Integration of a Formalized Handoff System Into the Surgical Curriculum

Resident Perspectives and Early Results

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**Hypothesis:** The Situation, Background, Assessment, and Recommendation model (SBAR) provides an excellent framework for communication in daily resident handoffs.

**Objective:** To evaluate implementation of SBAR into the surgical curriculum.

**Design:** A curriculum using video and role-play scenarios to augment a didactic lecture on SBAR was implemented for general surgery residents. Resident assessment was achieved via an anonymous survey administered after training. Outcome was evaluated by assessing sentinel events and resident order entry 30 days before and after training. Surgical subspecialty resident order entries were used as controls. Duplicated, cancelled, and wrong patient orders were attributed to failed communication.

**Setting:** Academic department of surgery.

**Participants:** Forty-five general surgery residents at our institution.

**Results:** Survey response rate was 100%. Poor communication was identified as the leading cause of handoff failure, with nurse-to-resident handoffs considered the most problematic. Overall, the curriculum was well received. Outcomes analysis demonstrated no difference in sentinel events. A 2.3% decrease in pretraining and posttraining order entry errors (14.5% vs 12.2%; \( P = .003 \)) was demonstrated. No difference was demonstrated in controls who did not undergo SBAR training (12.9% vs 13.6%; \( P = .47 \)).

**Conclusions:** Most of the residents indicate that the SBAR curriculum addressed frequently encountered communication issues and taught clinically beneficial communication skills. The identified specific communication deficiencies will direct future curriculum goals. The SBAR model is an effective and valuable tool to standardize communication. Early outcomes analysis demonstrates a decrease in order entry errors after training. Sentinel events are infrequent and will require long-term evaluation.

Arch Surg. 2011;146(1):89-93

A handoff is defined as the transfer of patient responsibility or information from one health care provider to another for the purpose of ensuring continuity and safety of patient care.1,2 However, the hazards associated with transfer of information between multiple health care providers are well recognized.1-3 Communication-related errors after handoffs marked by missing, incomplete, or inaccurate information are often responsible for adverse events.1,12 Our institution is no exception. Root-cause analysis has identified communication errors as responsible for 75% of sentinel events at our institution. Nationally, a great deal of attention has been placed into decreasing communication-related errors. Improved communication among health care providers has become a top priority for The Joint Commission (formerly known as the Joint Commission on Accreditation of Hospital Organizations).2,3 As part of National Patient Safety Goal 2e, The Joint Commission included the need to “implement a standardized approach to handoff communications, including an opportunity to ask and respond to questions,” in an effort to decrease adverse hospital events.2,12 As this goal recognizes, it is not sufficient to simply pass on patient information. A level-appropriate system should be established that incorporates asking questions and confirming accurate information transfer.

The Situation, Background, Assessment, and Recommendation model (SBAR) was initially developed by the US military as a means to standardize communication during situational debriefings.5 The changing paradigm of health care has made

See Invited Critique at end of article

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A curriculum using video and role-play scenarios to augment a didactic lecture on SBAR was mandated for all interns rotating on the general surgery service and categorical general surgery residents in postgraduate years (PGY) 1 through 5 at The Mount Sinai Medical Center in January 2009, the midpoint of the academic year. The curriculum spanned 2.5 hours and occurred in a single session conducted by the program director (C.M.D.), a representative from the hospital Quality Assessment and Improvement Department, and study investigators (D.A.T., K.E.B., and B.C.). This program was piloted through the Department of Surgery in conjunction with the Quality Assessment and Improvement Department.

To promote patient safety and continuity of care, using a system that instills a sense of patient ownership, a clear definition of roles, and empowerment is crucial. We hypothesized that integration of a standardized resident handoff system into the surgical curriculum would minimize missed or misunderstood information, improving overall patient care. We chose SBAR because it provides an excellent framework for communication and serves as an empowerment tool by allowing an opportunity to ask questions, formulate a plan for care, and ensure information was understood. In addition, SBAR is being implemented as an institution-wide policy, ensuring communication standardization among all health care providers. The purpose of this study was to evaluate resident perceptions of handoffs, identify areas of communication deficiency, and evaluate early outcomes after formal implementation of a standardized communication model into the surgical curriculum.

**METHODS**

A total of 45 residents underwent SBAR training. Residents were shown a video displaying 3 clinical scenarios requiring transfer of information. Each scenario was first performed inappropriately, discussed, and then performed properly using the SBAR model. Scenarios were developed from frequently encountered problems within the hospital system observed by our program director, identified by the Quality Assessment and Improvement Department, and reported within the surgical literature. The first scenario modeled nurse-to-resident interaction; the second, chief resident-to-team interaction; and the third, a resident-to-resident handoff after a shift. Residents were then given 2 clinical scenarios based on the video and asked to identify and correct the erroneous transfer of information in small group discussions. **Figure 1** demonstrates 2 of the clinical role-play scenarios. Residents were expected to participate in video discussion and role-play scenarios. At the conclusion of the course, resident assessment of the practicum was achieved via an anonymous survey.

Because optimal outcome measures of communication training are unavailable, sentinel events and order entry error were chosen as incidents that are regularly attributed to communication errors. Sentinel events were identified from the morbidity and mortality surgical database and the hospital Performance Improvement Initiative. Sentinel events were defined according to The Joint Commission guidelines, namely an unexpected occurrence involving death or serious physical or psychological injury or the risk thereof and necessitating immediate investigation and response. Order entry at our institution is electronic, and each resident must log on using a unique identifying key code. Order entries 30 days before and after train-

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**Figure 1. Situation, Background, Assessment, and Recommendation (SBAR) clinical role-play scenarios.** CT indicates computed tomography; ED, emergency department; IV, intravenous; OR, operating room; and PACU, postanesthesia care unit.

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institution of a standardized means of communication essential because increased dependence on communication transfer among multiple health care providers is widespread. The SBAR model serves as an effective tool to standardize communication and to promote patient ownership and health care provider empowerment. Although initially instituted for nonphysician practitioners, many hospitals are now implementing SBAR for all health care providers.

Within the past several years, resident duty hour limitations introduced a new component to patient care. Although studies demonstrate an overall decrease in medical errors and enhanced quality of resident life since duty hour limitation, preservation of continuity of care remains a challenge. Implementation of the 80-hour work week has increased daily resident handoffs by 40% and created a system in which shift work and dependence on nonphysician practitioners, including nurse practitioners and physician assistants, have become the norm. Within this new paradigm of patient care, studies demonstrate an increase in preventable adverse events, longer lengths of patient stay, and an increase in laboratory study orders; all are attributed to errors in resident communication due to increased handoffs. A study by Williams et al further dissected resident communication failures and identified decreased surgeon familiarity with patients, distorted or inhibited communi-cation, blurred boundaries of communication, and diverted surgeon attention as key factors.
ing by participating surgical residents were identified and compared. Duplicated, cancelled, and wrong patient orders were attributed to failed communication. Surgical subspecialty residents did not undergo training, and their order entries were used as controls. Surgical subspecialties were defined as orthopedics; ear, nose, and throat; plastic; and vascular surgery. All surgical subspecialty residents rotating at The Mount Sinai Hospital during the selected study period were considered eligible controls. Surgical subspecialty residents ranged from PGY 2 through 6.

Univariate analysis was conducted by unpaired *t* test for quantitative variables and *χ²* test for categorical variables. *P* values of less than .05 were considered to confer significance. We used Prism, version 4.0, 23234e statistical software (GraphPad Software Inc, San Diego, California) for all analyses. This study was approved by The Mount Sinai School of Medicine institutional review board.

### RESULTS

Our survey response rate was 100%. The Table provides the administered survey questions with mean results. Poor communication was identified as the leading cause of handoff failure, with nurse-to-resident handoffs considered the most problematic. Attending-to-resident transfer of information was perceived as the second most common cause of handoff failure. Overall, residents did not believe a problem with handoffs existed (mean score, 5.8, with 1 indicating no problem and 10, severe problem). Most of the residents indicated that the curriculum was helpful and representative of communication issues frequently encountered within the hospital. Most of the residents also indicated that they would recommend the curriculum again.

In the 30 days before and after training, a total of 13,233 electronic orders were entered by surgical residents: 6,360 in the 30-day period before training and 6,873 in the subsequent 30-day period. A total of 58 residents were tracked: 38 who underwent SBAR training and 20 controls. Of the 38 residents who underwent SBAR training, 25 were PGY 1 and 2 and 13 were PGY 3 through 5. Outcome assessment demonstrated a significant overall 2.3% decrease (14.5% vs 12.2%; *P* = .003) in 30-day pre-training and posttraining erroneous order entry for residents who had undergone SBAR training. Controlling for PGY level, PGY 1 and 2 residents had a significant 2.2% decrease (14.7% vs 12.5%; *P* = .001) in erroneous order entry, and residents who were PGY 3 through 5 had a significant 3.6% decrease (13.3% vs 9.7%; *P* = .05). No overall difference was demonstrated in controls who did not undergo SBAR training (12.9% vs 13.6%; *P* = .47) (Figure 2). One sentinel event occurred in this time

<table>
<thead>
<tr>
<th>Table. SBAR Survey With Results of Resident Response</th>
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<tbody>
<tr>
<td>Survey Request or Question</td>
</tr>
<tr>
<td>Rank in order the most problematic handoffs in your experience</td>
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<tr>
<td>Nurse to resident</td>
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<tr>
<td>Attending to resident</td>
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<tr>
<td>NP or PA to resident</td>
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<tr>
<td>Resident to resident</td>
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<tr>
<td>Chief resident to intern</td>
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<tr>
<td>Rank in order the most common problems encountered during handoff</td>
</tr>
<tr>
<td>Poor communication</td>
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<tr>
<td>Time constraints</td>
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<td>Unclear designation of tasks</td>
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<tr>
<td>Distraction</td>
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<td>Multiple shift changes</td>
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<td>Too many team members</td>
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<tr>
<th>Survey Request or Question</th>
<th>Resident Response, Mean (SD)</th>
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<tbody>
<tr>
<td>Questions concerning the video*</td>
<td></td>
</tr>
<tr>
<td>Do you think a problem with handoffs exists?</td>
<td>5.8 (1.6)</td>
</tr>
<tr>
<td>Was the video helpful?</td>
<td>7.5 (2.0)</td>
</tr>
<tr>
<td>Will you be able to use the teaching points in your clinical practice?</td>
<td>8.2 (1.7)</td>
</tr>
<tr>
<td>Will your handoff technique change after watching this video?</td>
<td>7.5 (1.9)</td>
</tr>
<tr>
<td>Did this video help your overall understanding of handoffs?</td>
<td>7.7 (1.9)</td>
</tr>
<tr>
<td>Were the video scenarios appropriate?</td>
<td>8.5 (1.4)</td>
</tr>
<tr>
<td>Did the video present scenarios that are relevant to clinical experience?</td>
<td>8.8 (1.2)</td>
</tr>
<tr>
<td>Did the video represent common problems encountered in the hospital?</td>
<td>8.6 (1.4)</td>
</tr>
<tr>
<td>Were the clinical scenarios helpful?</td>
<td>8.0 (1.8)</td>
</tr>
<tr>
<td>Were the scenarios appropriate?</td>
<td>8.4 (1.4)</td>
</tr>
<tr>
<td>Did the clinical scenarios augment the video teaching experience?</td>
<td>7.9 (1.9)</td>
</tr>
<tr>
<td>Did you able to recognize and correct communication errors?</td>
<td>8.7 (1.2)</td>
</tr>
<tr>
<td>Would you recommend this curriculum again?</td>
<td>8.6 (1.6)</td>
</tr>
</tbody>
</table>

Abbreviations: NP, nurse practitioner; PA, physician’s assistant; SBAR, Situation, Background, Assessment, and Recommendation.

*Answers were given on a scale of 1 to 10, in which 1 indicates not at all; 5, somewhat; and 10, very much.*
frame. Analysis demonstrated no difference in pretrain-
ing and posttraining sentinel events for residents who un-
derwent or did not undergo SBAR training.

Our study demonstrated overall resident satisfaction with
the implemented SBAR curriculum. Most of the residents
indicated that the curriculum addressed frequently en-
countered communication issues and taught clinically ben-
eficial communication skills. In a surprising finding, hand-
offs from attending to resident physicians were perceived
as the second most problematic area of communication
transfer. An explanation for this finding may involve in-
adequate transfer of level-appropriate information. Attend-
ing physicians may not adjust their method of informa-
tion transfer based on resident comprehension, particularly
for early PGY levels. Converstely, in a more traditional hi-
erarchical system, residents may be apprehensive about ask-
ing for clarification when information is not completely un-
derstood. The SBAR model provides an excellent framework
to rectify this problem by emphasizing transfer of level-
appropriate information and creating an environment that
is accepting and expecting of questions.

Overall, attending-to-resident transfer was one of sev-
eral communication deficiencies identified by our resi-
dent survey that will direct future curriculum goals and
institute a culture change within our institution. Attending
physicians will be required to reassess and standardize their
method of communication. In addition, because nurse-to-
resident communication was overwhelmingly selected as
the most problematic area of communication transfer, com-
prehensive inclusion of nonphysician providers is central
to curriculum development. Our department is currently
part of the hospital-wide SBAR implementation for all pro-
viders, including nonsurgical and surgical subspecialty resi-
dents, nurses, nonphysician health care providers, and at-
tending physicians. As such, by selecting SBAR, residents
are taught to communicate with nurses and other nonphysi-
cian health care providers using the same communica-
tion format. Hospital-wide implementation of a standard-
ized handoff system should improve communication
between all providers.

As in our study, outcome determination continues to
be the weakness of efficacy assessment of any communi-
cation model. To date, no universally accepted opti-
mal outcome measures are available. Based on current
literature, hospital sentinel events and erroneous order
entry were chosen because both are frequently attrib-
uted to communication errors. Early outcomes analysis
demonstrated a significant 2.3% decrease in order en-
try errors subsequent to SBAR training. This finding
persisted after controlling for PGY level. No difference
was demonstrated in control surgical subspecialty resi-
dents who did not undergo SBAR training. Although not
optimal, this finding suggests more effective communi-
cation by residents who underwent SBAR training. De-
creased order entry error potentially confers improved
patient care and decreased risk of preventable adverse out-
come. Although no significant difference in sentinel
events was demonstrated, sentinel events are infrequent
occurrences, and any conclusions concerning them will
require long-term evaluation.

Although longer follow-up is necessary, short-term out-
comes appear to support more effective transfer of
information after standardization of communication for
surgical residents at our institution. The SBAR model
will continue to be an integral part of our surgical cur-
riculum, with annual review for residents who have
already completed SBAR training and implementation
of training for incoming surgical residents during orien-
tation. Future directions will include identification of
additional outcome measures for increased validity and
long-term sentinel event tracking. Based on early
results, we support formalized integration of a stan-
dardized communication system into a surgical curricu-
um to decrease adverse events and ultimately improve
patient care.

Accepted for Publication: November 17, 2009.

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tegrity of the data and the accuracy of the data analysis.

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Acquisition of data: Telem, Buch, Ellis, Coakley, and Di-

vino. Analysis and interpretation of data: Telem, Buch, and Divino. Drafting of the manuscript: Telem, Buch, and Di-

vino. Critical revision of the manuscript for important in-
tellectual content: Telem, Ellis, Coakley, and Divino. Sta-
tistical analysis: Telem, Buch, Coakley, and Divino. Ad-

ministrative, technical, and material support: Ellis and Di-

vino. Study supervision: Divino.

Financial Disclosure: None reported.

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1. Vidyarthi AR, Arora V, Schnipper JL, Wall SD, Wachter RM. Managing discon-
tinuity in academic medical centers: strategies for a safe and effective resident

Teaching Residents to Pass and Catch the Baton

Telem et al are to be congratulated not only for tackling an important, challenging change by implementing a formalized handoff system into a surgical curriculum but also for evaluating the outcomes in terms of effect on patient safety. Resident handoffs have increased 40% since the change in resident duty hours,1 and the hazards associated with transfer of information between multiple health care providers are well recognized.2 The authors evaluated SBAR as a model to provide a communication framework for resident handoffs for the 45 general surgery residents at their institution. Outcomes were evaluated by assessing sentinel events and resident order entry before and after training. Telem et al noted a significant 2.3% decrease in erroneous order entry, but there was no overall difference among controls who did not undergo SBAR training. Their findings were consistent with the literature finding that a leading cause of handoff failure is status asymmetry3,4.

There is a wealth of literature on the use of SBAR for information transfer. However, SBAR does not contain an explicit statement empowering the recipient to question, verify, and/or clarify the information from the sender. The SBAR model as it is commonly defined fails to meet the standard of closed-loop communication and will not significantly affect the common causes of communication error, which are status asymmetry and ambiguity about responsibilities.3,4 Therefore, I disagree with the authors’ assertion that SBAR provides an excellent framework for communication and serves as an empowerment tool. The following alternate template is provided by Weick5 and is based on communication with fire chiefs in the US Forest Service:

- Here’s what I think we face.
- Here’s what I think we should do.
- Here’s why.
- Here’s what we should keep our eye on.
- Talk to me (tell me if you do not understand, cannot do it, or see something I do not).

This template specifically focuses on “sensemaking” and empowers juniors to question their leaders. Nonetheless, the study by Telem et al is a very important one that demonstrates short-term improvement in erroneous order entry. Longer follow-up will be necessary to determine whether the improvement is sustained.

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Financial Disclosure: None reported.
