The clinical work of secretaries: Exploring the intersection of administrative and clinical work in the diagnosing process

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Abstract: Diagnostic work is often defined by the skill of clinicians whereas the contributions of non-clinicians, for example secretaries, tend to fade into the background. The secretaries are deeply involved in diagnostic work through the eligible administration of patients in the collaborative electronic information systems. This study explores the *secretaries' role* in diagnostic work, focusing specifically on the context of diagnosing cancer. It identifies four key activities of secretaries that are essential for diagnosing patients: examining the patient's condition, interpreting the clinical information, monitoring the follow-up, and further informing the patient's trajectory. We argue that secretaries' role is positioned at the intersection of clinical and administrative practices and not limited to support of articulation work of clinicians and administrative work. Secretaries also carry out activities that fall under the core definition of clinical work. This clinical dimension of the secretaries' work, we argue, should be embedded in the design of collaborative systems to support the diagnosing process.

Keywords. Intersections, diagnostic work, electronic information systems.

1 Introduction

Diagnostic work is often understood as a particular type of collaborative work that is "clinical" or "medical" at its core [1, 2, 6, 7]. So it is the work of clinicians, ranging from physicians assessing patients, to technicians running tests, and nurses tending to patients while taking note of their condition. Secretaries, from this perspective, are the "right hand" of clinicians, ensuring that physicians, test results, and patients are brought together at the right time and place [3-5, 8, 9]. Despite the fact that secretaries are central to the core of clinical work (defined by Bardram [3] as examining the patient's illness and condition, requesting and interpreting clinical information, decision-making concerning the patient's illness and condition, further medical treatment of the patient's illness and condition, and monitoring the effect of it), and that diagnostic work is defined in relation to this core clinical work, surprisingly little attention has been paid to the role of secretar-

ies in diagnosis. This study empirically investigates the role of secretaries in both a radiology department and a medical department. We find that secretaries are central to diagnostic work and identify four particular activities where this is evident when secretaries: a) examine the patient's condition, b) interpret the clinical information, c) monitor the follow-up, and d) further inform the patient's trajectory. These activities constitute an intersection of clinical and administrative work where secretaries become involved in the handling of patients through the collaborative electronic information systems. The formal distribution of power when secretaries become involved in diagnosis is not the focus; the analysis focuses strictly on how to further specify the secretaries' role.

In the following we start by introducing the collaborative electronic information systems, RIS-PACS and OPUS-OCW, that were the subject of the secretaries' work in the study reported here. Then, we explore four specific examples of how secretaries contribute to the diagnosis of patients in a radiology department and a medical department. Third, we discuss the combined clinical and administrative content of these examples and point to the way in which it specifies the secretaries' work. Finally, we conclude that a detailed understanding of secretaries' work as intersecting is crucial to the support of collaborative systems.

2 Background

In Denmark, collaborative electronic information systems such as RIS-PACS (Radiological Information System - Picture Archiving and Communication System) and OPUS-OCW (Open Clinical Workspace) were implemented in recent years as part of a national strategy for the digitalization of the health service [10]. In terms of diagnostic work, the national strategy is focusing in particular on support of radiology to ensure better and faster diagnosis. Secretaries' work, in this way, is an implicit part of the national strategy that has as its purpose the connection of the entire health service in Denmark. RIS-PACS and OPUS-OCW are both multi-module access portals. RIS-PACS is primarily oriented toward radiology (administration and picture archiving). The medical department uses OPUS-OCW, which supports a broader spectrum of clinical practices (administration, medication, monitoring, etc.). These systems are intended to support continuous and smooth coordination of the clinical and administrative work. While systems such as RIS-PACS and OPUS-OCW are increasingly prevalent in diagnostic work, there are several reasons why it is crucial to place secretaries at the center of analysis. First, the development of, and experimentation with, collaborative electronic information systems has been occasion for reappraising rather than dismantling the role secretaries play. Second, the implementation of these systems has not simply supported existing practices but rather entailed reorganization of activities and responsibilities [9, 11]. This reorganization confirms the classic argument of Hughes and others: that new kinds of technology may interfere with existing roles and the organization of work [1, 12]. Given that roles are in flux, the very understanding

of what kinds of work practices comprise diagnostic work needs to be re-examined.

3 Theoretical Framework

In order to understand the organizational positioning of the secretary, we will argue that this role cannot be understood simply within administrative or "supportive" terms or by the concept of "articulation work." The secretary is deeply involved in the core "clinical work," but this aspect has remained under-theorized. In the following we will briefly review the way secretaries work has been conceptualized in the literature.

3.1 Secretarial Work

Secretarial work is by no means a new subject. Research within CSCW and related fields has expanded our understanding of the secretary's role in various fields of collaboration. Secretarial work has been addressed broadly in relation to directing assistants [13, 14], secretaries [15-17], medical secretaries [3, 5, 18-21], clerical workers [1, 22], office workers [23, 24], and coders [25]. A shared departure for this research is the argument that secretarial work is something that cannot be performed by everyone. Pointing to the knowledge work, CSCW research has demonstrated that understanding the role of secretaries is important for the design of collaborative electronic information systems in various fields of collaboration.

Secretarial work, as has been demonstrated in CSCW, is rarely recognized as knowledge work. Instead, a secretary is often thought of as someone who simply connects clients with software or answers phones and types. In contrast to this simplified picture, it has been shown, for example, that the software relies on secretaries' work in different ways [14, 25]. Müller demonstrated how the work of a particular type of secretaries – telephone operators – is about collaborative refinement of clients' requests and not just connecting the software (database of telephone numbers) and the clients. Hence, knowledge work is defined by the domain-specific *memory* and use of domain-specific *patterns of meaning*, and Müller demonstrates that this is also a characteristic for telephone operators [14].

Somewhat related, the key activities of the medical secretary have been characterized as: printing clinical information [20], transcribing and filing physicians' dictations [31], locating files [19], and being a receptionist [5] Often, however, the secretary's role is described as "collaborating" with nurses and physicians or "providing clerical support" [3, 5, 19, 20, 31]. It remains somewhat unclear how the work of the medical secretary is "knowledge work" and how it relates to what is seen as the core clinical work, which diagnosis is a part of.

3.2 Clinical Work

"Clinician" is a rather broad term that covers professions doing work in a clinic or work that is related to the observation and diagnosis of patients [27]. The performance of clinical work typically relies on different types of specialties and is thus essentially collaborative. This is particularly true in relation to complex diseases, such as cancer [5]. Bardram characterizes the performance of clinical work as a circular process roughly consisting of five activities [3]: a) examining the patient's illness and condition, b) requesting and interpreting clinical information, c) decision-making concerning the patient's illness and condition, d) further medical treatment of the patient's illness and condition, and e) monitoring the effect of it. These activities define clinical work, Bardram argues; but they are determined by the actual condition of the patient [3]. Clinical work varies across patients (for example, how fast symptoms develop and hence can be diagnosed). This variety very much affect the work environment of clinicians. Few settings are as rich in detail as clinical settings [3, 20, 27], which, in the words of Strauss et al., consist of places "where very different resources (space, skills, ratios of labor force, equipment, drugs, supplies, and the like) are required" to carry out the work [27 p. 6]. At the same time, clinical work is dispersed across time and space; and, the co-ordination or articulation of this work is pivotal.

3.3 "Articulation Work" in Clinical Settings

The support of articulation work – or the reduction of effort involved in articulation work of others – is a classic job of secretaries besides administrative work. The organization of clinical work relies on articulation work to bridge the various types of specialties involved in clinical work [3, 8, 27]. Articulation work, from this perspective, defines a type of "supra work process" that supports the accomplishment of distributed activities [28]. Articulation work is an ongoing and shared concern of clinicians to make the collective work add up to more than discrete bits of accomplished work [27]. Secretaries are reported as part of this process, for example, when they structure and send information in collaborative electronic information systems that support the clinical work [3-5, 20, 21]. Here, the articulation work of clinicians, for example, structuring information, is the core work of secretaries.

Emphasis has often been placed on the role of shared repositories and objects for this articulation work [31, 32]. The concept of "boundary objects" points to objects that are "weakly structured in common use and become strongly structured in individual-site use" [29 p. 393]. In a clinical setting boundary objects can serve *different* purposes for different communities of practice (such as clinicians and secretaries) and still maintain some common sense of purpose across them [29-

32]. Equally important, the central concept within CSCW of "common information space" [37], such as that provided by a collaborative electronic information system, also allows different communities of practice to pursue *different* purposes. Secretaries clearly play a role in the establishment and maintenance of such "boundary objects" or "common information spaces," and hence in the support of articulation work [33]. It is in relation to the pursuing of a *shared* purpose of different communities of practice that the secretary's role in diagnostic work is explored.

3.4 The Clinical Work of Secretaries?

While we find the above conceptualizations of secretaries' work important, we also note that the secretary tends to be seen as an administrative function or as part of the articulation of clinical work [3-5, 8, 9]. There is no explicit account of the way secretaries might also be partaking directly in the clinical work, which diagnosis is a part of. While this is no surprise in light of both common sense and formal distinctions between the job of physicians, nurses, and secretaries, we will show that secretaries also carry out tasks that fall under the core definition of clinical work.

4 Research Method

The study reported here was conducted in a mid-sized hospital that specializes in patients with general symptoms. These patients are particularly important when investigating the initial diagnosis because they often fail to meet the formal criteria for referring patients to hospital departments that specialize in cancer. The study focused on two departments: the radiology department and the medical department. *The radiology department* provides important examinations critical for the initial diagnosis of complex diseases such as cancer. The staff in the radiology department includes specialists of radiology, radiographers, and secretaries. *The medical department* has several sub-sections specializing in different areas of medicine (such as diabetes, gastroenterology, cardiology, etc.) as well as 4 outpatient clinics and an acute care section. The medical department diagnoses a number of patients with cancer every year in collaboration with other departments, although, this is not the specialty of the department. The staff of the medical department includes specialists of medicine, secretaries, and nurses.

The study was ethnographically informed [34, 35]. The initial diagnosis process - and the secretaries' role - was explored through detailed analysis of ethnographic notes from observations of practices related to diagnostic work, as well as *in situ* interviews and semi-structured interviews, artifacts (schedules, classification schemes, etc.), and images. Observations were conducted by the first author over a

period of 13 months. In total, the first author spent 118 hours observing practices and conducting *in situ* and semi-structured interviews. Prior to commencing these observations, preliminary observations were conducted, in total, 14 hours. Data were analysed right from the beginning of the data-constructing process. In this way, data collection and data analysis together formed an iterative process of analyzing themes that emerged as being essential for the process of diagnosis, for example, variations of secretaries' work. Data were continuously contested by presenting it to the secretaries and clinicians when observations were resumed. Secretaries' as well as clinicians' insight provided useful interpretations for further collection and analysis of data. In this way the contesting of data in one stage became the preconception for the collection of data in the next stage and a way of reasoning in the analysis [36].

5 Analysis: The Clinical Work of Secretaries

In Denmark, secretaries are often the first hospital staff to handle requests of diagnostic examinations and incoming referrals, which positions secretaries as central to diagnostic work. In the following analysis, we explore the role of secretaries in four specific examples of activities involved in diagnostic work. First, we analyze how secretaries participate in the examination of a patient's condition in order to ensure that severe patient cases are given first priority. Second, secretaries' clinical interpretations are analyzed. Third, we analyze how secretaries evaluate patients to make sure they received appropriate follow-up. Finally, we analyze how secretaries further inform the patient trajectory. Figure 1 illustrates the relationship between the radiology and the medical department and the distribution of responsibilities during the initial diagnosing process.
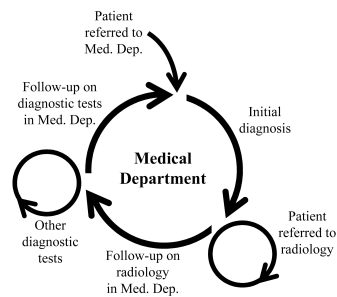

Figure 1: Distribution of responsibilities during the initial diagnosing process

5.1 Examining the Patient's Condition

To even begin the process of diagnosing a patient will have to be referred to a clinical department. In the medical department the referrals are received by the general secretaries' office (the medical secretariat) before patients are distributed to the "local" secretariats in the sub-sections. Most referrals are received electronically, but they may also be received as paper referrals. The referrals are printed (if received as paper referrals they are scanned so that they are also registered in the electronic information system) and then distributed to plastic trays that each sub-section has in the general secretariat. Although, it might seem to be a somewhat trivial task, while distributing the printed referrals to the sub-sections, this secretary, the following example shows, is simultaneously examining the patients' conditions. Reading through the free-text of one of the referrals the secretary quickly realizes that she has to take action. The free-text reads:

> "77 year old woman, known to have COLD [chronic obstructive lung disease] as well as afli [atrial fibriliation], recently started treatment with Maravan. Referred acute since the patient has macroscopic hematuria and development of various ecchymosis of OE. Had INR [international normalized ratio] taken in lab >7.5". (Referral for the medical department, September 30th 2009)

The secretary's examination, in this example, is highly relevant for the diagnosing of the patient. The electronic referral template allows the referring physician to indicate the condition as either "acute" or "planned". The patient in this example is categorized in the referral template as "planned" indicating that this patient may wait. However, the free-text tells the secretary an entirely different story: Reading through the free-text, the secretary underlines the text "acute" with a yellow marker and then explains that an INR >7.5 (a measure of the blood coagulation) is problematic, before she comes to the conclusion that this patient will have to be handled "acute" and not as a patient that can wait. The patient, the secretary explains, is not supposed to have an INR this high.

When she looks up the patient in the collaborative electronic information system her suspicion is confirmed. In the collaborative electronic information system it is registered that the patient (despite the fact that the referral was sent electronically to the general secretariat) has already been admitted physically through the hospital's acute care section. Knowing this, the secretary may cancel the referral in the collaborative electronic information system. To make sure that it is also clear to the clinicians why the referral is canceled, she notes this information in the comment field. When done, the secretary throws out the printed copy of the referral and continues to read through the rest of the referrals received in the general secretaries' office that morning.

The example illustrates exactly how the secretary gets involved in diagnostic work (examining the condition of the patient). While this work is not something that any of the clinical staff are aware of (unless they read the comment in the collaborative electronic information system), it influences the diagnostic work. If the patient had not been admitted, it would have been a potentially dangerous situation. Even if the patient had been admitted (physically) but the secretary had

not reacted adequately (electronically), this would have been disturbing to the diagnostic work. Eventually the clinical staff would have been the ones to make sure this patient was receiving proper diagnostic care. However, in terms of timing, this assurance would have occurred much later than when the secretary noticed the seriousness and took action.

5.2 Interpreting Clinical Information on the Patient's Condition

Another department equally important for the diagnostic work is the radiology department. Radiology often guides the next diagnostic step as clinicians are trying to understand the nature of patients' symptoms. The secretary is the first person to receive referrals for radiology. The rule is, the secretary in the radiology department explains, that all referrals should be scheduled the day they are received, as a way to ensure that patients are not waiting because of the administration of the referrals. In this way, the radiology department tries to avoid patients waiting for reasons other than clinical ones. The incoming referrals are lined up in a list in the radiology information system, RIS-PACS.

Also the radiologist on call, located downstairs in the protected space of the CT-scanner and MR-scanner, takes notice of the referrals as the electronic list of referrals fills up. The radiologists have a work space next to the CT-scanner and the MR-scanner so that they can pay attention to the scanners and access the collaborative electronic information system at the same time. RIS-PACS is used by the radiologist for describing the scans, and in between the description of scans the radiologist interprets the information in the referrals so that the secretary can continue to schedule them.

Back in the secretaries office the next electronic referral for a CT-scan is waiting to be scheduled. The referral is received like any other electronic referral (automatically listed one after the other in RIS-PACS). The radiologist has added a priority and specified the program and sequence of the particular scan. Reading through the electronic referral template, the secretary interprets the wording of the referring physician and the radiologist, which both says something about the way the scan is to be carried out, she explains. Scheduling a CT-scan is not the same as scheduling an MR-scan or any of the other scans, it is revealed when the secretary glances at a protocol hanging above the secretary's desk entitled "CT – The short version".

The presence of the protocol in the secretaries office is surprising at first due to the clinical nature of it. The exact same A3-sized (11.7 x 16.5 inches) protocol is hanging downstairs next to the radiographers as well as in the radiologists' work space. The CT-protocol is a clinical tool used by the radiologists; the CT-scans each require specification of the appropriate sequence and program before the radiographer can perform the CT-scan. The CT-protocol, for example, specifies that "tumour detection" corresponds to sub-protocol number 6A in RIS-PACS and also specifies the situations where, for example, contrast is needed. The secretary confirms that the various clinical information corresponds.

The example illustrates how the secretaries' work (specifying the protocol and sequence while scheduling the CT-scan) involves an artefact (the CT-protocol) that is strictly clinical while checking the clinical history for other conditions that may influence the way the CT-scan is carried out (contrast or not). Although the clinical information on the choice of program and sequence is not filled in by the secretary, she does become involved in the diagnostic work when she once again interprets it. In the convey of information the secretary makes sure that the patient is supposed to have contrast when this is specified.

5.3 Monitoring the Follow-up of the Patient's Condition

When the scan has been performed it appears in a list in RIS-PACS. The medical department can then retrieve the scan for their department and sub-sections. The responsibility for retrieving scan results in the medical department is placed with the "local" secretaries in the sub-sections. In the sub-section for medical acute care patients, the secretaries share the office space with the physicians and nurses. There are always two secretaries on duty; one takes care of the many *ad hoc* tasks and the other types the physicians' dictations. The secretary who is responsible for *ad hoc* tasks retrieves the results of patients' scans in RIS-PACS and makes sure that a physician takes responsibility for the particular scans so that they are followed-up.

This routine was established, the secretary explains, to avoid adverse events. Before this, the sub-section sometimes experienced that it was unclear who was responsible for the follow-up, which presented a risk to the patients if the result was, for example, cancer related. The secretary explains this while sorting printed copies of scan results into three piles: 1) scan results that have to be signed by the physician responsible for the patient; 2) scan results that the physician on-duty may sign before it is sent to the patient's GP; and 3) scan results that must be signed by another department because the patient has been transferred there. The secretary carefully reads the result of the scan and then reads the newest part of the continuation (clinical notes). In this way, she tries to make sense of the results and how they should be sorted (as 1, 2 or 3). When the secretary is uncertain, she consults the physician on-duty.

The physicians also monitor RIS-PACS, but only when they have requested the scan themselves. It is possible that a physician will call their colleague in the radiology department prior to the release of a scan, the secretary explains, to have a first indication of whether the result points in one direction or the other (cancer or not). The secretary gets up to consult the physician on-duty working at a computer in the background. The scan results are not printed simply to be distributed; the secretary's responsibility is quite literal, she says, when the secretary returns with the signature of the physician. The secretary's name is printed at the bottom of the paper copy that is later saved in the patient record. If no physician has signed for the printed result it is her responsibility, the secretary explains and points to her name at the bottom of the paper.

The example illustrates that while printing scan results might seem as extra work or doing the same work twice, in the sense that a physician already has the scan in mind, the secretary is not just printing scan results to remind the physician. The real task is the overall monitoring involved in this activity where physicians share the responsibility for the patient. The secretary does not monitor the single patient like the physicians do; instead the secretary monitors all the patients. Physicians schedule changes, and since the physician may be at the ward one day and in the clinic or at a conference the next, patients are sometimes left in a vulnerable situation. The secretary makes sure scan results are still followed-up and therefore gets involved in the diagnosing process in a crucial way.

5.4 Further Informing the Patient Trajectory

The "local" secretary in the medical sub-sections is the person responsible for registering that the diagnosing process has come to an end in the collaborative electronic information system, OPUS-OCW. The act of registering this clinical milestone a) indicates the change of responsibility for the patient (if responsibility is to be turned over to another clinical department or the GP) and b) signals to the medical department itself that no further action is taken. In this way, diagnosing is accomplished by the secretary who registers the final diagnosis – at least in a formal sense.

The secretary, sitting with the paper record in front of her, looks up the patient in the system (OPUS-OCW). The physicians in the medical department decided that they could not come any closer to a final diagnosis for the patient. The secretary now has to find out how to close the patient's case, she explains. This happens every now and then, that no diagnosis is set, but the patient's case still has to be closed. Flipping through the paper record, the secretary notices that there are several pages in the continuation (the clinical notes) that are obsolete. The secretary prints a new, complete edition of the electronic continuation and replaces the previous one.

The electronic registering is part of a larger setup where the patient's status is reported to The National Patient Register (LPR). Although the purpose of the registering is somewhat clear to the secretary, who is also aware of and tries to register the patient according to the registering guide (spending time reading through it several times), it does not help her. To get her work done, the secretary instead interprets the patient's "unknown" diagnosis in a way that to some extend informs the further diagnosis process. The secretary's interpretation is that she can "close" the patient's trajectory to one of two patient categories in the electronic information system:

"HA" [The patient is already diagnosed]
"HF" [The patient is being diagnosed]

After some time of going back and forth between the registration guide the secretary finally decides to register the patient as "HF," although, she notes, this does not fit the registration guidelines if taken literally. The code "HF," the secretary explains, is used to register that the patient is still being diagnosed. Therefore, to register the patient as "HF" (being diagnosed) is somewhat contradictory to the fact that "HF" in this case is "closing" the diagnosis of the patient. But, a decision has to be made, and that is what she chose to do. In this way the secretary becomes involved in diagnostic work by deciding how to close the diagnosis of the patient that further informs the diagnosis process in other departments – or, the process if the patient returns.

6 The Intersection of Clinical and Administrative Work

Articulation work, according to Strauss et al., is the ongoing and shared concern of clinicians to make the collective work add up to more than discrete and conflicting parts [27]. Strauss et al. do not explicitly mention secretaries' work (the underlying point being that articulation work is carried out not only by administrators but also by clinicians), which is perhaps why the opposite point is not made: that clinical work is carried out not only by clinicians but also by "administrators" such as the secretaries explored in this study. While "articulation work" and "work" are analytical concepts difficult to separate in practice, this is not only an omission of Strauss and colleagues. Secretaries' work is well described within CSCW and related fields. However, it tends to be conceptualized using the limited terminology of secretaries as administrators, or support of clinicians' articulation work to manage the intersection of administrative and clinical work [3-5, 8, 9]. In general, a considerable part of secretaries' common work is to support the articulation work and administrative work necessary for the diagnosis of patients, but not all of it can be understood as such.

In addition to these supportive and administrative functions, we have shown that secretaries also play an important role in the diagnosis of patients: examining the condition; interpreting the clinical information; monitoring the follow-up; and further informing the trajectory. At the intersection of administrative and clinical work, the secretary carries out activities that fall under the core definition of clinical work, for example, when the secretary distributes referrals. To distribute the referral is formally the secretary's task; however, while doing this task she simultaneously becomes aware that the patient is at risk of not receiving the sufficient treatment and therefore takes action. Bardram describes how a core clinical activity of a physician is the change of a request if the physician, for example, finds it insufficient to address the stated problem of the patient [3]. The example illustrates how the secretary also carries out clinical work in the same way as the physician. However, the direct partaking of the secretary in clinical work should not be understood as coincidental practice. Rather, we argue, this partaking follows from the positioning of the secretary at the "intersection" of, formally separate but practically enmeshed practices, namely administrative and clinical work.

We emphasize the concept of "intersection" in order to draw attention to the fact that formal and common sense definitions of tasks and job responsibilities do not always, and in fact seldom, mirror exactly the reality of work. This is by no means a new observation [21, 27]. But, as we have illustrated, the understanding of the work of medical secretaries in previous research has stayed relatively true to such common sense and formal distinctions, even though organizational reality can be empirically shown to be different. The concept of "intersection" entails that clinical work does not come in clearly demarcated chunks and that practitioners often seesaw between tasks in a fashion that makes it hard to distinguish where one type of work ends and another begins. This is particularly relevant to CSCW because the design and use of collaborative electronic information systems often suffers from poor understandings of the actual collaborative work and of the specific ways in which this work is divided and coordinated. The concepts of "common information spaces" and "boundary objects" seek to address the same type of intersecting or "crossing" activities that we argue also characterize diagnostic work. However, the use and discussion of these concepts tends to be concerned with how to support articulation work for practitioners to be able to collaborate across their *different* practices [29-32, 37].

While Bannon and Bødker point to a need for more attention to the issues of managing boundaries [37], their focus is predominantly on the handling of articulation work and not so much the *crossing* or intersecting activities. We address the intersecting work of secretaries and clinicians. Based on the empirical examples of secretaries' work, we argue that, in relation to the work itself, it is necessary to be open about the division of work when designing collaborative electronic information systems. This is, for example, evident when the secretary takes care of the follow-up of the scan results: to formalize her responsibility the secretary has to print a copy of the scan result and sign it. The system reveals the name of the physician who requested the scan and therefore formally is responsible for the follow-up. Hence, this example shows that it is not enough to assume the reality of formal boundaries or job descriptions. The secretary also plays a central role in the follow-up. Therefore, these collaborative electronic information systems should be designed to support the practices at the intersections of conventional boundaries as well.

7 Conclusion

Secretaries' work is of central interest to CSCW. Despite this interest, the secretary's role has been given surprisingly little attention in relation to diagnostic work. We have emphasized the need to explore the secretary's role as part of diagnostic work just as is done in other fields of collaboration. Diagnostic work is often defined by the skills of clinicians while secretaries' work tends to slide into the background. Some of the most significant CSCW research emphasizes how articulation work is carried out by physicians, which is perhaps why the opposite point is not often made: that clinical work is also carried out by secretaries.

Secretaries handle patients in collaborative electronic information systems. As collaborative electronic information systems that integrate administrative and clinical tasks are becoming increasingly prevalent in diagnostic work, there is good reason to place secretaries at the center of attention. We aim to further specify the "intersection" of clinical work and administrative work in relation to the process of diagnosing patients. The research question we explored is: what role do secretaries play in diagnostic work, and how is it related to the use of collaborative electronic information systems?

We explored this question in our analysis of various activities of secretaries in a radiology department and a medical department. The two departments are often involved in the initial diagnosing of potential cancer. Diagnosing potential cancer is a complex, collaborative activity that involves various specialties, particularly in the initial part of the process where symptoms can point to a range of conditions. The secretaries reduce the effort involved in clinicians' articulation work during this process. However, as the analysis illustrated, the secretaries' contribution is also achieved through work that fall under the core definition of clinical activities - this may be an advantage from a timely perspective.

Subsequently, the contribution of this study lies in empirically showing how secretaries, in addition to their administrative tasks and their support of clinicians articulation work, also carry out clinical tasks. Thus, we specify how exactly the secretaries work is located in between, or at the "intersection" of, formally separate but practically enmeshed practices, namely administrative and clinical work. This suggests, we argue, that the clinical dimension of secretaries' work should be embedded in the design of collaborative systems supporting diagnostic work.

Acknowledgements

References

1. Aydin, C.E., and Rice, R.E. Bringing social worlds together: Computers as catalysts for new interactions in health care organizations. Journal of Health and Social Behavior 33 (2), pp. 168-185 (1992)
2. Büscher, M., O'Neil, J., and Rooksby, J. Designing for diagnosing: Introduction to the special issue on diagnostic work. Computer Supported Cooperative Work 18, pp. 109-128 (2009)

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3. Bardram, J.E. "I love the system - I just don't use it!". In proceedings of The 1997 International ACM Conference on Supporting Group Work, pp. 251-260 (1997)

4. Paul, S.A., and Reddy, M.C. Understanding together: Sensemaking in collaborative information seeking. In Proceedings of The 2010 ACM Conference on Computer Supported Cooperative Work, pp. 321-330 (2010)

5. Schmidt, K., Wagner, I., and Tolar, M. Permutations of cooperative work practices: A study of two oncology clinics. In Proceedings of The 2007 International ACM Conference on Supporting Group Work, pp. 1-10 (2007)

6. Berg, M. Accumulating and coordinating: Occasions for information technologies in medical work. Computer Supported Cooperative Work, 8 (4), pp. 373-401 (1999)

7. Saunders, B.F. CT Suite. The Work of Diagnosis in the Age of Noninvasive Cutting. Duke University Press (2008)

8. Bardram, J.E., and Bossen, C. Mobility work: The spatial dimension of collaboration at a hospital. Computer Supported Cooperative Work 14, pp. 131-160 (2005)

9. Vikkelsø, S. Subtle reorganization of work, attention and risks: electronic patient records and organizational consequences. Scandinavian Journal of Information Systems 17 (1), pp. 3-30 (2005)

10. Digital Sundhed. National strategi for digitalisering af sundhedsvæsenet 2008-2012 - til fremme af befolkningens sundhed samt forebyggelse og behandling. Digital Sundhed, pp. 1-53 (2008)

11. Berg, M. Practices of reading and writing: The constitutive role of the patient record in medical work. Sociology of Health & Illness 18, (4), pp. 499-524 (1996)

12. Hughes, E.C. The Sociological Eye. Selected papers. Transaction (1984)

13. Lawrence, D.E., Atwood, M.E., and Dews, S. Surrogate Users: Mediating between social and technical interaction. Proceedings of The 1994 SIGCHI Conference on Human Factors in Computing Systems, pp. 399-404 (1994)

14. Müller, M.J. Invisible work of telephone operators: An ethnocritical analysis. Computer Supported Cooperative Work 8, pp. 31-61 (1999)

15. Ehrlich, S.F. Social and psychological factors influencing the design of office communications systems. ACM SIGCHI Bulletin 18 (4), pp. 323-329 (1987)

16. Grudin, J. Why CSCW applications fail: problems in the design and evaluation of organizational interfaces. In Proceedings of The 1988 ACM Conference on Computer Supported Cooperative Work, pp. 85-93 (1988)

17. Pipek, V., and Wulf, V. A groupware's life. In Proceedings of The Sixth Euopean Conference on Computer Supported Cooperative Work, pp. 199-218 (1999)

18. Møller, N.H., and Bjørn, P. Layers in sorting practices: Sorting out patients with potential cancer. Computer Supported Cooperative Work 20, pp. 123-153 (2011)

19. Reddy, M.C., and Jansen, B.J. A model for understanding collaborative information behavior in context: A study of two healthcare teams. Information Processing and Management 44, pp. 256-273 (2008)

20. Reddy, M.C., and Spence, P.R. Collaborative information seeking: A field study of a multidisciplinary patient care team. Information Processing & Management 44 (1), pp. 242-255 (2008)

21. Svenningsen, S. Den Elektroniske Patientjournal og Medicinsk Arbejde - Reorganisering af Roller, Ansvar og Risici på Sygehus. Handelshøjskolens Forlag (2004)

22. Glenn, E.N., and Feldberg, R.L. Degraded and deskilled: The proletarianization of clerical work. Society for the Study of Social Problems 25 (1), pp. 52-64 (1977)

23. Markussen, R. Politics of intervention in design: Feminist reflections on the Scandinavian tradition. AI & Soc 10, pp. 127-141 (1996)

24. Rouncefield, M., Viller, S., Hughes, J.A., and Rodden, T. Working with "constant interruption": CSCW and the small office. The Information Society 11, (3), pp. 173-188 (1995)

25. Blomberg, J., Suchman, L., and Trigg, R.H. Reflections on a work-oriented design project. Human-Computer Interaction 11, pp. 237-265 (1996)

26. Tellioglu, H., and Wagner, I. Work practices surrounding PACS: The politics of space in hospitals. Computer Supported Cooperative Work 10, pp. 163-188 (2001)

27. Strauss, A.L., Fagerhaugh, S., Suczek, B., and Wiener, C. Social Organization of Medical Work. The University of Chicago Press (1985)

28. Clement, A., and Wagner, I. Fragmented exchange: Disarticulation and the need for regionalized communication spaces. Proceedings of The Fourth European Conference on Computer Supported Cooperative Work, pp. 33-49 (1995)

29. Star, S.L., and Griesemer, J.R. Institutional ecology. 'translations' and boundary objects: amateurs and professionals in Berkeley' s Museum of Vertebrate Zoology'. Social Studies of Science, 19 (3), pp. 387-420 (1989)

30. Lee, C.P. Boundary negotiating artifacts: Unbinding the routine of boundary objects and embracing chaos in collaborative work. Computer Supported Cooperative Work 16, pp. 307-339 (2007)

31. Bossen, C., and Markussen, R. Infrastructuring and ordering devices in health care: Medication plans and practices on a hospital ward. Computer Supported Cooperative Work19, pp. 615-637 (2010)

32. Bossen, C. The parameters of common information spaces: the heterogenity of cooperative work at a hospital ward. In Proceedings of The 2002 ACM Conference on Computer Supported Cooperative Work, pp. 176-185 (2002)

33. Schmidt, K., and Simone, C. Coordination mechanisms: Towards a conceptual foundation of CSCW system design. Computer Supported Cooperative Work 5, pp. 155-200 (1996)

34. Forsythe, D. "It's just a matter of common sense": Ethnography as invisible work. Computer Supported Cooperative Work 8, pp. 127-145 (1999)

35. Luff, P., Jon, H., and Heath, C. Workplace Studies: Recovering Work Practice and Informing System Design. Cambridge University Press (2000)

36. Klein, H., and Myers, M.A. A set of principles for conducting and evaluating interpretive field studies in information systems. MIS Quaterly 23 (1), pp. 67-93 (1999)

37. Bannon, L. and Bødker, S. Constructing common information spaces. In Proceedings of The Fifth European Conference on Computer Supported Cooperative Work, pp. 81-96 (1997)