

# Detection of malignant tumours and referral of a patient to treatment

*Is cancer detected and treatment started on time?*



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## Summary of audit results

### For your information

For early breast, lung, kidney and pancreatic cancer, delayed commencement with treatment has shown to increase mortality by 1.2–3.2% per each week delayed.

Source: Time to initial cancer treatment in the United States and association with survival over time: An observational study. 2019

The Estonian Cancer Control Plan 2021–2030 states that the total duration of a patient's treatment pathway from suspicion of cancer to initial treatment should be a maximum of 63 days.

**In cancer treatment, every delay leads to a decrease in the life expectancy of a cancer patient, but in Estonia, cancer is detected too late – for example, in 2018, only about 29% of cervical cancer, 35% of colorectal cancer and 49% of breast cancer was detected in the early stage of the disease. An effective method for early detection of cancer is screening that is carried out in Estonia and elsewhere with regard to some sites. Participation in screening is low in Estonia. All the more important is the timely treatment that must be ensured. In Estonia, the time from the suspicion of cancer to the commencement of cancer treatment is longer than recommended.**

### Main audit observations

**In Estonia, the late detection of cancer has not been reduced and this significantly affects the life expectancy of patients.** In Estonia, the relative five-year survival rate of cervical cancer patients, i.e. the probability of being alive five years after receiving a diagnosis, has been around 66% over the last 20 years. The survival rate of breast cancer patients has increased from 73% to 80% and for colorectal cancer from 50% to 59%. However, the level of early detection of cancer and survival rate is significantly lower than could be achieved based on the example of countries that are successful in treating cancer.

**One reason for late detection is poor participation in population-based screening.** Coverage, i.e. participation rate of members of the target group in screening, is considerably below the 70% agreed in Estonia, reaching 52% for breast cancer, 42% for cervical cancer and 50% for colorectal cancer in 2020. In addition to socio-demographic factors such as level of education and awareness of examinations, the following factors may be obstacles to participation in screening: screening notification is not well-targeted, invitations do not reach many addressees, registration is available mainly by phone. At present, screening time cannot be booked through the national eBooking System; appointments for individual service providers can be booked through their websites.

**The fragmentation of management and implementation is also an obstacle to more efficient organisation of screening.** The tasks of carrying out screening are divided between the Estonian Health Insurance Fund and the National Institute for Health Development, but the Ministry of Social Affairs has not yet clearly decided who is responsible for leading and developing the area as a whole. In addition, it has so far not

been possible to correctly measure the effectiveness of screening so that management decisions would be based on better data.

**Of the four cancer sites examined in the audit – lungs, large bowel, cervix and breast, only breast cancer patients received treatment on time**, with their first treatment session starting, on average, on day 52 after their first visit. It took about 100 days for cervical and lung cancer patients and 122 days for colorectal cancer patients. Delays in the treatment pathway occurred both in the stage of primary health care and specialised medical care, but also in cancer treatment centres. One reason for the delay in treatment is also the long waiting time for examinations. These bottlenecks were revealed in the expert work carried out in the audit; no information is currently being collected in Estonia systematically and/or centrally on the duration of different stages of treatment in the cancer treatment pathway and on delays in treatment.

**Cancer statistics important for high-quality decision-making in the area is published with a delay of two years.** This is because there is a lot of duplication of work in entering data and transmitting data to the cancer registry, and it takes a long time to check the quality of data.

**The share of cancer treatment funding in the Estonian health care funding is one of the largest compared to other areas, but we fall behind many European states in terms of the supply of personnel and equipment related to cancer treatment.** Cancer treatment expenditure in Estonia has increased by approx. 10% per year as the number of patients has increased and new services and medicinal products have been added to the list of health care services. In Estonia, cancer treatment expenditure is reimbursed if it exceeds the originally planned budget for the area. Despite these trends, direct costs related to cancer treatment accounted for 5.8% of all health care costs in Estonia in 2018, remaining below the European average (6.2%).

### For your information

Estonia's expenditure on health care as a whole is lower than the European average: the European average is 9.9% of GDP, while in Estonia, the figure is 6.4%.

Source: The Swedish Institute for Health Economics (IHE). Comparator Report on Cancer in Europe. 2019

**The need for cancer treatment resources may increase even further in the coming years.** Due to the coronavirus pandemic, fewer people were screened and treated for cancer. Insofar as some people did not see a doctor in time and later treatment may be more expensive, cancer treatment expenditure may increase faster than before.

### Main recommendations

**Based on the aforementioned, the National Audit Office recommends the following:**

- Make participation in screening as easy and accessible to people as possible, incl.
  - create an opportunity to book a screening time also in the national eBooking System;
  - increase the role of family physicians and nurses in notifying of and, where possible, in consulting and organising screening, for example following the good practice of colorectal cancer screening where the family physician contacts patients and advises them;

- additionally adopt more general measures such as implementing recommendations of behavioural psychology and service design methods in notification/organisation.
- Make the institutional organisation of screening more efficient, incl.
  - designate a specific institution responsible for the national management of screening;
  - establish a functioning system for collecting data on performance and quality indicators of screening.
- Contribute to shortening the patient's treatment pathway, incl.
  - empower medical specialists and family physicians to diagnose and refer patients with suspected cancer to treatment quicker (e.g. create an opportunity for patients with suspected cancer to be admitted for an appointment and examinations with a shorter waiting time, integrate treatment guidelines with the family physician's clinical decision support system, use more e-consultation);
  - establish performance indicators for pathway stages in order to determine the exact causes for delays and seek solutions for these.

#### **Response of the audited:**

The Minister of Health and Labour agreed with the recommendations and confirmed that everything outlined is important and that the necessary changes must move forward quickly. The Estonian Cancer Control Plan 2021–2030 was approved in May 2021, based on which a more detailed implementation plan for shorter periods will be prepared. At the same time, implementing the solutions requires the involvement of people and organisations involved in resolving the COVID-19 crisis. Therefore, the planned activities may take longer than intended.

The Estonian Health Insurance Fund agreed with the recommendations and is prepared to improve the organisation of screening through various activities. For example, an analysis of a patient's pathway in cervical cancer screening has newly been completed. The information obtained from this together with the identified development needs will allow improving other types of screening as well. In addition, preparations for designing a comprehensive and smooth treatment pathway for tumour patients has also commenced.

The National Institute for Health Development also agreed with the recommendations. In order to raise people's awareness of the symptoms characteristic of different types of tumours, the development of a communication strategy has commenced under the leadership of the Institute. In addition, a new system for collecting performance and quality indicators is being developed with the aim of having complete and high-quality data for the performance of the tasks of the cancer screening register.

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## Screening organization

### Target group coverage, cancer detection and survival

**Site** - the main location of the malignancy in the body.

**Target group coverage** - the share of the target group members who participated in the survey in the total number of persons belonging to the target group.

### For information,

studies show that regular screening can prevent 83% of cervical cancer deaths.

Source: Landy et al. „Impact of cervical screening on cervical cancer mortality: estimation using stage-specific results from a nested case-control study“, 2016

A recent study showed that breast cancer screening has prevented 21 deaths a year in Estonia.

Source: Ziolonke et al. „The potential of breast cancer screening in Europe“, 2020

Out of all the malignancies detected during the year, approximately 9% of cervical cancer cases, 28% of colon cancer cases and 41% of breast cancer cases are detected during screening.

Source: Estonian Health Insurance Fund "Sõeluuringute roll vähi diagnoosimisel", 2021

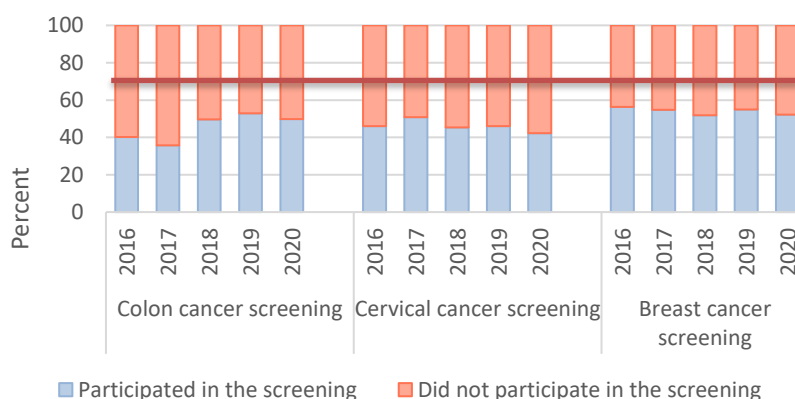
### Screening has not reduced the late detection of cancer

1. Screening is a study of healthy people without complaints to detect a pre-cancerous condition or cancer that has already developed (hereinafter - a malignancy) at the earliest possible stage. Late detection of a malignancy has a significant effect on treatment outcomes, for example, according to a recent study, each lost week increases the mortality rate by 1.2 to 3.2%.<sup>1</sup> According to another study, a four-week delay in treatment increases mortality as much as by 6-13%, depending on the site and the type of treatment.<sup>2</sup>

2. In Estonia, screenings for breast, cervical and colon cancer are organized.<sup>3</sup> The age of the target group of screening and the regularity of participation vary by site. A more specific annual target group is set out in the screening guide for each site. Effective screening requires at least 70% coverage of the target group.<sup>4</sup>

3. In Estonia, the coverage of population-based screening is well below 70%: in 2020, 52.2% of breast cancer, 42.2% of cervical cancer and 49.8% of colon cancer target groups were covered (see Figure 1).

Figure 1. Target group coverage of screening in 2016–2020, %



Source: National Audit Office based on the data of the National Institute for Health Development

4. Due to the low coverage of screening, the level of early detection of cancer in screened sites in Estonia is significantly lower than could be achieved with better coverage. In 2018, only a third of the primary cases

<sup>1</sup> „Time to initial cancer treatment in the United States and association with survival over time: An observational study“, 01.03.2019.

<sup>2</sup> Hanna TP, King WD, Thibodeau S, Jalink M, Paulin GA, Harvey-Jones E, et al. Mortality due to cancer treatment delay: systematic review and meta-analysis. BMJ 2020;371:m4087.

<sup>3</sup> Estonia is also considering the introduction of screening for lung and prostate cancer. The feasibility study for lung cancer screening is carried out in 2021 and will involve the Institute for Health Development, the University of Tartu, the University of Tartu Hospital and three primary care centers in Tartu. The use of personalized screening for breast cancer is also being discussed, and the study “Clinical Pilot Projects in Personal Medicine for the Precise Prevention of Breast Cancer and Cardiovascular Disease” has been completed.

<sup>4</sup> Cancer Control Plan for 2021–2030, interview with the Estonian Society of Oncologists.

of cervical and colon cancer and half of the breast cancer cases were diagnosed as local malignancies <sup>5</sup> (see Annex A for details).

5. The sample of expert work performed during the audit (see also Section 72) also revealed that only 31% breast cancer and 39% of cervical cancer tumours were found in stage I. However, the proportion of stage I diagnoses for both cancers could be higher because these sites are subject to screening. Late detection has a direct impact on patient survival, as in case of an advanced cancer treatment is generally no longer possible.

6. According to the National Institute for Health Development (NIHD), the age-standardized five-year relative survival rate of screened cancer sites in Estonia is as follows:

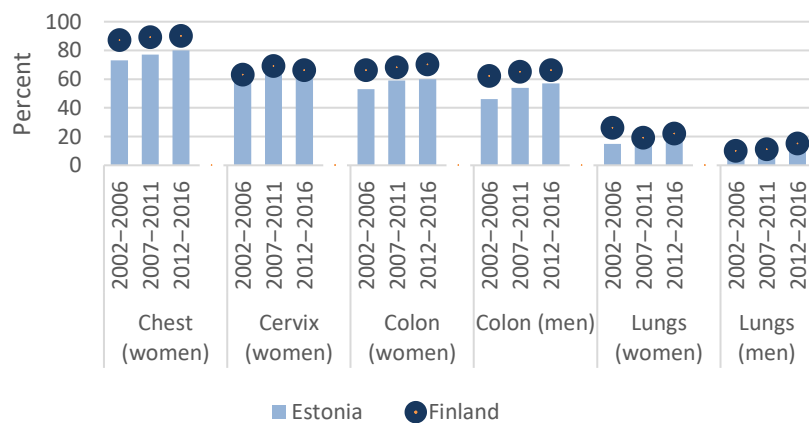
- Breast cancer survival rate has increased from 73% in 2002–2006 to 80% in 2012–2016 (see Figure 2<sup>6</sup>);
- The five-year survival rate for colorectal cancer was 50% in 2002–2006 and 59% in 2012–2016;
- The five-year survival rate for cervical cancer has stayed at 66% in 2002–2006 and 2012–2016.

7. Survival trends suggest that there is still much room for improvement in the relative survival rates of colorectal cancer, with just over half of those with colorectal cancer and almost two-thirds of those with cervical cancer still alive five years after the disease is diagnosis (see Figure 2).

**Survival** - likelihood to be alive a certain number of years after the disease is diagnosed. The most commonly used indicator is the **five-year relative survival rate**, which can be interpreted as the percentage of patients with a disease alive five years after the disease is diagnosed,

**Age standardization** - adjustment to the age composition of the population, eliminating the effect of the age composition of different populations on the indicator when comparing different countries or time periods.

**Figure 2. Age-standardized five-year survival rate for four cancer sites in Estonia and Finland from 2002 to 2018 by sex, location and country\***



\* Finnish indicators refers to a 2 years earlier period, i.e., when the Estonian indicator is for the period of 2002–2006 then the corresponding figure for Finland is for the period of 2004–2008.

<sup>5</sup> The Institute for Health Development collects statistical data on the spread of malignancy as follows: local, regional (nearby) lymph node involvement, neighboring organ involvement, distant metastases. Categories one to four are used to determine the stage of a tumor during diagnosing. The higher the stage, the more tumor tissue there is in the body. The categories of tumor spread and disease stage do not correlate, but overall characterize the patient's condition in a similar way.

<sup>6</sup> Figure 2 also shows lung cancer survival rate, although the introduction of lung cancer screening in Estonia is still under discussion.

Source: National Audit Office based on the data of the National Institute for Health Development

8. The five-year survival rate for breast cancer is much better (80% for women), but it is lower than, for example, in the Nordic countries with approximately 90%.<sup>7</sup> Compared to Finland our survival rate for colon cancer is lower, whereas, for cervical cancer our situation is more or less the same. For lung cancer, the survival rate of women in Finland is slightly better, while that of men is similar (see Figure 2).

9. In 2021, the circle of participants in screening was significantly expanded in Estonia. Free screenings were also made available to uninsured persons, who have accounted for *about* 8% of the total target group in recent years. The target group for cervical cancer screening was also extended to 65 years of age. Before 2021, the target group for cervical cancer screening was 30–55 years. These changes will allow more people to participate in screening, thereby increasing the rate of early detection of cancer and preventing cancer.

10. The EHIF's 2021 survey also showed that when

- colon cancer is detected by screening, 91% of patients are still alive after three years (current data are limited to assess five-year survival rate), while for patients who are diagnosed outside the screening the survival rate is 71%;
- cervical cancer is detected by screening, 99% of patients are alive after five years, and 75% if detected outside of screening;
- breast cancer is detected by screening, 92% of patients are alive after five years, and 77% if detected outside of screening.<sup>8</sup>

11. **In conclusion**, so far we have not succeeded to involve enough people in screenings and thus to prevent or detect more malignancies at an early stage. As low coverage of screening affects the survival of cancer patients, it needs to be considered how to significantly increase screening participation. It is important that those invited to the screening also participate.

### **Screening campaigns do not take into account specific factors or conditions of the target groups.**

12. Screening campaigns should take into account different patient barriers, such as socio-demographic, psychosocial, economic or geographical factors, as well as fear, awareness, understanding or lifestyle. Organization of campaigns and promotion work requires a very good knowledge of the target group.

13. Surveys conducted in Estonia have also confirmed that participation in screening is influenced by various factors such as social background, age, level of education, nationality, as well as the place of the

### **Factors affecting screening coverage**

<sup>7</sup> In 2014-2018, the five-year [survival](#) rate for breast cancer was 91.9% in Sweden, 90.2% in Finland, 89.6% in Denmark and 88.5% in Iceland.

<sup>8</sup> [Estonian Health Insurance Fund](#) „Sõeluuringute roll vähi diagnoosimisel“, 2021.

survey.<sup>9</sup> <sup>10</sup> <sup>11</sup> Statistics show large differences by counties; for example, in Ida-Virumaa and Harju Counties the participation rate of all screenings has been lower than the Estonian average during the last five years (see Table 1 for coverage statistics for the last two years; the above average rate is indicated in colour, whereas over 60% coverage is marked in a darker shade).

**Table 1. Coverage of target groups (%) by colon, breast and cervical cancer screening in counties in 2019 and 2020<sup>12</sup>**

County	Colon cancer, 2019	Colon cancer, 2020	Breast cancer, 2019	Breast cancer, 2020	Cervical cancer, 2019	Cervical cancer, 2020
Harju County	51	47	52	51	46	41
Hiiu County	54	39	61	60	52	38
Ida-Viru County	47	41	51	47	41	38
Jõgeva County	57	62	61	63	48	46
Järva County	63	53	66	58	50	45
Lääne County	64	56	51	56	52	50
Lääne-Viru County	56	53	59	56	55	53
Põlva County	65	63	58	61	48	45
Pärnu County	59	57	53	51	54	53
Rapla County	58	53	58	56	43	41
Saare County	48	44	68	64	50	48
Tartu County	62	60	61	55	45	44
Valga County	46	46	58	47	45	43
Viljandi County	56	52	61	57	42	42
Võru County	67	61	61	52	44	47
Average	53	50	55	52	46	42

Source: National Audit Office based on the data by the National Institute for Health Development

**Mammography** - an X-ray examination of breasts to detect and diagnose breast diseases in women.

14. According to Eurostat statistics for 2014, participation in screening was also related to the level of education (see Figure 3). The analysis showed that in the last three years prior to the study, the participation rate among Estonian women who had taken PAP test<sup>13</sup> differed by the level of education, the difference between the groups of women with lower and higher education was *about* 17 percentage points. The participation rate

<sup>9</sup> Liisa Koreinik. Emakakaelavähi sõeluuringus osalemist mõjutavad tegurid Eestis. Magistritöö. 2019.

<sup>10</sup> Kadi Lubi jt. 50–69aastaste naiste rinnavähi sõeluuringul mitteosalemist mõjutavad põhjused Eestis. Eesti Arst 2020;99:139–146.

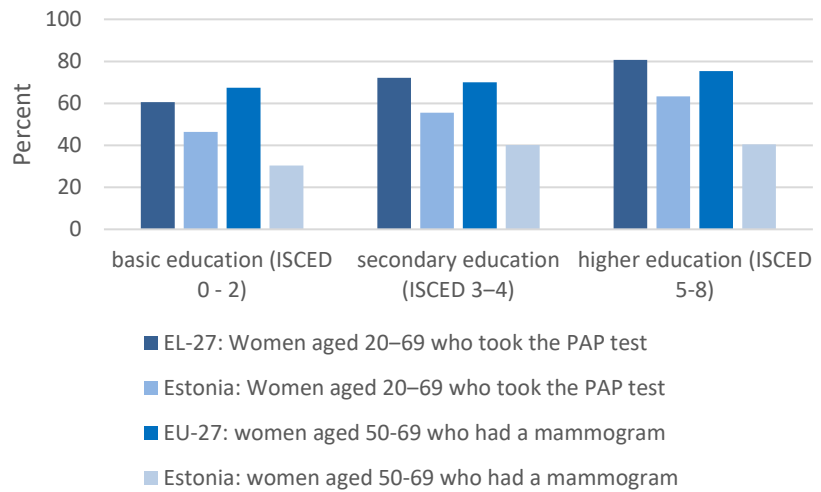
<sup>11</sup> Eesti Uuringukeskus. Rinnavähi alase teadlikkuse uuring. 2020.

<sup>12</sup> The table shows coverage statistics for two years, as the COVID-19 crisis that started in 2020 may have affected participation in screening in 2020.

<sup>13</sup> Cervical cancer screening has been performed based on several tests. Until 2021, all screening participants were tested for PAP (Papanicolaou test or cytological test), and from 2021 for HPV (human papillomavirus test to show the presence of the virus).

among those who had done **mammography examination** in the last two years differed by 10 percentage points by level of education.

**Figure 3. Educational levels of women who have passed the PAP test and mammography in Estonia and the average of the 27 EU countries based on the 2014 survey<sup>14</sup>**



Source: National Audit Office based on the Eurostat's "Healthcare activities statistics - preventive services"

## Campaigns

15. The EHIF has been responsible for carrying out screening campaigns. They organize nationwide information campaigns on breast and cervical cancer and colon cancer screenings that target the persons that belong to a target group in a specific calendar year. The EHIF has used various media and communication channels to reach the target groups: television, radio, outdoor media, online banner advertising, print media and social media. Adds on social media (Facebook) have been targeted at members of the target group.

16. The mammography bus is advertised regionally. Articles have also been published in county level newspapers. For example, in 2020, a theme night for breast cancer screening was organized for women, both in Estonian and Russian languages. The theme night was also shared via Facebook. In addition, the Estonian Cancer Society runs campaigns in co-operation with the EHIF and organizes thematic days in various locations and distributes written materials.

17. According to the EHIF, the impact of the campaigns has also been studied after their implementation. For example, in 2020, a breast cancer awareness survey was conducted with 1,200 women. The survey showed that the majority of respondents had participated in screenings and were aware of these surveys. However, the responses appeared to differ by age group. The main reason for non-participation was the lack of health complaints. In the summer of 2021, at the time of writing this report, a similar study was conducted to find out the reasons for not participating in cervical cancer screening.

18. In addition, in 2019, Tallinn Health Care College, together with the Health Insurance Fund, conducted an analysis of the reasons for not

<sup>14</sup> ISCED ( *International Standard Classification of Education* ) is a classification system developed by UNESCO to compare the education systems of different countries and to produce internationally comparable education statistics.

participating in breast cancer screening. According to this, the decision not to participate in the screening comes from a combination of different habitual, emotional and practical reasons. According to the authors of the study, further communication must take these reasons into account and be more precise in shaping messages for different age groups.

19. Thus, the EHIF has organized campaigns for the population and studied the reasons for not participating in some screening. However, the coverage of the target group has not changed significantly. This means that the knowledge gained from performance studies evaluating screening information and design should be better applied, taking into account the regional, educational and/or age factors of target groups.

20. **In conclusion**, Estonia has developed a tradition of regular nationwide screening campaigns. At the same time, research reporting should be further targeted, taking into account patient barriers.

### Inviting for screening has so far not yielded the expected results.

21. The organization of screenings must ensure that the invitation reaches the person and that the service is easily accessible to all those invited. The invitation to the screening should be as clear as possible and drafted in such a way that the letter itself (including its structure) facilitates the decision to participate in the screening.

22. The EU recommendations state that the invitation should include the exact time of the examination and that the invitation could be signed by a (family) physician.<sup>15</sup> It is also important to send a repeat invitation, SMS or have the call robot make a reminder call. At the same time, the findings and recommendations of behavioural sciences play an increasingly important role in changing patients' behaviour.<sup>16</sup> For example, creating a feeling that a person is taking part in something important reduces disregard for invitations.

23. NIHD sends e-invitations and/or postal invitations to the target group through the Cancer Screening Register. They started sending electronic or e-invitations first in the summer of 2019. E-invitations are sent to persons who have a valid e-mail address in the population register or whose eesti.ee e-mail is directed to their personal e-mail address. In 2020, 70% of all invitations sent by NIHD were e-invitations.

24. A postal invitation will be sent to those who do not have a valid e-mail address, but have a regular mail address in the population register. Invitations to the mammography bus are also sent by mail because the service provider has preferred it (see Section 43). A paper invitation will be sent also when the e-mail does not reach the recipient. From July 2019 to March 2021, such cases made up *about* 3% of all the e-invitations sent.

25. Thus, a person will only receive an invitation if he or she has an e-mail address on the eesti.ee portal or a valid address in the population register. If a member of the target group has not participated in the

## Screening invitations and reservations

### For information,

**In April 2021, e-invitations went through a fundamental change.** The State Information Systems Board was allowed to direct the so-called state inbox of a person located on the eesti.ee portal to the e-mail address indicated in the population register. This means that the e-invitation will also reach people who have not yet redirected themselves to their eesti.ee inbox, but whose e-mail address existed in the official register of their official contact.

<sup>15</sup> [The EU](#) recommendations on inviting women aged 50-69 to organized screening programs.

<sup>16</sup> S. J. Martin et al. [Commitments, norms and custard creams – a social influence approach to reducing did not attends \(DNAs\)](#). 20212.

screening during the first half of the year, he/she will be sent a repeat invitation either by e-mail or regular mail.

**Service provider, i.e., health care provider** - a health care professional or a legal person providing health care services who has applied for an activity license from the Health Board for the provision of health care services.

26. The rate of invitation receipt is difficult to estimate. **One service provider** that was interviewed during the audit estimated based on their previous experience that people who have not received invitations could make up 20-30% of the target group. According to the NIHD, the situation is better, as only up to 10% of the target group have a correct contact address in the population register. Both parties acknowledged that the sending of e-invitations had improved the receipt of the notification. However, the Ministry of Social Affairs also confirmed that the invitations do not reach all members of the target group.

27. A person can register for a screening without an invitation, but he or she must know that he or she belongs to the target group. The e-invitation is available on the patient portal, but not everyone is aware of the possibility to view it. While the patient portal needs to be made more user-friendly<sup>17</sup>, there is no certainty that all invitees will be able to find a screening invitation on the portal. Thus, if a person has not received an invitation, either by e-mail or regular mail, it is unlikely that they will participate in the screening.

28. In Estonia, the Ministry of Social Affairs, together with specialty agencies, has decided that the invitation does not include a booking of a screening time. Although the introduction of this (so-called one-click) solution has been discussed again recently, right now the invitee has to make him/herself an appointment with a doctor. There are telephone numbers provided in the regular mail invitation to register for the screening. The e-invitation has a web link (<https://www.haigekassa.ee/soeluringu-kontaktid>), where you can find the contacts of a suitable service provider.<sup>18</sup>

29. In addition to telephone numbers, you can find links to the online register of some service providers via the EHIF's web link. Booking is currently not possible via National eBooking System. Enabling the booking through this would make the service more accessible, as a person would be able to choose the time and place for the screening from a single place at a convenient time or easily change the booking.

30. From a patient's perspective, it is important to reduce all barriers to participation in screening. In addition to easy booking, the content, structure and appearance of the invitations are also important. All Estonian screening invitations provide important information about participating in the screening. However, the specific content, structure and sending of invitations vary by site. According to the NIHD, in 2020 the content of screening invitations was made more precise and easy to understand.

31. So far, nobody has focused on the systematic design of invitations, i.e., the structure of the text and the content of the message based on the patterns of people's thinking and behaviour. Changes are expected in this

<sup>17</sup> Annual Report of the National Audit Office “#e-riik ehk ülevaade riigi vara kasutamise ja säilimise kohta 2018.–2019. aastal”, p. 62.

<sup>18</sup> Screening for colon cancer is exceptional because the invitation asks you to contact your primary care center.

area - in May 2021, an intervention study was launched in cooperation with the Institute of Psychology of the University of Tartu (UT), the aim of which is to increase the participation rate in evidence-based screening by changing the content and form of breast cancer screening invitations. The suitability of invitations is also analysed when examining the reasons for non-participation in cervical cancer screening (see also Section 17).

## The role of family physicians and others in inviting for screening

**Coloscopy** - an examination that allows to observe the colon with a fully flexible optical instrument (endoscope).

32. The colon cancer screening invitation is the only one that includes the name of the family physician at the end of the invitation sent by regular mail. The family physician has a significant role in this screening.<sup>19</sup> More specifically, the primary contact of the study is the family physician (more precisely their team), who advises the patient about the test and provides a sample taking set. The family physician will also refer the patient for **coloscopy**, provided there was a finding.

33. Breast cancer screening is performed separately from a primary care provider. In the future, the primary test for cervical cancer screening can also be performed in health centres that bring together several primary care providers (family physicians). Also, the invitation to the last two screenings does not include the name or signature of any other doctor.

34. In order for family physicians to have information on which patients on their list are in the target group for a given year, they will be sent a list of people at the beginning of the year. Since the family physician is the patient's primary contact with the healthcare system, the family physician has the opportunity to advise people on the issues of screening.

35. Colon cancer screening is a good example - a family physician has a direct interest in advising patients, as the colon cancer screening coverage of the family physician's list is one component used to assess the quality of family physician's work.<sup>20</sup> Whether family physicians also advise those invited for other screenings is currently up to the doctors themselves.

36. Considering the patients' reasons for not participating in screenings, one should increase the participation of family physicians in inviting people to other screenings as well. For example, screening invitations could be made more personal by adding the name of the family physician to all invitations. One option is to have the family physician's team contact those members of the target group who have not been in the screening for a long time. It is also easier to advise patients when needed through a more personalized approach to primary care.

37. In 2020, the EHIF started cooperating with Apotheka pharmacies on informing about screening. Apotheka created an additional application in its information system that notifies the pharmacist when the person making the purchase belongs to the target group of the screening. Pharmacists remind the client that their birth cohort is expected to participate in the screening. Such cooperation with pharmacies creates good preconditions for raising people's awareness.

38. An innovation team has been established in Estonia as a joint initiative of six ministries, which together with the Ministry of Social

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<sup>19</sup> The detailed organization of screenings are described in Annex B.

<sup>20</sup> You can read more about the quality system on the EHIF's [website](#).

**Follow-up treatment** – treatment immediately following active treatment that is related to previous active treatment.

**Service design** – an area that combines management principles and a set of tools to design functional services and develop a delivery process.

Affairs, the North Estonian Regional Hospital (PERH) and the Health Insurance Fund have been designing a patient-centred treatment route from the first signs of cancer to **follow-up treatment**.<sup>21</sup> **Service design** principles and tools could also be used to further develop the promotion and organization of screening to reduce the impact of patient barriers to screening (just as the campaigns have already started implementing behavioural sciences).

39. **In conclusion**, screening invitations do not reach all members of the target group. Nevertheless, an informed person belonging in the target group can still participate in the screening without the invitation reaching their (inbox) mailbox. A good example of a creative solution for involving people in screening is working with pharmacies.

40. The detailed design of the invitation has not been done in Estonia so far, but in co-operation with the University of Tartu, the invitation for breast cancer screening has been redesigned. Screening can now be booked mainly by phone, which is a fairly easy option. However, allowing bookings through a National eBooking System would significantly expand people's choices.

41. Increasing of family physicians' role in the notification and organization of screenings also deserves to be analysed on the example of colon cancer screening. Service design methods could be helpful in this.

### **Good availability of the service increases participation in screening.**

42. Efforts have been made to bring **breast cancer** screening closer to people by offering services on mammography buses that stop in different parts of Estonia. Thus, the service is provided in both inpatient mammography rooms<sup>22</sup> as well as on the mammography bus<sup>23</sup>.

43. In 2020, mammography buses stayed in one place for 1–35 working days at a time. Regional mammography bus stops and schedules have been selected by considering the fact that the service is not otherwise available. The mammography study appointments fulfilment in the region is also taken into account. Service providers usually try to be in the same area twice in the same year so that members of the target group who forget or cannot come in the spring can still participate in the autumn.

44. The service was suspended from March 18 to May 2020 due to the COVID-19 situation, but the service provider has already decided to carry out further studies. In total, there were only 9 fewer service days in 2020 than in 2019 (see Table 14 in Annex B).

45. According to the service providers and the NIHD, the provision of the so-called bus service has increased the breast cancer screening coverage of the target group. The service is available on certain days of the year only as a bus service in the following counties: Järva County, Rapla County, Saaremaa, Hiiumaa, Lääne-Virumaa County, Viljandi

<sup>21</sup> See the Innotiim website for an introduction to a [cancer patient care pathway project](#).

<sup>22</sup> East Tallinn Central Hospital (ETCH), North-Estonia Medical Center (NEMC), also provides services in Lääne County and Narva Hospitals), Tartu University Hospital, Pärnu Hospital.

<sup>23</sup> Until now, the service has been provided by AS Mammograaf and the Tartu University Hospital. From 2021, Viljandi Hospital was added as a provider of mobile services.

## **Mammography bus**

### **For information,**

Mammography buses stop at different parts of Estonia according to the schedule agreed with the NIHD and the EHIF.

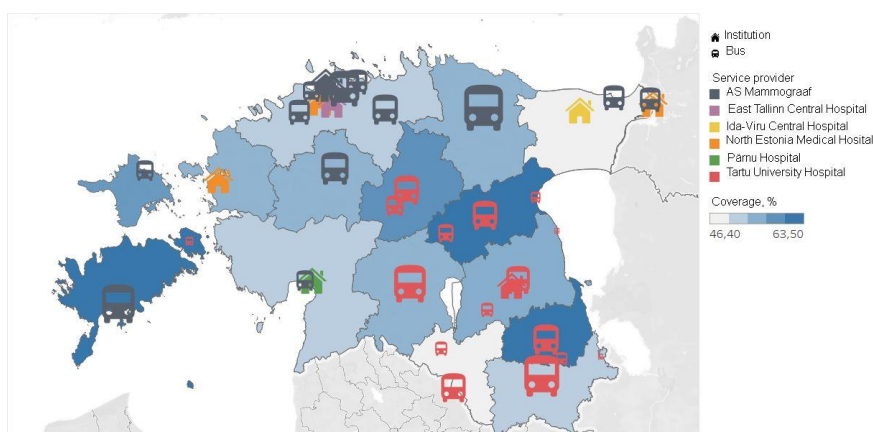
Registration for a mammogram study is available for the target group of respective region as well as for others. Those who do not belong to the target group of the screening can also have the examination for a fee.

County, Jõgeva County, Põlva County, Valga County and Võru County (see Figure 4, where **the size of the bus indicates the number of service days per year**). The figure shows that participation in the screening is quite good in Saare, Põlva and Jõgeva counties, where only the mammography bus service is available.

46. About two weeks before the arrival of the bus, the NIHD sends screening invitations to women in the area. Service providers also advertise the service independently at the location in different ways. For example, when AS Mammograaf saw in Ida-Virumaa that very few had registered, the company decided to advertise in a local newspaper. This significantly increased the number of bookings.

47. The itinerary of the bus must also be based on patients' preferences. For example, the 2020 Breast Cancer Awareness Survey found that Estonian-speaking women would prefer to visit a mammography bus more often than non-native speakers (49% *versus* 28%). At the same time, non-native women would prefer a regular hospital or outpatient clinic significantly more than Estonian speaking women (58% *versus* 41%). Based on the experience of the Tartu University Hospital (TUH), the mammography bus at Tartu Kaubamaja helped increase the number of participants by 10% per year.

Figure 4. Breast cancer screening providers in 2020 and target group coverage by county



Source: The National Audit Office based on the data of the National Institute for Health Development

48. **Cervical cancer** screening can be done in different institutions in each county. In addition, home HPV testing was piloted in 2020: in the corresponding feasibility study, the necessary testing kit was sent home to the patient.<sup>24</sup> As a further step, it is planned to conduct a survey in the second half of 2021 with the possibility of HPV home testing for repeat screening recipients. If the results of home testing are effective, it is possible that this testing option will be included in the screening program.

49. For **colon cancer** screening, patients receive a test kit from their primary care centre. If an additional examination is needed, it can be done at a colonoscopy provider. There are seven of them in Estonia and they are located in Harju County, Pärnu County, Ida-Viru County, Saaremaa and Tartu County. Screening service providers by location in 2016–2020 are listed in Tables 15 and 16 in Annex B. Although additional screenings

<sup>24</sup> You can read more about this on the [NIHD website](#).

are not performed in each county, a primary screening test is available in each county.

**50. In conclusion**, the use of a mammography bus is an example of how bringing screening closer to people increases participation rates. Therefore, it is important to find ways to make screenings more accessible to people.

### The quality of screenings has not been measured.

**51.** In order to measure and improve the quality of screenings, it is necessary to collect respective data.

**52.** The Estonian Cancer Screening Registry (ECSR) was established in 2015. NIHD is the controller of the registry. According to the statutes, the ECSR is used to conduct cancer screening, analyse data from screening-related research and post-screening treatment, detect cancer early, evaluate the quality and effectiveness of screening, and develop health policy and conduct statistics and scientific research.

**53.** The data of service providers reach the ECSR via the **Health Information System (HIS)**. Service providers must submit information on participation in screening, initial and additional examinations, etc., to the Health Information System, by providing the established standard document form. The HIS collects data from service providers' **epicrisis** in the form of referral responses and epicrisis and periodically transmits them to the ECSR on the basis of a separate request initiated by the ECSR.

**54.** There are various outcome indicators in the screening guidelines that should be measured. The Breast Cancer Screening Guidelines contain 28 indicators, the Colon Cancer Screening Guidelines 21 indicators and the Cervical Cancer Screening Guidelines 16 indicators. However, based on the long list, it is now possible to measure, for example, who has received an invitation from the target group or how many have participated in the screening.<sup>25</sup>

**55.** Other indicators cannot be measured because service providers do not transmit data based on uniform standards established by the HIS. Therefore, it is not possible to machine-add all data to the ECSR. There is also no certainty that screening providers will submit all the necessary data. The NIHD also does not have the possibility to check whether the Health and Welfare Information Systems Centre (TEHIK) has forwarded them all information received from the HIS.

**56.** For these reasons, the data collected are not of high quality or complete. Therefore, in practice, data is collected both to identify the target group and the invitees and to monitor the results of the screening from the EHIF, which provides the ECSR with data based on **treatment invoices** (which, however, do not provide all the necessary information).

**57.** According to the NIHD, in cooperation with TEHIK, a data warehouse project for the development of the ECSR is underway, where

**Health Information System** - central information system that aggregates data submitted for patients' health condition.

**Epicrisis** - a summary of medical history.

### For information,

**you can read about the problems of e-health in the** annual report of the National Audit Office "#e-riik ehk ülevaatest riigi vara kasutamise ja säilimise kohta 2018.–2019. aastal", pp. 49, 50.

**Treatment invoices** - invoices submitted by medical institutions to the EHIF for the healthcare services provided to the insured patients. The price of the treatment is based on the prices approved in the valid list of health care services by the EHIF.

<sup>25</sup> In the case of cervical cancer screening, in addition to the data of the EHIF, it is possible to measure, for example, the rate of colonoscopy.

data from the HIS will be sent to the ECSR in a defined form. The development was due to be completed by the end of 2021, but due to the pandemic, the deadline was postponed. As a result of the development of the data warehouse, the availability of data from the HIS should improve. However, the problem of unstructured data, in other words what data providers transmit to the HIS and in what form, still remains.

## Inspections carried out

**Target selection** - checking the compliance of the document, i.e., checking the compliance of the treatment documents with the legislation, the terms of treatment financing agreement, coding instructions, clinical guidelines, etc. The correspondence between the treatment invoice and the treatment document is also verified.

58. Screening guidelines have been prepared for each malignancy site. The compliance of the practice with them has been checked on a few occasions only. Over the last 10 years, the EHIF has made two **target selections**:

- In 2019, the target selection “Grounds for the Colon Cancer Prevention Allowance” was conducted, the aim of which was to assess whether the entries of the colon cancer screening in the health card comply with the screening guidelines and whether the treatment invoice complies with the requirements when the patient has refused to participate in the screening.
- The target selection for breast cancer was made in the first half of 2014. Compliance with the established requirements for screening and medical indications for referral outside the screening, as well as archiving of information, were assessed.

59. In 2014, the NIHD commissioned a comparison (audit) of cervical cancer laboratories, in the course of which the quality of the eight laboratories that participated in the screening in 2013 was assessed, i.e., a partial re-analysis of PAP tests (re-screening) was performed. The analysis showed that compared to the 2006 audit, the quality of laboratories participating in cervical cancer screening had been significantly improved, with an average test discrepancy of 6.9% instead of the previous 25%. The audit resulted in recommendations to further improve quality.

## Screening management arrangements

60. One of the reasons causing problems in screening is fragmented management. The Ministry of Social Affairs has not specified the responsibilities of the managing authorities very precisely. The EHIF and the NIHD have divided organizational responsibilities such as funding, sending invitations, etc. However, there is no decision on who manages the field of screening, audits compliance with the guidelines and follows international developments, and implements new trends in Estonia. Both parties, the EHIF and the NIHD, acknowledged the problem.

61. The new Cancer Control Plan for 2021–2030 also states that Estonia lacks central coordination of screening, including the procedure for starting new screening, auditing and national management.

62. **In conclusion**, the quality of screening has not been measured. This is also difficult to do because the data needed to conduct the analyses do not reach the ECSR in a suitable form. There is no single leading body in the field of screening.

## Conclusions and recommendations of the National Audit Office

63. **According to the National Audit Office**, screenings have not been able to reduce the late detection of cancer. Screening invitations are sent, but many people probably do not receive them. It is not possible to book a time for screening via the National eBooking System. Screening

campaigns have been carried out, however, all screening information communication should be better targeted.

**64.** Although system-based barriers (e.g., time needed for development, need for money and knowledge, etc.) are also important, the next leap in development should come from the systematic removal of various patient barriers. In other words, the current direction taken (e.g., collaborative projects with UT and pharmacies) should be continued to make notification about and participation in screenings as patient-centred as possible, taking into account, inter alia, evidence-based methodologies for target group involvement.

**65.** The role of the family physician is important in inviting people to screening, especially for colon cancer screening, but this role should also be increased in other screenings. In addition, it has so far not been possible to correctly measure the quality of screening and to achieve a state where management decisions would be based on better data. Responsibility for conducting screenings is shared between the various institutions, but there is no decision on who will take care of the field as a whole.

**66. The National Audit Office's recommendations to the Minister of Health and Labour:** Designate the authority responsible for the national management of screening.

**Response of the Minister of Health and Labour:** Today, several parties in Estonia are responsible for the nationwide management of screening: The Estonian Health Insurance Fund (EHIF), the Institute for Health Development (NIHD), the Centre for Health and Welfare Information Systems (TEHIK) together with the Ministry of Social Affairs, which is why it is important to specify the roles and activities of different agencies. We have also held negotiations with the Estonian Health Insurance Fund on the same topic in the past, and we plan to continue them in the near future, involving the other parties mentioned above. Please also understand that in the current situation, rapid progress may not be possible as our focus is on the prevention of the spread of coronavirus.

**67. Recommendations of the National Audit Office of Estonia to the Minister of Health and Labour in cooperation with the chairman of the board of the National Institute for Health Development and the Director of the National Institute for Health Development:**

- Target communication, taking greater account of the preferences and characteristics of different target groups;
- Use the principles and practices of behavioural psychology and service design in the notification about screening;
- Increase the role of family physicians and nurses in informing and advising the target group of the screening, as the family physician (their team) is the person's primary contact with health care system;
- Increase, where possible, the role of family physicians in all screening activities;

- Establish a functioning system for collecting data on performance and quality indicators of screening.

**Response of the Minister of Health and Labour:** We agree with the recommendations. Almost half of the cancers are preventable through a healthy lifestyle and vaccination, which is why we will focus more on the preventive measures in the coming years. In particular, all screening programs need commitment and consistent work in order to ensure high level of participation and consequently achieve desired results. We will discuss with all the parties during the updating of the screening guidelines the possibilities of increasing the role of family physicians and nurses in screening. We agree that they are the primary contact and, in the health centres where the midwife is employed, she/he could perform cervical cancer screening and provide consultation, however, we need to look at whether the primary care level can take on any additional burden considering the current situation and additional tasks.

In cooperation with the Estonian Health Insurance Fund and the Institute for Health Development, we have already made several changes in the screening programs and organization, and we will jointly continue to improve them, as well as the development and monitoring of quality indicators. In cooperation with TEHIK, the reconstruction of the data collection system of the Estonian Cancer Screening Register was launched in February 2020 to integrate it with the data of the Health Information System.

**Response of the chairman of the board of the Estonian Health Insurance Fund:** We will enhance national screenings as follows:

- Screening management activities: removing administrative, geographical and/or time barriers;
- contributing to the expansion of screening start points (invitation channels, recall/reminder, information sharing);
- improving testing facilities for screening, offering new tests / services, involving even more primary care centres;
- the concept of conscious participation that influences people's behaviour;
- introduction and development of a model of breast cancer precision prevention service;
- contributing to the development of a system for measuring results and quality of screening.

**Response of the Director of the National Institute for Health Development:**

- The Estonian Cancer Screening Registry has already changed the schedule for sending invitations to ensure better screening organization: Since 2019, the first invitation has been sent to all those invited in the first half of the year, and repeat invitations to non-participants since August, so that no one receives the first invitation at the end of the year when the participation is difficult. In 2015–

2018, initial invitations were sent within 10 months (January to October) and there was little time to send repeat invitations. Several co-operation projects are underway with the Estonian Health Insurance Fund, the University of Tartu and other co-operation partners. Breast cancer screening participation intervention study and HPV home testing pilot study in cervical cancer screening.

- The NIHD participated in the cervical cancer screening user re-design project, which was also the topic of one of the workshops at the Opinion Festival in Paide.
- As the coverage of breast cancer screening is the best in the regions where the service is provided by a mammography bus, the NIHD plans to increase the operating funds for the mammography bus as a targeted allocation and to extend the support to Viljandi County Hospital from 2022.
- The updating of the guidelines for colorectal cancer screening is in progress by the Estonian Health Insurance Fund. The NIHD, family physicians and medical specialists are all involved.
- Since October 2021, primary care centres have also been involved in conducting the primary cervical cancer screening. The primary cervical cancer screening test (HPV test) can be done at primary care centres. We plan to discuss with all the parties during the updating of the screening guidelines the possibilities of increasing the role of family physicians in screening.
- With technical and organizational changes, a new system for collecting screening results and quality indicators is being developed. In cooperation with TEHIK, the reconstruction of the data collection system at the ECSR was launched in February 2020 to harmonize it with the data at the HIS for which an amendment to the statutes of the ECSR has been prepared by appointing TEHIK as the data processor of the ECSR. The aim of the new system is to obtain high quality data from the HIS for performing the tasks of the ECSR. The introduction of the "data warehouse" enables the data of examinations and treatments received by the HIS to be made available to the register in a machine-readable form without any losses due to previous inquiries. The deadline was postponed due to the COVID-19 pandemic. Testing of the new system will commence in 2022.

**68. Recommendations of the National Audit Office of Estonia to the Minister of Health and Labour in cooperation with the Chairman of the Board of the National Institute for Health Development and the Director of the Health and Welfare Information Systems Centre:**

- Create an opportunity to book a screening time also via the National eBooking System;
- Require providers to send screening responses to the HIS in a standardized form so that data could be sent from the HIS to the ECSR in a structured and machine-readable form.

**Response of the Minister of Health and Labour:** We agree with the recommendations, and we consider it important to make it easier for

people to reach screening. We would like to add that at the development of the new generation information system (UpTIS) we have focused on data exchange, not document exchange.

#### **Response of the chairman of the board of the Estonian Health**

**Insurance Fund:** We agree with the recommendation to create the screening invitation in the National eBooking System by cooperating with TEHIK. We have submitted a proposal to the IT development roadmap of the Association of Hospitals, so that their data could be entered in the system in a structured and machine-readable way, and in cooperation with TEHIK, people could have the opportunity to book screening times in the National eBooking System.

#### **Response of the Director of the Health Welfare Information Systems**

**Centre:** Development work to complete the National eBooking System has been commissioned and is currently in progress. The option of registration for cancer screening via the National eBooking System will be available for users in January 2022, based on today's best knowledge. In cooperation with the Association of Hospitals, we are currently working to ensure that all hospital information systems use the latest supported standard versions. In addition, a project is underway to use algorithms that would allow the ECSR to obtain the necessary information, even from non-standard data. According to today's best knowledge, these development works are to be completed during the first half of 2022. Unfortunately, it is currently not possible to set a more specific date due to the volume of priority development work needed to alleviate the COVID-19 crisis.

## **Patient's pathway from the onset of symptoms to the start of treatment**

### **The patient's journey to treatment takes longer than planned.**

69. Patients with suspected cancer should move between the different stages of health care as quickly as possible to reduce mortality and increase the effectiveness of treatment. As noted in Section 1, delay in starting treatment significantly increases mortality. The current incidence and mortality of cancer in Estonia are presented in the overview of the field (see Annex C).

70. According to the new Cancer Control Plan 2021-2030, a patient with suspected cancer must arrive at a cancer treatment centre (more precisely, to a cancer specialist) within 14 days of the initial visit to a medical specialist or family physician (see Figure 5).<sup>26</sup> The maximum waiting time for treatment or diagnostics at a cancer treatment centre should not exceed 49 days.

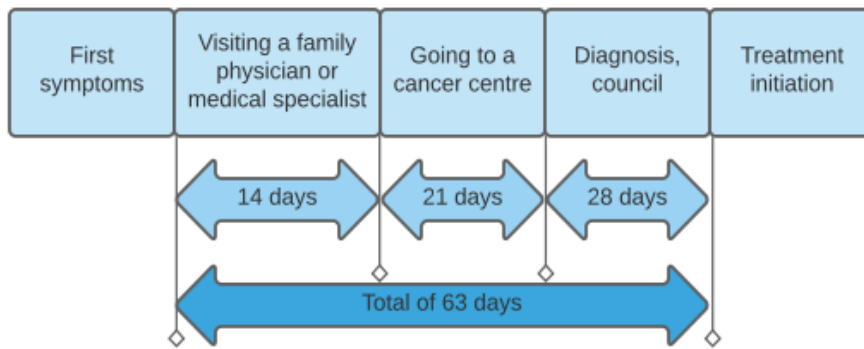
71. Initial treatment of a cancer patient should start **within maximum of 28 days of a Multidisciplinary Oncology Council meeting** (hereinafter - Oncological Council). The total journey time from the patient's suspicion of cancer to primary treatment should be maximum of 63 days.

**Multidisciplinary Oncology Council** - a site-based advisory body that consists of specialists in three therapies and medical specialists in tumour diagnosis.

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<sup>26</sup> In previous patient treatment guidelines, the duration of the journey steps has been similar.

Figure 5. The timely treatment of a patient from suspected cancer to the start of treatment



Source: National Audit Office on the basis of the Cancer Control Plan for 2021–2030

**An overview of the patient's actual care pathway**

72. The National Audit Office and the Estonian Society of Oncologists conducted an expert study for the purpose of this audit to check whether the 100 patients who received the primary diagnosis of lung cancer in 2019, as well as 99 patients with primary colon cancer diagnosis, 100 patients with primary cervical cancer diagnosis, and 100 patients with that of breast cancer have reached the treatment (the first treatment session) in time since the first suspicion of cancer, i.e., in line with the objective set out in the patient treatment guidelines and the new Cancer Control Plan.<sup>27</sup>

73. The expert study showed that of the patients with primary diagnosis, only breast cancer patients received timely treatment. They reached from the cancer suspicion to the treatment the fastest (52 days on average), whereas the colon cancer patients' journey from the suspicion to the treatment was the longest, 122 days on average (see Table 2). The journey of patients with lung and cervical cancer to treatment also lasted about 100 days on average.

Table 2. The average number of days from the first visit to the first treatment session by cancer site

	Breast cancer	Cervical cancer	Lung cancer	Colon cancer
Average number of days from first visit to the start of treatment	52	101	92	122

Source: The National Audit Office on the basis of expert work

**Expert assessments by care pathway stages**

74. The experts assessed each stage of the patient's care pathway separately: family physician, medical specialist, cancer specialist, Oncology Council, first cancer treatment session. Based on expert assessments, the majority of patients received timely treatment (see Figure 6 and read more in the next two subsections). For example:

- on average, 76% of patients were treated by their family physician on time,

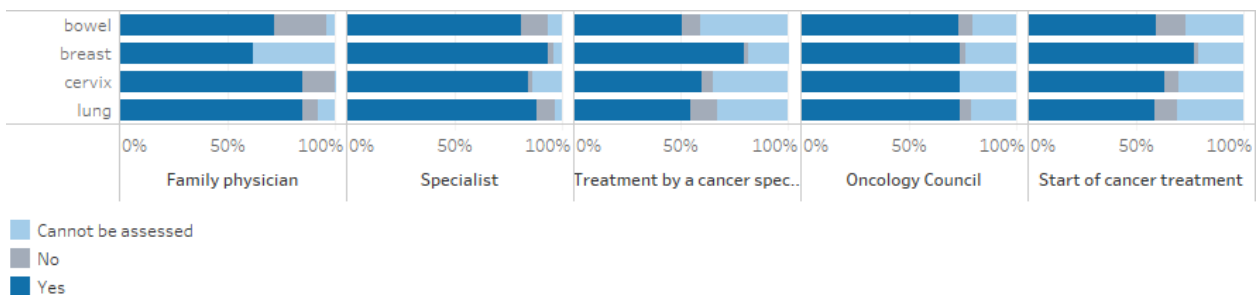
<sup>27</sup> Read more about the methodology of the expert work in the audit description.

- on average, 87% of patients were treated by a medical specialist in time,
- on average, 61% of patients were treated by a cancer specialist in time,
- Oncology Council meeting was carried out in time for approximately 74% of patients,
- cancer treatment was started timely for an average of 65% of patients.

75. According to experts, there were also patients at each stage who did not receive timely treatment. You can see in Figure 6 that

- 24% of colorectal cancer patients were not treated timely by their family physician and 12% by a medical specialist,
- 12% of lung cancer patients were not treated timely by a cancer specialist,
- for colon cancer patients, 7% of patients did not reach the Oncology Council timely, and
- in 13% of cases, treatment for colon cancer was delayed.

Figure 6. Expert assessment on the timely treatment of patients by cancer site



Source: The National Audit Office on the basis of expert work

## Patient-caused delays and health behaviours

### For information,

**one patient diagnosed with stage II cervical cancer and in poor condition** went to her family physician whom she had not been visited for at least three years.

**Another patient diagnosed with cervical cancer refused to initially see a medical specialist** and did not get to the specialist appointment until 301 days later.

**One patient** had to be persuaded by a family physician 3 to 4 times to take part in a colon cancer screening before the patient did so. Finally, the patient was diagnosed with stage I cancer.

76. In order to start treatment in time, it is important that patients themselves cooperate with the healthcare system and are involved in treatment decisions. Patient compliance is one of the key preconditions for receiving timely treatment.

77. The audit revealed that patients did not always take the tests or see a doctor recommended and/or booked for them. Among patients assessed by experts such patients made up 5% of the sample (21 patients). Of these, 8 patients delayed their medical specialist appointment and 10 patients delayed their visit to the cancer centre. The reasons were refusal of treatment, non-attendance at prescribed analyses, etc. There were also cases in the sample of expert work where the start of cancer treatment was postponed due the patient's comorbidity.

78. Another important factor is the patient's lifestyle. The study showed that 71% of patients diagnosed with lung cancer were smokers. 23% of cervical cancer patients smoked and 13% were overweight. 8% of colorectal cancer patients were overweight. 22% of patients with primary

diagnose of breast cancer had family history as an additional factor, i.e., a similar malignancy in a close relative.

**79. In conclusion,** it was found that only the breast cancer patients' care pathway from the suspicion of cancer to the first treatment session corresponded to the duration of the treatment pathway established in the specialty documents. According to experts, there is room for improvement in all stages of the patient care pathway. One of the reasons for the delay was the patient's behaviour: there were cases when the patient just did not go to the doctor or for an examination. The experts' observations are explained in more detail below.

### Patients do not get to a cancer specialist after their family physician or medical specialist visit quickly enough

**80.** After seeing a family physician or medical specialist, a patient with suspected cancer should get to the next stage of the care pathway within two weeks. Waiting times of the examinations prescribed to the patient should not exceed 14 days.

**81.** The expert work showed that after referral by a family physician or medical specialist,

- 37% of bowel cancer patients,
- 37% of lung cancer patients,
- 35% cervical cancer patients, and
- 58% of breast cancer patients reached a cancer specialist (the first visit to the cancer centre) within allowed waiting time, i.e. within two weeks.

**82.** Family physician is usually the patient's primary point of contact with the healthcare system. 44% of the patients in the sample (175 out of 399) made their first tumour-related visit to their family physician: most frequently among colorectal cancer patients (in 69% of colorectal cancer cases) and least frequently among cervical cancer patients (in 13% of cases). In 60% of lung cancer cases, the first contact with medical care was a visit to a family physician.

**83.** For colon cancer patients, it took 91 days from the first family physician visit to **a cancer specialist appointment**, and for lung cancer patients it was 58 days (see Table 3). Looking at the average number of days for breast and cervical cancer, it should be borne in mind that family physician has a smaller role in these cases, as patients usually turn with their complaints directly to a medical specialist.

**Table 3. The average number of days from the patient's first visit to their family physician to an appointment with a cancer specialist by cancer site**

	Breast cancer	Cervical cancer	Lung cancer	Colon cancer
The time from the first visit to a family physician to an appointment with a cancer specialist	42	61	58	91

Source: The National Audit Office on the basis of expert work

### Treatment by a family physician

#### For information,

a number of non-standard cases were found in the sample of expert work. For example, one lung cancer patient was not referred for any test or analysis after the initial visit, but was prescribed antibiotics, whereas at least an X-ray should have been performed based on the symptoms. Half a year later, when the family physician had been changed, the family physician treated the patient correctly and quickly.

Another patient, with suspected colon cancer, was referred for colonoscopy 6 months after the initial visit.

**Endoscopy** - an examination in which certain organs are examined with an endoscope and, if necessary, pieces of sample tissue, etc., are harvested.

**E-consultation** - an opportunity created for family physicians to consult with medical specialists through the health information system in order to specify the diagnosis and treatment of their patient.

**Decision Support** - a digital application that provides personalized, person-centred recommendations integrated into a physician's workflow, bringing together medical knowledge and electronic medical records.

84. The expert work showed that the average time from a family physician visit to a medical specialist visit was 29 days for colon cancer patients and 31 days for lung cancer patients. It also showed that several family physicians referred patients to a medical specialist and decided not to start the examinations themselves.

85. According to experts, family physicians should have prescribed themselves more examinations to the patient. According to experts, patients with suspected colon and lung cancer need important additional examinations (**endoscopy**), as the endoscopic examination results are one of the main diagnostic indications for colon and lung cancer.

86. Colon cancer patients were prescribed the diagnostic examinations during the first visit the least frequently, only for 32% of patients. For the remaining sites, this figure was between 44 and 60%. In at least 22 of the 175 cases, the expert found that the family physician should have referred the symptomatic patient for examinations, but they did not.

87. It was also revealed from the expert work that the average time from the first family physician visit to the examinations was often too long, in some cases up to 30 days (see Annex D). The longest waiting times were for colonoscopy, for example, in one case it took 55 days from the family physician visit.

88. In addition, it was found that family physicians had not always described the examinations of colon cancer patients in their medical history.<sup>28</sup> There is therefore no assurance that the necessary medical examination was carried out.

89. In 2019, family physicians used digital referrals and paper referrals the most to refer patients to a medical specialist (appr. 40%). **E-consultation** was used less (appr. 16% of those referred). According to family physicians, e-consultation between a family physician and a medical specialist functions well and enables to refer a patient to the specialist faster, and this opportunity should be used more.

90. For timely detection of cancer, family physicians should have a treatment guidelines developed in collaboration with oncologists to better identify suspected cancer and refer the patient to a cancer centre quickly via e-consultation. Such guidelines could be part of the family physicians' **Decision Support**, and its algorithms could be supplemented accordingly.

91. In order to support and treat patients on their list, family physicians need to know when a medical specialist has diagnosed cancer and the patient has not seen their family physician before that. In such a case, family physicians may be unaware of their patient's cancer and the support and (other) treatment the patient receives may be incomplete due to a lack of information.

92. Besides, epicrisis related to cancer treatment arrive in the HIS with a delay. These epicrisis often do not include information that would help the family physician support and treat the patient. The expert work also

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<sup>28</sup> Experts say no targeted medical examination of patients with intestinal bleeding has been described.

revealed that the information needed to view all stages of treatment was often not sent to the HIS.

## Treatment by a medical specialist

### For information,

**one patient with suspected lung cancer waited for a computed tomography (CT) scan for more than 2 weeks.**

For another lung cancer patient, it took 30 days from the time of receiving a CT scan response **to the referral to a cancer specialist.**

93. Based on expert work, 85% of patients visited a medical specialist<sup>29</sup>, most often cervical cancer patients (99%), followed by lung cancer patients (91%), breast cancer patients (76%) and intestinal cancer patients (74%). Medical specialist referred the patient most often to a cancer specialist (53% of patients who visited a medical specialist) and to other medical specialists (16%).

94. 12% of colon cancer and 9% of lung cancer patients were not treated on time by medical specialists. The corresponding figure for the other two sites was 2%. The average journey time from a medical specialist to a cancer specialist was 29 days for breast cancer patients and 77 days for cervical cancer patients (see Table 4).

**Table 4. The average number of days from the first visit to a medical specialist to an appointment with a cancer specialist by cancer site**

	Breast cancer	Cervical cancer	Lung cancer	Colon cancer
The time from the first visit to a medical specialist to an appointment with a cancer specialist	29	77	45	44

Source: The National Audit Office on the basis of expert work

95. According to experts, **the average waiting times to the examinations** prescribed by a medical specialist were also long, which delays the start of treatment. Average waiting times for examination varied but were up to 90 days (see also Annex D). For example, the waiting times for the following examinations were too long:

- PET-CT study took 90 days for lung cancer patients;
- **histological examination** of the tissue took 37 days for colon cancer patients;
- the average waiting time for **MRI** exceeded 14 days for all tumour sites evaluated.

96. With regard to tests one must take into account the fact that not all tests can be performed by a medical specialist or family physician<sup>30</sup> – one test may reveal the need for a new or additional examination, which may delay the start of treatment.

97. According to experts, medical specialists to whom family physicians refer most patients need to be empowered to diagnose cancer and treat cancer patient for patients with suspected cancer to be treated in a timely manner. For example, patients with suspected cancer should be given the opportunity to get an appointment, get to examinations, etc., within a shorter waiting period.

98. **In conclusion**, not all patients moved quickly from a family physician and/or medical specialist to a cancer specialist. This was mostly

**PET - Positron Emission Tomography** is an examination technique where a small amount of a radioactive tracer is injected into a patient to obtain an image. In the same study, the patient undergoes a computed tomography (CT) scan, which combines the anatomical image with the PET image.

**CT or Computed Tomography** – a radiological examination method that uses ionizing radiation to obtain layered and spatial images of the human body.

**Histological examination of a tissue** – an examination to determine the degree of malignancy of the tumour and the extent of the tissue involved in the tumour.

**MRI or Magnetic Resonance Imaging** - an examination method that allows to obtain both two-dimensional and three-dimensional images of different parts of the body and organs using a strong magnetic field.

<sup>29</sup> In this subsection, family physicians are excluded from the list of medical specialists.

<sup>30</sup> Only those examinations that family physicians are allowed to prescribe are evaluated here. For example, a family physician cannot prescribe an MRI or CT scans.

due to the fact that tests took too long. However, the timing of tests does not always depend on the doctor, but rather on the waiting times for specific tests. Also, the family physician did not always send the patient to the examination, but referred the patient to a medical specialist, which further extended the care pathway.

**In cancer centres, the duration of the care pathway more or less complies with the recommendations.**

99. According to the new Cancer Control Plan, a patient with suspected cancer must also move quickly along their care pathway inside a cancer centre. The cancer centre will perform additional diagnostic tests and the person will be referred to the Oncology Council in a maximum of 21 days. Treatment must begin within 49 days after the patient arrives in the cancer centre.

100. Expert analysis showed that the journey inside the cancer centre more or less corresponded to the recommendations in terms of time (see Table 5). Only the journey of lung cancer patients exceeds the prescribed time by 4 days.

**Table 5. The average number of days from the arrival in the cancer centre to the first treatment session by cancer site**

	Breast cancer	Cervical cancer	Lung cancer	Colon cancer
Time from a cancer specialist visit to the Oncology Council meeting	8	20	36	15
Time from the Oncology Council meeting to the first treatment session	11	24	17	17
<b>Total</b>	<b>19</b>	<b>44</b>	<b>53</b>	<b>32</b>

Source: The National Audit Office on the basis of expert work

101. According to the expert assessments, 12% of lung cancer patients did not receive timely treatment from a cancer specialist, while in case of other sites, the percentage of such patients was lower. The Oncology Council was not held timely in 7% of colorectal cancer patients and the first cancer treatment session was delayed for 13% of colorectal cancer patients and for 10% of lung cancer patients.

102. One of the reasons the journey was prolonged were the examination times at the cancer centre (from the visit of a cancer specialist), which in some cases were up to 40 days. In addition, delays due to the patient's behaviour, as well as waiting times for radiation treatment, were mentioned as reasons for the delay.

**For information,**

**the Oncology Council for a breast cancer patient after visiting a cancer specialist was delayed** because the patient did not have health insurance.

**One patient experienced a delay in getting to the Oncology Council after visiting a cancer specialist** (due to the waiting time of the examination), as well as from the Oncology Council to the first cancer treatment session (probably due to long waiting times for radiation treatment).

103. It was also found in the expert work that Oncology Council was not always convened before the start of treatment. According to the treatment guidelines, the patient should always undergo an Oncology Council evaluation. The Ministry of Social Affairs is also aware that this is not always the case in practice. To ensure clarity and better quality of care, oncologists should agree on the cases in which this is definitely needed, and this agreement should be followed throughout.

104. The results of the expert work showed that the duration of the cancer patient's journey must be measured in stages by the Ministry of Social Affairs in co-operation with the EHIF and the NIHD in order to make the

bottlenecks causing delays in patients' treatment more visible. This is important because every week of delay has a negative effect on survival. As a basis for measurement, more accurate patient pathway measures need to be agreed than those set out in the new Cancer Control Plan for 2021-2030.

105. In order for the patient's care pathway to be smooth at each cancer treatment provider, each institution must have guidelines for the treatment of patients with suspected and diagnosed cancer, the basic principles of which have been agreed nationally.

### Quality and availability of Health Information System data

106. One of the bases for the expert work was the data in the HIS. Figure 6 shows that the proportion of the “cannot be assessed” category in the analysis of the timeliness of patient treatment is quite high. In other words, some of the data were not of sufficient quality, one of the reasons being that the service providers had not sent the necessary information to the HIS. Similarly, some epicrisis were missing (particularly epicrisis from cancer specialists) and thus it was not possible to fully assess all patients in the sample.

107. For the same reason, only those cases where the information was sufficient have been taken into account in the analysis of patient movement on which Tables 2–5 are based. Thus, it is important to agree in the future on precise data collection criteria so that the treatment of a cancer patient can be analysed in more detail.

### New Cancer Control Plan

108. Early detection and treatment of cancer patients is also an important topic in the Cancer Control Plan for 2021–2030, prepared under the instruction of the Ministry of Social Affairs and NIHD. The Minister of Health and Labour approved the Cancer Control Plan on 30 April 2021.

109. The Cancer Control Plan covers all areas of cancer control, from prevention, diagnosis and treatment to the post-cancer period, with appropriate outcome indicators. More than 100 experts in the field from different institutions and societies were involved in drafting the document<sup>31</sup>. The National Audit Office commends the NIHD and the Ministry of Social Affairs for their thorough work.

110. The control plan forms a basis for drawing up more detailed implementation plans for shorter periods, the first plan will be prepared for 2021-2024. The content of the implementation plans shows what practical decisions need to be made to promote cancer treatment and whether the resources needed for development will be found.

111. **All in all**, most patients at the cancer treatment centre have moved forward with their treatment in a timely manner. However, there were those who experienced delays. Expert work has shown that one of the reasons for this is long waiting times for examinations. In order to ensure in the future that patients are attended timely in their journey inside cancer treatment centres, more accurate measurement of the patient care pathway time at the centres should be introduced. This presupposes that more comprehensive data will be required from healthcare providers in the future. In order to address possible challenges, the NIHD and the Ministry of Social Affairs have developed a Cancer Control Plan for

<sup>31</sup>Ministry of Social Affairs [Press release](#) 2 May 2021.

2021–2030, the implementation of which depends on the content of future implementation plans (activities, deadlines, responsible persons, resources).

**More clarity is needed regarding the duration of the oncology waiting lists.**

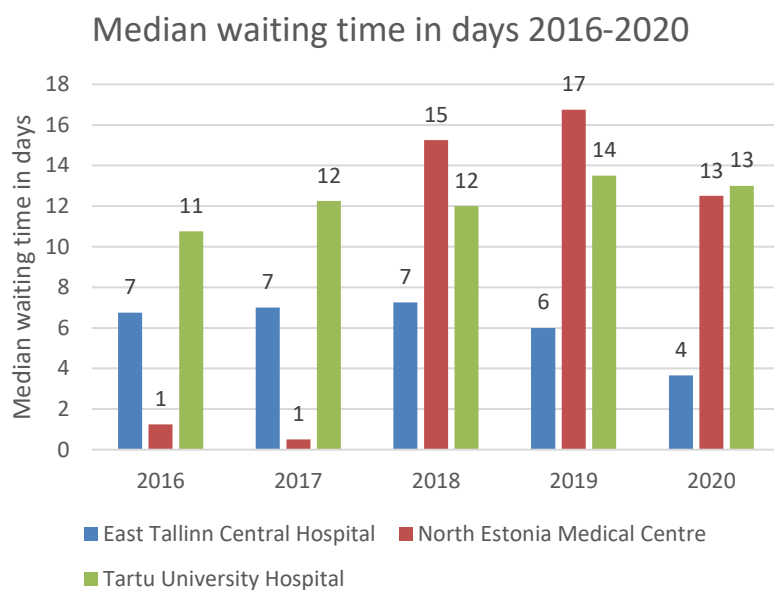
112. The EHIF has set the maximum length of the waiting list for outpatient specialist care in Estonia at 6 weeks, i.e., 42 days, and no special conditions are prescribed for cancer patients.<sup>32</sup> However, as explained above, the patient guidelines and the new Cancer Control Plan recommend that the patient be seen by a medical specialist within two weeks (see Figure 5).

113. The information on the waiting list is available on the EHIF's website<sup>33</sup>, the information is published as of the previous month by medical specialists. **The median waiting time** is used to measure the duration of waiting lists. For example, in June 2021, the waiting time for an oncologist's appointment was 6 days at ETCH, 25 days at NEMC and 17 days at TUH. The average median waiting times for the audited period are shown in Figure 7.

**Median waiting time** – the midpoint that divides patients into two equal groups, with half of the patients waiting equal to or less than the median and half equal to or longer than the median.

**Oncology** – a branch of medicine that deals with the causes, development, classification, diagnosis, treatment and prevention of tumours.

**Figure 7. Waiting lists for primary outpatient oncology appointments based on quarterly reports submitted to the EHIF 2016–2020 \***



\* According to NEMC, there were inaccuracies in the data submitted to the EHIF, which explains the large fluctuations.

Source: National Audit Office based on the data of the Estonian Health Insurance Fund

**Collection of statistics on waiting lists**

114. Until December 2020, medical institutions submitted quarterly reports on waiting lists to the EHIF. From January 2021, waiting lists are measured on the basis of referral data, bookings and appointment notices, and institutions will no longer be required to report separately.

115. Based on the reports submitted to the EHIF until 2021, it is not possible to say for the audited period how many patients reached the first

<sup>32</sup> Resolution No. 5 by the Supervisory Board of the Estonian Health Insurance Fund of 11 January 2013.

<sup>33</sup> Estonian Health Insurance Fund [Waiting lists](#).

outpatient appointment within the 14 days recommended in the new Cancer Control Plan, as data were collected for other time periods (see Table 6).

**Table 6. Average waiting time (%) of patients in the waiting lists for the period 2017–2020**

Waiting time	East Tallinn Central Hospital	North Estonia Medical Centre	Tartu University Hospital
0 days	14%	33%	4%
1–7 days	44%	15%	33%
8–42 days	39%	22%	50%
Over 42 days	3%	30%	13%
	100%	100%	100%

Source: The National Audit Office on the basis of statistics on the EHIF's waiting lists

116. The proportion of cancer patients who waited more than 42 days in the audited period was 3% in ETCH, 30% in NEMC and 13% in TUH. It was found that, for example, the waiting time data for NEMC patients included patients who had already had a repeat visit in addition to patients who had seen a doctor for the first time and whose visit was the first one per calendar year.

117. The information system currently used by NEMC does not allow to distinguish between a first visit and a first repeat visit in one calendar year. Therefore, it is not possible to say exactly how many patients had to wait more than two weeks for their first visit.

118. According to the hospital, two appointment times are reserved for first-time patients with suspected cancer who visit outpatient clinic for cancer treatment. If the time reserved for cancer patients has not been used, the time will be freed for other patients in the waiting list two days before the appointment.

119. In this way, according to NEMC, first-time patients have access to a doctor's appointment within two weeks. E-consultation also helps shorten the waiting time.

120. **In conclusion**, based on the information on waiting lists collected so far, it is not possible to say how many patients had to wait longer than 42 days as recommended by the general procedure or longer than 14 days as recommended in the specialty documents for cancer treatment. Information about how long a patient has to wait in a waiting list is important for a more specific analysis of the cancer patient care pathway.

### **It takes too long to publish the Cancer Registry data**

121. National cancer statistics are based on the Cancer Registry data. The data will make it possible to analyse the incidence of cancer, the survival of cancer patients, shape health policy and carry out research.<sup>34</sup> All of this requires as accurate, complete and up-to-date information as possible.

<sup>34</sup> [Statutes of the Cancer Registry](#).

## Collection of cancer statistics

122. The purpose of the Cancer Registry is to have a complete record of cancer cases. According to the NIHD, the Cancer Registry covers more than 95% of all cancer cases diagnosed in Estonia. For this, doctors must submit the relevant information to the Cancer Registry. Forensic experts also submit data to the Cancer Registry. In addition, the data are compared with NEMC, TUH, Tallinn Children's Hospital registries, as well as the register of causes of death in order to identify all cases.

123. All data received is reviewed on a case-by-case basis. For each patient, the available information is reviewed and any additional questions are identified. This is done manually, not automatically.

124. So far, the necessary notifications and additional information have been sent to the Cancer Registry either on paper or by encrypted e-mail. Basically, doctors complete the report and forward it to the Cancer Registry, where the data is re-entered.

125. As of spring 2021, NEMC is the first institution to transmit data via a digital notification form. This allows data to be entered at source without having to be copied by the notifier. The new form opens to the doctor already partially pre-filled.<sup>35</sup> Other institutions still provide data in the old way.

126. For the aforementioned reasons, the publication of cancer statistics in Estonia is delayed about 2 years. By comparison, the Cancer Registry wants to reduce the time to 1.5 years, which is also the median time for European cancer registries.<sup>36,37</sup> According to the Ministry of Social Affairs, the publication time of cancer statistics could be even shorter in the future, i.e., one year. One of the prerequisites for achieving this is the possibility of sending digital notifications. The introduction of digital notifications in all institutions would also save doctors' working time, as data would not have to be entered more than once.

127. **In conclusion**, cancer statistics are published with a two-year delay due to duplication of data exchange and entry. It is also time consuming to review and complete the data. In the case of digital data collection, it would take less time to collect, review and publish the data.

## Conclusions and recommendations of the National Audit Office

128. **According to the National Audit Office**, not all cancer patients have a timely access to the first treatment session. Expert work showed that only breast cancer patients reached the treatment at the scheduled time. There were delays in the patient care pathway at both the family physician and a medical specialist stages, but this also occurred during the cancer centre phase. One reason for the delay was also the long waiting time for examinations. The patients themselves also caused delays as they did not see a doctor in recommended time. In addition, cancer registry statistics are published with a 2-year delay. This time should be shorter.

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<sup>35</sup> [Meditisiiniuudised](#), 26.05.2021

<sup>36</sup> Cancer Control Plan for 2021-2030, p. 82.

<sup>37</sup> Zanetti R, Schmidtmann I, Sacchetto L, Binder-Foucard F, Bordoni A, Coza D, et al. Completeness and timeliness: Cancer registries could/should improve their performance. *Eur J Cancer* 2015;51:1091–8.

**129. Recommendations of the National Audit Office to the Chairman of the Board of the Estonian Health Insurance Fund:**

- Check the data encryption practices of service providers so that the initial scheduled appointments could be distinguished in the information on the waiting lists. This would allow a better analysis of whether or not patients have to wait longer than expected;
- Instruct family physicians to use more e-counseling to refer patients with suspected cancer so that the patient can move faster to the next stage on the care pathway, if necessary;
- Find ways to empower medical specialists (e.g., allow patients with suspected cancer to be admitted and examined in a shorter waiting period) in order to speed up the diagnosis and further treatment of a patient with suspected cancer;
- Assess and decide, in collaboration with professional societies, whether or not to hold a Multidisciplinary Oncology Council before starting treatment for all patients diagnosed with cancer, given the patient's need for prompt and high-quality treatment;
- Enable family physicians to identify patients with suspected cancer in a timely manner by developing appropriate treatment guidelines in collaboration with different professionals, which could be integrated into the family physicians decision support applications.

**Response of the chairman of the board of the Estonian Health Insurance Fund:** We agree with the recommendations of the National Audit Office. We are currently designing a screening project from the beginning to the end of the care pathway, while also developing a financing method suitable for the respective care pathway. We will extrapolate the experience gained from this to other screening programs.

While designing the care pathway we:

- can pay attention to errors in the coding of activities and the creation of common practices;
- make e-consultation an integral part of the pathway, ensuring faster access to diagnostic and treatment options;
- include a Multidisciplinary Council in the pathway on the proposal of the experts participating in the working group.

An integral part of the care pathway of the screening project is the beginning of the pathway set at the primary care level. Here we use a primary care decision support platform. We are cooperating with the University of Tartu in the field of medical sciences and the members of the Council for Clinical Guidelines to develop a primary care guide for patients with suspected cancer.

**130. Recommendation of the National Audit Office to the Minister of Health and Labour in co-operation with the Chairman of the Board of the Estonian Health Insurance Fund and Director of the Institute for Health Development:** Introduce a system that allows to use outcome

indicators to assess the duration of various stages of patient care pathway and the quality of service in order to better identify problems in the system.

**Response of the Minister of Health and Labour:** Estonia has started to develop a framework for health system evaluation and is developing a new generation information system. We will also work with health authorities to agree on additional data needed to regularly assess the quality of diagnosis and treatment and to improve treatment outcomes, and we will continue evaluations on the basis of existing options.

**Response of the chairman of the board of the Estonian Health Insurance Fund:** We will develop screening patient outcome indicators in our area of responsibility in 2022.

**Response of the Director of the National Institute for Health Development:** Under the leadership of the NIHD, the Cancer Control Plan was developed in 2021 in cooperation with all parties, which includes activities to standardize the waiting times of cancer patients on the care pathway and to assess the quality of treatment (surgical treatment, radiation treatment). As part of the implementation of the Cancer Control Plan, the preparation of analyses of the use and need for surgical and radiation treatment has begun under the leadership of the NIHD. In order to regularly assess the quality of diagnosis and treatment and to improve treatment outcomes, the Cancer Control Plan provides for the collection of additional site-specific data. This requires the agreement with the health authorities.

**131. The National Audit Office's recommendation to the Minister of Health and Labour in co-operation with the Director of the Institute for Health Development:** Develop the technical capacity so that digital notifications can be sent to the Cancer Registry in a standardized format.

**Response of the Minister of Health and Labour:** We hope to solve this problem during 2022, when the notifications of health care providers to the Cancer Registry could be received electronically via X-Road. The Cancer Control Plan also provides for a number of actions to improve the quality of data submitted by healthcare providers.

**Response of the Director of the National Institute for Health Development:** From June 2021, the Cancer Registry has been receiving notifications from the North Estonian Medical Centre electronically via X-Road. In 2022, it is planned to expand the system to the following hospitals: East Tallinn Central Hospital, West Tallinn Central Hospital, Tartu University Hospital, Pärnu Hospital, Ida-Viru Central Hospital and Tallinn Children's Hospital. The development is underway and the goal is that the delay in publishing the Cancer Registry data would not exceed 18 months by 2025.

Today's two-year delay in publishing data is due not only to the double entry of paper notifications but also to the incomplete reporting of cancer cases by healthcare providers, which is time consuming for the registry when identifying and registering missing cases. Digital data transmission can help improve the completeness of reporting. In addition, the Cancer Control Plan provides for a number of actions to improve the quality of data submitted by healthcare providers.

## Funding of cancer treatment

### The costs of cancer treatment in Estonia are low compared to developed countries

132. One of the prerequisites for effective cancer treatment and longer survival is that the procedures required for cancer treatment (operations, radiation or chemotherapy, etc.) are adequately funded and that treatment of patients is not delayed or missed due to insufficient funding.

133. A study by the Swedish Institute for Health Economics (IHE) of 2019 shows that the number of cancer cases in Europe has increased by 50% in the last few decades and that **direct costs** of cancer treatment have doubled to 103 billion euros.<sup>38</sup>

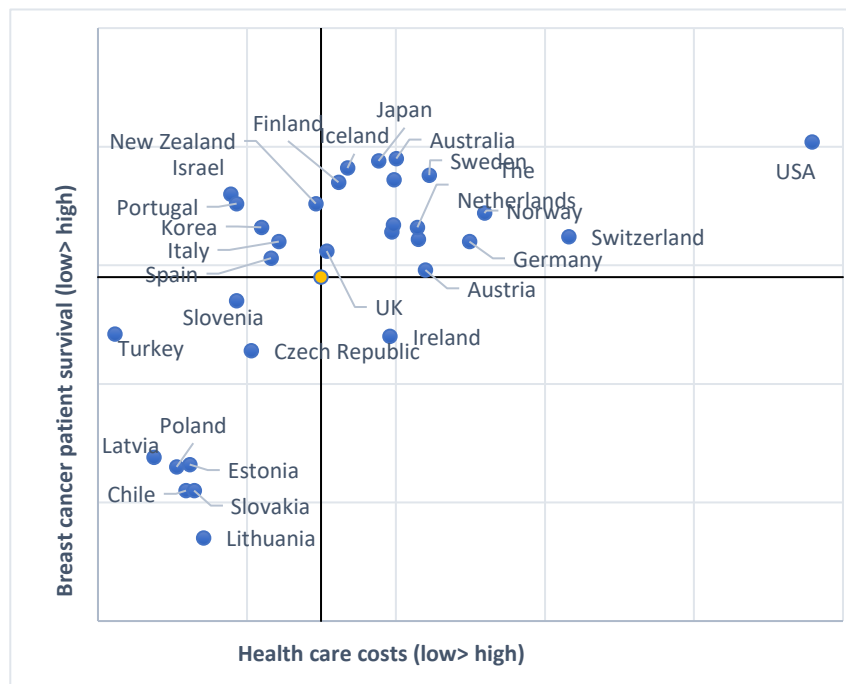
134. According to the OECD 2020 report, Estonia is among the nine countries (Slovenia, Turkey, the Czech Republic, Poland, Latvia, Slovakia, Lithuania, Chile) that contribute less to health costs than the OECD average and where five-year survival rate for breast cancer, which is considered to be the main measure of the effectiveness of cancer treatment, is one of the weakest (see Figure 8).

**Direct costs** - costs directly related to cancer prevention, treatment and follow-up care.

**Indirect costs** - costs related to, for example, the payment of incapacity benefits.

### Comparison of cancer treatment costs with other countries

Figure 8. Proportion of health care costs and survival of breast cancer patients in OECD countries



Source: National Audit Office based on the indicators in the OECD report "Health at a Glance" (2019)

135. According to the IHE report, direct costs related to cancer treatment accounted for an average of 6.2% of all health care costs in European countries in 2018, in Estonia this figure was 5.8%.

136. The indicators of other resources related to cancer treatment (such as equipment and personnel) are also low in Estonia, remaining in the

### Cancer treatment equipment and personnel

<sup>38</sup> The Swedish Institute for Health Economics (IHE). Comparator Report on Cancer in Europe, 2019.

**For information,**

considering the number of patients that need radiation treatment, there should have been nine accelerators in Estonia in 2020, but there were only six.

Source: Cancer Control Plan for 2021–2030

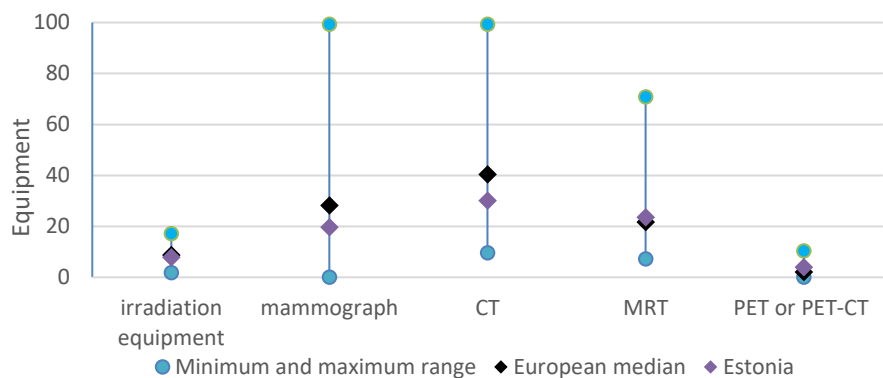
**For information,**

you can read about the investments made in medical devices and the use of the devices in the report of the National Audit Office on the follow-up audit of the acquisition and use of medical devices in medical institutions (*Järeldud meditsiiniseadmete soetamisest ja kasutamisest meditsiinasutustes*, 2011).

comparison made by the World Health Organization (WHO) in 2020<sup>39</sup> per 10,000 cancer patients below the European average (median) (see Figure 9 and Table 7).

137. For example, according to cancer specialists interviewed during the audit, radiation therapy is one of the most (cost-) effective types of cancer treatment, but there is a lack of radiation equipment in Estonia. Therefore, it is not always possible to ensure that the waiting time for treatment in Estonia does not exceed four weeks. At the same time, healthcare providers are responsible for their own investments. The EHIF and the Ministry of Social Affairs do not set conditions for financing.

**Figure 9. Comparison of cancer treatment equipment resources per 10,000 cancer patients in Europe in 2020**



Source: Based on the data of the report "WHO Cancer Country Profile" (2020)

138. When purchasing equipment, you need people who can use them. According to an analysis prepared by the WHO, there is also a shortage of cancer treatment personnel in Estonia (see Table 7). Healthcare providers have begun to address this issue in collaboration with educational institutions. For example, in the autumn of 2021, the training of radiology technicians of Tartu Health Care College was launched at NEMC, which gives the hospital the opportunity to train specialists in Tallinn.<sup>40</sup>

**Table 7. Comparison of cancer treatment personnel resources per 10,000 cancer patients in Europe in 2020**

	Minimum number	Maximum number	European average (median)	Estonia
Radiation Oncologist	8.4	180.3	20.8	18.3
Medical Physicist	1.0	124.0	22.0	14.4
Surgeon	191.0	2854.0	848.0	246.6
Radiologist	36.0	1502.0	211.0	200.9

Source: Based on the data of the report "WHO Cancer Country Profile" (2020)

139. **In conclusion,** despite the steady growth in funding in recent years (see next section), Estonia's spending on cancer treatment is lower than in

<sup>39</sup> WHO report on cancer: setting priorities, investing wisely and providing care for all, 2020.

<sup>40</sup> Press release by NEMC of [15 June 2021](#).

more successful European and OECD countries. Also, the number of devices and personnel related to cancer treatment in Estonia is still below the median of European countries. This in turn affects the availability of cancer treatment.

**However, cancer treatment is a priority in Estonian healthcare.**

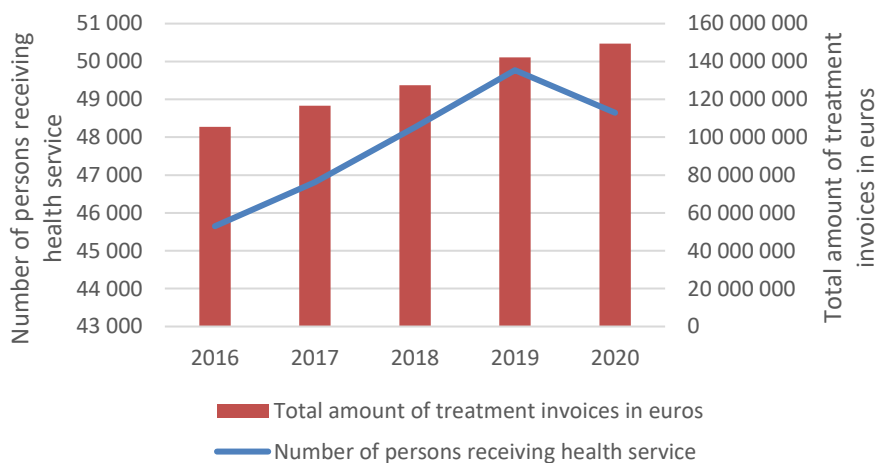
**Cancer treatment budget and actual cost**

140. In order for cancer treatment to be available to all cancer patients, the demand for treatment in Oncology must be covered by funding. According to the EHIF's statistics, the costs of cancer treatment invoices in Estonia have increased by about 10% per year in the period of 2016–2019 (i.e., an average of 12.2 million euros per year), reaching 149.5 million euros by 2020. The number of patients has also grown steadily, at about 3% per year (average growth per year is 1374 people). The increase in costs is due not only to the increase in the number of patients but also to the addition of new services and medicinal products.

141. 2020 is an exception, when the growth rate of costs slowed down and the number of people treated decreased due to the pandemic (see Figure 10). According to the hospitals, the number of admissions decreased mainly due to follow-up checks, which could be postponed. Efforts were made to ensure the admission of primary patients.

142. However, the number of referrals from family physicians to medical specialist appointments decreased. In addition, some patients did not attend the appointment they had booked. According to ETCH, one could notice that the number of visits to the emergency care department also decreased, which in turn reduced the number of primary oncological diagnoses.

**Figure 10. Treatment costs of patients with oncological diagnosis submitted to the EHIF based on statistics of treatment invoices in the period of 2016–2020**



Source: National Audit Office based on the data of the Estonian Health Insurance Fund

**Projected demand** – forward-looking annual demand calculation.

**Funded demand** – the number of cases and costs planned in the budget based on the forecast.

**Actual demand** – actual number and cost of treatment cases.

143. An analysis of funding for cancer treatment shows that between 2018 and 2020, the funded demand for treatment in Oncology (i.e., the planned budget) has been slightly higher than the initially projected demand for treatment. In other words, the budget has been prepared with a small margin.

144. Actual demand has been on average 3.9% (approx. 3 million) lower than the planned budget in 2018–2020:

- in 2018, the actual demand was by 1.4%;
- in 2019, by 2.8%,
- in 2020, by 8% lower than the budget.

According to the EHIF's explanation, the actual demand shows the number of actual cases of cancer treatment that were reimbursed by the EHIF.

**Hematology** - a field that covers the physiology of blood and haematopoiesis, methodological aspects of research, the mechanisms of impairment of blood and haematopoietic functions and the resulting disease conditions, aspects of their diagnosis and treatment.

145. In Hematology, on the contrary, the actual demand has so far exceeded funding by a total of 5.8% (1.4 million) on average between 2017 and 2019. More precisely:

- in 2017, actual demand was by 12.3%;
- in 2018, by 1%,
- in 2019, by 4% higher.
- In 2020, actual demand decreased by 1.2% (0.3 million) due to emergency situation.

146. In total, the EHIF has estimated the financial growth of the demand for cancer treatment cases in 2017–2020 in both Hematology and Oncology to be 32%: a total of 20.3 million in Oncology and 6.9 million in Hematology (see Figures 11 and 12).

Figure 11. The EHIF statistics on demand and funding in Oncology

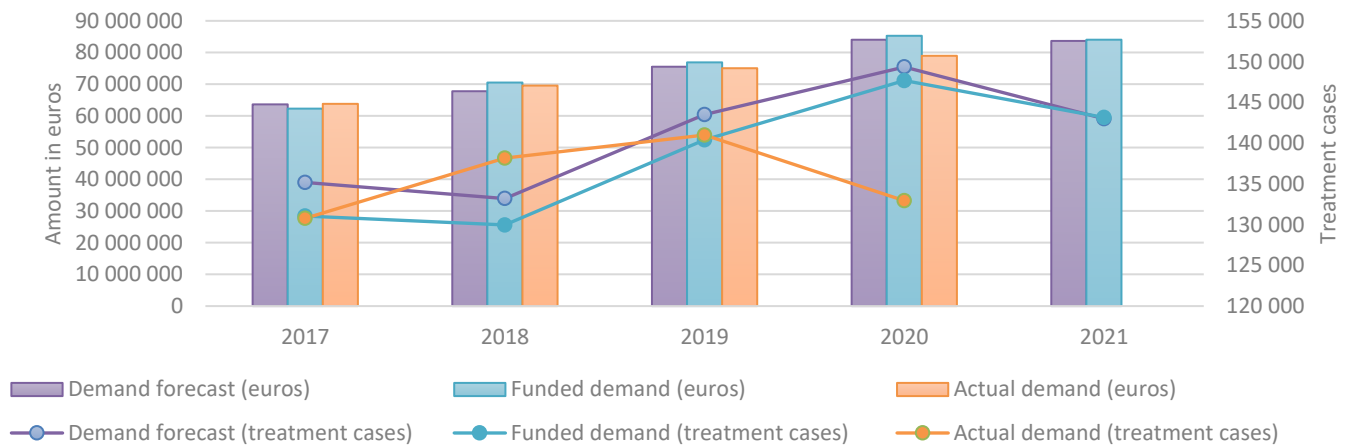
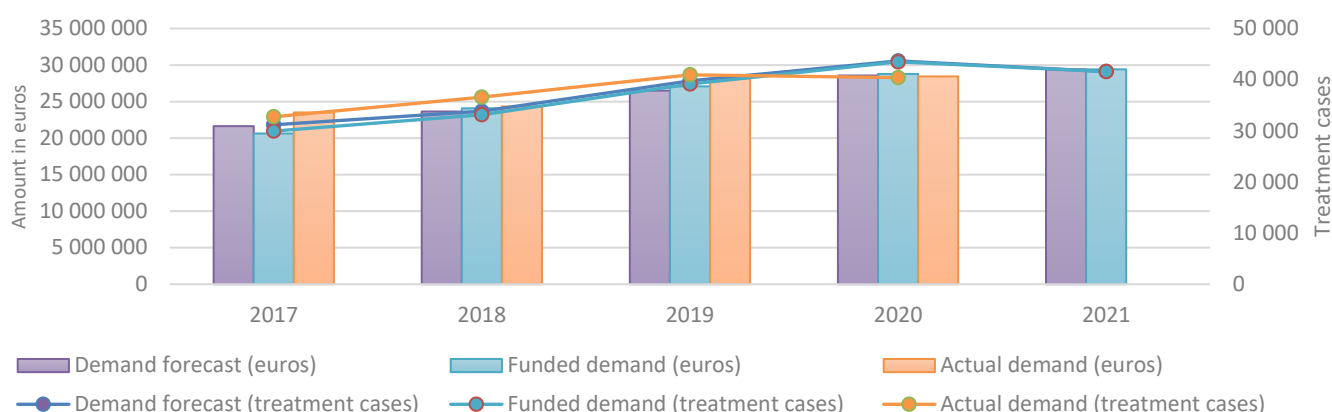


Figure 12. The EHIF statistics on demand and funding in Hematology



Source: National Audit Office based on the data of the Estonian Health Insurance Fund

147. Based on the EHIF's annual reports, the Oncology costs in the budget of the EHIF have averaged about 15% of the costs of specialized care in 2016–2020, and this share is on a small growth trend (see Table 8). While in 2020 the budget of specialized care in Oncology was in the third place in terms of budget (17%) after surgery (26%) and internal medicine (34%), then in the elective<sup>41</sup> specialized care, Oncology accounted for only 6% of all treatment cases.

Table 8. Actual cost of specialized care and the budget and actual cost of Oncology in millions of euros

Year	2016	2017	2018	2019	2020
Total actual cost of specialized care (including Oncology)	578.5	614.9	598.6	658.5	645.6
Oncology budget*	81.8	84.8	97.4	104.0	114.1
Actual costs in Oncology	82.6	89.9	96.8	103.3	107.4
Share of Oncology in specialized care	14%	15%	16%	16%	17%

\* The main specialty of Oncology also includes the use of Hematology treatment services.

Source: The National Audit Office based on the EHIF's annual reports for 2016–2020

148. **In conclusion**, it can be said that cancer treatment has an important status in the costs of health care services in Estonia. When assessing the demand for and funding of treatment cases, it can be seen that cancer treatment is expensive, but its costs are usually reimbursed. At the same time, in order to significantly increase the survival of cancer patients in Estonia, much more resources are required in addition to the usual increase in costs: equipment, medical personnel, medicinal products and funds.

### Contributing to screening is cost-effective

149. In its annual reports and budgetary strategies, the EHIF has consistently emphasized the importance of funding screening, as screening allows for the detection of pre-cancerous and early-stage cancer when the person may not yet have any complaints or symptoms. Early

<sup>41</sup> The analysis focused on elective treatment cases, as the pandemic affected the real picture in different ways in different areas.

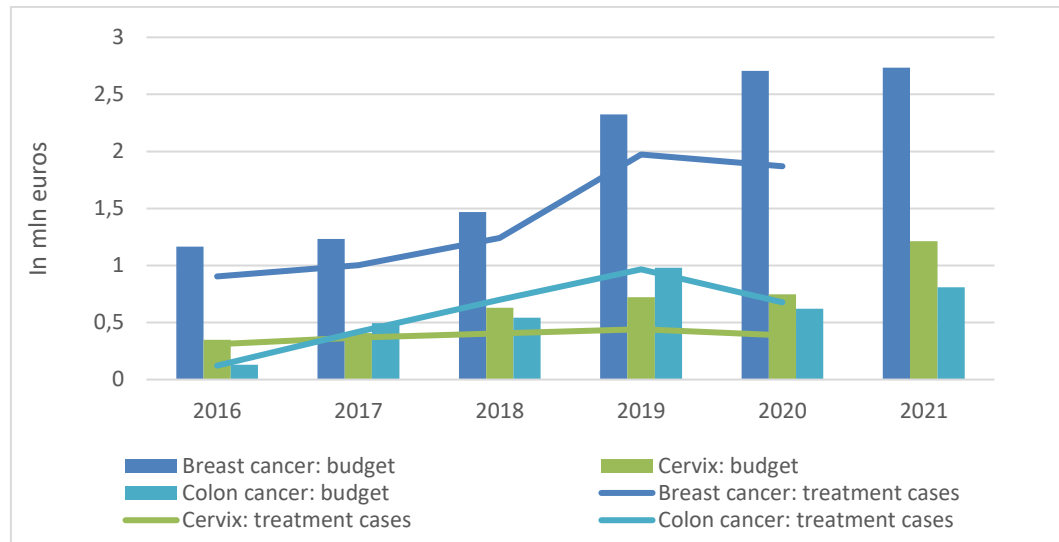
cancer treatment is more effective, relatively cheaper, and has less of an impact on a patient's quality of life.

### Funding for screening

150. In 2020, the budget for Oncology was 114 million euros and for screening 4 million euros. Thus, screening accounts for about 3–4% of the EHIF's Oncology budget. This ratio is similar, for example, to Finland.<sup>42</sup> The screening budget also includes funding for annual awareness campaigns.

151. The budget for screening is planned following the principle that the coverage of target groups needs to be increased every year. In other words, a certain increase in the number of participants is accounted for. As the actual coverage of screening has been rather low, the EHIF annual reports for 2016–2020 (see Figure 13) show that the budget has been fully performed for colon cancer screening only (five-year average 103%). The screening budget for other two sites was underperformed: 79% for the breast cancer screening budget and 71% for the cervical cancer screening budget.

Figure 13. The EHIF screening budget and its implementation in 2016–2021



Source: The National Audit Office based on the EHIF's annual reports for 2016–2020

152. Statistics from the EHIF's treatment invoices show that spending on breast cancer and colon cancer screening has increased the most (see Table 9). The increase in the costs of cervical cancer screening has been smaller. The average cost of a treatment invoice for one person's screening is 25 euros.

<sup>42</sup> [Report of the Finnish Cancer Center Syöpäsäätiö](#)

Table 9. Treatment invoiced submitted for screenings in 2016 – 2020

	Total number of service recipients	Total amount of treatment invoices (in euros)	Proportion of cost from three screenings	Increase in the amount of treatment invoices in 2016–2020	The average cost of a screening treatment invoice per person
Cervix	83 733	1 909 877	18%	23%	23
Breast	195 353	6 471 259	61%	101%	33
Colon	107 691	2 163 180	21%	63%*	20

\* Since the screening was launched in the second half of 2016, then the growth calculation has been made on the basis of 2017–2020.

Source: The National Audit Office on the basis of the EHIF statistics

## Cancer treatment related costs

153. The average annual cost of treatment invoices for cancer diagnosis per person is 2,673 euros. Table 10 shows the cost of four cancer sites audited, three of which are screened.

Table 10. Treatment invoices for audited cancer sites\* in 2016-2020

	Total number of persons	Total amount of treatment invoices (in euros)	Share of cost from four sites	Change in the number of persons 2020 vs. 2016	Increase in the amount of treatment invoices 2020 vs. 2016	Average cost of a treatment invoice in euros per person per year
Cervical cancer	7 517	12 266 864	5%	–11%	14%	1 631
Breast cancer	38 177	90 835 897	37%	12%	23%	2 379
Lung cancer	12 736	54 344 460	22%	6%	67%	4 267
Colon cancer	24 858	87 849 288	36%	7%	25%	3 534

\* All treatment invoices with C00-D09 as the primary or secondary diagnosis.

Source: The National Audit Office on the basis of the EHIF statistics

## Costs of treatment types

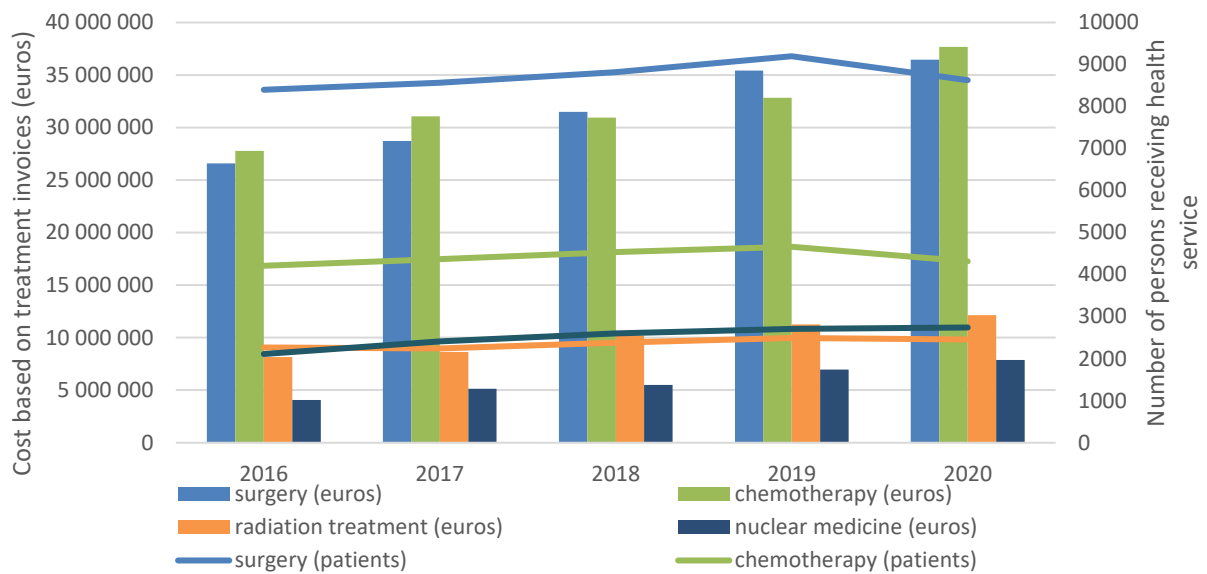
**Chemotherapy** – a type of treatment that involves the treatment of live pathogens (bacteria, viruses, etc.) or tumours in the body with medicinal substances.

**Nuclear medicine** – a field of medical care that uses small amounts of radioactive material to study and treat a variety of diseases, including several types of tumours.

154. Treatment invoices submitted to the EHIF show that the most expensive type of treatment, considering the proportion of patients, is **chemotherapy** (see Figure 14). The average cost per patient for treatment invoice that include this service is 7,260 euros per year. Chemotherapy is followed by radiation treatment at a cost of 4,240 euros per year.

155. The most commonly used type of treatment is surgery, with an average cost of 3,634 euros per patient per year. **Nuclear medicine** is gaining popularity. The shares of ETCH, NEMC and TUH by the four largest types of treatment are presented in Annex F.

**Figure 14. The EHIF's costs based on treatment invoices and number of persons receiving services for the four largest types of treatment in the period of 2016–2020**



Source: The National Audit Office on the basis of the EHIF statistics

**156. In conclusion,** funding for screening is an important and cost-effective way to prevent the high costs associated with subsequent cancer treatment.

**Conclusions and recommendations of the National Audit Office**

**157. According to the National Audit Office,** the procedures necessary for the treatment of cancer are financed in Estonia to the extent that ensures basic treatment for patients. The costs of cancer treatment are covered in actual volumes, which in some years means exceeding the budget. Nevertheless, Estonia is lagging behind the level of funding for cancer treatment compared to successful countries and is also below the European average in terms of the availability of medical equipment and personnel.

**158.** Increasing the survival rate of cancer patients in Estonia would require investing in resources at a much faster pace than increasing costs at the usual pace. More equipment, medical personnel, medicinal products and funds would be needed. At the same time, Estonia should continue contributing to the financing of screening, as screening helps curb the growth rate of cancer treatment costs.

**159. The National Audit Office's recommendation to the Minister of Health and Labour in co-operation with the Chairman of the Board of the Estonian Health Insurance Fund:** Find ways for people in need of different types of treatment (including radiation) to receive treatment on time, and that access to treatment would not depend, for example, on the lack of equipment or personnel in a particular treatment facility.

**Response of the Minister of Health and Labour:** In Estonia, there are two cancer competence centres - in Tallinn and Tartu, which coordinate their treatment services and provide primary services to cancer patients at their location through their networks. By specifying the treatment quality indicators, we can get data on problems, which can then be solved in cooperation with the parties, also considering the motivation of the

service providers to complete the patient care pathway in the optimal time.

### **Response of the chairman of the board of the Estonian Health**

**Insurance Fund:** We support the development of competence centres in Tallinn and Tartu, which coordinate their medical services through their networks (Hospital Network Development Plan hospitals), ensuring primary services on the location. The responsibility for personnel and equipment remains with the service provider, who must find the appropriate means to ensure the quality of the service. It is important to make sure that people have timely access to examinations and treatment throughout the entire care pathway.

**160. The National Audit Office's recommendation to the Chairman of the Board of the Estonian Health Insurance Fund:** Introduce indicators that would make it possible to assess the effectiveness of investments and campaigns related to screening and thereby enhance further activities.

### **Response of the Chairman of the Board of the Estonian Health**

**Insurance Fund:** We are developing metrics to assess screening investment and campaign performance in 2022.

## **Availability of cancer medicines**

**List of health care services** – all medical services, procedures, medicines required in hospitals, etc. included in the health insurance package together with their prices and conditions for payment for them. The EHIF pays for the service provided that it is medically indicated to an insured person.

**List of reimbursable pharmaceuticals** – a list of prescription medicines, where the EHIF pays a part of the price of the medicine to the pharmacy for certain diseases and medicinal products. This allows the patient to buy the medicine for a cheaper price.

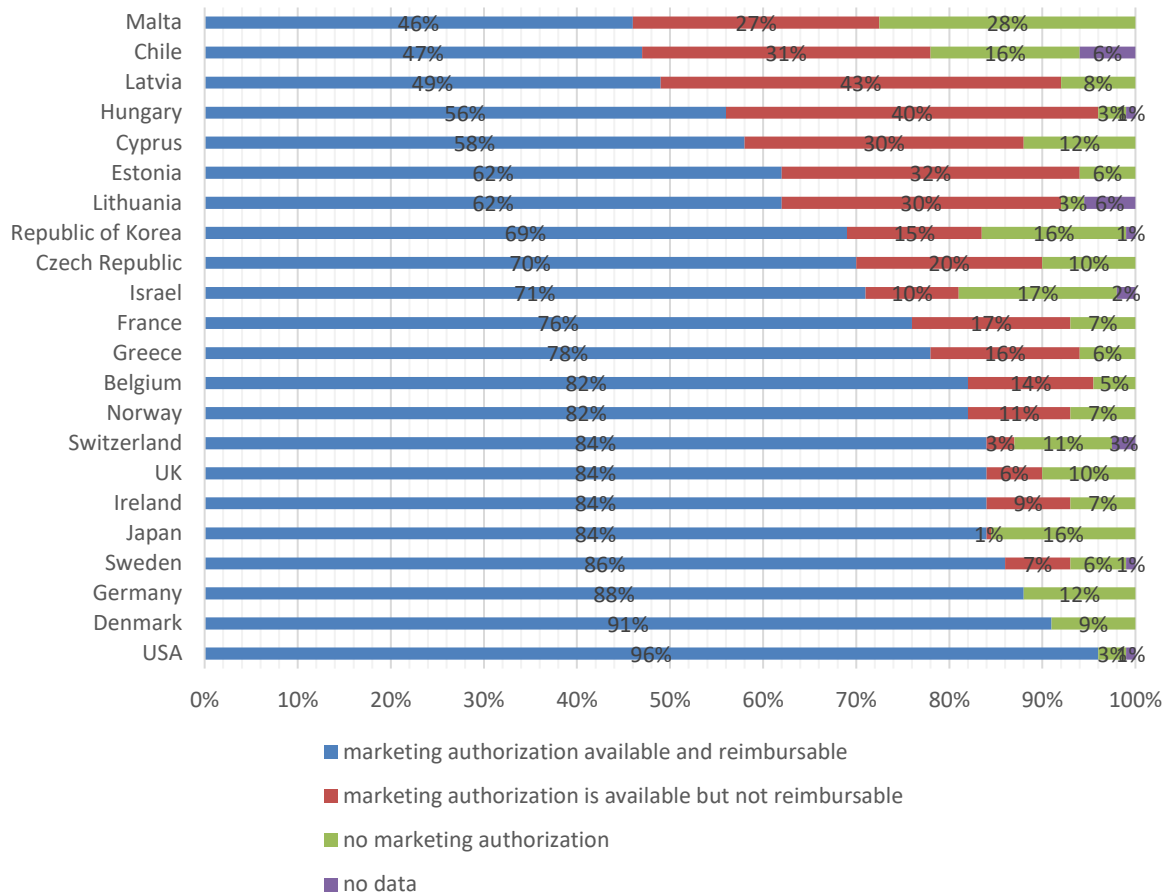
**161.** A prerequisite for effective cancer treatment is that the necessary cancer medicines are available. Therefore, the speed at which new medicinal products are **added to the list of healthcare services** is also important (the list of healthcare services concerns **hospital pharmaceuticals**). The **time taken to add medicinal products to the list of reimbursable pharmaceuticals** (for reimbursable **prescription medicines**) could also be at least comparable to the EU average.

**162.** Over the last 10 years, the European Medicines Agency has approved about 10 new anti-cancer medicines a year. At the same time, the prices of medicinal products have increased. According to the OECD report<sup>43</sup>, which assessed the availability of 109 cancer medicines / unique combinations in 109 countries, 62% of these medicines were reimbursable in Estonia (see Figure 15). 32% of the cancer medicines had marketing authorization but were not reimbursed by the EHIF.

**163.** The WHO has drawn up a list of recommended medicines that should be available in each country. According to an OECD report, 100% of them are in use in Estonia. This means that the availability of cancer medicines in Estonia is ensured at the basic level.

<sup>43</sup> OECD. Addressing Challenges in Access to Oncology Medicines. 2020.

**Figure 15. Availability of 109 cancer medicines or combinations thereof based on marketing authorizations and reimbursability in OECD and EU countries**



Source: National Audit Office on the basis of OECD 2020 data

**Addition of medicinal products to the list of reimbursable pharmaceuticals and to the list of healthcare services**

164. On the one hand, rapid addition of new medicinal products to the list of reimbursable pharmaceuticals and the list of health care services in Estonia is hindered by the limited funds. On the other hand, there is little interest in reimbursing new medicines and the time taken to process applications is long. It should be noted that according to the EHIF's own analysis, over several years, nobody has shown interest in 42% of new medicines authorized in 2015-2017 or applied for reimbursement.

**For information,**

the National Audit Office has addressed the problem that the inclusion of medicinal products in the list of reimbursable pharmaceuticals takes longer than recommended, also in the audit "Order of Reimbursement of Medicinal Products" (2012).

165. Applications for inclusion of new medicinal products **in the list of reimbursable pharmaceuticals** (so-called pharmacy medicines) can be submitted by pharmaceutical manufacturers, but given the small market in Estonia, they have no greater interest in applying- The State Agency of Medicines, the Ministry of Social Affairs and the Health Insurance Fund can also submit applications for inclusion of medicinal products in the list of reimbursable pharmaceuticals. For example, in 2019-2020, the EHIF submitted 22 applications for medicines, two of them for cancer medicines, while the State Agency of Medicines and the Ministry of Social Affairs did not use this opportunity.

**Marketing Authorization Holder** - a manufacturer of a medicinal product or their representative to whom a marketing authorization for a medicinal product has been issued.

166. In the **process of adding medicines to the list of healthcare services** (i.e., adding medicines for hospital use), the number of applicants is limited and the procedure is time-consuming (see the description of the process in Annex E). **Marketing authorization holders** cannot apply, but professional

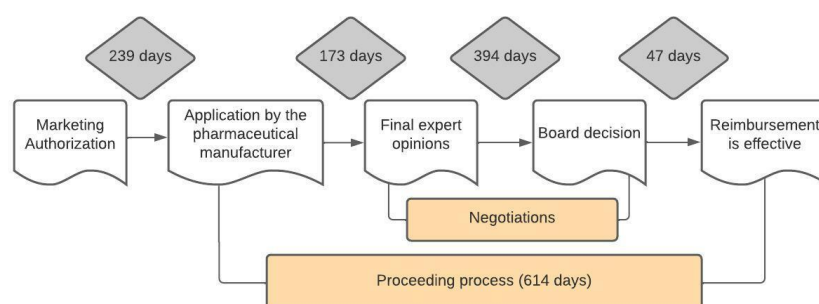
associations can. According to the doctors, this is time-consuming extra work for them, which they do free of charge in their free time. According to the Estonian Society of Oncologists, such a model is not sustainable. The current procedure and system for applying for reimbursable medicines needs to be changed to ensure the continued availability of modern cancer medicines in Estonia.

167. According to the regulation governing the addition of medicines to the EHIF’s list of reimbursable pharmaceuticals<sup>44</sup>, the submitted application should be reviewed and resolved within 180 days, i.e., within about 6 months from its submission to the EHIF. After the decision by the EHIF and the expiry of the term for contesting it, the medicinal product must be added to the list of reimbursable pharmaceuticals within 6 months at the latest. This can only be done if a **price agreement** has been reached with the pharmaceutical company.

**Price agreement** - an agreement concluded between the Chairman of the Board of the Health Insurance Fund and the pharmaceutical company in order to ensure the stable distribution of medicines and to avoid unexpected price increases.

168. In reality, the whole process is longer, taking more than a year and a half (see Figure 16 of the procedure). According to the EHIF, the length of the procedure also includes the time it sometimes takes for a pharmaceutical manufacturer to withdraw, make additions and resubmit an application after receiving a preliminary expert opinion.

**Figure 16. Timeline of the procedure for medicinal products that have reached the EHIF’s list of reimbursable pharmaceuticals, the figure shows the actual average processing times in days**



Source: The National Audit Office based on the data of the Estonian Health Insurance Fund

169. The OECD 2020 report shows that **the entire process from obtaining a marketing authorization for a medicine to making a reimbursement decision** takes an average of 40 months in Estonia and 28 months in other countries (see Figure 17).

170. On closer look, the first long delay appears in submitting an application. At present, according to the EHIF, it takes up to 9 months for a manufacturer to do that in Estonia. One of the ways to save time, according to the EHIF, is to apply for the reimbursement of a medicine immediately after receiving the medicine's marketing authorization.

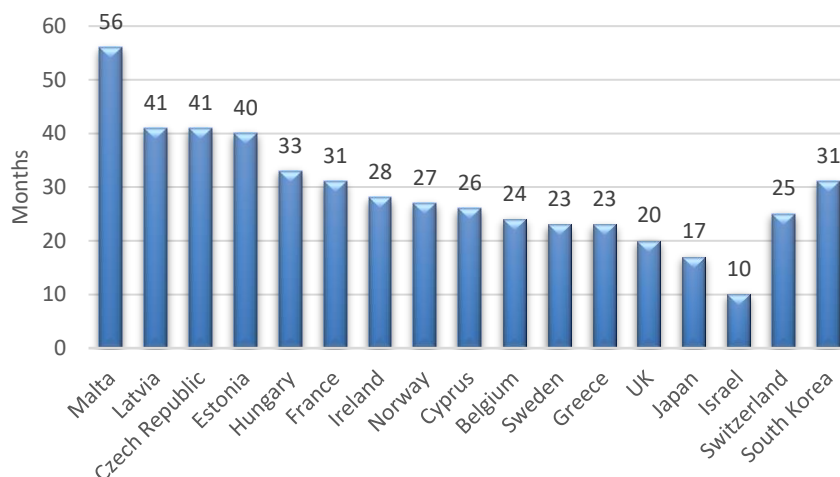
171. The next step is to obtain various expert opinions, which takes an average of six months. According to the NAO, the possibilities for optimizing this activity should also be reviewed. According to the EHIF, the

<sup>44</sup> Minister of Health and Labor’s Regulation No. 59 of 19 December 2017 “Procedure for compiling and amending the EHIF’s list of pharmaceuticals, the assessors of the content and compliance with the criteria for establishing the list, and formation and procedure of the Committee for Medicinal Products”.

last and most time-consuming stage of the procedure is reaching a price agreement.

172. Negotiations to reach a price agreement take about a year, although the time spent at this stage is often justified - according to the EHIF, thorough negotiations can lead to an average price reduction of up to 30%. In conclusion, according to the OECD report, it takes about 19 months **from the submission of the application for reimbursement** to the final decision in Estonia, and 16 months in other countries.

**Figure 17. Average processing times for medicines from marketing authorization to reimbursement decision from 2014 in OECD countries**



Source: Based on the data of the OECD report "Addressing Challenges in Access to Oncology Medicines" (2020)

### Changes to the system for financing medicines

173. In recent years, the system for financing medicines has been made more flexible. Risk-sharing is applied to the financing of new medicines - if there is a clearly identifiable significant risk that the medicine will only work in some patients, the EHIF will pay for the medicine if its effects have been confirmed by a doctor for each patient. Such solutions are difficult to monitor and therefore risk-sharing is not widely used. According to the EHIF, as of October 2020, it had been applied to eight medicines.

174. In addition, in order to mitigate the risk of budget overruns in financing new medicines, so-called volume-limited price agreements have been concluded with pharmaceutical companies in recent years. This means that if the agreed annual budget for medicines is exceeded, reimbursement invoices will be issued to the pharmaceutical companies.

175. In some countries, Oncology medicines are procured through central procurement. In Latvia, for example, the state organizes public procurements of chemical drugs. A similar pilot project was launched in Estonia: last year, the EHIF, in cooperation with TUH, NEMC, ETCH and Pärnu Hospital, organized a joint procurement of biological drugs (including for the treatment of cancer patients), which resulted in savings of approximately one million euros.

176. For example, in 2020, the Association of Pharmaceutical Manufacturers submitted its proposals to improve the availability of medicines to the Social Affairs Committee of the Riigikogu and the Estonian Confederation of

Employers respectively to the Ministry of Social Affairs<sup>45</sup>. Both associations supported the expansion of the list of persons entitled to apply for the inclusion of new medicines in the EHIF's list of health care services.

## Objectives of the Cancer Control Plan to improve the availability of cancer medicines

177. One of the goals of the Cancer Control Plan for 2021–2030 is to develop rules for applications for new reimbursable medicines and healthcare services that include medicines, in order to facilitate and speed up the delivery of new effective medicines to patients. In order to ensure the availability of medicines, the aim is to make sure that the time lag between reimbursement and the approval of a new indication and reimbursement by the EHIF is not longer than the EU average.

178. **In conclusion**, the time required to add new medicines to the list of reimbursable pharmaceuticals and the list of health care services in Estonia is one of the longest in Europe. As fewer applications are submitted than could be, the share of reimbursable pharmaceuticals in Estonia is also below the OECD average, which was 73% based on medicines assessed in the OECD report and 62% in Estonia.

179. The relative scarcity of medicines is primarily due to the small size of the Estonian market and the resulting economic unattractiveness. According to the EHIF's explanation, it must also be taken into account that among the new medicines that have entered the market, there are some competing medicines, as well as medicines that, in the opinion of experts, do not provide significant benefits.

## Conclusions and recommendations of the National Audit Office

180. **According to the National Audit Office**, despite the fact that the availability of cancer medicines is ensured for all sites, the speed of the procedure related to the reimbursement of new medicines must be increased in order to achieve even better access to treatment.

181. **The NAO's recommendation to the Chairman of the Board of the Estonian Health Insurance Fund:** Analyse the process of reimbursement of medicines in order to identify main problems (e.g., justification for restricting the circle of applicants, excessive bureaucracy, too long deadlines, lack of experts processing applications).

### Response of the chairman of the board of the Estonian Health Insurance Fund:

- We will analyse how to facilitate and speed up the process of processing medicine reimbursement applications.
- We are reviewing the process of changing the list of healthcare services (including hospital pharmaceuticals) in cooperation with service designers and all parties.
- In November 2020, we submitted a proposal to the Ministry of Social Affairs to amend the Health Insurance Act, which aims to expand the circle of TTL applicants, and proposed to simplify the amendment of the list of diseases (a government decree to a ministerial decree).

<sup>45</sup> [Proposals of the Estonian Employers' Confederation to the Bill on Amendments to the Health Care Services Organization Act and Other Acts.](#)

## Impact of pandemic on cancer treatment

182. Both the number of treatment invoices submitted to the EHIF and the actual demand for treatment cases show that fewer people were treated for cancer as a result of the pandemic. According to the hospitals, the patients' own desire to postpone treatment and consultation was also noticeable. As a result, the need for resources may increase in the coming years, as some people did not see a doctor in time and later treatment is more expensive.

183. According to the analysis of treatment invoices submitted to the EHIF, the usual 3% annual increase in patients was replaced by a decrease in 2020, when the number of patients decreased by 2% compared to 2019 (1,128 patients). The growth rate of cancer treatment costs also slowed down - instead of the usual 10% increase, costs increased by only 5%. According to the EHIF, the number of participants in screening decreased in 2020: compared to the same period last year, the decrease in breast cancer screening was 6% and in cervical cancer screening 10%.

### Likely increase in cancer treatment costs following the COVID-19 pandemic

184. The EHIF bases the planning of treatment demand on the indicators of previous years. While demand for treatment funding was projected to increase by an average of 4% in Oncology and 13% in Hematology between 2017 and 2020, the actual demand for treatment funding in 2020 decreased by 12% (16,389 cases) in Oncology and by 8% (3277 cases) in Hematology in 2020 (see Figures 11 and 12).

185. Considering the special situation in 2020, the EHIF chose 2019 instead of 2020 as the baseline year for demand planning in 2021, when there was no pandemic yet. As a result of the change of baseline, the EHIF projected demand for treatment cases in 2021 is higher than in 2019, but still up to 5% lower than in 2020.

186. The EHIF increased its demand forecast by 1%, but hospitals estimate that the impact may be even greater. Given that in 2020, primary oncological diseases may have remained undiagnosed and untreated in time, the number of patients diagnosed with cancer at an advanced stage is expected to increase in the coming years.

187. As the treatment of advanced cancer cases is more expensive than the treatment of an early detected disease, an increase in the cost of cancer treatment (the so-called increase in contract volume) can also be expected. For example, ETCH has projected up to 15% more workload in both Chemotherapy and oncological surgery.

188. **In conclusion**, the faster than usual growth of cancer treatment costs in the coming years must be taken into account. Despite efforts to secure reception for first-time applicants, many people reached treatment late due to the pandemic. Follow-up care of patients was also postponed (see section 142). All of this, in addition to the usual trend of increasing the number of cancer patients, may put even more pressure on treatment waiting lists and in turn affect survival.

189. **The National Audit Office's recommendation to the Minister of Health and Labour in co-operation with the Chairman of the Board of the Estonian Health Insurance Fund:** Analyse the impact of the social crisis caused by the corona virus on cancer treatment, assess how the

postponement of doctor's appointments could be avoided in the future, and plan in advance the covering resources for the increase in the need for treatment.

**Response of the Minister of Health and Labour:** We are aware of the problem and are working to assess the impact of the crisis. Cancer treatment is certainly an important budgetary priority.

**Response of the chairman of the board of the Estonian Health Insurance Fund:** We are aware of this problem and consider the change in need for treatment over time. Cancer treatment has been a budgetary priority for us every year, and based on that, we have also planned funds to finance cancer treatment.

/signed digitally/

Ines Metsalu-Nurminen  
Director of Audit at the Audit Department

## Recommendations of the National Audit Office and responses of the auditees

Based on the audit, the National Audit Office issued several recommendations to the Ministry of Social Affairs, the Estonian Health Insurance Fund, the Institute for Health Development and the Health Welfare Information Systems Centre. The Minister of Health and Labour sent their reply to the recommendations of the National Audit Office on 10 November 2021, the Chairman of the Board of the Health Insurance Fund on 26 October 2021, the Director of the institute on 25 October 2021 and the Director of TEHIK on 26 October 2021.

### General comments regarding the audit report

**Response of the Chairman of the Board of the Estonian Health Insurance Board:** The goal of the Health Insurance Fund is to contribute effectively to activities that help prevent or detect cancer earlier. In this way, we want to increase the healthy life years of our people while maintaining their quality of life. Considering the causes and prevention opportunities, almost 50% of all malignant neoplasms are preventable and can be prevented through a healthy lifestyle and vaccination. We know that tobacco use (including passive smoking), alcohol abuse, unhealthy diet, lack of physical activity and related obesity play a significant role in the development of cancer.

The clear direction of the Health Insurance Fund in the coming years is to increase people's health awareness, which will contribute to their skills to better control their health. Unfortunately, many different factors influence people's health behaviour, and we also see that problems with health behaviour in different population groups vary greatly.

We see the need to set up a national screening steering body to better ensure the full operation and development of ongoing screening and the implementation of possible new screening. We have expressed our readiness to the Ministry of Social Affairs to contribute to the implementation of the National Cancer Control Plan, and we agree to take full responsibility for the organization and management of screening at the Health Insurance Fund.

We are convinced that the driving force is broad-based cooperation through the involvement of stakeholders, targeted prevention, i.e., activities aimed at a specific result. Also the functionality of the services and the bidding process, which is designed to suit different target groups.

The largest customer of service design is the public sector, and inside this the healthcare system. The Health Insurance Fund has embarked on a journey and has recently mapped the route of the cervical cancer screening program, the information obtained from which, together with the development needs, is also reflected in the policies for improving screening.

In the prevention and treatment of malignant neoplasms, we consider it important to ensure a comprehensive care pathway for cancer patients. We have begun preparations for this. Today, we are funding the development of an application at pilot project competition that will allow for the sharing of cancer patient treatment data at both the cancer centre and the primary care level.

**Response of the Director of the National Institute for Health Development:** We consider the early detection of cancer both inside and outside screening very important. The majority of cancer patients are diagnosed with symptoms, so attention should be paid to people's awareness of the symptoms of different types of cancer. Under the leadership of the NIHD, a corresponding communication strategy is being developed within the framework of the Cancer Control Plan.

Primary prevention focuses on activities aimed at avoiding the development of cancer. As 30-50% of cancer cases are preventable, better awareness of behavioural and environmental factors associated with cancer and personal preventive action will create the preconditions for developing effective interventions to reduce cancer-related health loss.

The NIHD's activities to raise people's health awareness and prevent diseases concern smoking cessation, reducing alcohol consumption, a healthy diet and a supportive environment, as well as physical activity. In addition, one of the priorities of the NIHD is the development of personal prevention activities, including the use of genetic data in cancer prevention. The NIHD project "Application of Personal Medicine in Estonia" deals with the creation of precision prevention services based on genetic data in order to involve people with a genetic risk in cancer screening as early as possible.

One method of early detection of cancer is population-based screening, which is effective provided that screening is conducted in accordance with the World Health Organization's 1968 Screening Principles (Wilson JM, Jungner YG. Principles and practice of mass screening for disease. Bol Oficina Sanit Panam; 1968):

1. Tumour site is a critical health problem.
2. It must be a treatable disease.
3. There must be an accurate, safe and inexpensive screening test acceptable to the target group.
4. Additional tests and treatment should be immediately available, if needed.
5. The screening program must be sustainable and cost-effective.

High-quality and complete cancer data are needed to make good health policy decisions. Ensuring the data quality of the Cancer Registry requires action in accordance with international rules, which is why cancer data published with a delay of up to two years is considered up-to-date. The Cancer Control Plan for 2021–2030 sets the goal that the delay in publishing data from the Cancer Registry will not exceed 18 months by 2025. Today's two-year delay in publishing data is due not only to the double entry of paper notifications but also to the incomplete reporting of cancer cases by healthcare providers, which is time consuming for the registry when identifying and registering missing cases, and underfunding of the registry. At the end of this year, the number of healthcare providers transmitting data digitally to the cancer register will be expanded.

The NIHD agrees with the NAO's recommendation on page 2: "make participation in screening as easy and accessible as possible for people", for which the invitation must reach the person, and regarding this we propose, in cooperation with local

governments and family doctors, to regularly update the contact information of people in the population register: including the e-mail address used and the exact postal address.

The NIHD is aware of these problems and several innovations have been made to increase the coverage of screening so that screening information reaches everyone; from 2019, we send the first invitation to the screening to all those invited in the first half of the year, and repeat invitations to non-participants from August.

If the e-invitation does not reach the addressee, we will receive an automatic notification from the invitation sending system, of which we will regularly notify the Information Systems Board and the Population Register.

We agree with increasing the role of family physicians and nurses in the screening process. The primary screening for cervical cancer will also be performed by family doctor centres from 2021 onwards. In order to evaluate new possible screening programs, a feasibility study of lung cancer screening is underway, where the initial selection of patients will be carried out by three primary care centres in Tartu.

The establishment of a functioning data collection system for screening results and quality indicators has been under way since the establishment of the Cancer Screening Registry in 2015. Today, the activities of the NHDI and the Health and Welfare Information Systems Centre (TEHIK) are aimed at creating a new high-quality system to obtain complete and high-quality data for the performance of the tasks of the Cancer Screening Register.

We've added some clarifying remarks / suggestions for improvement:

Page 1, paragraph 3: One reason for late detection is poor participation in population-based screening,

The sentence "Coverage, i.e. participation rate of members of the target group in screening, is considerably below the 70% agreed in Estonia, reaching 52% for breast cancer, 42% for cervical cancer and 50% for colorectal cancer in 2020", need to be commented: The COVID-19 crisis, which began in 2020, affected participation in screening in 2020.

To explain: In 2020, the number of invitations sent by the Cancer Screening Registry and communication and campaigns to increase participation by the EHIF and the Cancer Society have increased compared to previous years, but the participation rate has decreased, which can only be explained by the impact of the pandemic. In addition to the fear of infection and the suspension of elective treatment in the spring, the public has been affected by messages about overburdened health care system, etc.

Response of the National Audit Office of Estonia: The NAO agrees that the level of screening coverage may be affected by the COVID-19 crisis. Therefore, Table 1 shows the coverage shares for both 2019 and 2020. Considering that the coverage in 2019 was not significantly higher either and the difference with the target level is still quite large, the NAO does not consider it necessary to supplement this '.

Page 1: Summary of audit results

In the chapter "Main Findings of the Audit" and throughout the audit, the term "elumus" (survival) is used. In the Estonian cancer epidemiology literature, the term "elulemus" is used with the same meaning, based on the following article: Rahu, Mati. Epidemioloogiatee: 45 aasta rännak [Language of epidemiology: A 45-year personal odyssey]. Akadeemia 2013;25:1616–1649.

Response of the National Audit Office of Estonia: A remark has been added to the explanation of the term "elumus" that the term "elulemus" is parallelly used. When choosing the term, we took into account that the word "elumus" is also used in the joint dictionary of the Institute of the Estonian Language (sõnaveeb.ee).

Page 10 Section 23: electronic and digital invitations are not comparable in this context: digital invitations include a referral from the Patient Portal for screening (with a unique referral number) and an e-invitation is an e-mail invitation to the screening (sent to everyone, and in addition to those who did not participate during the year, repeatedly).

Response of the National Audit Office: the report has been amended.

Page 10 Section 25 sentence 1: Thus, a person will only receive an invitation if he or she has an e-mail address on the eesti.ee portal or a valid address in the population register.

We suggest clarifying the wording: Thus, a person will only receive an invitation if he or she has an e-mail address on the eesti.ee portal or a correct address in the population register.

Response of the National Audit Office: the report has been amended.

Page 11 Section 31 sentence: "So far, nobody has focused on the systematic design of invitations, i.e., the structure of the text and the content of the message based on the patterns of people's thinking and behaviour."

We suggest clarifying the wording: "nobody has focused on systematic design with sufficient performance." The design of invitations has passed an update since the launch of the screening every year in cooperation with the Health Insurance Fund, the ECSR has updated both the design and the content of invitations ".

Response of the National Audit Office of Estonia: The National Audit Office does not change the text of the report. The observation has been based on explanations received during the audit.

**Response of the Minister of Health and Labour:** Thank you for auditing the topics related to the detection and referral of malignant neoplasms. We consider the recommendations made very important, as they also largely reflect the activities that need to be developed in the National Cancer Control Plan. We acknowledge all those who have contributed to the preparation of the audit report and have clearly stated its contents.

The goal of the Estonian National Cancer Control Plan for 2021–2030, approved in May this year, is to reduce the number of cancer cases and deaths and to improve the quality of life of cancer patients. The entire plan is very comprehensive covering all areas of cancer control, from prevention, diagnosis and treatment to the post-cancer period. The approval of the main responsible parties in the implementation plan is to be carried out, with whom we can carry out the necessary activities on a large scale. A more detailed implementation plan for shorter periods will be drawn up on the basis of a long-term cancer control plan. The steering group of the Cancer Control Plan and the Ministry of Social Affairs together with the agencies with the necessary authority and decision-making power to implement the activities planned in the Cancer Control Plan, organize and

control health services, establish evidence-based guidelines and standards, direct resources, evaluate results and reorganize health services accordingly.

In conclusion, all the activities and the areas to be developed that have been identified are very important, and we need to move forward quickly. At the same time, the solutions require the involvement and contribution of people and organizations involved in resolving the COVID-19 crisis. Therefore, the development and implementation of solutions may take slightly longer than originally planned.

Recommendations of the National Audit Office	Responses of the auditees
<p><b>Management of screening organization</b></p> <p><b>66. The National Audit Office's recommendations to the Minister of Health and Labour:</b> Designate the authority responsible for the national management of screening.</p> <p>Sections 60–62</p>	<p><b>Response of the Minister of Health and Labour:</b> Today, several parties in Estonia are responsible for the nationwide management of screening: The Estonian Health Insurance Fund (EHIF), the Institute for Health Development (NIHD), the Centre for Health and Welfare Information Systems (TEHIK) together with the Ministry of Social Affairs, which is why it is important to specify the roles and activities of different agencies. We have also held negotiations with the Estonian Health Insurance Fund on the same topic in the past, and we plan to continue them in the near future, involving the other parties mentioned above. Please also understand that in the current situation, rapid progress may not be possible as our focus is on the prevention of the spread of coronavirus.</p>
<p><b>Increasing screening coverage</b></p> <p><b>67. Recommendations of the National Audit Office of Estonia to the Minister of Health and Labour in cooperation with the Chairman of the Board of the Health Insurance Fund and the Director of the National Institute for Health Development:</b></p> <ul style="list-style-type: none"> <li>▪ Target communication, taking greater account of the preferences and characteristics of different target groups;</li> <li>▪ Use the principles and practices of behavioural psychology and service design in the notification about screening;</li> <li>▪ Increase the role of family physicians and nurses in informing and advising the target group of the screening, as the family physician (their team) is the person's primary contact with health care system;</li> <li>▪ Increase, where possible, the role of family physicians in all screening activities;</li> <li>▪ Establish a functioning system for collecting data on performance and quality indicators of screening.</li> </ul> <p>Sections 12–62</p>	<p><b>Response of the Minister of Health and Labour:</b> We agree with the recommendations. Almost half of the cancers are preventable through a healthy lifestyle and vaccination, which is why we will focus more on the preventive measures in the coming years. In particular, all screening programs need commitment and consistent work in order to ensure high level of participation and consequently achieve desired results. We will discuss with all the parties during the updating of the screening guidelines the possibilities of increasing the role of family physicians and nurses in screening. We agree that they are the primary contact and, in the health centres where the midwife is employed, she/he could perform cervical cancer screening and provide consultation, however, we need to look at whether the primary care level can take on any additional burden considering the current situation and additional tasks.</p> <p>In cooperation with the Estonian Health Insurance Fund and the Institute for Health Development, we have already made several changes in the screening programs and organization, and we will jointly continue to improve them, as well as the development and monitoring of quality indicators. In cooperation with TEHIK, the reconstruction of the data collection system of the Estonian Cancer Screening Register was launched in February 2020 to integrate it with the data of the Health Information System.</p> <p><b>Response of the chairman of the board of the Estonian Health Insurance Fund:</b> We will enhance national screenings as follows:</p> <ul style="list-style-type: none"> <li>▪ Screening management activities: removing administrative, geographical and/or time barriers;</li> <li>▪ contributing to the expansion of screening start points (invitation channels, recall/reminder, information sharing);</li> <li>▪ improving testing facilities for screening, offering new tests / services, involving even more primary care centres;</li> <li>▪ the concept of conscious participation that influences people's behaviour;</li> <li>▪ introduction and development of a model of breast cancer precision prevention service;</li> <li>▪ contributing to the development of a system for measuring results and quality of screening.</li> </ul> <p><b>Response of the Director of the National Institute for Health Development:</b></p> <ul style="list-style-type: none"> <li>▪ The Estonian Cancer Screening Registry has already changed the schedule for sending invitations to ensure better screening organization: Since 2019, the first invitation has been sent to all those invited in the first half of the year, and repeat invitations to non-participants since August, so that no one receives the first invitation at the end of the year when the participation is difficult. In 2015–2018, initial invitations were sent within 10 months (January to October) and there was little time to send repeat</li> </ul>

Recommendations of the National Audit Office	Responses of the auditees
	<p>invitations. Several co-operation projects are underway with the Estonian Health Insurance Fund, the University of Tartu and other co-operation partners. Breast cancer screening participation intervention study and HPV home testing pilot study in cervical cancer screening.</p> <ul style="list-style-type: none"> <li>▪ The NIHD participated in the cervical cancer screening user re-design project, which was also the topic of one of the workshops at the Opinion Festival in Paide.</li> <li>▪ As the coverage of breast cancer screening is the best in the regions where the service is provided by a mammography bus, the NIHD plans to increase the operating funds for the mammography bus as a targeted allocation and to extend the support to Viljandi County Hospital from 2022.</li> <li>▪ The updating of the guidelines for colorectal cancer screening is in progress by the Estonian Health Insurance Fund. The NIHD, family physicians and medical specialists are all involved.</li> <li>▪ Since October 2021, primary care centres have also been involved in conducting the primary cervical cancer screening. The primary cervical cancer screening test (HPV test) can be done at primary care centres. We plan to discuss with all the parties during the updating of the screening guidelines the possibilities of increasing the role of family physicians in screening.</li> <li>▪ With technical and organizational changes, a new system for collecting screening results and quality indicators is being developed. In cooperation with TEHIK, the reconstruction of the data collection system at the ECSR was launched in February 2020 to harmonize it with the data at the HIS for which an amendment to the statutes of the ECSR has been prepared by appointing TEHIK as the data processor of the ECSR. The aim of the new system is to obtain high quality data from the HIS for performing the tasks of the ECSR. The introduction of the "data warehouse" enables the data of examinations and treatments received by the HIS to be made available to the register in a machine-readable form without any losses due to previous inquiries. The deadline was postponed due to the COVID-19 pandemic. Testing of the new system will commence in 2022.</li> </ul>
<p><b>Registration for screening and receipt of screening results</b></p> <p><b>68. Recommendations of the National Audit Office to the Minister of Health and Labour in cooperation with the Chairman of the Board of the National Institute for Health Development and the Director of the Health and Welfare Information Systems Centre:</b></p> <ul style="list-style-type: none"> <li>▪ Create an opportunity to book a screening time also via the National eBooking System;</li> <li>▪ Require providers to send screening responses to the HIS in a standardized form so that data could be sent from the HIS to the ECSR in a structured and machine-readable form.</li> </ul> <p>Sections 21–29, 55–57</p>	<p><b>Response of the Minister of Health and Labour:</b> We agree with the recommendations, and we consider it important to make it easier for people to reach screening. We would like to add that at the development of the new generation information system (UptIS) we have focused on data exchange, not document exchange.</p> <p><b>Response of the chairman of the board of the Estonian Health Insurance Fund:</b> We agree with the recommendation to create the screening invitation in the National eBooking System by cooperating with TEHIK. We have submitted a proposal to the IT development roadmap of the Association of Hospitals, so that their data could be entered in the system in a structured and machine-readable way, and in cooperation with TEHIK, people could have the opportunity to book screening times in the National eBooking System.</p> <p><b>Response of the Director of the Health Welfare Information Systems Centre:</b> Development work to complete the National eBooking System has been commissioned and is currently in progress. The option of registration for cancer screening via the National eBooking System will be available for users in January 2022, based on today's best knowledge. In cooperation with the Association of Hospitals, we are currently working to ensure that all hospital information systems use the latest supported standard versions. In addition, a project is underway to use algorithms that would allow the ECSR to obtain the necessary information, even from non-standard data. According to today's best knowledge, these development works are to be completed during the first half of 2022. Unfortunately, it is currently not possible to set a more specific date due to the volume of priority development work needed to alleviate the COVID-19 crisis.</p>
<p><b>Diagnosis and referral of a cancer patient</b></p> <p><b>129. Recommendations of the National Audit Office to the Chairman of the Board of the Estonian Health Insurance Fund:</b></p>	<p><b>Response of the chairman of the board of the Estonian Health Insurance Fund:</b> We agree with the recommendations of the National Audit Office. We are currently designing a screening project from the beginning to the end of the care pathway, while also developing a financing method</p>

Recommendations of the National Audit Office	Responses of the auditees
<ul style="list-style-type: none"> <li>▪ Check the data encryption practices of service providers so that the initial scheduled appointments could be distinguished in the information on the waiting lists. This would allow a better analysis of whether or not patients have to wait longer than expected;</li> <li>▪ Instruct family physicians to use more e-counseling to refer patients with suspected cancer so that the patient can move faster to the next stage on the care pathway, if necessary;</li> <li>▪ Find ways to empower medical specialists (e.g., allow patients with suspected cancer to be admitted and examined in a shorter waiting period) in order to speed up the diagnosis and further treatment of a patient with suspected cancer;</li> <li>▪ Assess and decide, in collaboration with professional societies, whether or not to hold a Multidisciplinary Oncology Council before starting treatment for all patients diagnosed with cancer, given the patient's need for prompt and high-quality treatment;</li> <li>▪ Enable family physicians to identify patients with suspected cancer in a timely manner by developing appropriate treatment guidelines in collaboration with different professionals, which could be integrated into the family physicians decision support applications.</li> </ul> <p>Sections 66–103</p>	<p>suitable for the respective care pathway. We will extrapolate the experience gained from this to other screening programs.</p> <p>While designing the care pathway we:</p> <ul style="list-style-type: none"> <li>▪ can pay attention to errors in the coding of activities and the creation of common practices;</li> <li>▪ make e-consultation an integral part of the pathway, ensuring faster access to diagnostic and treatment options;</li> <li>▪ include a Multidisciplinary Council in the pathway on the proposal of the experts participating in the working group.</li> </ul> <p>An integral part of the care pathway of the screening project is the beginning of the pathway set at the primary care level. Here we use a primary care decision support platform We are cooperating with the University of Tartu in the field of medical sciences and the members of the Council for Clinical Guidelines to develop a primary care guide for patients with suspected cancer.</p>
<p><b>Mapping of a cancer patient journey</b></p> <p><b>130. Recommendation of the National Audit Office to the Minister of Health and Labour in co-operation with the Chairman of the Board of the Estonian Health Insurance Fund and Director of the Institute for Health Development:</b> Introduce a system that allows to use outcome indicators to assess the duration of various stages of patient care pathway and the quality of service in order to better identify problems in the system.</p> <p>Sections 104–105</p>	<p><b>Response of the Minister of Health and Labour:</b> Estonia has started to develop a framework for health system evaluation and is developing a new generation information system. We will also work with health authorities to agree on additional data needed to regularly assess the quality of diagnosis and treatment and to improve treatment outcomes, and we will continue evaluations on the basis of existing options.</p> <p><b>Response of the chairman of the board of the Estonian Health Insurance Fund:</b> We will develop screening patient outcome indicators in our area of responsibility in 2022.</p> <p><b>Response of the Director of the National Institute for Health Development:</b> Under the leadership of the NIHD, the Cancer Control Plan was developed in 2021 in cooperation with all parties, which includes activities to standardize the waiting times of cancer patients on the care pathway and to assess the quality of treatment (surgical treatment, radiation treatment). As part of the implementation of the Cancer Control Plan, the preparation of analyses of the use and need for surgical and radiation treatment has begun under the leadership of the NIHD. In order to regularly assess the quality of diagnosis and treatment and to improve treatment outcomes, the Cancer Control Plan provides for the collection of additional site-specific data. This requires the agreement with the health authorities.</p>
<p><b>Sending data to the cancer registry</b></p> <p><b>131. The National Audit Office's recommendation to the Minister of Health and Labour in co-operation with the Director of the Institute for Health Development:</b> Develop the technical capacity so that digital notifications can be sent to the Cancer Registry in a standardized format.</p> <p>Sections 121–127</p>	<p><b>Response of the Minister of Health and Labour:</b> We hope to solve this problem during 2022, when the notifications of health care providers to the Cancer Registry could be received electronically via X-Road. The Cancer Control Plan also provides for a number of actions to improve the quality of data submitted by healthcare providers.</p> <p><b>Response of the Director of the National Institute for Health Development:</b> From June 2021, the Cancer Registry has been receiving notifications from the North Estonian Medical Centre electronically via X-Road. In 2022, it is planned to expand the system to the following hospitals: East Tallinn Central Hospital, West Tallinn Central Hospital, Tartu University Hospital, Pärnu Hospital, Ida-Viru Central Hospital and Tallinn Children's Hospital. The development is underway and the goal is that the delay in publishing the Cancer Registry data would not exceed 18 months by 2025.</p>

Recommendations of the National Audit Office	Responses of the auditees
	<p>Today's two-year delay in publishing data is due not only to the double entry of paper notifications but also to the incomplete reporting of cancer cases by healthcare providers, which is time consuming for the registry when identifying and registering missing cases. Digital data transmission can help improve the completeness of reporting. In addition, the Cancer Control Plan provides for a number of actions to improve the quality of data submitted by healthcare providers.</p>
<p><b>Providing necessary personnel and equipment for cancer treatment</b></p> <p><b>159. The National Audit Office's recommendation to the Minister of Health and Labour in co-operation with the Chairman of the Board of the Estonian Health Insurance Fund:</b> Find ways for people in need of different types of treatment (including radiation) to receive treatment on time, and that access to treatment would not depend, for example, on the lack of equipment or personnel in a particular treatment facility.</p> <p>Sections 133–139</p>	<p><b>Response of the Minister of Health and Labour:</b> In Estonia, there are two cancer competence centres - in Tallinn and Tartu, which coordinate their treatment services and provide primary services to cancer patients at their location through their networks. By specifying the treatment quality indicators, we can get data on problems, which can then be solved in cooperation with the parties, also considering the motivation of the service providers to complete the patient care pathway in the optimal time.</p> <p><b>Response of the chairman of the board of the Estonian Health Insurance Fund:</b> We support the development of competence centres in Tallinn and Tartu, which coordinate their medical services through their networks (Hospital Network Development Plan hospitals), ensuring primary services on the location. The responsibility for personnel and equipment remains with the service provider, who must find the appropriate means to ensure the quality of the service. It is important to make sure that people have timely access to examinations and treatment throughout the entire care pathway.</p>
<p><b>Implementation of performance indicators for screening funding</b></p> <p><b>160. The National Audit Office's recommendation to the Chairman of the Board of the Estonian Health Insurance Fund:</b> Introduce indicators that would make it possible to assess the effectiveness of investments and campaigns related to screening and thereby enhance further activities.</p> <p>Sections 147–157</p>	<p><b>Response of the Chairman of the Board of the Estonian Health Insurance Fund:</b> We are developing metrics to assess screening investment and campaign performance in 2022.</p>
<p><b>Making cancer medicines available</b></p> <p><b>181. The NAO's recommendation to the Chairman of the Board of the Estonian Health Insurance Fund:</b> Analyse the process of reimbursement of medicines in order to identify main problems (e.g., justification for restricting the circle of applicants, excessive bureaucracy, too long deadlines, lack of experts processing applications).</p> <p>Sections 162–178</p>	<p><b>Response of the chairman of the board of the Estonian Health Insurance Fund:</b></p> <ul style="list-style-type: none"> <li>■ We will analyse how to facilitate and speed up the process of processing medicine reimbursement applications.</li> <li>■ We are reviewing the process of changing the list of healthcare services (including hospital pharmaceuticals) in cooperation with service designers and all parties.</li> <li>■ In November 2020, we submitted a proposal to the Ministry of Social Affairs to amend the Health Insurance Act, which aims to expand the circle of TTL applicants, and proposed to simplify the amendment of the list of diseases (a government decree to a ministerial decree).</li> </ul>
<p><b>Changes in treatment needs due to COVID-19</b></p> <p><b>189. The National Audit Office's recommendation to the Minister of Health and Labour in co-operation with the Chairman of the Board of the Estonian Health Insurance Fund:</b> Analyse the impact of the social crisis caused by the corona virus on cancer treatment, assess how the postponement of doctor's appointments could be avoided in the future, and plan in advance the covering resources for the increase in the need for treatment.</p> <p>Sections 182–188</p>	<p><b>Response of the Minister of Health and Labour:</b> We are aware of the problem and are working to assess the impact of the crisis. Cancer treatment is certainly an important budgetary priority.</p> <p><b>Response of the chairman of the board of the Estonian Health Insurance Fund:</b> We are aware of this problem and consider the change in need for treatment over time. Cancer treatment has been a budgetary priority for us every year, and based on that, we have also planned funds to finance cancer treatment.</p>

## Audit description

### Audit objective

The aim of the performance audit is to provide assessment as to whether or not the organization of prevention and early detection of cancer allows for timely detection of tumours, and whether or not cancer treatment starts at the right time, i.e., without undue delays.

### Criteria for giving an assessment

Audit criteria:

- screening is organized in such a way that groups at risk reach control in time;
- cancer is detected at an early stage;
- the start of cancer treatment received has been timely, i.e., without undue delay;
- the procedures and medicines needed to treat cancer are being funded to the extent necessary, i.e., the treatment of patients is not delayed or cancelled due to insufficient funding.

### Scope and approach of the audit

The first auditee was the Ministry of Social Affairs, which has overall responsibility for the protection of public health and the development of medical care. The other auditee was the Estonian Health Insurance Fund, which organizes screening: pays for screening, determines the birth years and conditions of those invited to screening, as well as pays for cancer treatment and organizes campaigns. The third auditee was the Institute for Health Development, which is responsible for the transmission of screening invitations and the operation of the Cancer Registry and Screening Registry, and participates in the organization and financing of mammography buses.

The audited period was 2016–2020.

In the course of the audit, various parties in the field of health care were interviewed (see Table 11), documents were analysed, expert work was carried out, descriptive statistics were made on the basis of treatment invoices, cancer screening and survival, etc.

**Table 11. Persons interviewed in the course of the audit**

Interviewees	Institution	Interview time
Jüri Teras - Chairman of the Management Board Kristiina Ojamaa - Member of the Board Helis Poker - Member of the Board Kristi Niinepuu - Member of the Board Taavi Põdrämägi - Member of the Board Rena Tiigi - Member of the Board	Estonian Society of Oncologists	30 June 2020 16 September 2020 30 September 2020 8 October 2020 30 October 2020 6 May 2021
Le Vallikivi - Chairwoman of the Board Karmen Joller - Member of the Board Ruth Kalda - Member of the Board, Head of the Institute of Family Medicine and Public Health, University of Tartu	Family Physicians Association	7 July 2020 14 January 2021
Maie Egipt, Chairwoman	Estonian Cancer Society	19 August 2020
Annika Veimer - Director Toomas Veidebaum - Research Director Piret Viiklepp - Head of the Registers Department and Head of the Tuberculosis Register	The National Institute for Health Development	25 August 2020 22 January 2021

Pille Kink - Development Manager Kai Kabin - Senior Analyst, Cancer Screening Registry Kaire Innos - Head of the Department of Epidemiology and Biostatistics Jane Idavain – Head of the Department of Health Statistics Margit Mägi - Head of the Cancer Registry		
Ulla Raid - Advisor Agris Koppel - Chairman Heli Paluste - Head of Healthcare Network Kersti Esnar - Head of Healthcare Resources Silja Elunurm - Advisor Kaily Susi - Chief Specialist Elery Lapp - Chief Specialist	Ministry of Social Affairs, Health System Development Department	27 August 2020 17 June 2021
Maivi Parv - Member of the Board Erki Laidmäe - Head of the Medicinal Products and Medical Devices Department Marko Tähnas - Head of the Partnership Communications Department Ene Kiisk – Medical Expert at the Partnership Communications Department Kristel Kolga – Senior Medical Expert at the Partnership Communications Department Made Bambus – Chief Specialist at the Primary Care Department Taisi Kõiv - Specialist at the Public Relations and Health Promotion Department	Estonian Health Insurance Fund	10 September 2020 14 December 2020
Vahur Valvere - Head of the Clinic of Oncology and Hematology (PERH), Chairman of the Supervisory Board (Estonian Cancer Society)	North Estonia Medical Centre, Estonian Cancer Society	11 September 2020
Jana Jaal - Senior Physician-Lecturer at the Radio and Oncotherapy Department Sulev Ulp - Senior Physician-Lecturer at the Radiology Department	Tartu University Hospital	27 January 2021 16 February 2021
Kadri Tammepuu - Member of the Board	Estonian Patients Union	23 February 2021
Silver Raudsepp - Member of the Board Anne Pardla - Member of the Board Hille Koppen - Head of Office	AS Mammograaf	8 March 2021
Raivo Tapfer - Chairman Chris Ellermaa - Head of the Working Group on Oncology Drugs	Association of Pharmaceutical Manufacturers	20 October 2021

## Document analysis

The audit analysed specialty documents, including legislation, WHO and OECD studies, EU guidelines, guidelines for cancer sites, screening-based assessments of health care technologies, screening guidelines, various international cancer analyses, the NIHD's cancer screening registry guide, and EHIF annual reports.

## Expert work

The expert work sought answers to two questions:

- Have patients turned to a family physician or medical specialist with their health problem and has the doctor suspected cancer in time?
- Have patients received the treatment prescribed by a medical specialist on time?

The sample of the expert work included patients who had received a primary diagnosis of cancer in the period from 1 January 2019 to 31 December 2019. The sample was formed on the basis of the EHIF's treatment invoices for the treatment of 2382 adults who received a primary cancer diagnosis in 2019 for four sites (cervix, chest, lung, colon). Patients who received their primary cancer diagnosis at TUH NEMC, ETCH, or WTCH were included in the sample to reduce the number of misdiagnosed patients. The sample consisted of partially uninsured persons from 2017–2019 who had received respective primary diagnosis. The final selection was made randomly, but the proportions of the population in the hospital and rural-urban categories were taken into account. When designing the sample, the National Audit Office asked the EHIF to check in advance whether oncospecific treatment or Oncology Council treatment invoices had been received for the persons included in the sample, so that people who had not actually been diagnosed with cancer would not be included in the sample.

After the selection of the sample, all the treatment invoices of the persons included in the sample were asked from the EHIF; All epicrisises (outpatient, day care, inpatient and nursing epicrisises), referrals and their responses, and emergency care cards from one year before the primary diagnosis of cancer until the first treatment session. The registry data of the medical records were asked from the image bank about where and which images were taken of the person during respective period. Data were requested for the period one year before the cancer was diagnosed and from the cancer diagnosis until the first treatment session.

The final sample size was 399 people.

Based on the requested documents and data, 8 experts from the Estonian Society of Oncologists evaluated patient histories, based on a questionnaire previously prepared by the same society on the basis of the criteria of the National Audit Office. The questionnaire was divided into the following blocks:

- general data, including screening information;
- family physician;
- medical specialist;
- cancer centre (cancer specialist, Oncology Council, first treatment session).

Based on the assessments, the Estonian Society of Oncologists made an overall assessment.

### **Descriptive statistics**

The descriptive statistics were based on the following data:

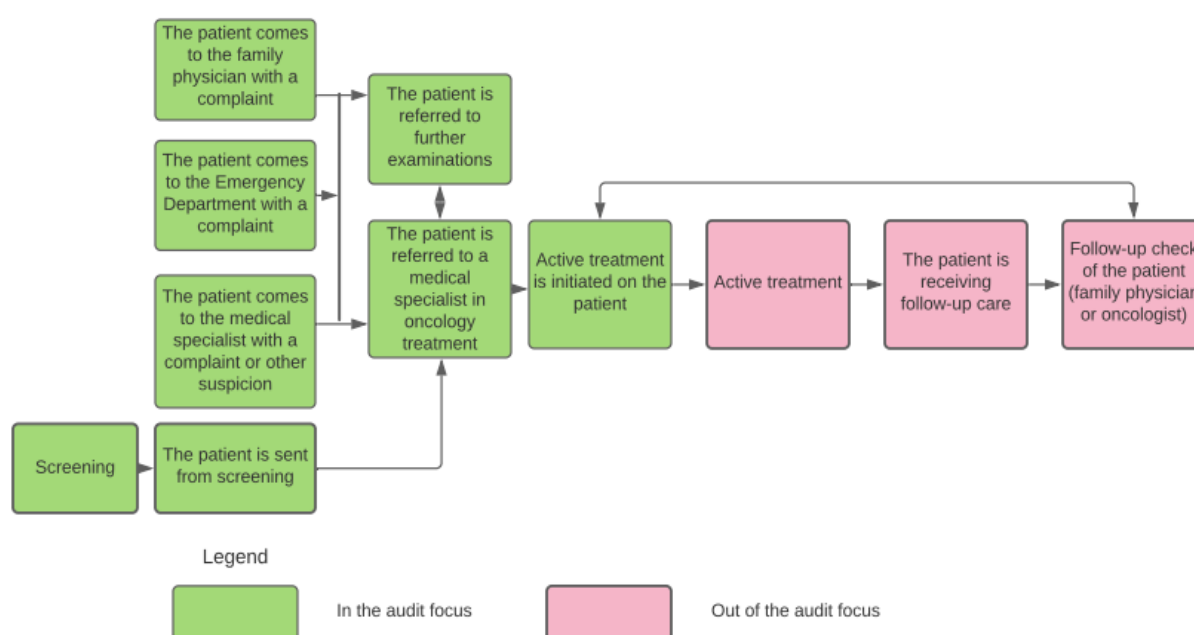
- Cancer treatment statistics for the period 2016–2020:
  - the cost of cancer treatment in different sections of different types of treatment,
  - the cost of screening and the number of participants;
- projected demand, funded and unfunded demand in the field of screening and Oncology by treatment cases and amounts in 2017–2020 and forecast for 2021;
- waiting list data for 2016–2020;
- data on participation in screening in 2016–2020;
- cancer site survival and morbidity data;
- schedules for mammography buses in 2016–2021.

## Topics covered by the audit

The audit has been dealing with health screenings, i.e. the aspects of health behaviour being a part of cancer prevention have been left out. The audit covered all cancer sites, but in the section of screening, three sites were observed (breast cancer, cervical cancer and colon cancer). Namely, screenings of these sites are currently being carried out in Estonia. The focus of the expert work was on four sites: breast cancer, cervical cancer, colon cancer, and lung cancer.

From the perspective of cancer treatment, the audit has mainly focused on cancer diagnostics and the timeliness of the start of active oncospecific treatment. The focus of the audit excluded active treatment (the cancer patient care pathway was analysed until the first treatment session), follow-up treatment (i.e., palliative care for cancer patients, i.e., supportive and rehabilitation treatment) and end-of-life treatment for cancer patients (hospices, nursing homes). Funding for cancer treatment was reviewed throughout treatment, not just until the start of active treatment. The organization of cancer treatment is shown in Figure 18, the part covered by the audit is marked in green.

Figure 18. Patient care pathway covered by the audit



## Time of completing the audit

The audit activities were completed in July 2021.

## Audit team

The audit team consisted of audit managers Mart Vain and Rauno Vinni and auditors Thea Teinemaa, Pille Kuusepalu and Ingrid Hindrikson.

## Contact details

Additional information regarding the audit is available at the Communications Department of the National Audit Office

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An electronic copy (pdf) of the audit report is available on the website [www.riigikontroll.ee](http://www.riigikontroll.ee).

Summary of the audit report is also available in Estonian.

The number of the audit report in the internal records system of the National Audit Office is 80061.

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## **Previous audits of the National Audit Office in the field of healthcare**

4 June 2020 – **Control by the Health Insurance Fund over the funding of health services**

23 October 2018 – **Emergency medical care**

17 January 2014 – **Activity of the state in implementing eHealth**

6 September 2012 - **Order for reimbursement of medicinal products**

**All reports are available on the website of the National Audit Office at [www.riigikontroll.ee](http://www.riigikontroll.ee)**

## Annex A. Distribution of primary cancer cases in 2017–2018

**Table 12. Distribution of primary cases by tumour site and spread at diagnosis in Estonia in 2017 and 2018, women<sup>46</sup>**

Site	Diagnosis code in RHK-10	Number of cases		Local		Involvement of regional lymph nodes		Involvement of neighbouring organs		Distant metastases		Not specified	
		2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Breast	C50	760	836	47.0%	49.4%	34.5%	30.6%	3.2%	3.2%	9.3%	9.4%	6.1%	7.3%
Cervix	C53	150	127	36.0%	29.1%	4.0%	6.3%	32.7%	44.9%	20.7%	8.7%	6.7%	11.0%
Colon and rectum, etc.	C18–C21	543	497	36.1%	34.0%	21.4%	22.5%	12.5%	9.5%	23.8%	25.4%	6.3%	8.7%

Source: National Audit Office on the basis of the NHDI data

**Table 13. Distribution of primary cases by tumour site and spread at diagnosis in Estonia in 2017 and 2018, men<sup>14</sup>**

Site	Diagnosis code in RHK-10	Number of cases		Local		Involvement of regional lymph nodes		Involvement of neighbouring organs		Distant metastases		Not specified	
		2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Colon and rectum, etc.	C18–C21	488	475	34.6%	35.8%	20.5%	24.2%	10.5%	7.6%	26.6%	25.7%	7.8%	6.7%

Source: National Audit Office on the basis of the NHDI data

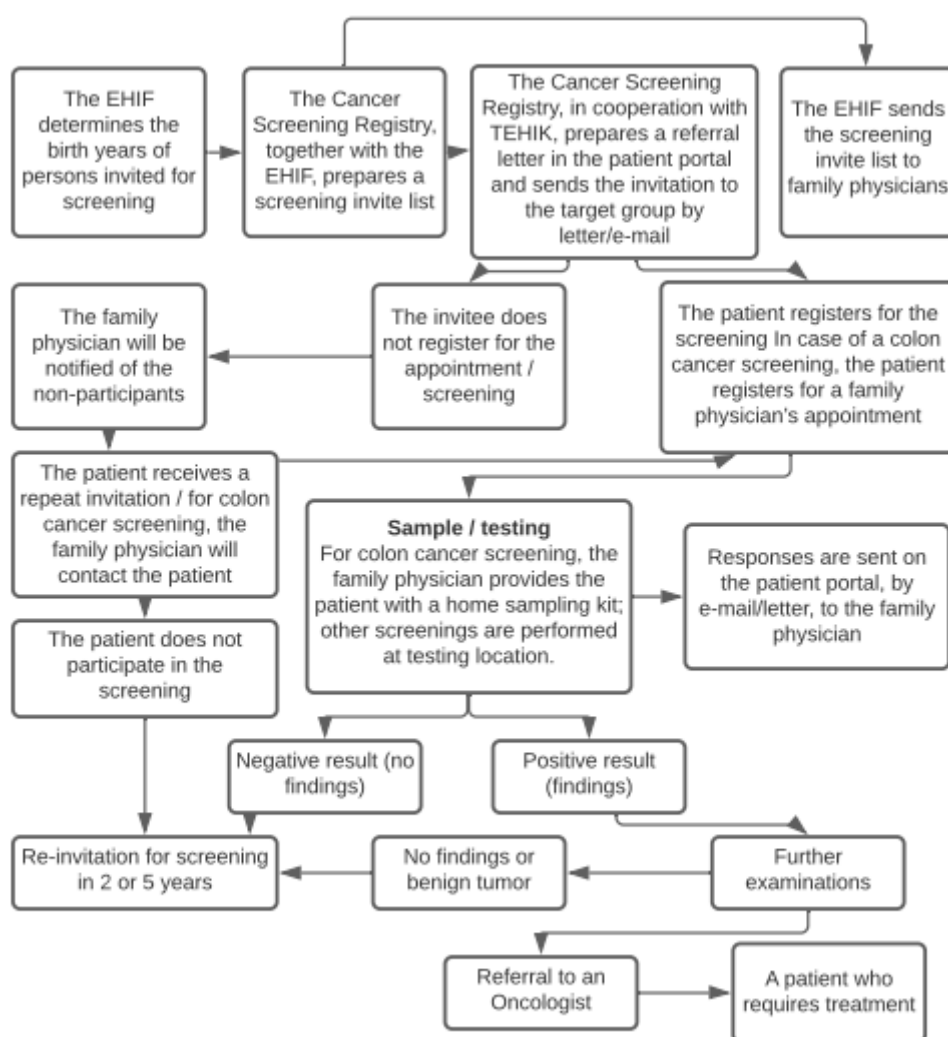
<sup>46</sup> Vähihaigestumus Eestis 2017, 2018. NHDI

## Annex B. Organization of screening

In Estonia, screenings for breast cancer, cervical cancer and colon cancer are organized. The Institute for Health Development and the Estonian Health Insurance Fund are responsible for inviting people belonging to the target group to screening and conducting screening (see Figure 19).

At-risk groups, or target groups for targeted studies, have been identified on the basis of age and vary by cancer site (see below for details). At the same time, these screening invite risk groups to check themselves with different regularities. From 2021, uninsured people will also be invited to participate in screening.

Figure 19. Screening organization



Source: National Audit Office on the basis of screening guidelines

Population-based screenings for breast cancer have been conducted since 2003.

The incidence of breast cancer in women rises significantly between the ages of 50 and 60.<sup>47</sup> Until 2017, women with health insurance up to the age of 62 were invited to breast cancer screening in Estonia. From 2018 onwards, the age limit was gradually raised: according to the updated National Guidelines for Breast Cancer Screening, women have been invited to join the screening every two years until they reach the age

<sup>47</sup> <https://www.tai.ee/et/tegevused/tervise-edendamine/vahi-ennetamine>

of 69. The phased expansion will end in 2022, as by that time all women aged 50–69 will have been screened for breast cancer in Estonia.<sup>48</sup> This is in line with the European Commission's recommendation, as Estonia has so far covered a narrower age group compared to other European countries.<sup>49</sup>

The NIHD sends an invitation to the breast cancer screening with explanations to a woman in the target group. To participate in the screening, the woman can register for a mammography in a health care institution of her choice. Mammography can be performed in a healthcare facility or on a mobile mammography bus.

In the event of a negative or no mammography result, the screening unit will send a response to the woman within two weeks of the screening. The woman will receive a new invitation to participate in a breast cancer screening in two years. In case of abnormal mammography results, the screening unit sends to the woman an invitation for further examinations. Additional examinations shall be carried out in the screening unit as soon as possible, but not later than two weeks after the main examination. If cancer is diagnosed or cannot be ruled out as a result of further examination, or if there is a benign abnormality that requires specialist consultation, the patient will be informed and referred to a specialized gynecologist or surgeon for a consultation in up to two weeks.

The number of working days per year for mammography buses is shown in Table 14.

**Table 15. Total number of mammography bus working days per year by service provider for the period 2017–2021**

institution / year	2017	2018	2019	2020	2021 / in planning
AS Mammograaf	163	178	230	250	253
Tartu University Hospital	179	198	240	211	239
Viljandi Hospital	–	–	–	–	141
<b>Total / number of working days</b>	<b>342</b>	<b>376</b>	<b>470</b>	<b>461</b>	<b>633</b>

Source: National Audit Office on the basis of the NHDl data

Cervical cancer screening were first conducted in Tallinn and Tartu in 2003, and since 2006, screenings have been nationwide. From 2021, women between the ages of 30 and 65 are invited to screening for cervical cancer every 5 years. In 2018, the EHIF, in cooperation with professional societies, started updating the National Guidelines for Cervical Cancer Screening. The purpose of revising the guidelines is to agree on organizational issues for cervical cancer prevention. The new guidelines came into force in early 2021. Both the age limit (previously 30-55 years old) and the primary study were changed.

Participation in screening helps detect possible cell changes and pre-cancerous conditions early when they are treatable.

A woman who has received an invitation from the NIHD can book an appointment at a suitable institution, the details of which can be found in the invitation. The HPV test is similar to a gynecological examination, in which a small sample is taken with the help of a cervical brush from the cervical mucosa. If the result is positive, the laboratory will perform another test. When this also shows a finding, the woman must be referred to a colposcopy study.

Cervical cancer can be prevented with the HPV vaccine. HPV is a human-to-human virus with high-risk strains that cause more than 85% of cervical cancers, according to various studies. Four out of five people become infected with HPV in their lifetime. In Estonia, 12-year-old girls are being vaccinated free of charge within the framework of the national immunization plan since 2020. In 2018–2019, girls aged 12–14 were vaccinated. Vaccination is usually carried out at school, is voluntary and in the case of minors,

<sup>48</sup> 2019 Annual Report of the Estonian Health Insurance Fund

<sup>49</sup> European Commission. Cancer screening in the European Union. Report on the implementation of the Council Recommendation on cancer screening. 2017.

parent's consent is required. In 2018, the coverage of 12–14-year olds with the first dose of HPV vaccine was 56.1% and in 2019, 61.6%.<sup>50</sup>

Cervical cancer screening providers in 2016–2021 are listed in Table 15 and breast cancer screening providers by county in Table 16.

**Table 16. Cervical cancer screening providers in 2016–2021**

Location	Medical institution	2016	2017	2018	2019	2020	2021
Haapsalu	Lääne County Hospital	X	X	X	X	X	X
Hiiumaa municipality	Hiiumaa Hospital	X	X	X	X	X	X
Jõgeva municipality	SA Põltsamaa Tervis			X	X	X	X
Jõgeva municipality	Pärnu Hospital	X	X	X	X	X	X
Kohtla-Järve	Ida-Viru Central Hospital	X	X	X	X	X	X
Kuressaare	Kuressaare Hospital	X	X				
Narva	Narva Hospital	X	X	X	X	X	X
Narva	Albinea Foundation			X	X	X	X
Paide	Järva County Hospital	X	X	X	X	X	X
Põlva municipality	Malial OÜ				X	X	X
Põlva municipality	Põlva Hospital	X	X	X	X	X	X
Pärnu	OÜ KLV Arstikabinet			X	X	X	X
Pärnu	OÜ Marieta			X	X	X	X
Pärnu	Pärnu Hospital	X	X	X	X	X	X
Rakvere	Rakvere Hospital	X	X	X	X	X	X
Rakvere	Ciconia OÜ			X	X	X	X
Rakvere	OÜ Marika Jõgi			X	X	X	X
Rakvere	Tiina Mäeker OÜ			X	X	X	X
Rapla municipality	Private clinic PRAXIS			X	X	X	X
Rapla municipality	Rapla County Hospital	X	X	X	X	X	X
Saaremaa municipality	Aktsiaselts Hanvar			X	X	X	X
Saaremaa municipality	Kuressaare Hospital			X	X	X	X
Tallinn	Aktsiaselts MEDITA BALTICS			X	X	X	X
Tallinn	Arvenos OÜ	X	X	X	X	X	X
Tallinn	AS Medicum Tervishoiuteenused		X	X	X	X	X
Tallinn	Carrara SA			X	X	X	X
Tallinn	Evita Grupp OÜ			X	X	X	X

<sup>50</sup> E-mail by the Ministry of Social Affairs of 8 July 2020

Tallinn	Fertilitas AS	X					
Tallinn	East Tallinn Central Hospital	X	X	X	X	X	X
Tallinn	West Tallinn Central Hospital	X	X	X	X	X	X
Tallinn	Medicum AS	X	X				
Tallinn	Osaühing Estmedica Tervisekeskus			X	X	X	X
Tallinn	OÜ BALNEOM			X	X	X	X
Tallinn	North Estonia Medical Centre	X	X	X	X	X	X
Tallinn	Albinea Foundation			X	X	X	X
Tartu	Aktsiaselts MEDITA BALTICS				X	X	X
Tartu	Tamme Erakliinik AS			X	X	X	X
Tartu	Tartu University Hospital	X	X	X	X	X	X
Valga municipality	Valga Hospital	X	X	X	X	X	X
Valga municipality	Valga Naistearst Ene Kornet OÜ			X	X	X	X
Viimsi municipality	Fertilitas AS		X	X			
Viljandi	Heli Tobre Erakliinik OÜ			X	X	X	X
Viljandi municipality	Viljandi Hospital	X	X	X	X	X	X
Viru-Nigula municipality	Kõiva Maie private practice			X	X	X	X
Võru	AS PMA			X	X	X	X
Võru municipality	South Estonian Hospital	X	X	X	X	X	X

Source: National Audit Office based on the data of the Estonian Health Insurance Fund

**Table 17. Breast cancer screening providers by counties in 2016–2021**

County	Medical institution	2016	2017	2018	2019	2020	2021
Harju County	East Tallinn Central Hospital	X	X	X	X	X	X
Harju County	Tartu University Hospital			X	X		
Harju County	Mammograaf AS	X	X	X	X	X	X
Harju County	North Estonia Medical Centre	X	X	X	X	X	X
Hiiumaa	Mammograaf AS	X	X	X	X	X	X
Ida-Viru County	Tartu University Hospital						X
Ida-Viru County	Mammograaf AS			X	X	X	X
Ida-Viru County	Ida-Viru Central Hospital	X	X	X	X	X	X
Ida-Viru County	North Estonia Medical Centre	X	X	X	X	X	X
Jõgeva County	Tartu University Hospital	X	X	X	X	X	X
Järva County	Tartu University Hospital	X	X	X	X	X	X
Lääne County	Mammograaf AS	X	X	X			
Lääne County	North Estonia Medical Centre	X	X	X	X	X	X

Lääne-Viru County	Mammograaf AS	X	X	X	X	X	X
Põlva County	Tartu University Hospital	X	X	X	X	X	X
Pärnu County	Mammograaf AS			X	X	X	X
Pärnu County	Pärnu Hospital	X	X	X	X	X	X
Raplamaa	Tartu University Hospital	X	X	X	X	X	X
Raplamaa	Mammograaf AS	X	X	X	X	X	X
Saaremaa	Tartu University Hospital					X	
Saaremaa	Mammograaf AS	X	X	X	X	X	X
Tartu County	Tartu University Hospital	X	X	X	X	X	X
Tartu County	Mammograaf AS					X	
Valga County	Tartu University Hospital	X	X	X	X	X	X
Viljandi County	Tartu University Hospital	X	X	X	X	X	
Võru County	Tartu University Hospital	X	X	X	X	X	X

Source: National Audit Office based on the data of the Estonian Health Insurance Fund

Colon cancer screenings were first conducted in Estonia in July 2016. The target group includes men and women aged 60-69 and they are screened every two years. In the first year of the screening, a single year age group was invited, and in each subsequent year, one age group of up to five age groups is added.<sup>51</sup>

People in the target group have the opportunity to turn to their family physician and inform the physician about their wish to participate in the screening. The patient receives a home sampling set from their family physician. The set includes a sample container, information material, a questionnaire and a pre-paid envelope with the address of the laboratory on it. The person takes the sample at home and then mails it to the laboratory. If the test is positive, the family physician will prepare a referral for colonoscopy.<sup>52</sup> Further testing is required if the fecal occult blood test is positive. A notification and information about the further action will be sent to the person's home.

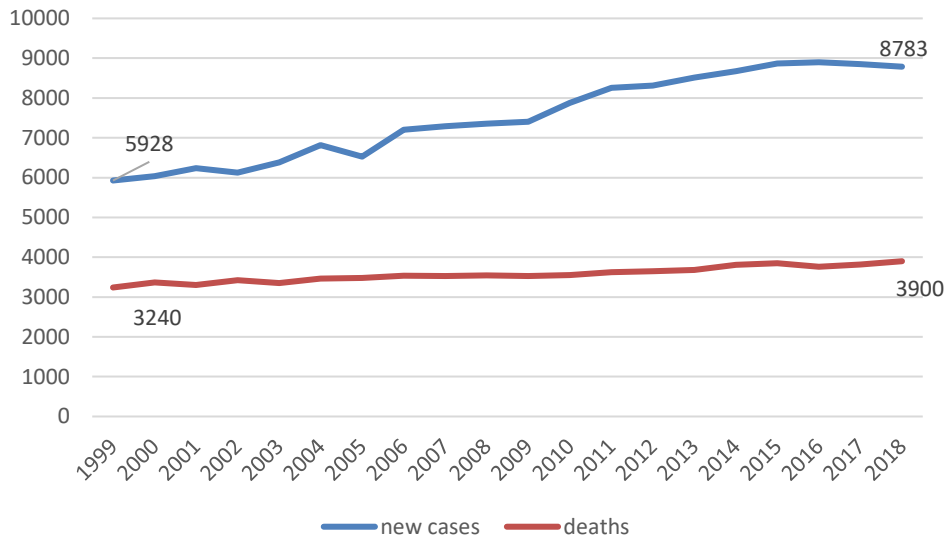
<sup>51</sup> <https://www.tai.ee/et/tegevused/tervise-edendamise/vahi-ennetamine>

<sup>52</sup> <https://www.haigekassa.ee/inimesele/haiguste-ennetus/jamesoolevahi-soeluuring>

## Annex C. Overview of the field

Almost 9,000 people are diagnosed with cancer in Estonia every year, and more than 3,800 people die of malignancies, which forms almost a quarter of all deaths. Over the last twenty years, the number of primary cases of cancer has increased by almost half, i.e., from about 6,000 cases to about 9,000 cases (see Figure 20). Cancer mortality has risen less, from about 3,200 to 3,900 cases.

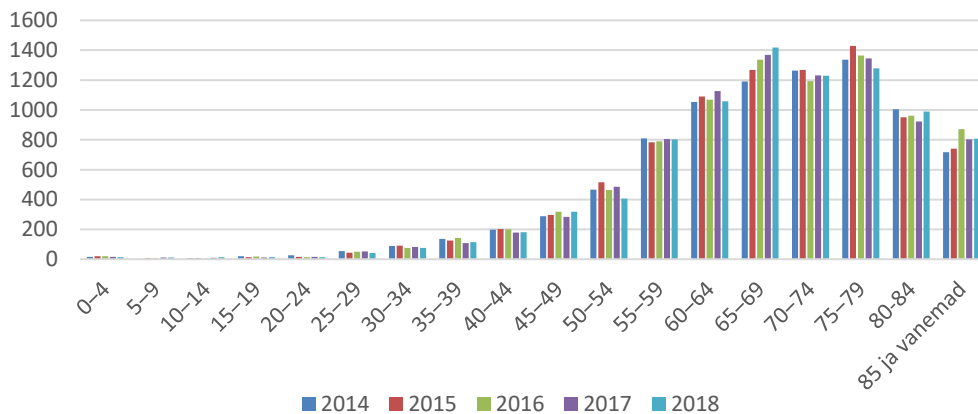
Figure 20. New cases of malignant neoplasms and deaths in 1999–2018



Source: The National Audit Office based on the data of the National Institute for Health Development

In 2018, 86% of cancer cases were diagnosed in people aged 55 and older. The increase in the total number of cancer cases is related to the aging of the population (see Figure 21). For younger people, the incidence has increased in certain sites (e.g., stomach cancer) and is related to diet and lifestyle.<sup>53</sup>

Figure 21. New cases of malignant neoplasms by age group



Source: The National Audit Office based on the data of the National Institute for Health Development

<sup>53</sup> Interview with Helis Pokker, Medical Director of the North- Estonia Medical Center, 23 September 2019.

According to the cancer diagnoses registered in 2018, the most common malignancy in men was prostate cancer, which accounted for 26% of all cancers. The incidence was followed by lung cancer (14%), colon and rectal cancer in men at 11%, followed by gastric cancer (4%).

Breast cancer and colorectal cancer were the most common among women, accounting for 19% and 12%, respectively, of all new cases; these were followed by lung cancer and uterine cancer with 6% and 5%, respectively.

### **Cancer detection and treatment**

For the purpose of prevention and early detection of cancer, breast cancer, colorectal, and cervical cancer health screenings are held in Estonia.

If a family physician or medical specialist suspects cancer, the patient should be referred for treatment according to treatment guidelines. As symptoms may not be unambiguous, diagnosing can be difficult. Various tests are used to detect cancer, such as blood and bone marrow scans, X-rays, computed tomography, magnetic scans, biopsy of tumour tissue, endoscopic scans, and ultrasound scans. Histological examination or tissue examination provides definitive information about the nature of the tumour. If necessary, additional tests will be performed during treatment.

In cancer treatment, different methods are used that are often combined.

Surgical treatment is the removal of a cancerous lesion or lesions by surgery. This is the main treatment option for patients whose cancer has not spread beyond the original site to other parts of the body.

Radiation treatment damages cancer cells so that they die. It is usually used as a separate treatment or as an alternative to surgical treatment. Radiation therapy is often required before or after surgery and/or simultaneously with chemotherapy.

Chemotherapy (systemic treatment of tumours) kills tumour cells with pharmaceuticals. For several cancer sites, chemotherapy is used sequentially or at simultaneously with surgery and radiation. In case of stage IV cancer, systemic therapy is the main method of treatment and the purpose of it is to prolong the patient's life and improve their quality of life.

Biological therapy or target therapy is the latest branch of anti-tumour systemic therapy, in which the drug affects the tumour cell through a specific protein, receptor, gene change, etc., as a result of which the growth of the tumour is inhibited and the tumour shrinks. Immunotherapy has also been introduced as a new approach, in which the body's own immune system is triggered to kill the cancer.

With the introduction of personalized medicine, cancer treatment is becoming more effective and less toxic, but such treatment has so far been rarely used in Estonia. The basis of personal medicine in oncology is the identification of gene changes in a patient's tumour tissue and the treatment with a specific drug that affects the identified gene changes so that the tumour recedes. Personal medicine is the basis of biological treatment or target therapy.

In genetics, it is already possible to detect gene mutations that cause certain inherited tumour syndromes, and as a result, the disease can be predicted, which enables to improve the quality of life and prolong life. The detection of these genetic changes in healthy adults helps prevent the development of hereditary tumours (such as breast, ovarian and bowel cancer). So far, personalized treatment is not available in Estonia, and initial gene projects are in progress.

Patients are also supported with palliative care to relieve symptoms and improve coping during and after treatment. Supportive home care and rehabilitation are also available.

In Estonia, two regional hospitals offer all cancer treatment services to adults: Tartu University Hospital and North Estonia Medical Centre. By decision of the Multidisciplinary Oncology Council of the regional hospital (consisting of four specialists), the patient can be referred to a central hospital for elective surgery

of the malignancy.<sup>54</sup> East Tallinn Central Hospital offers systemic therapy, oncological surgery and nuclear medicine services on the basis of an oncology activity license. Oncology treatment services (in the sense of chemotherapy) are also provided at the East Tallinn Central Hospital and from 2014 at Pärnu Hospital, from 2018 at Ida-Viru Central Hospital (in cooperation with North Estonia Medical Centre and Tartu University Hospital) and from 2020 at Kuressaare Hospital (in cooperation with East Tallinn Central Hospital).<sup>55</sup>

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<sup>54</sup> Regulation of the Minister of Social Affairs “Requirements for hospital types”, RT I, 1 June 2016, 7.

<sup>55</sup> Cancer Control Plan for 2021-2030.

## Annex D. Time of arrival at examinations

**Table 18. The average time in days the patient arrived to the examination after the first visit to their family physician**

Examination	Colon	Cervix	Breast	Lung
Ultrasound	7	2	*	12
Gastroscopy	16	10	*	*
Colonoscopy	30	*	*	*
X-ray	*	*	at the same day	3
Mammogram	*	*	12	*
Other	*	*	at the same day	12

\* This survey is not used for this site.

Source: The National Audit Office on the basis of expert work

**Table 19. The average time in days the patients arrived to examinations prescribed by a medical specialist**

Examination	Cervix	Breast	Colon	Lung
X-ray	at the same day	4	at the same day	1
Ultrasound	5	11	2	10
Computed tomography	5	14	8	6
Magnetic resonance imaging	15	17	22	15
Radiological procedures	*	10	*	at the same day
Mammogram	4	4	*	*
Metastasis biopsy	*	*	37	*
Transthoracic biopsy	*	*	*	7
Nuclear medicine diagnostics	44	*	*	90
Non-surgical tissue sampling for examination	*	8	*	*
Urological procedures and diagnostics	3	*	32	45
Endoscopies	*	*	13	2
Cytological analysis	3	7	at the same day	6
Bronchoscopy	*	*	*	7
HPV testing	19	*	*	*
Colposcopy	44	*	*	*
Cervical biopsy	25	*	*	*
Diagnostic surgery	71	*	*	*
Laboratory tests	at the same day	6	82	2
Blood pressure, lung and other function tests	*	*	*	1
Other	*	5	*	4

\* This survey is not used for this site.

Source: The National Audit Office on the basis of expert work

**Table 20. The average time in days the patients arrived to examinations prescribed by a cancer specialist**

Examination	Breast	Cervix	Colon	Lung
X-ray	2	at the same day	10	*
Coarse needle biopsy	5	*	*	41
Ultrasound	8	*	*	*
Computed tomography	15	13	8	47
Magnetic resonance imaging	9	18	8	*
Nuclear medicine diagnostics	21	42	9	11
Cytological analysis	2	at the same day	*	*
HPV testing	*	43	*	*
Colposcopy	*	at the same day	*	*
Colonoscopy	*	*	10	*
Mammogram	4	*	*	*
Other	5	*	1	8

\* This survey is not used for this site.

Source: The National Audit Office on the basis of expert work

## Annex E. Amendments to the List of Health Services

Figure 22. Amendments to the List of Health Services



Source: [Health Insurance Fund home page](#)

## Annex F. Statistics on treatment invoices by the Health Insurance Fund 2016–2020

Table 21. Treatment invoices submitted by the three largest hospitals (with a primary or co-diagnosis of cancer (C00-D09)) for the four largest types of treatment in the period of 2016-2020

	Proportion of treatment costs for similar treatments in three hospitals	Total treatment invoices 2016–2020 (in euros)	Increase in treatment invoices 2016 <i>versus</i> 2020 (in euros)	Increase % 2016 <i>versus</i> 2020
<b>Surgical treatment</b>				
East Tallinn Central Hospital	13%	18 391 482	1 391 228	46%
Tartu University Hospital	35%	47 666 553	3 748 929	49%
North Estonia Medical Centre	52%	72 156 082	3 156 868	25%
<b>Chemotherapy</b>				
East Tallinn Central Hospital	9%	14 093 119	37 443	1%
Tartu University Hospital	37%	56 991 526	2 805 279	27%
North Estonia Medical Centre	54%	81 455 275	5 947 448	43%
<b>Radiation therapy</b>				
East Tallinn Central Hospital	1%	454 351	-29 595	-22%
Tartu University Hospital	31%	15 439 510	2 335 945	119%
North Estonia Medical Centre	68%	34 519 451	1 676 166	28%
<b>Nuclear medicine</b>				
East Tallinn Central Hospital	16%	4 537 518	350 293	50%
Tartu University Hospital	23%	6 573 315	950 405	121%
North Estonia Medical Centre	61%	17 036 290	2 496 210	106%

Source: National Audit Office based on the data of the Estonian Health Insurance Fund

## Annex G. OECD statistics on national health care costs and survival of breast cancer patients in 2019

Table 22. OECD statistics on health care costs and breast cancer patients

Country	Health care costs <i>per capita</i>	5-year survival rate for breast cancer (%)
Australia	5005	89.5
Austria	5395	84.8
Belgium	4944	86.4
Canada	4974	88.6
Chile	2182	75.5
Czech Republic	3058	81.4
Denmark	5299	86.1
Estonia	2231	76.6
Finland	4228	88.5
France	4965	86.7
Germany	5986	86.0
Iceland	4349	89.1
Ireland	4915	82.0
Israel	2780	88.0
Italy	3428	86.0
Japan	4766	89.4
South Korea	3192	86.6
Latvia	1749	76.9
Lithuania	2416	73.5
The Netherlands	5288	86.6
New Zealand	3923	87.6
Norway	6187	87.2
Poland	2056	76.5
Portugal	2861	87.6
Slovakia	2290	75.5
Slovenia	2859	83.5
Spain	3323	85.3
Sweden	5447	88.8
Switzerland	7317	86.2
Turkey	1227	82.1
UK	4070	85.6
USA	10586	90.2
OECD average	3994	84.5

Source: National Audit Office based on the indicators in the OECD report "Health at a Glance" (2019)