Optimizing the Pediatric Hospitalist Schedule with Neonatal Expansion

Final Report

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Executive Summary
C.S. Mott Children's Hospital is considering combining the pediatric and neonatal hospitalist groups. The services that are currently covered by each group separately will become shared services among the merged hospitalist group. The merger would also require many hospitalists to expand their skill set due to the increase in services that need coverage. The pediatric hospitalists will be asked to cover newborn shifts all year (currently cover 32 weeks per year) and delivery/resuscitation services. An issue with the potential merger is that the pediatric hospitalists’ scope of responsibilities will become too broad, thus decreasing the quality of patient care. In addition, recruiting issues could arise because pediatric hospitalists would be required to perform duties that are “less desirable” than their current duties. The Associate Director of Pediatric Hospitalist Services asked IOE 481 Team 9 to examine the potential expansion, make recommendations regarding the scheduling of hospitalists, and discover ways to make the potential expansion more appealing to the pediatric hospitalists.

Background
The pediatric and neonatal hospitalist groups currently operate on different shift schedule. The neonatal hospitalists have three 8-hour shifts per day, Monday - Sunday. The pediatric hospitalists have three 8-hour shifts per day, Tuesday - Thursday; however, they perform two 12-hour shifts on the weekend and an 8-hour shift combined with a 16-hour shift on Monday and Friday.

In addition to the different shift times, the neonatal hospitalists have only one attending on duty at a time. In contrast, the pediatric hospitalists have two attendings on duty during day shifts and one during night shifts.

Methodology
The team performed the following tasks to examine the current scheduling model and make recommendations regarding a new schedule: 1) observational studies, 2) interviews, 3) surveys, 4) peer institution benchmarking, 5) time studies and historical data.

Findings
Many important findings emerged as a result of the interviews, survey, peer institution interviews, and time studies and historical data.

Survey
The findings from the survey were useful in determining what attributes of a schedule were most appealing to the pediatric hospitalists. The key findings from the survey are shown below:

Pediatric Hospitalist Survey Results
- Palliative care and wards are most enjoyable shifts (avg. rank < 2.5) and weekend days/nights, Mon/Fri nights, and overnights are least enjoyable (avg rank ≥ 5)
- 77% preferred fewer, longer weekend day shifts
- 85% of feelings regarding the delivery service were negative or somewhat negative
- 70% of feelings regarding the newborn service were neutral to positive
Neonatal Hospitalist Survey Results

- Daily coverage, triage babies, and teaching are most enjoyable shifts (avg rank < 3) and weekend days/overnights, overnights, and palliative care consults are least enjoyable (avg rank ≥ 7)
- 67% preferred more, shorter weekend day shifts
- 100% of feelings regarding the delivery service were positive
- 100% of feelings regarding the newborn service were positive or somewhat positive

Interviews

The interviews revealed that many pediatric hospitalists have more concerns about the merger than neonatal hospitalists. The concerns and thoughts of the pediatric hospitalists include:

- Current responsibilities are satisfying and stimulating
- Scope of responsibilities will be too broad and may compromise specialization
- Delivery service is uncomfortable or unfamiliar and would require training
- Schedule will become less flexible

The neonatal hospitalists have the following concerns and thoughts:

- Schedule will become less flexible
- Expansion of responsibilities will be stimulating

Peer Institution Benchmarking

The three phone interviews with peer institutions provided the team with alternative scheduling methods. See Appendix __ for a summary and comparison of findings.

Time Studies and Historical Data

The team collected time study data on 64 patients. The average time spent rounding on each patient was 12.5 minutes. The historical data from January 2012 - October 2012, which includes 2,649 patients, reveals that hospitalists spent an average of 9.2 minutes rounding on each patient.

Interpretations

Based on the findings, the major takeaways are:

- Current job satisfaction among pediatric and neonatal hospitalists is high
- Concerns exist from both groups about the incorporation of new services
- Some hospitalists are willing to be a part of the potential expansion with incentives
- Some hospitalists are excited about the expansion

Also based on the findings, the major roadblocks to the expansion include:

- Lack of standardization between neonatal and pediatric hospitalist schedules
- Decrease in specialization of pediatric hospitalists

Recommendations and Expected Impact

The team developed six recommendations; if a mutual expansion of services is agreed upon by both the pediatric and neonatal groups, the recommendations are:
1 **Standardize shift design and full-time definition**

If a mutual expansion is to be successful, both groups need to use the same shift design. Based on some of our findings from the surveys and interviews, the recommended shift design is to use 8 hour shifts (3 shifts per day, 7 days per week) or use 8 hour weekday shifts (3 shifts per day, Mon-Fri) and 12 hours weekend shifts (2 shifts per day, Sat-Sun). **Expected Impact:** This will make the transition more fluid and also make scheduling easier upon the potential merger.

2 **Expand to cover 24/7 newborn service while training for deliveries**

This recommendation is that the pediatric hospitalists begin covering 52 weeks of 24/7 newborn service, but not the delivery/resuscitation service. The team recommends that the pediatric hospitalists be required to complete the training associated with the deliveries to make the group more comfortable with the delivery service. **Expected Impact:** This will make the expansion a step-by-step process (less overwhelming).

3 **Combine groups with weighting on respective services**

This recommendation is to combine the two groups and have weighted allocation of shifts so that the pediatric hospitalist would be doing more pediatric-specific roles and the neonatal hospitalists would be doing more neonatal-specific roles. However, the weighting would still allow for both groups to get experience with all the responsibilities across the two disciplines. Therefore, the coverage would be expanded but both groups would still be spending most of their time in the roles they originally were hired to do. **Expected Impact:** This will maintain pediatric hospitalist satisfaction while increasing neonatal hospitalist variety.

4 **Add specific delivery role**

This recommendation is to combine both groups and incorporate a new delivery/resuscitation role. The addition of the delivery role could be done in two ways: 1) have one attending every day who works on administrative or teaching roles during the downtime between deliveries or 2) add delivery/resuscitation responsibility to a current role such as wards or AOD and have backup available during rounding or other times when the hospitalist responsible is busy. **Expected Impact:** This will allow delivery coverage to minimally interfere with current duties.

5 **Implement alternative scheduling models**

The fifth recommendation could be used in both the expanded system or the current system, and is basically a proposal for scheduling algorithms based on guiding principles. **Expected Impact:** This will give greater context to scheduling and should reduce time/effort spent on scheduling.

6 **Continuation of project**

The final recommendation is that the project be continued by another IOE 481 student group. The team has been able to gather a pertinent information so that an actual scheduling tool can be made to optimize both the current hospitalist schedule and the schedule of the potential expansion. **Expected Impact:** This will allow for further evaluation of the hospitalists schedule.
Introduction
The pediatric hospitalists at C.S. Mott Children’s Hospital have been asked to take over the coverage of the newborn and delivery/resuscitation services, in addition to the services they currently cover. The possible expansion of the pediatric hospitalists’ services has resulted in concerns regarding decreased job satisfaction, reduced quality of patient care, and trouble with recruiting new team members. The Associate Director of Pediatric Hospitalist Services would like to know what would entice his group to accept the expanded service, and asked an Industrial and Operations Engineering (IOE) student team from the University of Michigan to analyze the pediatric hospitalist current and requested services. The team was also asked to determine what changes should be made to cover all responsibilities and develop recommendations to create a block coverage schedule that maintains job satisfaction. This report contains the recommendations that the team developed to address these problems and the findings, interpretations, and data collection and analysis methods.

Background
The current hospitalist model was developed by a common interest of hospitals and physicians to improve the quality and efficiency of the care they provide as well as concern for cost containment. The number of hospitalists in the United States has increased dramatically in the past few years; the National Association of Inpatient Physicians (NAIP) included only 12 members when it was founded in 1996. By 2001, the NAIP estimated that there were between 5,000 and 6,000 physicians practicing as hospitalists.

There are 15 pediatric hospitalists (which is equal to 7.2 Full Time Equivalents, or FTEs) at C.S. Mott Children’s Hospital, who currently provide 24/7 service coverage on backup, wards (inpatient care), newborn, admitting officer of the day (AOD), and palliative care.

The current problem facing the pediatric hospitalists at the University of Michigan Health System, as reported by the Associate Director of Pediatric Hospitalist Services, is maintaining job satisfaction and retaining new staff members while expanding services. As determined by the Associate Director of Pediatric Hospitalist Services, certain responsibilities covered by pediatric hospitalist group are more stressful than others. Some of the pediatric hospitalists also do not have enough experience with the new services (deliveries and newborns) to want to expand their coverage. These stressful responsibilities may present problems for recruiting, given that new recruits are noticeably less likely to stay in their current position if they are responsible for only these “stressful” jobs. While stress is an unavoidable factor, balancing the amount of stress with satisfaction among the entire group will help maintain job satisfaction levels and hopefully maximize the future retainment of new staff after the expansion of services for the pediatric hospitalists.

Goals and Objectives
The primary goal of the project was to create a hospitalist scheduling model that expands service coverage while maintaining job satisfaction. To achieve this goal, the team:

- Quantified the hospitalists’ job satisfaction for the different responsibilities
- Conducted observations and studies of the current hospitalist shift responsibilities
- Evaluated and analyzed scheduling and staffing needs of the pediatric hospitalists to maximize job satisfaction while covering all responsibilities
The team developed recommendations to:

- Create a scheduling model for the current states of both the pediatric and neonatal hospitalist teams
- Create a new hospitalist scheduling model for 2014 with the expanded body of hospitalists
- Balance job satisfaction with stress levels
- Balance desirable and undesirable jobs among the hospitalists so that the job will be more appealing to potential new staff members

**Key Issues**

The following key issues are factors that contribute to the problem:

- Pediatric hospitalist coverage has been requested to extend to other services
- Expansion of hospitalist services in C.S. Mott Children’s Hospital may affect job satisfaction
- Inefficient processes, such as circumcisions, are consuming time unnecessarily
- Due to the need to extend roles to other services, the desirability of joining the hospitalist program may decrease as “fun” roles are outweighed by stressful or undesirable roles

**Project Scope**

This project included only the hospitalist scheduling model of the pediatric and neonatal hospitalist teams in C.S. Mott Children’s Hospital and the shifts and services they must cover. These services are the wards (Gold & Silver, Maize & Blue), deliveries/newborn resuscitation, admitting officer of the day (AOD), backup, palliative care, and newborns.

The specifics of medical processes or procedures were not included in this project. Any task not related to the scheduling and requirements of pediatric and neonatal hospitalists in the pediatric and newborn units was not included in this project. In addition, any scheduling of hospitalists outside of the pediatric and neonatal departments was not included in this project.

**Recommendations, Findings, and Interpretations**

The following recommendations are if a mutual expansion of service is agreed upon by both the pediatric group and the neonatal group:

1. *Standardize shift design and full-time definition*

   It is recommended that the shift design for the pediatric and neonatal hospitalist groups become standardized (i.e. all hospitalists operate on the same shift schedule). The team recommends using 8 hour shifts (3 shifts per day, 7 days per week) or 8 hour weekday shifts and 12 hour weekend shifts (3 shifts per day during the week and 2 shifts per day on the weekend). In addition to standardizing the shift design, it is recommended that the definition of ‘full-time’ should be standardized as well (i.e. both neonatal and pediatric hospitalist consider a 48-hour week or a 40-hour week as full-time).

   The findings that led to the first recommendation are that the pediatric and neonatal hospitalist groups run on different shift schedules, most pediatric hospitalists prefer fewer longer weekend
shifts (survey), and the 16 hour Mon/Fri night shift is one of the least enjoyable pediatric hospitalist shifts (survey).

2. Expand to cover 24/7 newborn service while training for deliveries
During the expansion, another of the team’s recommendations is to cover newborn services for all 52 weeks of the calendar year while some sort of training be offered for delivery shifts and delivery resuscitation training. The team recommends not to expand to delivery service immediately; instead, the team suggest to revisit the idea when schedules are more compatible and when the pediatric hospitalists are more comfortable with deliveries.

The team developed the second recommendation while taking some main survey and interview findings into account, including the fact that 11 out of 13 pediatric hospitalists have a negative or somewhat negative attitude toward the delivery/newborn resuscitation service. From the interviews, the team found that these negative attitudes were in part because most pediatric hospitalists have not done newborn resuscitation since residency and do not feel comfortable with it.

3. Combine groups with weighting on respective services
During the scheduling process, the neonatal and pediatric groups should be combined and shifts should be assigned with weighting according to one’s respective FTE (i.e. a 0.7 FTE should be assigned a greater number of shifts than a 0.25 FTE, but each should be getting a similar percentage in shifts) and type of hospitalist. With the two groups combined and total service coverage with weighted allocation, the neonatal will do more delivery and newborn shifts, the pediatric will do more pediatric-specific services, and both groups would get more variety in their respective schedules. This way everyone has to do all the services but the service are weighted so that the neonatal are doing more neonatal services and the pediatrics hospitalist are doing more pediatrics services. This way also gives the neonatal hospitalists who want to do rounding and teach the opportunity to do so as much as possible.

The findings that led to the third recommendation are mainly from the interviews. 4 out of 8 hospitalists commented that they would be excited about the variability opportunities accompanying the potential expansion. Since many pediatric hospitalists expressed the concern that the potential expansion would produce too many different responsibilities to already busy schedules, the team developed the weighted allocation idea.

4. Add specific delivery role
Adding a specific delivery role, ‘one-attending’ model person could work at preparing conference for residents or administrative/leadership/teaching role. When the neonatal groups and pediatric groups are combined, a role would be created specifically for covering deliveries and incorporating into current duties. Another option is to have two attendings with one having primary responsibilities and the second covering if first attending is not available (backup). The findings that led to the fourth recommendation are mainly from the interviews. All 6 pediatric hospitalists were concerned with how the delivery/resuscitation service would be incorporated into the current model without affecting the quality of other services.
5. Implement alternative scheduling models
The last part of the team’s recommendation is implementing an alternative scheduling model which can be seen summarize below:

Inputs:
- FTE per hospitalist and shift capability
- Ratings for each shift per hospitalist
- Time off requests (given to scheduler)
- Scheduler should ensure the following:
  - Coverage requirements (all shifts covered)
  - Fairness
    - Ensure “undesirable” shifts are spread out among group
  - Vacations are granted
    - Remove/add people based on vacation requests
  - Shift preferences are acknowledged
  - Remove/add people based on their shift ratings
  - Variability
    - Remove/add based on learning opportunities
    - If people are on the same shift 80% of the time, give them different shifts so they can learn new things

The data collection methods include observational studies, a survey, interviews, peer institution benchmarking, and historical data and time studies.

The findings that led to the alternative scheduling models are mainly from the interviews with both pediatric and neonatal hospitalists regarding scheduling and literature review regarding heuristic scheduling methods.

6. Continuation of project
The final recommendation developed by the team is that the project be continued by another IOE 481 student group. Our team feels that we have been able to gather a vast amount of pertinent information so that an actual scheduling tool and schedule can be created to both optimize the current hospitalist scheduling process but also the scheduling process of the potential expansion. The continuation would also allow for further evaluation of this potential merger and the effects of such an action.

Findings
The following findings are collections of analyzed data from our implemented methods:

Survey. The team surveyed the pediatric and neonatal hospitalist groups from November 2nd-9th, 2012 and November 16th-21st, 2012, respectively. Many of the key findings from the surveys led to the team’s recommendations. The survey results from both surveys are shown in Appendix B.

Pediatric and Neonatal Hospitalist Similarities
First, many of the survey results from the pediatric and neonatal hospitalists agreed with one another:

1. Career development and medical education are most important to hospitalists
Pediatric and Neonatal Hospitalist Dissimilarities

Next, some of the survey results revealed discrepancies between the pediatric and neonatal hospitalist groups:

1. Fewer, longer weekend day shifts are preferred by pediatric hospitalists but not neonatal hospitalists
   a. Pediatric (n=13): 10 out of 13 (77%) preferred fewer, longer weekend day shifts
   b. Neonatal (n=6): 4 out of 6 (67%) preferred more, shorter weekend day shifts

2. Feelings regarding the delivery/resuscitation service are mostly negative for pediatric hospitalists mostly positive for neonatal hospitalists
   a. Pediatric (n=13): 11 out of 13 (85%) have negative or somewhat negative feelings
   b. Neonatal (n=4): 4 out of 4 (100%) have positive feelings

3. Overworked feelings generally occur at least once a month for pediatric hospitalists and once a month or rarely for neonatal hospitalists
   a. Pediatric (n=14): 11 out of 14 (79%) feel overworked at least once a month
   b. Neonatal (n=4): 6 out of 6 (100%) feel overworked once a month or rarely

Pediatric Hospitalist Specific Findings

The questions asked specifically to the pediatric hospitalists revealed that:

1. Palliative care and wards are most enjoyable shifts (average ranks less than 2.5) and weekend days and nights, Mon/Fri nights, and overnights are least enjoyable (average ranks greater than or equal to 5)
2. Ideal length of newborn shift is 8 hours for 10 out of 11 (91%) pediatric hospitalists
3. 11 out of 14 (79%) pediatric hospitalists are interested or might be interested in serving as a dedicated teaching attending

Neonatal Hospitalist Specific Findings

1. Preference in shift length is 8 hours for 6 out of 6 (100%) of neonatal hospitalists
2. Daily coverage, triage babies, and teaching are most enjoyable shifts (average ranks less than 3) and weekend days and nights, overnights, and palliative care consults are least enjoyable (average ranks greater than or equal to 7)

Interviews. The hospitalist interviews provided insight into the concerns and excitements regarding the potential expansion. The interview results showed four major findings:
8 out of 8 hospitalists interviewed are satisfied with or “like” their current job
3 out of 8 hospitalists interviewed mentioned concerns about maintaining schedule flexibility
4 out of 8 hospitalists interviewed expressed excitement towards some aspects of the potential expansion
4 out of 6 pediatric hospitalists interviewed voiced concerns about adding the delivery/resuscitation service
1 out of 2 neonatal hospitalists voiced interest in adding more variability in their responsibilities

The team also asked the hospitalists what would be an added incentive that would make the potential merger of hospitalist groups more enticing. The team recorded the following information regarding incentives for the pediatric hospitalists:

- 3 out of 6 would desire training for delivery/resuscitation
- 2 out of 6 would desire the ability to shadow delivery/resuscitation shifts
- 2 out of 6 would desire fewer night shifts
- 3 out of 6 would desire fewer weekend shifts

Likewise, the team recorded the following information regarding incentives for the neonatal hospitalists:

- 1 out of 2 would desire a greater scheduling pool
- 1 out of 2 would desire protected teaching time

**Peer Institution Benchmarking.** Although one of the three interviewed peer institutions was not a 24/7 service as defined by C.S. Mott Children’s Hospital, two institutions did not have their pediatric hospitalists cover delivery services. At these hospitals, the delivery service was covered by the neonatal department. Also from the peer institutions, it was found that high satisfaction was achieved with flexibility of the schedule. Texas Children’s Hospital scheduled every month for the next three months, Cincinnati Children’s Hospital Medical Center scheduled once a year. Both institutions scheduled their pediatric hospitalist using Amion scheduling software. For more information about specific findings and comparisons, see Figure G.3.1 in Appendix G.

**Time Studies and Historical Data.** According to the time studies results, the pediatric hospitalists spend 12.5 minutes on average in each patient room during rounds. Each round consisted of 4 patients on average, with a range of 1 to 7 patients.

On average pediatric hospitalists spend 9.2 minutes in each patient room during rounds. On average, a little less than 5 patients per round. Round times follow a lognormal distribution.

**Interpretations**

Based on the findings, the major takeaways are:

- Current job satisfaction among pediatric and neonatal hospitalists is high
- Concerns exist from both groups about the incorporation of new services
- Some hospitalists are willing to be a part of the potential expansion with incentives
- Some hospitalists are excited about the expansion

Also based on the findings, the major roadblocks to the expansion include:
● Lack of standardization between neonatal and pediatric hospitalist schedules
● Decrease in specialization of pediatric hospitalists

Data Collection Methods
The team used the following methods to collect and analyze data: 1) observational studies, 2) surveys, 3) interviews, 4) peer institution benchmarking, and 5) time studies and historical data.

Observational Studies. The team observed various hospitalists on different shifts for a total of 19 hours. Each team member took notes about the observed duties of the hospitalists and recorded the duration of each duty. The primary purpose of the observational studies was to gain a general understanding of hospitalists’ responsibilities and to develop a method for the time studies.

Surveys. The Associate Director of Pediatric Hospitalist Services provided a rough outline for survey questions to quantify the hospitalist team’s job satisfaction and identify their issues with both the current state and proposed future state. Potential issues were thought to arise from the types and time requirements of expanded services. The team revised the survey in collaboration with the Associate Director of Pediatric Hospitalist Services and gave the preliminary paper survey to the hospitalists at a bi-weekly hospitalist meeting. The completed preliminary surveys were returned to the team, which upon review did not ask questions appropriate to the goals of the project. Since the team and coordinator agreed the survey content was inadequate to achieve desired goals, the coordinator suggested meeting with a survey expert.

Using the feedback from this meeting, the team completed the third set of revisions to the survey to ensure that the results from the survey would produce usable data and the questions did not bias the survey taker. The final survey was sent out to the 15 pediatric hospitalists on Friday, November 2nd 2012 and remained open until Saturday, November 10th, 2012. The final survey was also sent to 6 neonatal hospitalists on November 16th 2012 and remained open until November 21st 2012.

Appendix A displays the pages of the survey as individual figures.

Interviews. In conjunction with the developed survey, the team interviewed members of the hospitalist team to expand on the qualitative data received from some of the survey questions. The team developed potential interview questions which were presented at both the weekly coordinator and the weekly client meetings. Using feedback on the question set from the team’s client and coordinator the team revised and finalized the interview questions. The team conducted 8 half-hour (6 pediatric, 2 neonatal) interviews from Monday November 12th to November 19th.

Peer Institution Benchmarking. The team conducted an online search and discussed the findings with the project coordinator to find 13 peer institutions of C.S. Mott Children’s Hospital that operate with a similar hospitalist system. The project coordinator provided the team with contact information for the 13 peer institutions. The team contacted the peer institutions to see if their hospitalist service was a 24/7 service similar to the service used at C.S. Mott Children’s Hospital, and if so, requested interviews with a member who had knowledge of scheduling practices to discuss that peer institution’s scheduling model. The team conducted phone interviews with hospitalists at Texas Children’s Hospital, Cincinnati Children’s Hospital Medical
Center, and St. Louis Children’s Hospital. Appendix C shows a list of all the peer institutions that were contacted and all the peer institutions interviewed.

**Time Studies and Historical Data.** The team received historical ward rounding time data from the Administrative Manager for Clinical Programs of UMHS, and to validate the recorded times, the team constructed a data collection plan to perform time studies on hospitalist rounds. The collection plan, shown in Appendix D, stipulated how time spent rounding on each patient, walking time between patients, and time of round start and end would be measured. The team performed time studies between November 3rd and 12th, 2012. Each member of the team completed 2 time study collection periods where one collection period is rounding ward times, time taken by a hospitalist to visit and speak with all patients on 1 of the 4 teams, for 2 of the 4 teams.

The Administrative Manager for Clinical Programs gave the team access to an online database that contains the amount of time hospitalists have spent on ward rounds from 2007 to 2012 for each team (Blue, Maize, Gold, and Silver).

The team also received data from the Director of Pediatric Hospitalist Service and an Administrative Specialist regarding the appointment fractions of the 15 pediatric hospitalists in an Excel spreadsheet. Appointment fractions refer to the fraction of time each hospitalist spends doing hospitalist work, since many hospitalists are also teachers, researchers, etc. The team has also received information from the coordinator regarding daily census levels and total annual baby deliveries at C.S. Mott as deliveries is one of the services to be covered in the possible expansion.

**Data Analysis**
Analysis methods for the data mentioned in the data collection section are discussed below and include ANOVA analysis, qualitative analysis, and other numerical analysis supported by Excel and Minitab. The team used Minitab to find the probability distribution of historical data. Data collected from the time studies conducted by the team was analyzed and used to validate the historical data.

**Observational Studies.** The team used the information from the observational studies to develop a data collection plan and sheet for time studies about ward rounding time.

**Survey.** The team used the survey results to quantify the desirability of various shifts. Shift desirability was analyzed so it was independent of the time of the shift. The team analyzed shift desirability data with histograms and Pareto charts using Microsoft Excel. The team performed the same analysis on the length and time of shifts.

**Interviews.** The team used interview data to identify incentives that will reduce hospitalist concerns about the expansion. The interview data will also be used, along with survey data, to formulate the alternative scheduling model. The interviews provided additional insight about the hospitalists’ feelings toward the expansion.

**Peer Institution Benchmarking.** The team requested interviews with the peer institutions listed in Appendix C with 24/7 pediatric hospitalist coverage to gain insight into their pediatric
hospitalist scheduling practices. The team qualitatively analyzed the data to identify common and unique practices among the peer institution. Both the common and unique practices have been analyzed to find how implementation of specific aspects would affect scheduling of pediatric hospitalists at C.S. Mott Children’s Hospital.

**Time Studies and Historical Data.** For historical rounding time analysis, the team implemented Minitab Statistical Software and Microsoft Excel. The team collected data from all four rounding teams (Blue, Maize, Silver, and Gold) for the months January 2012 through October 2012. The historical data was recorded in standard time (i.e. 12:00 am), so the team used Excel to compile and convert the data to minutes. Excel was also implemented to find maximum value, minimum value, mean, standard deviation, variance, and median of the data set.

After the data was compiled and converted to minutes, it was exported to Minitab to find the distribution of the data. Anderson-Darling and KS test were run on the data to determine the possible distributions. The data produced the hypotheses that it possibly followed gamma distribution, log-logistic distribution, or lognormal distribution. The probability plot of each distribution was generated to test each of the null hypotheses and can be seen in Appendix E.

The team rejected the hypothesis that the data followed a gamma distribution because a large amount of the data set was outside the 95% confidence interval. The team rejected the hypothesis that the data followed a log-logistic distribution because it produces a p-value greater than the test-statistic. The team concluded that the data followed a lognormal distribution since the majority of the data points fell within the 95% confidence interval, and it produced a p-value less than the test statistic.

While constructing the time study data collection plan, the team started timing rounds at the point when the attending hospitalist met with the residents to begin rounds and to record the time the attending hospitalist and residents entered a patient’s room, left a patient’s room, and the walking time between rooms. The end of rounds was measured as the time when the hospitalist and resident team exited the last patient room.

Once all of the time studies were complete, the results were compiled in Excel and the average time per patient for each round on each team (including and not including walk time) was calculated. The average time per patient for each round and the number of patients for each round were compiled for all teams to compare to the historical rounding data.

After compiling both the time study and historical data, the team conducted validation test. F-test was conducting the null hypothesis that variance of the time study is equal to the variance of the historical data; the alternative hypothesis was the variance of the time study is not equal to the variance of the historical data. Using Minitab to run the F-test with 15 degrees of freedom for the time study data and 596 degrees of freedom for the historical data; the F-test produced a test-statistic of 0.63 and a p-value of 0.148, shown in Figure 1. The results of the F-test failed to reject the null hypothesis that the variances of the historical data and the time study data were equal; concluding the assumption that the time study and historical data have equal variance. The team also implemented Minitab to conduct a 2-Sample T-test with a 95% confidence interval of the historical and time study data. The 2-Sample T-test was run with a null hypothesis that the mean of the time study data and the mean of the historical data were equal;
the alternative hypothesis was the mean of the time study data is greater than the mean of the historical data. The sample size of the historical data was 597 and the time study data had a sample size of 16. The 2-sample T-test produced a p-value of 0.0 (see Figure 2), so the team rejected the null hypothesis that the means of the time study data and the historical data are equal; concluding that the time study data means are significantly greater than the historical data means.

<table>
<thead>
<tr>
<th>Test Method</th>
<th>DF1</th>
<th>DF2</th>
<th>Statistic</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>F Test (normal)</td>
<td>596</td>
<td>15</td>
<td>0.63</td>
<td>0.146</td>
</tr>
<tr>
<td>Levene's Test (any continuous)</td>
<td>1</td>
<td>611</td>
<td>1.65</td>
<td>0.200</td>
</tr>
</tbody>
</table>

Figure 1: F-Test Minitab Output for Historical Data Validation

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>StDev</th>
<th>SE Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historical Means</td>
<td>597</td>
<td>9.19</td>
<td>3.70</td>
<td>0.15</td>
</tr>
<tr>
<td>Collected Means</td>
<td>16</td>
<td>12.47</td>
<td>4.66</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Difference = μ (Historical Means) - μ (Collected Means)
Estimate for difference:  -3.280
95% upper bound for difference:  -1.724
T-Test of difference = 0 (vs <): T-Value = -3.47  P-Value = 0.000  DF = 611
Both use Pooled StDev = 3.7293

Figure 2: F-Test Minitab Output for Historical Data Validation

**Expected Impact**

Overall, the expected impacts of the above recommendations are maintained or increased job satisfaction for both the pediatric and neonatal hospitalists and more positive feelings toward the potential expansion. Expected impacts for each specific recommendation are:

1. **Standardize shift design and full-time definition**
   - Creates easier transition and scheduling upon potential merger
2. **Expand to cover 24/7 newborn service while training for deliveries**
   - Makes expansion a step-by-step process, less overwhelming
3. **Combine groups with weighting on respective services**
   - Maintains pediatric hospitalist satisfaction while increasing neonatal hospitalist variety
4. **Add specific delivery role**
   - Allows for coverage of deliveries to have minimal interference with current duties
5. **Implement alternative scheduling models**
   - Gives greater context to scheduling and should reduce time/effort spent on scheduling
6. **Continuation of project**
   - Allows for further evaluation of the potential merger of hospitalist groups
Appendix A: Qualtrics Survey

Figure A.1 of Qualtrics Survey

Figure A.2 of Qualtrics Survey
Currently, about how many hours a week do you spend on hospitalist duties?
- 26 hours or less
- 30 hours
- 35 hours
- 40 hours or more

Currently, how many months (4 weeks of Monday – Friday) are you on wards annually?
- 1 month
- 2 months
- 3 months
- 4 months

How often do you feel overworked?
- Never
- Rarely
- Less than Once a Month
- Once a Month
- 2-3 Times a Month
- Once a Week
- 2-3 Times a Week
- Daily

As you may know, the pediatric hospitalist team will soon expand to completely cover the delivery/newborn resuscitation and newborn services.

In your opinion, what are the advantages and disadvantages of the service expansion?

Please share any additional comments:
In a given month, which would you rather work?
- More weekend day shifts
- More weekend night shifts

In general, which would you rather work?
- More shorter weekend day shifts
- Fewer longer weekend day shifts

What is the maximum number of night/ evening shifts you would be willing to do in a row?
- 2 Shifts
- 3 Shifts
- 4 Shifts
- 5 Shifts
- 6 Shifts
- 7 Shifts

What is the most hours you would work in a week as a hospitalist?
- 36 Hours
- 40 Hours
- 44 Hours
- 48 Hours

Figure A.4 of Qualtrics Survey
Would you rather the Tuesday-Thursday day/night shift division be 8/8/8 hours (status quo), 12/12 hours, or 8/16 hours?
- 8 hour day shift & 8/8 hour night shift
- 12 hour day shift & 12 hour night shift
- 16 hour day shift & 8/8 hour night shift

Would you rather the Monday/Friday day/night shift division be 8/16 hours (status quo), 12/12 hours, or 8/8/8 hours?
- 16 hour day shift & 8 hour night shift
- 12 hour day shift & 12 hour night shift
- 8 hour day shift & 8/8 hour night shift

What is your ideal number of months (4 weeks of Monday - Friday) to be on wards annually?
- 1 Month
- 2 Months
- 3 Months
- 4 Months

Would you rather have:
- 1 attending per team with more months on?
- 1 attending per 2 teams (status quo)?

Would you rather have:
- More consistent/Less flexible schedule (a sequence or cycle of shifts)?
- Less consistent/More flexible schedule (NOT a cycle or sequence of shifts)?

Figure A.5 of Qualtrics Survey
What is your ideal length of delivery/newborn resuscitation shifts?
- 8 Hours
- 12 Hours
- 10 Hours
- 24 Hours

Please indicate your feelings regarding the delivery/newborn resuscitation service:

If you have any comments regarding the coverage of the delivery/newborn resuscitation service please comment below:

Figure A.6 of Qualtrics Survey
Would the delivery/newborn resuscitation service be more enjoyable to you if (Please select all that apply)

- [ ] You had fewer weekend shifts
- [ ] You had fewer evening/overnight shifts
- [ ] You had the same amount of ward shifts
- [ ] You had fewer ward shifts
- [ ] Other

Figure A.7 of Qualtrics Survey
Figure A.8 of Qualtrics Survey
Would the newborn service be more enjoyable to you if: (Please select all that apply)
- You had fewer weekend shifts
- You had fewer evening/overnight shifts
- You had the same amount of ward shifts
- You had fewer ward shifts
- Other

Figure A.9 of Qualtrics Survey

Would you be interested in serving as a dedicated teaching attending (primarily responsible for running student conference, grading of student write-ups, and general education)?
- Yes
- Maybe
- No (keep the current model)

Please rank the following in terms of importance to you (with 1 being the most important and 4 being the least important):
- Mentoring for you (career development)
- Medical education development for you (become a better teacher)
- Leadership opportunities
- Quality Improvement opportunities

Figure A.10 of Qualtrics Survey
Figure A.11 of Qualtrics Survey

Figure A.12 of Qualtrics Survey
The following is a survey created by the Industrial and Operations Engineering students working on the Neonatal Hospitalist Scheduling Project at C & W Mott Hospital.

Questions will be asked about current feelings and personal satisfaction about your role as a neonatal hospitalist. The questions pertain to your role as a hospitalist and exclude such roles relating to AOD, moonlighting, clinic, and others unless otherwise noted in the specific question.

Figure A.13 of Neonatal Survey

Please select all services that apply to you as a hospitalist:
- Weekend Days
- Weekend Nights
- Newborn
- Delivery Coverage
- Days
- Evenings
- Overnights
- Triage Babies
- Teaching
- Palliative Care Consults
- NAI/Prenatal Consults

Figure A.14 of Neonatal Survey
Currently, about how many hours a week do you spend on hospitalist duties?
- 20 hours or less
- 25 hours
- 30 hours
- 35 hours
- 40 hours or more

How often do you feel overworked?
- Never
- Rarely
- Less than Once a Month
- Once a Month
- 2-3 Times a Month
- Once a Week
- 2-3 Times a Week
- Daily

As you may know, the pediatric hospitalist team may expand to completely cover the delivery/newborn resuscitation and newborn services and the neonatal hospitalist group would merge or become part of the pediatric hospitalist group.

In your opinion, what are the advantages and disadvantages of the potential service expansion?

Please share any additional comments.

Figure A.15 of Neonatal Survey
Figure A.16 of Neonatal Survey
Figure A.17 of Neonatal Survey

Would you rather the shift division be status quo (3 shifts of 8 hours per day), 12/12 hours, or 3/16 hours?
- 8 hour day shift, 8 evening shift, & 8 hour overnight shift
- 12 hour day shift & 12 hour night shift
- 16 hour night shift & 8 hour day shift

Would you rather have a:
- More consistent/Less flexible schedule (a sequence or cycle of shifts)?
- Less consistent/More flexible schedule (NOT a cycle or sequence of shifts)?

>> Back Next >>

Figure A.18 of Neonatal Survey

What is your ideal length of delivery/newborn resuscitation shifts?
- 8 Hours
- 12 Hours
- 16 Hours
- 24 Hours

Please indicate your feelings regarding the delivery/newborn resuscitation service:

If you have any comments regarding the coverage of the delivery/newborn resuscitation service please comment below:

>> Back Next >>
Figure A.19 of Neonatal Survey

Would the delivery/newborn resuscitation service be more enjoyable to you if: (Please select all that apply)

- [ ] You had fewer weekend shifts
- [ ] You had fewer evening/overnight shifts
- [ ] You had the same amount of ward shifts
- [ ] You had fewer ward shifts
- [ ] Other

[<< Back  Next >>]

Figure A.20 of Neonatal Survey

What is your ideal length of newborn coverage shifts?

- [ ] 8 Hours
- [ ] 12 Hours
- [ ] 16 Hours
- [ ] 24 Hours

Please indicate your feelings regarding the newborn service:

[Happy Face Icon]

If you have any comments regarding the coverage of the newborn service please comment below:

[Comments Box]

[<< Back  Next >>]
Would the newborn service be more enjoyable to you if you had fewer weekend shifts?
Would you be interested in serving as a dedicated teaching attending (primarily responsible for running student conferences, grading of student write-ups, and general education)?

Please rank the following in terms of importance to you (with 1 being the most important and 4 being the least important):
- Mentoring for you (career development)
- Medical education development for you (become a better teacher)
- Leadership opportunities
- Quality improvement opportunities
Figure A.23 of Neonatal Survey
Appendix B: Pediatric Hospitalist Survey Results

**Ideal # Months on Wards Annually**

- **n=13**
- 1 Month: 8%
- 2 Months: 38%
- 3 Months: 38%
- 4 Months: 15%

Figure B.1. Survey Results

**Weekend Day Shift Preferences**

- **n=13**
- More shorter weekend day shifts: 23%
- Fewer longer weekend day shifts: 77%

Figure B.2. Survey Results
Figure B.3. Survey Results

Preference in Max Hours a Week as a Hospitalist
n=13

Figure B.4. Survey Results

Maximum Number of Night Shifts in a Row
n=13
Preference in # of Attendings on Wards

n=12

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>One attending per team with more months on?</td>
<td>33%</td>
</tr>
<tr>
<td>One attending per two teams (status quo)?</td>
<td>67%</td>
</tr>
</tbody>
</table>

Figure B.5. Survey Results

Interest in Serving as Teaching Attending

n=14

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>50%</td>
</tr>
<tr>
<td>Maybe</td>
<td>29%</td>
</tr>
<tr>
<td>No (keep the current model)</td>
<td>21%</td>
</tr>
</tbody>
</table>

Figure B.6. Survey Results
Figure B.7. Survey Results

Tuesday-Thursday Day/Night Shift Preference

n=12

8 hour day shift & 8/8 hour night shift: 92%
12 hour day shift & 12 hour night shift: 8%
16 hour day shift & 8 hour night shift: 0%

Figure B.8. Survey Results

Preference of Schedule Attributes

n=12

More consistent/Less flexible schedule (a sequence or cycle of shifts)? 25%
Less consistent/More flexible schedule (NOT a cycle or sequence of shifts)? 75%
Figure B.9. Survey Results

Figure B.10. Survey Results
Average Rank of Importance (1=Highest)
n=14

<table>
<thead>
<tr>
<th>Mentoring for you (career development)</th>
<th>Medical education development for you (become a better teacher)</th>
<th>Leadership opportunities</th>
<th>Quality Improvement opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.07</td>
<td>2.14</td>
<td>2.64</td>
<td>3.14</td>
</tr>
</tbody>
</table>

Figure B.11. Survey Results

Frequency of Feeling Overworked
n=14

<table>
<thead>
<tr>
<th>Frequency</th>
<th>0%</th>
<th>20%</th>
<th>40%</th>
<th>60%</th>
<th>80%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>21%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Rarely</td>
<td>0%</td>
<td>0%</td>
<td>14%</td>
<td>29%</td>
<td>14%</td>
<td>14%</td>
</tr>
<tr>
<td>Less than Once a Month</td>
<td>14%</td>
<td>29%</td>
<td>14%</td>
<td>14%</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Once a Month</td>
<td>14%</td>
<td>29%</td>
<td>14%</td>
<td>14%</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>2-3 Times a Month</td>
<td>14%</td>
<td>29%</td>
<td>14%</td>
<td>14%</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Once a Week</td>
<td>14%</td>
<td>29%</td>
<td>14%</td>
<td>14%</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>2-3 Times a Week</td>
<td>14%</td>
<td>29%</td>
<td>14%</td>
<td>14%</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Daily</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Figure B.12. Survey Results
Figure B.13. Survey Results

Figure B.14. Survey Results
Figure B.15. Survey Results

Figure B.16. Survey Results
Figure B.17. Survey Results

Figure B.18. Survey Results
Figure B.19. Survey Results

Weekend Day/Night Preference

- More weekend day shifts: 46%
- More weekend night shifts: 54%

n=13

Figure B.20. Survey Results

Shift Preference

- 16 hour day shift & 8 hour night shift: 22%
- 12 hour day shift & 12 hour night shift: 11%
- 8 hour day shift & 8/8 hour night shift: 67%

n=9
Figure B.21. Survey Results

Ideal Length of Newborn Shift

n=11

- 91% for 8 Hours
- 9% for 12 Hours
- 0% for 16 Hours
- 0% for 24 Hours
Appendix C: Neonatal Hospitalist Survey Results

**Weekend Day Shift Preference**

![Weekend Day Shift Preference Chart](chart1.png)

*Figure C.1. Survey Results*

**Maximum Hours Desired to Work as Hospitalist Weekly**

![Maximum Hours Desired Chart](chart2.png)

*Figure C.2. Survey Results*
Figure C.3. Survey Results

Maximum Number of Consecutive Evening Shifts
n=6

<table>
<thead>
<tr>
<th>Shifts</th>
<th>0%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
<th>100%</th>
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</thead>
<tbody>
<tr>
<td>2 Shifts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50%</td>
</tr>
<tr>
<td>3 Shifts</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td>4 Shifts</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>5 Shifts</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0%</td>
</tr>
</tbody>
</table>

Figure C.4. Survey Results

Interested in Serving as Dedicated Teaching Attending
n=6

<table>
<thead>
<tr>
<th>Response</th>
<th>Yes</th>
<th>Maybe</th>
<th>No (keep the current model)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>0%</td>
<td>83%</td>
<td>17%</td>
</tr>
</tbody>
</table>

Yes | Maybe | No (keep the current model)
Figure C.5. Survey Results

Preference in Length of Shifts

<table>
<thead>
<tr>
<th>Shift Type</th>
<th>Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 hour day shift, 8 evening shift, &amp; 8 hour overnight shift</td>
<td>100%</td>
</tr>
<tr>
<td>12 hour day shift &amp; 12 hour night shift</td>
<td>0%</td>
</tr>
<tr>
<td>16 hour night shift &amp; 8 hour day shift</td>
<td>0%</td>
</tr>
</tbody>
</table>

Figure C.6. Survey Results

Preference in Schedule Attributes

<table>
<thead>
<tr>
<th>Schedule Attributes</th>
<th>Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>More consistent/Less flexible schedule (a sequence or cycle of shifts)?</td>
<td>17%</td>
</tr>
<tr>
<td>Less consistent/More flexible schedule (NOT a cycle or sequence of shifts)?</td>
<td>83%</td>
</tr>
</tbody>
</table>
**Attitude regarding Delivery Service**

- **n=4**

![Attitude regarding Delivery Service Graph]

Figure C.7. Survey Results

**Ideal Length of Delivery Shift**

- **n=6**

![Ideal Length of Delivery Shift Graph]

Figure C.8. Survey Results
Figure C.9. Survey Results

Average Rank of Importance
n=6

- Mentoring for you (career development): 1.83
- Medical education development for you (become a better teacher): 1.83
- Leadership opportunities: 3.00
- Quality Improvement opportunities: 3.33

Figure C.10. Survey Results

Frequency of Feeling Overworked
n=6

- Never: 50%
- Rarely: 50%
- Less than Once a Month: 0%
- Once a Month: 0%
- Once a Week: 0%
- 2-3 Times a Week: 0%
- 2-3 Times a Week: 0%
- Daily: 0%
Figure C.11. Survey Results

Figure C.12. Survey Results
Figure C.13. Survey Results

Ideal Length of Newborn Shifts

- 8 Hours: 100%
- 12 Hours: 0%
- 16 Hours: 0%
- 24 Hours: 0%

n=6

Figure C.14. Survey Results

Attitude regarding Newborn Service

- Negative: 0%
- Somewhat Negative: 0%
- Neutral: 0%
- Somewhat Positive: 40%
- Positive: 60%

n=5
Figure C.15. Survey Results

**Current Hours Doing Hospitalist Duties**

- 20 hours or less: 50%
- 25 hours: 0%
- 30 hours: 0%
- 35 hours: 0%
- 40 hours or more: 50%

Figure C.16. Survey Results

**Shift Coverage**

- Weekend Days: 100%
- Weekend Nights: 83%
- Newborn Delivery Coverage: 100%
- Days: 100%
- Evenings: 83%
- Overnights: 83%
- Triage Babies: 100%
- Teaching: 100%
- Palliative Care Consults: 83%
- NAS/Prenatal Consults: 100%
Appendix D: Hospitalist Interview Questions

Table D.1. Hospitalist Interview Script

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How long have you been a hospitalist?</td>
<td></td>
</tr>
<tr>
<td>2. How long have you been working at Mott?</td>
<td></td>
</tr>
<tr>
<td>3. How do you feel about your job currently?</td>
<td></td>
</tr>
<tr>
<td>What are some of the most enjoyable parts of your job?</td>
<td></td>
</tr>
<tr>
<td>What are some of the least enjoyable parts of your job?</td>
<td></td>
</tr>
<tr>
<td>4. As we think about expanding services (newborns - rounding and deliveries - going to deliveries if pediatrics says there is need and possibly doing resuscitation) Do you feel there are any issues with this possible expansion?</td>
<td></td>
</tr>
<tr>
<td>5. What would make it difficult to incorporate this into the current state? Issues that would affect quality of work and functionality of system and hospitalist team Can you identify some top issues related to the expansion of the newborn service? Can you identify some top issues related to the expansion of the delivery/newborn resuscitation service?</td>
<td></td>
</tr>
<tr>
<td>6. What are your reactions to and feelings about this? Referring to the potential expansion Is there anything potentially exciting about the potential expansion? Do you have any concerns about the potential expansion? About the feelings discussed above: how strong are they?</td>
<td></td>
</tr>
<tr>
<td>7. What would make you more comfortable with the potential expansion? Fewer shifts, fewer types of shifts (night and weekends), etc.</td>
<td></td>
</tr>
</tbody>
</table>

Thank you very much for your time.
Appendix E: Historical Data Analysis

Figure E.1. Probability Plot of Ward Historical Rounding Time

Figure E.2. Probability Plot of Ward Historical Rounding Time
Figure E.3. Probability Plot of Ward Historical Rounding Time

Figure E.4. Histogram of Ward Historical Rounding Time
### Appendix F: Time Study Data Collection Sheet

<table>
<thead>
<tr>
<th>Team:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalist:</td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td></td>
</tr>
<tr>
<td><strong>Round Start Time:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Round End Time:</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient #</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<table>
<thead>
<tr>
<th><strong>Total Round Time</strong></th>
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<tr>
<td><strong>Total Walk Time</strong></td>
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### Appendix G: Peer Institution Information

Table G.1. List of Peer Institutions and those Interviewed

<table>
<thead>
<tr>
<th>Identified Peer Institutions</th>
<th>Interviewed Peer Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boston Children's Hospital</td>
<td></td>
</tr>
<tr>
<td>Children's Hospital of Philadelphia</td>
<td></td>
</tr>
<tr>
<td>Cincinnati Children's Hospital Medical Center</td>
<td>X</td>
</tr>
<tr>
<td>Texas Children's Hospital</td>
<td>X</td>
</tr>
<tr>
<td>Children's Hospital of Los Angeles</td>
<td></td>
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<tr>
<td>Children's Hospital Colorado</td>
<td></td>
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<tr>
<td>Nationwide Children's Hospital</td>
<td></td>
</tr>
<tr>
<td>Ann and Robert H. Lurie Children's Hospital of Chicago</td>
<td></td>
</tr>
<tr>
<td>Children's Hospital of Pittsburgh of UPMC</td>
<td></td>
</tr>
<tr>
<td>Johns Hopkins Children's Center</td>
<td></td>
</tr>
<tr>
<td>St. Louis Children's Hospital</td>
<td>X</td>
</tr>
<tr>
<td>Riley Hospital for Children</td>
<td></td>
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<tr>
<td>UH Rainbow Babies</td>
<td></td>
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</table>
Table G.2. Institution Interview Script

“We are working on a project with the pediatric hospitalists at Mott to investigate a potential expansion of services. Currently, it is a 24x7 service with roles such as: well newborn rounding, wards, evenings, overnights, palliative care, AOD, and backup.”

The hospitalist services are currently covered by two different structures: pediatric and neonatal hospitalists. Right now, the pediatric hospitalists cover wards, evenings, palliative care, AOD and backup fully and cover newborns 32 weeks per year. The neonatal hospitalists also cover newborns and deliveries/newborn resuscitation

Putting the two groups into one reporting structure that covers all the services 24x7 is being considered”

<table>
<thead>
<tr>
<th>We would like to record this interview, is that ok with you?</th>
</tr>
</thead>
<tbody>
<tr>
<td>At the end of our interview process we are offering to send out compiled results. Would you be willing to have your answers shared and would you like a copy of the results?</td>
</tr>
<tr>
<td>We would like to confirm that you are 24x7 service?</td>
</tr>
<tr>
<td>How many pediatric hospitalists do you employ?</td>
</tr>
<tr>
<td>How many FTE pediatric hospitalists are there?</td>
</tr>
<tr>
<td>How do you schedule your pediatric hospitalists?</td>
</tr>
<tr>
<td>How long have you used this scheduling process?</td>
</tr>
<tr>
<td>How do you feel this has worked in relation to both effectiveness and employee satisfaction?</td>
</tr>
<tr>
<td>Can you identify what and how this has worked well?</td>
</tr>
<tr>
<td>Have there been any problems encountered?</td>
</tr>
<tr>
<td>If so, can you identify them?</td>
</tr>
<tr>
<td>Thank you very much for your time.</td>
</tr>
<tr>
<td>Institution</td>
</tr>
<tr>
<td>------------------------------</td>
</tr>
<tr>
<td>C.S. Mott</td>
</tr>
<tr>
<td>St. Louis Children’s Hospital</td>
</tr>
<tr>
<td>Texas Children’s Hospital</td>
</tr>
<tr>
<td>Cincinnati Children’s Hospital</td>
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<tr>
<td>Institution 2011 Activity Comparison</td>
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<tr>
<td>St. Louis Children’s Hospital</td>
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<tr>
<td>Texas Children’s Hospital</td>
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<tr>
<td>Cincinnati Children’s</td>
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Figure G.3.2 Comparison Matrix