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Characteristics and costs of surgical scheduling errors

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Abstract

BACKGROUND: Errors that increase the risk of wrong-side/-site procedures not only occur the day of surgery but also are often introduced much earlier during the scheduling process. The frequency of these booking errors and their effects are unclear.

METHODS: All surgical scheduling errors reported in the institution's medical event reporting system from January 1, 2011, to July 31, 2011, were analyzed. Focus groups with operating room nurses were held to discuss delays caused by scheduling errors.

RESULTS: Of 17,606 surgeries, there were 151 (.86%) booking errors. The most common errors were wrong side (55, 36%), incomplete (38, 25%), and wrong approach (25, 17%). Focus group participants said incomplete and wrong-approach bookings resulted in the longest delays, averaging 20 minutes and costing at least $320.

CONCLUSIONS: Although infrequent, scheduling errors disrupt operating room team dynamics, causing delays and bearing substantial costs. Further research is necessary to develop tools for more accurate scheduling.

Wrong-site surgery, including the wrong side, the wrong patient, and the wrong procedure, continues to occur at an alarming rate. It was the most frequently reported sentinel event in 2009 and the third most reported sentinel event in 2010.[1] Although the exact incidence and prevalence of wrong-site surgery remain unknown, the Joint Commission estimated a national incidence rate as high as 40 per week.[2]

The Joint Commission Center for Transforming Healthcare also launched a wrong-site surgery project in 2009 and recently reported that the scheduling process is "ripe for errors."[3] Miscommunication between the surgeon, the individual scheduling the surgery (eg, a secretary or office manager), and the hospital's scheduling office can easily result in incorrect or incomplete bookings. The Joint Commission's project found that in 39% of cases errors that increased the risk of wrong-site surgery were introduced during the scheduling process.[3] A few institutions have already implemented changes to their booking process. The Mayo Clinic studied surgical case listing accuracy at their medical center in 2008 and introduced changes to their surgery computer entry system.[4] The Minnesota Alliance for Patient Safety initiated a surgery scheduling and verification project in 2009.[5] Although these efforts begin to address the problems that can occur during the scheduling process, booking errors and the extent of their effects are still not well understood. This study analyzes the characteristics of booking errors and their impact on operating room staff and costs. Based on our findings, we also discuss potential solutions.

Methods

Mount Sinai Hospital (MSH) is a tertiary care academic hospital with 49 operating rooms. We analyzed data from the

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Table 1 Laterality/site scheduling errors under a paper versus electronic reporting system*

	Paper reporting system	Electronic reporting system (MERS)	*P* value
	January 1, 2009–July 31, 2009	January 1, 2011–July 31, 2011	
Number of scheduling errors reported (related to laterality or site)	41	66	
Number of scheduled surgeries performed	17, 053	17, 606	
Error rate (%)	.24	.37	.024

*The electronic reporting system, MERS, was implemented in the ORs in March 2010.

MSH electronic medical event reporting system (MERS) from January 1, 2011, to July 31, 2011. This database was implemented in the operating rooms (ORs) in March 2010. Nurses, physicians, and other staff members can submit reports anonymously or with identification. Information collected included the date and time an error occurred, a description of the error, and the location where the error was discovered or reported. To calculate an error rate, we obtained the total number of scheduled surgeries performed from MSH Perioperative Services. We also compared this error rate with the booking error rate under a paper-based medical event reporting system at MSH from January 1, 2009, to July 31, 2009. All the paper reports had to be signed by the individual submitting them. The paper-based reporting system only had records of booking errors related to laterality or site, so only the corresponding cases in 2011 (wrong side/site or missing side/site) were used for this comparison.

To study the effects of scheduling errors, we held 3 focus groups with OR nurses and technicians. The focus groups consisted of OR nurses and technicians from the general surgery cluster (8 participants), orthopedics cluster (13 participants), and ophthalmology cluster (5 participants). During the focus groups, participants were asked questions such as (1) "What types of booking errors have you encountered?" (2) "How often do you encounter these types of booking errors?" (3) "What effects do booking errors have?" and (4) "How long does it take for these booking errors to be corrected?" The average delay because of booking errors was estimated based on the numbers cited during these focus groups.

OR cost data were also provided by MSH Perioperative Services. To estimate the OR room costs per minute, we divided the general OR costs per hour, $968, by 60 to get $16 per minute. The OR costs include the salaries of OR nurses, technicians, and support staff; the costs of disposable supplies; and the costs of minor equipment (excludes the costs of capital equipment). The surgeon's and anesthesiologist's fees were not included. This per-minute calculation was used to estimate the average costs of scheduling errors. MSH's Institutional Review Board determined that this study did not meet the definition of human subjects research and therefore did not require their review or approval.

Results

There was a significant increase in the reporting of laterality or site scheduling errors from the paper-based reporting system in 2009 to the electronic reporting system (MERS) in 2011. The error rate from January 1, 2009, to July 31, 2009, was .24% (41) compared with an error rate of .37% (55) from January 1, 2011, to July 31, 2011 ($P < .05$) (Table 1). Although MERS reports can be submitted anonymously (unlike the paper reports), all the booking errors were submitted with identification.

From January 1, 2011, to July 31, 2011, there were 151 booking errors (.86%) reported out of 17,606 scheduled surgeries. No wrong-site surgeries occurred. The most common type of error was wrong-side booking (55, 36%) followed by incomplete booking (38, 25%), wrong approach (25, 17%), wrong procedure (14, 9%), wrong site (7, 5%), wrong patient information (7, 5%), missing side (3, 2%), wrong procedure and wrong side (1, 1%), and wrong patient (1, 1%) (Fig. 1). Incomplete bookings consisted of cases in which additional procedures (eg, diagnostic laparoscopy, cystoscopy, or ureteral stent placement) were added or bilateral cases were scheduled only on 1 side. Missing-side bookings consisted of cases that did not indicate any side. Wrong-approach bookings involved a change in approach (eg, from laparoscopic to open or open to laparoscopic) before making any incisions. Bookings with the wrong patient information had the wrong date of birth, the wrong medical record number, or a misspelled name. There was 1 wrong patient booking in which the wrong patient (ie, the same first name but different last name, date of birth, and medical record number) was scheduled for surgery.

Plastic surgery had the highest booking error rate (9, 1.63%) followed by general surgery (47, 1.16%), ophthalmology (9, 1.24%), orthopedics (26, .96%), and vascular surgery (9, .94%) (Fig. 2). Different departments had different types of booking errors. Plastic surgery had mostly wrong-side bookings (5, 56%), whereas general surgery had mostly wrong-approach bookings (16, 43%) (Fig. 3). Most booking errors were caught in the holding area or the OR (122, 81%). The remaining errors were caught in the admitting or assessment areas (28, 18%). Booking errors were discovered throughout the day. Forty (26%) were first cases (discovered from 6:00 AM–8:59 AM), 43 (28%) were discovered from 9:00 AM to 11:59 AM, and 55 (36%) were discovered in the afternoon (after 12:00 PM).

Although the responses of focus group participants varied among and within departments, most of them said that scheduling errors create additional paperwork, reduce the