

**EFFICIENCY IN THE PHYSICAL THERAPY CLINIC:
TRADITIONAL VS. COMPUTERIZED DOCUMENTATION**

THESIS

**Presented to the Graduate Council of
Southwest Texas State University
in Partial Fulfillment of
the Requirements**

For the Degree

**Master of Science
in Physical Therapy**

By

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**San Marcos, TX
May 1998**

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ACKNOWLEDGMENTS

I would like to express my appreciation to the following individuals who provided their time and effort in helping to see this project to completion: Dr. Janet Bezner whose writing skills, input, and most importantly, her patience were key in the success of this project; my committee members, Dr. Brenda Boucher and Dr. Barbara Sanders, for their invaluable input; Daniel Ludwig for his assistance in analysis and interpretation of the data; Smokey Kubaceck and Chris Arrigo for their assistance in the data collection; and finally my family whose support and love have had an integral part not only in the completion of this project, but also my education.

I would also like to thank HealthSouth Sports Medicine and Rehabilitation Center, Austin, TX and HealthSouth at the Ballpark, Arlington, TX and all of their staff for participating in the data collection as well as sharing their knowledge and skills.

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ABSTRACT

EFFICIENCY IN THE PHYSICAL THERAPY CLINIC: TRADITIONAL VS. COMPUTERIZED DOCUMENTATION

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Background and Purpose. Today's ever-growing demand on the clinician to provide quality care at an efficient pace is requiring those in the health care industry to reevaluate existing operating systems. Computerized documentation is a possible alternative currently under consideration. Unfortunately, limited research exists providing objective results of computer use for documentation, and the benefits and concerns of computerized documentation are mostly postulated. The purpose of this investigation was two-fold: 1) to determine whether efficiency in a physical therapy setting was increased by the use of computerized documentation and 2) to determine general perceptions of staff members who utilized computerized documentation. Traditional (hand-written) and computerized documentation were observed and timed in three different phases of the documentation process: actual time required to complete an initial evaluation, time required to complete notes of the initial evaluation, and time required to submit notes of the initial evaluation to the referring physician. **Subjects.** The subject population consisted of six licensed physical therapists in outpatient orthopedic physical therapy clinics. **Methods.**

The times of each stage were analyzed using unmatched t-tests comparing traditional vs. computerized documentation. Perceptions of staff members were analyzed via a questionnaire. **Results.** In comparing computer versus traditional documentation, there was no significant difference in the time it took to complete an initial knee or shoulder evaluation or to complete the initial note. However, there was a significant decrease in the length of time it took to submit the note to the physician when the computerized documentation was used. In addition, the staff members were either indifferent to or supportive of the use of computers in the physical therapy clinic. **Discussion and Conclusion.** The transition to computerized documentation and the questions that surround it are well supported in the literature. However, there is limited evidence of increased efficiency in a variety of settings. The results of this study suggest that efficiency can improve in areas of documentation with the use of computers and that attitudes are not negative towards their use. More important than an increase in efficiency or a decrease in cost, the literature states that outcome measures generated from computerized documentation use appear to provide a better measure of quality care than measures available with the use of traditional documentation.

CHAPTER I

INTRODUCTION

New trends in the management and providing of health care have increased the pressure on health care providers to objectively measure the effectiveness and efficiency of the care they are providing. Technology offers possible solutions to these challenges and provides opportunities for expanded innovation.

Computers have already played an important role in health care delivery in numerous areas. These include, but are not limited to: assisting individuals with disabilities in adapting to their environment, cognitive rehabilitation, patient education, functional assessment and re-education of gait.¹⁻⁶

Computerized patient records (CPRs) are now being used in the health care field as well. It has been postulated that computerized documentation indirectly affects the efficiency and effectiveness of a health care facility by allowing instant access to patient records, ease of order entry, management and quality improvement, facilitation of data capture, and legibility.⁷ Concerns with the use of CPRs include compromising confidentiality, lack of standard query language among various health care disciplines, resultant change in routine and attitude required in the workplace and of the employees, and cost effectiveness.⁸ The literature is lacking in objective measurement of the efficacy of computerized documentation. This scarcity of information makes it difficult to determine if

a physical therapy clinic will benefit from the implementation of computers for documentation. In addition, it is difficult to determine which elements of computer software need further development to improve existing programs so that computers indeed serve the purpose of increasing efficiency and effectiveness in the physical therapy clinic. Quantifiable measures of efficiency secondary to the use of computerized documentation may result in an increase of interest, confidence, and further development of computerized documentation in the health care setting. The purpose of this study was to investigate and provide objective measurement of the effect computerized documentation has on efficiency in a physical therapy clinic. It was hypothesized that the amount of time taken to complete the 1) initial evaluation, 2) initial note, and 3) submission of the initial note to the physician would decrease with the use of computerized documentation. General perceptions of those staff members who utilized computerized documentation were also assessed. Refer to Appendix A for a definition of terms.

CHAPTER 2

LITERATURE REVIEW

A general question in health care today is how to best use computer technology to maximize quality while minimizing cost.⁹ Medicine is laden with technology, yet utilization of this technology to its full potential continues to be a challenge facing health care providers. The following literature review will focus on: computers in medicine and physical therapy, advantages and disadvantages of computerized documentation, utilization of patient databases for outcome measures, and the economic and legal issues surrounding the use of computerized documentation.

COMPUTERS IN HEALTH CARE

Computers in Medicine

Computers have begun to play a more versatile role in medicine. They are being used in a myriad of settings for a variety of purposes. For instance, computers are having a profound effect on how health care professionals communicate with their peers and patients alike. Physicians are able to communicate with their colleagues nearly instantaneously using electronic mail (e-mail). One example is teleradiology - technology allowing diagnostic images to be transmitted from one location to another. Teleradiology allows rural and urban health care providers to be linked, thereby creating a more efficient system of communication.¹⁰ Stross (1979) and Weinburg (1981), as cited by Buffone,¹¹ state that peer to peer communication among health care providers is a primary means of

disseminating information regarding diagnostic exams, evaluation and treatment methods, as well as other significant medical information. Computers provide an excellent means to communicate this information. With the use of e-mail or bulletin board systems, information can be shared with a broader audience in a more convenient manner.¹¹

In addition, physicians can communicate with their patients via e-mail. The physician can use this process to describe symptoms and provide general advice before the patient seeks further medical care.¹¹ The patient can communicate with the physician regarding new or changing symptoms of an already existing ailment. The patient may also have access to his or her own medical records while still complying with appropriate confidentiality laws.

Computers are utilized in patient education. The Computer-Aided Learning Program (CAL) is a program developed specifically for diabetic patients.³ This program is designed to educate and motivate patients to maintain healthy blood glucose levels. A study investigating CAL compared two groups of diabetic patients: those educated via CAL and those educated with the traditional classroom method.³ Each group was tested three months later. Each showed a significant increase in their knowledge of the disease, but the computer-educated group's blood glucose levels were significantly lower than those educated in the traditional manner. This outcome indicates that computer education can be as effective, if not more so, than traditional classroom style education. The CAL program also allows patients with limited access to professional educators an adequate education concerning their disease.³ Buffone and Beck¹¹ report studies by Johnson (1991) and Adamson (1989) that have also shown an increase in comprehension levels and compliance along with a decreased risk of liability for the physician when patient-physician meetings are recorded on audio and/or video for patient review.¹¹

Computers also provide another medium for education in academic settings. This application is typically referred to as computer-assisted instruction (CAI) and is recognized as an effective tool for learning and stimulating interest in students.^{12,13} CAI is designed to reinforce concepts once the students have participated in classroom, laboratory, and small group activities.¹⁴ Drill and practice programs, tutorials, models that allow the student to manipulate variables and observe outcomes, and case-based scenarios presented in an interactive simulation are only a few of the possibilities that CAI offers.¹³ Johns Hopkins University uses two programs in particular, CV Sim and Interactive Respiratory Physiology, allowing the student a high degree of realism in observing and diagnosing simulated patients.¹² CV Sim allows the student to "recognize evolving cardiovascular physiological conditions and to predict effects of interventions..."¹² while Interactive Respiratory Physiology consists of tutorials, quizzes, labs, a dictionary, and an encyclopedia. Pre-clinical medical students utilizing CV Sim in a physiology lab stated that it was one of the most effective parts of the course and that it provided a much more realistic presentation of physiological processes than traditional methods of teaching.¹² Another program, WebPath, is currently utilized at the University of Utah. It is designed to enhance education while reducing faculty lecture time.¹⁴ WebPath decreased classroom hours by 30% and students, when evaluating the course, rated it as the highest out of all course content.

CAI enhances dynamic learning.¹⁴ CAI provides the student with the most current information available. Web-based curricula can be changed and delivered to students rapidly compared to creating a new syllabus or version of a textbook. CAI allows interactive communication and access to global resources. Medical students communicate, share resources and experiences, and organize e-mail discussions with students in other medical programs, thus increasing their knowledge base. Web resources and search engines like CliniWeb and Yahoo! also exist, providing an organized gateway to medical

resources on the Internet.¹³ Further research is necessary in this new area of learning, but CAI appears to provide an excellent method of interactive teaching.

In addition to improved education, physicians are able to be more consistent and provide more reliable treatment with the use of computers. Schriger et al¹⁵ implemented a medical record system assuming the following would improve: documentation of important items in medical record and discharge instructions, compliance with guidelines for lab testing and treatment, and the percentage of charges for indicated activities. They assumed that each of these items would return to baseline should the computer charting system be removed. The investigators conducted the study in three phases: 1) baseline phase in which the physicians documented as usual; 2) intervention phase in which physicians were asked to use computers when testing a specific diagnosis; and 3) post intervention phase in which computers were removed. It was found that physicians provided care compliant with the guidelines 63% of the time in phase one, 83% of the time in phase two, and 52% of the time in phase three. In addition, there was evidence of a decrease in undertesting and overtesting. For instance, when computers were utilized, there was a 27% decrease in performing tests when they were not indicated (overtesting). There was also a ten percent decrease in not performing tests that *were* indicated when the computers were in use. Consequently, the computerized charting improved compliance with clinical guidelines, decreased the overuse and underuse of tests and, therefore, appeared to produce a temporary behavior change among physicians. Furthermore, it was suggested that the computerized charting system database could be used to facilitate quality improvement aimed at refining guidelines and decreasing unwanted variance in care.¹⁵

Occupational therapists (OTs) have been able to improve the efficiency of therapeutic sessions by computer training to assist in the cognitive rehabilitation of traumatically brain injured (TBI) patients.² Rehabilitation of the TBI patient typically

involves developing compensatory strategies, addressing neglect of one side of the body, and addressing memory skills. While paper and pencil exercises have been successful in addressing these issues to some degree, they require the presence of another individual to assist in the exercise. The advantage of computer use is that the computer never tires and provides the necessary repetition that stimulates cognitive function. The computer progressively increases the level of task difficulty to challenge the patient, thereby enhancing the patient's progression. Computers are used to facilitate community reintegration as well, by assisting the TBI patient to prepare for a job and enjoy leisure-activities which are difficult to simulate in a clinical setting.²

The American Occupational Therapy Association (AOTA) has also begun to examine and utilize computer technology in an attempt to improve occupational therapy assessment skills. The AOTA has recently developed the Occupational Therapy Functional Assessment Compilation Tool (OTFACT),¹⁶ a computerized instrument for collecting, integrating and reporting assessment data.¹⁷ The OTFACT system analyzes evaluation data to reflect the patient's strengths, weaknesses and progress, as well as providing questions to lead users through a clinical reasoning process.¹⁷ Occupational therapists have found that OTFACT minimizes their workload by improving their evaluation skills. Smith¹⁸ compared two versions of OTFACT (paper-and-pencil vs. computerized version). He found that practitioners who utilized the paper and pencil version of OTFACT required up to four hours to tally and score the data and had a 50% error in the calculations and graphs. The computerized version of OTFACT allowed data to be tallied and scored within 20 minutes error free.

Computers provide assistance with the education, training and assessment of patients and function as diagnostic tools in many areas of medicine. Computers play an

important role in medicine and are becoming increasingly more important specifically in the field of physical therapy (PT).

Computers in Physical Therapy

Physical therapists (PTs) currently utilize computers in various areas of practice. Computers assist in specific evaluative measures and analysis of the evaluation when measuring such things as balance and strength.^{5,6,20} Computers also serve as diagnostic tools and assist in therapeutic sessions allowing the therapist more efficient use of his or her time.^{19,20}

Physical therapists in specific states evaluate and treat without a referral, increasing the importance of a general health screening as a part of the overall assessment. Currently, there is no universal screening standard for PTs to determine if their clients are appropriate for physical therapy management.¹⁹ A tool is being developed which will provide a checklist of screening questions for PTs. The tool will analyze the data from the health screen and alert the physical therapist to all of the diagnostic or management options that should be considered for that particular patient. This type of technology will enable PTs to identify general health factors that may preclude, interfere or influence PT interventions, thus enhancing the accuracy of evaluation and differential diagnosis.¹⁹

The areas of evaluation and assessment of diagnoses specific to PT have also benefited from the use of computers. Computers assist in the evaluation, measurement and treatment of balance and ambulation, two large components of physical therapy practice. Turnbull et al⁶ utilized the Chattecx BalanceSystem in a study examining the deficiency of weight shift in hemiplegics. In this study, the system examined weight shift with four foot plates that measured force exerted from the rear and forefoot of each lower extremity. The footplate coordinates were entered into an international business machine, personal-

computer (IBM PC), which calculated and analyzed the weight shift of each patient in anteroposterior, lateral and diagonal directions. Turnbull et al⁶ found that there were marked deficiencies in weight shift over lower limbs of hemiplegics when compared to normal subjects. The deficiencies were detected in weight shift with feet side by side and positioned diagonally. In conclusion, the investigators suggested improving weight shifting through the hemiplegic leg through progressive gait training with the patient's feet placed in a variety of diagonal patterns to improve gait symmetry.⁶

Montoya et al⁵ performed a study examining the use of computerized biofeedback in gait rehabilitation of individuals who had suffered hemiparesis secondary to stroke. The biofeedback system was designed to train patients in taking steps of a given length. The system was comprised of a lighted walkway to provide targets for each step, a locometer that measured the position of the foot in comparison with the target position and a walking cycle allowing efficient locomotion. The system was organized around a computer with software that calibrated the equipment, tested the walkway signals and analyzed all of the data. The computer allowed visualization and printing of the foot displacement versus time, and detected the beginning and ending phases of the walking cycle. The subject pool was made up of two groups of individuals with hemiparesis. Each group underwent a specific gait-training protocol, but one group used biofeedback (BFB), and the other did not. Montoya et al⁵ found the step length of the paretic limb increased and was stronger in the BFB group. The investigators felt that this method of gait training was beneficial due to the improved temporal organization of the locomotor cycle resulting in long-term improvements in gait.⁵

Isokinetic systems are typically found in outpatient physical therapy clinics and are another example of computer application in the field. These systems measure and assist in conditioning dynamic muscle performance. Dynamic refers to a “specific situation in

which a muscle or muscle group contracts against a controlled accommodating resistance which is at a constant angular velocity.”²⁰ Isokinetic dynamometry is concerned with the provision of resistance and the measurement of the moment exerted by the muscle group against the resistance. Dynamometers provide clinicians with information about the dynamic, mechanical performance of muscle groups by evaluating the performance of voluntary contracting muscle. The measurement recorded represents the size of the force exerted by the moving distal body segment against the force sensor, typically displayed in graph form on the computer display.²⁰

The basic elements of an isokinetic system include: 1) force acceptance unit: interface between subject and system; 2) load cell: converts force signal into an electric signal; 3) head assembly: houses motor responsible for motion of lever arm which can be adjusted to maintain appropriate alignment; 4) seat: provides a stable and aligned position for the subject; 5) lever arm: base of the force acceptance unit; 6) control unit: personal computer and peripheral equipment responsible for data processing; and 7) specific attachments for specific applications. Different types of kinetic dynamometers include the Cybex I, II, and 340, Lido 2.0, Kin-Com, Merac, and the Biodex 2000. Each system is unique, therefore findings attained from one system cannot be considered a baseline for, or compared with, those from another system.²⁰ The Biodex provides the ability to test and exercise in passive, eccentric, isometric and isokinetic mode in virtually all planes for the upper extremity and lower extremity. The results are captured by the control unit as described above, and can then be analyzed.²¹

Computers have a long history in the field of medicine and have become more relevant in physical therapy. Computer programs have been designed to assist the PT in differential diagnosis which further supports a PT's ability to evaluate without physician referral. Computers have also provided a more objective method of evaluating complex

diagnoses like balance and ambulation. Therapeutic sessions have been enhanced secondary to the use of computerized tools like the Biodex and biofeedback machines. The relevant services computers provide in the physical therapy field for evaluation, assessment, diagnosis, and treatment are clear. They play a vital role in the delivery of quality care.

COMPUTERIZED DOCUMENTATION

Although many facets of physical therapy specifically and health care in general use computer technology in the evaluation and treatment of patients, the majority of health care information is still maintained in written-form, stored on shelves in a medical facility. The data is typically fragmented, voluminous and often-times illegible, thereby limiting individuals' ability to collect, analyze and utilize patient data for research.²² A computer system that stores and analyzes patient data in a manner that is user-friendly can enhance the opportunity to identify areas in which the quality of care can be improved and standards in health care can be agreed upon.

The computerized patient record (CPR) is now being introduced to address these needs. The CPR is "an electronically based, adaptable clinical tool for primary input, storage and recall of patient care related information."⁸ A CPR involves basic tasks such as data entry for patient admission information to more complicated tasks that include analyzing data and making logical decisions.²³ Claims postulated by software designers for CPRs include: reduction of data entry errors, automation of chart auditing, projections of costs for specific groups of patients, decreased time spent on documentation, and the ability to measure and report outcomes.²³ Computerized patient records also create the possibilities of pooling patient data into large databases that provide an information resource for creating health care policy, clinical studies of effectiveness and appropriateness, equitable reimbursement policies and scientific hypotheses for further

research.²² In short, computer software designers claim that an overall increase in quality of care will occur once CPR systems are implemented and refined. Ultimately patients could have a longitudinal CPR consisting of all of their medical information that can follow them throughout their lifetime.²²

Advantages of Computerized Documentation

Advantages of utilizing a CPR include the decrease in repetitive documentation and the time saved on calculations that would otherwise have to be done manually. For instance, a pharmacy associated with the Detroit Medical Center found duplication of medical records and the assignment of more than one pharmacist per patient as the patient was transferred within the medical center.²⁴ The pharmacy's goals were to improve the efficiency of monitoring patients as well as to assign only one pharmacist per patient regardless of the patient's location within the Medical Center. A computerized documentation system was implemented using a hospital-wide IBM PC-based local area network (LAN) with customized software to address these goals. Comparisons between the manual and computerized documentation systems were made. The computerized system allowed all patient information to be centralized and accessed from any location. It also calculated cost savings correctly, whereas data was lost and cost savings miscalculated with manual documentation. Finally, computerized documentation allowed workload activity reports to be completed in a more expedient fashion with 100% accuracy.²⁴

The patient can reap direct benefits from computerized documentation as well. Wong et al²⁵ examined the effect of an inpatient order-entry system on physician resource utilization. The investigators demonstrated a decrease in the length of stay and medication charges by 10.5% and 15.3%, respectively. Also, physicians were found to charge 12.7% less in total charges. However, physicians required 5.5 minutes longer per patient to write the orders as a result of using the computerized system.

Perceived benefits by those utilizing computerized documentation can oftentimes determine the success of the system. The New Jersey Department of Health studied the effects of computerization on hospital care delivery by installing a variety of bedside nursing information systems in 17 New Jersey hospitals.²⁶ Perceptions of the users were discussed. Hospital staff stated documentation was obviously more legible, topics were in predictable places due to the consistent format of screens, and documentation was completed in a more timely fashion because it was completed at the bedside instead of at the end of the shift. Staff and patients alike felt that the care had improved due to computer prompts that reminded the staff of certain necessary tasks, as well as the increased time staff spent in the patient's room. However, there were complaints of standing too long due to the terminal being located at the bedside which required charting to be performed while standing. Also, considering the system was not completely paper free, physicians complained that charts were too bulky and had to be thinned.

Utilizing computerized documentation allows the opportunity to compile patient databases. The American Congress of Rehabilitation Medicine and the American Academy of Physical Medicine sponsored a task force to develop a patient database referred to as the Uniform Data System (UDS).²⁷ The purpose of the UDS was to document severity of patient disability and the outcomes of medical rehabilitation. The investigators measured the functional status of their patients upon admission and discharge with the Functional Independence Measure (FIM). Granger et al²⁷ defines the FIM as "an 18 item, 7-level scale of independent performance in self-care, sphincter control, mobility, locomotion, communication and social cognition." The investigators were able to document significant timely and measurable functional improvement of patients who underwent medical rehabilitation in the hospitals and units in which they collected data. They concluded that the UDS demonstrated effective and efficient care and provided the opportunity to identify areas that needed improvement as well as other outcome measures.²⁷

At Riverview Medical Center in Red Bank, New Jersey, a voice-activated documentation system was implemented in order to save nursing time, introduce user friendly technology, and to create flawless documentation.²⁸ Through the use of this voice-activated system, operating room (OR) nurses found their documentation time decreased by 66%. Documentation that once required an average of fifteen to eighteen minutes to complete manually was reduced to five minutes and was virtually flawless. The OR nurses perceived the documentation program as exceptionally tailored to the specific needs of the OR. Although cost was not excessive, it was suggested that purchasing software with a general purpose would be more economically sound. They also found the computer hardware difficult to manage secondary to the considerable amount of space the hardware occupied.²⁸

Computerized documentation allows centralization of medical information in a legible, predictable manner that enhances interpretation of patient information. There is clear, but limited, evidence that computers assist in the reduction of documentation time. It has also been demonstrated that computers positively affect length of stay, medication charges, total charges, and improvements in patient satisfaction. Consequently, computerized documentation appears to have a positive impact on the delivery of health care services.

Disadvantages of Computerized Documentation

As with any new concept, several limitations exist in implementing computer technology. The Department of Family and Preventative Medicine at the University of Oklahoma implemented a comprehensive computerized medical information system.⁷ After three months of dealing with several challenges, the department chose to discontinue use of the system. Problems they encountered included inconsistency in the system's interface

therefore impairing the integrity of the system, as well as difficulty in learning the computerized system. Also, lack of standardized terminology and limited medical terms defined within the program restricted the physicians when ordering specific tests, procedures, or medications. The authors suggested that a system should be easy to understand by management so that they may make quick and concise administrative decisions to limit setbacks in paperwork. They concluded that the creation and use of a support team consisting of a representative of the computer vendor and individuals with database and operating system expertise would greatly assist in the success of any computer system.⁷

It is difficult to design a computer system that can attend to the mobility of the health care provider. Clinicians require access to the patient's medical information at the point of need, which is virtually anywhere. This situation poses a challenge due to the inconvenience of static terminals or bulky hand-held computers. There have been advancements in the size-to-performance ratios for the notebook or pen-based computer. Unfortunately, they are still cumbersome and limit the ability and mobility of the clinician. Oftentimes these systems can only function within a certain distance from the server or have to be plugged in, which breaks up the work pattern of the clinician, thereby defeating the purpose of computer charting systems.¹¹ Clearly, there are disadvantages associated with computerized documentation; however it is not clear whether they outweigh the advantages.

Outcome measures

The new concept of outcome measures is a result of the assiduous transformations in health care since the 1940's. These transformations began with the 'Era of Expansion' which lasted through the 1960's.²⁹ The 'Era of Expansion' consisted of rapid growth in the number of practicing physicians, hospital facilities, developments in science and

technology, and the extension of insurance coverage to the majority of the population. In addition, the development of investor-owned medical care businesses offered an open-ended system of insurance payment and expansion of medical services which were attractive opportunities for investors. Rapid development and expansion of medical services resulted in the extreme inflation of medical care costs which inevitably led to the 'Era of Cost Containment.'²⁹ The chief cause of this cost crisis was not due to the price of services, but the ever increasing volume and intensity of medical services provided in hospitals and outpatient settings. At first, these costs were accommodated without question, but eventually, there was a revolution by employers and the federal government against rising health care costs. Even though third party payers' control has initiated the containment of medical costs, frustration with the inability to guarantee the need for, quality of, and outcomes of medical services still exists.²⁹ Therefore, it is important to find a balance between the assessment of gains achieved for a certain cost and an accountability for those costs incurred.³⁰

The potential value of improving the evaluation of health services and technology has been recognized. The Health Care Financing Administration (HCFA) sponsored a conference in which government representatives, private insurers, major corporations, community agencies and medical professionals were present.²⁹ All of these groups agreed that to provide a foundation for decisions on future funding and organization of health care, information on variations in performance among medical institutions and practitioners along with proper interpretation of this information was needed. It was believed that this information could be gathered and analyzed appropriately with outcome measures research. Outcome measures provide an index of the relative effectiveness of different interventions that allow the elimination of unnecessary expenditures and function as a vital monitoring system used to detect the deterioration of health care.³¹ Outcome measures can also provide justification for policies regulating practice including consensus statements,

practice guidelines, and practice protocols, which are increasingly offered as standards for third party reimbursement and malpractice protection.³⁰

Obstacles involved with the utilization of outcome measures do exist. For instance, there is no clear consensus on how to best measure outcomes or which tools are the most reliable.³² Also, it is difficult to collect good data on the outcomes of various procedures. There is little evidence of the effectiveness and complication rates as well as the quality-of-life effects of many medical treatment procedures. Without this evidence, it is difficult to review physician and hospital performance or to develop reliable protocols for appropriate care. In addition, there is the possibility of employers sacrificing quality care by implementing the use of computerized documentation solely to decrease costs, thereby sacrificing the quality of care provided by the facility. Most importantly, consumers are not appropriately educated to create the demand for quality care. They are still largely unaware of the variations in practice patterns or differences in quality among health care providers.³²

Literature strongly supports the inability to determine the effects that most health care services, including PT, have on patient related outcomes.³³ Currently, PTs are unable to determine which treatment interventions are the most efficient and provide the patient with the best results. Patient databases derived from implementation of computers in the clinic provide excellent opportunities for determining whether an intervention will reliably produce the desired effect under well-controlled, essentially ideal circumstances.³¹ In addition, computerized patient databases can demonstrate how an intervention compares to other possible interventions, thereby allowing the clinician to treat the patient in the most effective manner.

It is evident that, although there are obstacles to overcome, technological advancements provide the clinician with ample opportunities to maximize care and minimize

time spent providing care. Insurance companies are now demanding proof of such abilities. The question that often follows discussion of the opportunities computers offer health care tends to address the economic implications of purchasing such technology. Therefore, the subject of cost in regards to purchasing and managing a computerized system is an important consideration to discuss.

Economics

The discussion of implementing a computerized documentation system often comes to a halt when cost is calculated. There is no doubt that implementing such a system can be a costly endeavor. Computerized documentation should not be considered a technological supplement to an already existing system. Instead, a redesign of the financial, operational and/or clinical processes of a clinic or hospital should occur, thereby creating the possibility of a long-term cost decrease for the facility.³⁴

A physician clinic in Honesdale, PA reported that implementing computerized documentation was an expensive undertaking.³⁵ The system installed by the clinic cost \$60,000 initially, with \$3,000 monthly fees to maintain and upgrade the technology. Also, it required the hiring of a full time employee for data entry. Another long term cost included major hardware upgrades that occurred approximately every seven years for this specific clinic.

Computerized documentation has several benefits that indirectly decrease costs. For instance, linked information systems allow health information to be entered only once and shared across systems.²³ This type of system decreases the number of individuals necessary for data entry and keeps documentation time to a minimum. Linked systems also decrease data entry errors and the duplication of chart information which indirectly can effect cost.

Through preventative measures, a clinic can indirectly decrease the costs of care and possibly improve quality, as well as use the system as a marketing tool. For instance, the Honesdale clinic found that they were able to use their database to contact patients to remind them of the need for vaccinations.³⁵ The number of patients immunized doubled the next year. They were able to analyze the database for trends in effective treatment or diagnoses and were able to prevent more complicated diagnoses from developing. Another possible financial advantage currently being investigated within the Honesdale clinic is the possibility of decreased malpractice premiums secondary to having more complete, legible notes.³⁵

Another hospital implemented an automated system to monitor and remind staff of the appropriate use of prophylactic antibiotic administration for abdominal surgical patients.³⁶ The hospital found that the percentage of hospital-acquired infections decreased from 36 to 17 percent, and the inappropriate use of antibiotics decreased by \$60,000 annually.

Computer documentation can have a profound effect on reimbursement.³⁷ Appropriate reimbursement is directly related to the correct coding of procedures by the clinician. Unfortunately, physicians, business managers, and administrators admit to frequent under- and over-coding, approximately 20% and ten percent respectively, secondary to vague coding guidelines. Coding problems can result in distressing implications in regards to instant loss of income. Furthermore, reimbursement may be adjusted based on current profiles which reflect incorrect information due to poor coding, thereby affecting the clinic's future reimbursements.³⁷ Computerized documentation systems can theoretically eliminate these coding errors, as consistency and accuracy are achieved in reimbursement.

Through preventive and appropriate treatment and varied revenue increases secondary to billing improvements, it appears that the cost of a computer system could be recovered by savings as a result of computer systems use. Economic concerns of implementing computerized documentation are often coupled with concerns of confidentiality. Currently, there are laws protecting patients' *written* records. With the development of CPRs, new legal issues are being created regarding the viewing and manipulation of medical records.

Legal implications

The standard requirement of confidentiality which the health care system attempts to maintain in regard to patient records does not change once the records are computerized. Unfortunately, the legal liability increases with computer records due to the potential damage one individual could cause with access to a computerized documentation system.³⁸

Enforcement of confidentiality at the present is the responsibility of each state, resulting in inconsistencies. Medical records are oftentimes transmitted from state to state, which compromises the confidentiality system maintained by each state.³⁹ This inconsistency of enforcement, along with the introduction of computerized documentation, has lead to the discussion of the development of federal laws to regulate confidentiality of patient records. Federal regulation would override any state laws and therefore create consistency in maintaining confidentiality.³⁸ Two goals of federal regulation are to: 1) protect privacy and; 2) to allow access to medical information only in the interest of the patient, as well as for society.³⁹

Various ideas to maintain confidentiality include the assignment of passwords to control access to the system, electronic monitoring of who views each chart and what information the user is viewing, and the provision of 'read only' screens to prevent the possibility of authorized or unauthorized users altering the medical record.^{38,40} Other

possibilities include fingerprint or voiceprint recognition, limiting access to certain screens and tracking what screens the user is viewing.^{34,38}

It is important to note that computers are considered a tool in the health care field, and as with any tool, they can be used with good or bad intentions. However, with correct and thorough implementation of safeguards (i.e. passwords), a computerized chart is thought to be as safe, if not more so, than the standard paper chart.⁴⁰

Summary

Computerized documentation offers a variety of innovative ways to improve the quality of health care in all realms. The limited studies available establish basic support for the use of computers in the health care industry, yet do not focus on physical therapy specifically. Further, the literature is inconclusive in providing scientific support for the use of computerized documentation in all of the areas discussed. Therefore, the purpose of this study was, as mentioned earlier, two-fold: 1) to determine whether efficiency in a physical therapy setting increased as a result of the use of computerized documentation measuring three variables and 2) to determine perceived effectiveness of those who utilized the computerized documentation.

CHAPTER 3

METHODS

The effect computerized documentation had on efficiency in the physical therapy clinic was determined by timing three phases of documentation. The perception of staff utilizing computerized documentation was measured via satisfaction survey.

Subject Pool

In evaluating efficiency, the subject pool consisted of six licensed physical therapists. Four therapists were from HealthSouth Sports Medicine and Rehabilitation Center in Austin, TX and two were from HealthSouth at the Ballpark in Arlington, TX. The pre-test group in Austin, Group A, utilized the traditional style of documentation. The post-test group in Arlington, Group B, utilized the computer documentation system implemented by HealthSouth,* referred to as HPass. HPass is the computerized charting system recently implemented by HealthSouth. This system consists of hand-held, pen based computers that are battery operated and therefore, mobile. The documentation completed by therapists utilizing HPass is downloaded to a server located in Birmingham, Alabama. This server stores all documentation and will be used to derive outcome measures for outpatient HealthSouth clinics.

Data regarding staff perception of efficiency as well as effectiveness of computerized documentation was gathered via survey. (Appendix C) The staff of

* HealthSouth, One HealthSouth Parkway, Birmingham, AL, 35243

approximately five HealthSouth outpatient clinics in the Dallas/Ft. Worth area who were currently using the HPass system participated in the survey (n=28).

Instrumentation

To measure phases of efficiency, a stopwatch was used by the examiner to document each initial evaluation and the amount of time required to complete documentation of the initial evaluation. Time required to submit initial evaluation notes to the physician was documented by the clerical staff responsible for mailing/faxing evaluations to the referring doctor at the HealthSouth in Austin. Time for submission of notes at the HealthSouth in Arlington was documented per verbal verification once the PT had downloaded the evaluation. All of the times were recorded on a form as shown in the Figure.

Pt. Evaluation	Date of Evaluation	Beginning of Evaluation	End of Evaluation	End of Documentation	Note Submitted to Physician
1					
2					

<-----eval efficiency----->
 <-----note efficiency----->
 <----eff. of com. w/physician---->

Figure: Example of Data Collection Form

The survey tool utilized to measure perceived effectiveness and efficiency requested demographic data of those employees at HealthSouth who utilized HPass, including licensed (PT, PTA) and non-licensed (clerical staff) staff. Demographic questions included current position, length of time each employee had worked under that title, and length of time they had worked for HealthSouth. Data was then gathered to address the perceived benefits and effectiveness of the recently implemented computer system. Utilizing a five-point Likert scale from strongly disagree (1) to strongly agree (5), subjects were asked to

respond to five questions addressing training, quality of care, time spent on paperwork and outcome measures.

Procedure

Evaluations to be timed were chosen on the basis of patient diagnosis. Any patient with a knee or shoulder referral was introduced to the study by the coordinator. Participation was voluntary and required the patient to sign a consent form which described the investigation and those involved. (Appendix B) Consequently a convenience sample was established. Knee and shoulder complaints were chosen because these were the primary diagnoses seen at the clinics participating in the study.

The evaluation and documentation by each therapist was timed in three phases to address efficiency when performing the initial evaluation, completing the initial note and submitting the initial evaluation to the physician. The first phase was the initial evaluation. The timing began when the PT asked the patient the first question and ended when the physical therapist began discussing the patient's treatment plan.

The second phase was the completion of the initial note. Timing began at the end of the evaluation as defined above and ended when the PT had completed documentation of the initial evaluation. Ending time for the computerized documentation occurred when the evaluation had been completely entered into the system.

The third phase was the submission of the note to the physician. Timing began when the documentation had been completed or the notes had been completely entered into the computer system, and ended when the evaluation was submitted to the physician. For traditional documentation, the ending time was documented by the clerical staff responsible for mailing/faxing the evaluations. For the computerized documentation, ending time

occurred when the PT downloaded the evaluation note onto the server and the computer verified that it had been accepted. To measure the perceived effectiveness and efficiency, the survey tool was distributed and collected via fax to five HealthSouth outpatient clinics in the Dallas/Ft. Worth area.

Data Analysis

The independent variable in this study was efficiency. The dependent variable was type of documentation (traditional or computerized). Data collected were analyzed with unmatched, one tailed t-tests comparing traditional to computerized documentation in three areas:⁴¹

1. The time required to complete an initial evaluation = evaluation efficiency;
2. The time required to complete the initial evaluation notes = note efficiency;
3. The time required to submit initial evaluation notes to the physician = efficiency of communication with the physician.

The $p \leq .05$ level of significance was chosen for all data analyses measuring efficiency.

Perceived efficiency and effectiveness ratings were evaluated via frequency distribution.

CHAPTER 4

RESULTS

The results are reported in two sections. The first section addresses efficiency per time measurements of evaluation completion, note completion, and submission of the initial note to the physician. The second section addresses the perceived effectiveness of computerized documentation.

Efficiency

Demographics

The subjects varied greatly in age and years worked as a PT. Six PTs participated, three women and three men. Ages ranged from 27 to 54 years (mean = 36yrs) and years worked in the discipline ranged from six months to 32 years (mean = 11yrs). Forty-two knee or shoulder patients elected to participate in the study (21 knee evaluations and 21 shoulder evaluations).

Table 1 shows the mean time for each therapist on the three variables. Only one out of the six therapists differed significantly from the others on the length of time it took to complete an evaluation. (Table 2) This therapist utilized the computerized documentation system and required a longer time to complete an evaluation, on average, compared to the other subjects.

The mean traditional evaluation completion time was .246 hrs (SD = .072, Range = .141 to .381). The mean computer evaluation completion time was .283 hrs (SD = .082, Range = .132 to .444). Time between the two methods was not significantly different ($t = 1.55$). Therefore, there was no significant difference in the time it took to complete a knee or shoulder evaluation utilizing the two different methods of documentation.

Completion of the initial note utilizing the traditional method of documentation required a mean time of 1.7519 hrs. (SD = 1.830, Range = .206 to 3.583) and utilizing the computerized method, the mean time was 1.415 hrs. (SD = .937, Range = .244 to 6.607). (Table 3) The t-test indicated no significant difference ($t = .74$) in the time it took to complete the initial note using the two methods of documentation.

The mean time required to submit the note to the physician via the traditional method was 172.706 hrs (SD = 145.407, Range = 1.598 to 360) and using the computerized method was .027 hrs. (SD = .508, Range = .007 to .047). (Table 3) During data collection, the HealthSouth in Austin changed their method of submitting traditionally documented initial notes to the doctor. Of the evaluations used in this study from this clinic ($n = 20$), thirteen were submitted to the doctor utilizing a dictation method and seven were submitted via fax machine. HealthSouth found that the dictation service took too long (mean time = 262.154 hrs, SD = 93.190) and faxing was much more efficient (mean time = 6.588 hrs, SD = 7.462). (Table 3) When these two methods were compared, there was a significant difference found in the efficiency of faxing versus dictation ($t = 9.83, p \leq .05$). Secondary to the change in method of submission in the Austin clinic, it was important to compare the computer mean to both methods used in the traditional documentation system. A significant difference between the computer and dictation method was found ($t = -10.14, p \leq .05$), as well as between the computer and

faxing method ($t = -2.33, p \leq .05$) per an independent, two-tailed t-test. (Table 3)

Therefore, there was a significant difference identified between the computerized and traditional method times required to send documentation to the physician.

Perceived Effectiveness

Demographics

A total of 28 surveys were completed. Those who participated in the survey portion of this study held the following positions: 14 PTs, three Physical Therapist Assistants (PTAs), eight clerical staff, and three others holding various positions. These positions had been held by these individuals an average of five, three, three, and six years, respectively. Of those who completed the survey, 14 had worked for HealthSouth less than one year, three worked for HealthSouth for one to five years and eight worked for HealthSouth for more than ten years.

Results

The percentage of staff at HealthSouth who agreed or strongly agreed with the use of HPass is demonstrated in Table 4. Forty-six percent of those surveyed agreed that they were adequately trained. Thirty-two percent agreed the quality of care would improve upon implementation of computerized documentation, while only four percent strongly agreed. Fifty-two percent agreed and 28% strongly agreed that the use of computerized documentation to develop a database of outcome measures was valuable. Sixty-eight percent and 18% agreed and strongly agreed, respectively, that computerized documentation should continue to be integrated into the practice of physical therapy.

CHAPTER 5

CONCLUSION AND DISCUSSION

An unwavering theme in health care today revolves around quality documentation¹³ and the use of technology to further the advancement of the health care profession. A current trend, as demonstrated in the literature, is the search for more efficient means of documentation.^{22,24,28,42-45} Computerized documentation is theorized to decrease the time required to complete an evaluation or an initial note. The data in this study did not support this hypothesis, even though the therapists *perceived* a decrease in time spent on documentation. This perception could be due to two reasons: 1) time spent documenting daily and progress notes, which was not measured, is decreased with the use of computers, or 2) documentation is less cumbersome with computers and is therefore perceived as less work. Since perceptions are presumed to be intimately related to job satisfaction and motivation, further research is needed.

No research was identified demonstrating a decrease in documentation time in a physical therapy setting using computerized documentation. However, as mentioned previously, OR nurses found a 66% decrease in their documentation time.²⁸ In a physician-based clinic, documentation time was decreased by automatically transferring blood test results into the patient's chart via a Kodak chemistry analyzer.³⁵ It is not clear why documentation times in the current study were not significantly less with the use of a computerized system. Since the one therapist who took significantly longer to document

compared to the other five therapists utilized the computerized system, and since there were only two PTs in the computerized clinic, the results could have been biased. Also, the low number of subjects ($n=6$) and evaluations examined ($n=42$) could have affected the results, given the wide variability in documentation times in the clinical setting. Variables that could not be controlled included the time, day, week, number of PTs working that day, and number of distractions PTs attended to during data collection. Further studies should consider controlling as many of these variables as possible.

A significant decrease in communication time between primary and secondary health care providers as a result of computer use was demonstrated, however. Another unexpected important observation was the significant difference found between the delivery methods of faxing and computerized delivery of the note to the physician. Hard-copy faxing not via computer is an efficient method of delivery, yet computer delivery of the note was still significantly more efficient. Communication between primary and secondary health care providers is essential in coordinating patient care and providing continuity.⁴² Often, medical information is deserving of expedient delivery. Computerized documentation allows medical information to be sent immediately via e-mail systems which can be followed by a hard copy if the facility deems necessary.³⁷

This finding is consistent with previous studies of the effect of computerized documentation on communication. Branger et al⁴² compared traditional documentation versus electronic data exchange of lab reports and admissions/discharge reports between hospitals and general practitioners. Traditional documentation took two to four days for the practitioners to receive the admission/discharge reports compared to one hour with electronic communication. Errors in reported lab data diminished also. Manually recorded lab reports displayed nineteen errors (0-5%) in 3,635 reports, whereas 5,633 lab reports entered electronically revealed no errors.⁴²

Several important limitations with this study deserve discussion. Originally, it was the intention of the researcher to measure data from traditional and computerized documentation in the same clinic, thereby comparing the subjects against themselves. Secondary to delays in implementing the new system, computer data had to be collected at a different clinic utilizing the HPass system. Ideally, it would have been best to use the same group of therapists for both methods of documentation to eliminate any variability in the skills and abilities of the subjects. Control was maintained in the present study by measuring two clinics within the same health care corporation so that evaluation and documentation procedures were similar.

Secondly, the clinic utilizing the traditional method of documentation altered the system in which the note was submitted to the doctor in the middle of the study, thereby skewing the data. This change should not have come as a surprise in a health care system constantly searching for a more efficient means of operation. Although comparisons were made between all the methods of delivery and the outcomes were as expected, it would have been best to have a uniform system for the duration of the study. Also, the time required for the notes to be submitted to the physician was not measured by the examiner directly, as were the other times in the study. The clerical staff and clinicians verbally communicated this time to the examiner. It is possible that these times were estimated and may not represent real completion times, thereby decreasing accuracy of the data. A more reliable and scientific method of attaining these times would have been preferred such as an already established system within the facility that documented when the notes were mailed, faxed, or electronically submitted to the physician. This type of system could also provide a tracking system ensuring proper handling of medical records.

Finally, the clinical setting used in the study represented a specific patient population (orthopedic outpatient clinic). Therefore, results do not represent other

physical therapy settings and should not be generalized beyond the orthopedic physical therapy clinical setting.

Given the lack of objective measurements of computerized documentation and the obvious trend of utilizing such a method, computerized documentation deserves further research. Further research should be conducted in a variety of settings, and perceptions of the patient and the physician regarding effectiveness should also be examined. In addition, therapists should be compared against themselves to establish the most control in measurements of efficiency. Health care facilities considering computerized documentation should contemplate analyzing their traditional methods to allow a true comparison of data once computers are instituted.

The present study demonstrated statistically significant benefits of computerized documentation in regards to the submission of the initial evaluation note to the physician, only one of the three categories examined in this study. Due to the limited sample examined and the absence of scientific guidelines regarding the implementation of computerized documentation in the literature, further research is necessary to establish the optimal style and implementation of computerized documentation. Nevertheless, limited research has appeared promising for these documentation systems and technology within health care continues to evolve.⁴⁵ Authors who have implemented computers for documentation have offered suggestions in order to curtail challenges of facilities looking to do the same.^{7,8,23,34,46,47} These suggestions allow the possibility of a more successful implementation process, thereby creating the opportunity for overall success of the computer charting system. These guidelines include:

- Establish goals of the facility and purchase a computer software system designed to address those goals.⁷

- Consult with facilities who have purchased and implemented computer systems designed for documentation. Explore their system and have that facility identify the challenges they experienced when implementing their system.⁷
- Purchase a user-friendly system. The ease and speed of functions often determine user compliance and therefore the success of the system.⁴⁶
- Train system users and provide continuous technical and managerial support.⁸
- Design a computer system to capture data at point-of-care and in a method that decreases the overall workload.²³
- Purchase or have software designed that will adapt to a variety of settings (home health care, inpatient, outpatient).³⁴
- Purchase or design software to link to other information infrastructures allowing transmission of pertinent information to be accessed where and when needed.⁴⁷
- Develop a standard terminology that is accepted by the facility and users of system.⁷
- Purchase a system that is reliable, credible, and consistent in presentation of information and efficient in its functions.⁷

These guidelines are designed to limit the disharmony within a workplace secondary to the implementation of a computerized documentation system. Such discord can dramatically affect the computer system's success, regardless of its potential capabilities.

Utilizing computers for documentation offers many benefits besides improving efficiency. Computer programs allow clinics to report outcomes utilizing databases,²⁷ project costs for specific groups of patients, reduce errors or omission of patient information, automate chart auditing, and, although not demonstrated in this study, reduce time spent on documentation.²³ Efficiency, although important, is not necessarily the key to quality care. Perhaps research should focus on what computer technology offers in regard to providing care from a more holistic approach. Measuring outcomes and adjusting care based on the results of outcome studies have resulted in more holistic approaches and thus are worthy aims of computerized systems.²⁷

Table 1**Means and Standard Deviations for each Variable for each Therapist**

PT	Number evals completed	Avg. evaluation completion time (hrs)	Std. Dev.	Avg. Note Completion time (hrs)	Std. Dev.	Avg. Note Submission time (hrs)	Std. Dev
1 *	11	.335	.060	3.012	1.843	.030	.008
2 *	11	.231	.069	.492	.379	.025	.008
3	6	.233	.079	2.160	1.00	304.00	86.755
4	10	.262	.080	.987	.572	159.953	128.989
5	2	.225	.033	.927	.582	2.249	.935
6	2	.226	.065	1.802	1.577	13.041	14.084
Total / Avg.	42	.252		1.563		79.883	

*PTs utilizing computerized documentation

Table 2**Comparison of Means of Therapists' Time to Complete an Evaluation**

	PT 1	PT 2	PT 3	PT 4	PT 5	PT 6	t value
Evaluation completion							
	.3347	.2315					3.74*
	.3347		.2333				2.74*
	.3347			.2619			2.35*
	.3347				.2250		3.74*
	.3347					.2260	2.20*
		.2315	2.333				-.05
		.2315		.2619			-.93
		.2315			.2250		.21
		.2315				.2260	.11
			.2333	.2619			-.70
			.2333		.2250		.21
			.2333			.2260	.12
				.2619	.2250		1.08
				.2619		.2260	.68
					.2250	.2260	-.02

*significant at the $p \leq .05$ level

Table 3

Independent t-tests Comparing the Means of Traditional vs. Computerized Documentation and the Variety of Delivery Methods Utilized in Submission of Note to Physician

	Traditional Documentation (hrs)	Computer Documentation (hrs)	t values
Evaluation completion	.246	.283	1.55
Note completion	1.415	1.752	.74
Submission of note to physician	172.706	.0277	-5.26*
	Dictation Method		
	262.154	.0277	-10.14*
	Faxing Method		
	6.5884	.0277	-2.33*

*significant at the $p \leq .05$ level

Table 4
Means and Percentages of Computerized Documentation
Attitude Survey Questions

Question	% who Agreed	% who Strongly Agreed
Trained Adequately	46.4	7.1
Quality of care improved	32.0	4.0
Decreases time spent on paperwork	46.4	10.7
Outcome measures considered valuable	52.0	28.0
Computers should be integrated in PT	67.9	17.9

APPENDICES

Appendix A

DEFINITION OF TERMS

Communication Network: total network of devices and transmission media necessary to transmit and receive intelligence ⁹

Database: a nonredundant collection of interrelated data items processable by one or more applications ⁹

Efficiency: the act of completing a specific task in a timely manner ⁹

IBM PC-based: International Business Machines, Personal Computer Based ⁹

Interface: a shared boundary between system elements; defined by common physical interconnection, signals and meanings of interchanged signals ⁹

LAN: Local Area Network; a communications network capable of providing an intrafacility internal exchange of voice, computer data, word processing, facsimile, video conferencing, video broadcasting, telemetry and other forms of electronic messaging ⁹

Software: term used to contrast computer programs with the "iron" or hardware of a computer system ⁹

Size to performance ratio: Refers to the inverse relationship between the computer size and its functional ability. The current trend is a decrease in the size of computers as the functional ability of the computer increases, representing a smaller ratio.

Appendix B

Department of Physical Therapy School of Health Professions Southwest Texas State University

Consent Form

Efficiency in the Physical Therapy Clinic: Dictated vs. Computerized Documentation

You are invited to participate in a study investigating the differences between dictated and computerized documentation in physical therapy. I am a graduate student at Southwest Texas State University at San Marcos (SWT), Department of Physical Therapy. This study will assist me in completing my thesis in order to complete my program at SWT. I hope to establish that computerized documentation improves the efficiency of performing an initial evaluation, thereby decreasing the time in which the evaluation process takes place. You were selected as a possible participant in this study because you have a knee or shoulder referral. You are one of a possible 100 subjects chosen to participate in this study.

If you decide to participate, I will time your initial evaluation while your physical therapist performs it. There are no physical or mental risks involved with your participation. I will, however, be observing your evaluation. Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission.

Your decision whether or not to participate will not prejudice your future relations with Southwest Texas State University or HealthSouth Sports Medicine and Rehabilitation Center. If you decide to participate, you are free to discontinue participation at any time without prejudice.

If you have any questions, please ask me. If you have any additional questions later, I, Alison Barry at 512-396-7325 will be happy to answer them, or you can contact my supervisor, Dr. Janet Bezner at 512-245-8351.

You will be offered a copy of this form to keep.

You are making a decision whether or not to participate. Your signature indicates that you have read the information provided above and have decided to participate. You may withdraw at any time without prejudice after signing this form, should you choose to discontinue participation in this study.

Signature of Participant

Date

Signature of Investigator

Date

Appendix C

Computerized Documentation Attitude Survey

Personal Information

1. My position with HealthSouth is:
 Physical Therapist
 Physical Therapy Assistant
 Physical Therapy Technician
 Clerical Staff

2. I have worked in the above capacity for ____ years.

3. I have been employed by HealthSouth for:
 less than one year
 one to five years
 five to ten years
 over ten years

Use the following scale to indicate how much you agree or disagree with the following statements:

(1)	(2)	(3)	(4)	(5)
Strongly Disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

- ____ 1. I feel adequately trained to use the new computers.

- ____ 2. The quality of care in this clinic has or will improve as a direct or indirect result of the application of computerized documentation.

- ____ 3. Computerized documentation decreases the amount of time spent on paperwork as compared to handwritten documentation.

- ____4. I believe that the use of computerized documentation for the purpose of establishing an outcomes database is valuable.
- ____5 Computerized documentation should continue to be integrated into the practice of physical therapy.

Thank you for participating in this survey.

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VITA

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