University of Michigan Health System

Programs and Operations Analysis

Analysis of Clerical Staff Workload

Final Report

To: Michael Valdes, Director of Finance and Business Operations, Nursing Services

Mary Duck, Management Systems Coordinator

Dr. Richard Coffey, Director Programs and Operations Analysis

From: IOE 481 Project Team, Programs and Operations Analysis

Lev Gartman

William Goldsmith

Karla Krause

Maurin Utz

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Executive Summary

Overview

During a shift, Inpatient Unit Clerks at the University of Michigan Health Service (UMHS) face variable levels of workload and are challenged to fulfill the unit's clerical needs without time delays. Currently all of the inpatient units staff one clerk for every 16 beds. Some units schedule an additional clerk during peak times, but the perception remains that the clerks are always busy.

The workload for the inpatient unit clerks is not currently quantified and clerical staff scheduling is driven by perceptions of workload volume. Staffing is fixed per unit and there is not defined system for determining when the workload warrants additional staff. As a result, UMHS requested a quantification of the clerical workload for future staffing level decisions. By quantifying the workload, it may be possible for UMHS to better allocate clerks and work in accordance with workload volume.

UMHS has also requested the following information regarding the inpatient unit clerical workload:

- Determine workload drivers
- Identify daily workload trends
- Determine average times for routine tasks
- Monitor how census affects clerical workload
- Develop workload standards per census level, admissions, discharges, and transfers.
- Report additional inefficiencies in the clerical system

The Industrial and Operations Engineering team addressed these requests through a work measurement study.

Approach

To quantify the clerical workload, the team collected data from a sample of three inpatient units: 5A, 7B/C and 6Mott, during the day and evening shifts from Monday through Friday. Clerical tasks tend to be uniform throughout UMHS inpatient units; mild differences stem from patient needs on each unit. For example, 5A handles surgical needs while 7B/C handles medical needs. Patients on 6Mott are children and female adults with both surgical and medical needs. Therefore, the findings and conclusions from this project apply to the general and intermediate care Inpatient Units Clerical Staff.

The project was conducted in six phases: literature search, analysis of previous clerical workload studies, unit observation, unit staff interviews, time studies and data analysis. During preliminary observations, the team observed the clerical staff on each unit and with information from past studies of UMHS clerical workload, the team identified the routine

tasks that they would measure during in the fifth phase of the project for times studies. Time studies occurred from October 11th through November 19th; data was recorded in a task log. A total of 28.6 hours of time study data was collected. In addition to time studies, the team created a database of admissions, discharges and transfers (ADTs) that occurred during September and October 2004 from each unit's log. During the data analysis phase, the team calculated average and standard task times across all inpatient units using findings from the unit logs and the time studies. The team also studied workload and time trends evident in the collected data looked for workload drivers. Finally, they developed a workload sensitive tool to predict the clerical staffing need on any unit during the day and evening shifts based on the census and number of incoming admissions.

Findings

Task Average Times

From the time study data, the team computed average times for the clerical tasks observed in the study. The results are shown in Table A.

Table A: Average Times for Routine Tasks

Task	Avg. Time
Answer Phone/Make Phone Call	0:00:48
Chart Maintenance	0:05:24
Cleaning	0:05:13
Close Chart	0:07:53
Diet Order	0:01:15
Discharge Orders	0:03:25
Discharge Request in Comp	0:00:46
Doctor/Nurse Questions	0:00:44
Enter/Remove Patients from Computer	0:01:19
Equipment Order	0:01:25
Filing	0:02:22
Get Registration Card	0:06:36
Lab Order	0:02:37
Maintain Census	0:03:12
Maintain Doctor/Nurse Info	0:03:41
Make Admit Pack/Name Cards	0:03:23
Make Chart	0:04:41
Make/Get Flowboard	0:00:53
Medicine Order	0:01:34
Patient/Family Questions	0:00:41
Procedural Order	0:02:31
Pull Orders	0:02:16
Send Fax	0:02:48
Send Page	0:00:32
Stamp Chart	0:04:26
Stuff Charts	0:01:36
Supply Order	0:01:10

Workload Drivers

The percentages of time clerks spend on tasks related to ADTs and census patients were used to create Figure A.

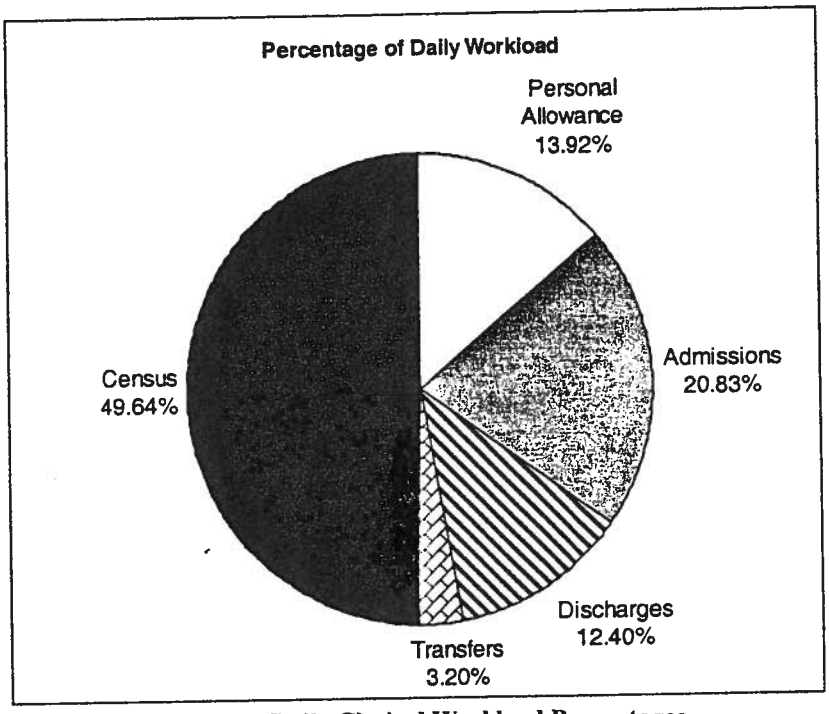


Figure A: Daily Clerical Workload Percentages

Figure A shows that Admissions account for almost half of the amount of work associated with census patients. Considering census related tasks as a fixed component of daily clerical workload, admissions are the workload driver.

Clerical Workload per Patient per Day (Standard Times)

Table B shows the standard time in minutes per patient each day tasks as they pertain to Admissions, Discharges, Transfers, Census, and the weighted average. A reasonable percent of the personal allowance is allocated to the census workload in these standards.

Table B: Routine Task Standard Times

Task Bucket	Standard Time (min/patient/day)
Admission	64.3
Discharge	28.2
Transfer	34.0
Census & PFD	34.8

For example, Table B shows that each admission takes 64.3 minutes per patient, daily.

Workload Trends

Clerical workload levels have a predictable fluctuation throughout the day. Figure 3 on page 15 shows a daily distribution of the average admissions expected in each 2 hour block for each unit. From these figures, it is obvious that most admissions occur during the day and evening shifts.

Conclusions

Fifty percent of clerical time is spent on daily census work and only 24% of the time is on Admissions work. However, Admissions workload is almost double the average census workload. When the admit arrives on the unit the work can be encompassing; the variation in admission levels can swing the workload an entire FTE's worth of work in one day. This validates the perception of the unit staff that clerks are always busy. The team concludes that Admissions drive the variation in inpatient unit clerical workload.

The majority of ADTs occur during the following times:

Admissions peak from 2pm - 8pm
Discharges peak from 12pm - 4pm
Transfers peak from 2pm – 10pm

During these peak times, clerks experience and an increase in workload and report feeling very busy.

Figure 6 on page 18 is a stratification of the total work per hour into 5 layered components. After accounting for personal fatigue delay and miscellaneous work, the figure shows how work for ADTs accumulates and increases the work per minute. Most ADTs tend to take place between 1:30pm and 3:00pm. Figure 6 also shows Admissions as the leading workload driver.

Recommendations for Implementation

The clerical staff scheduling system should consider the effect that admissions, as the workload driver, has on the daily clerical workload. The increase in work associated with admissions should be incorporated into the system to prevent possible delays in clerical task completion. Using the standard times, the team created a tool to predict the clerical staff need. The tool is presented in Table 8 on page 22.

The team recommends that UMHS use the Workload Indicator of Clerical Staffing Need tool presented in Table 8 for clerical staffing decisions. It is important to note that Table 8 assumes that an equal number of discharges are associated with the number of admissions during a shift. According to the tool, between 3.7 and 3.9 clerks are needed at the average census (30) and average admissions levels (6.2).

The team also recommends use of the tool for average census increases and allocating float clerks. In the past year, the average census has increased from 28 to 30 patients. UMHS should use the tool to predict staffing levels if they expect further increases in the average unit census.

The team also recommends using the tool when allocating float clerks or when a unit clerk calls in sick. For example if a unit clerk calls in sick when the unit census is at 28 patients with 4 expected admissions, the tool reports that the unit needs 3.1 clerks for the day and evening shifts. Thus, another clerk would not be needed fill the absence. In another scenario, if two units have a partial clerical need, the float clerk can split his/her time between each unit.

Introduction

At the University of Michigan Health System (UMHS) the inpatient unit clerical staff workload is currently not quantified. The Inpatient Unit clerks perform many tasks including managing patient information and ordering equipment. The clerical workload is comprised of roughly thirty different tasks and during a shift, workload levels vary and clerks are challenged to fulfill all of the unit's clerical needs with minimal time delays. Delays in the completion of clerical tasks can unnecessarily increase a patient's length of stay on the unit. At least two clerks are assigned to each unit during the morning and afternoon shifts to handle the workload (or 1 clerk for every 16 beds). Some units schedule additional clerks during "busy times." Thus, the current unit clerical staff schedule is driven by perceptions of daily workload levels; there is no standard method for clerical staff scheduling. As a result, UMHS asked the Industrial and Operations Engineering team to quantify the clerical workload. They specifically asked the team to:

- Determine workload drivers
- Identify daily workload trends
- Determine average times for routine tasks
- Monitor how census affects clerical workload
- Develop workload standards for census level, admissions, discharges, and transfers.
- Report additional inefficiencies in the clerical system

The Industrial and Operations Engineering team addressed the requests by quantifying the clerical workload through a work measurement study. The purpose of this project was to quantify clerical workload by identifying workload drivers, determining average times for routine tasks and monitoring the impact of unit census on the workload. For this study, workload drivers are defined as the variables that significantly affect workload level. Additionally, the team created The Workload Indicator of Clerical Staffing Need, a tool that predicts staffing levels based on a unit's workload. This report presents findings, conclusions, and recommendations from the study.

Project Scope

The scope of this project was limited to the inpatient unit clerical workload during the day and evening shifts (7:30am – 11:30pm), Monday through Friday of three units at UMHS:

- 5A (surgery-orthopedic)
- 7B/C (medical-cardiac)
- 6 MOTT (women and children).

The other 27 units were excluded from data collection. However, the three units observed serve as a representative sample. Inpatient unit clerical tasks tend to be uniform throughout UMHS with only mild differences between medical and surgical unit related tasks. Therefore, the findings, conclusions, and recommendations from this study apply to all General and Intermediate Care Inpatient Units.

This project is an extension of a clerical tasks time study and process analysis of surgical Orthopedic (5A) and Cardiology (7C) units done by a former Industrial and Operations Engineering 481 project team. As a result, this project utilized the findings from the report conducted in April 2004 to verify clerical workload data.

Approach and Methodology

The team examined current literature on clerical workload, studied past projects on Inpatient Unit clerical workload, observed clerks working on the units, interviewed clerks and managers regarding their workload perceptions and conducted time studies of clerical tasks to quantify the workload.

Performed Literature Search

To gather information from previous and published studies concerning the quantification of workload for heath system employees, the team performed a literature search and examined project methods from three studies. One project in particular helped the team during the initial project phases. The Workload Indicators of Staffing Need (WISN) method developed and field-tested by the World Health Organization is currently available to help healthcare planners and managers estimate staff requirements, allocate staff among diverse health facilities, and monitor staff performance.

The WISN method employs an "Activity Standard" or the average time required for a specific activity (complete a patient consultation, perform a surgical operation, fill a prescription, complete a clinic visit, visit a patient at home, deliver a health education lecture, etc.) when the activity is carried out by a health worker who is trained, motivated and working to acceptable professional standards in the circumstances of the country (medical practices, equipment available, etc.). The Activity Standards are converted into the equivalent annual workload, which is a measure of how much of this type of work could be done by one person in a year working to these professional standards. This is termed "Standard Workload." The Standard Workload is combined with annual facility volume statistics to determine how many staff in each category are required to accomplish the workload. According to the WISN method, this is the staffing requirement of the facility.

Examined Past Clerical Workload Projects

The team also studied past UMHS Program and Operations Analysis projects concerning clerical staff workload. We used these studies to understand what tasks clerks perform and looked at flowcharts to learn how clerks complete tasks.

Observed Units

To become familiar with the clerical workload, the team observed the units for a week. During these observations, we noted the complications of multi-tasking and pacing for data collection. We also verified clerical task process maps from past projects.

Interviewed Inpatient Unit Staff
To obtain qualitative information on clerical workload and tips for data collection, the team interviewed Rosemary Sieracki, the Staff Development Coordinator. The team interviewed nurse managers and clerks from the units to qualify workload concerns that could not be measured via time studies.

Collected Time Study Data and Unit Logs
The team performed time studies and collected unit logs to create a database for quantifying the workload. Data was collected from 5A, 7B/C and 6Mott. Collection days were Monday- Friday during the morning and afternoon shifts (7:00am – 11:00 pm). Data was not collected on the night shifts or during the weekend because of decreased clerical staffing as a result of low workload levels.

Each unit keeps a detailed daily log of the admissions, discharges and transfers (ADTs) for the unit (See Appendix A). The team photocopied and compiled a database of each unit's ADT log for the two-month period from September 2004 - October 2004. The logs served two purposes for this study. They were first used to verify final report data from the April 2004 project. Second, the team used the unit logs to quantify workload levels and show ADT time patterns for each unit.

The team performed time studies to develop a database to quantify the workload. A total of 43.5 hours of raw time study data was collected. After removing the first week of data collection and cleaning the data, the team had 28.6 hours of usable data. Table 1 shows the break down of hours per unit.

Table 1: Time Studies - Total Hours per Unit

Unit	Hours Collected
5A	11.5
7B/C	16.5
6Mott	15.5
Total	**43.5**

To measure the time required for a clerk to complete a task, the team used a stopwatch or the unit's clock. Task and task completion times were recorded on a data sheet. (See Appendix B.) Team members recorded the type of patient associated with the task: regular, admit, transfer or discharge. Reworked tasks, verification of tasks, interruptions, multi-tasking and any atypical occurrences were also recorded. Timing began with first notice of the task to clerk and ended when the clerk completed the task. The team accounted for interruptions. For example:

Task: Answer Phone
Start Time: After the First Ring
End Time: Clerk hangs up receiver

If Interruption: Stop timing when clerk puts caller on hold, resume timing when clerk takes call off of hold.

A multitask occurs when an additional task begins before the first is completed. The team double counted multitasking times.

Current System Findings

Currently, under the fixed staffing system, each inpatient unit observed uses has one, two, or three clerks assigned per shift. A float pool exists to replace clerks on scheduled or unscheduled paid time off. The float pool is not used to assist units experiencing increases in workload. While some inpatient units schedule a second or even a third clerk to prevent delays during alleged periods of high workload, the perception remains that the clerk are busy.

Tasks Analysis

Clerks are vital to the units because they receive and transmit information between patients and their family, nurses, doctors, and other healthcare staff. Information arrives to the clerk station in different modes: phone calls, pages, emails, instructions, questions and paper orders. The clerical staff is responsible for processing and relaying this information within and outside the unit. Clerical responsibilities can be described in terms of their required clerical tasks. Some tasks have priority over other tasks and the clerks must decide how they will prioritize various tasks. Clerks use multitasking methods to complete tasks when they experience high workload levels. The clerical tasks combine to create the clerical workload for a unit. The inpatient unit clerks perform the following major tasks:

Maintain Census
Diet Order
Medicine Order
Lab Order
Equipment Order
Supply Order
Procedural Order
Discharge Orders
Answer Phone/Make Phone Call
Send Page
Doctor/Nurse Questions
Patient/Family Questions
Make Chart
Make/Get Flowboard
Stamp Chart
Close Chart
Pull Orders
Enter/Remove Patients from Computer
Maintain Doctor/Nurse Info
Stuff Charts
Filing
Get Registration Card
Personal fatigue delay
Chart Maintenance
Personal Fatigue Delay
Cleaning
Send Fax
Discharge Request in Comp
Make Admit Pack/Name Card

The tasks listed above generate the clerical workload for a unit. Furthermore, several different factors impact workload. Tasks can surface separately; a clerk answers a telephone call from a patient's family, or several tasks can also be associated in a task

bucket. For example, an admission consists of a series of tasks such as telephone calls, pages to doctors, computer data entry, chart preparation and census maintenance. Therefore, an admission is a task bucket. Other factors that influence clerical workload are time of day, patient census and number of clerks on duty. Task buckets that significantly impact the workload are referred to as workload drivers.

For this report, factors that significantly impact clerical workload are qualified as workload drivers. To summarize, Figure 1 describes the elements of workload.

Task → series of tasks → **Task Bucket** → task bucket and other factors such as day, unit type and census that significantly influence workload → **Workload Driver**

Figure 1: Workload Components

While Figure 1 shows the procession of a task to a workload driver, Figure 2 shows how tasks are grouped into task buckets.

	Answer Phone/Make Phone Call	Chart Maintenance	Cleaning	Close Chart	Diet Order	Discharge Orders	Discharge Request in Comp	Doctor/Nurse Questions	Downtime	Enter/Remove Patients from Computer	Equipment Order	Filing	Get Registration Card	Lab Order	Maintain Census	Maintain Doctor/Nurse Info	Make Admit Pack/Name Cards	Make Chart	Make/Get Flowboard	Medicine Order	Patient/Family Questions	Procedural Order	Pull Orders	Send Fax	Send Page	Stamp Chart	Stuff Charts	Supply Order
Admission	x	x			x			x		x	x		x	x	x		x	x	x	x	x	x	x		x	x		
Discharge	x	x		x		x	x	x		x		x			x	x			x		x	x	x		x			
Transfer	x	x			x			x		x					x	x	x		x	x	x	x	x		x		x	
Census	x	x	x		x			x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x

Figure 2: Tasks Tied to Clerical Processes or Task Buckets

The team created the matrix in Figure 2 after studying past clerical workload projects and observing the units. These tasks buckets frequently appeared in past reports as substantial contributors to clerical workload. (See Appendix B for detailed task descriptions.)

Workload Findings

Assumptions

The following are assumptions associated with the findings:

- The Staff Development Coordinator hypothesized that the key workload drivers were admissions, discharges, and transfers. The unit clerks reinforced this assumption and through unit observations, the team also supported this belief. Data analysis focuses on the impact of admissions, discharges and transfers (ADTs) on the clerical workload.
- Clerks do not perform tasks at identical paces. The team did not assign pace ratings to each clerk they observed. They assumed that the collected data is representative of the average pace rating for a well trained, motivated clerk working under normal conditions.
- Clerks multitask when they have high workload levels. Complications occurred in adjusting task times to account for multitasking. The team had to assume that multitasking did not significantly affect the standard times to complete tasks.
- Clerks are frequently interrupted while they perform a task and may take a small amount of additional time to reacquaint themselves with the task. Since there is no clear way to address the affect that an interruption has on total task completion time the team assumed that all time segments related to a task sum to the total task completion time.
- Because ADT data collected from the unit logs was similar in trend and volume we combined and averaged the ADTs from all three units included in the scope.
- Tasks associated with census were assumed uniform in distribution during 7:30am – 11:30pm. The data collection period was not long enough to provide significant observations for determining variable levels.

Validation

To validate their data, the team compared percentages for time spent completing tasks with corresponding percentages from the April 2004 clerical workload study. The April 2004 study determined percentages in two ways: work sampling (beeper studies) and time studies. The team's time studies data coincided with April 2004 findings. Table 2 shows the percentages from each study.

Table 2: Work Study and Time Study Percentage Comparison

Task	April 2004 Time Study	April 2004 Work Sampling	Fall 2004 Time Study
Admissions	27.5%	14.0%	20.8%
Transfers	3.0%	4.0%	3.2%
Discharges	8.0%	7.0%	12.4%
Orders	21.5%	31.0%	24.4%
All questions	9.0%	5.0%	6.5%
Phone calls	5.0%	17.0%	10.9%

Source: April 2004 Analysis of Inpatient Unit Clerk Workload

From Table 2, the Fall 2004 percentages fall within the Time Study- Working Sampling range from the April 2004 study. The observed difference (Discharges) can be attributed to time of year and the units observed. Overall, the Fall 2004 data is valid.

Average Times for Routine Tasks

After completing the time study the team was able to determine the average time necessary to complete the clerical tasks. The average times, shown in Table 3, are representative of the routine tasks performed by all general care and inpatient units in Mott and University Hospitals.

Table 3: Average times for routine tasks

Task	Avg. Time
Answer Phone/Make Phone Call	0:00:48
Chart Maintenance	0:05:24
Cleaning	0:05:13
Close Chart	0:07:53
Diet Order	0:01:15
Discharge Orders	0:03:25
Discharge Request in Comp	0:00:46
Doctor/Nurse Questions	0:00:44
Enter/Remove Patients from Computer	0:01:19
Equipment Order	0:01:25
Filing	0:02:22
Get Registration Card	0:06:36
Lab Order	0:02:37
Maintain Census	0:03:12
Maintain Doctor/Nurse Info	0:03:41
Make Admit Pack/Name Cards	0:03:23
Make Chart	0:04:41
Make/Get Flowboard	0:00:53
Medicine Order	0:01:34
Patient/Family Questions	0:00:41
Procedural Order	0:02:31
Pull Orders	0:02:16
Send Fax	0:02:48
Send Page	0:00:32
Stamp Chart	0:04:26
Stuff Charts	0:01:36
Supply Order	0:01:10

From Table 3, the average time it takes to complete one diet order is 1 minute and 15 seconds. A supply order takes on average 1 minute and 10 seconds to complete.

Workload Drivers

The team studied the impact of ADTs and census on the clerical workload. Table 4 shows the percentage of time clerks spend on tasks within each bucket: Admission, Discharges, Transfers, Census and a weighted average. The table includes a personal fatigue delay of 13.92% to account for 100% of the time a clerk is scheduled to work (7.5 hours).

Table 4: Percentage of Time Spent on Each Task within Each Task Bucket (% of Total Time)

Task	Admits	Dis	Trans	Census	Weighted Average
Answer Phone/Make Phone Call	1.44%	0.15%	0.57%	8.77%	10.88%
Chart Maintenance	2.11%	0.71%	0.14%	5.23%	8.19%
Cleaning	0.00%	0.00%	0.00%	0.91%	0.91%
Close Chart	0.00%	7.36%	0.00%	0.00%	7.36%
Diet Order	0.67%	0.00%	0.22%	2.21%	3.14%
Discharge Orders	0.00%	1.40%	0.00%	0.00%	1.40%
Discharge Request in Comp	0.00%	0.18%	0.00%	0.00%	0.18%
Doctor/Nurse Questions	0.24%	0.20%	0.25%	3.94%	4.68%
Personal fatigue delay	0.00%	0.00%	0.00%	0.00%	0.00%
Enter/Remove Patients from Computer	1.16%	0.31%	0.17%	0.06%	1.69%
Equipment Order	0.74%	0.00%	0.00%	1.32%	2.07%
Filing	0.00%	0.06%	0.00%	2.70%	2.76%
Get Registration Card	0.34%	0.00%	0.00%	0.82%	1.15%
Lab Order	1.54%	0.00%	0.00%	3.04%	4.58%
Maintain Census	0.41%	0.27%	0.15%	2.34%	3.17%
Maintain Doctor/Nurse Info	0.00%	0.30%	0.53%	2.82%	3.65%
Make Admit Pack/Name Cards	3.08%	0.00%	0.06%	0.23%	3.36%
Make Chart	1.91%	0.00%	0.00%	0.00%	1.91%
Make/Get Flowboard	0.23%	0.02%	0.05%	0.06%	0.36%
Medicine Order	0.16%	0.00%	0.15%	1.14%	1.46%
Patient/Family Questions	0.48%	0.19%	0.00%	1.19%	1.85%
Procedural Order	0.44%	0.25%	0.00%	2.10%	2.79%
Pull Orders	2.92%	0.81%	0.26%	4.77%	8.73%
Send Fax	0.00%	0.00%	0.00%	0.49%	0.49%
Send Page	0.42%	0.18%	0.02%	2.99%	3.61%
Stamp Chart	0.77%	0.00%	0.00%	0.52%	1.29%
Stuff Charts	0.00%	0.00%	0.22%	1.37%	1.59%
Supply Order	0.00%	0.00%	0.00%	0.14%	0.14%
Miscellaneous (Total time)	1.78%	0.00%	0.41%	0.48%	2.67%
Totals	20.83%	12.40%	3.20%	49.63%	86.08%
Personal Fatigue Delay				13.92%	13.92%
					100%

To formulate Table 4 the team used the total time observed for each task stratified by task bucket. For example, the total of time spent on all phone calls for Admissions, divided by the total time observed overall gives the percentage of time spent on phone calls for Admissions during the day and evening shifts (1.44%). Similarly, unit clerks spend 0.81% of their time pulling orders for a discharge.

Clerical Workload per Patient per Day (Standard Times)

Table 5 shows the standard time in minutes per patient each day for tasks as they pertain to Admissions, Discharges, Transfers, and Census.

Table 5: Standard time per patient for routine tasks and task buckets (minutes)

Task	Admits.	Dis.	Trans.	Census
Answer Phone/Make Phone Call	4.45	0.34	6.08	5.59
Chart Maintenance	6.51	1.61	1.51	3.34
Cleaning	0.00	0.00	0.00	0.58
Close Chart	0.00	16.76	0.00	0.00
Diet Order	2.08	0.00	2.35	1.41
Discharge Orders	0.00	3.18	0.00	0.00
Discharge Request in Comp	0.00	0.41	0.00	0.00
Doctor/Nurse Questions	0.74	0.47	2.64	2.51
Enter/Remove Patients from Computer	3.56	0.71	1.84	0.04
Equipment Order	2.28	0.00	0.00	0.84
Filing	0.00	0.15	0.00	1.72
Get Registration Card	1.04	0.00	0.00	0.52
Lab Order	4.76	0.00	0.00	1.94
Maintain Census	1.26	0.61	1.60	1.49
Maintain Doctor/Nurse Info	0.00	0.69	5.58	1.80
Make Admit Pack/Name Cards	9.49	0.00	0.62	0.15
Make Chart	5.90	0.00	0.00	0.00
Make/Get Flowboard	0.71	0.06	0.55	0.04
Medicine Order	0.49	0.00	1.62	0.73
Patient/Family Questions	1.49	0.43	0.00	0.76
Procedural Order	1.34	0.56	0.00	1.34
Pull Orders	9.01	1.85	2.75	3.04
Send Fax	0.00	0.00	0.00	0.31
Send Page	1.29	0.40	0.25	1.90
Stamp Chart	2.38	0.00	0.00	0.33
Stuff Charts	0.00	0.00	2.30	0.87
Supply Order	0.00	0.00	0.00	0.09
Miscellaneous (Total time)	5.49	0.00	4.36	0.31
Personal Fatigue Delay	0.00	0.00	0.00	3.20
Total time spent daily per patient (min)	64.26	28.22	34.04	34.84

For example, a clerk spends 4.45 minutes on the phone each day for every patient admitted into the unit. In addition, the clerk will spend 5.59 minutes on the phone each day for every patient in the census.

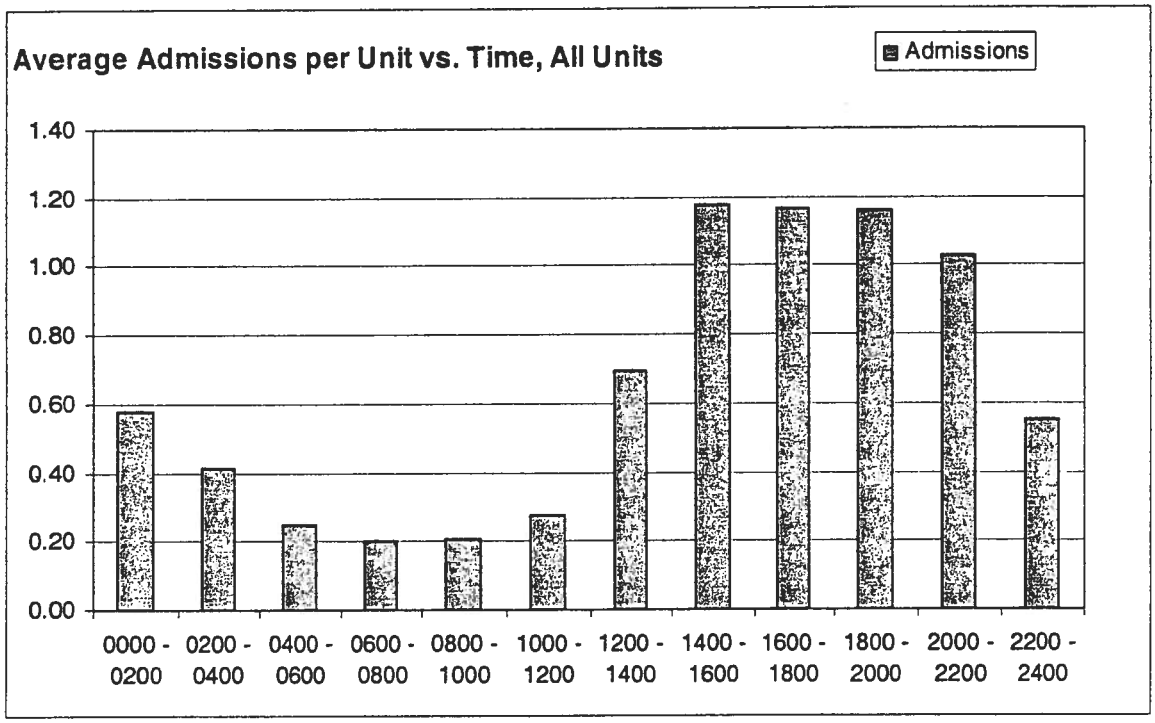
The following is an example of how the Table 5 standard times were calculated given the percentages from Table 4:

[8.77% of time spent on phone * (31.75 hr * 60 min/hr)] / 30 (average census)
= 5.59 daily minutes per patient

[1.44% time spent on phone for admissions * (31.75 hours * 60min/hr)]/ 6.2 (average admissions) = 4.45 daily minutes per patient

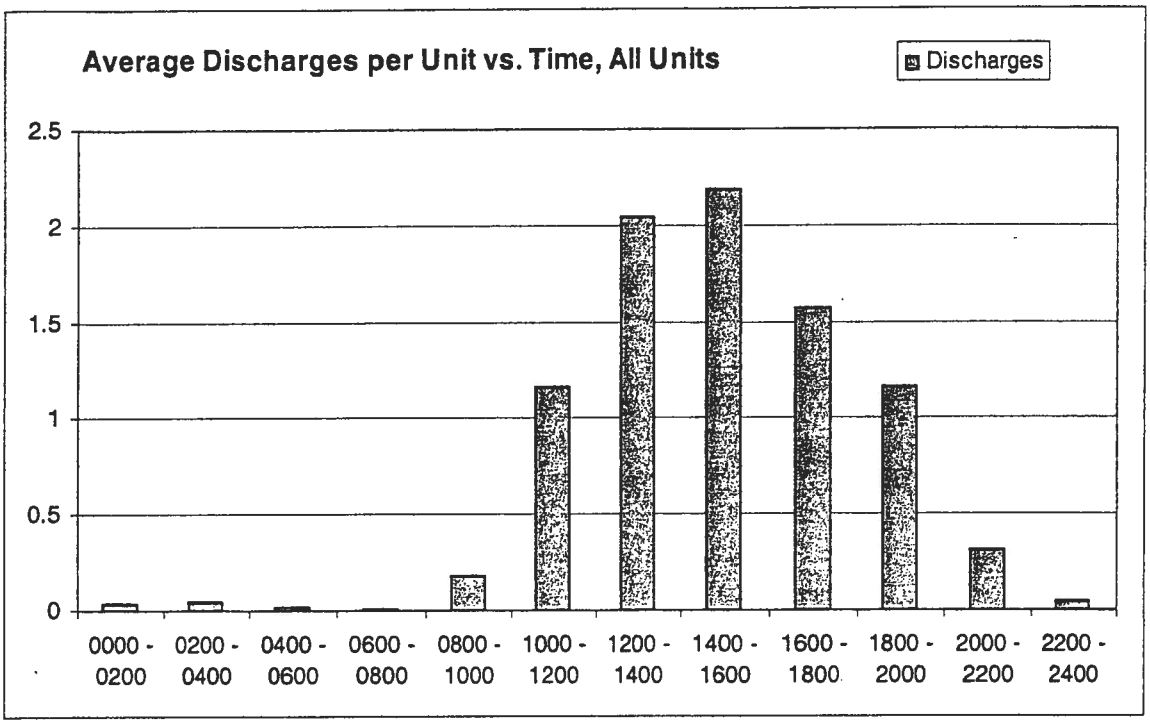
Workload Trends

Clerical workload levels have a predictable fluctuation throughout the day. Figures 3, 4, and 5 show the trend of ADTs in two-hour sections over an entire day.



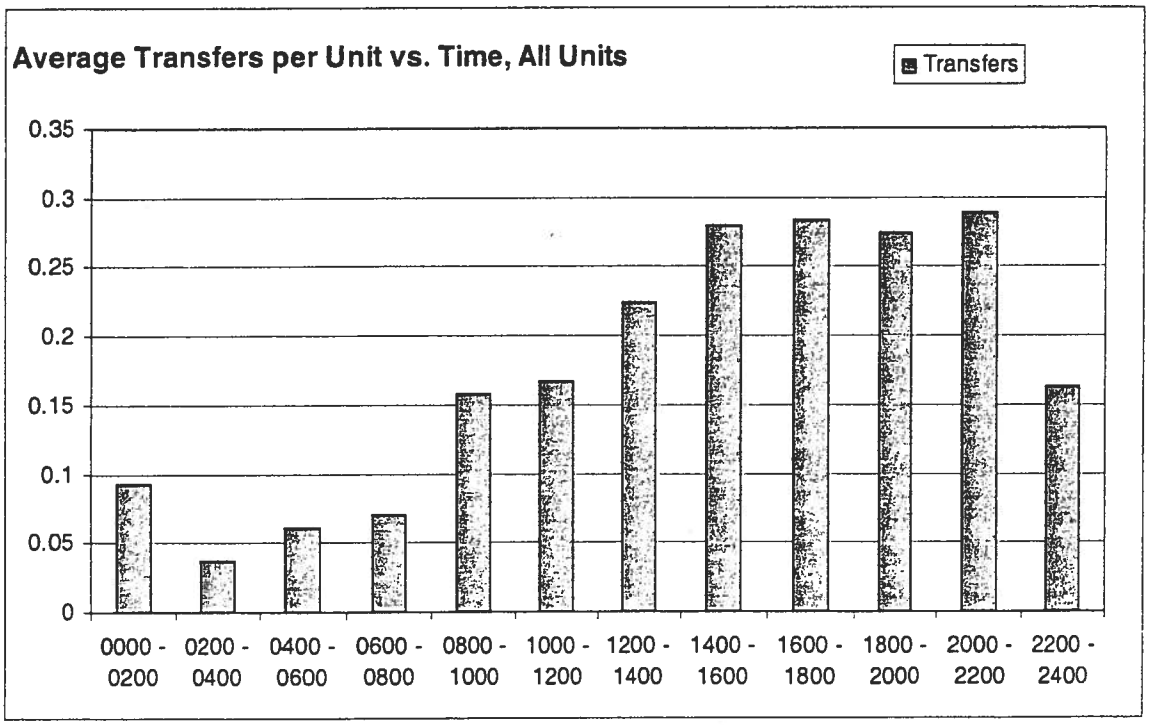
Source: ADT logs Sept. 04 – Oct. 04

Figure 3: Daily average admission per unit in two hour bins



Source: ADT logs Sept. 04 – Oct. 04

Figure 4: Daily average discharges per unit in two hour bins



Source: ADT logs Sept. 04 – Oct. 04

Figure 5: Daily average transfers per unit in two hour bins

Figures 3-5 were created by averaging the ADTs in 2 hour intervals for all units over 2 months (61 days, September 2004- October 2004). This gives a daily distribution of the average ADTs expected in each 2 hour block for each unit. From these figures, it is obvious that most ADTs occur during the day and evening shifts.

Conclusions: Clerical Workload

While 50% of clerical time is spent on daily census patient work and only 24% of the time is on Admissions work, Admissions workload is almost double the workload of the average census. When the admit arrives on the unit the work can be encompassing; the variation in admission levels can swing the workload an entire FTE's worth of work in one day. This validates the perception of the unit staff that clerks are always busy. The team concludes that Admissions drive the variation in inpatient unit clerical workload.

The bulk of ADTs occur during these peak times:

- Admissions peak from 2pm - 8pm
- Discharges peak from 12pm - 4pm
- Transfers peak from 2pm – 10pm

Figure 6 shows the total minutes of work per hour in a unit between 0700 and 2400 on an average day. For simplicity, the model assumes all census work is evenly distributed throughout the day, accounting for 64.3 minutes of clerical work per hour for the whole unit. (Actual workload would fluctuate somewhat). A 10% personal fatigue delay/personal delay time is built in and evenly spread throughout the 2 shift period. Admission work per hour was calculated by taking the average number of admissions a unit would receive during that hour, multiplied by the standard time to perform that task. Discharges and transfers were calculated in the same manner.

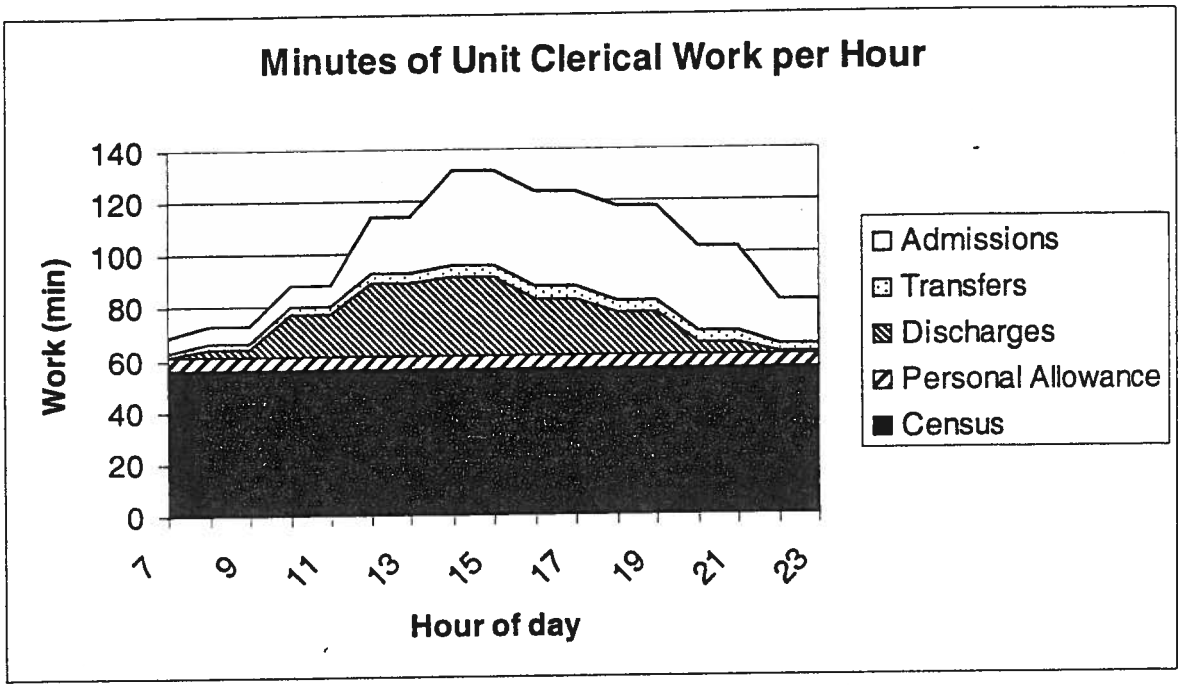


Figure 6: Unit clerical workload trend per hour

Figure 6 presents the total work per hour as comprised of all 5 components layered on top of each other. The clerical workload reaches a peak on average around 3 pm at 132 minutes of work per hour.

An overlap of ADTs occurs from 2pm – 4pm and it is here where the daily workload peak occurs.

The Routine Task Standard Times are summarized below in Table 6.

Table 6: Routine Task Standard Times

Task Bucket	Standard Time (min/patient/day)
Admission	64.3
Discharge	28.2
Transfer	34.0
Census & PFD	34.8

The standard times reflect the actual times observed to complete an admission, discharge or transfer for a patient. As seen in Table 6, these values were found by summing the standard time per patient in minutes for routine tasks as they pertain to ADTs, Census, and the task buckets combined.

Figure 7 below shows the amount of clerical work each day based on the patient's average length of stay in the unit.

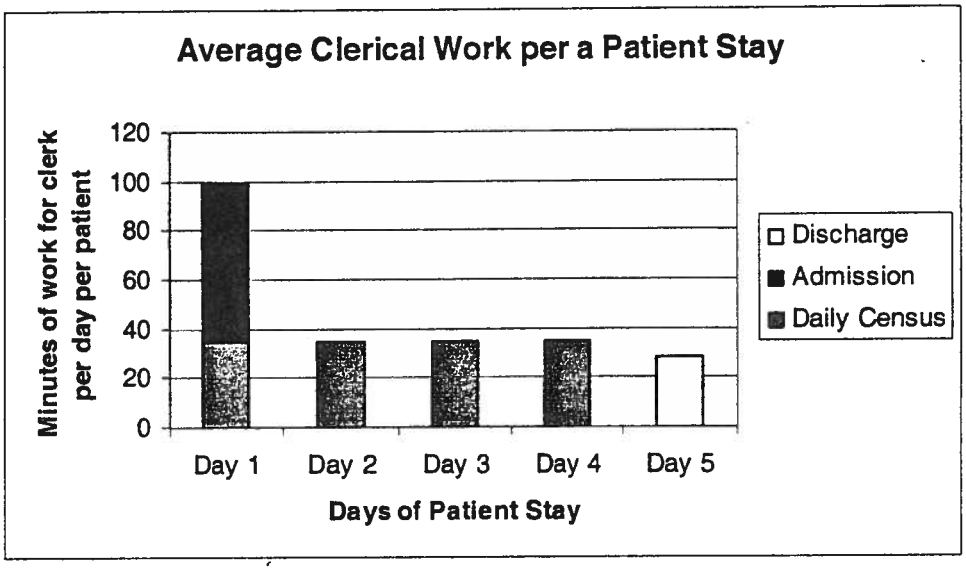


Figure 7: Average Clerical Work per a Patient Stay

Figure 7 assumes that the average patient stay is 5 days and incorporates data from Table 6: roughly 35 minutes each day are needed for the daily census work, roughly 64 minutes are needed for the admission, and 25 minutes are needed for the discharge.

Recommendations: Workload Indicator of Clerical Staff Need

Background

Table 7 shows the amount of time required in minutes based on an average daily census, admissions, discharges, and transfers.

Table 7: Workload and required clerical staff for an average day's census and ADTs (Mon – Fri)

Task Bucket	Standard Time (min) per patient	Average Volume	Total time (min) per bucket
Admission	64.3	6.2	398.4
Discharge	28.2	8.4	237.1
Transfer	34.0	1.8	61.3
Census	31.6	30.0	949.2
Personal Fatigue Delay	3.2	30.0	94.8
Total minutes of work per 2 shifts/unit			1740.8
Total available time per clerk (7.5hours* 60min)			450.0
Number of clerks needed/unit over 2 shifts			**3.9**

From Table 7, on average, admissions take a total 398 minutes for 6.2 patients admitted per day. Census workload is 31.6 minutes per patient, and for an average of 30 patients per day, the total time required for census tasks is 950 minutes. Table 7 also accounts for personal fatigue delay as 10% of the time required for census (3.2 minutes). Table 7 shows that on the average day, 3.9 clerks will be needed for 2 shifts of 7.5 hours each.

Tool for Predicting Staff Need

Table 7 shows the average daily clerical staffing need based on standard times for an admission, discharge, transfer, census, and personal fatigue delay; the team used the same calculations to determine the clerical staffing need with variation in census level and number of admissions per day. They only considered admissions knowing that admissions are the greatest workload variation driver. So that it can be easy to use, the tool assumes an average number of transfers per day and an equal number of discharges and admissions. Using the same calculations as above, below in Table 8 is the variable staffing tool we have created.

Using the standard times, the tool was calculated by multiplying the census by the time associated, plus the number of admissions multiplied by the time for an admission, plus the number of admissions multiplied by the time for a discharge (assumed same number of admissions and discharges), plus the personal fatigue delay associated with the corresponding census level all divided by the total minutes of work per clerk per day. This will supply the number of clerks needed for variable census and admission levels during the day and evening shift combined.

Example Cell:
Census = 28
Number of Admits = 6
Cell calculation = ((28 patients*34.8 min)+(6 admits*64.3 min)+(6 discharges*28.2 min)+(1.8 patients*34.0 min))/(450 min)

Table 8: Clerical staff need based on variable level of census and admissions

Number of Admits.	Census																
	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1	1.9	2.0	2.0	2.1	2.2	2.3	2.4	2.4	2.5	2.6	2.7	2.7	2.8	2.9	3.0	3.1	3.1
2	2.1	2.2	2.3	2.3	2.4	2.5	2.6	2.6	2.7	2.8	2.9	2.9	3.0	3.1	3.2	3.3	3.3
3	2.3	2.4	2.5	2.5	2.6	2.7	2.8	2.8	2.9	3.0	3.1	3.2	3.2	3.3	3.4	3.5	3.5
4	2.5	2.6	2.7	2.7	2.8	2.9	3.0	3.0	3.1	3.2	3.3	3.4	3.4	3.5	3.6	3.7	3.7
5	2.7	2.8	2.9	2.9	3.0	3.1	3.2	3.3	3.3	3.4	3.5	3.6	3.6	3.7	3.8	3.9	4.0
6	2.9	3.0	3.1	3.2	3.2	3.3	3.4	3.5	3.5	3.6	3.7	3.8	3.8	3.9	4.0	4.1	4.2
7	3.1	3.2	3.3	3.4	3.4	3.5	3.6	3.7	3.7	3.8	3.9	4.0	4.1	4.1	4.2	4.3	4.4
8	3.3	3.4	3.5	3.6	3.6	3.7	3.8	3.9	3.9	4.0	4.1	4.2	4.3	4.3	4.4	4.5	4.6
9	3.5	3.6	3.7	3.8	3.8	3.9	4.0	4.1	4.2	4.2	4.3	4.4	4.5	4.5	4.6	4.7	4.8
10	3.7	3.8	3.9	4.0	4.0	4.1	4.2	4.3	4.4	4.4	4.5	4.6	4.7	4.7	4.8	4.9	5.0
11	3.9	4.0	4.1	4.2	4.3	4.3	4.4	4.5	4.6	4.6	4.7	4.8	4.9	5.0	5.0	5.1	5.2
12	4.2	4.2	4.3	4.4	4.5	4.5	4.6	4.7	4.8	4.8	4.9	5.0	5.1	5.2	5.2	5.3	5.4
13	4.4	4.4	4.5	4.6	4.7	4.7	4.8	4.9	5.0	5.1	5.1	5.2	5.3	5.4	5.4	5.5	5.6
14	4.6	4.6	4.7	4.8	4.9	4.9	5.0	5.1	5.2	5.3	5.3	5.4	5.5	5.6	5.6	5.7	5.8
15	4.8	4.8	4.9	5.0	5.1	5.2	5.2	5.3	5.4	5.5	5.5	5.6	5.7	5.8	5.9	5.9	6.0
16	5.0	5.1	5.1	5.2	5.3	5.4	5.4	5.5	5.6	5.7	5.7	5.8	5.9	6.0	6.1	6.1	6.2

The highlighted cell (3.7) in Table 8 is the current number of clerks needed at the average census (30) and admissions (6.2) level.

We recommend using Table 8 when allocating float clerks or when a unit clerk calls in sick. For example if a unit clerk calls in sick when the unit census is at 28 with 4 expected admissions, the tool reports that the unit needs 3.1 clerks for the day and evening shifts. Thus, another clerk would not be needed fill the absence. In another scenario, if two units have a partial clerical need, the float clerk can split his/her time between each unit.

Supplemental Findings

While conducting interviews and observations, the team was attentive to other inefficiencies that may increase the time required for specific clerical tasks.

Paging System

The paging system seems slow. In some units, a clerk has to answer the patient call box, while in others; the patient call goes directly to nurse pagers.

Turnstile vs. Shelving System

Clerks notice flagged charts more easily when they are located on shelving units as opposed to a turnstile. A clerk must walk over to the turnstile, spin it and check for flagged charts. When charts are located on shelves, clerks feel that they have more

supervision capabilities. They are more aware when a chart needs their attention and they can quickly pull the chart to process orders.

Registration Cards
Registration cards are used to stamp charts and required during an Admission. If a clerk needs to make a registration card he or she must travel to another floor. This may delay order processing. However, a cost-benefit analysis performed last year determined that it was not more beneficial to order a new machine.

Supply Storage Location
A float clerk stated that the units lack a uniform system for supply storage. This clerk had to search for certain forms because the units differ in where supplies are stored.

Impact of Order Entry System on Clerical Workload

Background
Order processing is a significant portion of clerical workload. UMHS is currently considering the addition of an electronic order entry system. This order entry system would eliminate the written paper version of orders; doctors and nurses would directly enter the order into a computer instead of writing a paper order. The clerk would no longer need to manually "pull" and processing each order. Therefore, all work associated with written orders would be removed from clerical tasks.

Data Collected on Order Processing
We verified our time study data for order processing with the study from April 2004. After proving our data to be valid, we found order processing to be 24.35% of clerical workload. Assuming all order would be eliminated from clerical work, Tables 9 and 10 below show the new standard daily times per patient by task bucket time after orders have been removed to estimate the impact order entry system.

Table 9: Adjusted daily standard times per patient

Task	Admits.	Dis.	Trans.	Census
Answer Phone/Make Phone Call	4.45	0.34	6.08	5.59
Chart Maintenance	6.51	1.61	1.51	3.34
Cleaning	0.00	0.00	0.00	0.58
Close Chart	0.00	16.76	0.00	0.00
Doctor/Nurse Questions	0.74	0.47	2.64	2.51
Enter/Remove Patients from Comp.	3.56	0.71	1.84	0.04
Filing	0.00	0.15	0.00	1.72
Get Registration Card	1.04	0.00	0.00	0.52
Maintain Census	1.26	0.61	1.60	1.49
Maintain Doctor/Nurse Info	0.00	0.69	5.58	1.80
Make Admit Pack/Name Cards	9.49	0.00	0.62	0.15
Make Chart	5.90	0.00	0.00	0.00
Make/Get Flowboard	0.71	0.06	0.55	0.04
Patient/Family Questions	1.49	0.43	0.00	0.76
Send Fax	0.00	0.00	0.00	0.31
Send Page	1.29	0.40	0.25	1.90
Stamp Chart	2.38	0.00	0.00	0.33
Supply Order	0.00	0.00	0.00	0.09
Miscellaneous (Total time)	5.49	0.00	4.36	0.31
Personal Fatigue Delay (PFD)				2.14
Total time spent per patient/day (min)	44.31	22.23	25.01	23.61

When the standard times in Table 9 are compared with the standard times in Tables 5 and 6, it is obvious that removing the orders decreases the total time spent per patient daily. The standard time for Admissions decreases from 64.26 minutes to 44.31 minutes, a projected decrease of almost 20 minutes.

Table 10 shows that the average number of clerks needed per unit over the 2 shifts decreases by 1.2 clerks when compared with 3.9 needed in Table 7. Table 10 was formulated the same way as Table 7 but with the newly adjusted standard times.

Table 10: Adjusted Task Bucket Time

Task Bucket	**Adjusted Standard Time**	**Average Volume**	**Total time/bucket**
Admission	44.3	6.2	274.7
Discharge	22.2	8.4	186.7
Transfer	25.9	1.8	45.0
Census	21.5	30.0	644.1
Personal Fatigue Delay	2.1	30.0	64.4
Total minutes of work per 2 shifts/unit			1214.9
Total available time per clerk (7.5hours* 60min)			450.0
Number of clerks needed/unit over 2 shifts			**2.7**

Adjusted Workload Indicator of Clerical Staff Need

The following workload staffing tool, shown in Table 11, has been adjusted to estimate the changes in the order entry system.

Table 11: Clerks Required by Variable Census and Admissions Adjusted

Number of Admits	Census																
	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1	1.3	1.4	1.4	1.5	1.5	1.6	1.6	1.7	1.7	1.8	1.8	1.9	1.9	2.0	2.0	2.1	2.1
2	1.4	1.5	1.6	1.6	1.7	1.7	1.8	1.8	1.9	1.9	2.0	2.0	2.1	2.1	2.2	2.2	2.3
3	1.6	1.6	1.7	1.8	1.8	1.9	1.9	2.0	2.0	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.4
4	1.7	1.8	1.8	1.9	2.0	2.0	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.5	2.6
5	1.9	1.9	2.0	2.0	2.1	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.5	2.6	2.6	2.7	2.7
6	2.0	2.1	2.1	2.2	2.2	2.3	2.4	2.4	2.5	2.5	2.6	2.6	2.7	2.7	2.8	2.8	2.9
7	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.6	2.6	2.7	2.7	2.8	2.8	2.9	2.9	3.0	3.0
8	2.3	2.4	2.4	2.5	2.5	2.6	2.6	2.7	2.8	2.8	2.9	2.9	3.0	3.0	3.1	3.1	3.2
9	2.5	2.5	2.6	2.6	2.7	2.7	2.8	2.8	2.9	3.0	3.0	3.1	3.1	3.2	3.2	3.3	3.3
10	2.6	2.7	2.7	2.8	2.8	2.9	2.9	3.0	3.0	3.1	3.2	3.2	3.3	3.3	3.4	3.4	3.5
11	2.8	2.8	2.9	2.9	3.0	3.0	3.1	3.1	3.2	3.2	3.3	3.4	3.4	3.5	3.5	3.6	3.6
12	2.9	3.0	3.0	3.1	3.1	3.2	3.2	3.3	3.3	3.4	3.4	3.5	3.6	3.6	3.7	3.7	3.8
13	3.1	3.1	3.2	3.2	3.3	3.3	3.4	3.4	3.5	3.5	3.6	3.6	3.7	3.8	3.8	3.9	3.9
14	3.2	3.3	3.3	3.4	3.4	3.5	3.5	3.6	3.6	3.7	3.7	3.8	3.8	3.9	4.0	4.0	4.1
15	3.4	3.4	3.5	3.5	3.6	3.6	3.7	3.7	3.8	3.8	3.9	3.9	4.0	4.0	4.1	4.2	4.2
16	3.5	3.6	3.6	3.7	3.7	3.8	3.8	3.9	3.9	4.0	4.0	4.1	4.1	4.2	4.3	4.3	4.4

Table 11 was developed the using the same formulas as Table 8 but with the adjusted standard times where order related tasks have been removed. This tool shows the reduced number of clerks that would be needed with variable census and admission levels if orders were removed. The number of clerks needed for the current average census and admissions is highlighted.

Appendix A: Time Study Sheet

Your Name:________________ Unit:______ Shift:__________ Date:__________ Clerk:________________

Midnight Census________ # Admin___________ # Discharge_________ # Transfer________ # Clerks___________

Codes AD=Admission DS= Discharge TR= Transfer R=Regular U= Unit Specific V= Verify/Rework P=Personal

Code	Task	Time Start	Time End	Inter.	Length	Comments

Appendix B: Task Descriptions and Definitions

Admissions: Total time required for the clerk to prepare for an incoming patient to a unit for the first time. Tasks include: phone calls, filling out name cards, preparing chart, and making sure room is clean. Following the patient's arrival, the clerk pages the doctor, nurse and charge nurse to notify them of the admission. A clerk must process any orders that the patient brings upon arrival.

Discharge: Total time the clerk needs to process material inside the patient chart when a patient is ready for discharge. Once the clerk notices that the patient's chart is flagged blue, the clerk pulls the chart, checks the strip order, and processes any prescriptions that need to be ordered before the patient leaves. The clerk then puts all patient copies of orders into an envelope and enters the discharge request into the computer to alert Admissions and Housekeeping. The clerk records the discharge on the census worksheet and pulls the patient's tag halfway. After the patient leaves the unit, the clerk combines the flow board with the chart, looks for old charts for the patient, closes out the chart and brings all patient records to another location for Medical Records pick-up.

Transfer: Transfer into unit: total time required for the clerk to process the arrival of a patient to the unit from another unit. Transfer out of unit: total time required for the clerk to process the departure of a patient from the unit to another unit.

Patient Appointment: Total time required for the clerk to schedule any event in which the patient temporarily leaves the unit. For example, a patient may leave the unit for an X-ray, operation, or other scheduled appointment.

Orders: Total time required for the clerk to process instructions for patient care given by doctors. Orders are usually written in patient charts on strips of paper. Every fifteen minutes, the clerk checks if any of the charts are flagged which is the signal for an unprocessed order. The clerk then pulls the flagged chart and processes the new orders.

- Diet: An order given to every patient from the doctor when they are admitted. Diet orders describe the types of food that the patient may have while on the unit. Because patient procedures and condition changes can prompt the doctor to change the diet order, the clerk must enter every change in a patient's diet. The clerk enters the order into the computer.

- Equipment: An order for unit tools such as a heating pad, catheter, or IV apparatus. Equipment orders are often given to a clerk verbally from a nurse. The clerk enters the order into the computer.

- Lab: An order for the patient to receive diagnostic testing. When the clerk finds a lab order in a patient's chart, the clerk fills out a lab order form. Unlike a diet or equipment order, a lab is done via paper transfer.

Questions: Periodically a doctor, nurse, patient, or family member will request information from the clerk. Examples of events included in this task are page requests and requests to stamp parking tickets among others.

Maintain Doctor/Nurse Info: Typically this task involved things such as changing the nurse that is overseeing a patient at the start of a shift or updating who is paged automatically using the call box system.

Personal Fatigue Delay: Any time in which there were no tasks to perform at the clerk station.

Chart Maintenance: Typically this task would involve organizing the chart after a nurse or doctor had gone through it. Often papers would be left in a pocket inside the front cover of the chart, and the clerk would go through the papers and place them in the appropriate place.