



Extract from the report to the
Public Accounts Committee on
the implementation of electronic
patient records at Danish hospitals

February
2011

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I. Introduction and conclusion

1. This report is about the progress made by the regions in implementing electronic patient records (EPR) in Danish hospitals. The report also addresses the degree to which the initiatives taken by the Ministry of Interior and Health have furthered the development and dissemination of EPR in the regions.

2. In their comments to report no. 2/2007 on the IT support systems for hospital management, the Public Accounts Committee indicated that the formation of the five regions would provide a unique opportunity for knowledge sharing, coordination and cooperation across the regions on the implementation of shared and cost-effective future IT solutions for the hospital sector.

Rigsrevisionen followed up on the report on the IT support systems for hospital administration in a memorandum to the Public Accounts Committee of 4 March 2010. In its comments to the memorandum, the Public Accounts Committee made it clear that it did not consider it entirely satisfactory that clear objectives for the implementation of EPR had not been defined. Rigsrevisionen therefore initiated this examination of progress made in implementing EPR systems in Danish hospitals.

3. Since the mid-nineties the counties, and subsequently the regions, have worked on implementing EPR in the Danish hospitals. An EPR system consists of modules containing data on, for instance treatment and medication. The counties had developed a joint EPR strategy that was focused on implementing a notes module and a medicine module. The former counties and now the regions have invested considerable sums in the development of EPR systems. Statements of total expenditure incurred for procurement and development of EPR systems are not available.

4. When the regions were established in 2007, all hospitals had to some extent or other implemented some form of EPR system including a few EPR modules. In the years immediately preceding and following the establishment of the regions, focus shifted and more emphasis was put on ensuring that the IT systems supported the health professionals in their daily work.

The efforts to implement EPR are a reflection of the wish to establish effective and coherent patient pathways nationwide in order to curb hospital expenditure, enhance quality and increase patient safety. According to the Ministry of Interior and Health, most errors and lapses in patient treatment and care occur when the patients are transferred from one ward to another, or are being discharged for treatment by, for instance, their own GP.

5. The overall EPR strategy of the regions aims to improve the efficiency of the daily clinical work where many resources currently go into collecting relevant data via fax, over the phone or from systems that are not interoperational. These are the work processes that the regions are aiming to support with IT in order to increase patient safety and optimise utilisation of resources.

Electronic patient record (EPR)

The concept of EPR covers anything from computerising the conventional paper-based journal to advanced EPR solutions, that are supporting quality enhancement, clinical research, management and planning activities.

Generally, EPR systems consist of five modules:

- PAS-module (patient master data)
- Notes module
- Medicine module
- Booking module
- Requisition/lab results module.

In 2007, the former counties of Denmark were replaced by five regions:

- Capital Region of Denmark
- Region Zealand
- Region of Southern Denmark
- Central Denmark Region
- North Denmark Region

The five regions are responsible for the Danish healthcare service.

In hospitals where the clinical work processes are IT supported, all medical record-keeping is computerised, which means that the health staff has unrestricted access to all data on patients in an EPR system. Thus staff only has to consult one source to get full and updated data on the patient and treatment. Moreover, doctors and other health staff type data on patients directly into the system.

6. According to the "National strategy for the digitalisation of the Danish health care service 2008-2012" (the national IT strategy), the regions are required to define concrete objectives for the use and utilisation value (effects) of EPR systems. Effects are referring to the benefits that the regions are expecting to achieve in connection with the implementation of the EPR systems, i.e. fewer errors and fewer bed days. It is therefore essential to examine how much progress the regions have made implementing EPR.

7. The objective of the examination is to determine the extent to which the regions have implemented EPR in Danish hospitals. Another objective of the audit is to assess the hospitals' EPR modules and their application along with the regions' objectives and plans for the area. Finally, the audit will assess the degree to which the Ministry of Interior and Health has contributed to furthering the development and dissemination of EPR.

The examination answers the following questions:

- Progress made by the regions in implementing paperless work processes?
- To what extent have doctors and nurses access to electronic data on patients?
- To what extent do the doctors and nurses use the notes module and the medicine module?
- Has the Ministry of Interior and Health contributed to furthering the development and dissemination of EPR?

8. The examination comprises the Ministry of Interior and Health and the hospitals in the five regions. It covers the period from 1 January 2007, when the regions were formed, to the end of 2010.

MAIN CONCLUSION

Development and dissemination of electronic patient records (EPR) in the Danish hospitals are essential for the strengthening of patient safety and the cohesion of the health services that are provided to the individual patients. EPR may also contribute to optimising work processes and thereby ensuring more effective utilisation of resources.

Since the mid-nineties the counties and subsequently the regions have worked with EPR systems supporting hospital work processes. According to Rigsrevisionen's review of the progress made by the regions in implementing EPR systems in 2010, paper-based patient records have only been replaced by EPR systems in a few hospitals. In most hospitals, work processes are still paper based. Consequently, patient data may not be fully updated, double entries may occur, and paper-based clinical work processes are being used although data on patients are already available electronically.

The regions have, since they were established in 2007, made a great effort to merge the many systems they inherited from the counties. Some of the systems that the counties had invested in have been kept in operation, but the regions have also developed new systems. Rigsrevisionen has established that so far the regions have spent four years merging their EPR systems, and three more years will pass before the objective of having one EPR system in each region is expected to be achieved.

The regions are at different stages in this development; Region Zealand has implemented one EPJ system to be shared across the region. The Capital Region of Denmark and the Central Denmark Region are expecting to introduce one joint EPJ system in 2012, followed by the North Denmark Region and the Region of Southern Denmark in 2013. When comparing the different regions, it should be noted that the technological level of the different systems is not the same. In the opinion of Rigsrevisionen, the systems that the Region of Southern Denmark and the Central Denmark Region are about to implement in their hospitals, offer good data integration and screen images that are providing excellent views of all relevant data on a patient.

For a number of years, the individual regions have largely been focused on developing and implementing EPR solutions in their respective regions and have not participated in any mutually binding cooperation across the regions. Connected Digital Health in Denmark (Digital Health) was established in 2007 and one of its objectives was to promote the development and dissemination of EPR solutions. Moreover, Digital Health was intended to increase cost effectiveness and use joint principles and standards as point of departure. In the opinion of Rigsrevisionen, these objectives had not been converted into concrete initiatives to implement EPR in the hospitals, when Digital Health was closed down in 2010.

Rigsrevisionen recommends that the Ministry of Interior and Health should now attempt to contribute to a coordinated and cost-effective development at the regional level.

Rigsrevisionen is of the opinion that Digital Health provided an excellent opportunity for the regions to share knowledge and cooperate on subjects of mutual interest and thereby create a platform for the launch of initiatives that could have furthered the development of common standards for and requirements to EPR. Such a platform is still needed.

The main conclusion is based on the following findings:

Implementation of paperless work processes

In two of 31 hospitals, the paper-based journals have been replaced by EPR. More hospitals are switching to EPR. A few hospitals in the Central Denmark Region and Region of Southern Denmark have abolished elements of the paper-based journal.

The regions have in particular focused on development and roll-out of EPR systems. Rigsrevisionen's review of the general objectives and initiatives taken by the regions in the area points to a need for more systematic performance management to steer efforts in the direction of paperless work processes in the hospitals.

- The paper-based journals have been replaced by EPR in one hospital in the North Denmark Region and one hospital in the Central Denmark Region. None of the other hospitals have as of yet introduced paperless work processes; the hospitals will typically record patient data electronically, print the data sheet and append it to a paper-based journal.
- Significant data on medicine are recorded and kept electronically, which is key to achieving safety in the administration of medicine during treatments.
- The regions have not planned any initiatives comprising the conversion to paperless work processes. The regions state that the paper-based journal will automatically be phased out when the digital solutions are sufficiently developed to replace them.

Access to patient data

The regions have strived to merge the many systems they inherited from the counties. Rigsrevisionen has established that according to plans, the objective of having one EPR system in each region providing access to relevant data on patients will be achieved over the next three years, i.e. in 2013.

- Since the regions were established in 2007, they have strived to reduce the number of EPR systems to one EPR system in each region. In Region Zealand and to some extent also in the Capital Region of Denmark, access is provided to the same patient data across hospitals, because they all use the same EPR solution. The hospitals located in the other regions use different systems, which prevents general access to the same patient data across the hospitals in the region. The Capital Region of Denmark and the Central Denmark Region are aiming to share one EPR system by the end of 2012. The North Denmark Region and the Region of Southern Denmark are aiming to have one EPR system per region implemented before the end of 2013.

- Doctors and nurses have electronic access to patient data in most hospitals, but generally nurses do not have access to enter nursing data electronically. In three of four hospitals in the Region of Southern Denmark, however, the nurses can enter nursing data electronically.
- All the regions are expecting to introduce a cross-functional record module that can be used by all staff groups including the nurses, but Region Zealand and the Capital Region of Denmark have not launched any concrete initiatives in this respect.
- Doctors and nurses have access to read electronic patient records and laboratory test results via the e-journal (web-based health record) and sundhed.dk (the official Danish e-health portal), which both facilitate exchange of data across the health sector. The regions have decided to expand the e-journal and turn it into a national health record system in 2013 in order to improve access to the most important patient data across the regions. No concrete projects have been worked out in this respect as of yet, neither have any initiatives been launched.
- The regions have to varying degrees made their systems more user-friendly for the health staff; they have, for instance, introduced new functions; single sign-on, retention of patient data (master data) and an overall view of relevant patient data. The EPR systems that the North Denmark Region, the Central Denmark Region and the Southern Region of Denmark are planning to implement all provide excellent access to patient data. The capital Region of Denmark is currently implementing single sign-on in its hospitals.

Use of the notes module and medicine module

The extent to which doctors and nurses are using electronic notes modules varies from one region to the next. Nurses generally enter nursing data in a paper-based journal, because there is generally no access to enter such data electronically.

Data on treatment are generally entered electronically by medical secretaries at the dictation of a doctor. The fact that medical secretaries are entering data represents an additional work process and a risk that the notes module is not updated. Moreover, there may be errors in the data entries and these will not be detected and corrected before the doctor who has performed the treatment approves the data entries.

- Doctors and nurses use an electronic medicine module for the daily registration of data on medication.
- The doctors use an electronic notes module in their daily work, but generally they do not type data on treatments directly into the system.
- The nurses generally record nursing data on paper. Only a few hospitals offer access to enter nursing data electronically.
- Generally, the regions have not defined any objectives for the application of notes modules, as assumed in the national IT strategy.

Effort made by the Ministry of Interior and Health to promote EPR in the regions

Rigsrevisionen's examination shows that Digital Health was focused on developing shared services such as the Shared Medical Card and National Patient Index which are of importance to digital communication across the boundaries of the health sector. The Ministry of Interior and Health did not ensure that the objective of Digital Health from 2006 to promote the development and dissemination of EPR was converted into concrete initiatives.

- One of the objectives of Digital Health was to promote the development and dissemination of EPR solutions, and the development work should be focused on increasing cost effectiveness. However, Digital Health has not taken steps to establish cooperation across the health sector to meet this objective. The Ministry of Interior and Health has stated that neither the Ministry nor Digital Health was authorized to dictate the terms of the regions' cooperation on EPR. Rigsrevisionen is of the opinion that Digital Health should have launched joint initiatives in respect to standards for technology, and development and dissemination of EPR to ensure that the regions were all headed in the same direction.
- In 2010, the Ministry of Interior and Health completed a study, conducted by external consultants, which followed up on the development and dissemination of EPR. The study is not addressing follow-up on the objectives set for utilisation value and application in the EPR area, which the regions according to the national IT strategy are required to define.
- Digital Health was closed down in 2010 at which point the Ministry of Interior and Health and the regions decided that a more transparent decision process for cross-sectoral IT in the healthcare sector should be established. In 2010, the regions took the initiative to form a joint e-health organisation to provide a platform for, for instance, joint procurement of/and tenders for EPR, joint requirements specifications and systematized EPR knowledge sharing. As per 1 January 2011, the Ministry set up a new agency, the National Board of E-Health, which is responsible for national coordination and management of the cooperation with the regional and municipal level, etc.