

# **The Medical School Goes Paperless: Enhancing Access to Information for Improved Patient Care**

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This project consisted of surveying the clinical faculty and staff, medical students, and residents at the Capstone Medical Center and DCH Regional Medical Center in Tuscaloosa as a means to determine changes in their use of computers in patient care resulting from various improvements to the accessibility and availability of computer resources at the facility. In addition, the results of the survey were used to design a new collection of patient education and clinical reference resources available to all clinicians at the facility. This collection includes patient education handouts that can be easily printed and distributed to patients at the time of their visit, as well as resources such as electronic versions of popular medical reference books. Finally, in response to the growing popularity of Palm Pilots among the local residents and medical students and in order to help them use these devices effectively, the various PalmOS software tools available to healthcare professionals were researched.

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Through the Computer-Based Honors Program at The University of Alabama, I have worked on this research project for the past year and will continue to work on it for the next year. The purpose of this project has been to research and track the computer usage patterns among the clinical faculty and staff, medical students, and residents at Capstone Medical Center (CMC) and DCH Regional Medical Center (DCH) in Tuscaloosa as they care daily for patients. The computers at both centers have primarily been used for research, administration, communication, and education and testing of the medical students and family practice residents. The use of the computers has been gradually extended to direct utilization towards patient care as a result of the implementation of a series of improvements that has considerably improved the ability to use computers in direct patient care. The improvements include new and faster computers in the clinic areas, a new medical information system, and an electronic medical record system. To complete the tasks of

researching, tracking, and assessing computer usage, the clinical faculty and staff, medical students, and residents were surveyed before the improvements were implemented to determine the original patterns of computer usage in patient care. An identical follow-up survey was conducted a year later. The results of each survey were analyzed using Statistical Package for the Social Sciences (SPSS) software, and the data from the two surveys were compared.

The survey explored the use of computers in patient care among the clinical faculty and staff, medical students, and residents at the CMC and DCH. The survey form itself was a 1-page form that consisted of 7 questions. The survey consisted of some of the following questions:

- Do you use computers for patient care?
- How often do you use computers for patient care?
- Where do you use computers for patient care?

- What problems have you encountered using computers for patient care?

The first survey was distributed to 148 people in December 2000, after which 51 responses were received. It was then redistributed to all non-respondents in February 2002, at which point 30 additional responses were received. Thus, 81 of the 148 people who received the survey responded, which is a 54.7% response rate. The survey results indicate that 90.1% of the clinical faculty and staff, medical students, and residents use computers for patient care and that 9.9% do not. When the family practice residents, medical students, and nursing staff were compared as a group to the clinical faculty, 98.0% (49 out of 50) of the former and 75.9% (22 out of 29) of the latter indicated that they use computers for patient care, which is statistically significant ( $p=0.016$ ). Of those who do use computers for patient care, 78.1% (57 out of 73) stated that they use it several times a week or more. In addition, it was found that the group of individuals using the computers several times a week or more consisted primarily of the residents, medical students, and nursing staff rather than the clinical faculty. Among the residents, medical students, and nursing staff who indicated they use computers, 81.6% (40 out of 49) use the computer for patient care several times a week or more versus 68.2% (15 out of 22) for the clinical faculty.

Furthermore, the research results not only indicate that computers were used primarily in the clinic and hospital settings but also that the most frequent types of use were using resources such as *Harrison's Online*, *MD Consult*, *Visual Red Book*, and the *Physicians Desk Reference* (50 out of 81 = 61.7%) or to search the web for reference articles (48 out of 81 = 59.3%). This illustrates that utilization was predominantly limited to more research-oriented tasks such as using electronic versions of common medical reference books and searching the Internet for reference articles. According to the survey results, the computer was being used less often to search the web for practice guidelines and policy statements (32 out of 81 = 39.5%) or for patient education information (28 out of 81 = 34.6%). The survey results also show that the computer was being used less often to print patient-specific instructions for medical treatments

(25 out of 81 = 30.9%) or patient education information for distribution at the time of visit (21 out of 81 = 25.9%).

Moreover, the survey asked for suggestions for increased improvement of computers for patient care. Some of the most frequent responses included the following: a listing of useful web sites, faster computers, more access to computers in clinic areas, more access to Meditech, an electronic medical records system, and programs for the Personal Digital Assistants (PDA).

This first survey was conducted in 2000 to establish a baseline. Over the course of the following year, the suggestions from the first survey were considered and improvements were made. Additionally, several improvements were made to Capstone Medical Center's local computer network, including new and faster computers, a new server for the medical center's network, training sessions to assist medical personnel, improved access to certain software applications, and the completion of the residents' computer lab. A second round of surveying was conducted in 2002 to determine the effects of these changes and to establish a new baseline before the planned implementation of a new electronic medical records system and the completion of the new resources that were worked on as part of this project.

The second survey was first distributed in January 2002 to 151 possible respondents among the CMC clinical faculty, nursing staff, medical students, residents, and social work students. The survey was identical to the survey that was used for the first round of surveying. It was then redistributed to all non-respondents in February 2002. Of the 151 people who received the survey, 93 responded, which is a response rate of 61.6%. This represented an increase response rate.

As indicated by the survey results, 98.9% of the respondents indicated that they use computers for patient care. When the family practice residents, medical students, and nursing staff were compared as a group to the clinical faculty, 100.0% (64 out of 64) of the former and 96.0% (24 out of 25) of the latter indicated that they use computers for patient care, which is not a statistically significant difference. Of those who do use the computer for patient care, 89.1% (82 out of 92) use it several times a week or more. Moreover, the specific uses

of the computer in direct patient care were identical to the results from the first survey. In addition, some of the suggestions for improvement for the second survey were similar to suggestions from the first survey. Some of the most frequent responses included the following: the need for faster computers, confusion over passwords for online resources such as *MD Consult*, requests for useful Palm software, a lack of good computer resources specific to psychiatry, and requests for more computer training.

After the completion and analysis of both surveys, the responses from both surveys were compared to determine the effects of the improvements. The data showed a significant increase in the percentage of respondents who use computers for patient care from 2001 (90.1%) to 2002 (98.9%). Yet another significant discovery was the fact that more of the clinical faculty was using computers for patient care during 2002. Three-quarters (75.9%) of the clinical faculty used the computers for patient care in 2001 compared to 96% in 2002. Moreover, there was not a significant difference in usage of computers among the residents, nursing staff, and medical students between 2001 and 2002, but more of the residents and nursing staff began using computers for patient care several times a week or more during 2002 than during the previous year. In 2001, 70.4% of respondents used computers for patient care several times a week or more versus 89.1% in 2002. Furthermore, there was not a significant change in terms of where the computers were being used the most, except for the Capstone Clinic, where there was increase in usage from 65.4% in 2001 to 84.9% in 2002. Yet another significant finding was the increase in usage of computers to search the web for practice guidelines and policy statements in 2001 (34.5%) and 2002 (64.0%).

Some of the improvements that may have contributed to the increase usage of computers in patient care in 2002 resulted from this research project, whose aims included the creation of a server-based collection of resources, training sessions to assist in the use of these resources, and research of available medical PalmOs software. The

respondents indicated on the survey that they wanted a central place to find useful resources.

Consequently, the most useful and frequently used resources were collected and placed into one central location in a format that is familiar to people who are experienced with computers and easy-to-use for those who are not. This demand has led to the creation of two separate collections of resources under the headings of "Patient Education" and "Clinical References," which are available on web pages that are accessible only on the local server for the College of Community Health Sciences. The "Patient Education" section is a collection of patient education software from organizations such as the American Academy of Pediatrics (AAP) and the American Academy of Family Physicians (AAFP), handouts produced by the local Capstone faculty, and relevant and reliable web sites.

On the other hand, the "Clinical References" section is a collection of links to medical search engines, web sites of governmental agencies that pertain to the healthcare profession (such as the Center for Disease Control, Federal Drug Administration, and Alabama Department of Public Health), and online libraries, as well as access to electronic reference books and PDF versions of the most frequently used practice guidelines and policy statements. The local server includes the Capstone Clinic, some parts of DCH, resident and student computer labs, and faculty offices. The design is simple and aims at putting as few clicks as possible between the physician and the information he or she needs.

Another part of this project was to assist and train the clinical faculty, residents, and medical students on how to best use these new resources as well as several others introduced recently at the Capstone, with the ultimate goal being to educate them on how to use the computer as a tool to improve patient care. During these training sessions, the clinical faculty, residents, and medical students were also made aware of the numerous medical PalmOs applications that are available, including *PatientTracker*, *Epocrates*, *LexiDrugs*, *Griffith's 5-Minute Clinical Consult*, and numerous others.

As the clinical faculty and staff, medical students, and residents at CMC and DCH Regional Medical Center become familiar with numerous resources that have been made available to them and as they adapt to the electronic medical record system, I plan to continue with the third round of surveying, assist with making available additional resources, and train healthcare personnel. I am hoping that the physicians at the CMC and DCH will take advantage of the benefits of this system and that patient care has improved.

*This research project was conducted through The University of Alabama's Computer-Based Honors Program by Nabeel Memon and Brooke Taylor. Nabeel is a senior majoring in Biology from Tuscaloosa, AL. Brooke is a 2002 graduate from Tuscaloosa, AL and is currently attending The University of Alabama School of Medicine (UASOM). The project directors included Dr. Julia Hartman, a member of the Program for Rural Services and Research at The University of Alabama, and Dr. Michael Taylor, a pediatrics clinical physician at the Capstone Medical Center and associate professor at the College of Community Health Sciences at The University of Alabama*