National Institute for Health Development

Cancer in Estonia: incidence 2022, survival 2018–2022 and HPV-related cancers 1998–2022

Tallinn 2025

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Reviewer: Reeli Hallik

This work was supported by Estonian Research Council (grant nr PRG2543).

When using data from this publication, please use the following citation: Zimmermann M-L, Innos K, Paapsi K, Veerus P, Baburin A, Mägi M. Cancer in Estonia: incidence 2022, survival 2018–2022 and HPV-related cancers 1998–2022. Tallinn: National Institute for Health Development; 2025.

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Definitions

Age-standardized rate	a summary of the rate a population would have if it had a standard age structure. Standardization is necessary when comparing several populations that differ with respect to age. It is a weighted mean of age-specific rates; the weights are taken from the population distribution of the standard population
Cancer screening	checking for disease when there are no symptoms. Since screening may find diseases at an early stage, there may be a better chance of curing the disease
Morphology	diagnostic description of a tumour that describes the shape, structure, form and size of cells
Prevalence	measure of the total number of people in a specific group who have (or had) a certain disease, condition, or risk factor at a specific point in time or during a given period of time
Solid tumours	an abnormal mass of tissue that usually does not contain cysts or liquid areas. Solid tumours may be benign (non-cancerous), or malignant (cancerous). Types of solid tumours are named for the type of cells that form them
Survival	probability of being alive after a certain time after the diagnosis of a particular disease. The survival rate is often stated as a five-year survival rate, which can be interpreted as the percentage of people who are alive five years after their diagnosis
TNM staging	a system for describing the amount and spread of cancer in a patient's body, using TNM (T – tumour, N – node, M – metastasis) where T describes the size of the tumour and any spread of cancer to nearby tissue, N describes spread of cancer to regional lymph nodes and M describes metastasis (spread of cancer to other parts of the body)

Abbreviations

ECR	Estonian Cancer Registry
HPV	human papillomavirus
ICD-10	International Classification of Diseases, 10th version

Summary

Owing to internationally recognised population-based cancer registry, Estonian cancer incidence data are available for more than 50 years – since 1968. Over time, the annual number of new cancer cases has increased significantly. A total of 9,196 new cancer cases were registered in Estonia in 2022, with 4,563 cases diagnosed in men and 4,633 in women. Leading cancer sites in men were similar to previous years – the prostate (29% of all cancers in men) followed by non-melanoma skin (12%) and lung (11%). In women, the leading sites were the breast and non-melanoma skin (both 20% of all new cancer cases).

The increase in cancer cases is partly due to the ageing of the population – about half of all cases in 2022 were diagnosed in patients aged 70 years and older. Among women aged 54 and younger, cancer incidence was lower than among men in the same age group; however, from age 55 onwards, cancer incidence in men was remarkably higher than in women. Cancer is relatively rare in children and adolescents – in 2022, 21 cases of malignant tumours were diagnosed in children aged 0–14, and 147 new cases in the 15–34 age group.

The most frequent cancer sites vary in different age groups. In children, leukaemia was diagnosed most frequently. In age group 15–34, the leading cancer sites were the testis and brain in men, and the breast and non-Hodgkin lymphoma in women. In age group 35–54, the most common cancer site was the prostate in men, and the breast in women, followed by non-melanoma skin in both sexes. In age group 55–74, the leading sites were the prostate and lung in men, and the breast and non-melanoma skin in women. In men aged 75 and older, the most frequent sites were the prostate and non-melanoma skin, while in women, non-melanoma skin was followed by the breast.

In 2022, the proportion of microscopically verified cancer cases was 90%, indicating a rather good quality of diagnosis. Three percent of cancer cases were death certificate initiated (DCI), while ca 2% of cases were registered as death certificate only (DCO) cases. Although these proportions are rather low, they still indicate some degree of incomplete notification of cancer cases to the cancer registry.

It is very important to diagnose cancer and start the treatment as early as possible. In 2022, 53% of all new cancer cases were localized at the time of diagnosis, but ca 17% of men and 15% of women already had distant metastasis. The highest proportion of distant metastasis at diagnosis was seen in pancreatic cancer both in men (51%) and women (55%). Compared to 2021, the proportion of distant metastasis at the time of diagnosis had slightly decreased in both sexes for lung cancer as well as colorectal cancer (32% and 22%, respectively).

In men, the highest proportion of cases diagnosed at stage I was seen for kidney cancer and skin melanoma (56% and 44%, respectively). In women, 63% of corpus uteri cancer and 54% of skin melanoma were diagnosed at stage I. The proportion of stage I colon and rectal cancer has somewhat increased while the proportion of stage IV has slightly decreased, remaining near 23% in both sexes. The proportion of early stages in breast cancer is slowly increasing, while the proportion of stage IV cases remained below 7%. Around 30% of cervical cancer cases were diagnosed at stage I, but the proportion of stage IV increased, reaching 19%. Lung cancer was more often diagnosed at early stages, and the proportion of stage IV has somewhat decreased in both sexes. The proportions of stage I and stage IV of prostate cancers have slightly decreased.

In men, the total cancer incidence has been decreasing in recent decades, and in women it has stabilized, but incidence trends vary by cancer sites. The incidence of colon and rectal cancer has slightly decreased after 2019, but it is still early to say whether it is related to the preventive effect of screening or the impact of the COVID-19 pandemic. Lung cancer incidence has been in decline for over two decades in men and

stabilized in women. The incidence of stomach cancer has also been decreasing in both sexes. Breast cancer incidence in women is still rising. The incidence of prostate cancer was decreasing since 2011 but increased again in 2022. Cervical cancer incidence has decreased since 2012 – this is a long-term trend which can be associated with the preventive screening program. Kidney cancer incidence has slightly decreased in men in the last decade whereas the incidence of skin melanoma has slightly decreased in both sexes. The incidence of non-Hodgkin lymphoma has been stable both in men and women.

As of 31 December 2022, there were 70,457 persons (28,736 men and 41,721 women) in the Estonian population with a history of cancer. The most frequent cancer sites among prevalent cases were prostate and breast, similarly to previous years.

In 2018–2022, the one-year, five-year and ten-year relative survival estimates for all cancer cases diagnosed in Estonia were 78%, 65% and 61%, respectively. For most sites, survival estimates were higher for women than for men. In comparison with the Nordic countries, the survival gap remained for non-Hodgkin lymphoma, head and neck cancers (lip, oral cavity, pharynx), as well as for colon and rectal cancer, skin melanoma, and breast and corpus uteri cancer.

In addition to cancer incidence and survival, this report focused on **cancers related to human papillomavirus (HPV)**. HPV causes cancers of oropharynx, oral cavity, anus, larynx, vulva, vagina, cervix uteri and penis. The total number of cancers of these sites has increased in Estonia during 1998–2022. The role of HPV in cancer development can be characterised by the attributable fraction, which is interpreted as the proportion of disease that could be eliminated if the exposure to risk factor were eliminated. The internationally estimated attributable fraction of HPV varies by cancer site from 4% in oral cavity to 100% in cervical cancer. Based on the attributable fraction of HPV, the estimated annual number of cancer cases attributable to HPV has increased in men from 27 to 41 cases, whereas two thirds of the latter estimate are oropharyngeal cancers. In women, the overall number of cancers attributable to HPV has been declining since 2012 due to the decrease in cervical cancer cases. However, the number of oropharyngeal cancers has nearly quadrupled, and anal cancers doubled.

In 2018–2022, over 60% of cases of cervical and oropharyngeal cancer were diagnosed in people younger than 64 years.

The temporal incidence trends of HPV-related sites vary. The incidence of oropharyngeal cancer has rapidly increased since 2005 (nearly 5% per year), particularly in women (10% per year) and this trend is probably related to the increasing prevalence of HPV in the population. Anal cancer incidence is increasing in women at a rate of 4% per year, which can also be associated with HPV. The incidence of laryngeal cancer is decreasing due to the reduced smoking prevalence in the population. The long-term declining trend of cervical cancer incidence since 2012 (nearly 6% per year) can be associated with the preventive effect of the screening program. Improving the effectiveness of HPV vaccination program could help prevent more than 200 cancer cases in Estonia every year.

Introduction and methods

The Estonian Cancer Registry (ECR) was founded in 1978, while reliable incidence data are available for as far back as 1968. The ECR is a population-based registry that collects data on all cancer cases in Estonia. The main task of the registry is to ensure the complete and reliable registration of incident cancer cases, which forms the basis for national cancer statistics, survival analysis and epidemiological research.

In this report, incidence data were updated on 6 March 2025.

For coding the topography and morphology of the tumour, the ECR uses the Third Edition of the International Classification of Diseases for Oncology (ICD-O-3). For this report, the Tenth Revision of the International Classification of Diseases (ICD-10) has been used by converting the ICD-O-3 codes into ICD-10 codes [1]. The calculation of the age-standardized incidence rates is based on the World Standard Population [2].

In Estonia, the following tumours are to be reported: all malignant tumours (C00–C97), *in situ* tumours (D00–D09), benign tumours and tumours of uncertain or unknown behaviour of the brain and central nervous system, as well as of the endocrine organs located in the area of the brain (D32.0–D33.9, D35.2–D35.4, D42.0–D43.9, D44.3–D44.5), and other tumours of lymphoid, haematopoietic and related tissue (D45–D47).

In Figure 1, which shows the leading cancer sites in Estonia in 2022, as well as in Tables 6a and 6b (showing the distribution of new cancer cases by cancer site and the most valid basis of diagnosis) and Tables 7a and 7b (showing the distribution of new cancer cases by site and extent of disease), the percentage proportions may not sum to exactly 100% due to rounding.

Cancer incidence data include cases diagnosed during person´s lifetime, cases diagnosed at autopsy, and cases registered solely based on a death certificate. The analysis of TNM staging distribution only includes cancer cases for which the ECR has information that cancer was diagnosed while the patient was alive.

Cancer survival analysis is based on data on incident cases diagnosed in patients aged ≥15 years, excluding autopsy and death certificate only cases. Follow-up for vital status was conducted by linkage with the Estonian Causes of Death Registry and the Estonian Population Registry. Cancer survival was measured as one-year, five-year and ten-year relative survival ratios, calculated as the ratio of the observed survival of cancer patients to the expected survival of the underlying general population [3]. Expected survival was calculated based on population lifetables stratified by gender, age, and calendar year according to Ederer II method [4]. The one-year, five-year and ten-year relative survival ratios can be interpreted as the proportion of patients alive (not dead from cancer) one, five or ten years after being diagnosed with cancer. Period method was used to calculate survival for 2018–2022 [5]. International Cancer Survival Standards were used for age-standardization [6]. To evaluate the change in relative survival for selected sites, the age-standardized five-year relative survival for 2008–2012, 2013–2017 and 2018–2022 was calculated (cohort method was used for earlier periods) [5].

The special topic of this report was HPV-related cancer. HPV-related cancer sites were defined as follows: oropharynx (ICD-10 codes C01, C02.4, C05.1–2, C09–10), oral cavity (C02–06, excl. C02.4 and C05.1–2), anus (C21), larynx (C32), vulva (C51), vagina (C52), cervix uteri (C53) and penis (C60). The number of cases is presented for five-year periods during 1998–2022.

The role of HPV in the development of different cancers can be characterised by the attributable fraction, which is interpreted as the proportion of disease that could be prevented if exposure to risk factor were eliminated. The attributable fraction of HPV differs across cancer sites. For instance, the attributable fraction of HPV in cervical cancer is 100%, meaning that in case of elimination of HPV, all cervical cancer cases can

be prevented. In penile cancer, the attributable fraction is 51%, meaning that as a result of eliminating HPV, half of penile cancer cases can be prevented. To estimate the number of cancer cases attributable to HPV in Estonia, the following attributable fractions were used: 50% for oropharynx, 4,3% for oral cavity, 88% for anus, 4,6% for larynx, 24,9% for vulva, 78% for vagina, 100% for cervix uteri and 51% for penis [7].

The age and stage distribution of HPV-related cancer sites was analysed for 2018–2022.

Joinpoint regression model was used to analyse incidence trends of HPV-related cancer sites during 1995–2022 (standardised to world standard population) and to calculate the annual percent change. In the text, the annual percentage change is only shown for statistically significant changes (the annual percentage change is significantly different from zero at α=0.05).

1 Leading cancer sites

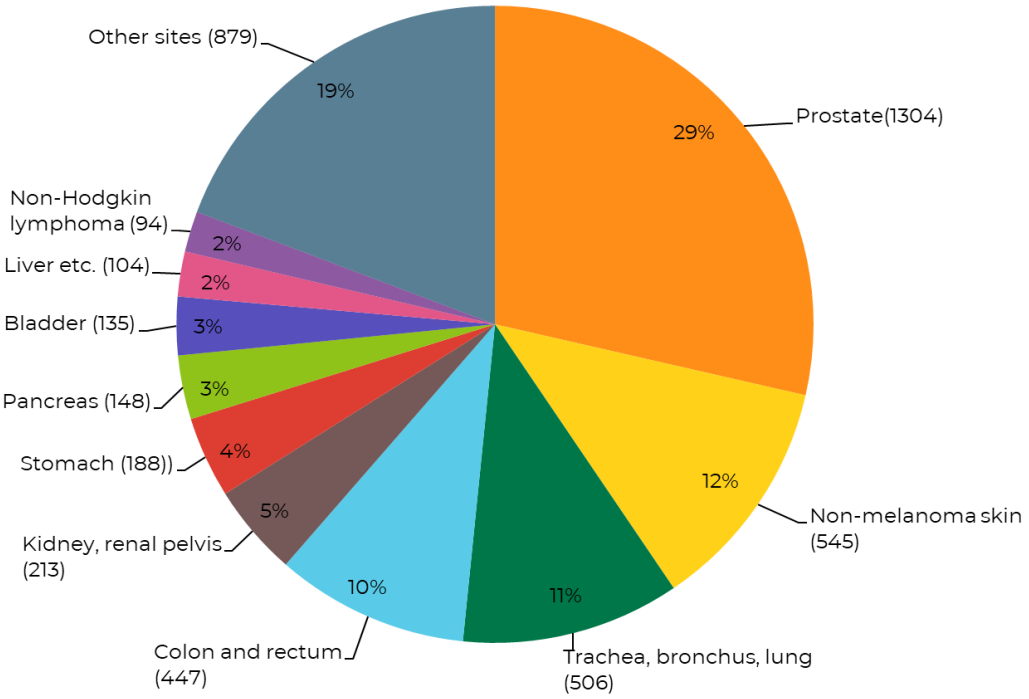
In 2022, Estonia registered 9,196 new cancer cases – 4,563 in men and 4,633 in women. Excluding non-melanoma skin, the total number of cancer cases was 7,742. The most common cancer sites are shown in Figure 1.

The leading cancer site in men was the prostate (29% of all cancers in men), followed by non-melanoma skin (12%), lung cancer (11%), colon (6%), kidney and renal pelvis (5%), stomach and rectum (both 4%). Pancreas, urinary bladder and liver were also among the ten leading sites in men.

In women, the most common sites were the breast and non-melanoma skin (both 20% of all cancer cases), followed by colon (8%), lung (6%) and corpus uteri (5%). Among the ten most common sites were also pancreas, rectum, stomach, kidney and renal pelvis, and ovary.

Tables 1a and 1b show the number of new cancer cases in 2022 along with the crude and age-standardized incidence rates per 100,000 persons in men and women for the ten leading cancer sites.

Men



Women

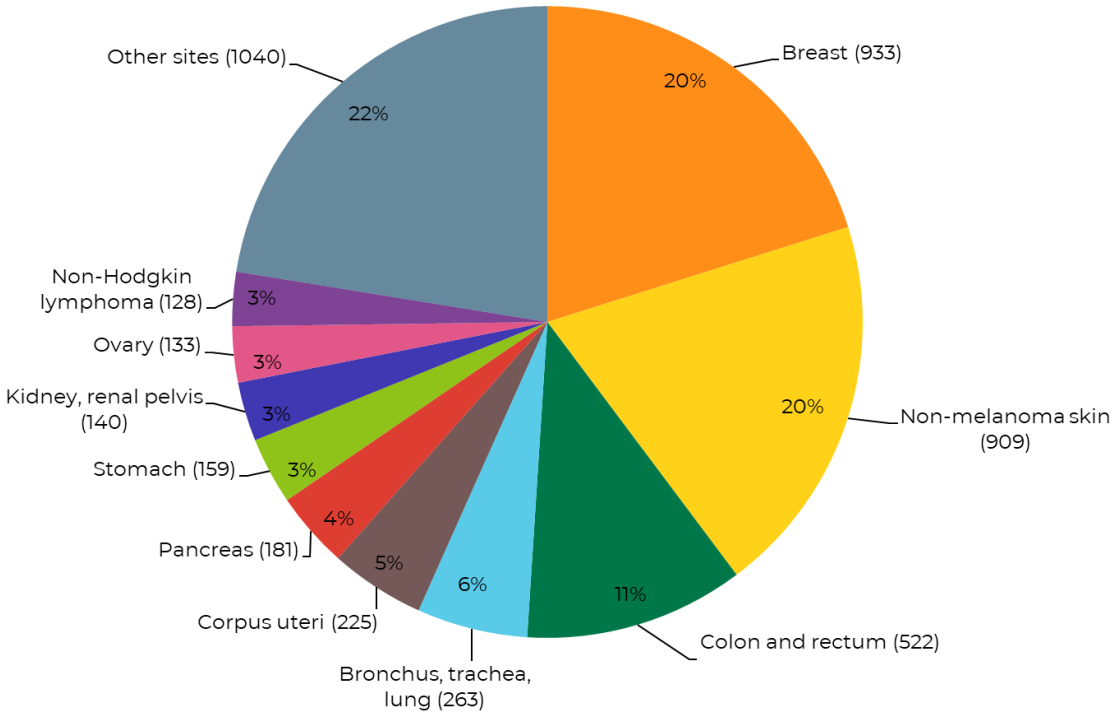


Figure 1. Leading cancer sites in Estonia 2022 (n, %).

Table 1a. Leading cancer sites in Estonia in men, 2022

Cancer site	ICD-10	New cases		Incidence rate per 100,000	
		Number	%	Crude	Standardized*
Prostate	C61	1,304	28,6	203.6	109.3
Non-melanoma skin	C44	545	11.9	85.1	43.3
Trachea, bronchus, lung	C33–C34	506	11.1	79.0	40.7
Colon	C18	269	5.9	42.0	20.6
Kidney, renal pelvis	C64–C65	213	4.7	33.3	18.5
Stomach	C16	188	4.1	29.4	15.1
Rectum etc.	C19–21	178	3.9	27.8	13.9
Pancreas	C25	148	3.2	23.1	11.8
Bladder	C67	135	3.0	21.1	9.8
Liver	C22 etc.	104	2.3	16.2	8,9
All sites	C00–C97	4,563	100	712.5	382.8

* Age-standardized to the world standard population.

Table 1b. Leading cancer sites in Estonia in women, 2022

Cancer site	ICD-10	New cases		Incidence rate per 100,000	
		Number	%	Crude	Standardized*
Breast	C50	933	20.1	131.7	70.8
Non-melanoma skin	C44	909	19.6	128.3	50.9
Colon	C18	354	7.6	50.0	16.7
Trachea, bronchus, lung	C33–C34	263	5.7	37.1	13.3
Corpus uteri	C54	225	4.9	16.5	14.8
Pancreas	C25	181	3.9	25.5	8.5
Rectum etc.	C19–C21	168	3.6	23.7	8.7
Stomach	C16	159	3.4	22.4	8.3
Kidney, renal pelvis	C64–C65	140	3.0	19.8	8.5
Ovary	C56	133	2.9	18.8	9.6
All sites	C00–C97	4,633	100	654.0	286.8

* Age-standardized to the world standard population.

2 Cancer incidence by site

Tables 2a and 2b show the number of new cancer cases, as well as the crude and age-standardized incidence rates per 100,000 persons by cancer site in men and women. The number of new cancer cases by age groups and the age-specific incidence rates by cancer site in Estonia are available in the Health Statistics and Health Research Database (https://statistika.tai.ee/index_en.html).

In Tables 3a and 3b, the same data are presented for malignant neoplasms of lymphoid, haematopoietic, and related tissues, which also include polycythaemia vera, myelodysplastic syndromes and other neoplasms of uncertain behaviour of lymphoid, hematopoietic, and related tissue coded as D45–D47 in ICD-10.

The number of *in situ* neoplasms, benign neoplasms, and neoplasms of uncertain or unknown behaviour of the brain and central nervous system, as well as of the endocrine organs located in the area of the brain are presented in Tables 4a and 4b, together with the crude and age-standardized incidence rates for men and women in 2022.

Table 2a. The number of new cases, crude and age-standardized incidence rates (ASIR) of cancer per 100,000 by cancer site in men in Estonia, 2022

Cancer site	ICD-10	Number of new cases	Incidence rate per 100,000	
			Crude	ASIR*
All sites	C00–C97	4,563	712.5	382.8
All sites (excl. non-melanoma skin)	C00–C97, excl. C44	4,018	627.4	339.5
Lip, oral cavity, pharynx	C00–C14	145	22.6	13.4
Lip	C00	10	1.6	0.8
Tongue	C01–C02	33	5.2	3.1
Gum. floor of mouth etc.	C03–C06	26	4.1	2.5
Major salivary glands	C07–C08	5	0.8	0.4
Tonsil, oropharynx	C09–C10	37	5.8	3.6
Nasopharynx	C11	4	0.6	0.4
Pyriform sinus, hypopharynx	C12–C13	28	4.4	2.4
Other lip, oral cavity, pharynx	C14	2	0.3	0.2
Digestive organs	C15–C26	1,034	161.5	82.5
Oesophagus	C15	88	13.7	7.5
Stomach	C16	188	29.4	15.1
Small intestine	C17	22	3.4	1.9
Colon	C18	269	42.0	20.6
Rectum etc.	C19–C21	178	27.8	13.9
Liver etc.	C22	104	16.2	8.9
Gallbladder etc.	C23–C24	36	5.6	2.8
Pancreas	C25	148	23.1	11.8
Other digestive organs	C26	1	0.2	0.1

* Standardized to the world standard population.

Table 2a. (continued)

Cancer site	ICD-10	Number of new cases	Incidence rate per 100,000	
			Crude	ASIR*
Respiratory, intrathoracic organs	C30–C39	576	89.9	47.0
Nasal cavities, ear, sinuses	C30–C31	6	0.9	0.6
Larynx	C32	54	8.4	4.7
Trachea, bronchus, lung	C33–C34	506	79.0	40.7
Thymus, heart, mediastinum, pleura	C37–C38	9	1.4	0.9
Respiratory organs etc.	C39	1	0.2	0.0
Bone, articular cartilage	C40–C41	6	0.9	0.6
Skin melanoma	C43	93	14.5	8.7
Non-melanoma skin	C44	545	85.1	43.3
Mesothelial and soft tissues	C45–C49	31	4.8	2.8
Breast	C50	6	0.9	0.5
Male genital organs	C60–C63	1,341	209.4	114.0
Penis	C60	7	1.1	0.6
Prostate	C61	1,304	203.6	109.3
Testis	C62	30	4.7	4.1
Other male genital organs	C63	–	–	–
Urinary organs	C64–C68	352	55.0	28.6
Kidney, renal pelvis	C64–C65	213	33.3	18.5
Ureter	C66	4	0.6	0.3
Bladder	C67	135	21.1	9.8
Other urinary organs	C68	–	–	–
Eye	C69	9	1.4	0.9
Brain, central nervous system	C70–C72	54	8.4	6.3
Meninges	C70	1	0.2	0.1
Brain	C71	52	8.1	6.0
Other central nervous system	C72	1	0.2	0.3
Thyroid gland	C73	25	3.9	2.4
Other endocrine	C74–C75	2	0.3	0.2
Site unknown or uncertain	C76–C80	54	8.4	4.2
Hodgkin lymphoma	C81	22	3.4	3.2
Non-Hodgkin lymphoma	C82–C85/96	94	14.7	9.1
Immunoproliferative diseases	C88	6	0.9	0.4
Multiple myeloma	C90	36	5.6	2.9
Leukaemia	C91–C95	132	20.6	11.7
Independent multiple sites	C97	–	–	–

* Standardized to the world standard population.

Table 2b. The number of new cases, crude and age-standardized incidence rates (ASIR) of cancer per 100,000 by cancer site, in women in Estonia, 2022

Cancer site	ICD-10	Number of new cases	Incidence rate per 100,000	
			Crude	ASIR*
All sites	C00–C97	4,633	654.0	286.8
All sites (excl. non-melanoma skin)	C00–C97, excl. C44	3,724	525.7	235.9
Lip, oral cavity, pharynx	C00–C14	70	9.9	5.4
Lip	C00	5	0.7	0.2
Tongue	C01–C02	15	2.1	1.1
Gum, floor of mouth etc.	C03–C06	18	2.5	1.2
Major salivary glands	C07–C08	5	0.7	0.5
Tonsil, oropharynx	C09–C10	23	3.2	2.1
Nasopharynx	C11	–	–	–
Pyriform sinus, hypopharynx	C12–C13	4	0.6	0.3
Other lip, oral cavity, pharynx	C14	–	–	–
Digestive organs	C15–C26	1,011	142.7	49.5
Oesophagus	C15	25	3.5	1.3
Stomach	C16	159	22.4	8.3
Small intestine	C17	23	3.2	0.9
Colon	C18	354	50.0	16.7
Rectum etc.	C19–C21	168	23.7	8.7
Liver etc.	C22	46	6.5	2.5
Gallbladder etc.	C23–C24	51	7.2	2.3
Pancreas	C25	181	25.5	8.5
Other digestive organs	C26	4	0.6	0.2
Respiratory, intrathoracic organs	C30–C39	280	39.5	14.4
Nasal cavities, ear, sinuses	C30–C31	6	0.8	0.4
Larynx	C32	6	0.8	0.4
Trachea, bronchus, lung	C33–C34	263	37.1	13.3
Thymus, heart, mediastinum, pleura	C37–C38	5	0.7	0.3
Respiratory organs etc.	C39	–	–	–
Bone, articular cartilage	C40–C41	5	0.7	0.7
Skin melanoma	C43	125	17.6	9.0
Non-melanoma skin	C44	909	128.3	50.9
Mesothelial and soft tissues	C45–C49	37	5.2	2.3

* Standardized to the world standard population.

Table 2b. (continued)

Cancer site	ICD-10	Number of new cases	Incidence rate per 100,000	
			Crude	ASIR*
Breast	C50	933	131.7	70.8
Female genital organs	C51–C58	535	75.5	37.2
Vulva, vagina	C51–C52	42	5.9	1.7
Cervix uteri	C53	117	16.5	9.8
Corpus uteri	C54	225	31.8	14.8
Uterus unspecified	C55	–	–	–
Ovary	C56	133	18.8	9.6
Other female genital organs	C57	17	2.4	1.2
Placenta	C58	1	0.1	0.1
Urinary organs	C64–C68	194	27.4	10.9
Kidney, renal pelvis	C64–C65	140	19.8	8.5
Ureter	C66	4	0.6	0.1
Bladder	C67	48	6.8	2.1
Other urinary organs	C68	2	0.3	0.2
Eye	C69	14	2.0	0.8
Brain, central nervous system	C70–C72	62	8.8	4.2
Meninges	C70	1	0.1	0.1
Brain	C71	59	8.3	3.7
Other central nervous system	C72	2	0.3	0.4
Thyroid gland	C73	76	10.7	6.9
Other endocrine	C74–C75	1	0.1	0.0
Site unknown or uncertain	C76–C80	67	9.5	2.7
Hodgkin lymphoma	C81	21	3.0	3.5
Non-Hodgkin lymphoma	C82–C85/96	128	18.1	8.2
Immunoproliferative diseases	C88	4	0.6	0.2
Multiple myeloma	C90	61	8.6	3.0
Leukaemia	C91–C95	100	14.1	6.2
Independent multiple sites	C97	–	–	–

* Standardized to the world standard population.

Table 3a. The number of new cases of malignant neoplasms of lymphoid, haematopoietic and related tissues, crude and age-standardized incidence rates (ASIR) per 100,000, in men in Estonia, 2022

Cancer site	ICD-10	Number of new cases	Incidence rate per 100,000	
			Crude	ASIR*
Hodgkin lymphoma	C81	22	3.4	3.2
Non-Hodgkin lymphoma	C82–C85/96	94	14.7	9.1
Immunoproliferative diseases	C88	6	0.9	0.4
Multiple myeloma	C90	36	5.6	2.9
Leukaemia	C91–C95	132	20.6	11.7
Lymphoid leukaemia	C91	85	13.3	6.9
Acute lymphoid leukaemia	C91.0	3	0.5	0.2
Chronic lymphoid leukaemia	C91.1	78	12.2	6.3
Other lymphoid leukaemia	C91.2–C91.9	4	0.6	0.4
Myeloid leukaemia	C92	44	6.9	4.6
Acute myeloid leukaemia	C92.0	20	3.1	1.7
Chronic myeloid leukaemia	C92.1	16	2.5	1.9
Other myeloid leukaemia	C92.2–C92.9	8	1.2	1.0
Other leukaemia	C93–C95	3	0.5	0.2
Polycythaemia vera	D45	14	2.2	1.2
Myelodysplastic syndromes	D46	20	3.1	1.5
Other neoplasms of lymphoid, haematopoietic and related tissue	D47	48	7.5	3.6

* Standardized to the world standard population.

Table 3b. The number of new cases of malignant neoplasms of lymphoid, haematopoietic, and related tissues, crude and age-standardized incidence rates (ASIR) per 100,000, in women in Estonia, 2022

Cancer site	ICD-10	Number of new cases	Incidence rate per 100,000	
			Crude	ASIR*
Hodgkin lymphoma	C81	21	3.0	3.5
Non-Hodgkin lymphoma	C82–C85/96	128	18.1	8.2
Immunoproliferative diseases	C88	4	0.6	0.2
Multiple myeloma	C90	61	8.6	3.0
Leukaemia	C91–C95	100	14.1	6.2
Lymphoid leukaemia	C91	61	8.6	3.4
Acute lymphoid leukaemia	C91.0	4	0.6	0.6
Chronic lymphoid leukaemia	C91.1	55	7.8	2.8
Other lymphoid leukaemia	C91.2–C91.9	2	0.3	0.1
Myeloid leukaemia	C92	38	5.4	2.4
Acute myeloid leukaemia	C92.0	18	2.5	1.3
Chronic myeloid leukaemia	C92.1	17	2.4	0.9
Other myeloid leukaemia	C92.2–C92.9	3	0.4	0.2
Other leukaemia	C93–C95	1	0.1	0.4
Polycythaemia vera	D45	19	2.7	1.1
Myelodysplastic syndromes	D46	22	3.1	0.7
Other neoplasms of lymphoid, haematopoietic and related tissue	D47	47	6.6	2.4

* Standardized to the world standard population.

Table 4a. The number of new cases of neoplasms *in situ*, benign, and uncertain or unknown behaviour*, along with crude and age-standardized incidence rates (ASIR) per 100,000 by cancer site in men in Estonia, 2022

Cancer site	ICD-10	Number of new cases	Incidence rate per 100,000	
			Crude	Standardized**
In situ neoplasms	D00–D09	196	30.6	16.1
Digestive organs excl. oesophagus and stomach	D01	5	0.8	0.4
Skin melanoma	D03	41	6.4	4.3
Non-melanoma skin	D04	43	6.7	2.9
Neoplasms of benign and uncertain or unknown behaviour of brain and central nervous system	D32, D33, D42, D43	29	4.5	2.9
Meninges	D32, D42	20	3.1	1.9
Brain, central nervous system	D33, D43	9	1.4	1.0
Neoplasms of benign and uncertain or unknown behaviour of intracranial endocrine glands	D35.2–D35.4, D44.3–D44.5	12	1.4	1.0

* Neoplasms reportable to the Estonian Cancer Registry.

** Standardized to the world standard population.

Table 4b. The number of new cases of neoplasms *in situ*, benign, and uncertain or unknown behaviour*, along with crude and age-standardized incidence rates (ASIR) per 100,000 by cancer site in women in Estonia, 2022

Cancer site	ICD-10	Number of new cases	Incidence rate per 100,000	
			Crude	Standardized**
In situ neoplasms	D00–D09	312	44.0	21.8
Digestive organs excl. oesophagus and stomach	D01	9	1.3	0.5
Skin melanoma	D03	80	11.3	8.3
Non-melanoma skin	D04	120	16.9	4.6
Breast	D05	46	6.5	3.8
Cervix uteri	D06	21	3.0	2.8
Neoplasms of benign and uncertain or unknown behaviour of brain and central nervous system	D32, D33, D42, D43	89	12.6	7.5
Meninges	D32, D42	61	8.6	4.2
Brain, central nervous system	D33, D43	28	4.0	3.3
Neoplasms of benign and uncertain or unknown behaviour of intracranial endocrine glands	D35.2–D35.4, D44.3–D44.5	12	1.7	1.2

*Neoplasms reportable to the Estonian Cancer Registry.

** Standardized to the world standard population.

3 Cancer incidence by age

Age-specific cancer incidence rates in 2022 among men and women are presented in Figure 2. Cancer incidence increases with age – almost half of all cancer cases were diagnosed in people aged 70 years or older (48% in men and 51% in women).

In women younger than 55 years, incidence rates are slightly higher than in men, whereas in men, incidence increases rapidly from age 55 and is significantly higher than in women in older age groups. Cancer in children and young adults is rare – in 2022, 21 cases were diagnosed in the 0–14 age group and 147 cases in the 15–34 age group.

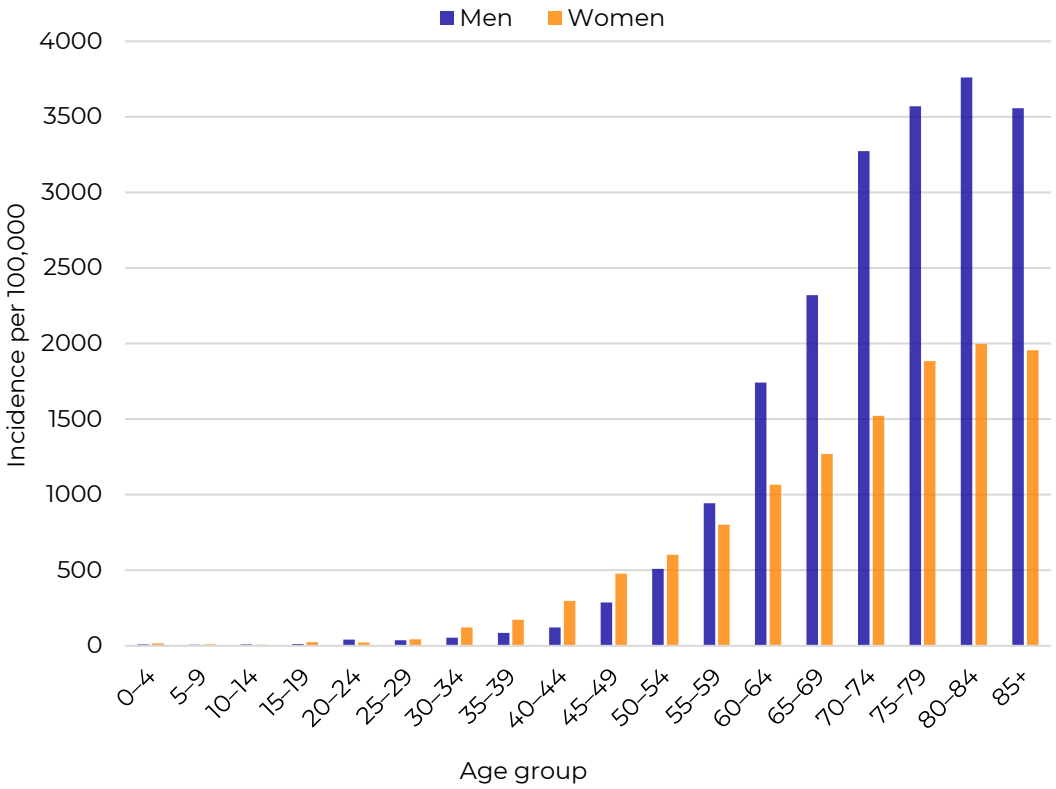


Figure 2. Age-specific cancer incidence in Estonia, 2022.

Tables 5a and 5b show that the most common cancer sites vary across age groups.

In children aged 0–14, leukaemia was the most frequently diagnosed cancer site in both boys and girls, followed by brain and central nervous system tumours in boys, and colon cancer in girls.

In age group 15–34, the most common cancer sites were testis, brain and non-melanoma skin in men, the breast, Hodgkin's lymphoma and non-melanoma skin in women.

In age group 35–54, the most frequently diagnosed cancer sites were the prostate, non-melanoma skin and lip, oral cavity and pharynx in men; and the breast followed by non-melanoma skin and corpus uteri in women.

In age group 55–74, the most common cancer sites were the same as in the general population – the prostate, lung cancer and non-melanoma skin in men, and the breast, non-melanoma skin, colon and lung in women.

In age group 75 and older, the most common cancer sites in men were also the prostate, non-melanoma skin and lung. In women, the most frequently diagnosed cancer site was non-melanoma skin, followed by the breast and colon.

Table 5a. Eight leading cancer sites by age group in men in Estonia, 2022

Age group / Cancer site	ICD-10	New cases	
		Number	%
Age group 0–14			
Leukaemia	C91–C95	4	40.0
Brain and central nervous system	C70–C72	2	20.0
Non-Hodgkin lymphoma	C82–C85, C96	1	10.0
Hodgkin lymphoma	C81	1	10.0
Eye	C69	1	10.0
Lip, oral cavity, pharynx	C00–C14	1	10.0
All sites	C00–C97	10	100
Age group 15–34			
Testis	C62	11	39.3
Brain and central nervous system	C70–C72	9	32.1
Hodgkin lymphoma	C81	9	32.1
Non-melanoma skin	C44	8	28.6
Leukaemia	C91–C95	6	21.4
Thyroid gland	C73	3	10.7
Skin melanoma	C43	3	10.7
Non-Hodgkin lymphoma	C82–C85, C96	2	7.1
All sites	C00–C97	59	100
Age group 35–54			
Prostate	C61	77	16.5
Non-melanoma skin	C44	75	16.1
Lip, oral cavity, pharynx	C00–C14	32	6.9
Kidney, renal pelvis	C64–C65	32	6.9
Skin melanoma	C43	27	5.8
Trachea, bronchus, lung	C33–C34	26	5.6
Colon	C18	21	4.5
Non-Hodgkin lymphoma	C82–C85, C96	19	4.1
All sites	C00–C97	466	100
Age group 55–74			
Prostate	C61	937	34.7
Trachea, bronchus, lung	C33–C34	331	12.3
Non-melanoma skin	C44	234	8.7
Kidney, renal pelvis	C64–C65	130	4.8
Colon	C18	128	4.7
Stomach	C16	114	4.2
Rectum etc.	C19–C21	101	3.7
Lip, oral cavity, pharynx	C00–C14	90	3.3
All sites	C00–C97	2,699	100

*In age group 0–14 all sites are shown, in other age-groups 8 more common sites are shown.

Table 5a. (continued)

Age group / Cancer site	ICD-10	New cases	
		Number	%
Age group ≥75			
Prostate	C61	290	21.8
Non-melanoma skin	C44	228	17.2
Trachea, bronchus, lung	C33–C34	149	11.2
Colon	C18	119	9.0
Rectum etc.	C19–C21	65	4.9
Urinary bladder	C67	61	4.6
Stomach	C16	59	4.4
Pancreas	C25	53	4.0
All sites	C00–C97	1,329	100

Table 5b. Eight leading cancer sites by age group in women in Estonia, 2022

Age group / Cancer site	ICD-10	New cases	
		Number	%
Age group 0–14			
Leukaemia	C91–C95	5	27.3
Colon	C18	2	27.3
Non-Hodgkin lymphoma	C82–C85, C96	1	18.2
Brain and central nervous system	C70–C72	1	9.1
Hodgkin lymphoma	C81	1	9.1
Bone, articular cartilage	C40–C41	1	9.1
All sites	C00–C97	11	100
Age group 15–34			
Breast	C50	16	18.2
Hodgkin lymphoma	C81	12	13.6
Non-melanoma skin	C44	11	12.5
Ovary	C56	8	9.1
Thyroid gland	C73	7	8.0
Cervix uteri	C53	5	5.7
Colon	C18	4	4.5
Skin melanoma	C43	4	4.5
All sites	C00–C97	88	100
Age group 35–54			
Breast	C50	261	36.9
Non-melanoma skin	C44	144	20.4
Corpus uteri	C54	36	5.1
Cervix	C53	33	4.7
Skin melanoma	C43	26	3.7
Thyroid gland	C73	23	3.3
Ovary	C56	18	2.5
Non-Hodgkin lymphoma	C82–C85, C96	18	2.5
All sites	C00–C97	707	100
Age group 55–74			
Breast	C50	443	21.2
Non-melanoma skin	C44	346	16.5
Colon	C18	149	7.1
Trachea, bronchus, lung	C33–C34	133	6.4
Corpus uteri	C54	124	5.9
Pancreas	C25	87	4.2
Stomach	C16	74	3.5
Rectum etc.	C19–C21	74	3.5
All sites	C00–C97	2,092	100

*In age group 0–14 all sites are shown, in other age-groups 8 more common sites are shown.

Table 5b. (continued)

Age-group / Cancer site	ICD-10	New cases	
		Number	%
Age-group ≥75			
Non-melanoma skin	C44	408	23.5
Breast	C50	213	12.3
Colon	C18	184	10.6
Bronchus, trachea, lung	C33–C34	114	6.6
Pancreas	C25	86	5.0
Rectum etc.	C19–C21	78	4.5
Stomach	C16	69	4.0
Corpus uteri	C54	64	3.7
All sites	C00–C97	1,735	100

4 Cancer cases by basis of diagnosis

Basis of diagnosis is an important indicator that reflects the accuracy of cancer diagnosis and data quality in a cancer registry. The distribution of new cancer cases by cancer site and the most valid basis of diagnosis are presented in Tables 6a and 6b.

One of the most important data quality indicators of a cancer registry is the percentage of microscopically verified (with histological, cytological, or haematological confirmation) cancer cases. In 2022, 90% of new cases were microscopically verified, indicating rather good quality [8].

An important method used to achieve high completeness of cancer cases is comparing the data of the ECR with the data of Estonian Causes of Death Registry. If the ECR has no record of a cancer diagnosis noted on a death certificate, it initiates a trace-back to the healthcare facility that issued the death certificate. Such cases are labelled death certificate initiated (DCI) cases. In 2022, the proportion of DCI cases was 3%, which is relatively low, but still indicates to some incompleteness in the notification of cancer cases to the ECR. Among DCI cases, lung cancer was the most frequent (16%), followed by cancers of unknown or uncertain site (12%), kidney and renal pelvis cancer (8%), and prostate cancer (7%).

Cases that are registered solely based on death certificates after conducting unsuccessful trace-back of death certificate notifications, are labelled death certificate only (DCO) cases. In DCO cases, the date of cancer diagnosis in the ECR is the same as the date of death, although cancer may have been diagnosed shortly before death or sometimes a long time before death. A high proportion of DCO cases indicates incomplete reporting of cancer cases, as well as unsuccessful data trace-backs conducted by the cancer registry [8]. In 2022, the percentage of DCO cases was rather low (2.4%) in Estonia, indicating good data quality [9].

Table 6a. The distribution of new cancer cases by cancer site and the most valid basis of diagnosis in men in Estonia, 2022

Cancer site	ICD-10	Number of new cases	Microscopic (%)*	Non-microscopic (%)**	Death certificate only (%)***
All sites	C00–C97	4,563	90.6	7.1	2.3
All sites (excl. non-melanoma skin)	C00–C97, excl. C44	4,018	89.4	7.9	2.6
Lip, oral cavity, pharynx	C00–C14	145	94.5	3.4	2.1
Lip	C00	10	90.0	10.0	–
Tongue	C01–C02	33	90.9	6.1	3.0
Gum, floor of mouth etc.	C03–C06	26	100	–	–
Major salivary glands	C07–C08	5	100	–	–
Tonsil, oropharynx	C09–C10	37	91.9	2.7	5.4
Nasopharynx	C11	4	100	–	–
Pyriform sinus, hypopharynx	C12–C13	28	96.4	3.6	–
Other lip, oral cavity, pharynx	C14	2	100	–	–
Digestive organs	C15–C26	1,034	83.3	14.0	2.7
Oesophagus	C15	88	89.8	8.0	2.3
Stomach	C16	188	89.4	7.4	3.2
Small intestine	C17	22	90.9	4.5	4.5
Colon	C18	269	92.9	5.6	1.5
Rectum etc.	C19–C21	178	90.4	7.3	2.2
Liver etc.	C22	104	64.4	30.8	4.8
Gallbladder etc.	C23–C24	36	77.8	22.2	–
Pancreas	C25	148	58.8	37.2	4.1
Other digestive organs	C26	1	100	–	–

* Histology, autopsy with histology, cytology, haematology.

** Clinical only, instrumental clinical, biochemical/immunological, surgery/autopsy without histology.

*** Cases registered solely based on death certificates.

Table 6a. (continued)

Cancer site	ICD-10	Number of new cases	Microscopic (%)*	Non-microscopic (%)**	Death certificate only (%)***
Respiratory, intrathoracic organs	C30–C39	576	81.6	14.4	4.0
Nasal cavities, ear, sinuses	C30–C31	6	83.3	–	16.7
Larynx	C32	54	98.1	1.9	–
Trachea, bronchus, lung	C33–C34	506	79.8	16.0	4.2
Thymus, heart, mediastinum, pleura	C37–C38	9	88.9	–	11.1
Respiratory organs etc.	C39	1	–	100	–
Bone, articular cartilage	C40–C41	6	83.3	16.7	–
Skin melanoma	C43	93	100	–	–
Non-melanoma skin	C44	545	99.1	0.7	0.2
Mesothelial and soft tissues	C45–C49	31	96.8	–	3.2
Breast	C50	6	100	–	–
Male genital organs	C60–C63	1,341	97.6	1.0	1.3
Penis	C60	7	100	–	–
Prostate	C61	1,304	97.5	1.1	1.4
Testis	C62	30	100	–	–
Other male genital organs	C63	–	–	–	–
Urinary organs	C64–C68	352	87.5	7.7	4.8
Kidney, renal pelvis	C64–C65	213	84.5	9.9	5.6
Ureter	C66	4	100	–	–
Bladder	C67	135	91.9	4.4	3.7
Other urinary organs	C68	–	–	–	–

* Histology, autopsy with histology, cytology, haematology.

** Clinical only, instrumental clinical, biochemical/immunological, surgery/autopsy without histology.

*** Cases registered solely based on death certificates.

Table 6a. (continued)

Cancer site	ICD-10	Number of new cases	Microscopic (%)*	Non-microscopic (%)**	Death certificate only (%)***
Eye	C69	9	33.3	66.7	–
Brain, central nervous system	C70–C72	54	66.7	29.6	3.7
Meninges	C70	1	–	100	–
Brain	C71	52	69.2	26.9	3.8
Other central nervous system	C72	1	–	100	–
Thyroid gland	C73	25	100	–	–
Other endocrine	C74–C75	2	100	–	–
Site unknown or uncertain	C76–C80	54	46.3	40.7	13.0
Hodgkin lymphoma	C81	22	100	–	–
Non-Hodgkin lymphoma	C82–C85/C96	94	97.9	–	2.1
Immunoproliferative diseases	C88	6	100	–	–
Multiple myeloma	C90	36	97.2	–	2.8
Leukaemia	C91–C95	132	97.7	–	2.3
Independent multiple sites	C97	–	–	–	–

* Histology, autopsy with histology, cytology, haematology.

** Clinical only, instrumental clinical, biochemical/immunological, surgery/autopsy without histology.

*** Cases registered solely based on death certificates.

Table 6b. The distribution of new cancer cases by cancer site and the most valid basis of diagnosis in women in Estonia, 2022

Cancer site	ICD-10	Number of new cases	Microscopic (%)*	Non-microscopic (%)**	Death certificate only (%)***
All sites	C00–C97	4,633	90.4	7.1	2.4
All sites (excl. non-melanoma skin)	C00–C97, excl. C44	3,724	88.3	8.7	3.0
Lip, oral cavity, pharynx	C00–C14	70	97.1	2.9	–
Lip	C00	5	100	–	–
Tongue	C01–C02	15	100	–	–
Gum, floor of mouth etc.	C03–C06	18	100	–	–
Major salivary glands	C07–C08	5	100	–	–
Tonsil, oropharynx	C09–C10	23	91.3	8.7	–
Nasopharynx	C11	–	–	–	–
Pyriform sinus, hypopharynx	C12–C13	4	100	–	–
Other lip, oral cavity, pharynx	C14	–	–	–	–
Digestive organs	C15–C26	1,011	82.4	13.6	4.0
Oesophagus	C15	25	92.0	4.0	4.0
Stomach	C16	159	88.1	8.8	3.1
Small intestine	C17	23	91.3	–	8.7
Colon	C18	354	88.7	9.0	2.3
Rectum etc.	C19–C21	168	89.9	6.5	3.6
Liver etc.	C22	46	67.4	21.7	10.9
Gallbladder etc.	C23–C24	51	74.5	19.6	5.9
Pancreas	C25	181	62.4	32.0	5.5
Other digestive organs	C26	4	50.0	50.0	–

* Histology, autopsy with histology, cytology, haematology.

** Clinical only, instrumental clinical, biochemical/immunological, surgery/autopsy without histology.

*** Cases registered solely based on death certificates.

Table 6b. (continued)

Cancer site	ICD-10	Number of new cases	Microscopic (%)*	Non-microscopic (%)**	Death certificate only (%)***
Respiratory, intrathoracic organs	C30–C39	280	72.5	23.6	3.9
Nasal cavities, ear, sinuses	C30–C31	6	100	–	–
Larynx	C32	6	100	–	–
Trachea, bronchus, lung	C33–C34	263	71.1	24.7	4.2
Thymus, heart, mediastinum, pleura	C37–C38	5	80.0	20.0	–
Respiratory organs etc.	C39	–	–	–	–
Bone, articular cartilage	C40–C41	5	80.0	20.0	–
Skin melanoma	C43	125	99.2	0.8	–
Non-melanoma skin	C44	909	99.0	0.7	0.3
Mesothelial and soft tissues	C45–C49	37	91.9	2.7	5.4
Breast	C50	933	96.5	2.3	1.3
Female genital organs	C51–C58	535	93.6	5.2	1.1
Vulva, vagina	C51–C52	42	90.5	7.1	2.4
Cervix uteri	C53	117	94.9	4.3	0.9
Corpus uteri	C54	225	96.4	2.7	0.9
Uterus unspecified	C55	–	–	–	–
Ovary	C56	133	90.2	9.0	0.8
Other female genital organs	C57	17	82.4	11.8	5.9
Placenta	C58	1	100	–	–

* Histology, autopsy with histology, cytology, haematology.

** Clinical only, instrumental clinical, biochemical/immunological, surgery/autopsy without histology.

*** Cases registered solely based on death certificates.

Table 6b. (continued)

Cancer site	ICD-10	Number of new cases	Microscopic (%)*	Non-microscopic (%)**	Death certificate only (%)***
Urinary organs	C64–C68	194	86.6	8.8	4.6
Kidney, renal pelvis	C64–C65	140	87.9	7.1	5.0
Ureter	C66	4	75.0	25.0	–
Bladder	C67	48	83.3	12.5	4.2
Other urinary organs	C68	2	100	–	–
Eye	C69	14	35.7	64.3	–
Brain, central nervous system	C70–C72	62	72.6	24.2	3.2
Meninges	C70	1	100	–	–
Brain	C71	59	74.6	22.0	3.4
Other central nervous system	C72	2	–	100	–
Thyroid gland	C73	76	98.7	1.3	–
Other endocrine	C74–C75	1	100	–	–
Site unknown or uncertain	C76–C80	67	34.3	35.8	29.9
Hodgkin lymphoma	C81	21	100	–	–
Non-Hodgkin lymphoma	C82–C85/96	128	100	–	–
Immunoproliferative diseases	C88	4	75.0	–	25.0
Multiple myeloma	C90	61	95.1	1.6	3.3
Leukaemia	C91–C95	100	95.0	–	5.0
Independent multiple sites	C97	–	–	–	–

* Histology, autopsy with histology, cytology, haematology.

** Clinical only, instrumental clinical, biochemical/immunological, surgery/autopsy without histology.

***Cases registered solely based on death certificates.

5 Extent of disease at diagnosis

5.1 Extent of solid tumours at the time of diagnosis

The extent of solid tumours is defined as following: localized tumour confined entirely to the organ where it started; spread to regional lymph nodes only; spread to adjacent tissues; spread to other distant organs or distant lymph nodes (distant metastasis).

The development of cancer in the human body is usually a slow process and diagnosing it as early as possible is crucial for the patient's prognosis. Unfortunately, a significant proportion of new cancer cases in Estonia are diagnosed after the disease has already spread beyond the primary tumour site. In 2022, 53% of the new cancer cases in both men and women were localized at the time of diagnosis, whereas around 17% of men and 15% of women already had distant metastasis.

The distribution of new cancer cases by the extent of disease at the time of diagnosis for different solid cancers in men and women is presented in Tables 7a and 7b.

The highest proportion of distant metastasis at diagnosis was seen in pancreatic cancer both in men (51%) and women (55%). The proportion of lung and colorectal cancer with distant metastasis in both men and women has somewhat decreased, remaining near 33% and 22%, respectively (compared to 40% and 25% in 2021). In men, the proportion of distant metastasis was also high for oesophageal (39%) and stomach cancer (37%); in women, this was the case for stomach (34%) and ovarian cancer (33%).

The extent of disease was unknown for about 11% of all solid tumours, but for some cancer sites the proportion of unknown extent was much higher – for instance, the extent was unknown for about 20% of all stomach and liver cancers. However, based only on the data of the ECR, it is not possible to ascertain whether the extent was unspecified at the health care facility or not reported to the registry.

Table 7a. The distribution of new cancer cases by site and extent of disease in men in Estonia in men, 2022

Cancer site	ICD-10	Number of new cases	Localized (%)	Regional lymph nodes only (%)	Regional, adjacent tissues (%)	Distant metastasis (%)	Unknown (%)
All sites	C00–C80	4,273	52.5	7.3	11.4	17.3	11.5
All sites (excl. non-melanoma skin)	C00–C80, excl. C44	3,728	45.9	8.4	13.0	19.8	12.8
Lip, oral cavity, pharynx	C00–C14	145	22.8	22.8	34.5	9.7	10.3
Lip	C00	10	100	–	–	–	–
Tongue	C01–C02	33	24.2	27.3	30.3	9.1	9.1
Gum, floor of mouth etc.	C03–C06	26	30.8	30.8	26.9	3.8	7.7
Major salivary glands	C07–C08	5	20.0	20.0	20.0	40.0	0.0
Tonsil, oropharynx	C09–C10	37	8.1	24.3	40.5	13.5	13.5
Nasopharynx	C11	4	25.0	–	75.0	–	–
Pyriform sinus, hypopharynx	C12–C13	28	7.1	21.4	50.0	7.1	14.3
Other lip, oral cavity, pharynx	C14	2	–	–	–	50.0	50.0
Digestive organs	C15–C26	1,034	27.7	13.6	10.9	31.9	15.9
Oesophagus	C15	88	18.2	11.4	14.8	38.6	17.0
Stomach	C16	188	17.6	14.9	9.6	36.7	21.3
Small intestine	C17	22	9.1	36.4	13.6	31.8	9.1
Colon	C18	269	40.5	12.3	14.9	22.3	10.0
Rectum etc.	C19–C21	178	32.0	20.2	9.6	22.5	15.7
Liver etc.	C22	104	38.5	5.8	7.7	28.8	19.2
Gallbladder etc.	C23–C24	36	16.7	19.4	16.7	41.7	5.6
Pancreas	C25	148	15.5	8.8	5.4	50.7	19.6
Other digestive organs	C26	1	–	–	–	–	100

Table 7a. (continued)

Cancer site	ICD-10	Number of new cases	Localized (%)	Regional lymph nodes only (%)	Regional, adjacent tissues (%)	Distant metastasis (%)	Unknown (%)
Respiratory, intrathoracic organs	C30–C39	576	25.0	15.1	13.2	30.0	16.7
Nasal cavities, ear, sinuses	C30–C31	6	16.7	16.7	50.0	–	16.7
Larynx	C32	54	42.6	3.7	27.8	5.6	20.4
Trachea, bronchus, lung	C33–C34	506	23.1	16.4	11.3	33.0	16.2
Thymus, heart, mediastinum, pleura	C37–C38	9	33.3	11.1	11.1	33.3	11.1
Respiratory organs etc.	C39	1	–	–	–	–	100
Bone, articular cartilage	C40–C41	6	66.7	–	–	16.7	16.7
Skin melanoma	C43	93	61.3	10.8	16.1	5.4	6.5
Non-melanoma skin	C44	545	97.1	–	0.2	0.4	2.4
Mesothelial and soft tissues	C45–C49	31	51.6	–	25.8	12.9	9.7
Breast	C50	6	66.7	–	33.3	–	–
Male genital organs	C60–C63	1,341	66.0	1.8	13.0	9.5	9.6
Penis	C60	7	57.1	14.3	–	28.6	–
Prostate	C61	1,304	66.2	1.5	13.4	9.2	9.7
Testis	C62	30	60.0	13.3	–	20.0	6.7
Other male genital organs	C63	–	–	–	–	–	–
Urinary organs	C64–C68	352	59.9	1.1	13.1	15.3	10.5
Kidney, renal pelvis	C64–C65	213	54.5	1.4	14.6	18.8	10.8
Ureter	C66	4	100	–	–	–	–
Bladder	C67	135	67.4	0.7	11.1	10.4	10.4
Other urinary organs	C68	–	–	–	–	–	–
Eye	C69	9	77.8	–	–	–	22.2

Table 7a. (continued)

Cancer site	ICD-10	Number of new cases	Localized (%)	Regional lymph nodes only (%)	Regional, adjacent tissues (%)	Distant metastasis (%)	Unknown (%)
Brain, central nervous system	C70–C72	54	94.4	–	–	–	5.6
Meninges	C70	1	100	–	–	–	–
Brain	C71	52	94.2	–	–	–	5.8
Other central nervous system	C72	1	100	–	–	–	–
Thyroid gland	C73	25	56.0	40.0	–	4.0	–
Other endocrine	C74–C75	2	50.0	–	–	50.0	–
Site unknown or uncertain	C76–C80	54	–	7.4	–	51.9	40.7

Table 7b. The distribution of new cancer cases by site and extent of disease in women in Estonia, 2022

Cancer site	ICD-10	Number of new cases	Localized (%)	Regional lymph nodes only (%)	Regional, adjacent tissues (%)	Distant metastasis (%)	Unknown (%)
All sites	C00–C80	4,319	53.0	13.0	8.6	14.7	10.8
All sites (excl. non-melanoma skin)	C00–C80, excl. C44	3,410	41.3	16.4	10.9	18.6	12.8
Lip, oral cavity, pharynx	C00–C14	70	35.7	31.4	25.7	–	7.1
Lip	C00	5	100	–	–	–	–
Tongue	C01–C02	15	46.7	33.3	13.3	–	6.7
Gum, floor of mouth etc.	C03–C06	18	33.3	22.2	33.3	–	11.1
Major salivary glands	C07–C08	5	60.0	20.0	20.0	–	0.0
Tonsil, oropharynx	C09–C10	23	13.0	47.8	30.4	–	8.7
Nasopharynx	C11	–	–	–	–	–	–
Pyriform sinus, hypopharynx	C12–C13	4	25.0	25.0	50.0	–	–
Other lip, oral cavity, pharynx	C14	–	–	–	–	–	–
Digestive organs	C15–C26	1,011	28.1	15.5	10.4	30.9	15.1
Oesophagus	C15	25	20.0	20.0	8.0	28.0	24.0
Stomach	C16	159	25.8	13.2	5.7	34.0	21.4
Small intestine	C17	23	21.7	8.7	13.0	30.4	26.1
Colon	C18	354	35.9	19.5	12.1	22.3	10.2
Rectum etc.	C19–C21	168	33.9	23.8	10.7	19.6	11.9
Liver etc.	C22	46	28.3	2.2	19.6	26.1	23.9
Gallbladder etc.	C23–C24	51	19.6	3.9	17.6	37.3	21.6
Pancreas	C25	181	14.4	9.4	6.6	54.7	14.9
Other digestive organs	C26	4	–	–	–	50.0	50.0

Table 7b. (continued)

Cancer site	ICD-10	Number of new cases	Localized (%)	Regional lymph nodes only (%)	Regional, adjacent tissues (%)	Distant metastasis (%)	Unknown (%)
Respiratory, intrathoracic organs	C30–C39	280	28.9	10.4	12.1	33.2	15.4
Nasal cavities, ear, sinuses	C30–C31	6	–	–	66.7	16.7	16.7
Larynx	C32	6	33.3	–	33.3	33.3	–
Trachea, bronchus, lung	C33–C34	263	29.7	11.0	10.3	33.5	15.6
Thymus, heart, mediastinum, pleura	C37–C38	5	20.0		20.0	40.0	20.0
Respiratory organs etc.	C39	–	–	–	–	–	–
Bone, articular cartilage	C40–C41	5	80.0	–	–	20.0	–
Skin melanoma	C43	125	64.8	9.6	8.8	8.0	8.8
Non-melanoma skin	C44	909	96.9	–	–	0.1	3.0
Mesothelial and soft tissues	C45–C49	37	45.9	–	21.6	10.8	21.6
Breast	C50	933	45.9	33.3	2.6	6.4	11.8
Female genital organs	C51–C58	535	44.5	3.6	26.7	17.9	7.3
Vulva, vagina	C51–C52	42	47.6	11.9	19.0	9.5	11.9
Cervix uteri	C53	117	31.6	4.3	43.6	14.5	6.0
Corpus uteri	C54	225	68.4	4.0	7.6	12.0	8.0
Uterus unspecified	C55	–	–	–	–	–	–
Ovary	C56	133	17.3	–	45.1	33.1	4.5
Other female genital organs	C57	17	17.6	–	41.2	23.5	17.6
Placenta	C58	1	100	–	–	–	–

Table 7b. (continued)

Cancer site	ICD-10	Number of new cases	Localized (%)	Regional lymph nodes only (%)	Regional, adjacent tissues (%)	Distant metastasis (%)	Unknown (%)
Urinary organs	C64–C68	194	62.4	1.5	12.9	10.3	12.9
Kidney, renal pelvis	C64–C65	140	63.6	–	13.6	11.4	11.4
Ureter	C66	4	50.0	25.0	–	25.0	–
Bladder	C67	48	62.5	4.2	12.5	6.3	14.6
Other urinary organs	C68	2	–	–	–	–	100
Eye	C69	14	85.7	–	14.3	–	–
Brain, central nervous system	C70–C72	62	90.3	–	–	–	9.7
Meninges	C70	1	100	–	–	–	–
Brain	C71	59	89.8	–	–	–	10.2
Other central nervous system	C72	2	100	–	–	–	–
Thyroid gland	C73	76	78.9	9.2	1.3	7.9	2.6
Other endocrine	C74–C75	1	100	–	–	–	–
Site unknown or uncertain	C76–C80	67	–	–	–	46.3	53.7

5.2 TNM staging of selected sites

The TNM staging system is used to describe the size and the extent of cancer. At stages I and II, the tumour is usually localized and rather small. At stage III, the cancer has grown beyond the primary tumour to nearby lymph nodes or organs and tissues. At stage IV, the cancer has spread from the primary tumour to distant organs or distant lymph nodes. TNM values depend on the exact cancer site, and in some cases, on tumour morphology.

The ECR collects data about TNM and the stage of disease at the time of diagnosis, before its progression or before the application of multimodal treatment that may change the tumour's size or spread. Since 2018, the 8th version of TNM Classification is used [10]. The TNM stage distribution of cancer cases diagnosed during person's lifetime in 2022 for selected sites is illustrated in Figure 3.

In men, the highest proportion of cases diagnosed at stage I was seen for kidney cancer and skin melanoma (56% and 44%, respectively). In women, 63% of corpus uteri cancers and 54% of skin melanomas were diagnosed at stage I. Stage I breast cancer was diagnosed in 34% of all cases.

The proportion of stage I colon and rectal cancer has somewhat increased (18% in both men and women, 16 % in 2021) while the proportion of stage IV has slightly decreased, remaining near 23% in both sexes (in 2021 25 % in men and 24% in women).

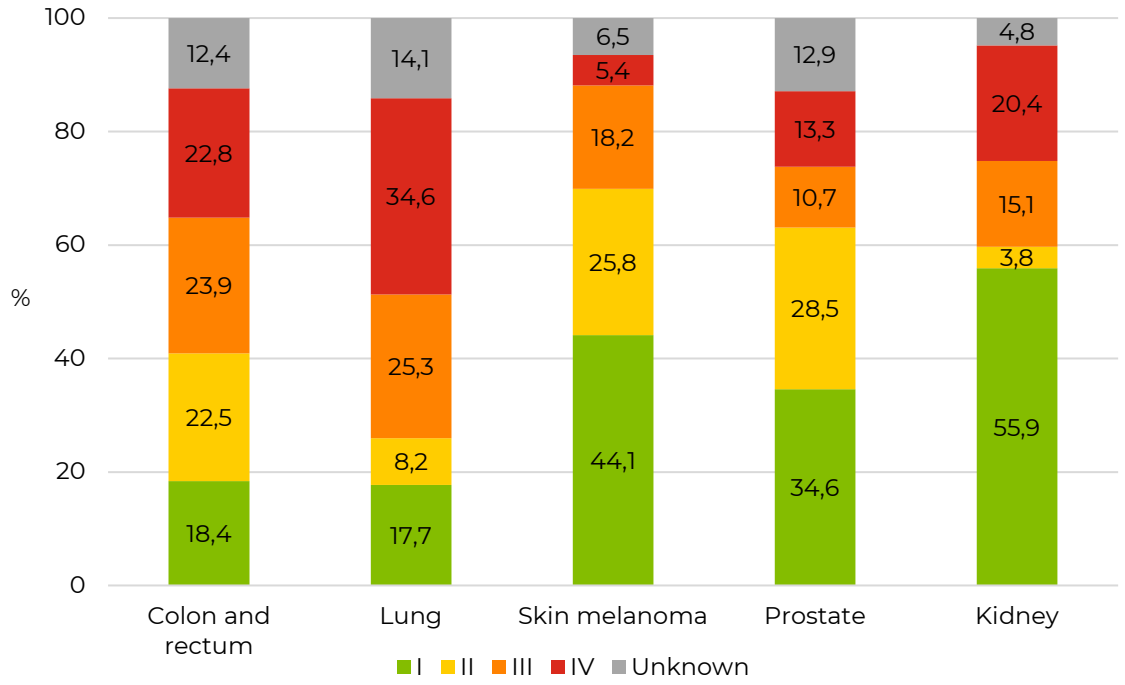
The proportion of breast cancer cases diagnosed at early stage is slowly increasing while the proportion of stage IV cases has levelled off at around 7%. Available data indicate that although breast cancer incidence has increased in the last decade by 1.4% per year, the main contributor to the increase have been stage I cases, whereas the incidence of stage III and IV has decreased [11].

Around 30% of cervical cancer cases were diagnosed at stage I, but the proportion of stage IV increased, reaching 19% (14% in 2021). The increase of stage III and stage IV cancers indicates that women who are at a higher risk of both developing cervical cancer as well as late detection, do not participate in screening nor get regular health check-ups [12].

The proportion of lung cancer diagnosed at early stage has slightly increased, and the proportion of stage IV somewhat decreased in both sexes. The proportion of stage I prostate cancers was around 35% (39% in 2021), and the proportion of stage IV decreased slightly, reaching 13%. The stage distribution of skin melanoma has been stable in recent years.

The proportion of cancer cases with unknown stage is rather high for some sites, for instance lung (14%), prostate (13%), as well as colon and rectal cancers (11%). However, based only on the data of the ECR, it is not possible to ascertain whether the stage was not determined at the health care facility or not reported to the registry.

Men



Women

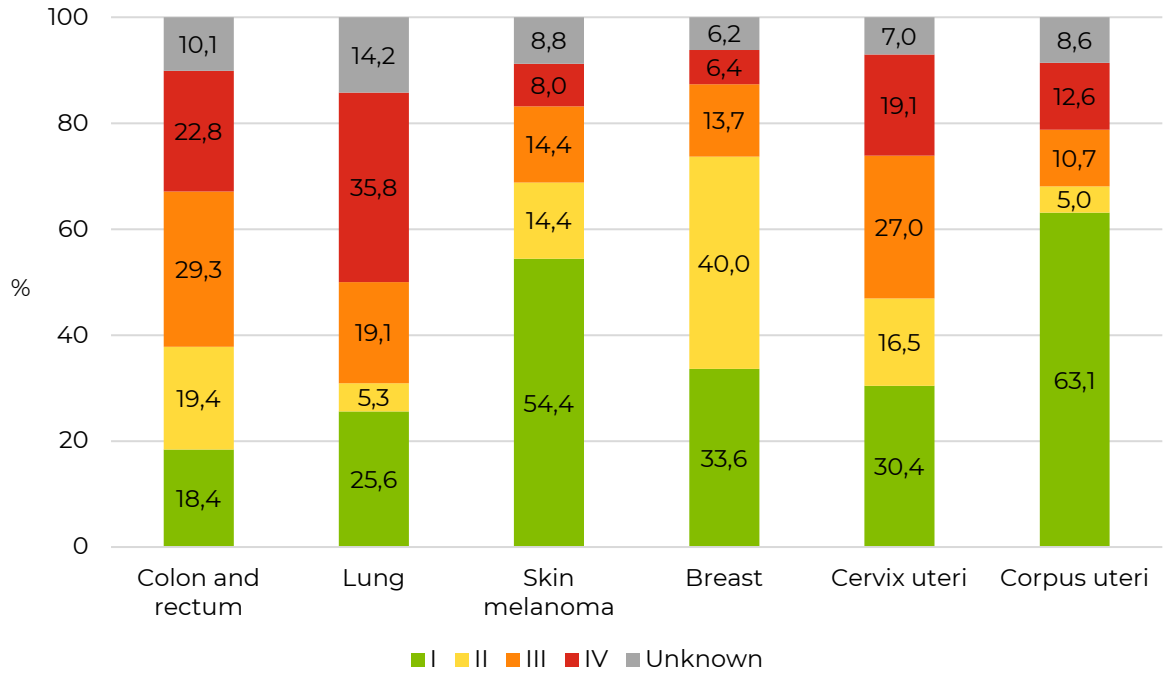


Figure 3. The TNM staging distribution at diagnosis of selected sites during lifetime in Estonia, 2022.

6 Cancer incidence trends

6.1 Total incidence

Cancer incidence data in Estonia are available for more than 50 years. The ageing of the population, improvements in diagnostic methods and increase in lifestyle-related cancers have all contributed to the increasing number of new cancer cases, the latter reaching nearly 9,200 in 2022 (Figure 4).

The number of new cancer cases exceeded 9,000 for the first time in 2019 (9,057) but declined in 2020 and in 2021 (8,509 and 8,376 new cases, respectively), likely due to the COVID-19 pandemic. Factors related to the pandemic include limited access to healthcare services that may have led to a decrease in the number of cases usually detected at screening or cases with mild symptoms diagnosed incidentally during health check-ups. Additionally, COVID-related deaths may have occurred in patients who would otherwise have been diagnosed with cancer in the near future [13]. In 2022, the number of new cancer cases returned to the pre-pandemic level.

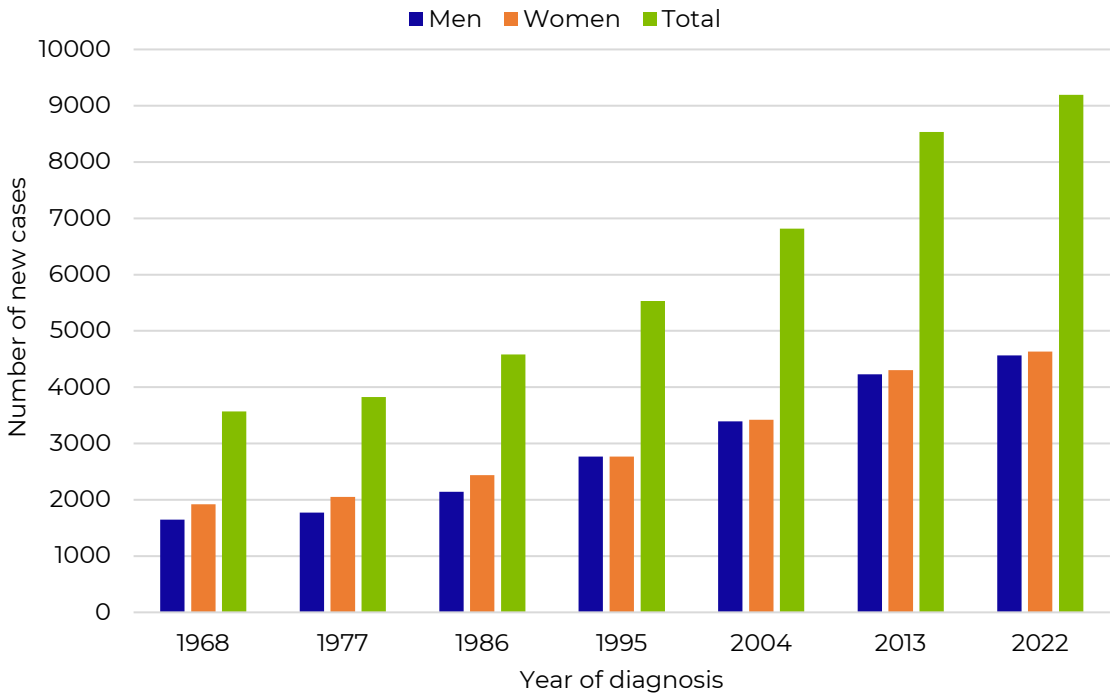


Figure 4. Number of new cancer cases in Estonia in 1968–2022 selected years.

6.2 Incidence trends of selected sites

One of the priorities of the Estonian Cancer Control Plan 2021–2030 is to achieve a decreasing trend in age-standardized cancer incidence through effective prevention activities [14]. Time trends of age-standardized cancer incidence for selected sites in 1968–2022 are presented in Figure 5. In recent decades, overall cancer incidence has decreased in men and stabilized in women [13], but incidence trends vary by cancer site.

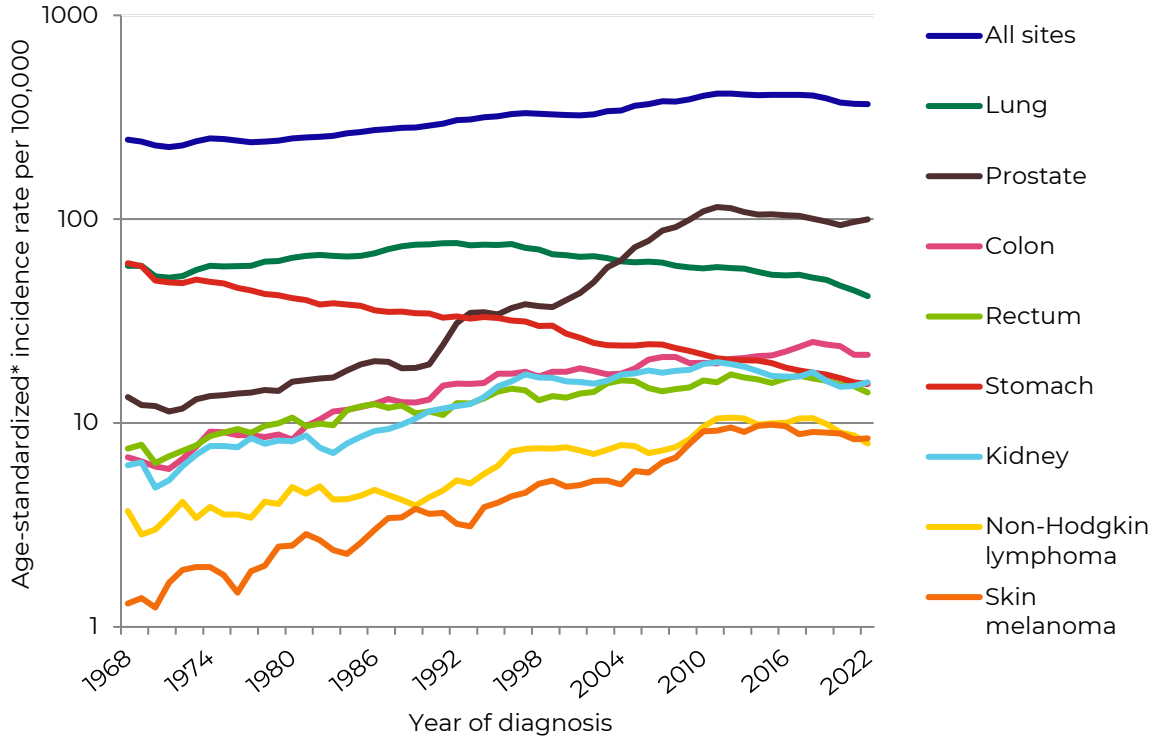
The incidence of colon and rectal cancer has slightly decreased after 2019, but so far it is not possible to determine, whether the decline is related to the preventive effect of the screening program or the impact of COVID-19 pandemic.

Lung cancer incidence has been in decline for over two decades in men and has stabilized in women. The incidence of stomach cancer has been decreasing in both sexes. Breast cancer incidence in women is still rising. The incidence of prostate cancer was decreasing since 2011 but increased again in 2022. Available data suggest that the increase is due to overdiagnosis of low-risk tumours resulting from widespread use of prostate-specific antigen (PSA) testing, rather than actual risk increase [15].

Cervical cancer incidence in Estonia remained among one of the highest in Europe [16] but has decreased since 2012 by 5.6% per year. This long-term trend can be associated with the preventive effect of the screening program.

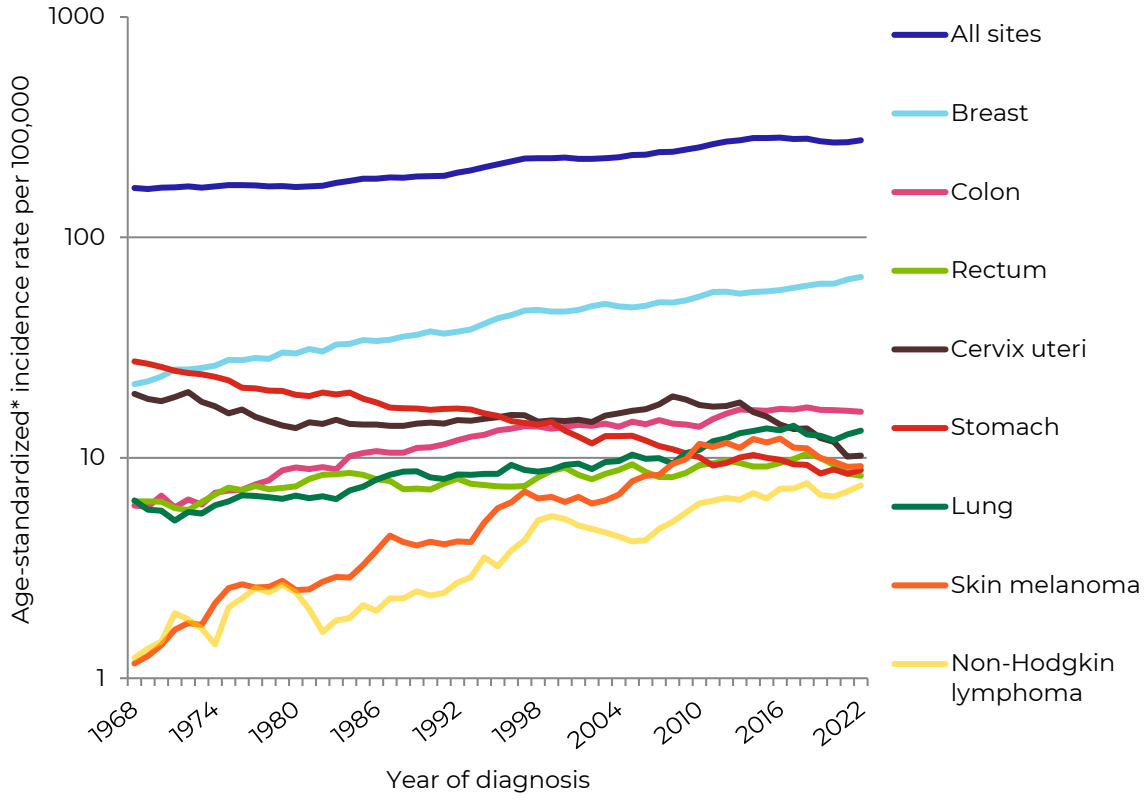
Kidney cancer incidence has slightly decreased among men in the last decade. The incidence of non-Hodgkin lymphoma has been stable both in men and women, whereas the incidence of skin melanoma has slightly decreased in recent years.

Men



* Standardized to the world standard population; calculated as the three-year running average.

Women



* Standardized to the world standard population; calculated as the three-year running average.

Figure 5. Trends in age-standardized cancer incidence in Estonia, 1968–2022 (selected sites).

7 Cancer prevalence

Cancer prevalence depends on incidence (the number of new cancer cases that are diagnosed in the population) and on survival (for how long cancer patients alive after diagnosis). As of 31 December 2022, there were 70,457 people in Estonia (28,736 men and 41,721 women) who had been diagnosed with cancer at some point during their lifetime. The number of people with a history of cancer has continuously increased (Figure 6) due to rising cancer incidence and improving survival rates of cancer patients [13].

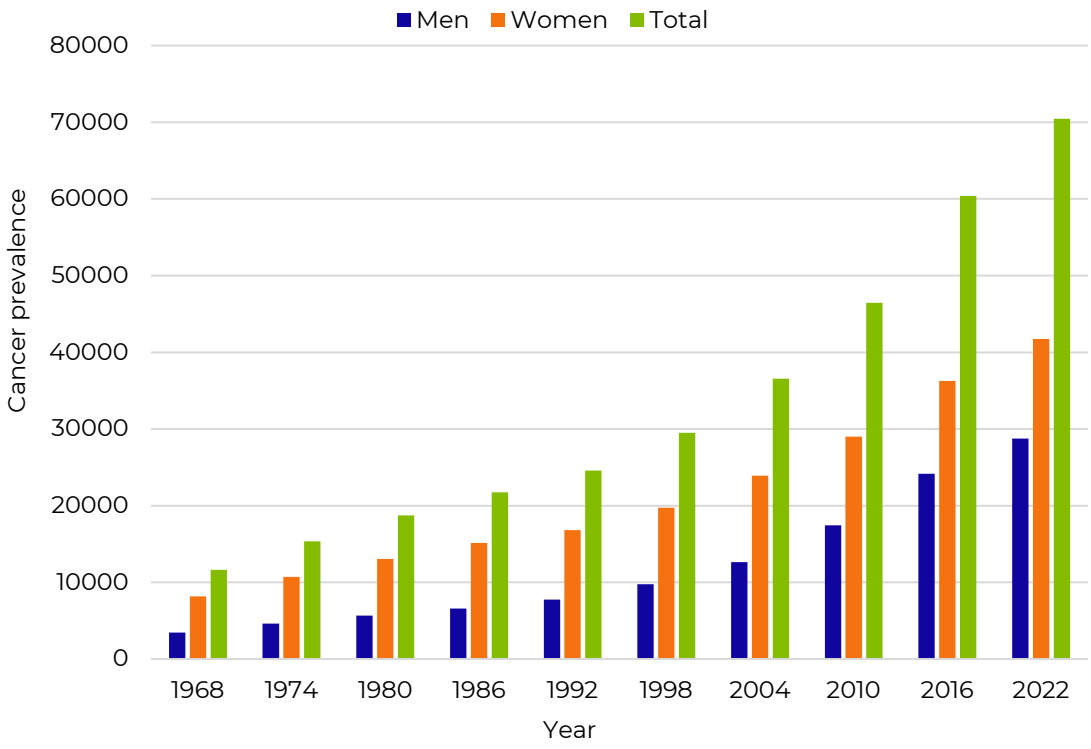


Figure 6. Number of persons with a life-time history of cancer in Estonia at the end of corresponding year.

Since one person can have multiple tumours during their lifetime, the number of prevalent cases was remarkably higher – a total of 78,354, of which 32,500 were in men and 45,854 in women. Excluding non-melanoma skin cancer, the leading site was the prostate (44%) among men and the breast (31%) among women (Tables 8a and 8b). The proportion of corpus uteri cancer was around 10%, the proportions of other sites were less than 8%.

Table 8a. The most frequent cancer sites among prevalent cases in men in Estonia as of 31 December 2022

Cancer site	ICD-10	Prevalent cases	
		Number	%
Prostate	C61	11,707	44.0
Colon	C18	1,804	6.8
Kidney, renal pelvis	C64–C65	1,550	5.8
Trachea, bronchus, lung	C33–C34	1,362	5.1
Rectum etc.	C19–21	1,290	4.8
Bladder	C67	1,144	4.3
Skin melanoma	C43	977	3.7
Stomach	C16	910	3.4
All sites except non-melanoma skin	C00–C97, excl. C44	26,619	100

Table 8b. The most frequent cancer sites among prevalent cases in women in Estonia as of 31 December 2022

Cancer site	ICD-10	Prevalent cases	
		Number	%
Breast	C50	10,778	31.3
Corpus uteri	C54	3,336	9.7
Colon	C18	2,651	7.7
Cervix uteri	C53	2,540	7.4
Skin melanoma	C43	1,946	5.6
Rectum etc.	C19–C21	1,496	4.3
Kidney, renal pelvis	C64–C65	1,477	4.3
Ovary	C56	1,323	3.8
All sites except non-melanoma skin	C00–C97, excl. C44	34,447	100

8 Survival

Estimating cancer survival allows a comprehensive assessment of cancer control, as it measures the combined effect of early diagnosis and the efficiency of cancer care.

In 2018–2022, the one-year, five-year and ten-year relative survival estimates for all cancer cases diagnosed in Estonia were 78%, 65% and 61%, respectively (Table 9). Excluding non-melanoma skin, the respective estimates were 74%, 58% and 53%. Table 9 presents relative survival ratios for all sites combined and for selected sites. For most sites, survival estimates were higher for women than for men.

Figure 7 shows the change in age-standardized five-year relative survival comparing time-periods 2008–2012, 2013–2017 and 2018–2022. Survival has increased the most for rectal cancer, leukaemia and lung cancer (by 8%). Survival has increased by 7% for Hodgkin lymphoma and kidney cancer, and by 5% for skin melanoma, breast and colon cancer.

One-year, five-year and ten-year relative survival ratios for selected sites by extent of disease at the time of diagnosis are presented in Table 10. For localized tumours, the five-year and ten-year relative survival was 100% for prostate cancer, over 90% for skin melanoma and breast cancer, and over 80% for colon and corpus uteri cancer. In case of distant metastasis at the time of diagnosis, five-year and ten-year relative survival was the highest for prostate cancer (40% and 18%, respectively).

One of the outcome indicators of the Estonian Cancer Control Plan 2021–2030 is relative cancer survival, aiming to achieve survival estimates similar to those seen in the Nordic countries [14]. Age-standardized five-year relative survival for selected sites in Estonia, Finland and Denmark are presented in Table 11 [17]. Survival rates in Estonia are comparable to those in the Nordic countries for stomach, pancreatic, lung, cervical, ovarian, prostate, testicular, and Hodgkin lymphoma. In comparison with the Nordic countries, the biggest survival gaps remain for non-Hodgkin's lymphoma and head and neck cancers (lip, oral cavity, pharynx), as well as for colon and rectal cancer, skin melanoma, and breast and corpus uteri cancers.

Table 9. One-year, five-year and ten-year relative survival by cancer site and gender in Estonia in 2018–2022

Cancer site	ICD-10	One-year relative survival (%)			Five-year relative survival (%)			Ten-year relative survival (%)		
		Total	Men	Women	Total	Men	Women	Total	Men	Women
All sites	C00–96	78	76	81	65	62	68	61	58	63
All sites (excl. non-melanoma skin)	C00–96, excl. C44	74	72	76	58	57	60	53	52	54
Lip, oral cavity, pharynx	C00–14	68	64	78	45	39	61	38	30	59
Oesophagus	C15	35	32	46	12	10	19	9	7	19
Stomach	C16	52	53	52	30	30	30	26	26	26
Colon	C18	77	76	77	61	61	62	55	56	54
Rectum etc.	C19–21	83	82	84	63	61	64	54	54	56
Anus and anal canal	C21	84	77	86	60	47	65	54	67	54
Liver	C22	29	27	33	9	8	10	5	5	5
Gallbladder etc.	C23–24	30	29	30	12	11	13	10	8	12
Pancreas	C25	24	24	24	6	6	6	5	4	5
Throat	C32	82	82	82	57	58	53	44	44	48
Lung	C34	46	43	53	22	18	30	15	12	23
Skin melanoma	C43	94	93	95	84	81	86	81	78	84
Non-melanoma skin	C44	100	100	100	100	100	100	100	100	100
Soft tissues	C48–49	75	81	71	53	56	50	50	52	48
Breast	C50	95	88	95	83	65	83	76	75	76
Cervix uteri	C53	—	—	85	—	—	67	—	—	62
Corpus uteri	C54	—	—	90	—	—	78	—	—	74
Ovary	C56	—	—	75	—	—	49	—	—	37
Prostate	C61	—	99	—	—	94	—	—	91	—
Testis	C62	—	99	—	—	98	—	—	98	—
Kidney	C64	82	81	84	72	70	75	65	62	68
Bladder, other urinary organs	C65–68	73	75	68	55	57	48	48	50	44

Table 9. (continued)

Cancer site	ICD-10	One-year relative survival (%)			Five-year relative survival (%)			Ten-year relative survival (%)		
		Total	Men	Women	Total	Men	Women	Total	Men	Women
Brain, central nervous system	C70–72	41	44	38	17	16	18	15	13	16
Thyroid	C73	93	92	94	91	92	91	91	91	91
Hodgkin lymphoma	C81	96	95	97	90	87	92	88	86	91
Non-Hodgkin lymphoma	C82–85/96	74	74	75	58	58	58	51	51	51
Multiple myeloma	C90	75	77	73	47	47	47	27	23	30
Leukaemia	C91–95	76	76	76	61	60	58	50	49	51

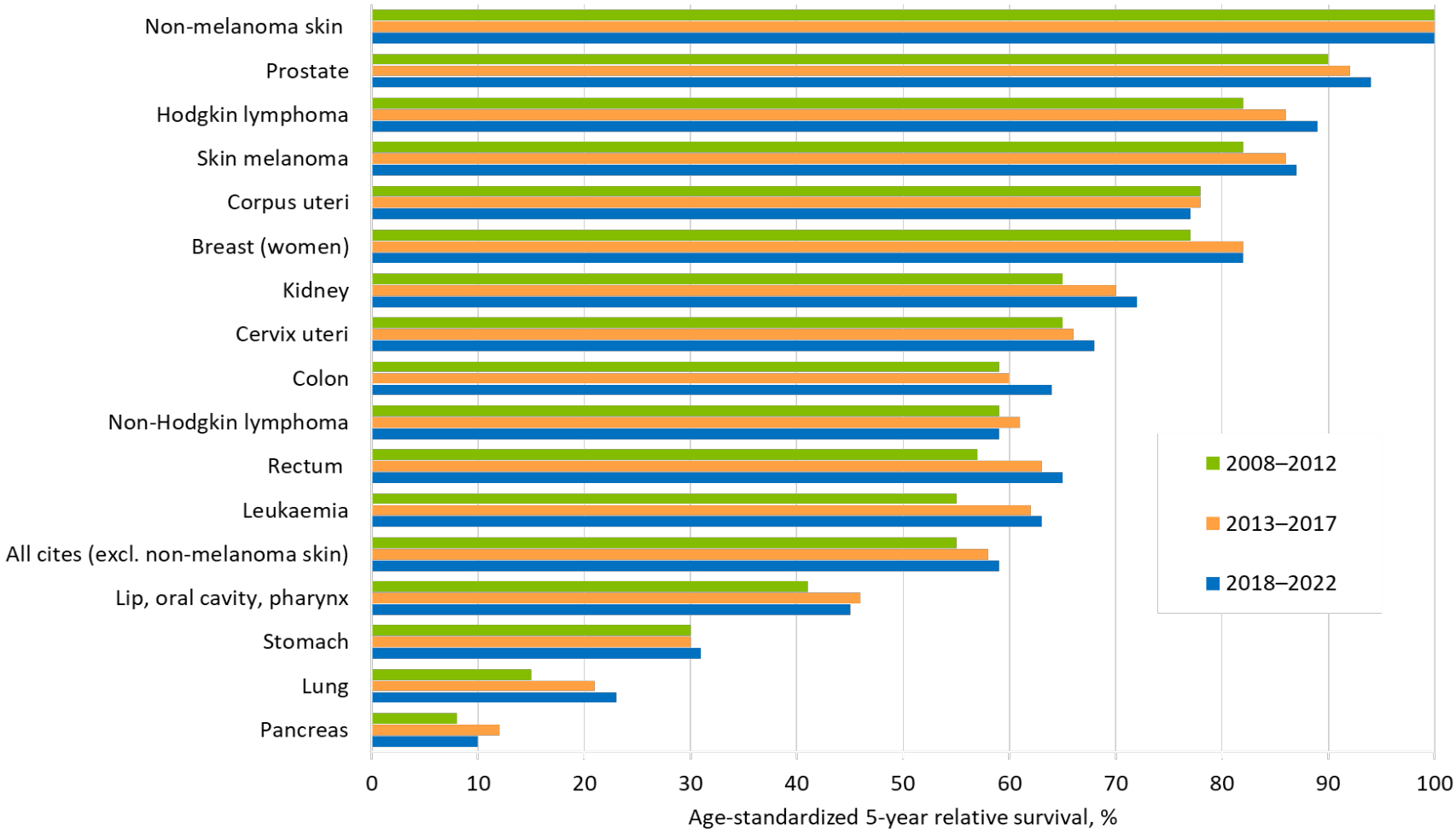


Figure 7. Age-standardized five-year relative survival in Estonia in 2008–2012, 2013–2017 and 2018–2022.

Table 10. One-year, five-year and ten-year relative survival for selected sites by extent of disease in Estonia in 2018–2022

Cancer site	ICD-10	One-year relative survival (%)			Five-year relative survival (%)			Ten-year relative survival (%)		
		Localized cancer	Lymph nodes, adjacent tissues	Distant metastasis	Localized cancer	Lymph nodes, adjacent tissues	Distant metastasis	Localized cancer	Lymph nodes, adjacent tissues	Distant metastasis
Lip, oral cavity, pharynx	C00–14	88	70	31	71	43	4	62	35	4
Stomach	C16	87	75	27	73	38	1	65	28	1
Colon	C18	95	87	46	89	70	10	76	63	6
Rectum	C19–20	94	91	54	85	72	12	70	61	7
Pancreas	C25	66	48	44	33	7	1	26	5	0
Lung	C34	91	58	21	67	17	2	46	11	1
Skin melanoma	C43	100	94	46	96	65	15	93	53	12
Breast (women)	C50	99	98	65	95	84	21	90	71	7
Corpus uteri	C54	99	87	40	90	61	15	84	50	10
Prostate	C61	100	100	85	100	96	40	100	84	18
Kidney	C64	98	89	43	92	76	18	82	58	9

Table 11. Age-standardized five-year relative survival (%) for selected sites in Estonia, Finland, and Denmark [17] in 2018–2022

Cancer site	ICD-10	Men			Women		
		Estonia	Finland	Denmark	Estonia	Finland	Denmark
Lip, oral cavity, pharynx	C00–14	38	65	62	60	78	70
Stomach	C16	30	30	30	32	38	37
Colon	C18	62	66	73	65	72	73
Rectum	C19–20	62	70	72	68	73	75
Pancreas	C25	8	11	13	12	13	15
Lung	C34	19	17	26	33	27	34
Skin melanoma	C43	84	93	96	89	95	98
Breast	C50	–	–	–	82	91	91
Cervix uteri	C53	–	–	–	68	70	76
Corpus uteri	C54	–	–	–	77	83	83
Ovary	C56	–	–	–	46	50	46
Prostate	C61	94	94	91	–	–	–
Testis	C62	98	92	96	–	–	–
Kidney	C64	70	75	79	77	74	78
Hodgkin lymphoma	C81	87	89	92	91	94	95
Non-Hodgkin lymphoma	C82–85/96	56	69	80	61	75	84

9 HPV-related cancers in Estonia in 1998–2022

9.1 Background

HPV is the most common sexually transmitted infection in the world. The virus spreads from one person to another through direct contact of skin or mucous membranes. It is estimated that over 80% of all sexually active people who have not been vaccinated are infected with HPV at some point in their life. Although most HPV infections are asymptomatic and clear spontaneously in about two years, the virus can persist in the body for many years in approximately 10% of the people.

HPV has about 200 different strains, most of which are low-risk subtypes that typically cause no serious health complications other than benign skin lesions or genital warts. High-risk HPV subtypes present a long-term health risk, as persistent infection can progress to precancerous lesions or cancer such as tumours of the oropharynx, oral cavity, larynx, anus, vagina, vulva, cervix and penis. It is estimated that HPV causes 4.5% of all cancers in the world [7]. The main carcinogenic subtypes are HPV16, HPV18, HPV31 and HPV45, but high-risk strains 16 and 18 together are responsible for around 70% of all cancers attributable to HPV and virtually all HPV-associated cancers in men [18].

The most efficient way to prevent HPV is vaccination before a person becomes sexually active. Condoms can offer some protection from HPV, but the virus may be present in areas that the condom does not cover, so it might still be possible for HPV to be transmitted. In Estonia, HPV vaccination for girls aged 12–14 started in 2018, and since 2024, free immunization has been available for girls and boys aged 12–14. In addition, teenagers aged 15–18 can get a free HPV vaccine if they have not yet been immunized. It is estimated that health risks related to high-risk HPV strains could be eliminated if at least 80% of boys and girls were vaccinated against HPV [19]. Unfortunately, coverage with HPV vaccine has been much lower in Estonia – in 2024, vaccination coverage in 12–14-year-old children was 47% (54% in girls and 40% in boys).

9.2 HPV-related cancer incidence

9.2.1 HPV-related cancer sites and estimated number of cases attributable to HPV

Tables 12a and 12b present the total and average annual number of cases of HPV-related cancer sites in 1998–2022. The number of oropharyngeal cancers has almost doubled in men and nearly quadrupled in women. There has also been an increase of penile cancers in men and anal cancers in women.

Figure 8 provides an overview of the change in the proportion of different sites among all HPV-related sites in Estonia in 1998–2022. In the middle of the observed period, cervical cancer accounted for nearly half of all cases of HPV-related sites, but due to cervical cancer screening, it has dropped to nearly 30% by the end of observed period. The proportion of laryngeal cancer has also decreased, mainly due to the declining smoking prevalence in the population. At the same time, the proportions of oropharyngeal cancer and anal cancer have increased, probably because of HPV.

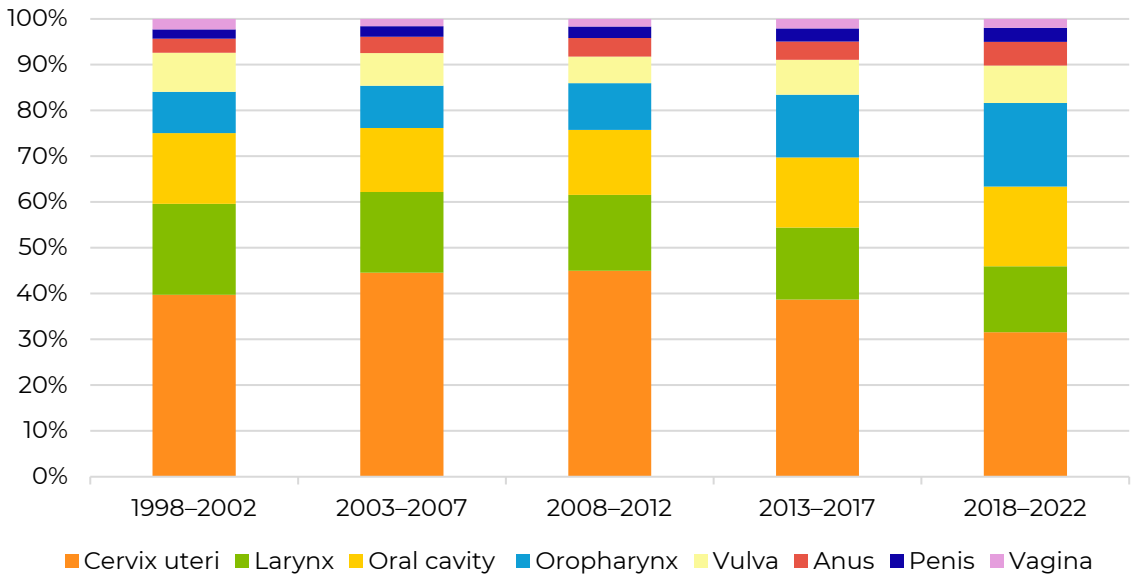


Figure 8. Site distribution of HPV-related cancer sites in Estonia, 1998–2022.

Based on the attributable fraction of HPV for different cancer sites, the estimated number of cancer cases attributable to HPV in Estonia in men increased from 27 cases in 1998–2002 to 41 cases in 2018–2022 (Table 13a). The number of oropharyngeal cancers increased the most and accounted for 66% of all HPV-attributable cases in men in the latest period. In women, the number of HPV-attributable cases increased until 2012, but declined thereafter due to the decreasing number of cervical cancer cases (Table 13b). However, the estimated number of HPV-attributable oropharyngeal and anal cancer cases has grown exponentially.

Table 12a. Total and average annual number of cases of HPV-related cancer sites in men, Estonia, 1998–2022

Cancer site	ICD-10	Total number of cases					Average annual number of cases				
		1998–2002	2003–2007	2008–2012	2013–2017	2018–2022	1998–2002	2003–2007	2008–2012	2013–2017	2018–2022
Oropharynx	C01, C02.4, C05.1–2, C09–10	148	150	177	223	266	30	30	35	45	53
Oral cavity	C02–06, excl. C02.4 and C05.1–2	228	180	196	217	243	46	36	39	43	49
Anus	C21	16	18	18	24	21	3	4	4	5	4
Larynx	C32	361	307	313	302	267	72	61	63	60	53
Penis	C60	39	44	52	60	63	8	9	10	12	13
Total		792	699	756	826	860	158	140	151	165	172

Table 12b. Total and average annual number of cases of HPV-related cancer sites in women, Estonia, 1998–2022

Cancer site	ICD-10	Total number of cases					Average annual number of cases				
		1998–2002	2003–2007	2008–2012	2013–2017	2018–2022	1998–2002	2003–2007	2008–2012	2013–2017	2018–2022
Oropharynx	C01, 02.4, C05.1–2, C09–10	28	25	36	62	109	6	5	7	12	22
Oral cavity	C02–06, excl. C02.4 and C05.1–2	74	86	102	101	114	15	17	20	20	23
Anus	C21	45	49	67	58	85	9	10	13	12	17
Larynx	C32	27	27	35	25	29	5	5	7	5	6
Vulva	C51	166	135	123	158	169	33	27	25	32	34
Vagina	C52	45	30	35	43	40	9	6	7	9	8
Cervix	C53	777	845	944	803	649	155	169	189	161	130
Total		1,162	1,197	1,342	1,250	1,195	232	239	268	250	239

Table 13a. Attributable fraction of HPV and the estimated average annual number of cases attributable to HPV in men, Estonia, 1998–2022

Cancer site	ICD-10	Attributable fraction of HPV (%)	Estimated average annual number of cases attributable to HPV				
			1998–2002	2003–2007	2008–2012	2013–2017	2018–2022
Oro-pharynx	C01, C02.4, C05.1–2, C09–10	50.0	15	15	18	22	27
Oral cavity	C02–06, excl. C02.4 and C05.1–2	4.3	2	2	2	2	2
Anus	C21	88.0	3	3	3	4	4
Larynx	C32	4.6	3	3	3	3	2
Penis	C60	51.0	4	4	5	6	6
Total			27	27	31	37	41

Table 13b. Attributable fraction of HPV and the estimated average annual number of cases attributable to HPV in women, Estonia, 1998–2022

Cancer site	ICD-10	Attributable fraction of HPV (%)	Estimated average annual number of cases attributable to HPV				
			1998–2002	2003–2007	2008–2012	2013–2017	2018–2022
Oro-pharynx	C01, C02.4, C05.1–2, C09–10	50.0	3	3	4	6	11
Oral cavity	C02–06, excl. C02.4 and C05.1–2	4.3	1	1	1	1	1
Anus	C21	88.0	8	9	12	10	15
Larynx	C32	4.6	0	0	0	0	0
Vulva	C51	24.9	8	7	6	8	8
Vagina	C52	78.0	7	5	5	7	6
Cervix	C53	100.0	155	169	189	161	130
Total			182	193	217	193	172

9.2.2 Age and stage distribution of HPV-related cancer sites 2018–2022

The age distribution of HPV-related cancer sites in 2018–2022 reveals that over 60% of cervical and oropharyngeal cancer cases in Estonia were diagnosed in people younger than 64 years (Figure 9). A third of cervical cancer cases were diagnosed in women aged 15–49, but more than half of vulvar and vaginal cancers were diagnosed in women aged 75 and older.

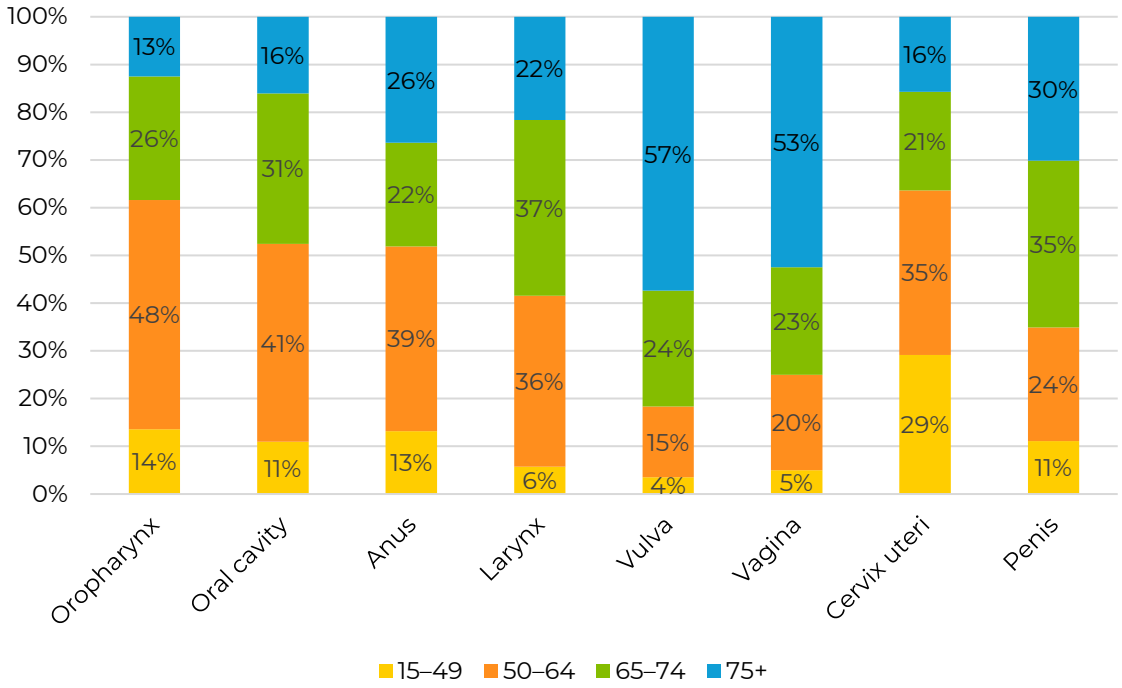


Figure 9. Age distribution of HPV-related cancer sites, Estonia 2018–2022.

Figure 10 shows the stage distribution of HPV-related cancer sites in Estonia in 2018–2022 (unknown stage excluded). Nearly half of vulvar cancers and one third of vaginal and cervical cancers were diagnosed at stage I, while the proportion of stage IV remained below 15 for these sites. The proportion of stage IV was the highest for cancers of oral cavity, oropharynx and larynx (50%, 39% and 30%, respectively). Over 40% of anal cancer cases were diagnosed at stage III, when the cancer had spread to nearby lymph nodes or grown into neighbouring organs.

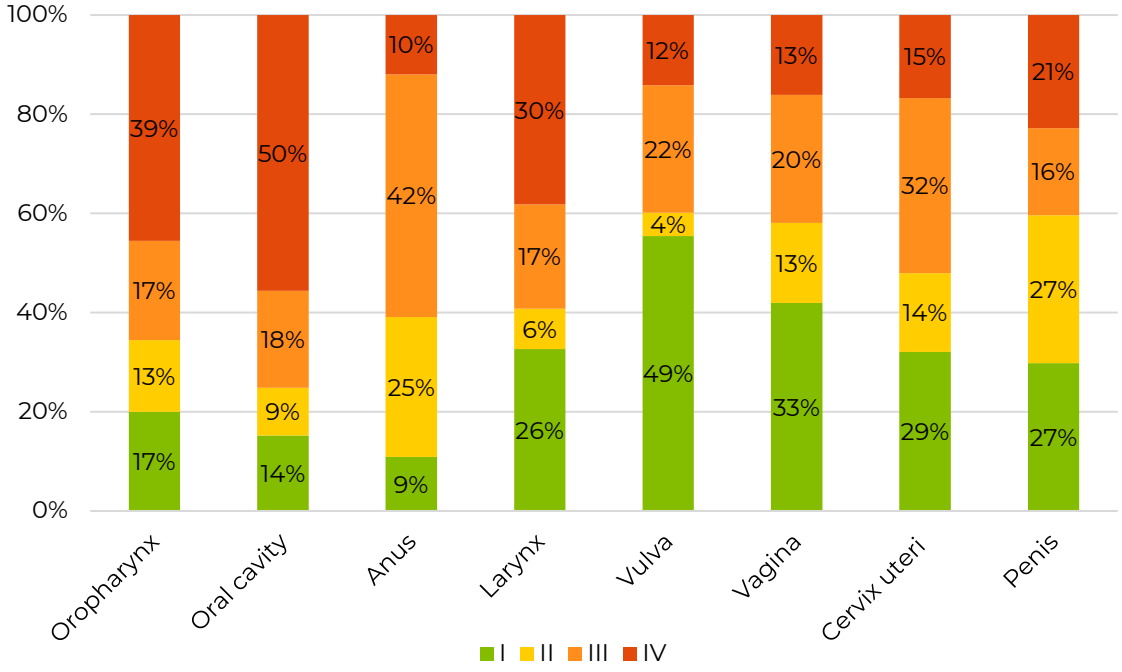


Figure 10. Stage distribution of HPV-related cancer sites (unknown stage excluded), Estonia, 2018–2022.

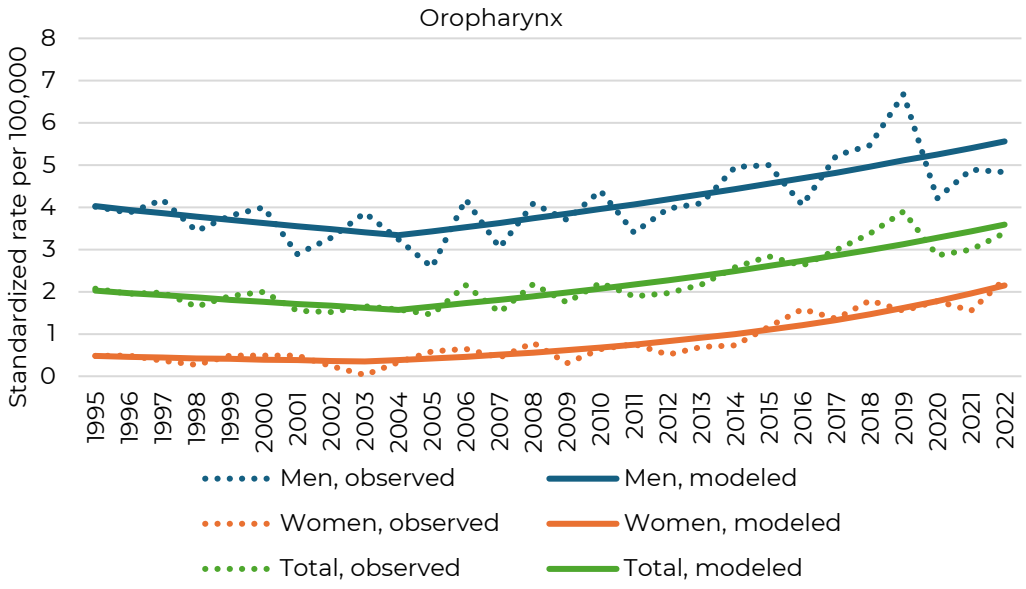
9.3 Incidence trends of HPV-related cancer sites 1995–2022

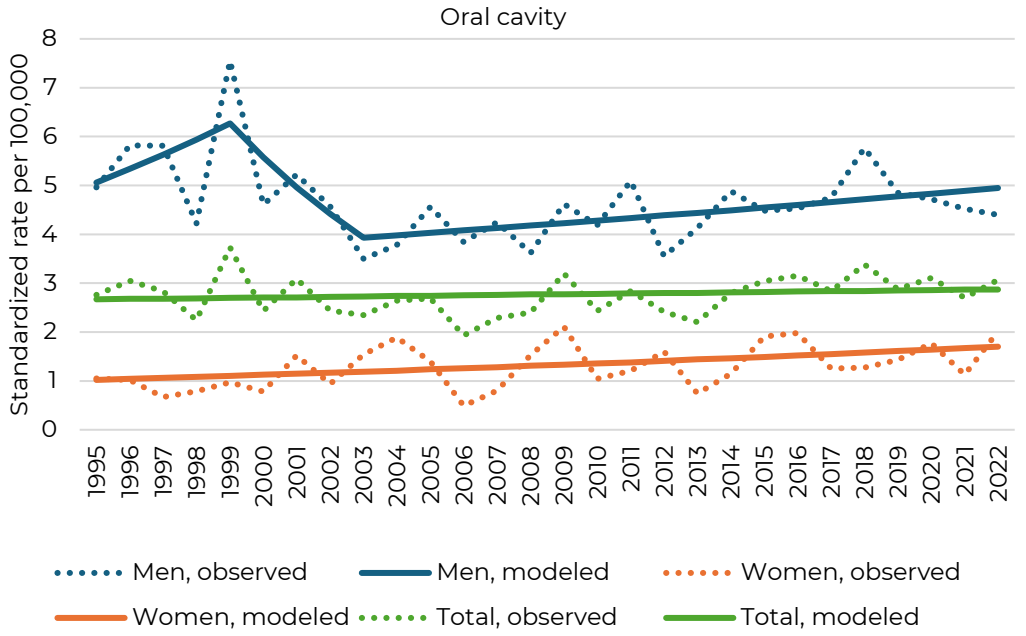
The incidence trends of HPV-related cancer sites during 1995–2022 vary (Figures 11, 12 and 13). The annual percentage change is shown in the text only for statistically significant trends.

The incidence of oropharyngeal cancer has increased by 4.7% per year overall (Figure 11). The increase has been particularly rapid in women (10% per year), the trend in men was not statistically significant.

Oral cancer incidence is slowly increasing in both men and women, but the trends were not statistically significant (Figure 11).

The incidence of laryngeal cancer has decreased by 2.1% per year in total and by 2.2% per year among men (Figure 11).





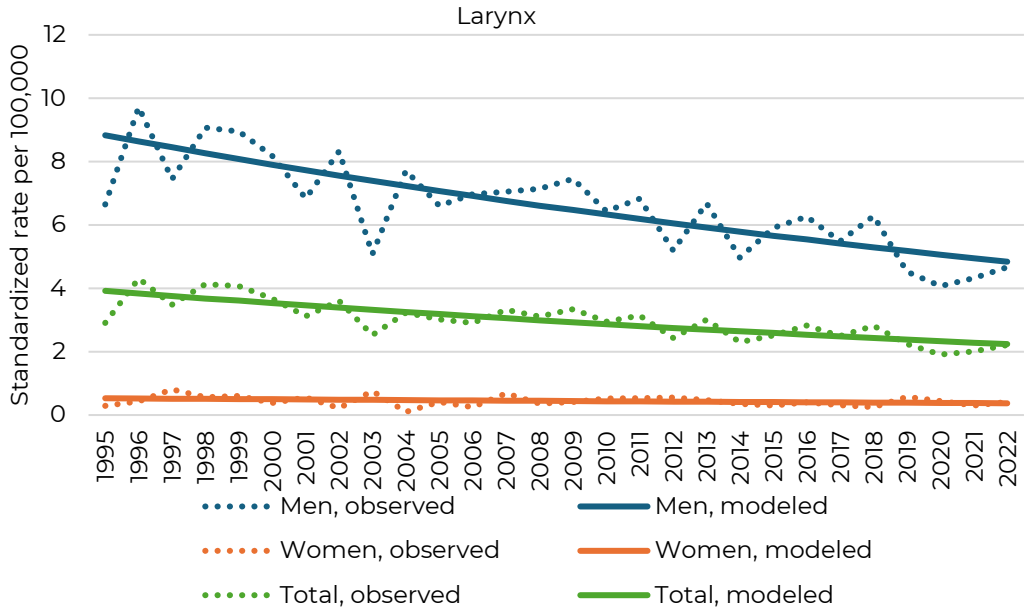
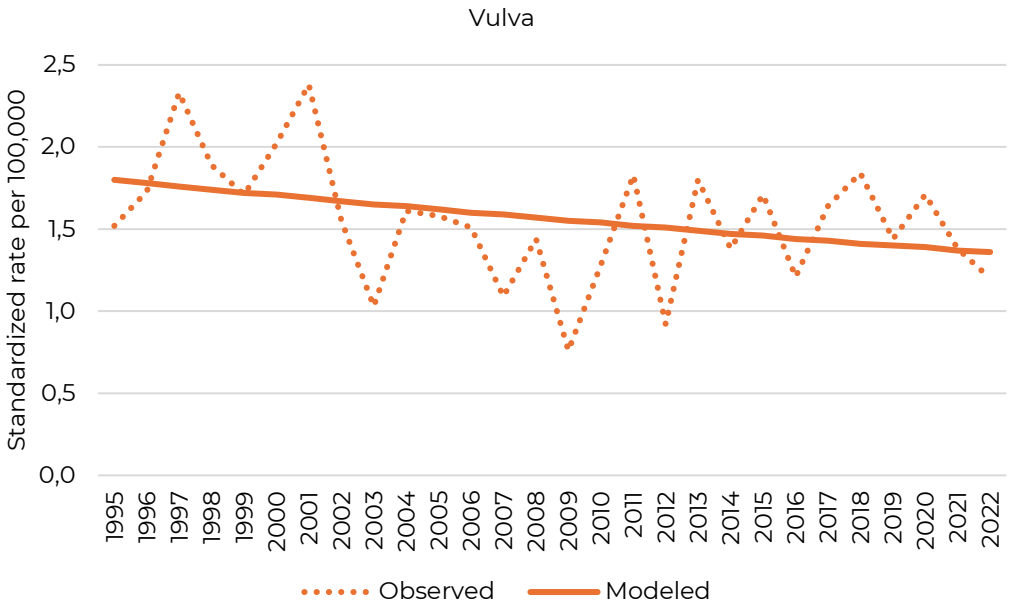


Figure 11. Incidence trends of cancers of oropharynx, oral cavity and larynx, Estonia 1995–2022.

The incidence of vulvar and vaginal cancers has slightly decreased during the observed period, but neither of the trends was statistically significant (Figure 12). Cervical cancer incidence increased until 2012 at a rate of 1.3% per year but has been decreasing thereafter by 5.6% per year.



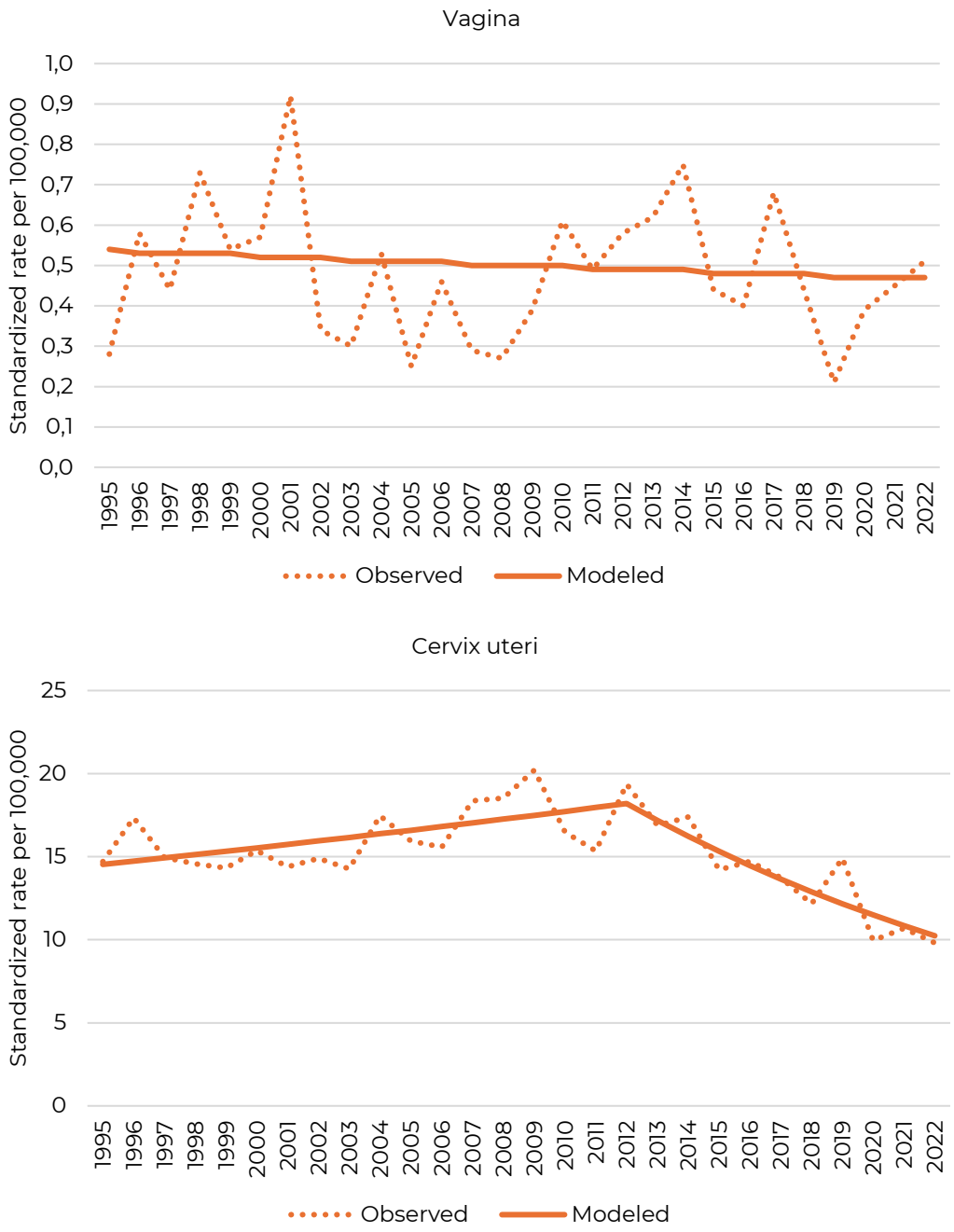


Figure 12. Incidence trends of cancers of vulva, vagina and cervix uteri, Estonia 1995–2022.

Figure 13 shows the incidence trends of anal and penile cancers in Estonia in 1995–2022. Anal cancer incidence has increased in total by 2.8% per year due to the rapid incidence increase in women (3.8% per year), while the trend has remained rather stable in men. The incidence of penile cancer has slightly increased, but the trend is not statistically significant.

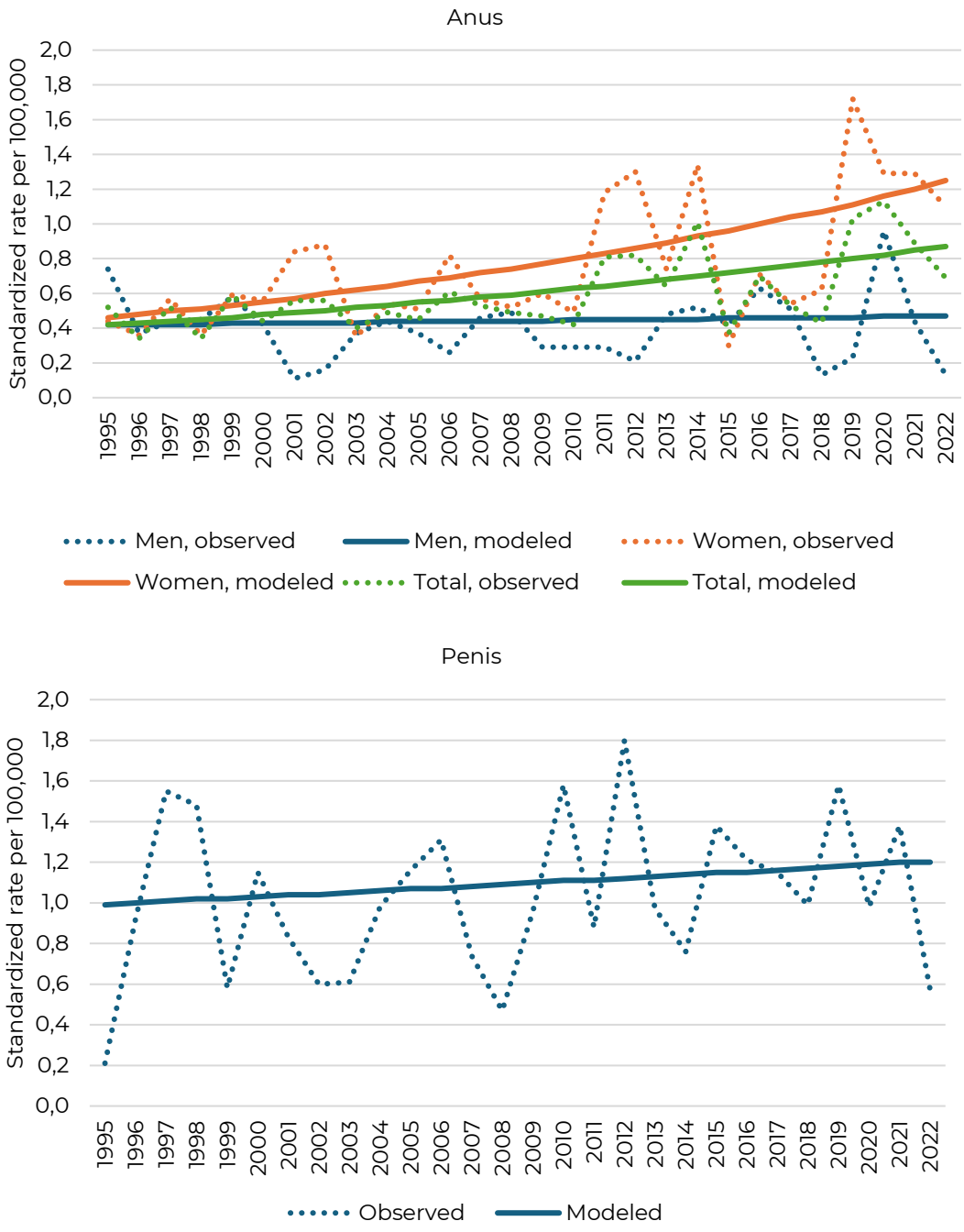


Figure 13. Incidence trends of cancers of anus and penis, Estonia, 1995–2022.

9.4 Summary of HPV-related cancers

The cancer incidence of HPV-related cancers in Estonia is increasing. The estimated number of HPV-attributable cancer cases in men in Estonia increased from 27 to 41 cases during 1998 and 2022, and in women it decreased from 182 to 172, mainly due to the decrease of cervical cancer incidence. The rapid increase in cervical cancer incidence in 2000s was likely due to the increasing prevalence of HPV in the population, whereas the decline in incidence since 2012 can be attributed to the impact of preventive screening.

In women, the incidence of oropharyngeal cancer has been rising by 10% and the incidence of anal cancer by 4% per year. As there is no screening for oropharyngeal and anal cancer, the increasing trend seen for these cancers in women is probably associated with HPV. The decreasing trend of laryngeal cancer in men is consistent with similar trends in other smoking related cancers (e.g. lung cancer) and is likely due to the declining prevalence of traditional tobacco smoking in the population. Improving the effectiveness of HPV vaccination could help prevent more than 200 cancer cases in Estonia every year.

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