to evaluate the quality of treatment	
Objective:	To show the proportion of radiotherapy after breast-conserving therapy in patients with breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: First treatment complex code(s): Radiotherapy = Z92.2, Z92.21.00 Z92.22.1, Z92.22.00, Z92.24, Z92.24.00, Z92.24.04, Z92.24.09, Z92.25.00, Z92.26.00, Z92.41, Z92.29.00, Z92.29.01, Z92.29.40, Z92.27.23, Z92.28.24, (Z92.28.71), Z92.29.1, Z92.29.40, Z92.4, Z92.41 AND age at start of radiotherapy > age at time of breast-conserving surgery AND age at start of radiotherapy = max. 1 year after age at time of breast-conserving surgery
	Denominator: ICD code = C50 AND pM ≠ 1 (M1) AND/OR cM ≠ 1 AND First treatment complex code(s): Breast conserving therapy: = Z85.A1, Z85.26 (Partial mastectomy, quadrantectomy, tumourectomy), Z00.R8 (Minor surgical procedure on tumour, not specified (for cancer registration only)), Z00.RD (Local excision, not specified (for cancer registration only))
Variables:	2.3.1 Date of incidence 3.3 ICD code 4.13 pM 4.5 cM 7.4 First treatment complex code(s) 7.5.1 First treatment complex start date(s) (age in days "age_tr1_1")
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	
Literature:	- Platform § 65c: QI 8 - Radiotherapy performed after breast-conserving therapy (13) - Indicator sheet breast DKG, German Society of Senology: Indicator 4 - Radiotherapy after breast-conserving therapy for invasive breast cancer (14)

29 Radiotherapy after breast-conserving therapy for DCIS	
Indicator to evaluate the quality of treatment	
Objective:	To show the proportion of radiotherapy after breast-conserving therapy in patients with DCIS and to evaluate changes over time
Inclusion criteria:	- ICD code = D05 - Only precancerous lesions (D05) diagnosed without or before a diagnosis of an invasive breast cancer
Calculation:	Numerator: First treatment complex code(s): Radiotherapy = Z92.2, Z92.21.00 Z92.22.1, Z92.22.00, Z92.24, Z92.24.00, Z92.24.04, Z92.24.09, Z92.25.00, Z92.26.00, Z92.41, Z92.29.00, Z92.29.01, Z92.29.40, Z92.27.23, Z92.28.24, (Z92.28.71), Z92.29.1, Z92.29.40, Z92.4, Z92.41 WITH First treatment start complex date(s) (age in days) AFTER breast-conserving surgery (see definition of denominator) AND age at start of radiotherapy > age at time of breast-conserving surgery AND age at start of radiotherapy = max. 1 year after age at time of breast-conserving surgery
	Denominator: ICD-O Morphology = 8500 AND ICD-O Behaviour = 2 AND First treatment complex code(s): Breast-conserving therapy = Z85.A1, Z85.26 (Partial mastectomy, quadrantectomy, tumourectomy), Z00.R8 (Minor surgical procedure on tumour, not specified (for cancer registration only)), Z00.RD (Local excision, not specified (for cancer registration only)
Variables:	2.3.1 Date of incidence 3.3 ICD code 3.5 ICD-O Morphology 3.6.1 ICD-O Behaviour 7.4 First treatment complex code(s) 7.5.1 First treatment complex start date(s) (and age in days)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	
Literature:	- Indicator sheet breast DKG, German Society of Senology: Indicator 5 - Radiotherapy after BET for DCIS (14)

30 Chemotherapy	
Indicator to observe the development of cancer	
Objective:	To show the proportion of chemotherapy in breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: First treatment complex code(s): Chemotherapy = Z99.25, Z99.25.00, Z99.25.51, Z99.25.52, Z99.25.53, Z99.25.54
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 3.3 ICD code 7.4 First treatment complex code(s)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	
Literature:	

31 Chemotherapy for HER2-positive and node-positive tumours	
Indicator to evaluate the quality of treatment	
Objective:	To show the proportion of chemotherapy in patients with HER2-positive and node-positive breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: First treatment complex code(s): Chemotherapy = Z99.25, Z99.25.00, Z99.25.51, Z99.25.52, Z99.25.53, Z99.25.54
	Denominator: ICD code = C50 AND pN ≥ 1 (pN1) AND Her2 receptor status = 1
Variables:	2.3.1 Date of incidence 3.3 ICD code 4.10 pN 5.1.3 Her2 receptor status 7.4 First treatment complex code(s)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	
Literature:	- Indicator sheet breast DKG, German Society of Senology: Indicator 6 - Chemotherapy for receptor-positive and nodal-positive findings (14)

32 Hormone therapy	
Indicator to observe the development of cancer	
Objective:	To show the proportion of hormone therapy in breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: First treatment complex code(s): Hormone therapy = Z99.2R.0, Z99.2R.01, Z99.2R.02, Z99.2R.03, Z99.2R.04, Z99.2R.05, Z99.2R.06, Z99.2R.07
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 3.3 ICD code 7.4 First treatment complex code(s)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	
Literature:	

33 Hormone therapy for hormone receptor-positive invasive breast cancer	
Indicator to evaluate the quality of treatment	
Objective:	To show the proportion of hormone therapy in patients with breast cancer and positive progesterone receptor status and/or oestrogen receptor status and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: First treatment complex code(s): Hormone therapy = Z99.2R.0, Z99.2R.01, Z99.2R.02, Z99.2R.03, Z99.2R.04, Z99.2R.06
	Denominator: ICD code = C50 AND (pM ≠ 1 and/or cM ≠ 1) AND Progesterone receptor status = 333, ≥10 AND/OR Oestrogen receptor status = 333, ≥10
Variables:	2.3.1 Date of incidence 3.3 ICD code 4.5 cM 4.13 pM 5.1.1 Oestrogen receptor status 5.1.2 Progesterone receptor status 7.4 First treatment complex code(s)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	- A cut-off value for hormone receptor status, above which hormone therapy should always be conducted, is difficult to define. In principle, hormone therapy is often indicated from 10% positive tumour cells. However, hormone therapy may also be indicated at percentages between 1-9% and depending on other factors.
Literature:	- Platform § 65c: QI 9 - Endocrine therapy for receptor-positive findings (13) - Breast DKG, German Society of Senology: Indicator 7 - Endocrine therapy with as many steroid-positive findings as possible (14) - According to the European Society of Breast Cancer Specialists/Advanced Breast Cancer Global Alliance quality indicators for metastatic breast cancer care: The goal is that 85% of cases with advanced oestrogen receptor-positive breast cancer receive anti-hormone therapy (27) - National Quality Forum (American College of Surgeons): QI 0220: Adjuvant hormone therapy is recommended or administered within 1 year (365 days) of diagnosis for women with AJCC T1cN0M0 or Stage IB - Stage III hormone receptor positive breast cancer (28) - S3 guideline on breast cancer: Patients with oestrogen and/or progesterone receptor-positive invasive tumours should receive hormone therapy. (p.172) ER-/PgR-positive: ≥ 10% positive tumour cells (p.115) (23)

34 Antibody therapy	
Indicator to observe the development of cancer	
Objective:	To show the proportion of antibody therapy in breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: First treatment complex code(s): Antibody therapy = Z99.28.11
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 3.3 ICD code 7.4 First treatment complex code(s)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	- Only the CHOP code Z99.28.11 (Other immunotherapy, with unmodified antibodies) is recorded and not the exact substance. It is therefore not possible to distinguish between different antibodies, such as trastuzumab and pembrolizumab.
Literature:	

35 Antibody therapy for HER2-positive invasive breast cancer	
Indicator to evaluate the quality of treatment	
Objective:	To show the proportion of antibody therapy in patients with HER2-positive breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: First treatment complex code(s): Antibody therapy = Z99.28.11
	Denominator: ICD code = C50 AND pT ≥ 1c (pT1c) AND (pM ≠ 1 and/or cM ≠ 1) AND Her2 receptor status = 1
Variables:	2.3.1 Date of incidence 3.3 ICD code 4.5 cM 4.8 pT 4.13 pM 5.1.3 Her2 receptor status 7.4 First treatment complex code(s)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	- No substances are recorded in the cancer registry, only a code for antibody therapy is used. It is therefore not possible to say with certainty, for example, whether the therapy involves trastuzumab or pembrolizumab.
Literature:	- Platform § 65c: QI 10 - Trastuzumab therapy for HER2-positive findings (Note: Metastatic tumours are excluded in the quality indicator from Germany. However, the S3 guideline recommends: "Metastatic HER2-positive breast carcinomas should be treated with anti-HER2 therapy, provided there are no cardiac contraindications" (p.240). QI 10 is defined much more precisely with the start and end of therapy. This will probably not be possible in Switzerland) (20) - Indicator sheet breast DKG, German Society of Senology: Indicator 8 - Trastuzumab therapy over 1 year for HER-2 positive findings (21) - According to the European Society of Breast Cancer Specialists/Advanced Breast Cancer Global Alliance quality indicators for metastatic breast cancer care: The goal is that 95% of cases with HER2-positive metastatic breast cancer receive antibody therapy with trastuzumab (p.109) (27) - S3 guideline on breast cancer: Adjuvant treatment with trastuzumab is indicated for patients with node-positive tumours and node-negative tumours ≥ 1 cm in diameter with HER2 overexpression. (S.186) (23)

36 Neoadjuvant treatment	
Indicator to observe the development of cancer	
Objective:	To show the proportion of neoadjuvant treatment in breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: First treatment complex code(s): Antibody therapy = Z99.28.11, Chemotherapy = Z99.25, Z99.25.00, Z99.25.51, Z99.25.52, Z99.25.53, Z99.25.54, Hormone therapy = Z99.2R.0, Z99.2R.01, Z99.2R.02, Z99.2R.03, Z99.2R.04, Z99.2R.05, Z99.2R.06, Z99.2R.07 AND First treatment start complex date(s) (age in days) BEFORE First treatment start complex date(s) (age in days) of First treatment complex code(s): Surgery = Z85._, Z00.R2, Z00.R1, Z00.R2, Z00.R8, Z00.RD, Z00.RE, Z00.RF, Z00.RG, Z00.RH, Z00.RI, Z00.RK, Z00.RN, Z00.RU, Z00.RV, (Z86.30, Z86.40))
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 3.3 ICD code 7.4 First treatment complex code(s)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	
Literature:	

37 Time between diagnosis and start of treatment	
Indicator to evaluate the quality of care	
Objective:	To show the time between the diagnosis and the start of treatment in breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50, D05 (separately) - Only primary tumours (C50) according to ENCR rules for multiple primaries (1) - Only precancerous lesions (D05) diagnosed without or before a diagnosis of an invasive breast cancer
Calculation:	- Mean and median time between age at incidence and age at start of the treatment in days
Variables:	2.3.1 Date of incidence 2.4 Age at incidence 2.11 Case number 3.3 ICD code 7.5.1 Date of start of first treatment (age in days "age_tr1_1")
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM) - By Nationality (1.11 Nationality)
Remarks:	
Literature:	- Q-Label: According to the guidelines for the certification of breast centres by the Swiss Cancer League and the Swiss Society of Senology: Treatment should be started within 20 working days after biopsy or initial consultation (p.11) (26) - Institute for Quality Assurance and Transparency in Health Care Germany: Federal evaluation of QI 51370: Time interval of less than 7 days between diagnosis and surgery (18) - Comparison with a retrospective study from Brazil on the duration between diagnosis and first treatment with a focus on the change in the context of the COVID-19 pandemic possible (29)

38 Time between diagnosis and surgery	
Indicator to evaluate the quality of care	
Objective:	To show the time between the diagnosis and the surgery in breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50, D05 (separately) - Only primary tumours (C50) according to ENCR rules for multiple primaries (1) - Only precancerous lesions (D05) diagnosed without or before a diagnosis of an invasive breast cancer - No neoadjuvant (preoperative) pre-treated patients, only curative treatment goal
Calculation:	- Mean and median time between age at incidence and age at the date of the surgical treatment in days - Definition surgery: First treatment complex code(s): Surgery = Z85.__, Z00.R2, Z00.R1, Z00.R2, Z00.R8, Z00.RD, Z00.RE, Z00.RF, Z00.RG, Z00.RH, Z00.RI, Z00.RK, Z00.RN, Z00.RU, Z00.RV, (Z86.30, Z86.40) - UICC I-III, UICC 0 (separately)
Variables:	2.3.1 Date of incidence 2.4 Age at incidence 2.11 Case number 3.3 ICD code 4.17 TNM stage group 4.3 cT 4.4 cN 4.5 cM 4.7 y-Prefix of pTNM 4.8 pT 4.10 pN 4.13 pM 7.3 First treatment complex goal(s) 7.4 First treatment complex code(s) 7.5.1 First treatment complex start date(s) (age in days "age_tr1_1")
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM) - By nationality (1.11 Nationality)
Remarks:	
Literature:	- Q-Label: According to the guidelines for the certification of breast centres by the Swiss Cancer League and the Swiss Society of Senology: Treatment should be started within 20 working days after biopsy or initial consultation (p.11) (26)

	- Institute for Quality Assurance and Transparency in Health Care Germany: Federal evaluation of QI 51370: Time interval of less than 7 days between diagnosis and surgery (18) - Comparison e.g. possible with a US-SEER-Medicare population (time from diagnosis to surgery)(30) Shanghai Jiaotong University Breast Cancer Database (31), NABON Breast Cancer Audit of the Netherlands (32)

Course of the disease

39 New event during the course of the disease	
Indicator to observe the development of cancer	
Objective:	To show the proportion of breast cancer cases with a new event during the course of the disease (recurrence, progression, metachronous metastasis) and to evaluate changes over time
Inclusion criteria:	- Only primary tumours (C50) according to ENCR rules for multiple primaries (1) - Only the first event is considered
Calculation:	Numerator: 1) Type of recurrence(s)/transformation(s) = 1 (progression), 3 (metastasis), 4 (recurrence), 9 (Unknown whether progression or recurrence) 2) 8.1 Type of recurrence(s)/transformation(s) = 1 (progression) 3) 8.1 Type of recurrence(s)/transformation(s) = 3 (metastasis) 4) 8.1 Type of recurrence(s)/transformation(s) = 4 (recurrence) 5) 8.1 Type of recurrence(s)/transformation(s) = 9 (Unknown whether progression or recurrence)
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 3.3 ICD code 4.5 cM 4.13 pM 8.1 Type of recurrence(s)/transformation(s)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	
Literature:	- DKG Breast Indicator Sheet, German Society of Senology: Indicator 14b - Patients with new (local) recurrence and/or distant metastases (without primary M1 patients) (16) - A retrospective analysis of 84 studies shows that the proportion of events (local recurrence, contralateral recurrence (and/or new primary breast cancer), distant disease, secondary cancers, or death from any cause) among all randomised patients has decreased over time: from 19 to 31% in studies started before 1990 to 4 to 13% in studies started after 2010 (33)

40 Event-free survival	
Indicator to observe the development of cancer	
Objective:	To show the event-free survival in patients with breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation	1) Mean and median event-free survival time in days between the age at incidence and age at time of the first event during the course of the disease (recurrence, progression, metastasis) 2) Observed 1, 5, 10 and 15-year event-free survival proportion
Variables:	2.3.1 Date of incidence 2.4 Age at incidence 3.3 ICD code 8.1 Type of recurrence(s)/transformation(s) 8.2.1 Date of recurrence(s)/transformation(s) (age in days "dacc_course")
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	
Literature:	

Comorbidities (supplementary variables)

41 Comorbidities	
Indicator to observe the development of cancer	
Objective:	To show the distribution of comorbidities in breast cancer patients and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: 1) Diabetes mellitus (supplementary data) = 1 (Uncomplicated (score 1)), 2 (End-organ damage (score 2)) 2) Liver disease (supplementary data) = 1 (mild (score 1)), 2 (moderate to severe (score 3)) 3) HIV/AIDS (supplementary data) = 1 (Yes (score 6)) 4) Moderate to severe chronic kidney disease (supplementary data) = 1 (Yes (score 2)) 5) Congestive Heart failure (supplementary data) = 1 (Yes (score 1)) 6) Myocardial infarction (supplementary data) = 1 (Yes (score 1)) 7) Chronic pulmonary disease (supplementary data) = 1 (Yes (score 1)) 8) Peripheral vascular disease (supplementary data) = 1 (Yes (score 1)) 9) Cerebrovascular Accident or Transient Ischemic Attack (supplementary data) = 1 (Yes (score 1)) 10) Dementia (supplementary data) = 1 (Yes (score 1)) 11) Hemiplegia / paraplegia (supplementary data) = 1 (Yes (score 2)) 12) Connective Tissue Disease - Rheumatic disease (supplementary data) = 1 (Yes (score 1)) 13) Peptic ulcer disease (supplementary l data) = 1 (Yes (score 1)) 14) Any comorbidity: at least one of the above-mentioned comorbidities is present
	Denominator: ICD code = C50
Variables:	3.3 ICD code 10.1 Diabetes mellitus (supplementary data) 10.2 Liver disease (supplementary data) 10.3 HIV/AIDS (supplementary data) 10.4 Moderate to severe chronic kidney disease (supplementary data) 10.5 Heart failure (supplementary data) 10.6 Myocardial infarction (supplementary data) 10.7 Chronic pulmonary disease (supplementary data) 10.8 Peripheral vascular disease (supplementary data) 10.9 Cerebrovascular Accident or Transient Ischemic Attack (supplementary data) 10.10 Dementia (supplementary data) 10.11 Hemiplegia / paraplegia (supplementary data)

	10.12 Connective Tissue Disease - Rheumatic disease (supplementary data) 10.13 Peptic ulcer disease (supplementary l data)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	
Literature:	

42 Charlson Index	
Indicator to observe the development of cancer	
Objective:	To show the distribution of the Charlson Index in breast cancer patients and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	- Percentage distribution of the Charlson index (in steps of 1 or 2 or other categories, to be defined)
Variables:	3.3 ICD code 10.1 Diabetes mellitus (supplementary data) 10.2 Liver disease (supplementary data) 10.3 HIV/AIDS (supplementary data) 10.4 Moderate to severe chronic kidney disease (supplementary data) 10.5 Congestive Heart failure (supplementary data) 10.6 Myocardial infarction (supplementary data) 10.7 Chronic pulmonary disease (supplementary data) 10.8 Peripheral vascular disease (supplementary data) 10.9 Cerebrovascular Accident or Transient Ischemic Attack (supplementary data) 10.10 Dementia (supplementary data) 10.11 Hemiplegia / paraplegia (supplementary data) 10.12 Connective Tissue Disease - Rheumatic disease (supplementary data) 10.13 Peptic ulcer disease (supplementary l data) 10.14 Charlson index (supplementary data)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence) - By UICC stage (4.17 TNM stage group, 4.3 cT, 4.4 cN, 4.5 cM, 4.7 y-Prefix of pTNM, 4.8 pT, 4.10 pN, 4.13 pM)
Remarks:	- The individual components of the Charlson Index are recorded and enable the NACR to calculate the Charlson Index, if the index itself is not provided.
Literature:	- The Charlson index is a scoring system that can be used to approximately assess the mortality rate of patients (34)

43 Familial and hereditary breast cancer	
Indicator to observe the development of cancer	
Objective:	To show the proportion of familial and hereditary breast cancer and to evaluate changes over time
Inclusion criteria:	- ICD code = C50 - Only primary tumours (C50) according to ENCR rules for multiple primaries (1)
Calculation:	Numerator: Hereditary predisposition(s) = 3 (hereditary breast and ovarian cancer (HBOC syndrome)), Hereditary predisposition(s) = 4 (hereditary breast cancer)
	Denominator: ICD code = C50
Variables:	2.3.1 Date of incidence 3.3 ICD code 9.1 Hereditary predisposition(s) (supplementary data)
Stratification:	- By sex (1.2 Sex) - By age group (2.4 Age at incidence) - By time period (2.3.1 Date of incidence)
Remarks:	- According to the National Cancer Data Dictionary V1.3 (supplementary data p.5) (12) code 4 is designated as hereditary breast cancer and code 3 is designated to hereditary breast and ovarian cancer (HBOC syndrome). To evaluate the familial and hereditary breast cancer, both codes are used.
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