Comparison between the number of inpatient care and day care discharges on the basis of the data from Health Information System and National Institute for Health Development

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The **mission** of the National Institute for Health Development is to create and share knowledge for influencing the attitudes, behaviour, policies and the environment with evidence-based information with an aim of improving the well-being of the people in Estonia.

We thank our colleagues for advice and comments.

When using the information presented in this report, refer to the publication. Recommended reference:

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Contents

Summary

This analysis examined the coverage of the data submitted by health care providers to the Health Information System compared to the data submitted to the National Institute for Health Development. The number of discharges from inpatient and day care by hospitals in 2016 was taken as the parameter to be studied.

In the reference period, 85% of hospitals submitted data to the Health Information System on inpatient care and 62% on day care. A comparison from 2013 shows that, by 2016, the number of hospitals that have submitted data on inpatient care had increased by 11%. The situation has remained the same for day care.

The number of inpatient and day care epicrises submitted to the Health Information System has remained insufficient during the last years. The analysis shows that, across all hospitals, the data coverage is 88% for inpatient care and 93% for day care. Although the indicators have increased by 9% in comparison to 2013, they are still low to produce high-quality statistics.

It can be said that although the quality of data submission has increased during 2013–2016, the data submitted on both inpatient care as well as day care is still inadequate. In addition to the low percentage of data submission by hospitals, a possible factor of under-coverage is lack of respective documentation standards (e.g. in nursing and day care epicrises).

The analysis provides an overview of the Health Information System's data coverage. However, in order to draw a more detailed conclusion, more thorough assessment is required.

Introduction

One parameter of data quality is sufficiency of data coverage. An analysis of hospital care data by National Institute for Health Development (NIHD) in 2011 showed a low coverage for the Health Information System (HIS) (1). In 2013, the submission of data by hospitals was of the same order of magnitude — the coverage for day care was 79% and for inpatient care 84% (1). The aim of this analysis is to compare the number of discharges from inpatient care and day care in HIS with the data of NIHD's health care statistics reports and investigate whether the coverage has improved.

The indicator under comparison is the number of discharges (i.e. number of persons who have been checked out, died or transferred) by the hospitals that have submitted data. The researches have examined coverage by hospitals which have submitted the respective data to NIHD and HIS. Both overall coverage as well as coverage by hospitals has been examined.

A significant variance in data precludes comprehensive statistics to be produced (2). This analysis compares the number of discharges. If a more detailed analysis is undertaken — for example by examining the variables by diagnosis or age groups — more acute differences may be seen between the two datasets. The comparison performed in this analysis does not examine the data in detail.

1 Methodology

The analysis compared the epicrises of inpatient and day care submitted to HIS with the data collected by NIHD's reports "Hospital" and "Day care". The data was studied by the type of hospital and individual hospitals. From HIS's data, double cases have been eliminated and the day care data submitted with inpatient care epicrisis by one hospital has been recoded as day care data. Furthermore, healthy newborns have been excluded since the health care statistics report does not collect data on them. The day care data submitted to HIS with outpatient epicrises is not included in this analysis since it cannot be distinguished from the outpatient care data in HIS.

The result of the comparison has been presented as a percentage that characterises the share of HIS' data in comparison with NIHD's:

$$\frac{\text{number of discharges by HIS}}{\text{number of discharges by NIHD reports}} \times 100\%.$$

The result is deemed statistically satisfactory if the percentage of coverage is 100% ± 5%. In this case, important information is not lost (2). Indicators were not calculated for the hospitals which submitted data only to one of the observed systems.

2 Comparison of the number of discharges from inpatient care

2.1 Aggregated data

In 2016, 55 hospitals operated in Estonia. All hospitals submitted inpatient care data to NIHD but only 34 hospitals to HIS (Table 1). 15 nursing hospitals, one rehabilitation hospital, four special hospitals and one local hospital left data on discharges from inpatient care unreported. Only 34 hospitals submitted data to both hospitals, i.e. 62% of all hospitals that were active in Estonia in 2016. In 2013, 31 hospitals had data in both datasets, comprising 51% of all hospitals in Estonia.

Table 1. Submission of inpatient care data by hospitals to HIS and NIHD by type of hospital, 2016

Type of hospital	Total number of hospitals	Data submitted to NIHD	Data submitted to HIS
Regional hospital	3	3	3
Central hospital	4	4	4
General hospital	11	11	11
Rehabilitation hospital	3	3	2
Nursing hospital	21	21	6
Special hospital	9	9	5
Local hospital	4	4	3
TOTAL	55	55	34

The number of discharges from the hospitals that submitted data to HIS comprised 88% of the corresponding figure for NIHD (table 2). Statistically, the figure should be between 95–105% for to be able to process the data and not lose important information (2).

Table 2. The number and share of discharges from inpatient care submitted to HIS compared with NIHD's data, 2016

Dataset	Discharges from inpatient care for all hospitals	Discharges from inpatient care for hospitals that have submitted data to both datasets
NIHD	226 983	222 795
HIS	200 182	200 182
Difference	26 801	22 613
Share (%)	88	90

There are 21 hospitals that submitted the data to NIHD and not to HIS, but the discharges of these hospitals contribute a small percentage of the total amount. Even if the missing hospitals would submit data to HIS, the problem of coverage of the number of discharges would not be resolved. There is a significant data loss for the 34 hospitals which also submitted data to HIS. The number of discharges from inpatient care submitted to HIS comprises 90% of data collected with NIHD's report (Table 2).

2.2 Data by individual hospitals

The following examines the coverage of the number of discharges from inpatient care for the hospitals that submitted data to both HIS and NIHD.

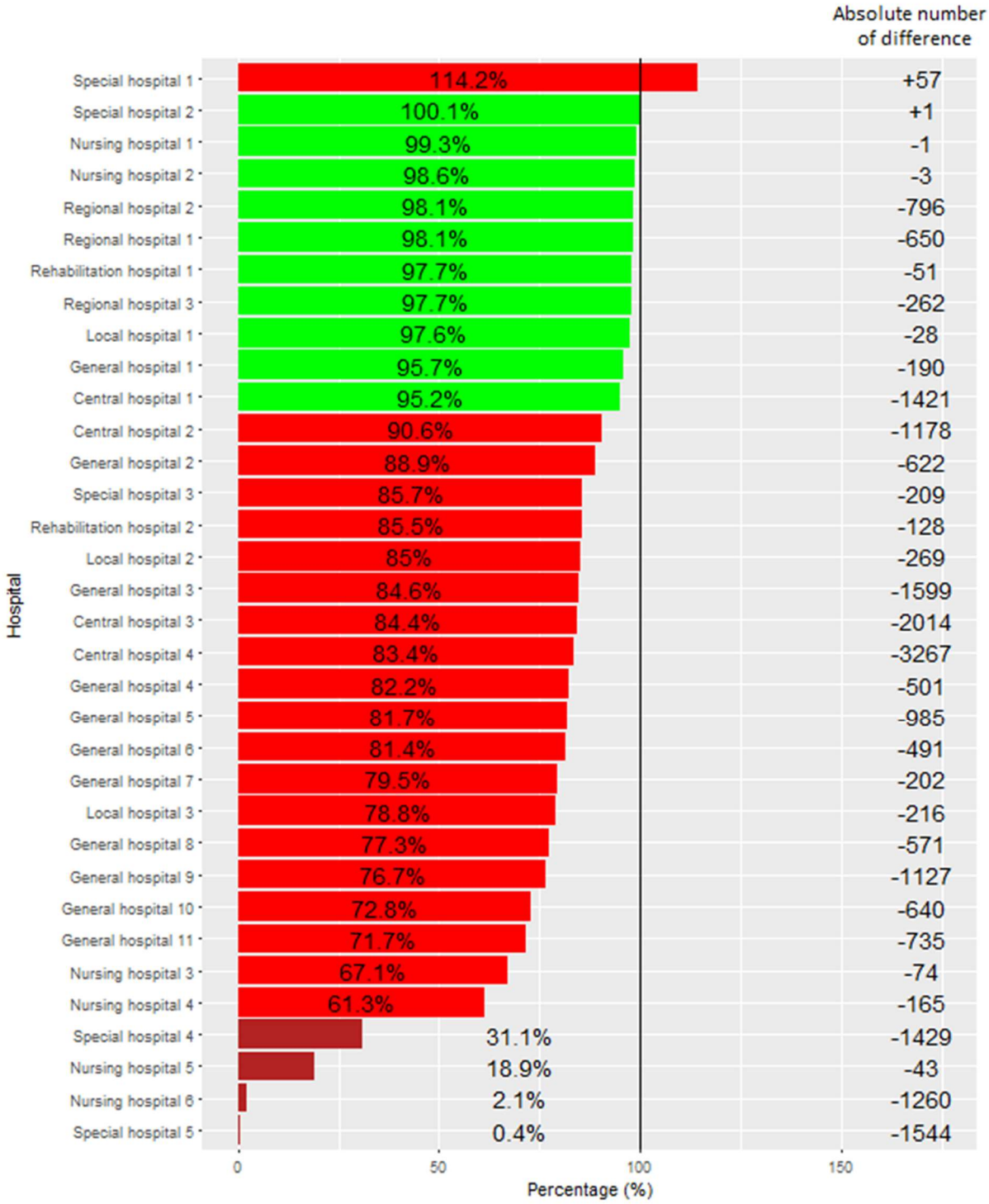

Figure 1. Comparison of HIS' dataset with NIHD's dataset in the number of discharges from inpatient care, 2016

* If the congruence of data for HIS and NIHD is near 100% (100% ± 5%), it is coloured light green on the graph. If the difference is over 5%, it is coloured red. If the value of one dataset is more than one and a half times greater or two times smaller than that of the other, it is coloured dark red.

For 18% of hospitals i.e. ten hospitals that submitted data on inpatient care to both HIS and NIHD, the data on the number of discharges is compatible, i.e. the ratio is 100% ± 5% (Figure 1). One special hospital submitted data on 57 discharges more to HIS than it did to NIHD. Therefore, the ratio is 114,2%, exceeding the allowed statistical limits.

For two special hospitals and two nursing hospitals, the ratio is less than 50%. For more than half — a total of 19 — of the hospitals examined, the ratio is between 50–95%. Due to a big information loss on the number of discharges from inpatient care, this does not enable to adequately and objectively describe the situation in the country and produce high-quality statistics.

3 Comparison of the number of discharges from day care

3.1 Aggregated data

Data on discharges from day care were submitted to NIHD and HIS by 27 and 23 hospitals, respectively (Table 3). Therefore, HIS included the data of 85% of the hospitals that submitted data to NIHD. The system under examination was missing the data of one general hospital, two special hospitals and one local hospital. In 2013, 23 hospitals had data on discharges in both datasets, also comprising 85% of all hospitals that submitted data to NIHD.

Table 3. Submission of day care data by hospitals to HIS and NIHD by type of hospital, 2016

Type of hospital	Total number of hospitals	Data submitted to NIHD	Data submitted to HIS
Regional hospital	3	3	3
Central hospital	4	4	4
General hospital	11	11	10
Special hospital	5	5	3
Local hospital	4	4	3
TOTAL	27	27	23

The number of discharges from day care submitted to HIS comprised 93% of the NIHD data (Table 4). The number of discharges submitted to HIS by the 23 hospitals that submitted data to both HIS and NIHD comprises almost 94% of the total number of discharges included in the NIHD's report.

Table 4. The number and share of discharges from day care submitted to HIS compared with NIHD's data, 2016

Dataset	Discharges from day care for all hospitals	Discharges from day care for hospitals that have submitted data to both datasets
HIS	67 263	67 263
NIHD	72 435	71 703
Difference	5 172	4 440
Share (%)	93	94

Although the indicator is higher than for inpatient care, it is still lower than the 95% needed to produce high-quality statistics (2). As mentioned above, data on day care may lack some data that hospitals have submitted to HIS with outpatient epicrises.

3.2 Data by individual hospitals

Figure 2 shows the coverage of the number of discharges from day care for the hospitals that submitted data to both HIS and NIHD.

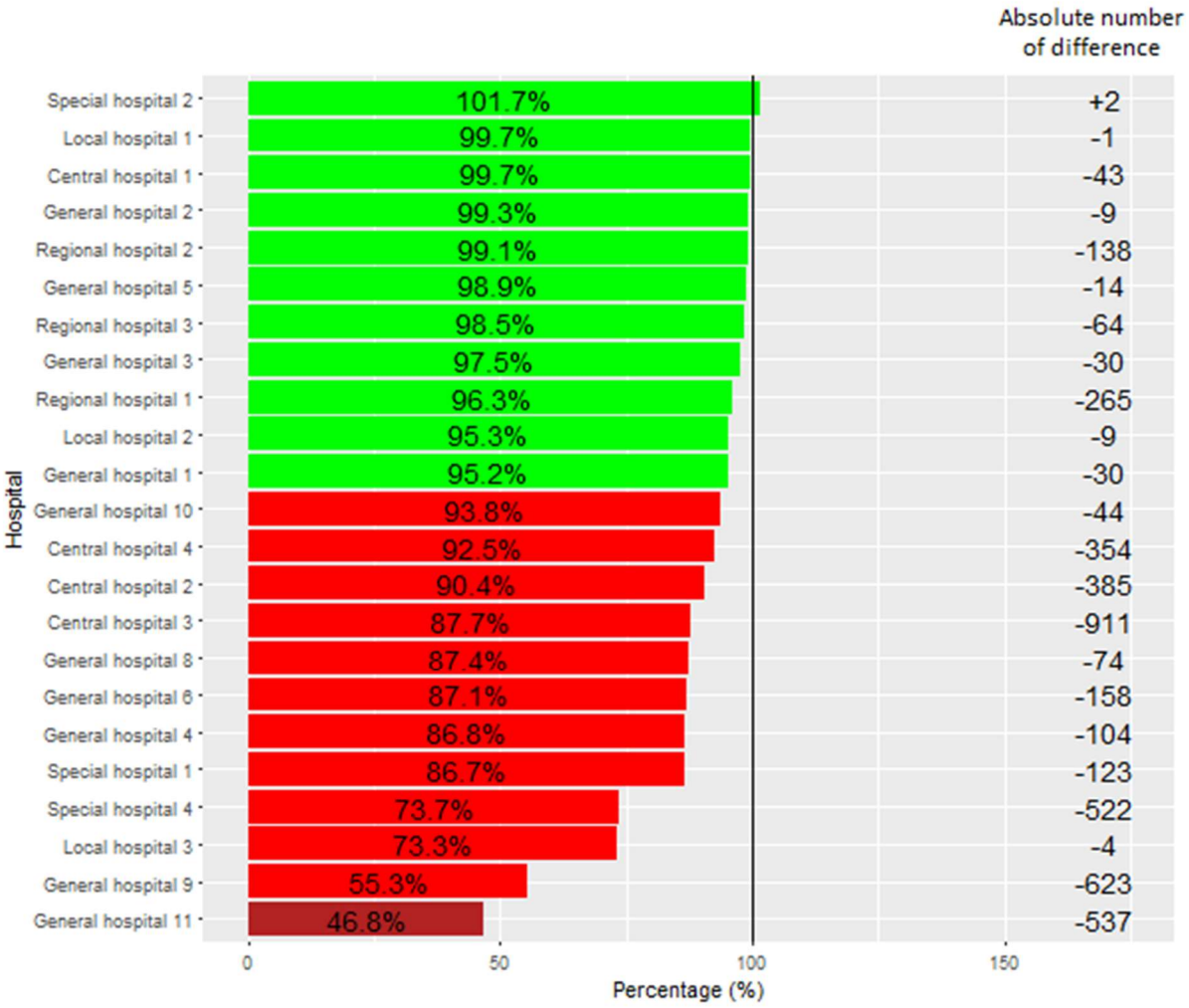

Figure 2. Comparison of HIS' dataset with NIHD's dataset in the number of discharges from day care, 2016

* If the congruence of data for HIS and NIHD is near 100% (100% ± 5%), it is coloured light green on the graph. If the difference is over 5%, it is coloured red. If the value of one dataset is more than one and a half times greater or two times smaller than that of the other, it is coloured dark red.

For 48% of hospitals i.e. 11 hospitals that submitted data on discharges from day care to both HIS and NIHD, the congruence is satisfactory, i.e. the share is 100% ± 5%.

The ratio is less than 50% for one general hospital — i.e. 53.2% of data is missing. In addition, data congruence is between 50–95% in case of 11 hospitals. Therefore, 12 hospitals have submitted imprecise data which comprises more than half of the health care providers under examination.

As large of an information loss on the number of discharges as this does not allow to produce objective statistics for the latter mentioned hospitals on the discharges from day care, and this can already be seen from the generalised data analysis.

References

1. National Institute for Health Development: Department of Health Statistics. Data comparison of the Health Information System and regular health statistics. II analysis; Tallinn: National Institute for Health Development; 2012. https://www.tai.ee/en/health-data/research-reports/download/481. Used on 9th Nov 2018.
2. Little RJA, Schenker N. Missing Data. In: Arminger G, Clogg CC, Sobel ME eds. Handbook for Statistical Modeling in the Social and Behavioral Sciences. New York: Plenum; 1994, p. 39–75,

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
- **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