Rationalising Shared Care: The Case of the Referral

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Abstract. As part of shared care the referral proves to be crucial for establishing inter-organizational communication around patients. In this workshop position paper we preliminarily describe the referral by foregrounding activities and artefacts that constitutes it. When engaging in infrastructural inversion (Bowker and Star 2000) we find an inherent set of multiple interdependent actions and artefacts mobilized. These we present with an ambition to provoke a discussion on analytic issues but moreover to engage in a dialogue on how to approach a collaborative redesign of the infrastructure that constitutes and surrounds referrals. In particular, we are concerned with consequences of rationalisation i.e. standardization and automation in relation to design of such complex, interdependent, and extremely contingent collaboration.

1 Introduction

The communication and coordination involved in the referral of patient from one health care provider to another, is an important part of modern shared care. In the following we report on a case study of referrals in the treatment of ICD[4] patients in the national region of Denmark. This treatment is distributed among a large number of health care providers, such as general practitioners (GPs), home care and hospitals. In this case we draw specific attention to the communication and

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[4] Implantable Cardioverter Defibrillator

coordination between cardiologists at satellite hospitals, who perform the preliminary diagnosis of the patients, and ICD specialists at Copenhagen University Hospitals Heart Centre, who assess referrals and implant ICD devices.

In the case study we specifically focus on the process whereby a referral of non-urgent patients are transmitted from one hospital to another, and how the referral is transformed in a sequence of activities and through use of a number of artefacts. We delimit ourselves from looking at the referral of urgent patients and patients diagnosed internally at Copenhagen University Hospital, as these cases follow different patterns.

The case study is based on a combination of observations and interviews. In total 6 observations were conducted at two referring satellite hospitals and at the Heart Centre at Copenhagen University Hospital. There were performed a total number of 8 interviews of nurses, doctors and secretaries from these organizations. The goal of the case study is to present a preliminary analysis of this empirical body and point out the direction for the future analysis and design process.

2   Framework for analysis and design

At first hand, a cardiologist' work with assessing referrals prior to admission of the patient Copenhagen University Hospital seems like a simple task. The same is apparent when the patient has arrived at the ward. What is hidden is the large amount of work that has been carried out to ease the tasks of assessing referrals and admitting patients. It is such seemingly simple activities that are afforded by the referral that we wish to examine through our case study. We wish to foreground all the background work of rendering the referral part of the infrastructure supporting the distributed communication.

Inspired by Bowker and Star's (2000) methodological trick of 'infrastructural inversion' we approach the phenomena of the referral as a compound artefact but also as a set of activities that together become infrastructure for working doctors and nurses. When employing infrastructural inversion the complexity of the infrastructure becomes visible. That is, large amounts of collaborative work activities, various artefacts, technologies, software, paper documents, terminologies, and standards etc. become centre stage for our case study. Bowker and Star formulate this powerful methodological trick as *"[..] to question every apparently unnatural easiness in the world around us and look for the work involved in making it easy."* (ibid. pp. 39).

With an extended analysis framed by infrastructural inversion, we are moreover interested in redesigning the "referral". As part of the CITH-project[5] we

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[5] CITH is short for "Co-Constructing IT and Healthcare". More information about the research project can be found on www.cith.dk

ambitiously wish to combine analytical insights with attempts to intervene and do actual design work on the referral. At present it is our plan to carry out collaborative design activities that will change the current infrastructure of the referral. With this interest we enter a discussion on how to take on design activities i.e. how should we continue our analysis and how can it inform the design process?

In relation to design we particularly wish to investigate the well known challenge of rationalising medical work (Berg 1997, Berg and Timmermans 2003). By rationalisation we mean formalising and standardising but also, and quite importantly to us, automating. The design process will therefore become engine for exploring both methods and techniques but also enter the growing interest in how rationalisation should be dealt with when designing for integrated care. Relevant for the CSCW community is that we wish to add to e.g. Winthereik and Vikkelsø's (2005), and thereby enter a discussion on the dilemmas of standardising inter-organisational healthcare communication. In the following sections we present the preliminary analysis of the case study.

3   The infrastructure of referrals

In the following, we focus our description of the tasks performed at four locations: 1) The satellite hospital. 2) The Visitation at the Heart Centre[6]. 3) The Bed Ward at Copenhagen University Hospital. 4) The operating room.

3.1   Activities at the satellite hospital

There are several satellite hospitals and specialised general GP who refer patients for ICD implantation. Patients get referred to ICD implantation because of multiple reasons (that we do not go into here). In the following, we simplify this process by describing the creation of a referral at hospital X on the basis of a somehow general trajectory. This work involves the following sub activities.

A) Medical consultation and dictation of referral (doctor)
As a consequence of a heart patient's health examinations and medical treatment the doctor can decide to refer the patient for ICD implantation. The decision is based on the doctor's training and knowledge about heart diseases and ICDs and is carried out by him/her dictating onto a cassette tape (part of the hospital paper record), reasons and indicators for referring. Part of this activity involves informing the patient about ICD implantation.

B) The referral is prepared and sent

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[6] We refer to the office where assessment of referrals are performed as the "Visitation"

When the secretary receives the doctors' oral dictation, she transcribes it and starts creating a referral. This involves making the front page in a blank word document, finding the address for the Heart Centre and copy-pasting transcribed text onto it. The secretary also retrieves the prescribed documentation, such as copies of health examinations and electrocardiograms. The secretary can use three means of communication to send the referral to Copenhagen University Hospital: letter, fax machine, a computer system or a combination[7]. By performing these actions, the secretary transforms a selection of documents into what is now a referral.

3.2 Activities at the Visitation at the Heart Centre

The overall task of the Visitation is to assess the referrals from the satellite hospitals prior to the admission of the patient on the Heart Centre. This work involves three roles; 1) Nurse X. 2) Nurse Y. 3) Cardiologist. The work can be divided into the following sub activities.

A) The referral is prepared for assessment (nurse X and nurse Y)
At the visitation all incoming referrals are handled as paper documents. This implies that referrals received through the computer system is printed, and thereby converted to paper format. When a new referral arrives, nurse X puts a stamp on the front page. This stamp contains a number of fields that will later be filled out. Nurse X writes the current date in one of the fields.[8] She then open a record in the computer system "GS!ÅBEN" and enters the master data of the patient.

The referral is then handed over to nurse Y, who runs through the attached documentation, e.g. description of the diagnosis and electrocardiograms. By experience, nurse Y knows what the assessing cardiologist requires from this documentation. Nurse Y acquires any missing documentation by contacting the secretary on the referring hospital, most often by telephone.

The referral is put on hold until the new documentation has arrived. The referral is then handed over to the cardiologist by placing it in one of four letter trays. Referrals concerning ICD patients are categorised as "Electrical". The main task for the nurses at this stage is to prepare referrals to be effectively assessed by the cardiologist. In an infrastructural perspective, the nurses and the artefacts in use, therefore becomes a part of the underlying infrastructure that ease the work of the cardiologist.

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[7] As the computer system cannot handle attachment such as electrocardiograms, referrals send by computer must always be supplemented by either a letter or a fax.

[8] Later, this stamp will be referred to as "the assessment stamp"

B) The referral is assessed (cardiologist)

A cardiologist visits the visitation office every day to assess new referrals. The cardiologist takes the pile of referrals from the letter tray, and carefully reads the documentation for each referral. She either approve the referral, reject the referral or in cases of doubt, requests for further medical examinations of the patient. The cardiologist writes the verdict in a field in the assessment stamp at the front page of the referral, at places it in the same letter tray as it was taken from. Due to the amount of documentation, this work can be time consuming, although the task is made significantly easier by the nurses' preparation.

C) The time for operation is booked

When the referrals have been assessed, nurse X reads what is annotated in the assessment stamp, and takes action as prescribed. If the referral is approved, she uses the computer system "ORBIT" to book a time for the implantation, writes the dates on the front page of the referral, and places it in the corresponding letter tray.

D) Nurse Y writes a letter of notification to the patient

When the referred patient has been appointed a time for implantation and admission, nurse Y picks up the referral from the letter tray, and uses the computer system GS!ÅBEN to write a notification to the patient. The letters are printed and send to the patient by mail. She then writes information on the appointment in a paper calendar placed next to the computer. This calendar acts as a backup system to the computer. Finally, nurse Y sorts all new referrals by the date of the admission, and places them in a ring binder.

E) The referral is brought to the bed ward

One week before the operation, the nurse X removes the referrals from the ring binder and carries them the bed ward where she places them in a letter tray.

3.3 Activities at the ward at the Heart Centre

The majority of activities surrounding the referral at the bed ward are carried out by a secretary and her assistant. This is mainly work on preparing or shaping the referral for becoming front page of the hospital paper record, i.e. ready for doctors' and nurses' work with the admission patients. Referrals are also input to the secretary's management of the ward's 30 beds. Below, we sequentially describe the activities and the artefacts involved.

A) Managing bed occupancy (secretary)

The arrival of referrals from the visitation triggers several activities at the bed ward. Most importantly the secretary uses the referrals in the management of the ward's 30 beds. She uses the information to allocate beds to admitted patients, and the referrals inform her on e.g. how many patients will arrive the following week,

which day, and indicators of length of stay. Going through the pile of referrals she adds each patient (barcode labels and annotation) to the overview of bed occupancy of each specific weekday. She incrementally builds up A4 paper sheets for every weekday for creating an overview of patient admission and bed occupancy. She refers to them as "the brain".

In this case, each referral feeds into creating overviews of patient arrivals that in the course of a day are vital parts of the infrastructure, both for the secretary, nurses and doctors at the ward.

B) The referral is reshaped and becomes front page of the hospital paper record (secretary and secretary assistant)

While creating the sheets of bed occupancy, the secretary also examines each referral for the assessment stamp and checks in GS!ÅBEN whether the patient have an existing hospital paper record. If not she needs to create one. If the patient is readmitted and a record already exists, the secretary acquires the hospital paper record by creating a collection of GS!ÅBEN "print-screen"-printouts. This makes it possible for the assisting secretary to dispatch the journals from different locations at the hospital. If the patient is new to the hospital she creates a new hospital paper record using data from the referral.

For all referrals she fills out a local bed ward referral form. The annotations are results from e.g. bookings of various examinations including blood testing. She makes a copy and places it in the nurses' chart in the hospital paper record and the original becomes front page of the hospital paper record. Finishing the preparation of a referral is its placement in the day pigeonhole according to the weekday that the patient arrives.

Jointly these activities result in reshaped referrals augmented by annotated bed ward referral forms. They are now front pages of patients' hospital paper records placed according to the weekday of the patient admission. It is this new shape and the placement in the pigeonhole that renders the reshaped referral an indispensable part of the infrastructure when nurses and doctors prepare for patient admission.

C) Receiving patients using the referral (doctors and nurses)

At this point in time referrals are ready to enter nurses' and doctors' work of admitting patients. However, the responsibility of each arriving patient needs to be delegated to nurses. This is carried out by three nurses working the night shift. What they do is picking up the referrals (that are now front pages of the hospital paper record) stacked for the coming day (in the weekday shelve system) and delegate by writing the patient name etc. together with the responsible nurse's name on a whiteboard in the nurses' office.

The following morning, nurses who are responsible of receiving patients start by checking the whiteboard and then pick up the corresponding hospital paper record (the nurses chart herein) in the secretary's office weekday shelves. They browse the referral and the record to get acquainted with the patient beforehand,

understanding reasons for admission, length of stay and other important indicators from the patient's trajectory. The same is the case for doctors when they visit the patient the first time. They use it together with a dialogue with the patient to write an admission note.

Again, the referral has shown to be important piece of the infrastructure supporting nurses' and doctors' work. Moreover, information from the referral gets transformed further onto a whiteboard and embedded into doctors' admission notes. After admitting the patient the referral ends up as an enclosed document in the hospital paper record.

3.4   Activities at the operating room at the Heart Centre

The referral ends its trajectory when it arrives at the operation room as enclosed in the hospital paper record. By now it has moved into being a part of the hospital paper record alongside other enclosed documents.

4   Approaching Design

The process of referring patients from one hospital to another is seemingly an easy task for the doctors involved, although this case study reveals a number of severe problems. Although not emphasised in our description above, the most important finding is that the work of assessing referrals at the visitation is permeated by exceptions; more often than not, nurse Y have to acquire supplementary documentation from the referring hospital, which increases her work load and delays the treatment of patients.

The main reason for these exceptions is found to be poor quality of the referrals from the satellite hospitals; often, relevant documents are missing, and often, medical examinations are of such poor quality, that they must be repeated. In relation to design an obvious solution is to rationalise this process, for instance by designing a referral system in a way that insures that and adequate amount of documentation is attached to the referral. Also it is obvious to automate a number of the many sequential actions and thereby reduce the average time it takes a referral to pass assessment.

Before entering the design phase with the goal of rationalising and automating the referral process, it is necessary with thorough consideration on the possible downsides of this approach in the context of shared care.

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