The Time Needed for Clinical Documentation versus Direct Patient Care

A Work-sampling Analysis of Physicians' Activities

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Keywords

Documentation, time and motion studies, workload, physicians, medical record systems

Summary

Objectives: Health care professionals seem to be confronted with an increasing need for high-quality, timely, patient-oriented documentation. However, a steady increase in documentation tasks has been shown to be associated with increased time pressure and low physician job satisfaction. Our objective was to examine the time physicians spend on clinical and administrative documentation tasks. We analyzed the time needed for clinical and administrative documentation, and compared it to other tasks, such as direct patient care.

Methods: During a 2-month period (December 2006 to January 2007) a trained investigator completed 40 hours of 2-minute work-sampling analysis from eight participat-

ing physicians on two internal medicine wards of a 200-bed hospital in Austria. A 37-item classification system was applied to categorize tasks into five categories (direct patient care, communication, clinical documentation, administrative documentation, other).

Results: From the 5555 observation points, physicians spent 26.6% of their daily working time for documentation tasks, 27.5% for direct patient care, 36.2% for communication tasks, and 9.7% for other tasks. The documentation that is typically seen as administrative takes only approx. 16% of the total documentation time.

Conclusions: Nearly as much time is being spent for documentation as is spent on direct patient care. Computer-based tools and, in some areas, documentation assistants may help to reduce the clinical and administrative documentation efforts.

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Introduction

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Health care is increasingly influenced by the use of modern information technologies (IT) [1]. IT systems are introduced to, among

other things, increase the quality and efficiency of patient care, and to support health care professionals in their daily tasks. Modern health care is characterized by the distribution of tasks between professional groups (physicians, nurses, etc.), clinical areas (radiology, surgery, etc.), and health care organizations (primary care, hospitals, nursing homes, etc.), producing a high demand for the documentation and communication of patient-related data. This is aggravated by rising economic pressure, decreasing lengths of stay [2], and legal regulations all requiring additional documentation under great time pressure. Overall, health care professionals seem to be confronted with an increasing need for high-quality, timely, patientoriented documentation.

An increase in administrative tasks has been shown to be associated with increasing time pressure and low physician job satisfaction [3], whereas adequate time for physician-patient interaction seems to be associated with higher physician satisfaction [4]. Furthermore, in Austria, this rising need for documentation is criticized by clinicians and regarded as a danger for the quality of patient care. The Austrian Medical Association states that clinicians spend too much time at the computer, and that the administrative and documentation tasks ("paper chaos") are taking too much time away from patient care [5]. A recent survey of 2000 Austrian hospital physicians showed decreasing job satisfaction compared to earlier years, with 82% of the physicians stating that they feel stressed partly or heavily due to administration and documentation tasks [6] – this representing the category with the highest stress level, higher than, for example, stress from a high personal workload or from night shifts. In this survey, 53% of the physicians stated that, in recent years, work has become more unpleasant, with increasing documentation and administration efforts being the frequently mentioned reasons (52%) for this feeling [6].

Researchers, therefore, have attempted to quantify the actual time needed for documentation, especially compared to the time available for direct patient care. For example, in an outpatient oncology clinic, Fontaine et al. found that U.S. physicians spend 29% of their time entering and retrieving information from paper-based medical records, and 43% on direct patient care [7]. In another U.S. study, Gottschalk et al. found that family physicians spend 55% of their time with faceto-face patient care, while other activities primarily involved reviewing medical records, writing notes, and writing prescriptions [8]. For Austria, the Austrian Medical Association estimates that physicians in hospitals spend no more than 63% of their time for direct patient care, without providing the source of these data [5].

The electronic patient record (EPR) and other more specialized computer-based documentation systems promise to support documentation and to reduce documentation efforts. Several evaluation studies have investigated the relationship between introduction of an EPR system and time efficiency. In a recent review, Poissant et al. [9] analyzed seven studies evaluating the effects of an EPR on the time efficiency of physicians. Four of those studies reported an increase in the documentation time (by 11-41%), whereas three studies reported a reduction (by 13-46%). Poissant et al. [9] found comparable varying results when analyzing studies on the time efficiency of nurses. Reasons for the observed differences among the reviewed studies may comprise differences in the amount of documented information, in hardware equipment (for example mobile tools), clinical workflow, and usability and quality of the IT systems in the evaluated settings [7,9]. An increase in workload for physicians can lead to low user satisfaction and even user boycott [10].

Overall, a rising demand for clinical and administrative documentation may lead to a decrease in the direct time available for patient care and reduced job satisfaction for physicians. This problem is currently being actively discussed in Austria. However, there seems to be no objective data on the overall time for documentation compared to the overall time for patient care.

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Objectives of this Paper

The objectives of this paper were, therefore, to objectively measure the time physicians spend on clinical and administrative documentation tasks, and to compare it with the time needed for other activities.

Methods

The traditional methods for time measurement comprise either the subjective estimation by the actors themselves in a survey, or the objective measurement by a trained observer. The second method is typically preferred, as the first one only provides an imprecise, and potentially biased, measure of activity [11]. For objective time measurements, the two most widely-used approaches are time-motion studies, as introduced by F. W. Tayler (in the 1880s) [12], and work sampling, as introduced by L. H. C. Tippett (in the 1930s) [13].

In time-motion studies, trained observers measure the duration of activities by documenting their beginning and end, using a predefined classification of activities. This method has been applied, for example, to measure the impact of an EPR system on the time use of oncologists [14], or to analyze the time needed after the introduction of computer-based physician order entry [15].

In a work-sampling analysis, a trained observer documents which activity is just being executed at predefined (for example, every five minutes) or randomly selected moments in time, also by using a predefined classification of activities. By counting the number of observed activities in each category, the overall distribution and thus the duration of each task can be estimated. The larger the number of observations, the more precise this estimation can be. Work sampling was used, for example, to study the work distribution of physicians in a general medical service unit [16].

The most important advantage of work sampling is that the data for several clinicians can be obtained by only one observer, which makes it rather efficient compared to continuous time-motion studies where, typically, one observer shadows one clinician [17]. In addition, work sampling minimizes the risk that clinicians' behavior will be affected by being observed permanently [7]. The disadvantage is that work sampling just provides an estimate of the real-time distribution [18]. In addition, work sampling is only feasible when the clinicians remain in a defined area, where they can easily be located by the observer. Both time-motion studies as well as work sampling have been conducted in clinical areas for many years [19]. In the 23 studies reviewed by Poissant et al., 58% used time motion, 33% work sampling, and 8% a selfreport survey approach [9].

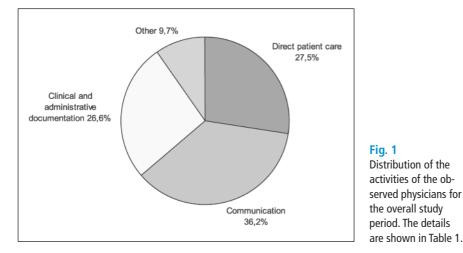
For our present study, we selected work sampling, as it allows for only one observer documenting the activities of several clinicians. We followed the steps of work sampling as described by Sittig [20]: First, the identification of working categories; then, the conduction of a pilot study for a sample size calculation; finally, the conduction and analysis of the main study.

Our analysis was conducted at a 200-bed hospital in Tyrol between November 2006 and January 2007. The study was conducted in two wards of the inpatient area of the department of internal medicine. Both wards admit around 520 patients each year. The mean patient length of stay in this department is around 18 days, with mostly postsurgical patients treated. All of the eight physicians (one doctor-in-training, four resident physicians, three senior physicians) working in the observed wards during the study period agreed to participate and were included in the study.

This hospital is equipped with a clinical information system (Cerner Millenium, [21]) that supports several clinical activities, such as order entry and result reporting for lab and x-ray, report writing, and patientrelated scheduling. A paper-based record is still maintained for the documentation of clinical admissions, vital signs, prescriptions, ongoing status documentation, and nursing care planning.

We developed the initial classification of activities that are needed for the work-sampling analysis, based on an earlier work of Blum et al. who investigated the documentation efforts in German hospitals [22]. Castelein later adapted Blum's classification for an Austrian hospitals' setting [23]. We used his classification as the basis for our study. We also reviewed the international literature to check the completeness of our classification system. Table 1Distribution of the most important activities of the observed physicians for the overall study
period. Mean and standard deviation of the percentage of the overall working time is indicated. Only
those categories higher than 1.5% (for categories I to III) resp. higher than 0.5% (for categories IV and
V) are indicated. For a complete list and definition of the categories, see Appendix.

Category	Mean (Standard Deviation)
I. Direct patient care	27.5% (10.5%)
Communication with patients	9.3% (5.5%)
Other patient care	7.2% (6.0%)
Medical activities	5.9% (5.3%)
Read in patient record	5.1% (3.2%)
Waiting for patient	0.0% (0.1%)
II. Communication	36.2% (10.5%)
Personal communication with physicians	12.9% (6.8%)
Regular meetings	10.0% (8.4%)
Phone calls	4.6% (3.2%)
Personal communication with non-physicians	4.0% (2.5%)
Other communication	1.6% (2.9%)
III. Clinical documentation	22.4% (10.7%)
Writing of a preliminary discharge letter	4.5% (3.9%)
Ongoing clinical documentation	3.2% (3.0%)
Writing of a final discharge letter	3.6% (2.8%)
Documentation of an initial examination	2.2% (3.1%)
Prepare documentation forms	3.4% (2.6%)
Documentation of findings	1.9% (2.6%)
Prepare forms for order entry	1.9% (1.1%)
Documentation of medication	1.5% (1.4%)
IV. Administrative documentation	4.2% (4.6%)
Generation of duty rosters	2.1% (4.6%)
Writing of discharge documents	0.7% (1.8%)
Completing of transportation orders	0.5% (0.9%)
Other administrative documentation	0.5% (0.9%)
V. Other activities	9.7% (7.4%)
Walking times	2.6% (1.4%)
Breaks	5.1% (3.6%)
Other	2.1% (7.1%)
Sum	100%



The resulting list of activities was refined by a pilot study in the hospital, which was conducted in November 2006. This pilot study comprised both direct observations of clinical workflow as well as interviews with the physicians. The interviews that were conducted with two physicians were used to discuss face validity of our instrument, and to check the definitions of each category. The direct observations within the pilot study lasted eight hours using a one-minute work sampling interval. The observations were used to train the observer, to test the prepared documentation form and to assess the completeness and clarity of each category. Overall, only slight modifications mostly in wording of individual categories were done as a result of the pilot study. The pilot study was conducted by that observer who also conducted the final study. No further formal reliability testing of the instrument was conducted.

The findings from the pilot observations were used to calculate the needed number of observations, using the formula provided by Sittig $(n = p (1-p)/\sigma^2$, with n = total number of observations, p = expected percentage of time required by the most important category of study (estimated from pilot), and σ standard deviation of percentage) [20]. Based on this formula, we calculated n = 2244 for our study. Estimating a planned duration of observation of 5 days à 8 hours, this n would be reached by 449 observations per day resp. 28 observations per hour. This means one observation every two minutes.

The final classification system comprised 37 categories, 21 describing documentation activities, with 11 related to clinical documentation and 10 to administrative documentation. ►Appendix 1 shows the classification system.

The main work-sampling study was conducted in December 2006 and January 2007, and comprised 40 hours of observations during the day shifts, with each day of the week covered equally. Based on the results from the pilot study, the chosen sampling period was two minutes. The observer (HS) used a programmable watch that beeped every two minutes. Typically, three to four physicians were observed in parallel by the observer. A typical observation session lasted eight hours. If necessary, the observer looked into the patients' rooms in case one of the physicians was there at the moment of observation, to

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capture patient-related activities. Overall, 30 so-called physician-days were observed (a physician-day reflecting a full-day observation of one physician).

The observation form that we used documented the following information for each observation point: the actor (name of physician); the performed activity (see Appendix); and the tool used (computer-based, paper-based, or other). Overall, 5500 observations were documented. MS Excel 2003 was used to analyze the respective data. First, for each individual physician, the number of activities documented in each category was translated into an individual percentage, using the overall number of documented activities of this physician as denominator. Then, based on those numbers, the mean and standard deviation of the categories of all physicians were calculated.

Results

► Table 1 and ► Figure 1 show the overall results of the work-sampling study. 27.5% of all activities were related to direct patient care, 36.2% to communication activities, 26.6% to documentation activities, and 9.7% to other activities. The clinical documentation activities accounted for 22.4%. Documentation activities typically defined as "administrative" (i.e. coding for billing purposes, documentation for quality management) accounted for 4.2% overall, that is 15.7% of all documentation time.

We also documented which tools were used for the documentation activities (categories III and IV). Here, we found that for $49.3 \pm 19.7\%$ of the documentation tasks, paper-based tools (for example paper-based patient record, paper-based forms for order entry or duty rostering) were used. Computer-based tools (for example electronic patient record, office, and statistic tools) were used for $49.3 \pm 19.7\%$ of the documentation tasks.

We also analyzed the activity distribution for each individual physician to calculate the individual daily and weekly documentation effort. The lowest daily documentation effort of an individual physician at a given day was 8.5% (for a resident), the highest 55.5% (for a senior physician). When analyzing activity distribution over one week, the lowest weekly documentation effort of an individual physician was 21.6% of the overall working time, and the highest was 36.2%. In 12 of 30 observed individual physician-days, the daily documentation load for a physician was near 30% or above.

Discussion

Meaning and Generalizability of the Results

Our most interesting finding was the substantial proportion of 27% of the working time dedicated to documentation, comprising both clinical and administrative tasks. We conducted our work-sampling analysis during the main working hours, i.e. 8 a.m. to 4.30 p.m. Physicians later stated that they often work overtime (i.e. after 4.30 p.m.), to finalize documentation tasks. If we estimate that this overtime was around 40 minutes per physician per day during the study period (as estimated from the administrative working time documentation of the department), the overall daily documentation workload would increase from 26.6% to 32.4%.

Before the study, the hospital management had stated that the documentation should not exceed 30% of the working time. While the mean (without overtime) is just below this threshold, each of the eight observed physicians spend at least one day (from five) with more than 30% of their time needed for documentation activities.

In a survey-based self-assessment study of 1010 German physicians conducted by Blum et al., they found a documentation effort of 40.6% [22]. The Austrian Medical Association has stated that physicians in hospitals spend up to 63% of their time on documentation [5]. Those subjective estimations may be biased [24] - a rising dissatisfaction of physicians in Germany and Austria with what they call "bureaucracy" may have led to those rather high subjective estimates. Our objective measurements confirm that the documentation efforts in the inpatient area are quite high with 27%. However, only one-sixth of this time is clearly devoted to administrative documentation.

Studies that analyzed the distribution of physicians' activities in a clinical setting comparable to our study are rare. For example, none of the studies reviewed by Poissant et al. [9] were comparable to our study. Most studies focus either on other professional groups (for example nurses), on outpatient areas, on specialized inpatient clinical settings (such as intensive care or emergency care units), or only on certain activities (such as order entry). For example, the study of Gottschalk et al. [8] analyzing activities of general physicians found that they spent around 20% of their time documenting - this lower number may reflect, however, the lower documentation requirements in outpatient care. Oddone et al. [24] analyzed the work distribution of 36 physicians at a university medical center and found 43.6% for "patient evaluation" (comprising direct patient care and discussing patient care), 18.9% for educational activities, and 13.9% for administration (for example charting, dictating, label/forms). Here it is unclear as to whether the activities noted for patient evaluation (such as physical exam, patient history, and ward rounds) may have also included related documentation activities. Educational activities were not relevant in our study, as the hospital is not an academic hospital. Hollingsworth et al. [25] used a time-motion study to analyze the time distribution in an emergency unit. They found that the observed ten faculty physicians spent 32% of their time on direct patient care, 22% on communication, and around 18.5% on charting and other paperwork. Mamlin et al. [19] conducted a combined time-and-motion and work-sampling study in a general medicine clinic and found that physicians spent 37.8% of their time charting, this reflecting the purely paperbased documentation at the time of the study.

A recent study by Westbrook et al. [26] is better comparable to our study; they used a time-motion approach to quantify work activities of doctors in a 400-bed teaching hospital where also a mix of computer-based and paper-based tools was used. They found that 33% of the time was spent on professional communication, 32% on (direct and indirect) patient care, and 12% for documentation (excluding medication documentation).

A high documentation effort is often not well accepted, and physicians argue that documentation takes away time from direct patient care, and thus endangering the quality of care. Especially documentation tasks that are seen as not directly related to patient care

(such as documentation for quality management or for legal reasons) are often not well accepted. In our study, we found 4.2% of the working time (i.e. 15.7% of all the documentation time) is spent exclusively on "administrative" documentation tasks, arguably reflecting a moderate effort. In addition, both clinical and administrative documentation is vital to provide good-quality, affordable and coordinated care to patients [8], especially in a health care setting that is characterized by a large number of different professional groups and institutions and by rising economic pressure. Therefore, the question should not just be how to reduce the documentation efforts, but rather how to plan and organize it to best support patient care [27].

Computer-based documentation systems may be helpful in streamlining documentation tasks, integrating data, and avoiding unnecessary double data entry. In our hospital, already around half of the documentation tasks are supported by computer-based tools, and this percentage is expected to increase in the coming years. For example, the documentation of the initial examination and of the medical history is still performed on paperbased forms. By using bedside terminals or mobile tools, such as laptops or PDAs, documentation may be facilitated and might increase the data quality [28, 29]. In addition, the use of mobile tools could also help to reduce the time needed for the paper-based documentation of medication and other clinical notes as well as for general order entry, which are at the moment performed in the paper-based records. Using a CPOE system (computerized physician order entry) may even help to increase patient safety by offering checks and alerts [30, 31]. Altogether, we estimate that another approx. 25% of the documentation time could be supported by computer-based point-of-care tools.

In addition, workflow reorganization may help to reduce any unnecessary documentation tasks. For example, the writing of discharge letters is – at the moment – a rather complicated process, with a physician dictating both a preliminary and later a final letter, and the final letter is written by secretaries with a long paper-based correction process involving the author as well as the senior and head physician. Overall, discharge letter production (both preliminary and final ones) sums to 8% of the daily working time of a physician (this is comparable to the 5% found by Westbrook et al. [26]), which means approx. 30% of the overall documentation time. Better computer-based support (including speech recognition and computer-supported correction workflow) may help to reduce documentation efforts, and reduce the turnaround time of discharge letters.

In Austria, physicians' organizations are calling for the introduction of so-called documentation assistants [5], who would take over certain documentation tasks in order to reduce the workload of the physicians. However, if we look at the documentation activities, only a few of them (such as coding of diagnosis and services, completion of transportation orders, documentation for quality management, preparation of documentation forms) seem to be appropriate for delegation to documentation assistants. Other major documentation activities such as discharge letter writing, ongoing clinical documentation, documentation of initial examinations, and documentation of medication, could not be delegated to nonmedical professionals. In our opinion, it is, therefore, questionable as to whether documentation assistants can help to reduce documentation tasks of physicians. Earlier studies showed that a medical assistant can help support physicians in certain areas of general information logistics, such as looking for records or test results [32]. However, these were results from mostly settings using paper-based records and may not be reproducible in settings with already high levels of computer support.

Strengths and Weaknesses of the Study

Using work sampling it was possible for us to observe four physicians at the same time because physicians mostly stayed in the defined area of a ward. The observer only had to take a short look at what a physician was doing at a certain moment, thereby minimizing the danger of a Hawthorne effect and avoiding any disturbance of the clinical workflow.

We developed a classification system with 37 activity categories, 21 of which were related to documentation activities, as this was the major focus of our study. Our classification was based on the work of Blum [22] who used 29 categories. Other authors have used much fewer detailed categories for documentation. For example, Bürkle et al. [33] used 23 categories to document nursing activities, only one of which was clearly related to documentation activities. Westbrook et al. [26] used 22 categories, two of them devoted to documentation.

We decided to execute the work-sampling observations at fixed intervals. Sittig [20] recommends fixed intervals for observation of random work activities such as the hospitalrelated activities in our study. For fixed observations, Nickman [11] recommends a minimum of eight observations per hour. With 30 observations per hour, we were well over this limit. The 2-minute interval observations placed a high workload on the observer, but guaranteed that the activities of a short duration were captured, which increased the precision of our measurements. Instead of using a paper-based work-sampling form, in order to reduce the time needed for data analysis as well as to eliminate transcription errors, the use of a PDA for activity documentation might have been helpful, as, for example, proposed by [34] and used in studies by [11, 26].

Our results may be subject to certain errors. For example, a misinterpretation of the work category definitions is one possible source of error. We attempted to limit the impact of this threat by having just one welltrained observer, by defining each category, and by conducting a pilot study to validate the working categories. Overall, each of our physicians was observed over approximately four full days. We cannot be certain that the observed days were representative, even when we attempted to guarantee representative days by distributing the observation days equally over the whole week and over two months. On all the observation days, the bed occupancy was high, which seems to be representative for the overall situation of the observed department.

The present study was conducted in a department of internal medicine, characterized by a mean length of stay of approx. 18 days, and with mostly post-surgical patients treated. This duration of stay is much higher than the overall mean duration of stay in Austrian hospitals, which was 5.7 days in 2006 [2]. Our results may, therefore, not be generalizable to other inpatient settings in Austria.

Conclusion

We found that a substantial proportion of 26.6% of working time was dedicated to documentation in a department of internal medicine, 22.4% of which was for clinical documentation, and 4.2% for administrative documentation. The time for direct patient care was 27.5% and, therefore, was only slightly higher than the time spent for documentation. The further introduction of computer-based tools and the reorganization of the working processes (such as discharge letter writing) may help to reduce the documentation efforts that physicians often state are excessively high. Further research is needed to see whether similar results can be found in other inpatient settings with a shorter mean duration of stay. In addition, evaluation studies may help to show how documentation efforts will develop after the introduction of computer-based tools and/or the employment of documentation assistants.

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Appendix

Classification System Used for Analysis of Physician's Activities

No.	Name of Category	Definition of Category
I	Direct patient care	
1.1	Medical activities	Any diagnostic and therapeutic activity of the physician, related to the care of a patient
1.2	Communication with patients	Direct conversation between the physician and patient
1.3	Waiting for a patient	Physician is waiting for the next patient to arrive
1.4	Read in patient record	Get information on the patient from the patient record
1.5	Other direct patient care	Other activities of direct patient care
II	Communication	
II.1	Personal communication with physicians	Direct conversation with other physicians
II.2	Personal communication with non-physicians	Direct conversation with health care professionals other than physicians (for example, nurses, co-therapists)
II.3	Personal communication with relatives	Direct conversation with family members of a patient
II.4	Phone calls	Phone calls with other health care providers (excluding phone calls for patient-related scheduling)
II.5	Communication for scheduling	Organization (mostly by phone calls) of patient-related appointments (such as diagnostic or therapeutic examinations, next inpatient admission)
II.6	Electronic communication	Use of e-mail, Intranet, and Internet
II.7	Regular meetings	Any meetings that take place at a predefined time
11.8	Other communications	Any other communication activities
III	Clinical documentation	
III.1	Documentation of the initial examination	Documentation of the initial examination of a patient after his admission to the hospital
III.2	Ongoing clinical documentation	Any written entries in the patient record, such as clinical notes (for example, during ward rounds)
III.3	Documentation of findings	Filing or copying of recent findings (such as lab or x-ray reports) into the patient record
111.4	Writing of preliminary discharge letter	Writing of the preliminary discharge letter upon the discharge of the patient from the hospital
III.5	Writing of final discharge letter	Writing of the final discharge letter, including the correction process and transport time
III.6	Writing of consultation letters	Writing of a consultation letter for other departments
III.7	Documentation of medication	Documentation of the prescribed drugs of a patient and of any changes to prescriptions
III.8	Preparation of documentation forms	Prepare weekly documentation forms for a patient (for example, for care planning and care documentation)
111.9	Preparation of the forms for order entry	Order diagnostic or therapeutic procedures using predefined forms
III 10	Writing of prescriptions	Filling-out paper-based prescription forms for a patient that is going to be discharged
III.11	Other clinical documentation	Any other documentation related to a patient
IV	Administrative documentation	
IV.1	Coding of the diagnosis and services	Documentation and coding of the diagnoses and services for accounting and legal reasons
IV.2	Completing of transportation orders	Completing of a transportation order form for a patient
IV.3	Writing of doctors' certificates	Writing of any patient-related certificates (for example, inability to work)
IV.4	Documentation for external quality manage- ment	Documentation of data for any quality reports
IV.5	Documentation of the working time	Personal documentation of the daily hours of work

Appendix

Classification System Used for Analysis of Physician's Activities (continued)

No.	Name of Category	Definition of Category
IV.6	Generation of departmental statistics	Development and update of departmental-oriented statistics related to patient care
IV.7	Generation of duty rosters	Development and update of departmental duty rosters for the clinical staff
IV.8	Writing of discharge documents	Finalization of the administrative discharge documents of a patient
IV.9	Writing of requests	Prepare patient-oriented applications for example, for rehabilitation, aftercare, nursing care, or further hospitalization
IV.10	Other administrative documentation	Any other administrative documentation
v	Other activities	
V.1	Walking times	Physician walking between rooms, departments, etc.
V.2	Breaks	Any breaks
V.3	Other	Any other activities (for example, private phone calls)