

SI 622

Evaluation of Systems and Services

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1. Introduction

This report presents a statistical analysis of assessments of CareWeb – a web-based electronic medical record system. The assessments were conducted by the clinicians and clinical support staff at the University of Michigan Health System (UMHS) via an online survey fielded for a four day period beginning on February 26, 2007 and ending on March 2, 2007. The survey is part of an overall project to evaluate the functionality, usability, and aesthetics of the CareWeb System and thus, the survey questions were generally directed to this end (see Appendix A).

This document begins with a brief overview of CareWeb, a description of the target population for the survey, and the survey goals. Next, an overview of the methodology and the findings from the analyses are presented. Lastly, the conclusion summarizes the significant findings and the implications of these for the design of CareWeb. A total of 60 CareWeb users who review records completed the survey and their responses comprise the dataset for this report.

1.1. Overview of CareWeb

CareWeb is a web-interface to the Clinical Data Repository (CDR), which contains electronic medical records of patients. CareWeb pulls together almost “real-time” lab, radiology, registration, medical records, cardiology, neurology, and other data and makes these available to UMHS clinical personnel for the care of their patients. While CareWeb does not allow the modification of information drawn from the CDR and other sources, the system allows for information like doctors’ notes, immunization records and medication lists to be added to a patient’s record. It also provides a means to sign documents digitally to speed up the patient care process. The system is only available on the UMHS intranet and requires user and password logins from authorized personnel for access.

1.2. Target Population

The target population consists of approximately 14,000 CareWeb users at the UMHS who review patient records. Due to constraints imposed by the nature of clinical work we did not expect a survey response from everyone in the target population. To account for this, we designed and executed the survey in such a manner as to capture a sufficiently large input for statistical testing from the various kinds of CareWeb users. The general users of the system consist of registered nurses (in-patient, out-patient or both), nurse practitioners (in-patient, out-patient or both), attending physicians, resident physicians, social workers, medical students and research lab technicians.

1.3. Goals

Previous interviews with 6 users of CareWeb provided information about the usability and functionality of CareWeb, and especially how CareWeb fits into the workflow of these individuals. The goal of the survey is to expound on this information, while collecting additional information that would allow for statistical analysis of trends that could be of relevance to the improvement of the CareWeb system. Consequently, we set the following goals for our team:

- Verify initial interview data and improve upon personas and scenarios as necessary
- Evaluate correlations between CareWeb usage and job description
- Evaluate impact of prior computer literacy on perception of CareWeb
- Identify use of feature trends based on frequency of feature use
- Assess the perceived usefulness of CareWeb
- Assess the perceived usability of CareWeb
- Assess the perceived satisfaction with the aesthetic design of CareWeb

2. Methodology

2.1. Designing Questions

Our survey questions went through many drafts, both initially among team members and during our pilot. At first, we drafted questions in Word and team members iteratively added comments, questions, and modifications.

The survey questions were designed to fit under five general themes: User profile (including demographics and general computer usage), job description, CareWeb feature usage, CareWeb usability, and CareWeb usefulness. Appendix A presents the survey questions as administered to users online through Survey Monkey. Broadly, the questions were divided into the following categories.

1. User Profile

- Demographics
 - Age Range
 - Gender
 - UMHS Department
- Computer Usage Frequency
 - Checking email

- Using search engine
- Shopping online
- Installing programs on computer

2. Job description

- Inpatient workload per day
- Outpatient workload per day
- Patient Contact

3. CareWeb Feature Usage Frequency

- By Top Level Feature
- Documents
 - Creation
 - Templates
 - Review

4. CareWeb Usability

- I find it easy to add notes into CareWeb.
- I find it easy to locate the results I'm looking for in CareWeb.
- I find it easy to locate the notes I'm looking for in CareWeb.
- I find it easy to create documents in CareWeb.
- It is fast for me to log into CareWeb.
- The terms used in the system are appropriate.
- CareWeb is/was easy to learn.
- The "Help" document is helpful.

5. CareWeb Usefulness

- I know where to look for information in CareWeb.
- I know how to set preferences for MyCareWeb.
- Usefulness also rated by Top Level Feature

We decided to use the Likert Scale for all of the usability, usefulness, and satisfaction questions, with the exception of the usefulness section broken down by feature, which has the options “Not Useful,” “Neutral,” “Useful,” “I don’t use this feature,” and “Did not know this feature existed.”

SurveyMonkey.com had some features that enabled us to condense our survey into fewer questions, despite asking for a great deal of information from our participants. The matrix-type question helped us avoid overwhelming the user with the length of the survey. Thus, questions with similar structure (e.g. Likert scale questions) could be grouped together under one question number. Still, our questions barely fit under the 10-question limit imposed on the free version of the software, so we decided to upgrade to a premium version prior to piloting our survey to actual users.

2.2. Pilot and adjustment

We piloted our survey with one internal medicine physician and one outpatient nurse practitioner who is now a business process consultant with Medical Center Information Technology (MCIT). Based on their feedback, we noticed several issues with our questions as drafted.

We struggled with appropriate choices for the work structure questions. Because we are not clinicians or UMHS staff ourselves, we have not been exposed to the terminology and differences in hours of the “shifts” that they work. “Shifts” was not a generally applicable term either; in fact, the term differed between inpatient and outpatient clinicians, and among physicians, residents, and nurses. The increments of the “shifts” also varied. Furthermore, our questions were originally framed to assume that the type of patient contact was only face-to-face, when in fact many nurses and physicians interact with patients or patient caregivers on the phone and need to access CareWeb for such purposes.

Since job functions and the role of CareWeb in an individual’s workday varied so much, we initially did not provide enough “opt out” choices for survey participants. For example, we added the questions “Do you have a CareWeb account?” (#9) and “Do you use CareWeb to review patient records?” (#10) to distinguish between those who are account holders and those who are active users. Some UMHS employees receiving the survey do not see patients, so we had to take this into account. Likewise, we added the preliminary question, “What types of patients do you see?” with the choices “Outpatient only,” “Inpatient only,” and “Both,” based on feedback from the nurse that we should clarify which questions should be answered by whom. Survey Monkey Premium also enabled us to add logic to skip over the inpatient questions when applicable.

Other details caught in the pilot included providing two specific responses in place of “N/A” for the feature usefulness matrix question (#16). Also, some of the range options for some questions were not realistic (number of outpatient clinics in one month would never be thirty days or more). We also added an “Additional comments” section and demographic information such as age range and sex at this stage of the survey formation.

2.3. Recruiting

We thought that the best approach to recruiting would be to make some contacts at UMHS who would be willing to distribute the survey on our behalf. We had interviewed four clinicians and one social worker from the kidney transplant clinic, and one nurse from the rehabilitation clinic. We asked three of these contacts to distribute the survey to colleagues – Dr. Joseph Norman, Lee Rosenblum, and Joyce Gebrekristos. In addition, we utilized the Health Informatics Research Organization email list and asked UMHS staff who were students in Introduction to Health Informatics (HMP668/SI542), taught by Kai Zheng. These clinicians were Wendy Behnke, Stephanie Diccion-Macdonald, and Rhonda Schoville, who distributed the survey to about 100 colleagues who worked in inpatient and/or outpatient settings. Judith Lynch-Sauer, Director of Student Affairs at the nursing school, also sent the survey email to all students in the school. Loree Collett emailed those in various pediatric roles at Mott Hospital.

2.4. Survey Administration

Our group thought of administering the survey online as well as through a paper format that could be left in some staff rooms for CareWeb users to fill out at their leisure. However, coordination

and survey pickup proved to be more cumbersome, and we were approaching the number of respondents required for SI622. Therefore, email through various channels was simpler and would make results easier to tabulate.

Our target survey availability dates were February 21 to February 28; however, we released the survey February 24 and gave respondents until noon on March 1 to complete it.

The survey questions were designed to fit under five general themes: User profile (including demographics and computer usage), job description (including title, department, inpatient/outpatient caregiver, and patient contact), CareWeb feature usage, CareWeb usability, and CareWeb usefulness.

2.5. Data Cleaning

We closed the survey on March 1, with a total of 82 unique respondents. Of these, only 60 were CareWeb users who both completed the full questionnaire and were users reviewing patient records. We filtered out this set of users and exported these responses to Excel spreadsheets grouped by type of question (User Profile, Job Description, and CareWeb Data further broke down into more categories). Certain range values such as “3-5” or “6-8” were processed as dates in Excel, so these had to be converted back to the appropriate interval numbers.

For some of our questions, our predefined categories were limiting. In particular, the job title choices and frequency of feature usage questions had to be re-organized. For job title, some of our original choices mapped out to different categories that better fit our survey population.

Original Job Title Choice	Number of Respondents in Original Job Title Category	Cleaned Job Title Category
Attending physician	12	Physician
Resident physician	1	Physician
Inpatient and outpatient nurse	7	Inpatient and outpatient nurse
Inpatient nurse only	10	Inpatient nurse only
Outpatient nurse only	14	Outpatient nurse only
Social Worker	1	Other
Other (specify: “Nurse Practitioner or NP”)	11	Nurse Practitioner
Other	4	Other
Total	60	

Table 1. Original and cleaned-data job title categories of respondents in the analysis dataset.

We also left the respondents’ UMHS department an open-ended question, which provided considerable variation in the kinds of responses given. Some respondents indicated which ward

they were working at (e.g. 7B), which we had to look up to find out the kind of medicine being practiced (e.g. Internal Medicine). We ended up grouping the open-ended department responses into 14 categories: Anesthesiology, Family Medicine, Internal Medicine, Medical Center Information Technology, Medical School, OB/GYN, Other, Pediatrics, Pharmacy Services, Rehabilitation, Research, Surgery, Transplant Center, and Unknown.

In addition to category mapping, we had to ensure that those who answered “Inpatient only” or “Outpatient only” did not answer questions that did not apply to them. Early on during survey distribution, we made all questions required except those related to Inpatient and Outpatient work structure. Because of this, 4 respondents skipped questions applied to their work structure type, and others unintentionally answered questions that did not apply to them. We cleaned this data before analysis.

2.6. Data Analysis

Most of the survey questions were designed around categorical variables such as type of patients seen (inpatient vs. outpatient), frequency of feature usage, job title, general computer usage, and perception of system usefulness and usability, among others. For this reason we decided to use summary statistics and Chi-square tests for data analysis. The data were summarized, analyzed and grouped according to the five major themes we have been focusing on: User profile, job description, CareWeb feature usage, the perceived usability of CareWeb, and the perceived usefulness of CareWeb.

For the user profile (including demographics, UMHS department, and computer usage) and job description sections we primarily employed percentage summary statistics to describe the characteristics of the respondent population. These results were graphed in bar charts or pie charts to help visualize the findings.

In the CareWeb feature usage section, we were most interested in seeing if the usage of “Medical Documents,” “Create Documents,” “Lab Results Viewer,” “Problem Summary List,” and “MyCareWeb Preferences” would differ by the users’ job titles. In order to test for statistical significance, we ran 5 Chi-square tests, one for each of these features against the job titles of users. These features were particularly chosen for the Chi-square tests against job title for the following reasons: “Medical Documents,” “Create Documents,” and “Lab Results Viewer” are among the most important features of CareWeb for reviewing and working with patient information. They are features that should be imperative for clinicians and clinical support staff with various job descriptions. The “Problem Summary List” is a feature about which we observed many complaints during our initial interviews due to varying amounts of information entered by different users, as well as the varying levels of detail in which the information is entered. One of our interviewees had actually stated that physicians tend to disregard this feature since the amount of information and its detail varies considerably depending on the staff member who enters the data. The “MyCareWeb Preferences” feature allows for personalization of the interface by the user, and therefore we were interested in seeing whether users actually make use of it. The Chi-square test was chosen since both of the variables we’re interested in (job title and feature use) are categorical. The degrees of freedom were 10 in all tests ($[r-1][c-1]$, where r = different job titles = 6, and c = categories of usage frequency = 3). We chose “R” for data analysis since this package is available in the School of Information DIAD and we can potentially use it for further data analysis if we

would like to run more tests. However, since none of our group members are familiar with this software we received help from Lyrica Xiaohong Liu in exporting the data into “R” and coding the Chi-square tests.

In the analyses of the perceived usefulness and perceived usability of CareWeb, we realized that the data were heavily concentrated in or skewed towards particular categories. Therefore we took the approach of summarizing our findings by percentage summary statistics instead of running multiple Chi-square tests for each feature. We charted our findings to have visual representations to aid in our analysis and interpretation.

3. Findings

The survey questions were designed to fit under five general themes: User profile (including demographics and computer usage), job description, CareWeb feature usage, CareWeb usability, and CareWeb usefulness. The full range of survey questions as administered to the users online can be found in Appendix A. Out of the 84 total respondents to our survey, we limited our analysis dataset to the 60 who both hold CareWeb accounts and use CareWeb to review patient records. In this section we present our detailed findings.

3.1. User Profile

3.1.1. Demographic Information

The survey managed to capture data from CareWeb users from a variety of departments across the UMHS. Figure 1 shows the respondent profile by UMHS department. Since CareWeb is a hospital-wide system and the workflow may vary between departments, having different departments represented was a positive factor in reducing some bias that may arise from focusing on data from a single UMHS unit.

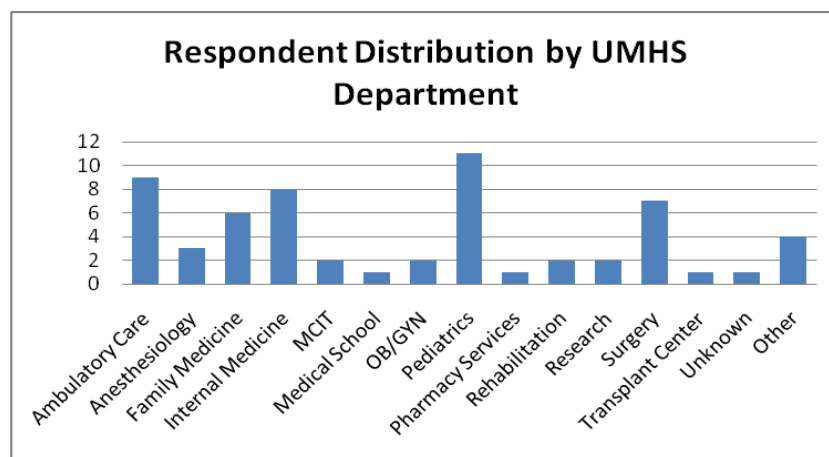


Figure 1. Frequency distribution of respondents by UMHS department.

The majority of our respondents were female (72%). This is likely due to the fact that many who participated in the survey were nurses; a profession that tends to be dominated by women.

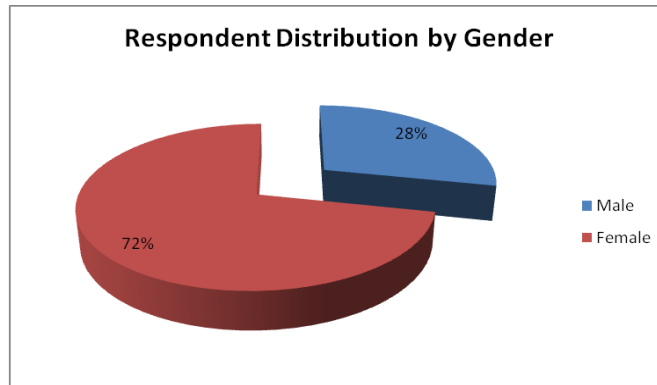


Figure 2. Percent distribution of respondents by gender.

Among our 60 respondents in the final dataset none were in the 18-25 age range. Figure 3 shows the percent distribution of respondents by age-range.

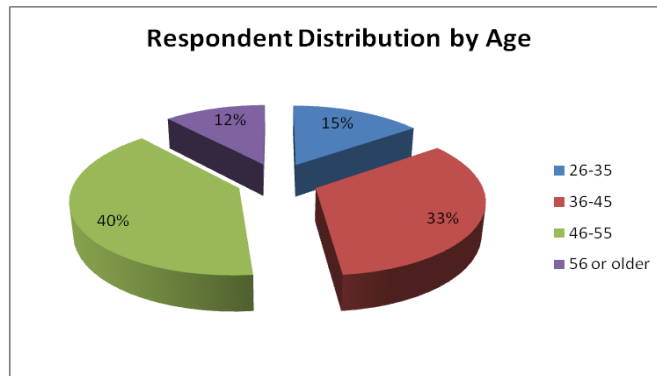


Figure 3. Percent distribution of respondent by age.

Our assessment of the participants’ general computer literacy was based on their frequency of e-mail use, search engine use, online shopping, and new program installation. Please see Appendix A for the questions on computer usage and the answer categories. The results show that the data are heavily skewed towards the “most frequent use” category for both e-mail (98%) and search engine use (77%), while data for online shopping seem to be more evenly distributed over the frequency of use categories, and the data for program installation are skewed towards the “less frequent” use categories (50% installed no programs, 30% installed 1-3 times). Shopping online may actually depend on user preference, and new program installation is a less common activity for general computer users. However, the high frequencies of use of both email and search engines suggest that computer usage within the population of respondents is by and large above average. Our respondents seem to be sufficiently computer-literate. In addition, just as most are likely to be familiar with their e-mail applications and popular search engines through frequent usage, they must also be more-or-less familiar with the CareWeb system through repeated usage.

3. 1. 2. Job Description

In our analyses we were interested in whether CareWeb usage, usefulness, and usability vary according to the job positions of the users. Since all clinicians and clinical support staff need to be

able to carry out their individual jobs as smoothly as possible to provide the best care for the patients, it is important for the hospital-wide electronic medical record system to be optimally supporting all caregivers and staff. If the system supports certain groups of users significantly less than others this might affect their workflow within the UMHS environment. In our initial interviews we had observed that there may be some discrepancies between the way the system is designed from an interface developer’s perspective and the needs of the hospital staff according to their overall workflow. Therefore, in our survey design and analysis we placed emphasis on the job descriptions of the respondents. In all, 13 physicians, 7 nurses who work both with inpatients and outpatients, 10 inpatient-only nurses, 14 outpatient-only nurses, and 11 nurse practitioners were included in our final dataset. In addition, we had 5 users who we placed in an “Other” category, who described their job positions as MCIT, pharmacy services, medical school, research, and transplant center. Figure 4 shows the distribution of CareWeb users in our analysis dataset by job description.

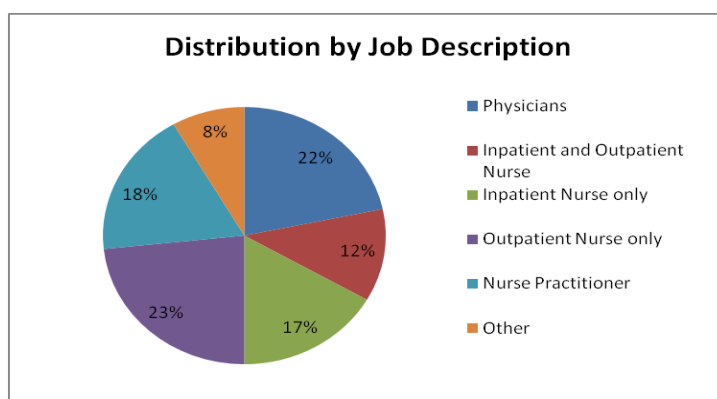


Figure 4. User Distribution by Job Description

3.2. Frequency of Usage by Feature

Our findings for daily system usage show that 90% of the respondents spend 15 minutes or less on average for reviewing a patient’s documents and results on CareWeb before visiting the patient (44% spend 5 minutes or less, 46% spend 5-15 minutes). Similarly, 88% spend 15 minutes or less reviewing a patient’s documents and results on the system after visiting the patient (48% spend 5 minutes or less, 40% spend 5-15 minutes).

According to the data on outpatient work structure, the majority (49%) of outpatient clinicians/clinical staff see 9 or more patients during one outpatient clinic. In addition, 32.7% receive 1-4 phone calls during one clinic that require outpatient record reviews or updates, 15.4% receive 5-8 calls, 5.8% receive 9-12 calls, and 25% receive 13 or more calls. Of the outpatient clinicians and staff, 58.5% participate in 6 or more clinics per month, with “16 or more” clinics being the mode value. These results indicate that the outpatient staff must be spending considerable time reviewing documents and results in CareWeb. Similar results were found for inpatient clinicians and clinical staff (data not presented). These findings are important since both paper records and the CareWeb system are available at the UMHS for reviewing recent patient information. The results suggest that account holders use the electronic medical record system considerably, probably both for previous and new data on a given patient. In more specific data, 57% of the respondents said that out of every 10 patients with whom they have contact, they

review the documents of 9 or 10 on CareWeb (this is also the mode value). Only 10% responded that they reviewed documents of 0-2 patients out of 10 patients with whom they come in contact.

One of the most interesting findings of usage was associated with the creation of outside document templates to add notes into CareWeb. From a total of 57 respondents to the question, 64.9% said they created their own templates outside of CareWeb. This issue had arisen in our initial interviews with users, some of whom said that adding notes into CareWeb was difficult due to a lack of common word-processing functions in the system. Our findings seem to support this observation.

Figure 5 shows the average number of times the respondents use different CareWeb features per workday, stratified by job title.

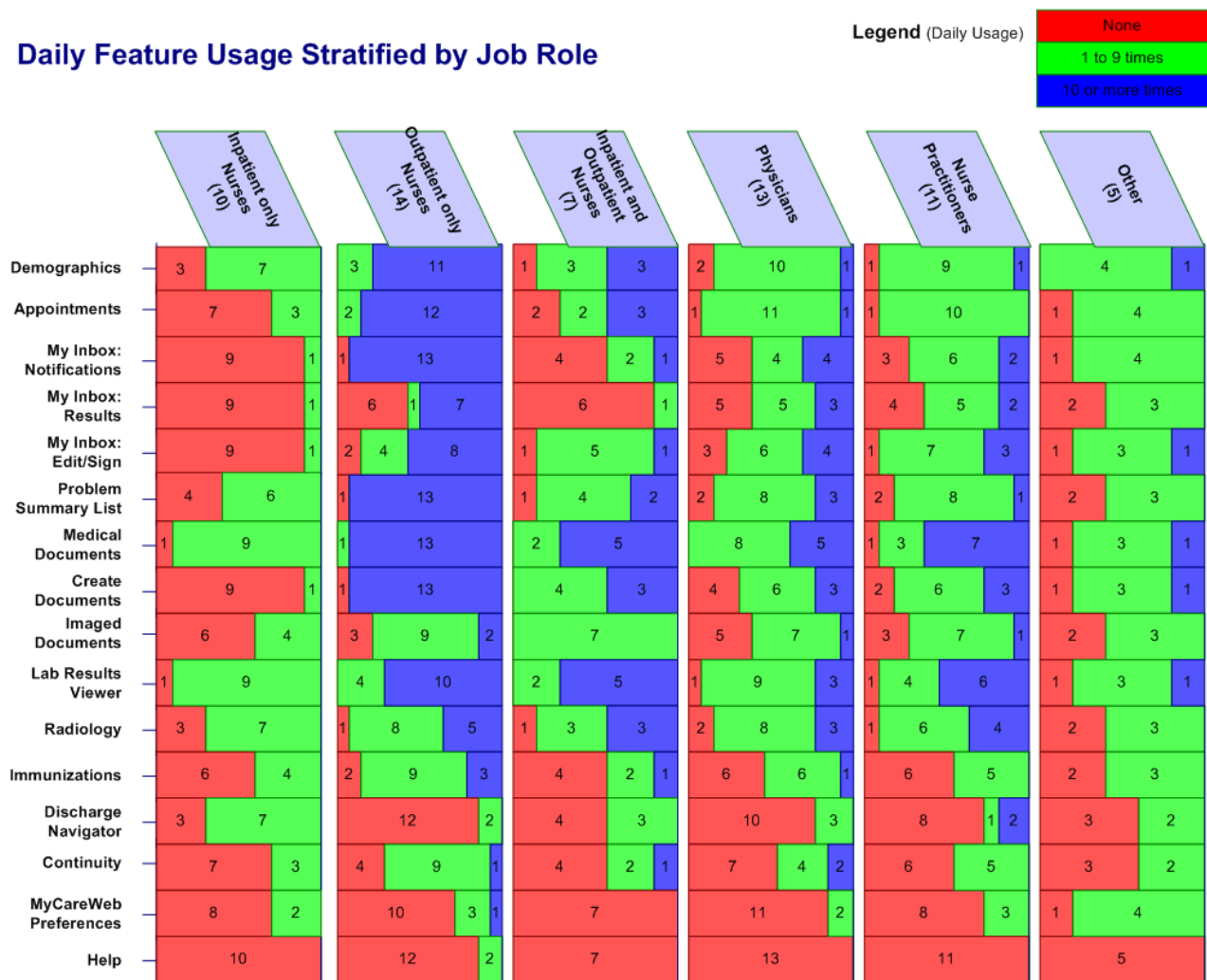


Figure 5. Users' usage of CareWeb features, stratified by job title

Table 2 presents the results of the five Chi-square tests performed in the statistical software package "R" to evaluate whether there is a significant association between job title and usage of

particular CareWeb features. The table shows the results by the CareWeb features tested; Medical documents, create documents, lab results view, problem summary, and MyCareWeb preferences.

	Medical Documents	Create Documents	Lab Results View	Problem Summary	MyCareWeb Preferences
Chi-square	28.404	45.16	20.082	36.95	19.527
p-value	0.001555	2.032* 10 ⁻⁶	0.02849	5.771*10 ⁻⁵	0.03406

Table 2. The results of the Chi-square tests for associations between job title and the usage of five CareWeb features.

According to the p-values of the Chi-square tests, there is a statistically significant association between the job title of users and each of the five CareWeb features tested; frequency of use differs statistically between different user groups. This is based on a test for significance by $p < 0.05$. Based on this criteria all p-values given above show statistical significance. Since the sample sizes in each job description category were relatively small we are not presenting Chi-square results for individual job title-to-job title comparisons for usage frequency. In fact sample size is a general concern with the Chi-square tests in our case. Since our sample size is relatively small ($n = 60$), some of the cells in the chi-square tables had too few entries. Therefore, the chi-square may not be the most powerful test to use under the circumstances. Our group consulted a statistician to address this concern, who said that the chi-square test in this case would work even though it may not be the best test to use. Using a larger sample size or perhaps a regression that allows multiple categories for both independent and dependent variables may be more advisable in further studies and data analysis.

3.3. Perceived Usability of CareWeb

To find out users' opinions about the usability of CareWeb, we designed questions that focused on the usability of the different features of the system. The responses to the questions were highly skewed towards the positive categories "Agree" and "Strongly Agree." Table 3 shows the data for the perceived usability of CareWeb by various system features. The numbers in bold show the mode values. We concluded that users of CareWeb generally agree that the system has good usability in terms of locating appropriate information and ease of feature usage.

Q8 - Please tell us your level of agreement with the following statements about CareWeb						(In percentage %)
Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
I find it easy to add notes into CareWeb.	6.7	5.0	23.3	35.0	30.0	
I find it easy to locate the results I'm looking for in CareWeb.	3.3	6.7	8.3	53.3	28.3	
I find it easy to locate the notes I'm looking for in CareWeb.	5.0	8.3	13.3	51.7	21.7	

I find it easy to create documents in CareWeb.	6.7	5.0	30.0	35.0	23.3
I know where to look for information in CareWeb.	1.7	0.0	15.0	55.0	28.3
I know how to set preferences for MyCareWeb.	16.7	13	12	15	10
It is fast for me to log into CareWeb.	1.7	3.3	8.3	50.0	36.7
The terms used in the system are appropriate.	0.0	1.7	11.7	63.3	23.3
I like the look (color layout etc) of the system.	0.0	6.7	20.0	50.0	23.3
CareWeb is/was easy to learn.	0.0	6.7	15.0	55.0	23.3
The "Help" document is helpful.	5.0	10.0	65.0	16.7	3.3
Overall I enjoy using CareWeb.	0.0	8.3	13.3	58.3	20.0
Total Respondents	60				

Table 3. Data for the perceived usability of CareWeb by various features.

3.4. Perceived Usefulness of CareWeb

To find out the overall satisfaction of users with the system, we designed questions for survey respondents to rate the usefulness of several features of CareWeb. The responses to these questions were concentrated mostly in the “Neutral” and “Agree” categories, with node values generally falling under “Neutral.” Therefore, we concluded that more information is needed from users in open-ended questions to find out how their satisfaction with individual features may be improved. It is interesting that the respondents’ opinions toward “MyCareWeb Preferences” show higher variance. The reason for the larger variance may be that many users don’t use or even don’t know about the feature (As shown in figure 6).

Question	Q9 - In your opinion how useful are the following features of CareWeb's patient record?					(In percentage %)
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Demographics	1.7	10.0	86.7	1.7	0.0	
Appointments	1.7	5.0	86.7	5.0	1.7	
My Inbox Notifications	5.0	10.0	61.7	20.0	3.3	
My Inbox Results	5.0	15.0	45.0	30.0	5.0	
My Inbox Edit/Sign	3.3	8.3	68.3	18.3	1.7	
Problem Summary List	5.0	15.0	78.3	1.7	0.0	
Medical Documents	0.0	5.0	91.7	3.3	0.0	
Create Documents	3.3	10.0	68.3	18.3	0.0	

Imaged Documents	3.3	13.3	76.7	6.7	0.0
Lab Results Viewer	1.7	6.7	15.0	55.0	23.3
Radiology	3.3	3.3	91.5	39.8	0.0
Immunizations	1.7	15.0	65.0	18.3	0.0
Discharge Navigator	3.3	21.7	40.0	33.3	1.7
Continuity	5.0	21.7	50.0	20.0	3.3
MyCareWeb Preferences	3.3	18.3	33.3	38.3	6.7
Help	1.7	28.8	25.4	39.0	5.1

Table 4. Data for the perceived usefulness of CareWeb by various features.

Figure 6 shows the average number of times the respondents use different CareWeb features per workday, stratified by job title.

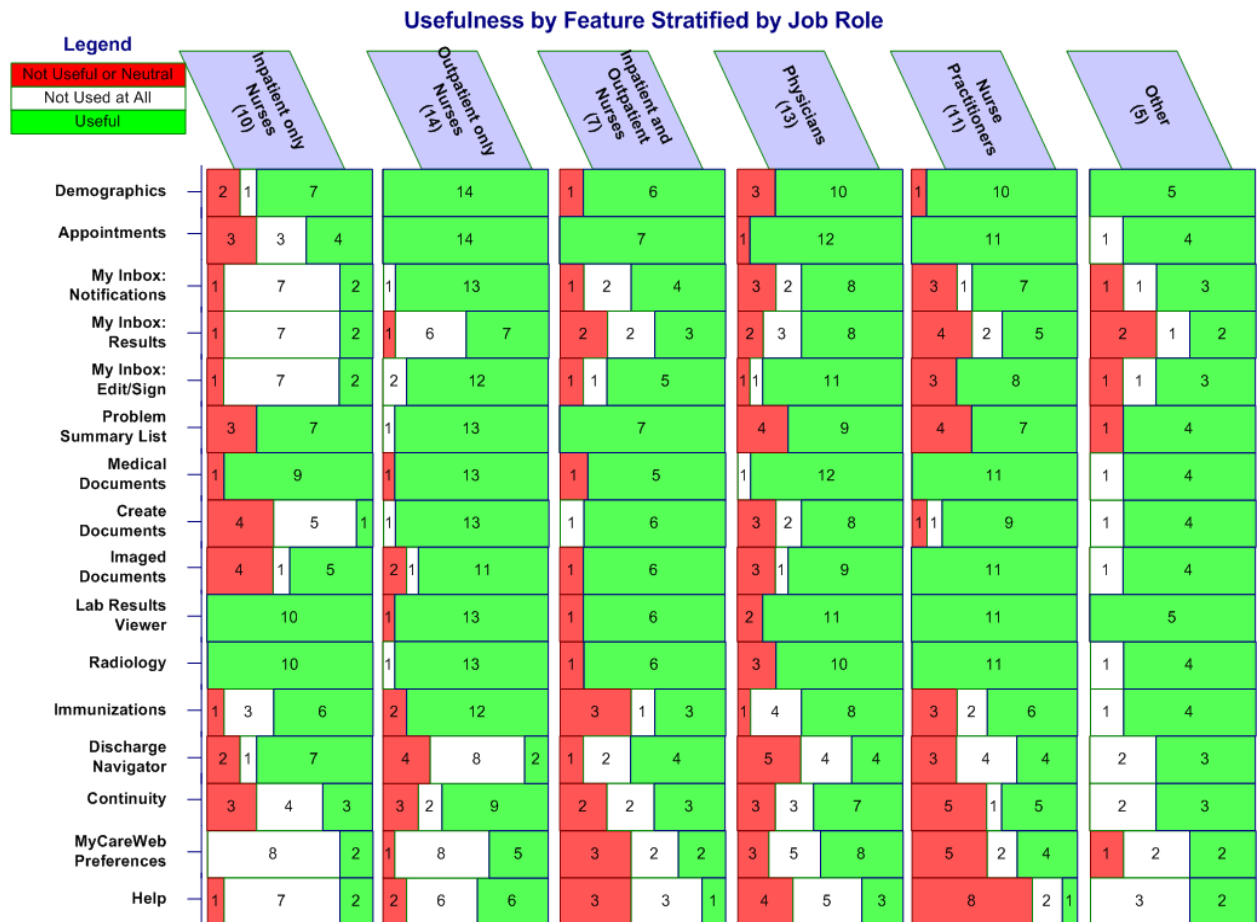


Figure 6. Users' satisfaction with the usefulness of CareWeb features, stratified by job title

4. Conclusions

We learned about the nature of survey methodology in general as well as in a specific and somewhat unfamiliar domain. Piloting and even executing our survey questions made us realize that we had made some assumptions about our target population, which we had previously profiled using clinicians and staff from the Kidney Transplant Clinic. In particular, we used ranges for many choices regarding system usage, feature usage, and work structure. Those ranges were an approximation of what we believed to be true, and sometimes led to skewed results. However, our heavy recruiting efforts in a broad variety of UMHS departments allowed us to capture a significant enough representation of each job description and respondents from at least 12 departments.

Despite our inexperience with the daily work structure of many types of clinicians and staff, we were able to combine ranges into categories of respondents and extract interesting findings stratified by job description. Ironically, our most skewed findings were the ranges we provided for general computer usage. Though our pilot caught many of the large issues, a more careful review process could have revealed even more interesting findings with regards to computer literacy and general usability and usefulness, which turned out to be high and positive, respectively.

Our key findings were strongly correlated by job description, for feature usage in particular. Though our sample size of each of the six individual job categories was relatively small (ranging from 5 to 14), we were fortunate to obtain statistically significant results. Further investigation into the workflow of each of the job roles would lead to feasible recommendations for an electronic medical record that is meant to be used generally by all clinicians and staff. Some departments use specialized systems, and inpatient nurses may prove to utilize paper or GE's Centricity over CareWeb. This may result in the Clinical Data Repository of CareWeb documents to be less than complete. Therefore, our findings that CareWeb feature usage frequency varies by job description has implications for designing features that optimize the workflow of job roles that both need the functionality and also find the feature usable in the context of their work.

Future investigations could also investigate a more granular range of usability and draw conclusions about how CareWeb affects a clinician or staff person's workflow in addition to how much its use is integrated into their job function.

5. REFERENCE

APPENDIX A SURVEY QUESTION GRID

The survey questions were designed to fit under five general themes: User profile, job description, CareWeb feature usage, CareWeb usability, and CareWeb usefulness. This section of the Appendix presents the full survey administered online through Survey Monkey in a grid format that includes the reasoning behind each question and the general theme under which each question fits.

Question	Instructions	Answers/Scale	Theme
What type of patients do you see?	Choose one	Out patient only In patient only Both	Job description
How many outpatient clinics of 4-hour half days do you participate in per month?	Choose one	None 1-5 6-10 10-15 16 or more	Job description
How many patients do you see in one outpatient clinic?	Choose one	0-2 3-5 6-8 9 or more	Job description
How many phone calls do you receive requiring outpatient record reviews or updates in one clinic?	Choose one	None 1-4 5-8 9-12 13 or more	Job description
How many inpatient days do you work per month? Please include one night "shift" as one inpatient day.	Choose one	None 1-5 6-10 10-15 16 or more	Job description
How many hours long is each inpatient day, on average?	Choose one	0-2 3-5 6-8 9 or more	Job description
How many patients do you see in one inpatient day?	Choose one	0-2 3-5 6-8 9 or more	Job description
How many phone calls do you receive requiring inpatient record reviews or updates in one inpatient day?	Choose one	None 1-4 5-8 9-12 13 or more	Job description
Do you have a Careweb account?	Choose one	Yes / No	Careweb feature usage
Do you review patient records with your CareWeb account?	Choose one	Yes / No	Careweb feature usage
On average, how much time do you spend with a new patient?	Choose one	5 min or less 5-15 min 15-30 min 30-45 min More than 45min	Careweb feature usage
On average, how much time do you spend with a previously seen patient?	Choose one	5 min or less 5-15 min 15-30 min 30-45 min	Careweb feature usage

		More than 45min	
On average, how much time do you spend reviewing a patient's documents and results on CareWeb before visiting the patient?	Choose one	5 min or less 5-15 min 15-30 min 30-45 min More than 45min	Careweb feature usage
On average, how much time do you spend reviewing a patient's documents and results on CareWeb after visiting the patient?	Choose one	5 min or less 5-15 min 15-30 min 30-45 min More than 45min	Careweb feature usage
For every ten patients you have contact with, how many do you review documents on CareWeb?	Choose one	0-2 3-5 6-8 9-10	Careweb feature usage
For every ten patients you have contact with, how many do you create documents on CareWeb?	Choose one	0-2 3-5 6-8 9-10	Careweb feature usage
I have my own template(s) to add notes into CareWeb.	Choose one	Yes / No	Careweb feature usage
Please record the average number of times you use the following CareWeb features per workday. <ul style="list-style-type: none"> - Demographics - Appointments - My Inbox notifications - My Inbox results - My Inbox edit/sign - Problem summary list - Medical documents - Create documents - Imaged Documents - Lab results viewer - Radiology - Immunizations - Discharge Navigator - Continuity - MyCareweb preferences - Help 	For each, choose one	None 1-3 times 3-5 times 5-7 times 7-10 times 10 or more times	Careweb feature usage
Please tell us your level of agreement with the following statements about CareWeb. <ul style="list-style-type: none"> - I find it easy to add notes into CareWeb - I find it easy to locate the results I'm looking for in CareWeb - I find it easy to locate the notes I'm looking for in CareWeb 	For each, choose one	Strongly Disagree Disagree Neutral Agree Strongly Agree	Careweb usability

<ul style="list-style-type: none"> - I find it easy to create documents in CareWeb - I know where to look for information in CareWeb - I know how to set preferences for MyCareWeb - It is fast for me to log into CareWeb - The terms used in the system are appropriate - I like the look (color, layout, etc) of the system - CareWeb is/was easy to learn - The "Help" document is helpful - Overall, I enjoy using CareWeb 			
<p>In your opinion, how useful are the following features of CareWeb's patient record?</p> <ul style="list-style-type: none"> - Demographics - Appointments - My Inbox notifications - My Inbox results - My Inbox edit/sign - Problem summary list - Medical documents - Create documents - Imaged Documents - Lab results viewer - Radiology - Immunizations - Discharge Navigator - Continuity - MyCareweb preferences - Help 	For each, choose one	Not useful Neutral Useful I don't use this feature Did not know this feature existed	Careweb usefulness
Please indicate the job title that best describes your current position at the UM Hospital	Choose one	Attending physician Resident physician Inpatient and outpatient nurse Outpatient nurse only Social worker Other	User profile
Please enter your current	Department name	Free text	User profile

department within the UMHS			
Please indicate your age group	Choose one	18-25 26-35 36-45 46-55 56-older	User profile
Please indicate your gender	Choose one	Male / Female	User profile
Computer Usage <ul style="list-style-type: none"> - How many times in the last 7 days have you checked your email? - How many times in the last 10 days have you searched for information through the search engine? (such as Google, MSN, Yahoo! etc.) - How many times in the last 90 days have you shopped online? - How many times in the last 90 days have you installed programs on your computer? 	Choose one	None 1-3 times 3-5 times Over 5 times	User profile
Please enter any additional comments that you have regarding CareWeb		Free text	General

Appendix B: Cleaned Data

Raw and cleaned data available in spreadsheet and summary format upon request.

See next pages for cleaned data.

RespondentID	StartDate	EndDate	IP Address	What type of patients do you see? If Response	How many outpatient clinics of 4- Response	How many patients do you see in one Response	How many phone calls do you receive Response	How many inpatient days do you work Response	How many hours long is each inpatient Response	How many patients do you see in one Response	How many phone calls do you receive Response	Do you have a CareWeb account? Response	Do you review patient records with Response	Average Daily System Usage	On average, how long does it take to review a patient's record? Response
378628205	2007/2/27 17:11	2007/2/27 17:30	199.72.180.90	Outpatient only	16 or More	0-2	13 or more					Yes	Yes	5-15 minutes	5-15 minutes
379761650	2007/2/28 05:19	2007/2/28 05:29	141.214.17.5	Outpatient only	16 or More	9 or more	13 or more					Yes	Yes	5 minutes or less	5-15 minutes
380049670	2007/2/28 10:00	2007/2/28 10:07	141.214.17.5	Both	6 to 10	9 or more	13 or more					Yes	Yes	15-30 minutes	15-30 minutes
381552519	2007/3/2 06:38	2007/3/2 06:46	141.214.17.5	Inpatient only				16 or More	9 or More	9 or more	9-12	Yes	Yes	15-30 minutes	15-30 minutes
379759986	2007/2/28 05:18	2007/2/28 05:22	141.214.17.5	Both	1 to 5	9 or more	1-4	None	0 to 4	0-2	None	Yes	Yes	15-30 minutes	5-15 minutes
379905536	2007/2/28 07:31	2007/2/28 07:39	141.214.17.5	Both	1 to 5	9 or more	5-8	1 to 5	0 to 4	3-5	1-4	Yes	Yes	5-15 minutes	5-15 minutes
380085243	2007/2/28 11:06	2007/2/28 11:21	141.214.17.5	Both	1 to 5	0-2	1-4	10 to 15	9 or More	9 or more	9-12	Yes	Yes	More than 45 minutes	15-30 minutes
380086338	2007/2/28 11:08	2007/2/28 11:17	141.214.17.5	Inpatient only				16 or More	9 or More	6-8		Yes	Yes	5 minutes or less	5 minutes or less
379914995	2007/2/28 07:39	2007/2/28 07:47	141.214.17.5	Inpatient only	None	0-2	None	16 or More	9 or More	3-5	1-4	Yes	Yes	More than 45 minutes	30-45 minutes
378227657	2007/2/27 09:55	2007/2/27 09:58	141.214.17.5	Outpatient only		0-2	None					Yes	Yes	5 minutes or less	5 minutes or less
378205622	2007/2/27 09:18	2007/2/27 09:23	141.214.17.5	Inpatient only	None	0-2	None	16 or More	7 to 8	3-5	1-4	Yes	Yes	More than 45 minutes	30-45 minutes
378315556	2007/2/27 12:34	2007/2/27 12:43	141.214.17.5	Inpatient only						3-5	None	Yes	Yes	More than 45 minutes	More than 45 minutes
378179164	2007/2/27 08:46	2007/2/27 08:54	141.214.17.5	Inpatient only	None			16 or More	9 or More	3-5	None	Yes	Yes	5-15 minutes	5-15 minutes
378256582	2007/2/27 10:44	2007/2/27 10:49	141.214.17.17	Inpatient only				16 or More	9 or More	0-2	None	Yes	Yes	5 minutes or less	5 minutes or less
379712003	2007/2/28 04:29	2007/2/28 04:38	141.214.17.5	Both	None	0-2	None	16 or More	7 to 8	3-5	None	Yes	Yes	5 minutes or less	5 minutes or less
380205379	2007/2/28 14:13	2007/2/28 14:28	75.45.195.196	Inpatient only	None	0-2	None	6 to 10	7 to 8	3-5	1-4	Yes	Yes	More than 45 minutes	More than 45 minutes
380905062	2007/3/1 13:00	2007/3/1 13:10	141.214.17.5	Inpatient only	None			16 or More	7 to 8	3-5	None	Yes	Yes	5-15 minutes	5 minutes or less
380180753	2007/2/28 13:28	2007/2/28 13:34	70.233.2.39	Outpatient only	1 to 5	6-8	1-4					Yes	Yes	15-30 minutes	15-30 minutes
378397417	2007/2/27 14:41	2007/2/27 14:46	68.40.14.170	Outpatient only	10 to 15	6-8	5-8					Yes	Yes	30-45 minutes	15-30 minutes
380049686	2007/2/28 10:00	2007/2/28 10:07	141.214.17.5	Outpatient only	10 to 15	6-8	1-4					Yes	Yes	More than 45 minutes	15-30 minutes
378677151	2007/2/27 17:41	2007/2/27 17:47	68.40.243.219	Outpatient only	16 or More	9 or more	1-4					Yes	Yes	15-30 minutes	15-30 minutes
378732807	2007/2/27 18:12	2007/2/27 18:18	141.214.17.5	Inpatient only				16 or More	9 or More	0-2	None	Yes	Yes	15-30 minutes	5 minutes or less
379663056	2007/2/28 03:35	2007/2/28 03:43	141.214.17.5	Both	1 to 5	0-2	1-4	1 to 5	9 or More	9 or more	13 or more	Yes	Yes	30-45 minutes	15-30 minutes
381466059	2007/3/2 04:51	2007/3/2 04:57	141.214.17.5	Both	1 to 5	6-8	1-4	1 to 5	7 to 8	6-8	1-4	Yes	Yes	More than 45 minutes	30-45 minutes
379811061	2007/2/28 05:58	2007/2/28 06:03	141.214.17.5	Outpatient only	10 to 15	9 or more	None					Yes	Yes	30-45 minutes	15-30 minutes
379773640	2007/2/28 05:29	2007/2/28 05:34	71.171.208.65	Both	None	0-2	1-4	10 to 15	9 or More	6-8	None	Yes	Yes	15-30 minutes	5-15 minutes
379668573	2007/2/28 03:40	2007/2/28 03:49	141.214.17.5	Both	1 to 5	6-8	5-8	16 or More	9 or More	9 or more	5-8	Yes	Yes	30-45 minutes	30-45 minutes
380045711	2007/2/28 09:53	2007/2/28 10:00	141.214.17.5	Outpatient only	10 to 15	9 or more	None					Yes	Yes	30-45 minutes	5-15 minutes
374101403	2007/2/22 08:35	2007/2/27 13:54	141.214.17.5	Outpatient only	None							Yes	Yes	30-45 minutes	5-15 minutes
379735031	2007/2/28 04:54	2007/2/28 05:01	68.43.197.15	Both	1 to 5	3-5	1-4	10 to 15	7 to 8	3-5	1-4	Yes	Yes	15-30 minutes	5-15 minutes
378176011	2007/2/27 08:43	2007/2/27 08:49	141.214.17.5	Inpatient only				1 to 5	9 or More	9 or more	1-4	Yes	Yes	5-15 minutes	5-15 minutes
380161094	2007/2/28 13:04	2007/2/28 13:16	141.214.17.5	Both	10 to 15	3-5	None	1 to 5	7 to 8	3-5	None	Yes	Yes	5 minutes or less	5 minutes or less
377482658	2007/2/26 07:51	2007/2/26 07:56	141.214.17.5	Both	1 to 5	3-5	None					Yes	Yes	30-45 minutes	5-15 minutes
378905675	2007/2/27 19:47	2007/2/27 20:00	75.46.49.124	Outpatient only	16 or More	0-2	13 or more					Yes	Yes	5-15 minutes	5-15 minutes
378395856	2007/2/27 14:40	2007/2/27 14:50	141.214.17.5	Outpatient only	16 or More	9 or more	13 or more					Yes	Yes	5-15 minutes	5-15 minutes
379872116	2007/2/28 06:55	2007/2/28 07:01	141.214.17.5	Outpatient only	16 or More	3-5	1-4					Yes	Yes	15-30 minutes	5-15 minutes
380050051	2007/2/28 10:01	2007/2/28 10:16	71.10.60.74	Outpatient only	6 to 10	9 or more	9-12					Yes	Yes	5 minutes or less	5 minutes or less
378360669	2007/2/27 13:58	2007/2/27 14:05	141.214.17.5	Outpatient only	6 to 10	9 or more	13 or more					Yes	Yes	5-15 minutes	5-15 minutes
378620409	2007/2/27 17:06	2007/2/27 17:12	141.214.17.5	Outpatient only	None	0-2	13 or more					Yes	Yes	15-30 minutes	5-15 minutes
380232718	2007/2/28 15:10	2007/2/28 15:17	141.214.17.5	Outpatient only	16 or More	3-5	9-12					Yes	Yes	5-15 minutes	5-15 minutes
380790021	2007/3/1 09:53	2007/3/1 10:04	141.214.17.5	Outpatient only	16 or More	3-5	9-12					Yes	Yes	More than 45 minutes	30-45 minutes
379707092	2007/2/28 04:23	2007/2/28 04:30	141.214.17.5	Outpatient only	6 to 10	0-2	13 or more					Yes	Yes	5 minutes or less	5-15 minutes
378359896	2007/2/27 13:56	2007/2/27 14:03	141.214.17.5	Outpatient only	16 or More	9 or more	13 or more					Yes	Yes	15-30 minutes	5-15 minutes
378618078	2007/2/27 17:05	2007/2/27 17:11	75.45.81.130	Outpatient only	16 or More	9 or more	13 or more					Yes	Yes	5-15 minutes	5-15 minutes
378361323	2007/2/27 13:59	2007/2/27 14:07	141.214.17.5	Outpatient only	6 to 10	6-8	13 or more					Yes	Yes	15-30 minutes	5-15 minutes
380646006	2007/3/1 06:31	2007/3/1 06:38	141.214.17.5	Outpatient only	16 or More	9 or more	1-4					Yes	Yes	5-15 minutes	15-30 minutes
379717174	2007/2/28 04:35	2007/2/28 04:43	141.214.17.5	Outpatient only	10 to 15	9 or more	13 or more					Yes	Yes	5-15 minutes	5-15 minutes
376438382	2007/2/24 14:58	2007/2/24 15:02	68.188.187.245	Both	6 to 10	9 or more	1-4					Yes	Yes	15-30 minutes	5-15 minutes
380327709	2007/2/28 19:33	2007/2/28 20:00	66.93.0.101	Both	None	0-2	1-4	16 or More	9 or More	9 or more	1-4	Yes	Yes	5-15 minutes	5-15 minutes
378327436	2007/2/27 12:57	2007/2/27 13:02	68.85.177.135	Both	1 to 5	9 or more	5-8	16 or More	9 or More	3-5	1-4	Yes	Yes	More than 45 minutes	30-45 minutes
381645864	2007/3/2 08:33	2007/3/2 08:40	141.214.17.5	Both	16 or More	9 or more	5-8	1 to 5	9 or More	3-5	1-4	Yes	Yes	15-30 minutes	5-15 minutes
378361265	2007/2/27 13:59	2007/2/27 14:05	68.40.187.140	Outpatient only	16 or More	9 or more	5-8					Yes	Yes	30-45 minutes	5-15 minutes
381124001	2007/3/1 19:00	2007/3/1 19:05	68.40.180.108	Outpatient only	16 or More	9 or more	13 or more					Yes	Yes	15-30 minutes	15-30 minutes
376831457	2007/2/25 11:55	2007/2/25 12:00	68.41.170.55	Outpatient only	1 to 5	9 or more	5-8					Yes	Yes	15-30 minutes	5-15 minutes
378384398	2007/2/27 14:30	2007/2/27 14:34	141.214.17.5	Both	16 or More	9 or more	1-4	1 to 5	0 to 4	0-2	None	Yes	Yes	30-45 minutes	15-30 minutes
380141462	2007/2/28 12:41	2007/2/28 12:51	141.214.17.5	Both	10 to 15	9 or more	1-4	1 to 5	7 to 8	9 or more	1-4	Yes	Yes	30-45 minutes	15-30 minutes
377054610	2007/2/25 19:45	2007/2/25 19:51	68.40.42.12	Outpatient only	6 to 10	9 or more	1-4					Yes	Yes	15-30 minutes	5-15 minutes
378209192	2007/2/27 09:24	2007/2/27 09:28	68.40.177.143	Inpatient only	None	0-2	None	16 or More	7 to 8	9 or more	1-4	Yes	Yes	30-45 minutes	15-30 minutes
378171648	2007/2/27 08:38	2007/2/27 08:46	141.214.17.5	Both	6 to 10	9 or more	5-8	6 to 10	9 or More	9 or more	13 or more	Yes	Yes	15-30 minutes	5-15 minutes
378178496	2007/2/27 08:45	2007/2/27 08:51	141.214.17.5	Both	16 or More	9 or more	1-4	16 or More	9 or More	6-8	1-4	Yes	Yes	30-45 minutes	5-15 minutes

Document Usage in CareWeb I have my own Please record the average number of times you use the following CareWeb features per workday.

On average, ho	On average, ho	For every ten p	For every ten p	Response	Demographics	Appointments	My Inbox Noti	My Inbox Resu	My Inbox Edu	Problem Sumr	Medical Docur	Create Docume	Imaged Docur	Lab Results Vi	Radiology
5-15 minutes	5-15 minutes	10-Sep	10-Sep	Yes	10 or more tim	10 or more tim	10 or more tim	None	1 to 3 times	10 or more tim	10 or more tim	10 or more tim	1 to 3 times	10 or more tim	10 or more tim
5-15 minutes	5-15 minutes	10-Sep	10-Sep	No	10 or more tim	10 or more tim	None	None	10 or more tim	10 or more tim	10 or more tim	10 or more tim	1 to 3 times	10 or more tim	10 or more tim
5 minutes or le	5 minutes or le	5-Mar	0-2	No	None	None	None	None	1 to 3 times	3 to 5 times	7 to 10 times	1 to 3 times	3 to 5 times	3 to 5 times	None
15-30 minutes	15-30 minutes	8-Jun	0-2	No	3 to 5 times	None	None	None	None	None	5 to 7 times	5 to 7 times	3 to 5 times	3 to 5 times	1 to 3 times
5-15 minutes	15-30 minutes	10-Sep	0-2	Yes	3 to 5 times	3 to 5 times	1 to 3 times	None	1 to 3 times	5 to 7 times	10 or more tim	1 to 3 times	3 to 5 times	10 or more tim	7 to 10 times
5-15 minutes	5-15 minutes	8-Jun	5-Mar	Yes	7 to 10 times	7 to 10 times	None	None	1 to 3 times	7 to 10 times	10 or more tim	1 to 3 times	3 to 5 times	10 or more tim	7 to 10 times
30-45 minutes	30-45 minutes	10-Sep	8-Jun	Yes	10 or more tim	10 or more tim	7 to 10 times	7 to 10 times	7 to 10 times	1 to 3 times	10 or more tim	10 or more tim	1 to 3 times	10 or more tim	10 or more tim
5 minutes or le	5 minutes or le	0-2	0-2	No	1 to 3 times	None	None	None	None	1 to 3 times	1 to 3 times	None	None	1 to 3 times	None
15-30 minutes	5-15 minutes	8-Jun	0-2	No	1 to 3 times	None	None	None	None	3 to 5 times	3 to 5 times	None	1 to 3 times	3 to 5 times	1 to 3 times
5 minutes or le	5 minutes or le	0-2	0-2	Yes	None	None	None	None	None	None	None	None	None	None	None
5 minutes or le	5-15 minutes	5-Mar	0-2	No	None	None	None	None	None	None	1 to 3 times	None	None	5 to 7 times	1 to 3 times
15-30 minutes	15-30 minutes	10-Sep	0-2	No	3 to 5 times	1 to 3 times	None	None	None	3 to 5 times	3 to 5 times	None	1 to 3 times	5 to 7 times	5 to 7 times
5 minutes or le	5 minutes or le	5-Mar	0-2	No	1 to 3 times	None	None	None	None	None	3 to 5 times	None	None	3 to 5 times	None
5 minutes or le	5 minutes or le	5-Mar	0-2	No	1 to 3 times	1 to 3 times	None	None	None	None	5 to 7 times	None	3 to 5 times	7 to 10 times	5 to 7 times
5 minutes or le	5-15 minutes	10-Sep	0-2	No	None	None	None	None	None	1 to 3 times	1 to 3 times	None	1 to 3 times	1 to 3 times	1 to 3 times
5-15 minutes	5-15 minutes	5-Mar	0-2	Yes	1 to 3 times	1 to 3 times	1 to 3 times	1 to 3 times	1 to 3 times	3 to 5 times	3 to 5 times	None	None	3 to 5 times	1 to 3 times
5-15 minutes	5 minutes or le	10-Sep	0-2	No	1 to 3 times	None	None	None	None	1 to 3 times	3 to 5 times	1 to 3 times	None	3 to 5 times	1 to 3 times
5-15 minutes	5-15 minutes	10-Sep	5-Mar	Yes	3 to 5 times	5 to 7 times	10 or more tim	10 or more tim	10 or more tim	5 to 7 times	10 or more tim	3 to 5 times	1 to 3 times	7 to 10 times	5 to 7 times
5 minutes or le	5-15 minutes	10-Sep	10-Sep	Yes	3 to 5 times	3 to 5 times	7 to 10 times	None	5 to 7 times	5 to 7 times	5 to 7 times	3 to 5 times	None	5 to 7 times	3 to 5 times
5-15 minutes	5-15 minutes	10-Sep	8-Jun	Yes	5 to 7 times	5 to 7 times	3 to 5 times	1 to 3 times	1 to 3 times	10 or more tim	10 or more tim	3 to 5 times	1 to 3 times	10 or more tim	7 to 10 times
5 minutes or le	5 minutes or le	10-Sep	10-Sep	No	7 to 10 times	1 to 3 times	3 to 5 times	1 to 3 times	1 to 3 times	7 to 10 times	7 to 10 times	5 to 7 times	None	10 or more tim	5 to 7 times
5 minutes or le	5 minutes or le	0-2	0-2	No	None	None	None	None	None	None	None	None	None	None	None
5-15 minutes	5-15 minutes	10-Sep	10-Sep	Yes	10 or more tim	3 to 5 times	1 to 3 times	1 to 3 times	1 to 3 times	5 to 7 times	10 or more tim	10 or more tim	1 to 3 times	10 or more tim	10 or more tim
5-15 minutes	15-30 minutes	10-Sep	8-Jun	Yes	5 to 7 times	5 to 7 times	5 to 7 times	5 to 7 times	5 to 7 times	5 to 7 times	10 or more tim	5 to 7 times	1 to 3 times	10 or more tim	10 or more tim
5 minutes or le	5 minutes or le	10-Sep	10-Sep	Yes	5 to 7 times	5 to 7 times	None	None	10 or more tim	None	5 to 7 times	1 to 3 times	7 to 10 times	7 to 10 times	10 or more tim
5-15 minutes	5-15 minutes	10-Sep	10-Sep	Yes	5 to 7 times	1 to 3 times	10 or more tim	10 or more tim	10 or more tim	1 to 3 times	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim
30-45 minutes	15-30 minutes	10-Sep	10-Sep	Yes	7 to 10 times	7 to 10 times	1 to 3 times	1 to 3 times	3 to 5 times	3 to 5 times	10 or more tim	10 or more tim	1 to 3 times	10 or more tim	7 to 10 times
5 minutes or le	5 minutes or le	10-Sep	10-Sep	No	5 to 7 times	5 to 7 times	None	None	5 to 7 times	5 to 7 times	10 or more tim	None	5 to 7 times	5 to 7 times	5 to 7 times
5-15 minutes	5-15 minutes	8-Jun	10-Sep	Yes	1 to 3 times	3 to 5 times	1 to 3 times	1 to 3 times	1 to 3 times	1 to 3 times	1 to 3 times	1 to 3 times	3 to 5 times	1 to 3 times	1 to 3 times
5-15 minutes	5-15 minutes	8-Jun	8-Jun	Yes	7 to 10 times	3 to 5 times	7 to 10 times	7 to 10 times	10 or more tim	5 to 7 times	7 to 10 times	5 to 7 times	7 to 10 times	7 to 10 times	7 to 10 times
5-15 minutes	5-15 minutes	8-Jun	0-2	Yes	1 to 3 times	None	1 to 3 times	1 to 3 times	1 to 3 times	3 to 5 times	7 to 10 times	1 to 3 times	5 to 7 times	10 or more tim	5 to 7 times
5 minutes or le	5 minutes or le	0-2	0-2	No	1 to 3 times	1 to 3 times	None	None	None	None	None	None	None	None	None
5-15 minutes	5-15 minutes	5-Mar	10-Sep	Yes	10 or more tim	1 to 3 times	3 to 5 times	None	3 to 5 times	None	10 or more tim	10 or more tim	None	1 to 3 times	None
5 minutes or le	5 minutes or le	5-Mar	8-Jun	Yes	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	1 to 3 times	10 or more tim	10 or more tim
5 minutes or le	5 minutes or le	8-Jun	10-Sep	Yes	10 or more tim	10 or more tim	10 or more tim	None	7 to 10 times	10 or more tim	10 or more tim	10 or more tim	None	7 to 10 times	5 to 7 times
5-15 minutes	5-15 minutes	8-Jun	0-2	Yes	10 or more tim	10 or more tim	10 or more tim	1 to 3 times	None	10 or more tim	10 or more tim	10 or more tim	1 to 3 times	10 or more tim	3 to 5 times
5 minutes or le	5 minutes or le	10-Sep	10-Sep	Yes	10 or more tim	10 or more tim	10 or more tim	None	10 or more tim	10 or more tim	10 or more tim	10 or more tim	3 to 5 times	10 or more tim	10 or more tim
5-15 minutes	5-15 minutes	10-Sep	10-Sep	Yes	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	3 to 5 times	10 or more tim	10 or more tim
5 minutes or le	5-15 minutes	8-Jun	10-Sep	Yes	10 or more tim	10 or more tim	10 or more tim	None	10 or more tim	10 or more tim	10 or more tim	10 or more tim	7 to 10 times	10 or more tim	1 to 3 times
5-15 minutes	5 minutes or le	10-Sep	8-Jun	Yes	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	3 to 5 times
5-15 minutes	5-15 minutes	8-Jun	8-Jun	Yes	10 or more tim	10 or more tim	10 or more tim	10 or more tim	3 to 5 times	10 or more tim	10 or more tim	10 or more tim	5 to 7 times	5 to 7 times	5 to 7 times
5 minutes or le	5 minutes or le	8-Jun	8-Jun	No	1 to 3 times	5 to 7 times	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim
5-15 minutes	5 minutes or le	10-Sep	10-Sep	Yes	5 to 7 times	10 or more tim	10 or more tim	None	10 or more tim	10 or more tim	10 or more tim	10 or more tim	1 to 3 times	10 or more tim	7 to 10 times
5 minutes or le	5 minutes or le	10-Sep	10-Sep	Yes	10 or more tim	10 or more tim	10 or more tim	10 or more tim	5 to 7 times	10 or more tim	10 or more tim	10 or more tim	None	10 or more tim	5 to 7 times
5-15 minutes	5 minutes or le	0-2	0-2	No	1 to 3 times	1 to 3 times	None	None	None	None	1 to 3 times	None	3 to 5 times	1 to 3 times	None
5-15 minutes	5-15 minutes	10-Sep	10-Sep	Yes	10 or more tim	10 or more tim	10 or more tim	None	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim	10 or more tim
5 minutes or le	5 minutes or le	0-2	0-2	None	None	None	None	None	None	None	1 to 3 times	None	None	None	None
5-15 minutes	5 minutes or le	5-Mar	0-2	No	None	3 to 5 times	None	None	None	3 to 5 times	3 to 5 times	None	1 to 3 times	3 to 5 times	3 to 5 times
5-15 minutes	5-15 minutes	10-Sep	0-2	No	1 to 3 times	1 to 3 times	None	None	None	1 to 3 times	7 to 10 times	1 to 3 times	1 to 3 times	7 to 10 times	7 to 10 times
5 minutes or le	5 minutes or le	10-Sep	5-Mar	Yes	7 to 10 times	7 to 10 times	10 or more tim	7 to 10 times	10 or more tim	10 or more tim	10 or more tim	7 to 10 times	1 to 3 times	7 to 10 times	3 to 5 times

	Please indicate the job title th	Please enter your current de	Please indicate your a	Please indicate your gender	Computer Usage	in the last 7 days	have you searched for information	in the last 90 days	in the last 90 days
Help	Response	Open-Ended Response	Response	Response					
Useful	Inpatient and outpatient nurse	Ambulatory Care	56 or older	Female	Over 5 times	1 to 3 times	None	None	
I don't use this feature	Inpatient and outpatient nurse	Ambulatory Care	36-45	Female	Over 5 times	Over 5 times	1 to 3 times	Over 5 times	
Neutral	Inpatient and outpatient nurse	Other	46-55	Female	Over 5 times	Over 5 times	Over 5 times	1 to 3 times	
I don't use this feature	Inpatient and outpatient nurse	Pediatrics	46-55	Female	Over 5 times	Over 5 times	1 to 3 times	None	
Neutral	Inpatient and outpatient nurse	Surgery	36-45	Female	Over 5 times	Over 5 times	Over 5 times	Over 5 times	
I don't use this feature	Inpatient and outpatient nurse	Surgery	36-45	Female	Over 5 times	Over 5 times	3 to 5 times	None	
Neutral	Inpatient and outpatient nurse	Surgery	56 or older	Female	Over 5 times	Over 5 times	Over 5 times	None	
I don't use this feature	Inpatient nurse only	Internal Medicine	36-45	Male	Over 5 times	Over 5 times	Over 5 times	1 to 3 times	
I don't use this feature	Inpatient nurse only	Internal Medicine	36-45	Female	Over 5 times	Over 5 times	None	None	
Useful	Inpatient nurse only	MCTT	36-45	Male	Over 5 times	Over 5 times	Over 5 times	Over 5 times	
Did not know this feature existed	Inpatient nurse only	Other	36-45	Female	Over 5 times	Over 5 times	1 to 3 times	None	
Not Useful	Inpatient nurse only	Other	36-45	Female	Over 5 times	Over 5 times	Over 5 times	3 to 5 times	
Did not know this feature existed	Inpatient nurse only	Pediatrics	36-45	Female	Over 5 times	Over 5 times	Over 5 times	None	
I don't use this feature	Inpatient nurse only	Pediatrics	26-35	Female	Over 5 times	Over 5 times	Over 5 times	Over 5 times	
I don't use this feature	Inpatient nurse only	Pediatrics	36-45	Female	Over 5 times	3 to 5 times	None	None	
Useful	Inpatient nurse only	Rehabilitation	26-35	Female	Over 5 times	3 to 5 times	None	None	
I don't use this feature	Inpatient nurse only	Rehabilitation	36-45	Female	Over 5 times	Over 5 times	1 to 3 times	1 to 3 times	
I don't use this feature	Nurse Practitioner	Ambulatory Care	46-55	Female	Over 5 times	3 to 5 times	None	None	
Neutral	Nurse Practitioner	Ambulatory Care	46-55	Female	Over 5 times	Over 5 times	Over 5 times	None	
Neutral	Nurse Practitioner	Ambulatory Care	46-55	Female	Over 5 times	Over 5 times	Over 5 times	1 to 3 times	
Neutral	Nurse Practitioner	Family Medicine	46-55	Female	Over 5 times	Over 5 times	1 to 3 times	None	
Neutral	Nurse Practitioner	Internal Medicine	56 or older	Female	Over 5 times	None	None	None	
Useful	Nurse practitioner	Other	36-45	Female	Over 5 times	Over 5 times	1 to 3 times	1 to 3 times	
Neutral	Nurse Practitioner	Pediatrics	36-45	Female	Over 5 times	Over 5 times	Over 5 times	None	
Neutral	Nurse Practitioner	Pediatrics	36-45	Female	3 to 5 times	1 to 3 times	None	None	
Neutral	Nurse Practitioner	Pediatrics	26-35	Female	Over 5 times	1 to 3 times	Over 5 times	None	
Neutral	Nurse Practitioner	Surgery	46-55	Female	Over 5 times	Over 5 times	1 to 3 times	None	
I don't use this feature	Nurse Practitioner	Surgery	46-55	Female	Over 5 times	Over 5 times	3 to 5 times	None	
I don't use this feature	Other	MCTT	46-55	Female	Over 5 times	Over 5 times	3 to 5 times	1 to 3 times	
I don't use this feature	Other	Medical School	26-35	Male	Over 5 times	Over 5 times	Over 5 times	Over 5 times	
Useful	Other	Pharmacy Services	26-35	Female	Over 5 times	Over 5 times	3 to 5 times	3 to 5 times	
I don't use this feature	Other	Research	26-35	Male	Over 5 times	Over 5 times	1 to 3 times	1 to 3 times	
Useful	Other	Transplant Center	36-45	Female	Over 5 times	Over 5 times	Over 5 times	1 to 3 times	
Useful	Outpatient nurse only	Ambulatory Care	46-55	Female	Over 5 times	Over 5 times	None	None	
Useful	Outpatient nurse only	Ambulatory care	46-55	Male	Over 5 times	Over 5 times	1 to 3 times	1 to 3 times	
I don't use this feature	Outpatient nurse only	Ambulatory Care	46-55	Female	Over 5 times	Over 5 times	None	None	
I don't use this feature	Outpatient nurse only	Ambulatory Care	46-55	Female	Over 5 times	None	None	None	
Neutral	Outpatient nurse only	Family Medicine	56 or older	Female	Over 5 times	3 to 5 times	1 to 3 times	None	
I don't use this feature	Outpatient nurse only	Family Medicine	26-35	Female	Over 5 times	Over 5 times	1 to 3 times	1 to 3 times	
I don't use this feature	Outpatient nurse only	Family Medicine	56 or older	Female	Over 5 times	1 to 3 times	None	None	
Neutral	Outpatient nurse only	Family Medicine	56 or older	Female	Over 5 times	Over 5 times	None	None	
Useful	Outpatient nurse only	Nursing	46-55	Female	Over 5 times	None	None	None	
I don't use this feature	Outpatient nurse only	OB/GYN	46-55	Female	Over 5 times	3 to 5 times	1 to 3 times	None	
Useful	Outpatient nurse only	OB/GYN	46-55	Female	Over 5 times	Over 5 times	None	None	
Did not know this feature existed	Outpatient nurse only	Pediatrics	46-55	Female	Over 5 times	Over 5 times	None	1 to 3 times	
Useful	Outpatient nurse only	Research	46-55	Female	Over 5 times	Over 5 times	1 to 3 times	1 to 3 times	
Useful	Outpatient nurse only	Surgery	46-55	Female	Over 5 times	Over 5 times	1 to 3 times	1 to 3 times	
	Physician	Anesthesiology	46-55	Male	Over 5 times	Over 5 times	Over 5 times	Over 5 times	
I don't use this feature	Physician	Anesthesiology	46-55	Male	Over 5 times	Over 5 times	Over 5 times	Over 5 times	
I don't use this feature	Physician	Anesthesiology	26-35	Male	Over 5 times	Over 5 times	3 to 5 times	3 to 5 times	
Useful	Physician	Family Medicine	36-45	Female	Over 5 times	Over 5 times	None	1 to 3 times	
Useful	Physician	internal medicine	36-45	Male	Over 5 times	Over 5 times	Over 5 times	1 to 3 times	
Neutral	Physician	internal medicine	46-55	Male	Over 5 times	Over 5 times	Over 5 times	None	
Useful	Physician	Internal Medicine	36-45	Male	Over 5 times	Over 5 times	Over 5 times	Over 5 times	
Neutral	Physician	Internal medicine	46-55	Male	Over 5 times	3 to 5 times	1 to 3 times	None	
I don't use this feature	Physician	Internal medicine	36-45	Male	Over 5 times	Over 5 times	3 to 5 times	1 to 3 times	
I don't use this feature	Physician	Pediatrics	26-35	Male	Over 5 times	Over 5 times	3 to 5 times	3 to 5 times	
Neutral	Physician	Pediatrics	56 or older	Male	Over 5 times	Over 5 times	Over 5 times	1 to 3 times	
Neutral	Physician	Pediatrics	46-55	Male	Over 5 times	3 to 5 times	1 to 3 times	1 to 3 times	
I don't use this feature	Physician	Surgery	36-45	Male	Over 5 times	Over 5 times	3 to 5 times	None	

Appendix C – Department Mappings

Response Given	Mapped Category	Rationale
5B Internal med.	Internal Medicine	Med short for Medicine, omitted ward 5B
6A Rehab	Rehabilitation	Rehab short for Rehabilitation, omitted ward 6A
7B/C	Internal Medicine	7B/C is the Internal Medicine/Cardiology Center, according to: http://www.med.umich.edu/nursing/diccion.htm
7bc	Internal Medicine	7B/C is the Internal Medicine/Cardiology Center, according to: http://www.med.umich.edu/nursing/diccion.htm
Amb care nursing	Ambulatory Care	Amb short for Ambulatory, nursing omitted
Ambulatory Care	Ambulatory Care	-
ambulatory	Ambulatory Care	Ambulatory short for Ambulatory Care
Ambulatory care	Ambulatory Care	-
Ambulatory Care	Ambulatory Care	-
Ambulatory Care	Ambulatory Care	-
Ambulatory Care	Ambulatory Care	-
Ambulatory Care	Ambulatory Care	-
ambulatory care cardiology and gynecology	Ambulatory Care	Generalized to Ambulatory Care
anesthesiology	Anesthesiology	-
anesthesiology	Anesthesiology	-
Anesthesiology	Anesthesiology	-
cardiac surgery	Surgery	Generalized to Surgery
CHC	Other	Unknown acronym
Dexter Family Medicine	Family Medicine	Generalized to Family Medicine
family medicine	Family Medicine	-
Family Medicine	Family Medicine	-
Family Medicine	Family Medicine	-
family medicine	Family Medicine	-
GCRC	Research	GCRC is "General Clinical Research Center" Source: http://www.umich.edu/~newsinfo/Releases/2001/Aug01/glossary.html
GCRC	Research	GCRC is "General Clinical Research Center"
GCRC-nursing	Research	GCRC is "General Clinical Research Center"
Holden NICU	Pediatrics	Holden NICU is the Neonatal Intensive Care Unit
Internal Medicine	Internal Medicine	-
internal medicine	Internal Medicine	-
Internal medicine	Internal Medicine	-
internal medicine	Internal Medicine	-
internal medicine	Internal Medicine	-
mcit	MCIT	-
Medical Campus Information Technology	MCIT	Abbreviation
medical school	Medical School	-
mott operating room	Pediatrics	Mott is children's hospital
mott pacu	Pediatrics	Mott is children's hospital

MPU	Other	Acronym not known
neurosurgery	Surgery	Generalized to Surgery
Neurosurgery	Surgery	Generalized to Surgery
neurosurgery	Surgery	Generalized to Surgery
nursing	Unknown	Not generalizable
Nursing	Unknown	Not generalizable
Nursing 5e Mott	Pediatrics	Mott is the children's hospital, nursing and ward omitted
nursing-mott	Pediatrics	Mott is the children's hospital, nursing not needed
OB	Obstetrics/Gynecology	Abbreviation
OB/GYN	Obstetrics/Gynecology	Abbreviation
obgyn	Obstetrics/Gynecology	Abbreviation
Orthopedic Surgery	Surgery	Generalized to Surgery
Pediatric Cardiology	Pediatrics	Generalized to Pediatrics
Pediatrics	Pediatrics	-
Pediatrics	Pediatrics	-
Pediatrics	Pediatrics	-
pediatrics	Pediatrics	-
Peds	Pediatrics	Abbreviation for Pediatrics
peds orthopaedics	Pediatrics	Abbreviation for Pediatrics, specialty omitted
pharmacy services	Pharmacy Services	-
ppp	Other	Acronym not known
rehab. 6a	Rehabilitation	Rehab short for Rehabilitation, omitted ward 6A
Saline Health Center	Family Medicine	Primary Care site Source: http://sitemaker.umich.edu/fammed-fom/primary_care_sites
surgery	Surgery	-
Transplant Center	Transplant Center	-
Vascular Surgery	Surgery	Generalized to surgery
Ypsilanti Pediatrics	Pediatrics	Generalized to Pediatrics