

The Austrian Case Study II: Documentation practices in an oncology clinic

June 2007

ACTION for Health

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INTRODUCTION

The report at hand deals with the second out of three case studies that were carried out within the ACTION for Health project. It was originally planned to deal with the introduction of a new, unified electronic documentation system at five oncology clinics in Vienna. Three of the clinics (ONC1-3) were chosen to study the changes in work practices through the use of a common documentation system. At the time of the study, at ONC1 and ONC2 they still used paper-based documentation systems, whereas at ONC3, a computerized documentation system was used. The study at ONC2, which is presented here, follows up on the first case study that was conducted at ONC1.

The data collection at ONC2 started before the case study at ONC1 was done^{*}. A first interview and a first observation at one of the wards were conducted at the beginning of February 2005. At the end of January there was also the opportunity to attend a workshop that was organized by one of the teams at the department. The aim of the workshop was to analyze and improve work processes. It was then decided to do the case study at ONC1 first, as at ONC2 they were engaged in the preparations for a symposium that was taking place in March 2005. The case study at ONC2 was resumed in August 2005 with an interview that was done with one of the doctors of the outpatient and day clinic who was mainly engaged in the formulation of the requirements for the planned computer system. With the experience gathered at ONC1, this interview was conducted to find out about the differences in documentation practices at ONC2. Follow-up observations of the work practice at the outpatient and day clinic were conducted in November and December 2005. Two workshops at ONC2 were observed in October and November 2005 that had been organized by the manager of the implementation project. At the time of the study the vendor of the computerized documentation system had been chosen. The workshops were intended to present the product and discuss necessary adjustments to support the work practice at ONC2.

The collected material was partly analyzed and used in previous publications that compare the different cases. The report at hand gives a comprehensive account of the case study at ONC2. It was written even after the case study at ONC3 was finished. At the time of writing the report (June 2007), the planned computer system is still not in place. According to the changed research strategy, the focus here is on the work practice. Some of the expectations towards the computer-based system are mentioned, as they are interesting in respect to the computer system in use at ONC3. The framework for the analysis and data collection was developed in the first case study at ONC1. The focus on the work processes and how they are supported by coordinative artifacts was taken over for this second case study. For this study it was also decided to consider mainly the outpatient and day clinic, as these were the sites where it was planned to use the computer system first. (At the time of conducting the case study the expectation was still that it would be possible to observe the introduction of the computer system.)

^{*} The data collection was mainly done by the author of this report. Christine Reidl accompanied her at one interview (August 18th 2005) and one workshop (November 28th 2005).

In the following the work processes and the main coordinative artifacts are described. The analysis provided in this report focuses on the commonalities and variations as compared to practices at ONC1.

THE CLINIC – ORGANIZATION AND WORK PROCESSES

The clinic (ONC2) is part of a large community hospital in Vienna. It consists of three wards, an outpatient and a day clinic. They are all located in one building, surrounded by a park with a café at the area of the hospital. The building also hosts other departments. The rooms of ONC2 are on the ground floor and the second floor. Like ONC1, they also take up general internal patients on the wards. In fact, they have a maximum of 20 per cent of oncological patients at the wards; all the rest are general internal patients (OBS3, p.4).

The personnel at ONC2 are organized in teams. They have four teams, one for each ward and one for the outpatient and day clinic. They try to assure that each day one of the physicians from each of the teams at the wards is present at the outpatient/day clinic. However, this is not always possible because they lack personnel (OBS1, p.1). The teams have different foci, e.g., one team is mainly engaged in the treatment of patients with breast cancer and other gynecological tumors, or another is specialized in leukemia. The teams have regular team meetings in addition to the morning conferences where doctors from all the wards are attending.

Scarce resources are a problem that comes up repeatedly throughout the study. The doctors have the usual core working time from 8 a.m. to 1 p.m. However, one doctor mentions that year-by-year more is crammed into the available time: training, interdisciplinary meetings, etc. Furthermore, night shifts cannot be done on overtime (OBS6, p.6). At the wards patient beds have to be put in the corridors. Also computers are a scarce resource.

In the following the work processes at the outpatient and day clinic are described. For the wards, only some remarks about differences in the documentation system (as compared to ONC1) are made.

The outpatient and day clinic

The outpatient and day clinic at ONC2 are both administered from one counter. All the patients arrive at this counter, whether they come for chemotherapy or for a consultation by one of the doctors or for a blood test. Punctures are done from 11 a.m. Before that the focus is on the blood tests so that they can start the chemotherapies; as one doctor mentions, “so that there is some progress upstairs” (OBS6, p. 5). The rooms of the day clinic are on the second floor, while the counter is located on the ground floor together with the consultation rooms.

Making appointments: Patients are taken upon appointment at ONC2. A date is appointed, not a certain time. This is done at the patient’s recent visit. For referrals from other departments of ONC2 they will usually call to make an appointment for the next day. Only few patients come without appointment in cases of emergencies. The appointments are administered by the secretary at the counter. Patients can call to make a new appointment or to change the date, if needed. One doctor comments that by this arrangement they have achieved that there are not too many patients who do not show up; he adds that usually a certain date is better remembered (OBS4, p.2).

Receiving patients: Contrary to ONC1, the patients are received by the secretary at the counter of ONC2. That is, between 7 and 8 a.m. patients are received by the nurses, as the secretary only arrives at 8 a.m. The secretary fetches the patient file to see what is planned for the patient. If a blood test has to be done, the secretary arranges everything. She then tells the patient to wait to be called up. The head nurse says that formerly the work at the counter used to be done by the nurses (INT3, p.2). However, she says that their experience with the secretary is very positive. She also writes letters and can take over other tasks, if necessary.

Doing blood tests: The blood is taken by an intern. In the morning the intern is in the outpatient clinic on the ground floor. Later on s/he moves up to the day clinic to administer chemotherapies. So during the day patients who have to have blood taken receive the tubes and are sent upstairs. Only if they are immobile the intern comes down to take the blood. The blood count that is necessary to decide about the chemotherapy is done in the internal laboratory at ONC2. Anything else is done in the central laboratory of the hospital. When the results of the blood count are available the nurses can access them at the computer. They print them out and put the printout on top of the file that they prepare for the doctors. If special values are needed immediately, e.g., the creatinine results, they tell the laboratory that it is urgent so that they do it earlier. Otherwise these results arrive in the afternoon and the doctor sees and signs them the next day. Patients are contacted if the values are not appropriate.

Medical consultation: At ONC2 there are usually two or three doctors present in the outpatient clinic. In the consultation rooms one doctor works together with one nurse each. At least this is how it is supposed to be. Due to holidays or illness, it happens that there are only two nurses, and in exceptional cases it even occurs that one nurse has to do the work alone. Furthermore, sometimes there are four doctors present in the outpatient clinic. In these cases one nurse is responsible for two (or even three) doctors. Patients come to the doctor that they have already seen. New patients are assigned to a doctor by the senior physician of the outpatient and day clinic according to their diagnoses.

In the consultation rooms doctors are sitting on their desks where they also have their computers. Nurses are not continuously present during the consultations. They call in the patients, take care of them, e.g., helping them on their way out if necessary or removing needles, and do all the necessary preparations and postprocessing. They prepare tubes for blood tests, sticking patient labels on them. They fetch the files from the counter providing them in the right order. They make sure that any information that is needed is available, e.g., they check for blood results and print them out. In the consultation rooms, they have their own computers on high desks that they operate while standing.

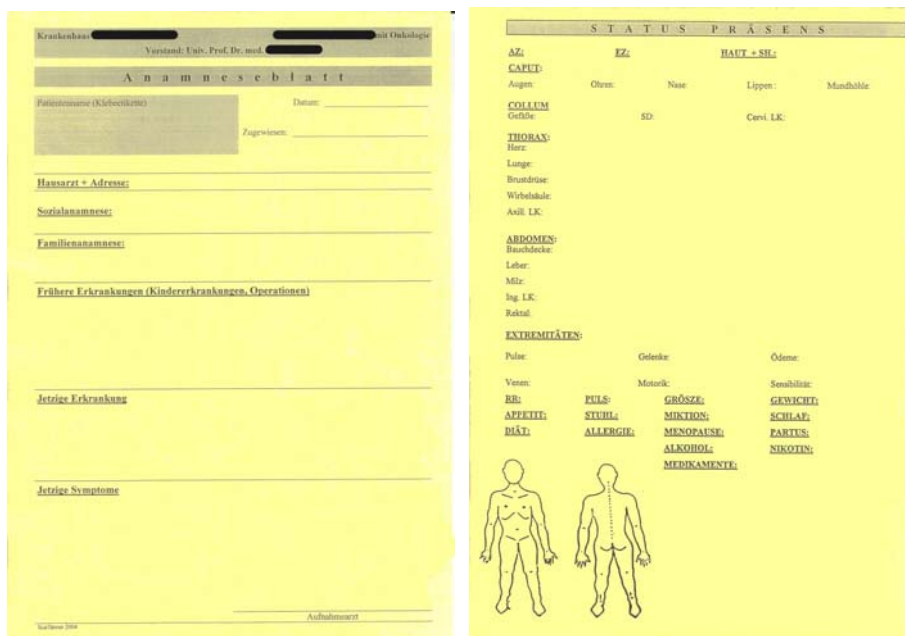


Figure Anamnesis sheet (front and back page)

At the first visit of a patient an anamnesis is done by the doctor. S/he writes down the results into an anamnesis sheet, a yellow sheet which is the same that is used at the wards (see figure). However, as one doctor mentions, the anamnesis won't be as detailed as for a stationary patient (INT2, p.14). During consultations the doctor usually looks through the results in the patient file. Some results that are not in the file might be accessible in the computer system. S/he arranges examinations and treatments, if necessary, e.g., entering a request to the radiology into the computer or calling the wards for a bed or filling out a prescription. The nurses assist them, taking over phone calls or preparing necessary documents. When there is a request on the phone, the patient file is provided by the secretary. At the end of a patient's visit the doctor arranges the next appointment and writes down the date for the patient. The progress notes are written by hand on the progress sheet (see below). Although the nurses are assigned to one doctor each and take care of the according patients, they are aware of each others' tasks and help each other occasionally, e.g., taking something along on their way up to the wards.

Administering chemotherapies: Upon the decision for a chemotherapy, it can be ordered immediately, i.e., usually chemotherapies are ordered in advance. For a new therapy, the patient has to sign an informed consent sheet with the patient label stuck onto it. The ordering is done by the doctors in the outpatient clinic by issuing a cytostatic request in a computer system that was especially designed for ONC2. To enter the patient data, a barcode scanner can be used to read the data from a patient label. The substance can be chosen from a catalogue, as well as the solvent to be used. The dosage and the way of application have to be entered. For the start date the current date appears automatically but can be changed. One doctor comments, *"It is only a sheet that is filled in on the screen"* (INT2, p. 10). No concomitant medication is suggested, and there is no automatic calculation of the dosage. The doctor goes on to explain, *"The only advantage is that the recent therapy is stored. This means that I can call up the recent therapy; and I only have to change the date or make any other corrections. Like any EDP it has the advantage that anybody can access at any time; and it is not like a paper sheet that can be lost"* (INT2, p.11). The order is printed out and put into the patient file.

The request is sent to the pharmacy via the computer system and taken over into their system that is used to actually produce the cytostatic drug. This is done one day in advance. On the day of application, the nurses call the pharmacy to confirm the order if the blood count is OK and after the patient has been seen by one of the doctors. Only then the drugs are dissolved in the pharmacy. The therapies are delivered to ONC2 in boxes: one for each of the wards and one for all the doctors at the outpatient clinic. For each therapy, an order form is included. Each doctor signs the order forms for those therapies that s/he has ordered. Together with the patient files, the forms are brought up to the day clinic. This is often done by patients who are told to take the file with them on their way up to the day clinic. The nurses in the outpatient clinic prepare the documents for the admission that are needed for each day of application. An admission sheet has to be filled in and signed by the doctor. For accounting, they have to provide a report about diagnoses and services provided. This is done on a yellow sheet that they have developed for the day clinic of ONC2. On this sheet there is a table where they only have to check off the according entries (see figure). One doctor comments, “to make it faster. But as you can see [there are] mountains of paperwork” (OBS6, p.1). At the time of the study they were just about to introduce a computer tool to help administer the reports for accounting.

The image shows a medical documentation form titled "MEDIZINISCHE DOKUMENTATION". At the top, there is a patient information section with fields for name, date of birth, and date of admission. Below this, there are several tables for recording medical data:

- HAUPTDIAGNOSE:** A large table with multiple columns for recording primary diagnoses.
- NEBENDIAGNOSEN:** A table for recording secondary diagnoses, with sub-sections for "METASTASEN" (metastases) and "ANDERE" (others).
- BEHANDLUNG:** A table for recording treatments, with a sub-section for "SONSTIGE" (other).
- DOZENTENLISTE:** A table for recording the names of attending physicians.

At the bottom of the form, there is a date field with the handwritten date "22.10.05" and a signature.

Figure Sheet for the accounting report

In the day clinic on the second floor there are two rooms. In the first room three beds are there for patients who need monitoring. All the preparations for the therapies are done in this room. There are desks and cupboards with all the material needed, like needles, gloves, etc., and a computer for the nurses (see figure). In the second room there are nine chairs where patients can sit or lay back. In this room a breakfast buffet is provided. At noon patients receive lunch in their chairs. Two nurses work together with one intern. They start their work at 8 a.m., with the workload steadily increasing until about 1 p.m. The two nurses have the same tasks; they might for example, just take turns on the patients arriving. As one nurse mentions, the coordination works without words: They just notice what the other one does (INT3, p.2).

The nurses prepare the therapies that they receive from the pharmacy. They might dissolve a medicament in a bottle with the patient's name written onto it or prepare the chemotherapy. For each patient they provide the patient file with the progress sheet on top, the care documentation, and the prepared infusion. For chemotherapies, the order form and the informed consent sheet is put onto the bed or near the chair where the patient sits. The nurses apply any premedication. Together with the intern they do the chemotherapies. They double check the substance, comparing the declaration with the information on the order form and asking for the patient's name and date of birth. They have to sign on the order form as well as in the computer system. For cytostatic drugs and blood transfusions, the time of application is documented.

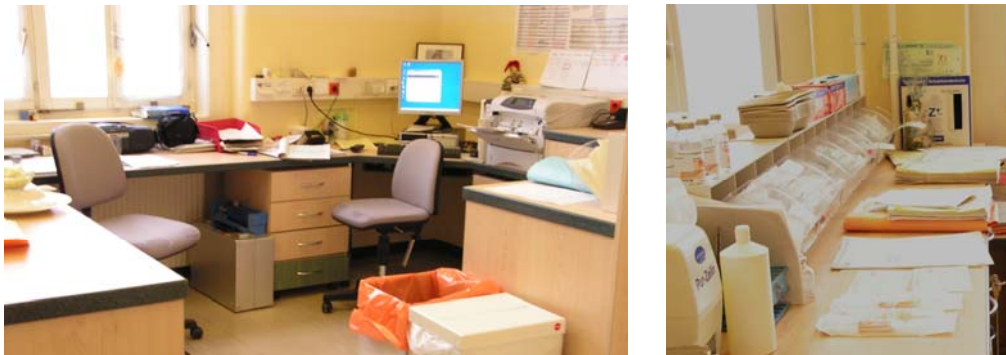


Figure Room in the day clinic with desks for preparations

The nurses monitor and take off the infusions. For some therapies they have to make adjustments after a certain time, so nurses regularly watch out for the clock that is hanging above the door. For some patients they also have to organize transports. In the morning they order the meals for lunch on the computer. In the afternoon, when it is again less hectic, they do the requests for the pharmacy. Twice a week they order all the materials that they have run out of. The work in the day clinic is quite challenging for the nurses. During the day many things run in parallel and they have to keep an overview of the current state of affairs. The two nurses work closely together, keeping an eye on each other's tasks. One nurse tells that she is constantly aware of the overall situation, having her attention focused on certain sounds or certain sentences of the other nurse (INT3, p.4). She says that in her mind she is always one step ahead. By this she assures that she is not taken by surprise in difficult situations and can react fast. This can be decisive for a patient. And it is not only the patients that they have to care for; they also have to make sure that everything is going smoothly. For example, in the afternoon they check if all the resources are available and working.

Administrative work and care documentation: Like in ONC1, the work done by the nurses is mainly administrative. In the outpatient clinic they prepare new files: They print out patient labels and put the anamnesis sheet, the progress sheet, and a patient card into the file. All through the day they are busy providing the doctors with the information needed and holding the files up-to-date, e.g., filing in blood results. For the admission they have to prepare the admission sheet together with the yellow sheet for the report about services. They also have to do the admission on the computer to get the new patient number for that day. This number is then also noted in the ward book where they document all the admissions for one day on a separate sheet. This is done in the day clinic. The nurses also have to write the care documentation for each patient of the day clinic. This is done on yellow sheets where they note for each patient a contact person, possible threats, like the need of a walking stick, and the like. For each therapy applied they write down date as well as starting and end times, and they sign the entry. By default they document

the preparation and monitoring of an infusion. Any special occurrences are noted, i.e., if anything goes wrong they call the doctor on the ground floor and take a quick look at the clock. Only afterwards they write down the steps taken each with the time when they were taken. Later on during the day they receive another sheet for each patient from the admission department by pneumatic post. This is used as cover sheet for the care documentation. Together they are put into the patient file that is thereby finished and can either be brought back down to the outpatient clinic, or it is kept in the day clinic if the patient is to come again the next day. The nurses still have other tasks of documentation. For example, blood transfusions have to be documented. For that aim they put the label that comes with the transfusion onto the progress sheet. Another label is put on the transfusion protocol which is signed by the intern. And they make sure that the informed consent that has to be signed by the patient is in the patient file.

Medical and care documentation

The main artifacts of documentation at the wards are the anamnesis sheet, which is the same that is used in the outpatient and day clinic (see above), the chart to document the progress during the stay, and the patient letter that is provided at the end of a patient's visit. These are going to be described in more detail in the following.

In the outpatient and day clinic the documentation is done on a progress sheet that is filled in at the end of the consultation by the doctor. An anamnesis sheet is produced at the first visit of a patient and included in the patient file. Other coordinative documents are the order sheets that are used to administer chemotherapies. For all those patients who receive chemotherapies in the day clinic, the nurses have to write a care documentation. This is done independently from the medical documentation on separate sheets.

KEY ARTIFACTS AND WORK PRACTICES

The calendar

For the organization of the appointments they use the calendar provided by MS Outlook®. In this calendar, for each doctor, the times of absence are noted: Colors indicate various reasons of absence, whereas white signals that they are present. It is accessible for all the doctors and nurses at ONC2; printouts are distributed to the personnel. The appointments for the outpatient and day clinic are entered into the system by the doctors at the end of a patient's visit. The name of the patient is entered with a letter at the beginning giving the name of the responsible doctor. Often the diagnosis is added at the end of the name. The secretary also makes entries into the calendar for new patients or if an appointment has to be changed. New patients are marked. For example, the entry "*new [patient name] 2. surg n colon*" for a certain date means that this patient has not been to ONC2 before and has been referred from the second surgical department with the suspected diagnosis of colon cancer (OBS6, p.3).

The calendar can also be used to get an estimate of the workload for the day. As one nurse at the day clinic mentions, she can see a lot from the calendar as she knows the names of the patients and knows what they receive (OBS8, p.3). However, one doctor criticizes: "*There are never all the patients on the calendar that actually come to the outpatient clinic. And there are never all the colleagues entered as absent even if they are absent. But this is not a problem of the system but rather of those who have to enter the information*" (INT2, p. 17-18).

Patient files

The documents for the patients are stored in paper envelopes with the patient name, address, and telephone number on them. The six last digits of the patient code are noted. They give the year of the first visit and a consecutive number. These are used to identify the file in the archive, which is accessible from the counter. There is still other information like the health insurance of the patient on the envelopes. They are grey for men and orange for women. They are used for the outpatient and day clinic where they are accessed during consultations by doctors to look up information about the patient histories. Therefore the files are provided by the nurses in the order of the patients' arrival times. They lay them side by side on the doctor's desk with current results put on top of the files. When the consultation is finished the doctor might hand over the file to the nurse or put it on her table for further processing. When patients are admitted to one of the wards at ONC2 the patient file is transferred to the ward during their stay there. However, as the nurses mention, this does not always work, and files are not at the ward when needed or are not returned to the outpatient clinic in time (OBS1, p.3). Patients who come for a chemotherapy take the file up to the day clinic after the consultation with the doctor. This signals for the nurse in the day clinic that the doctor has approved the therapy for the patient. In the day clinic the files are arranged reflecting the position of the patients in the room.

The files contain an anamnesis sheet, the progress sheets, sheets of informed consent for therapies or transfusions, results, reports about operations, patient letters from stays at the wards of ONC2 or other hospitals, and the like. The anamnesis sheet is easily recognizable as it is yellow. Blood results from the central laboratory have a cover sheet with the following sheets giving the values in columns. The blood count from the internal laboratory comes on a small sheet as a printout with a curve on it.

As already mentioned, preparing and keeping the files complete and up-to-date is one of the main tasks of the nurses. Especially the nurses at the wards report that they are constantly searching for patient files and other documents like examination results as well as doctors. They complain about the amount of paper sheets and the fragmentation of information (OBS1, p.5). Like in ONC1, at the outpatient clinic the files for some patients are quite big, storing documents that have been generated through many years of treatments at ONC2. Other than in ONC1, they do not keep all the results in the patient files, although this is a point for discussion as one doctor emphasizes the importance of keeping some of the results (OBS2, p.1). The head of the outpatient and day clinic explains that they throw away results that have been generated at ONC2, i.e., they have to shred them for reasons of data privacy, or they give them to the patients. These results (from the pathology, laboratory, x-rays and computer tomographies) are also accessible in the computer system. He mentions that patients deal with these results in various ways: Some archive them and trace them very carefully, whereas others just give them away (OBS4, p.3).

Progress sheet

On the progress sheet the doctors document the illness trajectory at each patient's visit (see figure). A label at the top of the sheet identifies the patient. The diagnosis is provided on each new sheet of the progress notes. The date is stamped in for each visit into the first column. The next four columns can be used to document current blood results. However, these are also available on separate sheets in the patient file. The last column is used for all other information. In this column the doctors write down current problems and document the condition of a patient

and what has been done. It also gives information about how to proceed: the therapies to be provided, e.g., a chemotherapy on a certain date, and the examinations to be done, e.g., a blood test. The next appointment is noted on the progress sheet. Colors and signs are used to enhance overview: All therapies are marked by brackets at the beginning and the end “< ... >”. All chemotherapies are written in red. The number “(2)” in the example in the figure indicates that this is the second cycle of the chemotherapy. Special incidents can be highlighted, e.g., by writing them on the left like the temperature in the example. Usually doctors know from the handwriting who did the notes.

VERLAUFBLATT

DIAGNOSE: *N. uedi.*

DATUM	LEU	ERY	Hb	THROMBO	DECURS
17. DEZ. 2005					<i>BBH</i> Psychologisch betreut von Mag. <i>[redacted]</i> <i>psych. betreut?</i> Schmerzen u. Mangel (2) < 100 NoCI + 1A Zofran ^{v. H.} i.v. > < 5mg Toramex / 250 NoCI i.v. > < Neo-Dolparan i.v. > < 1A Parfabe ^{v. H.} > < 4mg Zometa 100mg ^{v. H.} i.v. > beide CIP kein Thorax → 10.1. AB, L, U, Tot
22. DEZ. 2005					BB/ mit gutem Status physis; Sauer +; geipelter Infekt. 10. Temp. 38,5°C beide NK + Diff., CKP N L, Ger.; beide < Stavelox 400mg i.v. > < 500 Ringer + 1A Dantrolen > + 2ml Abgelin > beide 20K auf TBK

Figure Progress sheet

When a patient arrives at the counter of ONC2, the secretary uses the progress sheet to see what is to be done with the patient and arranges everything accordingly. When patients receive a chemotherapy, the nurses in the day clinic use the progress sheet to see what they have to provide: The infusions are given and the days of application, e.g., “1 3 5” means that the patient

receives the therapy on the first day and then again twice on the third and fifth day. They sign the therapy on the progress sheet upon preparation. The label from the bottle in which the therapy is provided is stuck onto the back side of the progress sheet and signed by the intern. The chemotherapies have blue labels. Yellow labels on the front side of the progress sheet indicate study protocols. The nurses also use the progress sheets to look up other information, e.g., when calling the transport service, they take the patient's address from the progress sheet. Apart from their signatures, the nurses only write down values like the blood pressure, pulse, or temperature into the progress sheet. There is only one exception. When patients call the outpatient clinic to report problems, the nurses write them down on the progress sheet. They would have to note it in the care documentation. However, as one nurse mentions, they know that doctors would not read it there (INT3, p.1).

Patient card

The patient card is a small, blue folded card that the patients receive at their first visit. A patient label identifies the patient. All the appointments are written down into this card by the doctor at the end of the recent visit. Only the dates are given for the patient to remember when s/he will have to come again.

Chemotherapy sheets

For all those patients who receive a chemotherapy, an order form or therapy plan is faxed from the pharmacy. This form is signed by the doctor during the consultation. The patient takes it up to the day clinic in the patient file. If a chemotherapy is to be applied the same day it was ordered, the nurse has to go down to let the order form be signed by the doctor. Together with the informed consent sheet the nurse puts it on the patient's bed or chair. The form is also used to check the chemotherapy together with the intern. They both have to sign for the application.

The pharmacy also sends another fax each day in the morning with a list that gives all the medications that they are going to deliver. Some of the medication is marked with an asterisk indicating that these are substances where they wait in the pharmacy for the nurses to confirm that they are actually going to be applied, e.g., an expensive chemotherapy or a substance that cannot easily be reused. For each of the medications the patient name is given, i.e., if a patient receives more than one therapy there are more entries with her/his name, accordingly. So on the list the nurses see who is going to receive what. One nurse explains that she can use this sheet to manage the patients as they can estimate how long each of the therapies will take (OBS8, p.3). All those patients who have finished their therapies are crossed out on the list.

Overview sheet

One of the doctors at ONC2 uses a self-designed sheet that he calls "overview sheet" (see figure). The aim is to provide an overview of a patient's trajectory at one glance. Information about the patient is summarized in the header: Name, date of birth, patient number, insurance number, and a barcode are given. In the following section the sheet contains information about the main diagnoses and when they were made, together with information about therapies and when they were provided. They are listed in sequential temporal order. A graphical display of relevant blood results (tumor markers) is provided, again each with the date of the test. Finally,

other diagnoses are given. The doctor says that he always puts it on top of all other documents in the patient file as it provides an orientation of what happened when (OBS3, p.6-7). He has designed it for himself and he fills it "by hand", i.e., he has prepared a template in MS Word® where he can enter all the information. The doctor says that in this sheet he sees the course of the disease of a patient, e.g., a partial remission after a chemotherapy, then a recurrence with the according localization and the next therapy, etc. For more detailed information he can, in a second step, look into the anamnesis of the according stay at the ward or the entry in the progress sheet of the outpatient clinic with the according date.

Übersichtsblatt

KRANKENHAUS	
Onkologische Abteilung Onkolog Barbara Univ. Doz. Dr.	Vorläufiger Aufnahmekurs 11.10.2005 in Bearbeitung
Patient: Gebdat.: 20.09. Pat. AZ: SV-Nr.:	[Barcode]

Vorläufiger Aufnahmekurs

Aufnahmedatum: 11.10.2005

Onkologische Diagnosen:
Rectum CA (Adenokarzinom höherer Reife)
 Anlage eines Colostomas 04/03 nach tiefer vorderer Resektion bei Situs inversus
 02/04 Rezidiv CHT 5FU/Leukovorin
 04/04 Irradiatio
 06/04 Fortsetzung der CHT (insg. 11.Zyklen)
 12/04: **Lebermetastasen** (solitär) St.p. Thermoablation
 06/05 *Xeloda*
 CT Thorax und Abdomen 5.8.05: Progression der Tumorerkrankung: Mehrere **intrapulmonale Sekundärblastome**, Progression des Leberbefalls. **Präsacrales Tumorrezidiv**, Patholog. LK mesenterial. Hochgrad. V.a. beginnende **Pertonealkarzinose** im li. Mittelbauch.
 8/05: *Campto/Avastin* 1. Zyklus 1.8.05

Sonstige Diagnosen:
 Art. Hypertonie
 St.p. Herpes Zoster
 HWS vor 6 Wochen
 Diclofenacallergie
 Pflasterallergie (Transtec)

Untersuchender Arzt: Dr.
 gesehen: Dr.
 DVR: 0000

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Figure Overview sheet

The overview sheet is especially interesting as it reflects some of the features the doctors expect from a computer system, mainly the kind of overview that can be gained at one sight.

The chart at the wards

For the charts that are used to document a patient's stay at one of the wards of ONC2, they use a different system than that described for ONC1. The way how all the parameters (like weight, blood pressure, temperature, excretion, or blood sugar level) are recorded is essentially the same. Columns are provided for each day of the stay and sections of the chart are dedicated for specific entries like orders of medication or infusions that are given by the doctors and administered by the nurses. The provided treatments are documented and the condition of the

patient is described in the progress notes where any other occurrences, like a talk with relatives, are also noted. One doctor mentions that they have adopted some mechanisms to enhance overview: For example, antibiotics are written in green, the blood clotting in red. For the medication, they start with the substances to be provided intravenously (i.v.) from the top, whereas the ones to be taken orally (p.o.) are written down at the bottom of the according section (OBS6, p.6). The difference to the chart at ONC1 is that the results from the laboratory are provided on labels that are stuck onto the chart rather than on separate sheets. One doctor explains for their system: *“The advantage is that it is comparably easy to grasp the patient – if you are familiar with the chart and work with it – at one sight. [...] As I can see the current laboratory and other results of the patient without having to turn pages. The drawback is that someone [...] has to make sure that the results get where they belong. That means [...] that there is always someone who has to stick the labels with the blood results onto the chart or transcribe other results to the chart accordingly”* (INT2, p.6). The sheets with the examination results are stored separately while the patient is at the ward and are only brought together in the patient history when s/he leaves.

The other system that they use at ONC1, and that they are about to introduce in ONC2, is called the “Kardex system”. That means that in addition to the chart, there is a folder with partitions where all the different results are stored (blood results or x-rays, etc.). Only some of them are also included in the progress notes on the chart. Asked for the reason why they are going to change their system, one doctor answers that both approaches have advantages and disadvantages. He prefers the system that they currently use because of the overview that can be gained at one sight, and he comments: *“Of course I see the work for the interns, who are mainly responsible to enter the results. But I also see that as an intern you have the opportunity to get more involved into the case [...] because you are forced to have a look at the results. [...] You can also deliberate for yourself what could be done or how to react”* (INT2, p.7).

Patient letters

Patient letters are dictated by the doctors at the end of the patients' stays at the ward. The doctors take the information from the charts, the anamnesis sheet and all the other sheets that give results of examinations and consultations, e.g., of other departments, and sum it up. This is then typed by a secretary. She uses a tool that allows her to insert results from the laboratory or x-ray examinations automatically; diagnoses have to be dictated. This is the same tool that at ONC1 they had just newly introduced at the time of the case study. The letters should be ready when the patients leave; however, they are often lagging behind. So patients receive so-called “short letters” with the diagnoses and a suggestion of therapy. This is intended for use by the family doctor. The letters are accessible on the computer system, i.e., for the department they are immediately accessible, for all the hospital they are only released when they have been checked by the head doctor.

The patients of the day clinic should also receive patient letters for each of their visits. However, as one doctor mentions, they do not have the necessary resources in terms of the time that it would take for the doctors and the secretary (INT2, p.3). So letters are only provided when a diagnosis results in a therapy or a therapy is modified or the condition of the patient has changed. One doctor says that in other cases he might write down a few lines for the family doctor by hand (OBS4, p.2).

COMMONALITIES AND VARIATIONS

At ONC2 the situation is slightly different from ONC1. Overall they have the same tasks, i.e., their field is internal oncology, and like ONC1, they do not have a particular focus but treat all hematological and oncological diseases. However, working routines differ and also the artifacts they use. At ONC2 they have three wards and one unit that hosts both the outpatient and day clinic. They are smaller than ONC1: They have 62 beds at wards (compared to 94 at ONC1) and 10 places at the day clinic (compared to 14 at ONC1). Also, the patient frequency is less at ONC2. Whereas in ONC1 they have peaks of up to 45 patients a day at the day clinic, they have between 10 and 32 in ONC2. According to the nurses they have on average 30 patients at ONC1 and 20 at ONC2 at one day in the day clinic. With the organization in teams at ONC2, they more explicitly than in ONC1 address the issue of assuring that patients see the same doctor or at least a doctor from the same team at each visit.

The outpatient and day clinic are both administered from one counter where all patients have to show up and are received by a secretary (in ONC1 this is done by a nurse). Also, other than in ONC1, there is no doctor specifically responsible for the day clinic but rather all the doctors do all patients: those who come for chemotherapies as well as those who only come for a consultation or a blood test. Each patient has to be seen by one of the doctors. So if a patient comes for a chemotherapy, a quick blood test is done, then s/he is seen by a doctor on the ground floor and afterwards gets up to the day clinic on the second floor, taking the patient file with her/him. It is not for the nurses to decide which of the patients they are to send for a consultation depending on the blood values. The nurses in the outpatient clinic are located in the doctors' rooms, having their own PCs there rather than being in a distant location. So they are not responsible for a certain task like in ONC1, but they are responsible for all the patients of one, or sometimes two, physicians.

These organizational differences have important consequences for the working routines and the artifacts used for documentation. At ONC1 the "care sheet" is a central document for the nurses, as they use it to document for themselves what has to be done. Furthermore, the care sheet is used by the doctors to give orders to the nurses about all those decisions that are not planned in advance but are taken during a patient's talk with the physician. This is not necessary at ONC2, as the nurse is usually present in the doctor's room and can directly react to any upcoming demands. For example, if the doctor decides that a patient should be sent to do an x-ray examination, the nurse just enters the request into the computer. Additionally, the documentation is done differently at ONC2. That is, the doctor does not dictate the results of the consultation and then this would be typed by secretaries and only be available some days later, as is the case at ONC1. Rather, the doctor writes down by hand all the relevant information, making it immediately available. At ONC1, the location of piles of folders is important to denote tasks to be done. This is not as central in ONC2, as each of the nurses at the outpatient clinic organizes the files for herself. Only in the day clinic the two nurses have to coordinate. So they have established a way of arranging the files so that both of them know which file is for whom (they are located near the beds accordingly) and what is to be done.

There are still other differences in artifacts: The documents for a patient are stored in an envelope, i.e., the patient file, not as in ONC1 in a folder. The files have different colors for male and female patients, not as in ONC1 for diseases. At ONC2 they do not keep all the examination results in the files. Also, some of the processes are different: At ONC2 they do not have to do the admission by phone but rather do it via computer. For the administration of patients, i.e., the

reporting for accounting, they use paper sheets (this is done on the computer at ONC1). They also use a different system to order the chemotherapies.

EXPECTATIONS TOWARDS THE COMPUTER-BASED DOCUMENTATION SYSTEM

In the following some of the expectations towards the computer system that was planned to support the documentation procedures are described, as they shed light on how the doctors at ONC2 think their work practice could be changed by a computer system.

Generally they expect that the documentation requirements are lowered and that access to the data is possible from anywhere at any time (OBS1, p.3). The head doctor explains that in discussions within the department, or with doctors from other departments, it happens that they do not exactly know what a patient has received and what was the stadium of the disease at a certain point in time. They would have to get the patient file to find this information, and this is not always possible due to the lack of personnel resources. Accordingly, the expectation towards the computer system is that either the data is accessible from the meeting room or it is possible to print out a report with a summary (INT1, p.4-5). The head doctor also emphasizes the importance of a good first anamnesis. All the information about the case history should be recorded once, preferably by an experienced physician. From then on it should be accessible and only updated if required. However, at present the anamnesis is mostly done by interns, and they often ask the patient for the same information twice, and *“the more often the anamnesis is done the bigger is the risk that errors creep in”* (INT1, p.4).

Another expectation is that it is possible to generate a patient letter for the day clinic from the data that is stored in the system and the progress notes that are entered at the according visit. It should include predefined elements like the next appointment (INT2, p.13). In a first meeting with the vendor of the system at which requirements were discussed, the doctors emphasized that it is important for them to be able to decide what is taken over from the progress notes, e.g., they want to have the option to enter text that is only internally visible to them and does not appear on the patient letter (OBS3, p.8).

Summing up, they anticipate the computer system to ensure better data quality and accessibility. But there is also the fear of losing control over the information that is automatically taken over into a patient letter or a summary sheet.

MATERIAL

	date	interview partner	place
INT1	1.2.2005	head doctor	office
INT2	18.8.2005	doctor	outpatient and day clinic
INT3	22.12.2005	nurse	day clinic

	date	observed persons	place	remark
OBS1	28.1.2005	doctors and nurses of one team, trainer	seminar room	workshop to discuss work processes
OBS2	1.2.2005	head doctor	ward	
OBS3	12.10.2005	doctors, project manager and software developer	seminar room	workshop for the implementation of the computer system
OBS4	23.11.2005	doctor and nurse	consultation room	
OBS5	28.11.2005	doctors, project manager and others involved in the project	seminar room	workshop for the implementation of the computer system
OBS6	12.12.2005	doctor	consultation room	
OBS7	12.12.2005	nurse	day clinic	
OBS8	14.12.2005	nurse	day clinic	