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# The work practice of medical secretaries and the implementation of electronic health records in Denmark

Pernille Bertelsen and Christian Nøhr

**Abstract**

The introduction of electronic health records will entail substantial organisational changes to the clinical and administrative staff in hospitals. Hospital owners in Denmark have predicted that these changes will render up to half of medical secretaries redundant. The present study however shows that medical secretaries have a great variety of duties, and often act as the organisational 'glue' or connecting thread between other professional groups at the hospital. The aim of this study is to obtain a detailed understanding of the pluralism of work tasks the medical secretaries perform. It is concluded that clinicians as well as nurses depend on medical secretaries, and therefore to reduce the number of secretaries because electronic health record systems are implemented needs very careful thinking, planning and discussion with the other professions involved.

**Keywords:** *Computerised medical records; medical records; professional practice; medical secretaries; practice management; quality of healthcare*

As the implementation of electronic health record (EHR) systems seizes the attention of politicians, hospital management and system consultants, it is becoming evident that in Scandinavia as well as other countries this innovation offers tremendous opportunities for organisational change in public hospitals, which in some cases make up more than 99% of hospital services. Among health informatics system developers in Denmark there seems to be a consensus that EHRs in Danish hospitals have to be more than 'paper based medical records with added IT-power'. Full integration between data from different feeder systems, and later also from primary and secondary sectors, together with 'seamless' care, are the new goals. Currently however, discussions in hospitals at ward and departmental levels are concerned with how implementation of EHR, or parts of EHR, changes the socio-technical use of medical records, how it affects the quality of the work, and further, how to avoid negative effects for the patients.

In Denmark the national strategy outlines a structure for a basic EHR, with interdisciplinary documentation of patient data. As a consequence nurses, clinicians and other health professionals within the hospitals will now document their work in a single record for each patient.

Within this context, the future of medical secretaries[1] has been a subject for debate. Some counties have announced a 50% reduction in the number of medical secretaries, arguing that there is no longer a need for them to type up the clinicians' dictation. These statements seem to be based on a stereotyped perception of the work medical secretaries currently perform, and an understanding of the clinicians' future EHR work tasks which is still to be seen in practice.

The debate about who will do what kind of work when and how, and the fact that the nature and content of medical secretarial work in Danish hospitals never has been formally described, has made this study topical. The present research investigates the work practice of medical secretaries in order to create a more balanced basis for discussing the changes in work which the new technology brings.

## Background

From an administrative point of view, healthcare in Denmark is highly decentralised. Responsibility for healthcare rests, as much as possible, at the lowest administrative level; that is, the level closest to the patient. Denmark is divided into 273 Local Authorities, which are responsible for primary healthcare and most social services. Fourteen counties[2] (at the regional level) and the Copenhagen Hospital Cooperation are responsible for hospitals. The counties organise healthcare services according to their own needs and priorities, without referring directly to the state organisation. The main task of the state is the formulation of a national health policy which initiates, coordinates and advises the healthcare sector.

The Danish healthcare service is characterised by funding through taxes (85%) and is run directly by the public authorities. Denmark has given priority to free access to most healthcare services for all, regardless of economic situation.

To summarise, according to Bernstein et al. (2005) and Lippert & Kverneland (2003):

- The National Health Service covers all 5.3 million citizens.
- There are 3500 general practitioners (GPs).
- More than 98% of GPs use some kind of EHR.
- GPs are predominantly publicly funded.

[1] Medical secretaries perform a similar role to those of ward clerks in Australian hospitals.

[2] By January 2007 they will be reorganised into five major regions.



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- There are 65 hospitals, owned by 14 counties and the Copenhagen Hospital Corporation, referred to as 'hospital owners' (there are no major private hospitals).
- There are 5.3 million outpatient visits per year.
- There are in total 20 663 hospital beds.
- The average length of hospital stay in 2004 was 4.6 days; in 2002, 6 days).
- Total admissions in 2004 were 1.3 million.
- Twenty-two percent of hospital beds were served by EHR by mid-2004, compared with 13% by mid-2003.

## EHR in Denmark

EHR development in Denmark is the responsibility of the hospital owners and is under the supervision of the National Board of Health. The Ministry of the Interior and Health has developed an IT strategy to support and coordinate national implementation (Danish Ministry of the Interior and Health 2003).

A few years ago, the different health providers communicated by sending messages to each other every time a patient was referred or a treatment or test had been completed. Even when the messages were communicated electronically via electronic data interchange there was still a lot of redundant information flowing, and it was impossible to aggregate information for other purposes (Box 1a).

Currently electronic communication in the Danish healthcare service is based on standardised messages, but the content of the message cannot be read at machine level (Box 1b). With the prospect of more IT systems being introduced there is a genuine risk that information 'islands' will arise, where information has to be copied manually, or is organised in such a disparate manner that it cannot be regrouped for analysis. It will be difficult for staff to find their way around in large amounts of data presented in ways not known in advance.

It is, however, possible to navigate comprehensively through the wealth of health related information by using a common and well-documented method of structuring the information input to the system (Box 1c). To the extent that the information is also based on some sort of classification, it can be reused by different IT systems. SNOMED CT is currently being translated into the Danish language to form the basis of terminology and infrastructure.

To ensure input of a certain granularity and structure, a common national structure for EHR has been defined by the National Board of Health: the *Basic Structure for Electronic Health Record* (BEHR), schematically represented in Box 2.

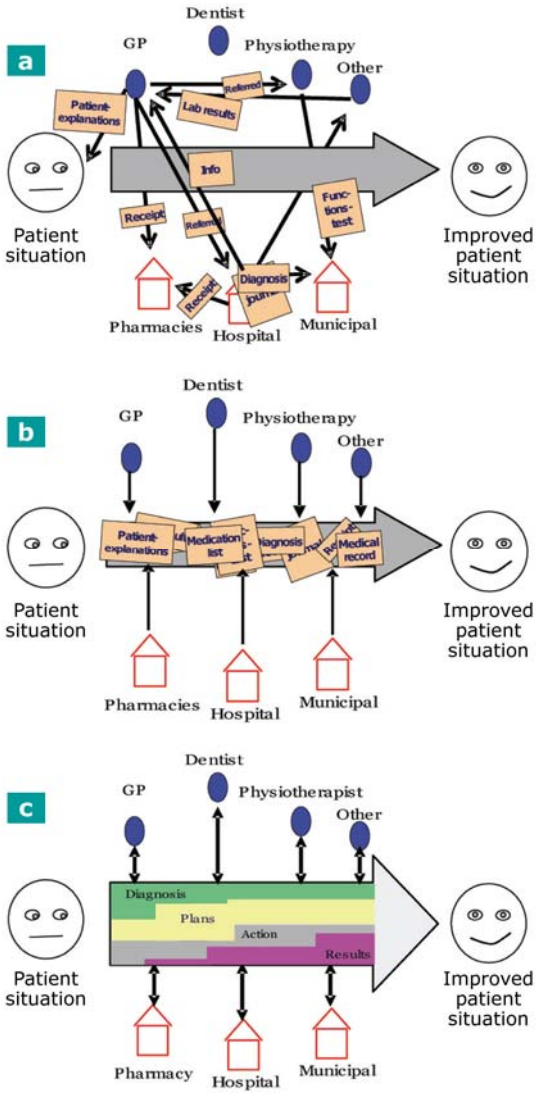
This is a clinical solving process model demanding structured information based on an episode of care, problem orientation and cross-professional documentation. It consists of four actions (diagnostic analysis, planning, execution, assessment) and four information elements (diagnosis, plan, goal, result). The content of each information element is structured according to set rules.

The diagnosis is a professional labelling of the patient's problem, using any relevant classification. The planning activity results in a set of planned interventions. When executed they produce a result which can be assessed in relation to a goal (Bernstein et al. 2005; Lippert & Kverneland 2003). The aim is to follow the interventions carried out and to assess the results achieved for a specific patient problem, regardless of which healthcare institution provided the service.

The national strategy does not provide funding for the development of concrete systems because power lies within the counties. This leads to different progress for EHR implementation in each county. A few

**1: Structure of shared data**

(a) Data are totally unstructured and not reusable. (b) Digital access to pooled information, not well structured. (c) Final state: all the data are shared and highly structured.




From Danish Ministry of the Interior and Health (2003).



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**2: Basic electronic health record (BEHR) model – concept level (Bernstein et al. 2005; Lippert and Kverneland 2003)**


counties have implemented EHR systems for more than 80% of their beds, but others have just started a call for tender process.

Another consequence of county freedom is the difference in choice of EHR implementation strategy; 60 different projects have been documented (Nøhr et al. 2005). The strategy at national level is to ensure compliance with the common standard and framework. This allows inter-communicability between different implementation and different proprietary systems. Inter-communicability permits a free market; as providers are forced up to a certain degree to communicate in a predefined form, different providers can implement different parts of the project.

## Medical secretaries and EHR

The first medical secretaries in Denmark were employed at the end of the 1930s. Their purpose was to assist clinicians in their documentation work. Since then they have been called 'the doctor's secretary' (directly translated from Danish). The notion that this labelling of a profession (which by 2005 had grown in number to more than 10 000) has influenced the debate about their future in the hospital following implementation of EHR cannot be avoided. It has also added to a stereotypical perception of the kind of work medical secretaries perform in the hospitals.

In Danish hospitals medical secretaries are employed at the department and ward levels. Over time, they build up a specialised domain of knowledge within the medical specialty of the ward in which they are employed (for example, cardiology, ophthalmology, urology), and they apply this knowledge when talking to patients or their next of kin over the telephone to identify primary contacts and to assess the urgency of the patient's situation. They also apply their knowledge when correcting errors in the clinicians' dictation.

The future situation of medical secretaries in hospitals is currently being debated and hence there does not at present exist a full picture of what work will be assigned to them following implementation of EHR.

The term medical secretary evokes in most people's mind an indelible stereotypical picture of a white coated woman equipped with a headset, typing to the clinicians' dictation on a computer, who then prints and files it as a printed medical record.

## Aim of the study

The purpose of this study was to investigate which work tasks the medical secretaries actually perform, and in addition, to evaluate the significance of these work tasks to the organisation of clinical work and shared care. It was not our purpose to appraise which work tasks will potentially disappear when the paper record eventually becomes interdisciplinary and electronic.

## Method

Our concept of the importance of developing a method to identify formal and informal work routines centred around the work of medical secretaries in hospitals is in line with the principles in Soft System Methodology and a '... fundamental proposition that in order to conceptualize, and so create, a system which *serves*, it is first necessary to conceptualize that which is *served*, since the way the latter is thought of will dictate what would be necessary to serve or support it.' (Checkland & Holwell 1998: p. 10).

The present research places itself in the action research tradition. The specific research questions were developed in collaboration with the Danish Medical Secretary Association. The action research method is highly clinical in nature and places the researcher in a helping role within the (hospital) organisation that is being studied (Baskerville & Wood-Harper 1998). Action research merges research with practice and by doing so produces highly relevant research findings. The social and organisational realities in hospital and other healthcare organisations are realities that are continuously being constructed and re-constructed during dialogue with the staff and in the context of the action which they take (Checkland & Holwell 1998).

## Design

The actual study design chosen was inductive and interpretive. It did not consider the researcher as neutral, but as someone who influences the result. We perceived the organisation of work in a hospital as a social construction by human actors. Each department or ward and its medical secretaries have their own reality that we wanted to explore, not deduct. An explorative method is thus valuable when the objective is to break new ground and yield insights into a new topic (Babbie 1998). Our study target was the work functions of the medical secretaries. Our aim was to disclose the variety of tasks in which



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secretaries are involved, rather than the time spent on each task. Neither were we concerned with which secretary was focused on which tasks. This was a qualitative and not a quantitative approach. Generalisation of findings from the sample cannot be justified; rather they serve as an eye-opener to the activities of medical secretaries.

## Unit of analysis

The sample was selected by using what may be called a 'convenience' or 'haphazard' sampling method where the aim was to investigate different departments and work areas rather than compare them (Bernard 2002). The informants comprised 10 medical secretaries in four hospitals. They were each interviewed for approximately two hours, and six of the 10 were observed at work for four to five hours by two researchers using video recordings. In order to test the method prior to carrying out the study, a pilot study with one medical secretary was carried out before data collection started.

## Data collection

After selecting the informants, they were sent a disposable camera together with a covering letter asking them to photograph their workplace and colleagues, then return the camera in a self-addressed envelope. In particular, they were requested to photograph their physical workplace, the technical aids they used at work, the different tasks in which they are involved, planning and distribution of tasks, their area of responsibility, colleagues, superior staff, co-workers and whatever came to mind. A convenient day for conducting the interview was also agreed upon.

## Interview

Each medical secretary was interviewed using a semi-structured interview guide and visual aids such as flip chart paper, post-it notes, and marker pens. The interview method was participatory in that as the participants explained their activities, they also analysed the technology they used as exemplifying the knowledge, technique, organisation and the product/outcome of their work (Bertelsen, Madsen & Hostrup 2005; Müller 2003). The flip chart paper was placed on top of the table and divided into four squares, each representing one of the four elements of the technology we wanted the medical secretaries to describe. All interviews were recorded and later transcribed. The flip charts were used to note the issues related to the four elements in the technology concept and later to encourage the medical secretaries to organise the product of their work under different headings.

We understand the current change from paper based medical record to electronic patient record as a change from the use of one technological system to another. The introduction of electronic devices is merely the introduction of a new technique which will never be successful without a simultaneous adjustment in two of the other three elements of the technology, namely the organisation and the knowledge elements. Changes in these three elements will finally affect the end result, the product, which in the case of the work of the medical secretary, we defined as the products/outcomes that can either be stored or are immediately consumed (Müller 2003).

## Verification

For verification of our interview and video recording results we read available reports and studies on the work of medical secretaries and extracted from these the work tasks mentioned and matched them up against our own results.[3] Furthermore, two workshops with a total of 32 medical secretaries from all over the country were arranged. The first edition of the video recordings was presented and discussed so as to ensure that the final edited version would represent a common understanding of the work of the medical secretaries. Prior to conducting the workshops, the results of the interviews were arranged in a 'mind map' illustration and were distributed to the participants who were then asked to mark the work task they performed at their present job.

## Results

Analysis of the data by the use of a Mind Manager tool (www.Mindjet.com) identified seven major categories of work that accommodated the identified work tasks. The many work tasks were then written into seven mind maps where we operated with a maximum of four levels. Here only the two top levels will be described. The seven categories at the very top level were:

- data input to the medical record
- data output from the medical record
- other operations involving the medical records
- support of clinical care plans
- administration of the professional clinical staff
- miscellaneous clerical tasks
- research and development activities.

The work tasks were sorted with the purpose of identifying the total number of work tasks done by the 10 secretaries.

## Category 1: Data input to the medical record

Work tasks that have to do with *data input to the medical record* include the more classical medical secretarial tasks, to:

- type up the clinicians' notes or dictation onto the medical records
- set up new medical records
- print information for the records
- edit information already in the records

[3] The reports are in the Danish language. A full account can be seen in Bertelsen (2005).



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- enter test results into the records
- order data from other departments or hospitals
- code information already in the records.

## Category 2: Data output from the medical record

The following subcategories all have to do with handling *data output from the medical record*:

- registration of record data elsewhere
- procedures for coding of data for different types of clinical databases
- coding of data (mainly ICD-10 and local standards)
- settlement arrangements
- a number of lists, for example, waiting lists, regional lists, incident reporting
- quality assurance data.

## Category 3: Other operations involving the medical record

The third major category of residual tasks is *other operations involving the medical records,* which includes:

- getting the medical record to and from the archive
- maculating confidential sheets of information from the medical record
- sorting and prioritising medical records into those required urgently and those that can wait
- photocopying of records to the patient, the insurance companies or other authorities.

## Category 4: Support of clinical care plans

The medical secretary assists in different ways to make the patient's contact with the hospital as smooth and seamless as possible. In the *support of clinical care plans,* three different subgroups of activities support this effort. The first category identified as planning of clinical interventions contained myriad tasks dealing with:

- booking of appointments or admission
- re-booking
- coordinating planned clinical interventions
- coordinating acute clinical interventions
- arranging for transport of patient to and from the interventions.

Tests and test results are sent to and received by medical secretaries between the various departments and wards both within and external to the hospital. An important task is to assume an overall logistic responsibility for those tasks that are conducted by other professions in the hospital. That involves:

- checking up on the physician to make sure he or she remembers to call back the patients waiting for test results
- detecting both spoken and written mistakes in the documentation.

External communication regarding patient care is a task which encompasses communication through mail correspondence or by telephone. More specifically, it entails writing emails and other types of correspondence to the staff in home care and in other institutions, answering telephone enquiries from patients, their next-of-kin, and primary sector staff. A quite frequent task is to request interpreters to assist non-Danish/English speaking patients, which is also a task involving external communication.

Inhouse communication concerns welcoming new patients to the hospital, answering telephone calls from inhouse staff from other departments and email correspondence to other departments.

The medical secretary handles referrals to and from other departments and general practitioners. A considerable amount of communication in referring patients is handled on standard forms and paper charts, often in multiple copies in different colours. In most cases it is the medical secretaries' task to fill in the forms, sort them, and make sure the form of a particular colour goes to the right place. In addition, many of the forms are also designed by the medical secretary.

## Category 5: Administration of professional clinical staff

The *administration of professional clinical staff* incorporates two major subcategories, formal and informal staff administration. Formal staff administration is a matter for decentralised management and includes keeping a record of notification of illness among staff, making on-duty schedules, and reporting of working hours for salary payment purposes, as well as monitoring staff vacation days. The purpoess of these concerns is to ensure the smooth running of the logistics surrounding other professions, and to facilitate the running of a large and complex organisation by hospital management.

Supplementing the formal work tasks is informal staff administration. This could include introduction and coordination of trainees and medical, nurse, and midwifery students. In general, secretaries play an important role in introducing new staff to the rules, routines and regulations in the department, and the new staff ask questions of the secretaries as they are more accessible than other staff categories.

## Category 6: Miscellaneous clerical tasks

In the category *miscellaneous clerical tasks* the concern is to make the daily work of colleagues and patients more comfortable, and by doing so strengthen the social capital. To go to the bakery for fresh bread, make coffee, feed the fish, and tidy the meeting room after meetings are tasks that the secretaries take on.



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We did, however, also find they are involved in tasks such as participating in meetings, committees and projects of different kinds, where they coordinate meeting dates, make photocopies, take minutes and maintain the project accounts.

Office materials and medical equipment used by hospital staff are ordered by medical secretaries. Materials and equipment are also lent out and registered by secretaries, and they carry out such tasks as 'tidying up' the depot to make it easy for the staff to locate the materials they need. When equipment breaks down the secretaries call technicians to repair it, and they order the necessary number of beds for patients that are admitted to the ward.

Clinicians or researchers with non-Danish training, and having not yet mastered the Danish language, need more support than their Danish colleagues. Medical secretaries often help these colleagues to document their clinical work in the Danish language and to find their way around the hospital.

### Category 7: Research and development activities

The last top level category is termed *research and development activities*. Five different subcategories related to research and development activities have been identified. The first category concerns setting up a research project. It contains the different support activities needed to write research proposals, such as setting up research protocols, and correspondence with funding agencies and different authorities, for example to seek approval of tests by ethics committees.

The second category is operation and management of research projects. It deals with all the activities that occur when research funds are in place. Here we find work tasks related to controlling and accounting for the funds, arranging meetings and conferences, as well as different tasks related to the researcher's travel.

The third category consists of reporting to research councils and administration, searching for literature, and establishing contact with different research groups. Minutes from meetings are written and contacts with councils, companies and insurance companies are maintained.

The fourth category comes into play when the research projects are completed and the results are to be communicated in writing, necessitating translation into English, proofreading and writing and/or editing annual reports. Writing articles from dictation as well as designing PowerPoint presentations for researchers are also part of the work tasks. A special task in relation to research projects is to bring clinical guidelines up to date.

Especially in relation to development programs within the hospital, the secretaries often participate in committees and working parties, not only in a clerical capacity, but also as qualified members of the professional staff.

## Discussion

Our concern was not to identify how many of the informants carried out the different work tasks. With a unit of analysis of 10 informants generalisation of this kind is not possible. The objective of the data processing has been to obtain a detailed understanding of the pluralism of work tasks the medical secretaries perform, but not to identify the work tasks that are performed by a majority of the informants. Such an exercise has yet to be done in Denmark.

During the sorting out of the work tasks we often encountered tasks that could be placed in more than one of the seven categories; for example, data from medical records used for treatment as well as research purposes, and which is also being reported to the clinical database. It is important for us to acknowledge that we are aware that as researchers, from time to time, we have influenced the category into which the work tasks have been placed.

However, we have been guided by a wish to generate major categories that would allow us to make sense of the myriad different work tasks we came across. It is not our intention to document all the secretaries' tasks at all times and in all hospital departments in Denmark that would fit into the same category. Thus, it is our perception that there will at all times be a socio-technical difference between hospitals and departments in respect of how secretaries' work tasks are performed. For this reason it will never be possible to find one blueprint that will apply to all situations.

Using the methodology outlined by the study has constructed a very detailed and sophisticated understanding of the work of Danish medical secretaries (Checkland & Holwell 1998). In relation to EHR systems, it has provided a foundation for discussion of the development and implementation of an EHR system that will best serve a particular hospital organisation or institution. The study disclosed a multiplicity of formal as well as informal work tasks that, by their sheer number, challenged the researchers to comprehend them. Even by using mind maps, to handle up to four levels of categories which are not entirely exclusive nor exhaustive is a complex undertaking.

Though the different departments employing medical secretaries have almost identical names at different hospitals, their organisation as well as priority of work tasks to be performed by medical secretaries varies considerably. A number of secretaries may perform the similar task of writing notes for the medical records, but the rest of their working hours may involve work on very different tasks. This makes it virtually impossible to compare and classify their tasks into fixed job profiles. That exercise will have to be done at the local departmental level. We can only use our findings to indicate the diversity in work tasks, particularly informal work tasks, among medical secretaries.

One relevant example of this diversity is the cross-cutting role where the medical secretary serves as a



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broker, the organisational glue or the connecting thread between other professional groups at the hospital. The medical secretary connects the other professionals by making sure the patient and care providers are in the same place at the same time with the required information to perform whatever task is required of them. In addition, they are the ones who manage follow-up on actions, making sure information or data are available when needed. However, in the debate about the future need for medical secretaries in hospitals when EHR is introduced, these important work tasks are rarely appreciated or discussed. Such lack of recognition may be due to the fact that this type of work is consumed immediately and cannot be stored like other work tasks (e.g., typing up dictation). Further, there seems to be a correlation between what can be labelled the informal work tasks and the work that cannot be stored, and between the formal work tasks and the work that can be stored.

The interview method presented in this paper has made it possible to go beyond the 'tell me about your work' approach. An investigation of work practices can target three levels of knowledge:

- what they think they do
- what they say they do
- what they actually do.

The interview method in this case targets the first two levels of understanding. By asking questions about the knowledge, technique, and organisation behind the work tasks, a much more detailed picture of the work of medical secretaries was achieved. Compared with interviews where only the end result of the work is investigated, this method has, by its holistic approach, investigated the related artefacts, colleagues, formal and informal knowledge, and the organisational issues relevant to the secretaries' roles. This has resulted in a sophisticated knowledge of the work tasks performed in very complex settings.

At a later stage of each interview the participants were asked questions relating to the photographs they had previously taken. This enabled the interviewer to point at different people, files and artefacts on the photographs, triggering the memory of the informant to recall additional work tasks that could be added to the list. This method became very important when interviews took place in a setting different from the workplace. If photographs were taken over some time they could illustrate work that was not done every day and which may be difficult to identify through participant observation in one- or two-day visits to the worksite.

The video observation of six informants revealed information about the third level, what they actually do. Thus the methodological requirement that empirical data be verified was satisfied. Random selection of participants from all hospitals across the entire country was not possible, and workshops were conducted to compensate for any regional bias that may have occurred. In these workshops, 32 medical secretaries, representing hospitals across the country, debated the accuracy of the interview results as a true representation of their professional tasks.

The present participatory technology analysis approach, combined with the workshop verification of the content, is a useful amendment to the representative democratic approach where one medical secretary represents the profession in a working group with representatives of other professions and the management. A hospital or regional IT authority can deploy the knowledge of the medical secretaries to better understand the important need for an organisational change to go hand in hand with implementing a new EHR system. Furthermore, the results have been verified through study of all the available reports, articles and papers on medical secretaries' work in Denmark. The results have been matched to the work tasks mentioned in those reports to further strengthen the validity of the data.

## Conclusion

Successful change from paper to electronic documentation technology in hospitals signifies changes in the organisation of formal as well as informal work. This analysis of the work of hospital medical secretaries in Denmark gives an insight into a very complex work organisation. Both clinicians and nurses depend on medical secretaries in a number of ways, and therefore to reduce the number of secretaries because EHR systems are to be implemented needs very careful thinking, planning and discussion with other professions. Major reorganisation of existing work practices needs to be accomplished simultaneously with the introduction of EHR systems.

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