

# Time of submitting the inpatient and day care epicrises to the Health Information System in 2015



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National Institute for Health Development

National Institute for Health Development

Department of Health Statistics

**Time of submitting the inpatient and day care  
epicrises to the health information system in 2015**

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## Used abbreviations/names

<b>ETCH</b>	East-Tallinn Central Hospital
<b>EVCH</b>	East-Viru Central Hospital
<b>TUH</b>	Tartu University Hospital
<b>WTCH</b>	West-Tallinn Central Hospital
<b>NEMC</b>	North Estonia Medical Centre
<b>NIHD</b>	National Institute for Health Development
<b>HIS</b>	Health Information System

## Objective

The National Institute for Health Development (NIHD) will continue with the evaluation of the data quality of the Health Information System (HIS). The analysis of the time between the end date of the inpatient and day care cases and the submission of summary documents (epicrisis) to the HIS with the 2015 data has been prepared to determine:

- whether and how fast after the end of the inpatient or day care case the first summary was sent to the Health Information System;
- whether and how many times, the first initial summary was modified in 2015;
- whether there have been any changes in sending the epicrisis over 2015 compared to 2014;
- how the practices of the health care service providers differ when sending the documents, and which health care service providers have shortcomings.

The Department of Health Statistics of the NIHD uses the analysis results to plan the preparation of the official health statistics based on the HIS data and make proposals in order to change the organisation of the current information exchange of the HIS, if necessary.

The analysis is also intended for analysts of the e-health of the Ministry of Social Affairs and the Estonian e-Health Foundation, for users of the inpatient and day care epicrisis data of the HIS, and for the health care service providers who send the epicrisis to the HIS.

## 1. Initial data

The analysis is based on an extraction of the health information system data received from the Estonian e-Health Foundation on the inpatient and day care epicrisis that had ended in 2015. The data extraction from the HIS was taken as of 31 May 2016. The analysis included 62,443 day care and 207,117 inpatient care entries of the year 2015.

The characteristics to be analysed are the end date of the case, the dates on which the first document and last entered to the HIS, and the number of versions of the document.

The number of versions does not represent the version number derived from the document, but indicates the number of times the document has been entered to HIS (including the number of times when the button send the document is pressed). The extraction includes documents of which there is a valid version available in HIS.

The characteristics in the received file were as follows:

**Asutus [Institution]**  
**Kood] [Code]**  
**Dokumendi\_nr [Document\_No]**  
**Juhtumi\_nr [Case\_No]**  
**Juhtumi\_lõppkp [Case\_enddate]**  
**Esmane\_sisestamine [First\_entry]**  
**Viimane\_sisestamine [Last\_entry]**  
**Dok\_arv [Doc\_quantity]**

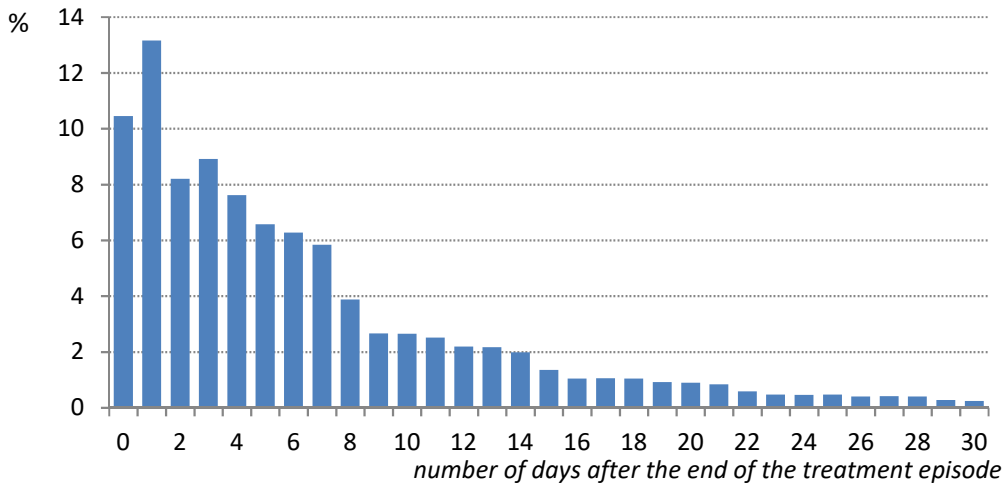
The conditions and characteristics of the extraction were the same as in the extraction that was completed for January 2014 and submitted to the Health Statistics Department of NIHD by the Estonian e-Health Foundation a year earlier. Therefore, also the data of the previous extraction (taken in February 2015) has been used in addition to the 2015 data to evaluate the changes over time. While the 2015 extraction covered the entire year, the data of one month – January – could be used for 2014.

North Estonia Medical Centre and Hiiumaa Hospital submitted the summaries of the day care treatment cases to the HIS on the inpatient epicrisis. It was possible to distinguish the day care cases of North Estonia Medical Centre from the inpatient ones based on the HIS statistical module document number and hospital bed specialty and are added to the day care in the analysis (except for the coverage of the inpatient epicrisis). It is not possible to distinguish day care epicrisis from the inpatient care epicrisis in Hiiumaa Hospital.

## 2. Results

### 2.1 Inpatient care

The information on the inpatient cases that had ended in 2015 was forwarded to the HIS in 10.4% of cases on the day of leaving the hospital. A total of 13.2% of epicrisis were transferred to the HIS on the following day and 8.2% on the day after the following day. While 9% of epicrisis were sent on the third day, the transfer started to decrease in time after that. The greatest decline in the transfer intensity took place from the eighth and ninth day from the discharge – 5.8% of documents were sent on the seventh day, 3.9% on the eighth day, and 2.7 on the ninth day. From the 15th day, the share of the transferred epicrisis fell below 2% per day.



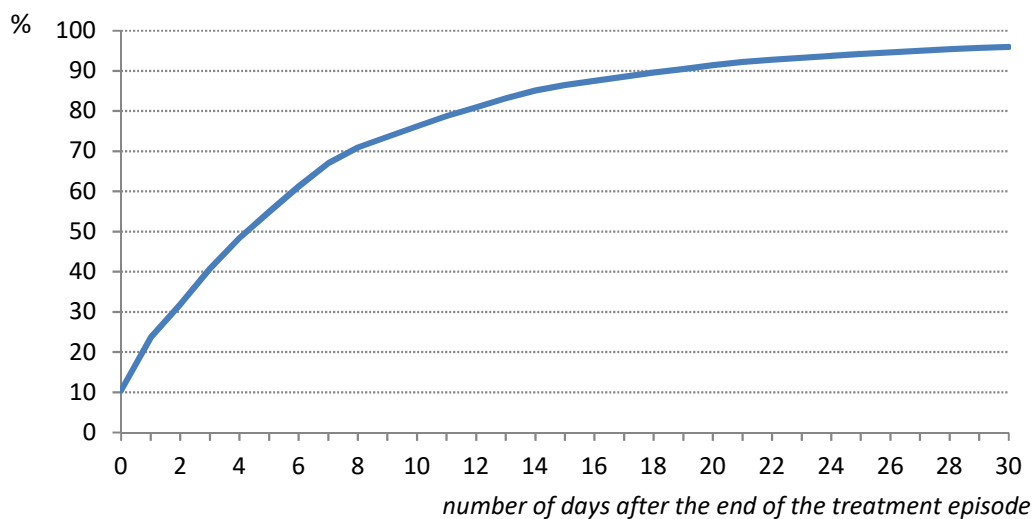
0 – inpatient epicrisis was sent to the Health Information System on the same day

**Figure 1. Submission of inpatient epicrisis during the first 30 days, 2015**

If 40% of documents are sent within the first four days (days 0–3), the two thirds (67%) are sent within the first eight days (Figure 2). Two weeks after the patient has left the hospital, in 85% of



cases, the summary has been sent to the HIS, and for 15% of cases, the summary information has not arrived to the HIS yet. Within 30 days of the end of the case, 96% of epicrisis have been sent to the HIS.



**Figure 2. Cumulative submission of the inpatient epicrisis during the first 30 days, 2015**

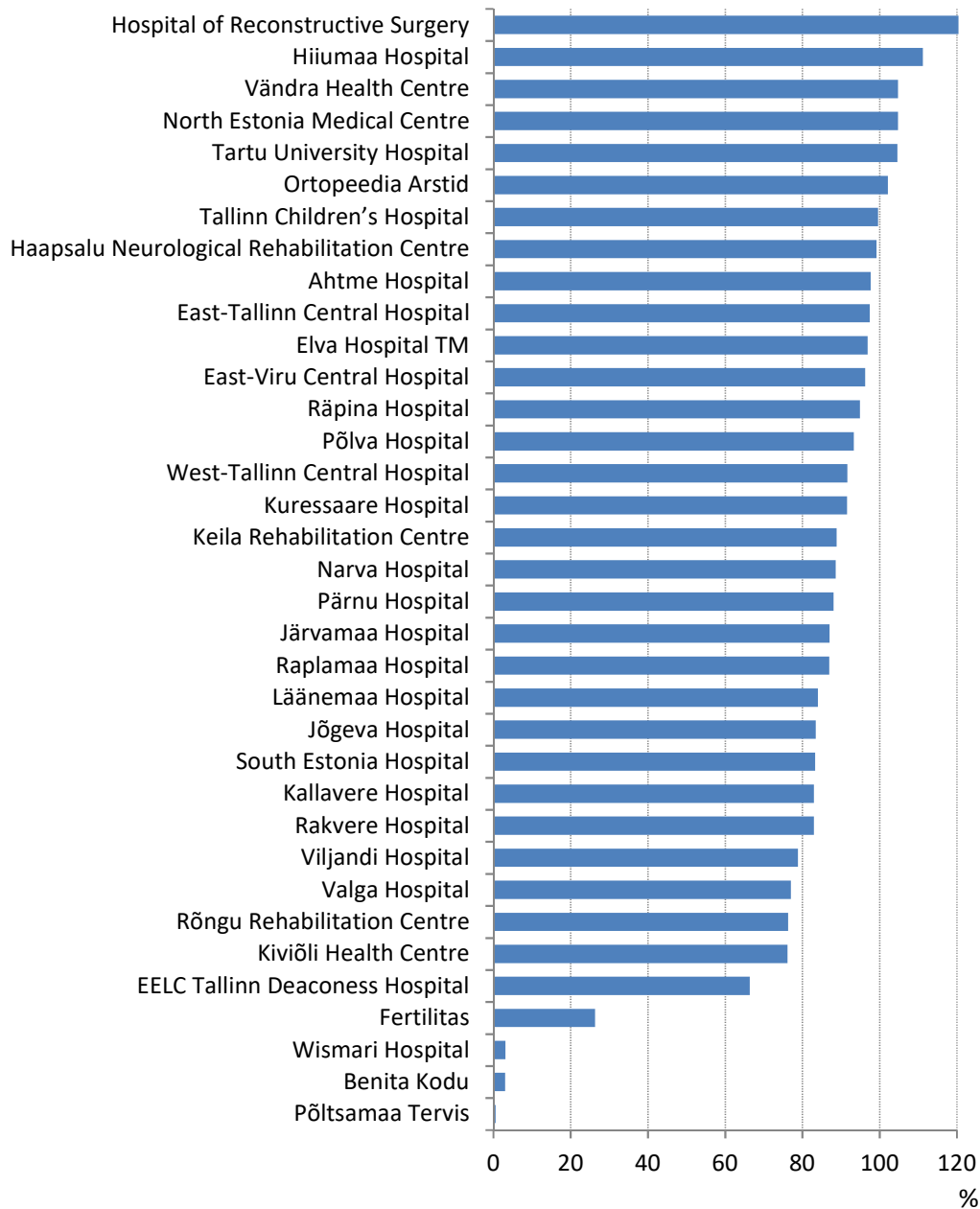
Here, it should be emphasised that only those cases that ended in 2015 are observed on which a summary information until the extraction date (31 May 2016) was sent, and those on which the information did not reach to the HIS by that time are left out. Although the purpose of the given analysis is not to research the coverage of data of the corresponding treatment episodes in the HIS, it is important to remember that in addition to the sent epicrisis there are treatment episodes on which data is never sent to the HIS.

In the health statistics reports, where day care data is provided separately, the preliminary<sup>1</sup> data indicates that 232,278 discharged patients left the inpatient care in 2015 (with those transferred to another hospital). According to the epicrisis in the HIS, there were 207,117 inpatient care cases (with the day care cases in North Estonia Medical Centre and Hiiumaa Hospital). Therefore, the coverage includes 89% of cases on the basis of the general data, and the gap between is approximately 25 thousand cases.

In case of six health care service providers, the number of the HIS cases exceeds the data provided with the health statistics report (Figure 3). When subtracting the day care treatment cases of the North Estonia Medical Centre and Hiiumaa Hospital from the number of inpatient epicrisis, the coverage of the hospital care treatment cases remains at 85%. Therefore, the submission of the day care epicrisis is also not 100% in these two hospitals. The assumptions about the difference in the number of cases in the remaining four hospitals are not available without further study – perhaps it is double sending, perhaps this happens for other reasons. For the next ten hospitals, the coverage is over 90%, for another ten ones, between 80–90%, and in case of four hospitals, between 70–80%. Taking into account the current coverage and the quality of the epicrisis data, the production of

<sup>1</sup> The final data of 2015 will be published in the NIHD Health statistics and health research database on 5 October 2016.

statistics requires that the service providers would send a summary on each treatment case that has ended.

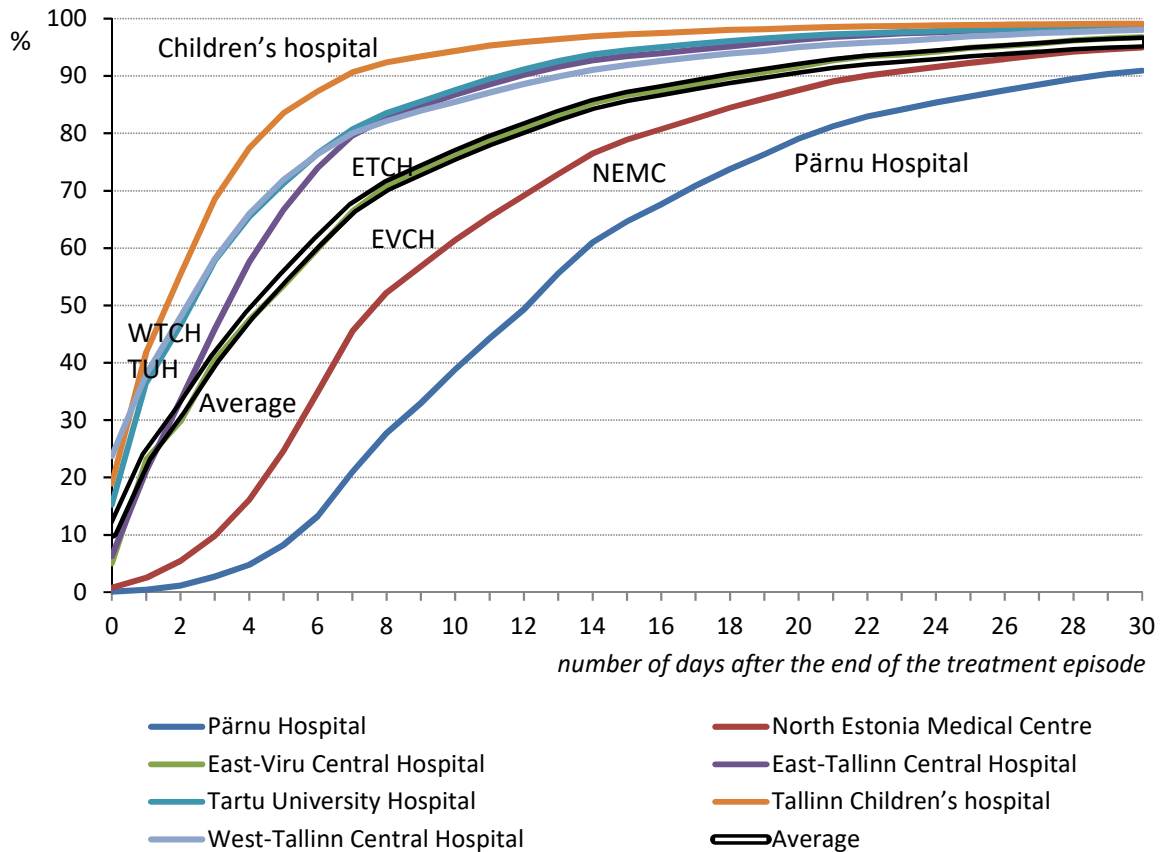


**Figure 3. Coverage of the inpatient epicrisis according to the service providers who sent the epicrisis, 2015**

The sending practice of the hospital documents is rather different, and this is illustrated by the following Figures 4–6 according to the hospital type. All the figures show for the comparison the Estonian average of sending inpatient epicrisis.

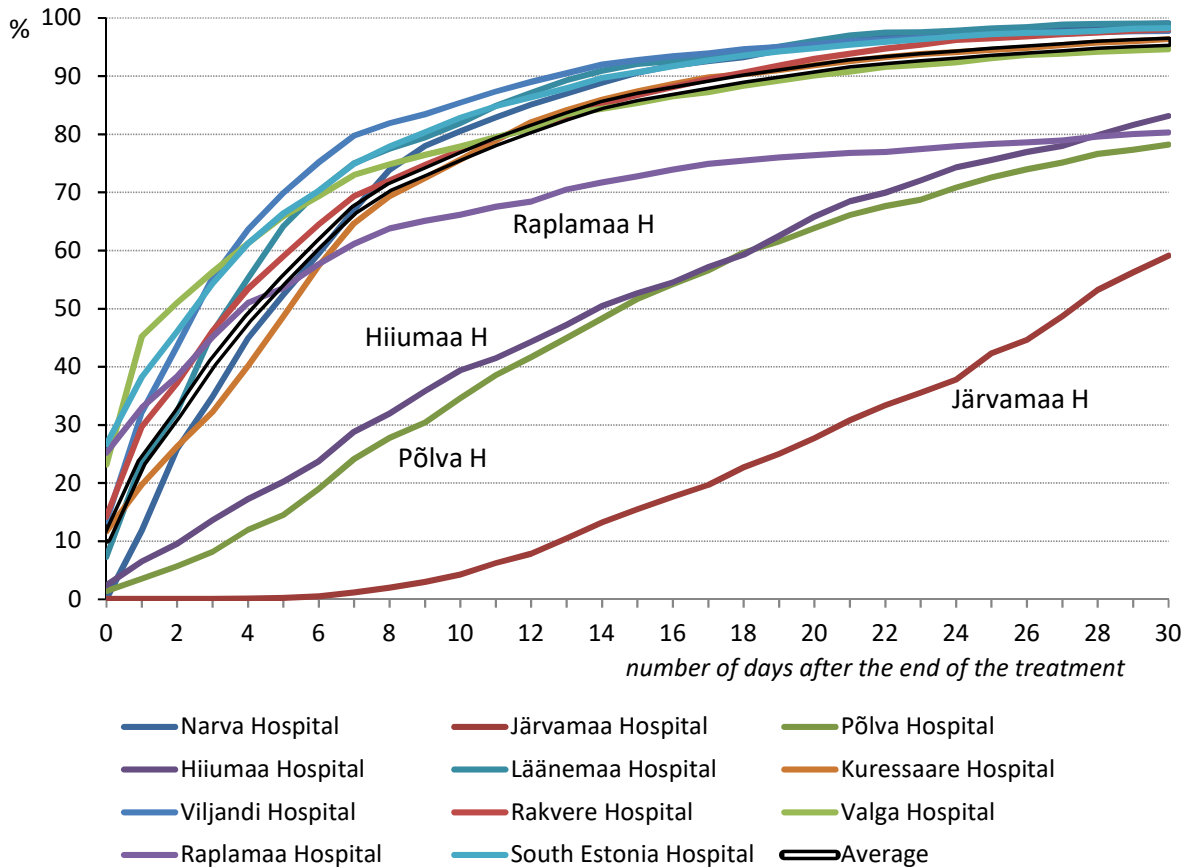
Of regional and central hospitals, Pärnu Hospital and North Estonia Medical Centre send their summaries somewhat later, however, Tallinn Children's Hospital, Tartu University Hospital, as well as East-Tallinn Central Hospital and West-Tallinn Central Hospital are somewhat faster in this regard

(Figure 4). Compared to the average, the information is forwarded from East-Viru Central Hospital. The coverage of the cases of Pärnu Hospital is the lowest in the given group – 88% (Figure 3).



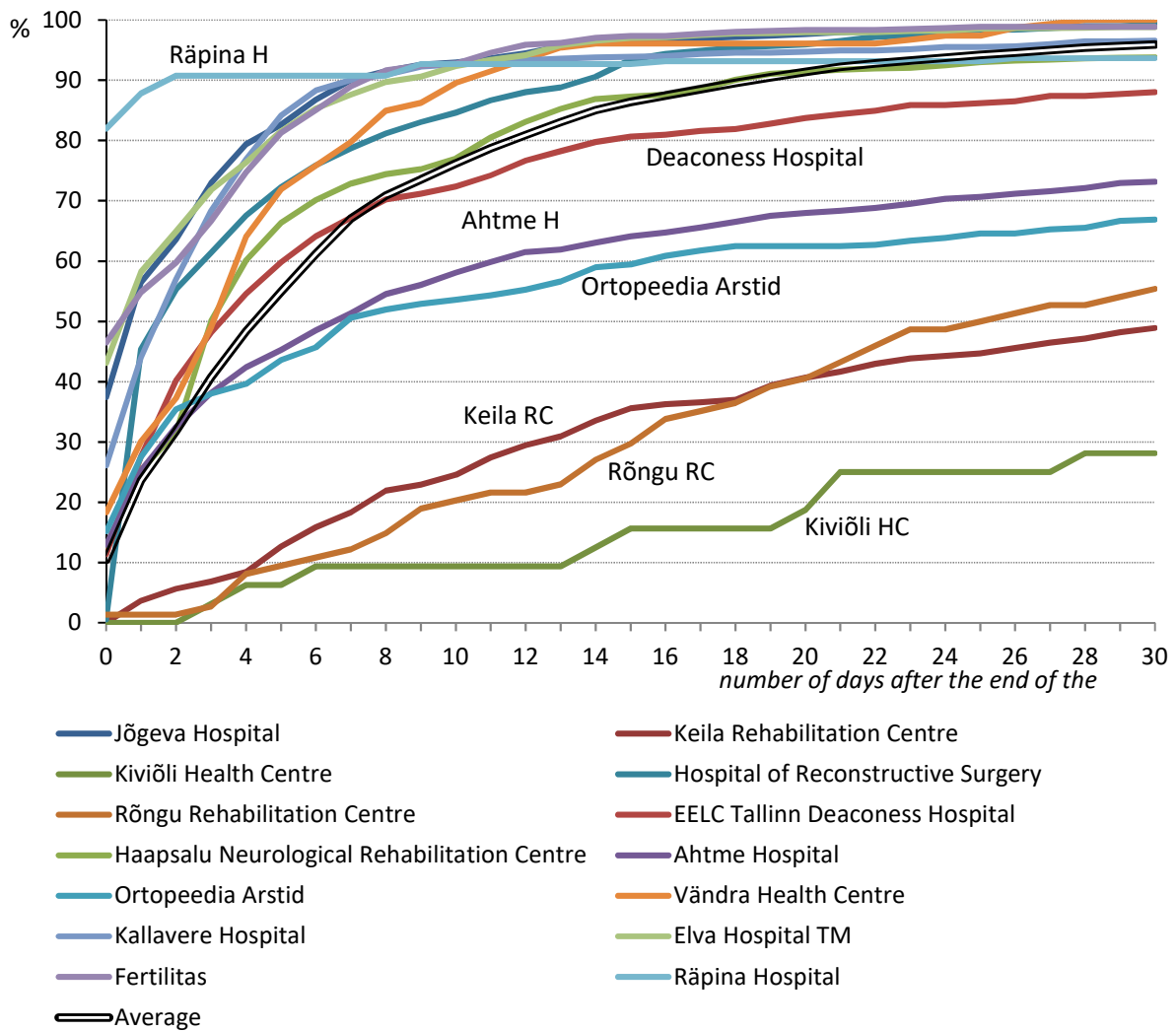
**Figure 4. Cumulative submission of the inpatient epicrisis from regional and central hospitals during the first 30 days, 2015**

When speaking about general hospitals, it can be said that the transfer of the documents is significantly slower in Järvamaa, Põlva, Hiiumaa, and Raplamaa hospitals (Figure 5). Even after 30 days, more epicrisis are missing compared to the other hospitals. Considering the need of statistics in the transition to the HIS data, the reasons for delays in these hospitals need to be identified and the speed of data transmission should be increased at least to the average level.



**Figure 5. Cumulative submission of the inpatient epicrisis from general hospitals during the first 30 days, 2015**

When leaving Benita Kodu, Põltsamaa Tervis and Wismari Hospital aside, which present a summary of the treatment episode on less than 10% of discharged patients to the HIS, from the rest of the hospitals send six ones their first epicrisis to the HIS with bigger delay than average (Figure 6).



**Figure 6. Cumulative submission of the inpatient epicrisis from the rest of the hospitals during the first 30 days, 2015**

It can be said that among those hospitals that send information to the HIS are those who make it fast and those who take time before sending. At the end of the first week, two-thirds of epicrisis have been sent to the HIS about discharged from hospital. There are great differences between hospitals in sending, which may be due to the specificity of information systems, the internal guidelines for documentation, or the missing of the supervision of the sending process. In accordance with the recent instructions on completing the inpatient epicrisis, the sending term of an epicrisis is determined to be five working days of the confirmation of an epicrisis<sup>2</sup>. It is important to send the first epicrisis to the HIS at least within five working days after the discharge and send an updated version later.

The problem also lies in **the information that is not sent**. Figure 3 illustrates the coverage of cases on the health care service providers who sent the epicrisis to the HIS. While the Health Information

<sup>2</sup> The manual has been published on the website of the Estonian e-Health Foundation in Estonian: <http://pub.e-tervis.ee/manuals/Statsionaarse%20epikriisi%20t%C3%A4itmise%20juhend>.

System failed to receive about 25,000 summaries of hospital treatment cases compared to the statistical reports, over 5,000 of these, or approximately one-fifth of the missing data derived from the hospitals that did not send a single summary to the HIS in 2015 (Table 1).

**Table 1. Health care service providers who have not sent the inpatient epicrisis and the number of patients who left hospital according to the health statistics reports, 2015**

	Name of the health care service provider	Number of persons discharged from the hospital
1	Villa Medica	15
2	Elite Clinic	41
3	Tõrva Hospital	72
4	Clinica	89
5	Alutaguse Care Centre	99
6	Total of prisons	105
7	Mustvee Tervis	108
8	Pärnu-Jaagupi Nursing Home	118
9	Lõhavere Health and Care Centre	120
10	Northeast Local Hospital	123
11	Abja Hospital	151
12	Koeru Care Centre	158
13	Kilingi-Nõmme Health and Care Centre	193
14	Peipsiveere Nursing Care Centre	199
15	Märjamaa Hospital	206
16	Almeda Nursing Hospital	209
17	Tapa Hospital	311
18	PJV Hooldusravi (Harjumaa)	1,069
19	Hiiu Medical Centre	1,819

In order to transfer to the official statistics produced on the basis of the HIS data, it is required to have the epicrisis of all service providers, including the inpatient nursing care service providers. It is not known how many epicrisis are not sent to the HIS and whether health care service providers verify the confirmation and sending coverage.

According to the number of sent versions, 93% of the epicrisis were sent once, 6% were sent twice and 1% three times. Although based from the used data was unknown how many repetitive transfers were due to excessive pressing on the send button, and how many included the actual updates of the documents, the repetitive transfer of documents is not very common. Less than 7% of hospital cases were related to more than one epicrisis.

**Table 2. Transfer of inpatient epicrisis by number of times, 2015**

Number of times	Number of epicrisis	%	Cumulative, %
1	192,676	93.0	93.0
2	11,964	5.8	98.8
3	2,043	1.0	99.8
4	316	0.2	99.9

5	87	0	100
6	20	0	100
7	5	0	100
8	1	0	100
10+	5	0	100
total	207,117	100	

The differences between hospitals in sending epicrisis within half a year of the end of the inpatient care episode are characterised in Table 3.

**Table 3. Cumulative sending of the inpatient epicrisis by hospitals according to the first delivery, 2015**

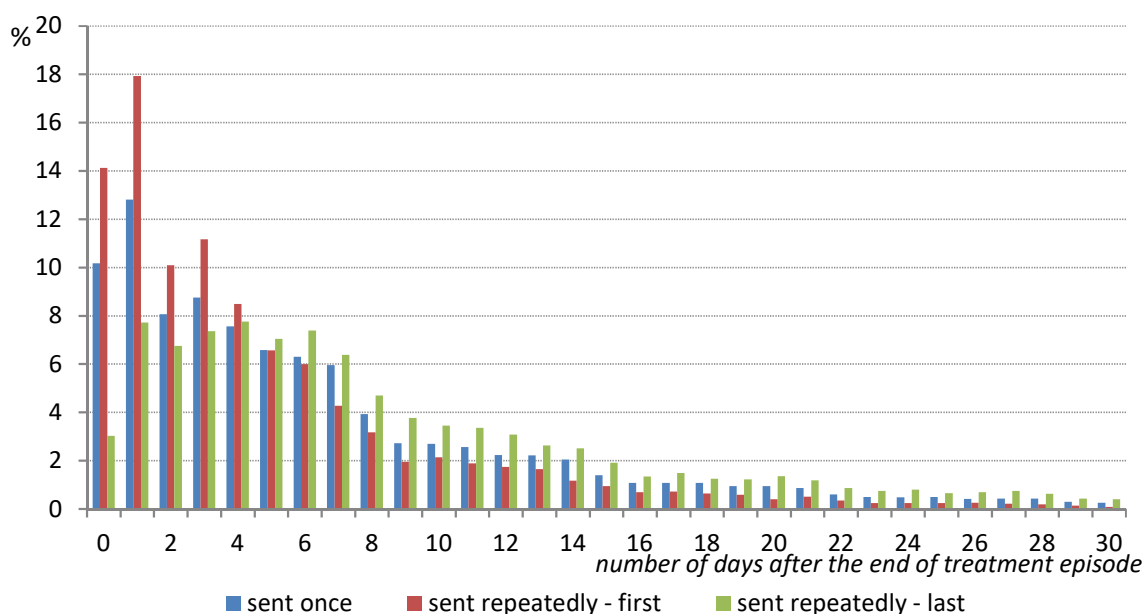
Health care service provider	From the end of the case to the first entry							
	before the end of the case	on the same day	1–3 days	4–7 days	8–14 days	15–30 days	31–90 days	91–180 days
Fertilitas	0.0%	46.5%	66.7%	89.0%	97.0%	98.9%	100.0%	100.0%
East-Tallinn Central Hospital	0.0%	6.3%	45.9%	79.6%	92.8%	98.8%	100.0%	100.0%
Järvamaa Hospital	0.0%	0.1%	0.1%	1.2%	13.3%	59.1%	98.5%	99.3%
Kallavere Hospital	0.0%	26.1%	68.3%	90.0%	93.8%	96.6%	100.0%	100.0%
West-Tallinn Central Hospital	0.0%	23.7%	58.1%	80.0%	91.1%	98.0%	99.6%	100.0%
Ortopeedia Arstid	0.0%	15.2%	38.0%	50.6%	59.0%	66.9%	88.6%	92.3%
Põlva Hospital	0.0%	1.4%	8.2%	24.1%	48.3%	78.2%	97.5%	99.8%
Rakvere Hospital	0.0%	14.2%	46.2%	69.4%	85.2%	98.0%	100.0%	100.0%
Räpina Hospital	6.3%	88.3%	97.1%	97.1%	99.0%	100.0%	100.0%	100.0%
Valga Hospital	0.1%	23.2%	56.4%	73.0%	84.5%	94.7%	99.0%	99.7%
Keila Rehabilitation Centre	0.0%	0.0%	6.8%	18.3%	33.5%	48.9%	81.3%	99.9%
South Estonia Hospital	0.1%	26.7%	54.4%	75.0%	89.8%	98.3%	99.7%	99.9%
Hospital of Reconstructive Surgery	0.3%	0.8%	61.6%	79.0%	90.8%	99.6%	100.0%	100.0%
Benita Kodu	0.0%	11.1%	11.1%	11.1%	33.3%	66.7%	100.0%	100.0%
Kuressaare Hospital	0.0%	11.7%	32.2%	64.7%	86.0%	96.4%	99.4%	99.9%
Läänemaa Hospital	0.0%	7.3%	45.9%	75.0%	91.0%	99.0%	99.9%	100.0%
Raplamaa Hospital	0.1%	25.3%	45.2%	61.2%	71.8%	80.4%	89.8%	96.0%
Ahtme Hospital	0.4%	13.3%	38.6%	51.7%	63.5%	73.6%	88.4%	92.5%
EELC Tallinn Deaconess Hospital	0.0%	11.3%	48.2%	67.2%	79.8%	88.0%	100.0%	100.0%
Elva Hospital TM	0.2%	43.3%	72.1%	87.9%	96.8%	99.0%	99.8%	99.9%
Haapsalu Neurological Rehabilitation Centre	0.0%	12.8%	50.0%	72.8%	86.9%	93.8%	99.6%	100.0%
Hiumaa Hospital	0.0%	2.4%	13.6%	28.8%	50.5%	83.1%	97.9%	99.4%
East-Viru Central Hospital	0.0%	5.1%	40.4%	66.4%	85.3%	96.8%	99.5%	99.8%
Jõgeva Hospital	0.0%	37.4%	72.9%	90.0%	96.3%	99.0%	99.9%	100.0%
Kiviõli Health Centre	0.0%	0.0%	3.1%	9.4%	12.5%	28.1%	100.0%	100.0%
Narva Hospital	0.0%	0.0%	34.9%	67.0%	88.8%	99.1%	99.9%	100.0%
North Estonia Medical Centre	0.0%	0.8%	9.8%	45.5%	76.5%	95.0%	99.5%	99.9%
Põltsamaa Tervis	0.0%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pärnu Hospital	0.0%	0.1%	2.7%	21.0%	61.0%	90.9%	98.8%	99.8%
Rõngu Rehabilitation Centre	0.0%	1.4%	2.7%	12.2%	27.0%	55.4%	75.7%	97.3%
Tallinn Children's Hospital	0.0%	18.9%	68.5%	90.6%	96.9%	99.1%	99.7%	100.0%
Tartu University Hospital	0.0%	15.3%	57.8%	80.7%	93.7%	98.6%	99.7%	99.9%
Viljandi Hospital	0.0%	13.4%	55.3%	79.8%	92.0%	97.8%	99.7%	99.7%

Vändra Health Centre	0.0%	18.3%	49.0%	79.7%	96.1%	100.0%	100.0%	100.0%
Wismari Hospital	0.0%	36.4%	69.1%	92.7%	100.0%	100.0%	100.0%	100.0%
Total	0.0%	10.5%	40.7%	67.0%	85.1%	95.9%	99.4%	99.8%

\* With regard to some epicrisises sent before the end of the case, there may be errors in the dates that emerge when the dates are compared with each other.

The difference in sending of documents of which one or several versions are available in the HIS by the day of the discharge are characterised by Figure 7. Most epicrisises are send within the first two days in both cases – on the day of leaving the hospital and the day after. In terms of repeated sending, there was a significantly higher sending rate within the first four days compared to the epicrisises sent once.

Epicrisises with more than one version are sent most frequently on the first, third, and fourth day after leaving the hospital. On the day of leaving the hospital, 3% of the last versions of repeated epicrisises are sent out. Within a week after leaving the hospital, the share of repeated epicrisises remains between 6% and 8% per day.



**Figure 7. Inpatient epicrisises sent once and several times by the day of sending, 2015**

After the 30th day, the share of the epicrisises to be sent is significantly reduced, some summaries are sent also a year later, as shown in Table 4.

**Table 4. Repeatedly transferred epicrisises by the time of transfer, 2015**

Number of days from the end of the case to submission	Number of epicrisises	%	Cumulative, %
on the same day	437	3.0	3.0
1–3 days	3,152	21.8	24.9
4–7 days	4,124	28.6	53.4
8–14 days	3,389	23.5	76.9



15–30 days	2,263	15.7	92.5
31–90 days	821	5.7	98.2
91–180 days	142	1.0	99.2
181–365 days	98	0.7	99.9
over a year	15	0.1	100.0
Total	14,441	100.0	

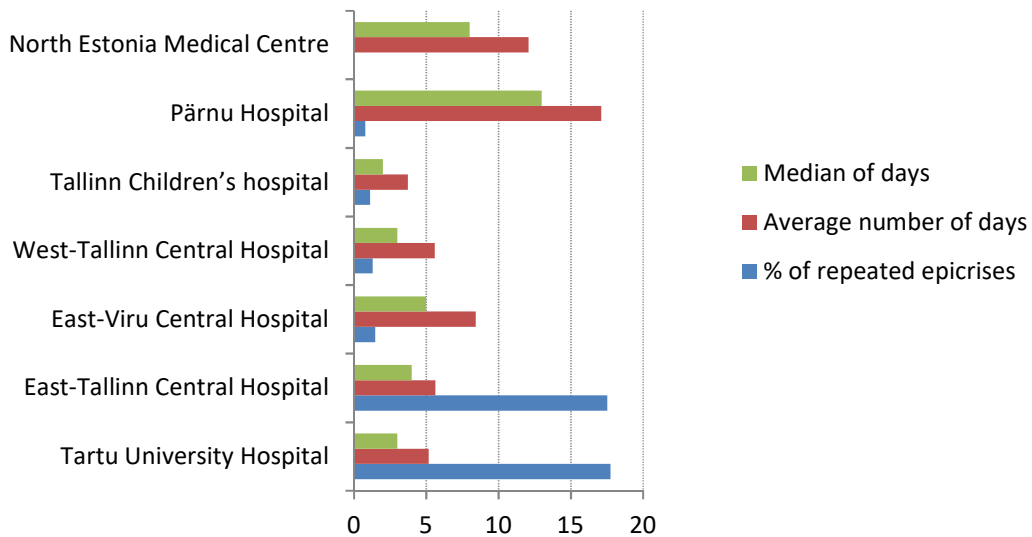
In case of documents with more than one version, the average number of days until the first sending is 5.4 days and until the last sending 13.8 days (Table 5). The median of the days, which indicates the day by which half of the epicrisis have been sent, is 3 days for the first sending and 7 days for the last sending. With regard to the documents sent once, the average number of days until the submission of the document to the HIS is nine days and the median is five days. This shows that documents sent faster require updates, which means extra work and time expenditure for a physician. If the document is not sent to the HIS immediately, usually one version will be confirmed, however, returning to an unfinished document does not result in significant work and time savings.

**Table 5. Differences in sending in days for the epicrisis sent once and several times, 2015**

	One submission	Several submissions	
		first	last
Number of cases	192,676	14,441	14,441
Submission days			
.. average	8.98	5.42	13.80
.. median	5	3	7
.. mode	1	1	4
.. standard deviation	17.5	8.7	29.5
.. percentiles 25%	2	1	4
.. percentiles 50%	5	3	7
.. percentiles 75%	10	7	14
.. percentiles 95%	28	18	40

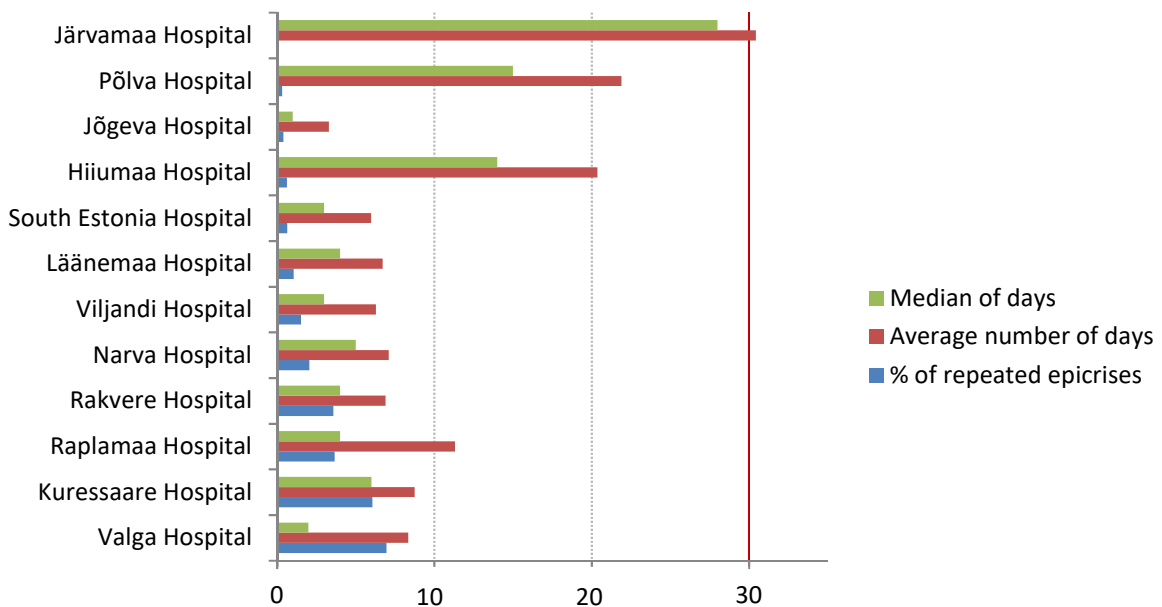
When investigating repeated submission by hospitals, appear hospitals that practically do not send updated versions of epicrisis. Figures 8–10 show the share of repeated epicrisis from the total number of inpatient epicrisis by hospitals with the median and average of the first submission day.

Hospitals are ranked in the figures according to the share of episodes repeatedly sent. Figure 8 of regional and central hospitals shows that the smaller the share of intercurrent epicrisis, the longer the delays in submitting the epicrisis to the HIS. The same phenomenon is also characterised by the median of the number of days elapsed before submitting – half of the epicrisis reach to the HIS faster when more intercurrent epicrisis are sent. North Estonia Medical Centre and Pärnu Hospital send relatively few repeated epicrisis and their average number of days from the end of the hospital care episode to sending the epicrisis to the HIS is significantly higher than is the case with East-Tallinn Central Hospital or Tartu University Hospital.



**Figure 8. The share of repeated epicrisis and the average time of sending in regional and central hospitals, 2015**

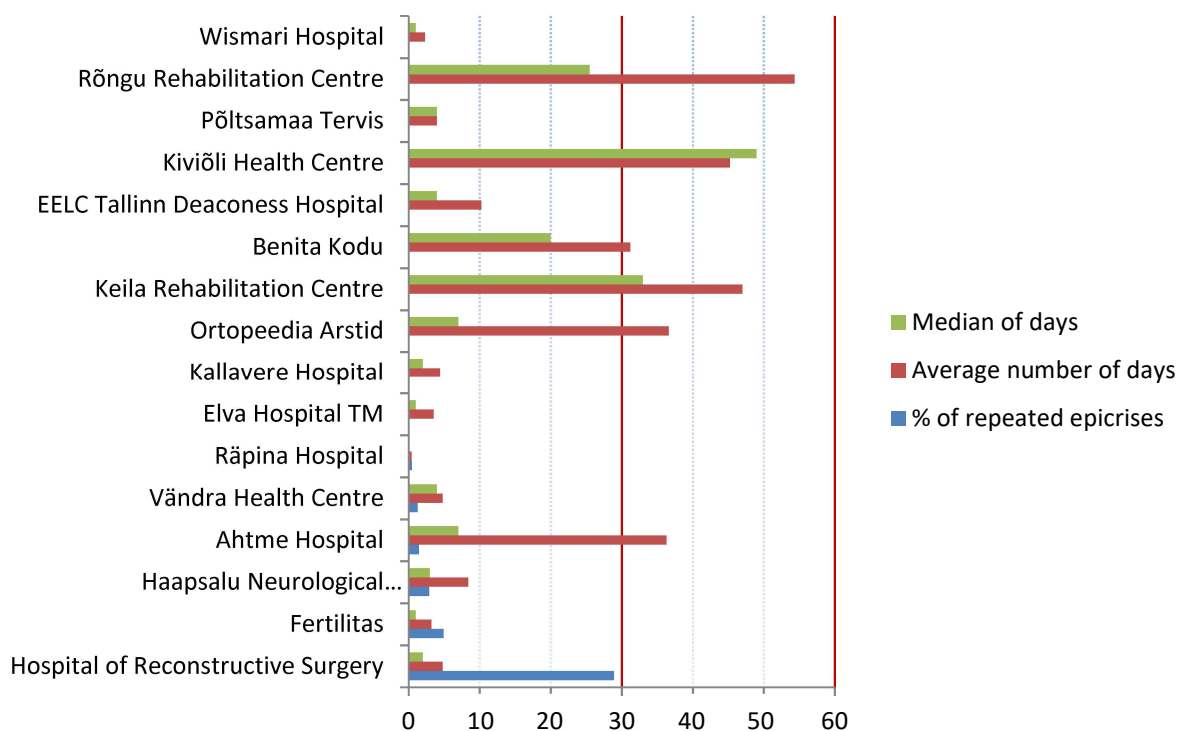
In general hospitals, a similar practice can be observed, where hospitals with a lower share of repeated documents have longer delays in transferring information; the figure shows significantly longer delays for the three hospitals. The difference in sending time may be due to differences in the information systems of the health care service providers.



**Figure 9. The share of repeated epicrisis and the average time of sending in general hospitals, 2015**

In the group of the rest of the hospitals, the average number of days for sending the documents to the HIS are even longer in some hospitals, although updates to the epicrisis could be less needed

after the discharge in this group of hospital, compared to the hospitals observed above (e.g. nursing care hospitals).



**Figure 10. The share of repeated epicrisis and the average time of sending in the rest of the hospitals, 2015**

Some hospitals only send epicrisis once but wait with the sending process until the specifications are received. The length of the delay is characterized by the difference between the end of the hospital care case and the time of the first submission to the HIS. On the one hand, any delays in sending allow to reduce the related additional work to send a new version later, but on the other hand, it can be concluded that the state does not prioritise fast data transfer to the HIS and through this to other health care service providers and physicians for use.

In the current situation, a family physician can receive information from the HIS on the hospital care episode after the patient has left the hospital within one week in 67% of cases and within two weeks in 85% of cases; information about the rest of the patients should be directly asked from them. Table 3 gives an overview of the prevailing diversity in the transfer process. If one wants to improve the speed with which documents are delivered and to ensure complete submission, more automated tools should be implemented and the work of physicians upon sending epicrisis should be simplified. Automatic epicrisis confirmation and sending reminders and controls can be implemented in the information systems of the health care service providers. However, the use of general national deadlines would have a significant effect. At the moment, the only deadline is in the manual on the completion of inpatient epicrisis – the document must be sent to the HIS within **five working days of the approval** of the epicrisis.

The need for sending updated versions of epicrisis arises both when additional data is received and when possible errors are corrected. The latter is not likely to be a common reason for updating the epicrisis, although the improvement at least of basic information is important for producing health statistics, for example, during one hospitalisation in stay dates in different departments. However, in practice, if the once sent epicrisis is not updated in the HIS upon receiving additional data with updated version, but a new document is sent instead, the number of cases will increase and the share of repetitive sending will decrease at the same time. Technical problems or employee skills in sending information to the HIS may, in turn, increase the number of repetitive documents sent. Duplicate documents must definitely be identified at least in the HIS, as these cases need to be counted once for statistics. It would be better if duplicate sending to the HIS is checked (the same patient, the same case) already in the information system of the health care service provider before sending it to the HIS.

## 2.2 Day care

In 2015, according to the health statistics reports (as of 13 June 2016), day care was provided by 55 service providers with 78,847 day care cases; in the HIS, based on epicrisis there was information only with regard to 23 service providers and on 62,443 cases. Thus, there are data in HIS only for 42% of service providers, covering 79% of day care cases. Most of the 32 health care service providers, who do not send the day care epicrisis to the HIS, are smaller service providers (up to 1,254 day care treatment cases in 2015). However, with regard to two of those health care service providers, the number of the day care treatment cases exceeded 1,000 per year; for two providers it was 800 and five providers had about 500 cases per year.

One cannot be satisfied with the coverage of the day care cases in the HIS also in terms of those service providers who sent epicrisis to the HIS (Figure 11). Those who send did so in 91% of day care cases. When comparing the coverage by health care service providers, the differences are quite high. A total of 11 health care service providers out of 23, i.e. almost a half of the service providers sent the epicrisis for more than 90% of cases. For another eight service providers, the coverage of cases was over 70%. For the remaining four hospitals, the coverage was much lower than among others.

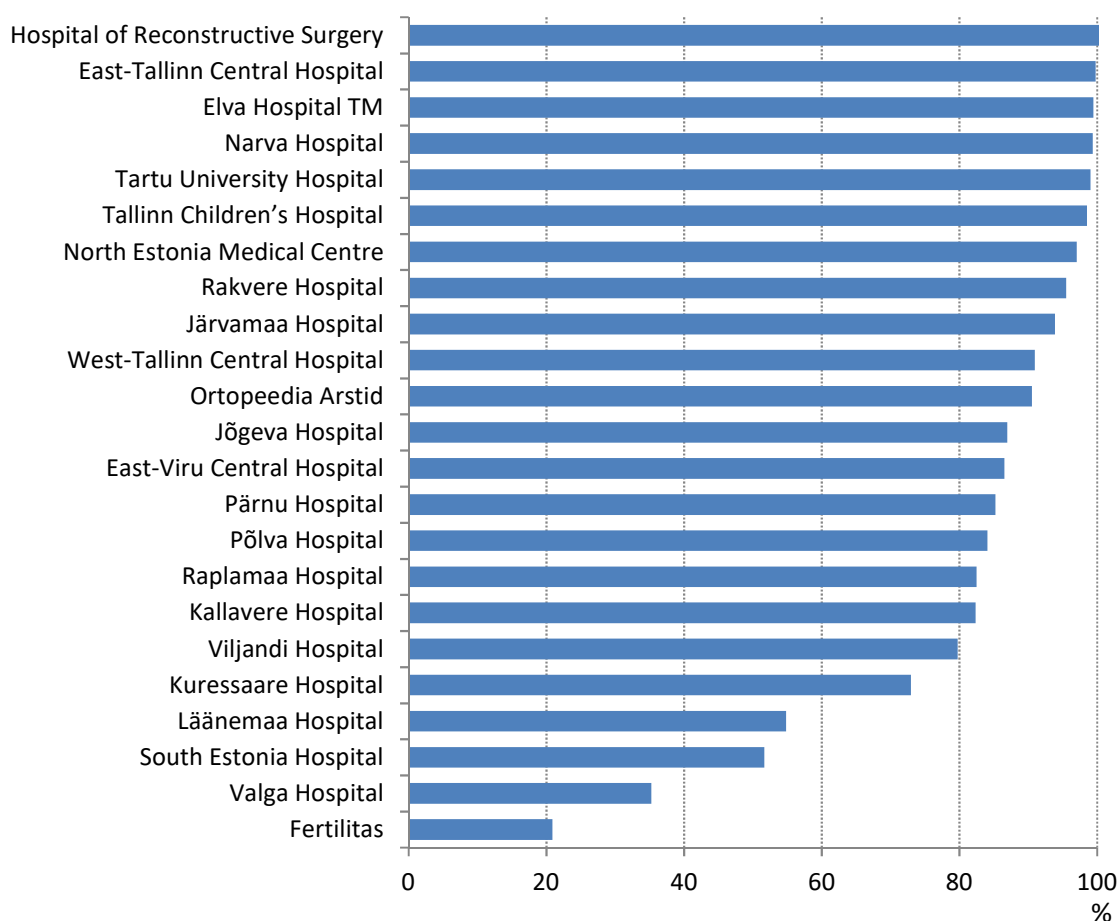
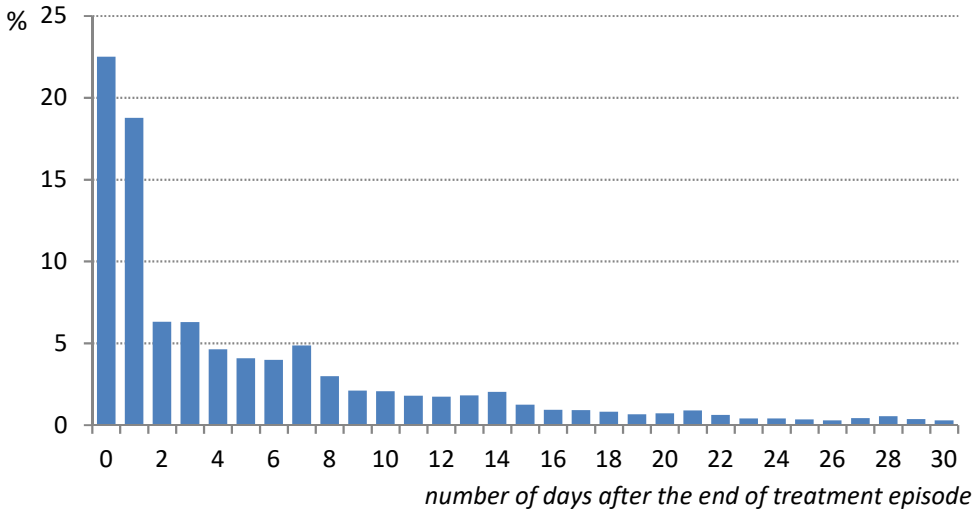


Figure 11. Coverage of day care epicrisis by the service providers who have sent the epicrisis, 2015

For those health care service providers with less than 95% coverage, the causes of unsent summary documents should be further explored. Without knowing the causes, it is difficult to improve the situation. Whether this question concerns individual physicians or departments within the health care service provider; whether the information systems do not support the physicians sufficiently (automatic controls, reminders, terms for sending summaries of discharged patients); or whether the failure to submit is related to a certain type of day care cases (for example, treatment cycles, continuous treatment) that do not fit into the usual definition – one day = one case<sup>3</sup>. As the day care epicrisis is not officially introduced and the HIS Standard Set 6.0 valid from 1 July 2016 does not include this document, there is no reason to expect the situation to improve. Rather, there may occur a deterioration in submitting compared to the current situation.

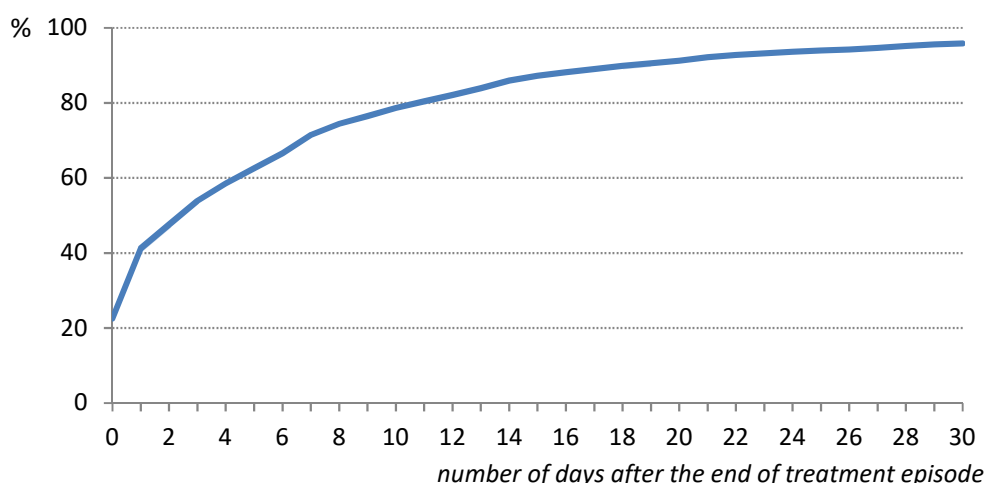
The day care epicrisis were first sent to the HIS within eight days on average. Slightly less than a quarter of epicrisis have already been sent on the same day, 50% have been sent by the third and 75% by the ninth day.



**Figure 12. Sending of the day care epicrisis during the first 30 days, 2015**

When observing the sending process day-by-day, the most important ones are the two first days, when over 40% day care epicrisis were sent to the HIS (Figures 12 and 13). More than 5% of sending took place on the second and third day after the end of the case. Subsequently, the sending rate was declining, but with smaller increases on the seventh, 14th, and 21th day, respectively.

<sup>3</sup> There is no distinctive data on Hiiumaa Hospital, whether and how much of the day care cases reach to the HIS.



**Figure 13. Cumulative submission of day care epicrisis during the first 30 days, 2015**

At the end of the day care case, the first summary was sent to the HIS in 22.5% of cases; within 1–3 days after the end of the case, the epicrisis were forwarded on 53% of cases. Of the epicrisis sent, 96% reached the HIS within 30 days (Table 6).

**Table 6. First sending of the day care epicrisis over time, 2015**

Number of days from the end of the case to submission	Number of epicrisis	%	Cumulative, %
before the end of the case	4	0.0	0.0
on the same day	14,053	22.5	22.5
1–3 days	19,595	31.4	53.9
4–7 days	10,957	17.5	71.4
8–14 days	9,076	14.5	86.0
15–30 days	6,175	9.9	95.9
31–90 days	2,073	3.3	99.2
91–180 days	338	0.5	99.7
181–365 days	162	0.3	100.0
over a year	10	0.0	100.0
Total	62,443	100.0	

By hospitals, the practice of sending the day care summaries has great differences. During the first week, 10 hospitals out of 23 had sent a summary to the HIS at least on 80% of cases, while one hospital just started sending and four hospitals had sent less than one-third of the case epicrisis (Table 7). During the one month, 19 service providers managed to send the epicrisis to the extent of 90%, and in four cases, the submission took longer time. Three of them were the same hospitals who sent also the inpatient epicrisis more slowly than others.

Upon improving the situation, a greater effect would be present if the service providers, who send summaries to a lesser or slower extent, are taken to the same level as others.

**Table 7. Cumulative sending of day care epicrisis according to the first sending day, 2015**

Health care service provider	From the end of the case to the first entry						
	on the same day	1–3 days	4–7 days	8–14 days	15–30 days	31–90 days	91–180 days
Fertilitas	4.7%	19.0%	41.2%	75.3%	98.0%	99.8%	100.0%
East-Tallinn Central Hospital	21.4%	65.1%	86.0%	94.7%	99.2%	100.0%	100.0%
Järvamaa Hospital	0.0%	0.0%	0.6%	6.2%	32.8%	89.5%	97.3%
Kallavere Hospital	14.3%	78.6%	85.7%	92.9%	100.0%	100.0%	100.0%
West-Tallinn Central Hospital	26.8%	57.5%	80.8%	95.1%	99.3%	99.9%	100.0%
Ortopeedia Arstid	0.2%	16.2%	29.3%	42.3%	54.1%	77.6%	86.0%
Põlva Hospital	0.5%	5.9%	16.7%	35.8%	61.7%	90.6%	99.9%
Rakvere Hospital	6.5%	27.2%	52.8%	73.1%	96.5%	100.0%	100.0%
Valga Hospital	16.0%	65.7%	74.3%	82.3%	94.6%	100.0%	100.0%
South Estonia Hospital	46.1%	67.2%	81.5%	92.7%	99.2%	99.9%	99.9%
Hospital of Reconstructive Surgery	0.0%	65.3%	90.3%	94.4%	96.8%	100.0%	100.0%
Kuressaare Hospital	25.4%	43.1%	57.7%	81.0%	97.1%	100.0%	100.0%
Läänemaa Hospital	4.5%	54.6%	81.2%	95.5%	99.4%	100.0%	100.0%
Raplamaa Hospital	9.8%	22.0%	31.3%	41.3%	56.1%	85.3%	95.6%
Elva Hospital TM	73.5%	97.1%	100.0%	100.0%	100.0%	100.0%	100.0%
East-Viru Central Hospital	1.9%	62.2%	71.2%	86.3%	98.2%	99.9%	100.0%
Jõgeva Hospital	3.2%	94.1%	94.7%	98.4%	100.0%	100.0%	100.0%
Narva Hospital	0.0%	26.6%	52.4%	88.4%	98.5%	99.8%	100.0%
North Estonia Medical Centre	0.8%	3.8%	27.6%	66.4%	93.3%	99.6%	99.9%
Pärnu Hospital	12.7%	46.7%	62.3%	77.6%	95.7%	99.5%	99.9%
Tallinn Children's Hospital	18.8%	65.2%	87.2%	95.5%	98.8%	99.9%	99.9%
Tartu University Hospital	51.6%	73.6%	85.6%	95.0%	99.1%	99.8%	100.0%
Viljandi Hospital	6.6%	52.9%	65.9%	83.5%	98.1%	100.0%	100.0%
Total	22.5%	53.9%	71.4%	86.0%	95.9%	99.2%	99.7%

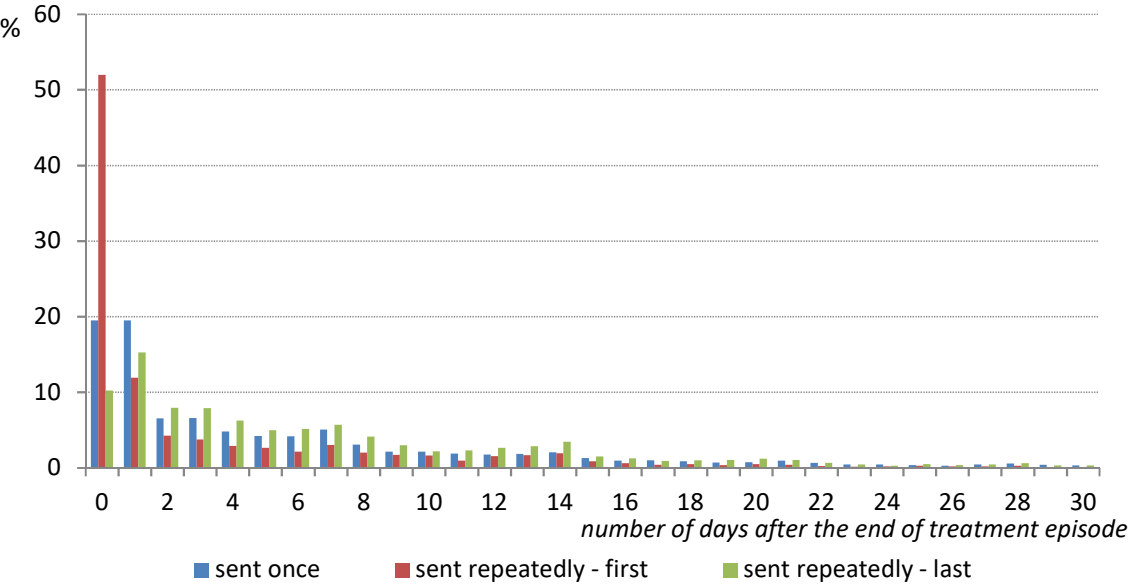
Of the day care epicrisis, 90.7% were sent once, 9.3% were sent repeatedly, of which 7.6% were sent twice (Table 8).

**Table 8. Sending of the day care epicrisis by number of times, 2015**

Number of times	Number of epicrisis	%	Cumulative, %
1	56,646	90.7	90.7
2	4,726	7.6	98.3
3	872	1.4	99.7
4	160	0.3	99.9
5	22	0.0	100.0
6	12	0.0	100.0
7	2	0.0	100.0
8	2	0.0	100.0
9	1	0.0	100.0
Total	62,443	100.0	



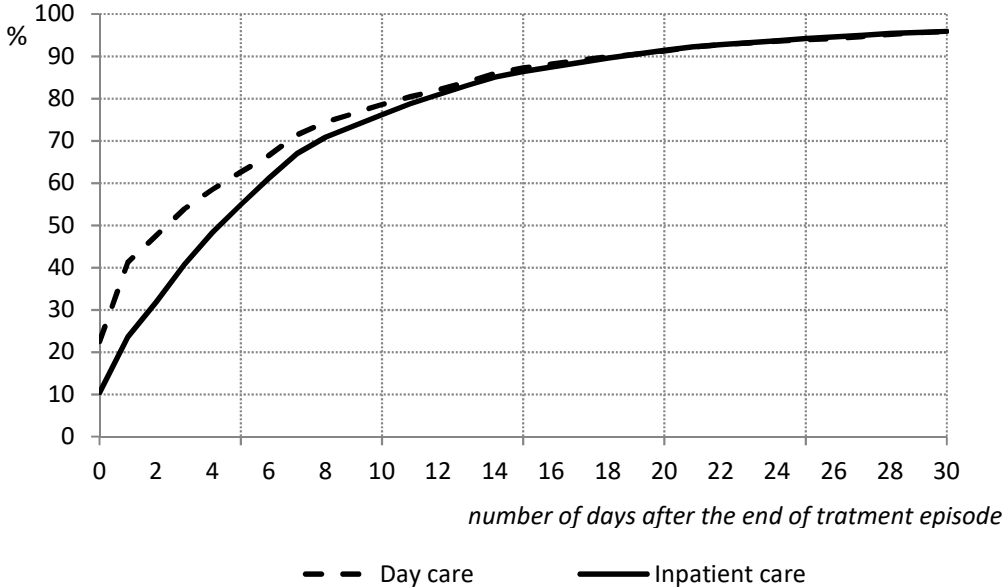
The day care summaries (Figure 14) were transferred to the HIS significantly faster than hospital care (Figure 7). Of the day care epicrisis sent once, the information was submitted on the fifth on the day of leaving the hospital and another fifth on the following day (in case of hospital care, 10% and 13%, respectively). From the epicrisis that were repeatedly sent, the information was transferred to the HIS on the same day in more than half of the cases, followed by another 10% on the following day (for hospital care, the corresponding indicators were 14% and 18% of repetitive cases).



**Figure 14. Day care epicrisis sent once and repeatedly by day, 2015**

### 2.3 Comparisons

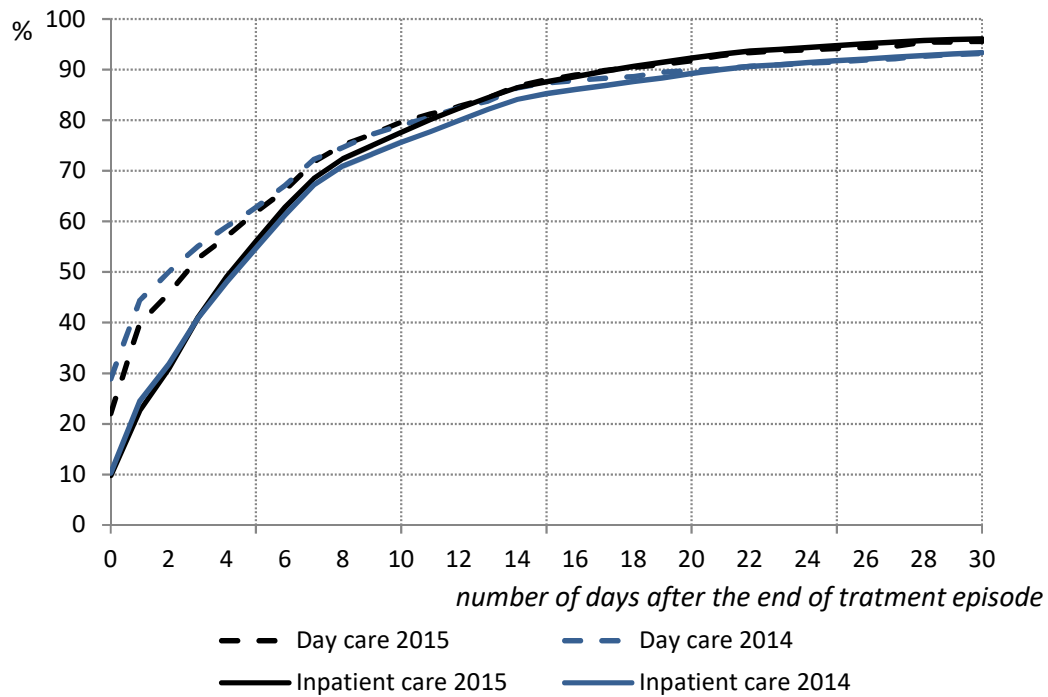
When comparing the sending of epicrisises to the HIS by service type, it can be noted that in case of day care, the summary is initially send somewhat faster, but after two weeks there is no longer any difference in transfer (Figure 15).



**Figure 15. Cumulative first submission of inpatient and day care epicrisises by the day of sending, 2015**

When comparing the sending of epicrisises of the cases in January 2014 and 2015, a very significant change is initially not visible to the eye (Figure 16). In the event of the day care treatment cases of January 2015, it is noticeable that the intensity of transfer was somewhat lower than in the previous year. On the same day, 22% were sent in 2015 and 29% in 2014, however, by the seventh day this difference was vanished.

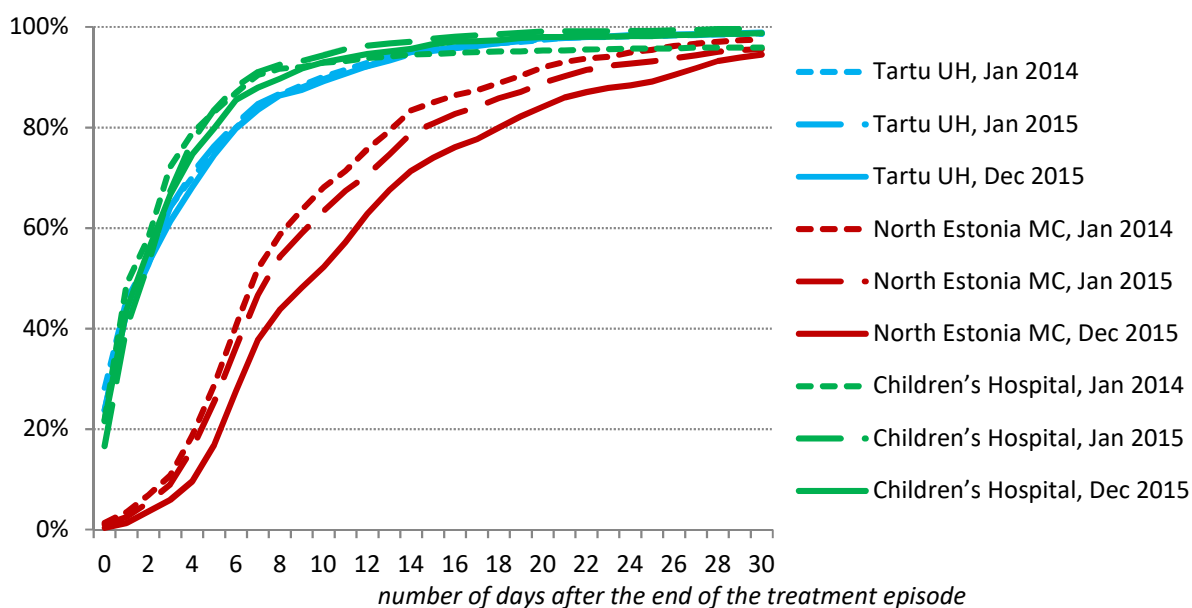
In case of inpatient care, the submission has occurred at the same pace compared to the previous year until the end of the first week. Since the second week, there has been a significant improvement in submission in 2015: from the ninth day onwards, the difference is permanently two percentage points, and from the 16th day even three percentage points higher. There was another change between days 16 and 20: The lines of sending the epicrisises of day care and inpatient care in 2015 meet in the chart at the level that is a few percentage points higher, and the lines characterising the receipts of 2014 remain together below them.



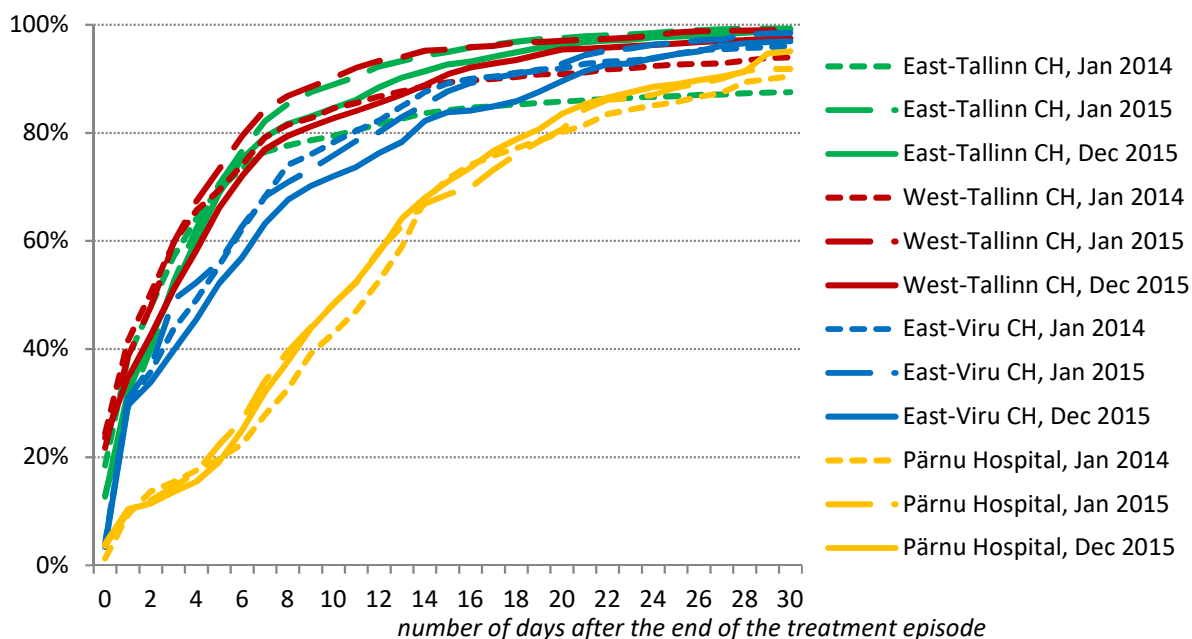
**Figure 16. Cumulative first submission of inpatient and day care epicrisis, January 2014 and 2015**

Improvement compared to 2014 has particularly occurred with a reduction in the presentation after a long period of time: Within 2 weeks, 85% was transferred (84% in 2014), within 15–30 days, 96% was transferred (94% in 2014), within 3 months, 99.5% was transferred (97.5% in 2014). The change may involve a situation where some information system of the health care service provider has implemented automatic (or manual) verifications with regard to unfinished and unsent epicrisis.

In general, transfer has slightly improved in 2015, however, there are also exceptions as the results by hospital reveal. In order to get an overview of the changes that have taken place over time, we observe three periods: January 2014, and January and December 2015. Inpatient and day care epicrisis are shown in Figures 17–20 in comparison by hospitals.



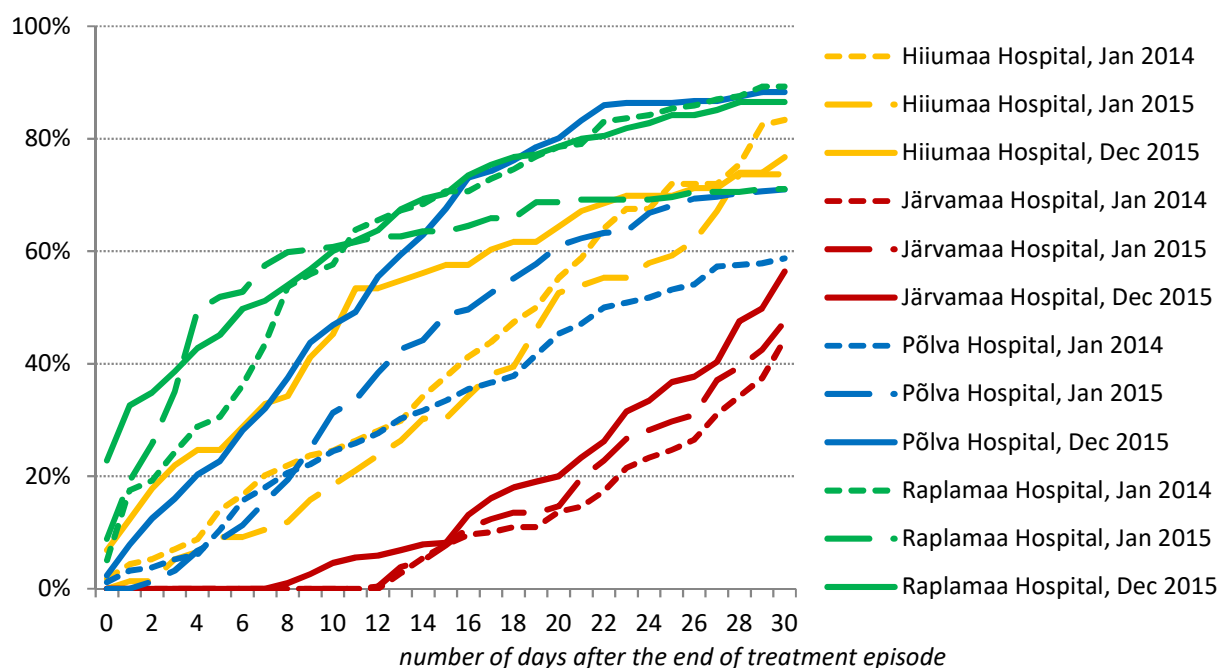
**Figure 17. Cumulative submission of the epicrisis of regional hospitals, 2014 and 2015**



**Figure 18. Cumulative submission of the epicrisis of central hospitals, 2014 and 2015**

Figures 17 and 18 indicate that North Estonia Medical Centre and Pärnu Hospital are behind other regional and central hospitals with regard to sending the epicrisis.

In general hospitals – Järvamaa, Kuressaare, Läänemaa, Rakvere, South-Estonia, Narva, Viljandi, Valga, Hiiumaa, Põlva, and Raplamaa Hospital – the situation is very different from one another (Figures 19 and 20).

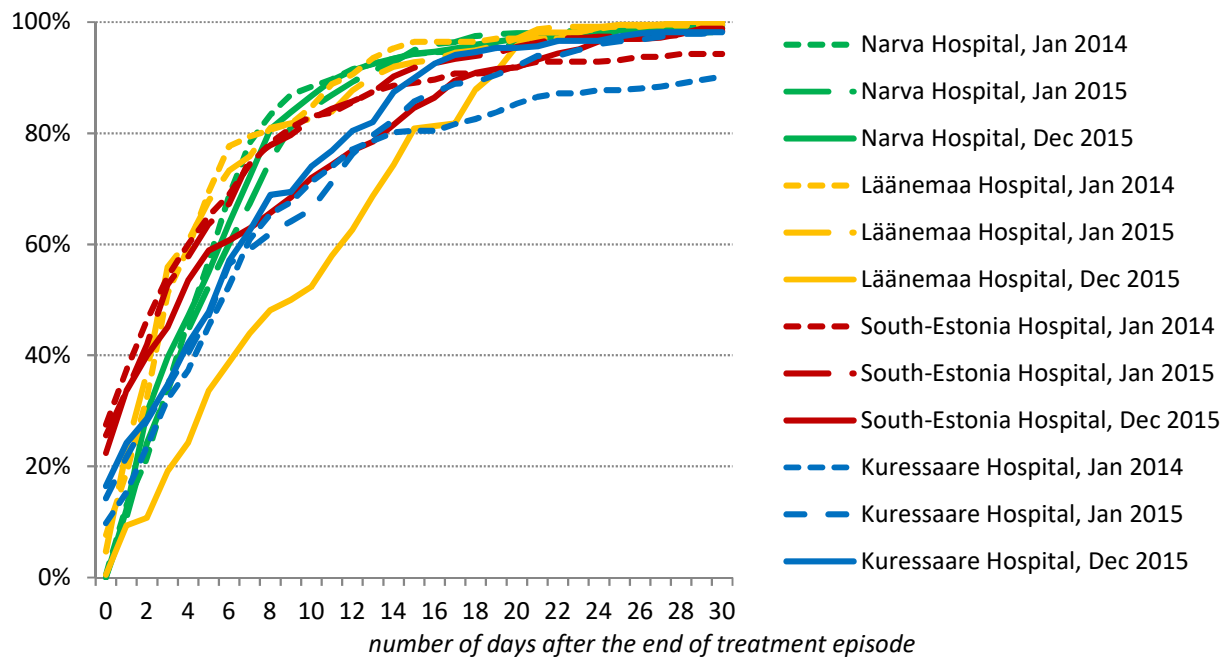


**Figure 19. Cumulative submission of the epicrisis of Hiiumaa, Järvamaa, Põlva, and Raplamaa Hospital, 2014 and 2015**

According to the surveyed periods (January 2014, January 2015, and December 2015), there were four general hospitals who were unable to send 90% of epicrisis to the HIS during the one month: Hiiumaa, Järvamaa, Põlva ja Raplamaa Hospital (Figure 19). In all three periods, the worst situation is in Järvamaa Hospital – 44% of the epicrisis of January 2014, 47% of the epicrisis of January 2015, and 56% of the epicrisis of 2015 reached the HIS within a month. The situation has gradually improved, but the level of other hospitals in submission has not been reached. Of these four, the situation has improved the most in Põlva Hospital, where the indicator of 59% in January 2014 has already increased to 88% in December 2015.

On the more positive side, there are four general hospitals that have managed to send more than 98% of epicrisis to the HIS within a month: Narva, Läänemaa, South-Estonia, and Kuressaare Hospital (Figure 20). All four send data relatively quickly (80% of epicrisis have been sent in two weeks) and they have been doing so since the beginning of 2014 already. With regard to speed, the epicrisis of Läänemaa Hospital from December 2015 serve as an exception, reaching the Health Information System relatively later. However, in about three weeks, the previous level has been achieved, and they have reach almost 100% by the end of the month.

Kuressaare Hospital is also different from others, but compared to the 2014 data, the situation has significantly improved – on the 15th date, 80% were sent in 2014, and in December 2015, a total of 90% were sent by the same date.



**Figure 20. Cumulative submission of Narva, Läänemaa, South-Estonia, and Kuressaare Hospital epicrisises, 2014 and 2015**

## Summary

In 2015, the first inpatient epicrisis was sent to the HIS on the day of discharge or the following day in 24% of cases on which the epicrisis was sent to the HIS. Within the first seven days, the HIS received information about 67% of inpatient cases, and by the 30th day, 96% of the summaries had arrived. In general, 11% of cases remained unsent to the HIS.

Of the day care cases, the first epicrisis was sent to the HIS on the end-day or the following day in 41% of cases on which the epicrisis was sent to the HIS. Similarly to the inpatient care, within the first seven days, the HIS received 67% of the day care cases sent, and by the 30th day, 96% of the summaries had arrived. In addition, 20% of cases remained unsent.

While 96% of the sent epicrisises are forwarded to the HIS within a month of the discharge, for four general hospitals the submission speed remains much lower than that. Three of them manage to send about 80% of epicrisises to the HIS and one only 60% within a month. In case of these hospitals, it is necessary to reach to the level of other hospitals before the health statistics can transfer to the statistics based on the HIS data, the work process and methodology of which are under development in the NIHD on the basis of the regular mass-extractions of the HIS statistics module.

Of the forwarded inpatient epicrisises, 93% were sent once. A total of 7% were sent several times, including 6% of inpatient summaries sent twice. Of the day care epicrisises, 91% were sent once, 9% were sent repeatedly, of which 8% were sent twice. Some hospitals usually only send the epicrisises once, in which case the average time of submission of the epicrisis to the HIS is longer as a rule. The average time for sending epicrisises once was nine days (median five days), the average time for first sending of repetitive epicrisises was five days (median three days), and the sending time of the last one was 14 days (median seven days).

In the event of repetitive sending, the last, or final entry in the HIS about inpatient care was made within the first week (or within days 0–6 of the end-date of the case) in 47% of cases, and in 74% of the cases, the epicrisis was updated within two weeks after the patient had left the hospital. The last sending of the day care epicrisises took place within the first week in 58% of cases and within two weeks in 80% of cases. Thus, during the first two weeks, most of the updated versions of epicrisises are also sent to the Health Information System.

When comparing 2014 and 2015, there were no significant changes in the submission practice of epicrisises, although the sending time of the documents to the Health Information System shortened slightly. It is possible that the reason for the change lies in some improvements made to the information system of some health care service provider. In some hospitals, sending summaries has improved, but the speed of change has not been enough for those who lag behind to reach the level of others.

The practice according to which the purpose is not to send the initial data about leaving the hospital or day care immediately to the Health Information System does not support the achievement of the desired purposes – fast and high-quality information exchange between the health care service providers and preparation of health statistics on the basis of the data of the Health Information System. The development of the information systems of the health care service providers based on uniform principles (automatic controls, reminders, etc. with maximum ease of use) is the key to improving data quality and data coverage.

It could be in the interests of the patients and their physicians that the first information about the ended cases would reach the Health Information System within the first two days. For the use of the treatment case summaries for statistical purposes, it is sufficient when a summary on **each** case is received by the Health Information System at least within the first four weeks.

Fast delivery of initial information will result in a greater need for primary information to be updated at a later time, as all final information may not always arrive on the day of leaving treatment. Based on the data of 2015, it can be said that the need to update the epicrisis (or new information) occurs in no more than 7%–9% cases. An important topic for statistics is reducing and avoiding errors to ensure that at least this would not lead to a situation where new versions of the epicrisis should be sent to the Health Information System. Input errors can be reduced by automatic checks in the information systems of the health care service providers. The errors currently occurring in the basic statistical indicators at the start or end dates of a case or between departments indicate that such controls have not been sufficiently implemented. The statistics module error log report allows all users who have joined the module to track any errors found (including by health care service provider). It is also necessary to introduce appropriate IT measures in the information systems of the health care service providers to prevent duplication of the case. Duplicating is also a situation where the times of staying in the departments are presented several times in the inpatient epicrisis. Duplicate submission, time overlaps, and date entry errors can and should be prevented in the information systems of the health care service providers before sending them to the Health Information System. The date fields should be filled in automatically to avoid typing errors, but there should be an option to change them manually.

Information loss, or the share of missing epicrisis on the ended treatment cases should exceed 3–5% in case of either inpatient or day care for health statistics. These are requirements that should be met before the introduction of the Health Information System data for official statistics. The situation in 2015 in sending out epicrisis is far below that.

The terms for sending the epicrisis to the Health Information System were not found in the current legislation. The only valid and published manual for the completion of an inpatient epicrisis, which has been prepared in accordance with the inpatient epicrisis document standard v7.0. (Version 3.1, 10 August 2016) states that “A medical history or **an inpatient epicrisis is prepared upon the end of the inpatient case on each hospitalised patient.** The health care service provider enters the information about the provision of inpatient health care service in the health information system with the data set prepared on the basis of clause 59<sup>2</sup> (2) 1) of the Health Services Organisation Act **within five working days of approval of the relevant document by the health care personnel.**” At the same time, it is not known to the Health Statistics Department of National Institute for Health Development whether there is also a term established to the health care personnel for approving an epicrisis prepared on the expired case or how the compliance to the term provided in the instructions is monitored.



## Health and health care statistics:

- **Health statistics and health research database**  
<http://www.tai.ee/tstua>
- **Website of Health Statistics Department of National Institute for Health Development**  
<http://www.tai.ee/en/r-and-d/health-statistics/activities>
- **Dataquery to National Institute for Health Development**  
[tai@tai.ee](mailto:tai@tai.ee)
- **Database of Statistics Estonia**  
<http://www.stat.ee/en>
- **Statistics of European Union**  
<http://ec.europa.eu/eurostat>
- **European health for all database (HFA-DB)**  
<http://data.euro.who.int/hfadb/>
- **OECD's statistical databases (OECD.Stat)**  
[http://stats.oecd.org/index.aspx?DataSetCode=HEALTH\\_STAT](http://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT)

