Improving Team Structure and Communication

* A Key to Hospital Efficiency

David M. Friedman, MD; David L. Berger, MD

**Hypothesis:** Improving team structure and heightening communication will help provide cost-effective and high-quality patient care for general surgery patients.

**Design:** This study surveys teamwork initiatives and their effects on specific variables related to patient care.

**Patients:** The study population comprised all patients admitted to the hospital’s general surgery teams during 5 years 3 months.

**Setting:** Tertiary care hospital.

**Interventions:** A complete restructuring of the patient care team for general surgery patients admitted to the hospital. The intervention occurred midway through the study period.

**Main Outcome Measures:** Mean length of stay for general surgery patients as a marker of team efficiency and a standardized patient satisfaction survey.

**Results:** The mean length of stay after initiation of the restructured care team was significantly shorter than before initiation. The significance was present despite a consistent patient acuity measure and was associated with a high patient satisfaction level.

**Conclusions:** Restructuring the patient care team yielded a decreased mean length of stay while maintaining a high level of patient satisfaction. This analysis helps validate a hospitalwide initiative to maintain a high level of patient care while increasing patient volume.

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**METHODS**

**Team Restructuring**

The general surgery patient care team was previously an informal concept, lacking well-structured collaboration between physicians, nurses, and case managers. Meetings between team members were unscheduled and often did not include all necessary team members. This disorganized system led to poor communication between team members. In addition, the du-
Application of roles that existed secondary to poor communication often frustrated team members and compounded problems. At the inception of this program, specific changes were introduced into the patient care system to correct these weaknesses. The concept of a patient care team became well defined, with each member having specific responsibilities. Redundancy between roles was removed to increase the effectiveness of time spent caring for patients. There was an emphasis placed on improving regular open communication and collaboration between all team members. In addition, a formalized schedule of meetings was designed to facilitate this collaborative effort. A general outline of the newly created system of interactions between team members is provided herein.

The first part of each morning involves the residents' seeing their patients on the floors. Then, on a daily basis, the staff surgeons speak with the residents regarding each patient’s hospital course, potential discharge date, and anticipated services. Ward service patients had no such identified staff surgeon denoted as caretaker on admission, whereas private service patients were defined as already having a preestablished staff surgeon denoted as caretaker on admission. Ward service patients had no such identified staff surgeon identified on admission, with most patients coming from the emergency department or an urgent care surgical clinic.

Table 1. General Surgery Inpatient Volume on General Surgery Floors: Hospital Days and Unadjusted Mean Length of Stay

<table>
<thead>
<tr>
<th>Service</th>
<th>No. of Patients FY98-00</th>
<th>Total Inpatient Days FY98-00</th>
<th>Unadjusted Mean Length of Stay, d FY98-00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>5181</td>
<td>34,852</td>
<td>6.73</td>
</tr>
<tr>
<td>Ward</td>
<td>2396</td>
<td>21,045</td>
<td>8.78</td>
</tr>
<tr>
<td>FY01-03Q1</td>
<td>5097</td>
<td>28,042</td>
<td>5.50</td>
</tr>
<tr>
<td>FY01-03Q1</td>
<td>1685</td>
<td>13,022</td>
<td>8.09</td>
</tr>
</tbody>
</table>

Abbreviations: FY, fiscal year; Q1, first quarter.

Statistical Analysis

The collected data were initially adjusted based on several criteria. This adjustment standardized the data across the individual years, making statistical comparison feasible. Factors used for adjustment, including age, sex, mean case weight, and admission source, were selected based on their perceived potential to unaccountably skew the data between study periods. Case weights were assigned to each patient based on diagnosis-related groups, with the mean case weight serving as a surrogate measure for patient complexity and acuity. Admission source is a hospital code assigned to each patient identifying whether he or she was admitted from home for elective surgery, through the emergency department, as a hospital transfer, or via some other route. The adjustment factors included a mean age of 54 years, 53% of patients as female, and a mean case weight of 2.6. The adjusted data were analyzed on an integer scale and a log scale using multiple linear regression models. Significance was set at $P < .05$.

Patient Satisfaction Survey

The use of a nationally recognized patient satisfaction survey, created by Press Ganey Associates Incorporated (South Bend, Ind), was instituted in 2001. The survey contained a series of questions pertaining to the quality of care during the hospital stay. The possible answers to each question were “very poor,” “poor,” “fair,” “good,” and “very good.” Patient survey results were entered into a hospitalwide database that maintains patient anonymity. The survey results were broken down by year and by hospital floor. There was no standardized system of measuring patient satisfaction in place at the hospital before 2001.

RESULTS

The general surgery service has 2 primary floors to which patients are admitted. There are 85 beds comprising the floors. At any given time, most patients on these floors are on the general surgery service. The staff surgeons and residents cover both floors equally.

The number of patients operated on and admitted increased on the private general surgery service, from 2302 patients in fiscal year 1998 to 3450 patients in fiscal year 2002. Of these patients, approximately 68% were admitted to the primary general surgery floors. The number of patients operated on and admitted by the ward general surgery service remained stable during the studied years, from 961 patients in fiscal year 1998 to 972 patients in fiscal year 2002. Of these patients, approximately 79% were admitted to the general surgery floors. Across both services, the total number of inpatient days (defined as the sum of all inpatient days for the studied patients) decreased. The ward service had a noticeable corresponding decrease in admissions between time periods compared with the private service (Table 1).

For the unadjusted data, there was a decrease in the mean length of stay across the 2 time periods for the pri-
Table 2. Mean Length of Stay for General Surgery Patients on General Surgery Floors: Unadjusted and Adjusted

<table>
<thead>
<tr>
<th>Service</th>
<th>FY98-00</th>
<th>FY01-03Q1</th>
<th>FY98-00</th>
<th>FY01-03Q1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>6.73</td>
<td>5.50</td>
<td>7.06†</td>
<td>6.22†</td>
</tr>
<tr>
<td>Ward</td>
<td>8.78</td>
<td>8.08</td>
<td>8.13</td>
<td>7.72</td>
</tr>
</tbody>
</table>

Abbreviations: FY, fiscal year; Q1, first quarter.
*Adjustment based on a mean age of 54 years, 53% of patients as female, and a mean case weight of 2.6.
†Comparison between FY98-00 and FY01-03Q1 significant, with P<.001.

Table 3. Adjusted Mean Length of Stay for General Surgery Patients on General Surgery Floors: Integer Scale and Log Scale

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<tbody>
<tr>
<td>Private</td>
<td>6.73*</td>
<td>5.50*</td>
<td>5.96*</td>
<td>4.78*</td>
</tr>
<tr>
<td>Ward</td>
<td>8.78</td>
<td>8.08</td>
<td>7.11*</td>
<td>6.22*</td>
</tr>
</tbody>
</table>

Abbreviations: FY, fiscal year; Q1, first quarter.
*Comparison between FY98-00 and FY01-03Q1 significant, with P<.001.

Figure 1. Patient survey results for general surgery floor number 1 during the second and fourth quarters of fiscal year 2002 (FY02Q2 and FY02Q4, respectively).

Figure 2. Patient survey results for general surgery floor number 2 during the second and fourth quarters of fiscal year 2002 (FY02Q2 and FY02Q4, respectively).

Table 3. Adjusted Mean Length of Stay for General Surgery Patients on General Surgery Floors: Integer Scale and Log Scale

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Variate and ward services (Table 1); however, these data were not statistically analyzed. Comparing the adjusted mean lengths of stay on an integer scale, there was a significant decrease (P<.001) between the first and second time periods for the private service but not for the ward service (Table 2). By using an integer scale, there can be a significant effect on the data by the presence of outliers (patients who stayed for an unexpectedly long time as an inpatient). The standard deviation of the unadjusted mean length of stay for the ward service was 11.7 days, compared with a standard deviation of 8.8 days for the private service. Although not statistically analyzed, this suggests that there was an increased range, and possibly more outliers, among inpatient stays on the ward service vs the private service.

For adjusted length of stay on a log scale, which reduces the effect of outlier data points, there was a significant decrease in the mean length of stay for both services between time periods (Table 3). The amount of decrease in the mean was greater for the ward service than for the private service in both time periods, suggesting a greater presence of extended inpatient stays in this group.

Although there are no patient satisfaction survey data available before 2001, data after 2001 are crucial to assess any negative aspects of the new initiatives. By using 2 recently analyzed quarters (the second and fourth quarters of fiscal year 2002) as marks of progress to date, the percentage of patients responding with “good” or “very good” overall responses ranged from 82.1% to 87.9% for the 2 general surgery floors (Figure 1 and Figure 2). Both floors had scores at or above the hospital mean in the areas of discharge speed and preparation of home care services on discharge. Also, both floors were above the hospital mean in regard to the perceived skill of the physician by the patient. These data suggest not only that patients are efficiently and well prepared for their discharge but also that there was no sacrifice in the physician-patient relationship by restructuring the treatment team. Potentially, there was an enhancement of the physician-patient relationship, as more of a physician’s time could be spent interacting about the care plan and less time was needed to plan all of the discharge details.
COMMENT

The clinical performance management team was initiated at the hospital to deconstruct practice patterns, with the goal of increasing hospital efficiency while maintaining excellent patient care. Our results show that this project is a success thus far. Comparing the adjusted mean lengths of stay for the years before the program implementation with those after implementation, there was a significant reduction in length of stay across ward and private services on the 2 primary general surgery floors. The length of stay reduction was, on average, more than 1 day for private service general surgery patients and almost 1 day for ward service general surgery patients.

When evaluating these results, it is important to translate them into benefits for the hospital, the staff, and the patients. A practical way to look at this study is to note that, for each hospital admission to the general surgery service, there is 1 fewer inpatient day. In fiscal year 2002, in which 4422 patients were admitted, this translates to approximately 4400 fewer inpatient days. It follows that these “open days” could subsequently be filled by new admissions to the hospital for surgery. Alternatively, if these available bed spaces went unfilled, the hospital could scale back or restructure staffing on floors that have this increased turnover, as the daily census would be lower. Our medical center has more than 90% of its beds filled at any given time. This high census pushes the administrative and ancillary supports to their limits of efficiency. By lowering the census, the strain on these services is decreased and the hospital can run more efficiently.

These results can also aid the surgeon. If a surgeon maintained a stable volume of cases, then the reduction in length of stay could correspond to a decreased personal inpatient census. However, the extra number of hospital days could instead be used to allow an increase in surgical volume. This increase could come from elective cases and from increased ability to add emergency cases because of vacant patient beds. Fortunately, regardless of the patient source, the surgeon’s referral base and patient load can substantially increase. In addition, waiting periods for patients to have elective surgery, which often stretch to weeks, could be decreased.

The benefits of this new system for the staff are several. There is a strong sense of collaboration instilled among team members who work toward a common goal. Well-integrated multidisciplinary care teams have been shown to be beneficial in other health care settings. In this case, although there is a hierarchy present among the members of the team, every member has equal opportunity to provide input regarding a patient’s care plan. With the removal of overlapping roles among team members, each person approaches the care of the patient from a unique perspective and provides unique input. In addition, each team member can begin to hone his or her skills to maximize the effect toward the overall care of the patient.

The second benefit for the care team relates to residents and their medical training. As of 2004, there are new nationwide rules limiting the work hours of residents. There is significant concern that these limitations could have negative effects on the quality of surgical training. One common resolution of this problem has been to employ physician extenders such as physician assistants and nurse practitioners. The use of physician extenders, specifically nurse practitioners, has been studied and has become commonplace in settings such as a trauma surgery care team. In that setting, the use of nurse practitioners reduced residents’ workloads and improved the quality of patient care. However, the cost of employing physician extenders is not trivial and can be prohibitive in some instances. This study highlights another method to decrease residents’ work hours. In addition, decreasing the length of stay of surgical patients, and possibly the inpatient census, creates an opportunity to decrease each resident’s patient load. Fortunately, even if there proved to be no significant decrease in the census (ie, the open patient beds were filled with an increase in surgical volume), the residents would have a denser learning experience by taking part in a larger number and variety of patients’ care for the same total number of patient days. Therefore, the efficiency of the care team would facilitate a richer resident experience, making the effect of lost time to work hour limitations less significant. Although some may question whether additional daily rounds take up time from the resident’s schedule, our experience shows that the benefit of increased efficiency during the day far outweighs the cost.

The final, and most important, group to benefit from this new collaborative team is the patients. By defining early in the hospital stay those resources that will be necessary on discharge, the patients can make a seamless and safe transition from the inpatient setting to the outpatient setting. There is less time lost while a patient remains in the hospital waiting for bed availability at a nursing home or rehabilitation center. In the daily rounds between the residents, the case managers, and the nurses, there is a strong sense of partnership toward a common goal. The residents provide information about potential postoperative problems related to the patient’s medical condition, the case managers relay the patient’s desires and concerns regarding the upcoming discharge, and the nurses highlight the patient’s functional status. It is expected that this also leads to a significant decrease in errors, as there is the potential for more oversight as the medical environment becomes busier and more complex.

Although this study shows significant positive results from our restructuring, there are certain limitations in the study design. The first limitation relates to the study population. Although there were several factors used to adjust the data for analysis, these are only markers of identifiable patient characteristics. It is complex to determine true patient acuity based solely on diagnosis-related groups, however, it is likely that most patients receiving similar operations will have similar acuity when you also adjust for age, sex, and admission source. In addition, there are noticeable differences between ward service and private service patients that limit direct comparisons between these patient groups. Whereas private service patients are usually admitted for elective surgery after a full preoperative evaluation, ward service patients typically undergo procedures that are less...
elective in nature and can have increased complexity based on their admission source (the emergency department). Also, ward service patients often have more complex social backgrounds, leading to delays in disposition from the hospital. Given these differences, it is remarkable that both groups displayed a decreased length of stay after implementation of the team restructuring.

A second limitation to this study is that there are no formalized preintervention patient satisfaction survey data with which we can compare our present survey results. Although this hinders performing any statistical analysis regarding the significance of the survey results, we believed that some empirical inferences could be made. Part of the goal of this research was to evaluate the effect of team restructuring on patient care, with patient satisfaction as a surrogate marker of perceived quality. By noting that most (82%-88%) patients surveyed were satisfied with their care, we extrapolated that the changes could not have made a large-scale difference in overall patient approval.

Finally, the patient care setting is a complex multidimensional place. Therefore, it is difficult to prove that this restructured patient care team was the only change responsible for the noted decrease in length of stay. However, it appears more than circumstantial that such a significant decrease was present after the inception of this collective effort.

This newly created collaborative team works well on a high-volume general surgery service with resident participation. Whereas the collaborative team approach is well suited to this type of system, it may not be adaptable to all types of general surgery services. Our team was able to increase productivity and efficiency. However, there are some inpatient settings in which case managers may not be as well integrated into the team, residents may not be present, or there is lower inpatient volume. In those types of settings, this system would have to be adapted for the available resources.

The restructured general surgery team is just one type of model for the larger goal of streamlining hospitals. As the volume of patients increases, trimming inefficient patient care systems becomes essential to offset increasing costs and decreasing reimbursements. The goal of this study was to evaluate how restructuring a care team's duties and attitudes could make the team more efficient. Preliminarily, it appears to be a success, with benefits for the hospital, the physicians, and the patients.

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REFERENCES