Cross-Site Scheduling of Endoscopic Procedures Improves Efficiency While Maintaining Patient Safety

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Background and Aim: Accuracy in scheduling complex procedures is improved through technology to aid nonmedically trained allied health professionals. We used a new computer technology to assess whether a single coordinator could schedule endoscopic procedures across sites of a multisite academic medical institution, thus improving efficiency within the clinic overall.

Methods: A multidisciplinary team designed a cross-site scheduling model. The first phase involved accurately identifying those procedures that were appropriate for nontrained coordinators to schedule. A pilot study with gastroenterology staff was implemented and evaluated and then rolled out to non-gastroenterology staff.

Results: A significant decrease in call volumes occurred which in turn led to a decrease from >100 to 38 seconds in average speed to answer (ASA). A total of 115 hours of manpower was saved with the efficiency of being able to schedule without the need for a second coordinator.

Conclusions: Efficiencies in call volume and ASA led to substantial time and money savings. Because of the continued involvement of multiple work groups, changes were seen as favorable rather than burdensome. Such technology could be used across other disciplines where routine procedures or tests require specific scheduling knowledge.

Keywords
procedures
first-time right
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patient-centered care

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Background

Accuracy in scheduling complex procedures, such as those in a surgical setting, is improved through technology that aids nonmedically trained allied health professionals (Cima et al., 2010). A recent scheduling system upgrade at our tertiary care academic medical institution was accompanied by a program entitled Request Manager (RM). This program was developed within the outpatient institutional scheduling system, an indication-based system with which users can identify division-specific scheduling preferences. The RM technology, providing tools geared toward helping allied health staff to accurately differentiate between routine and complex procedures, has the potential to improve scheduling processes by (1) increasing efficiencies through maximizing workload allocations, (2) decreasing the number of patient interactions required for scheduling, and (3) shortening itinerary completion time. It also has the potential financial benefit of reducing manpower needs in the procedure scheduling office. This upgrade was made in response to the current scheduling workflow that contained inefficiencies at several levels.

The process improvement project began in the Division of Gastroenterology and Hepatology (GIH) with current knowledge transferred from established procedure scheduling staff (non-licensed allied health professionals) to RM. The result was a series of questions in a decision tree model (i.e., RM) that created a mechanism for non-GIH (or cross-site) schedulers to determine procedure complexity and to schedule procedures in the most appropriate service area. Early on, we determined that scheduling a complex procedure such as endoscopic ultrasound or endoscopic retrograde cholangiopancreatography required unique expertise and training. However, other procedures that were deemed routine, such as screening colonoscopy without anesthesia or a routine esophagogastroduodenoscopy, could be scheduled by other scheduling staff without particular procedure expertise.

The ADKAR (awareness of the need for change; desire to participate and support the change; knowledge on how to change; ability to implement required skills and behaviors; and reinforcement to sustain the change; Prosci, 2013) model for change management focuses on (1) the "awareness" of the need to change, (2) the "desire" to make that change happen, (3) the provision of "knowledge" about how to implement the change, (4) ensuring that those involved in the change process have the "ability" to perform as expected after the change, and (5) building the supporting infrastructure to "reinforce" and sustain the desired results after the change is implemented. This methodology was selected by leadership as the standard approach for change across our institution. The GIH considered the impact of RM enhancement from a productivity, technology maintenance, and change management perspective. As noted in Gerdsri and colleagues (2010), best practices for technology road mapping and technology implementation can lead to changes in business processes and culture.

Using the ADKAR model of change management (Prosci, 2013), the team worked to develop a succinct and comprehensive model for cross-site scheduling of procedures. Relying on the ADKAR framework for idea initiation helped us to define the practice need and to draft a compelling message to create awareness and provide background on the impact of incorrectly scheduled procedures from a patient safety and practice perspective. Receptiveness to the change was promoted through open dialog sessions with key GIH stakeholders for the desk and scheduling operations functions. Questions and concerns were evaluated and findings were circulated as outlined in the project communication plan. Face-to-face training sessions provided us with an opportunity to further illustrate the importance of the practice need, to emphasize compliance with the prescribed guidelines, and to evaluate the users' ability to understand the RM algorithm and their ability to interpret orders within the scope of the practice. The sustainability of this implementation was aided through feedback and the support infrastructure created by the project team, which allowed multiple resource groups to assist as needed with training and discernment of procedure complexity as well as to provide positive reinforcement for the desired behaviors.

Specifically, the aims of the trial were (1) to measure the number of common procedures that could be scheduled using the new system, (2) to determine the error rate of those procedures scheduled by non-GIH personnel, and (3) to measure increased productivity as determined by the number of minutes saved and the decreased average speed to answer (ASA) of incoming calls.

Methods

The cross-site team aligned the implementation methodology with the guidelines set forth by the Institute of Medicine to ensure that quality care was the primary requirement for the end solution and approach:

- to deliver patient care without error or injury,
- to reach the desired outcomes based on best practices,
- to ensure that best practices meet the needs of the patient,
- when the patient needs it,
- while being good stewards of available human and material resources, and
- in an equitable manner regardless of personal characteristics or socioeconomic status.

Team Structure

A multidisciplinary team consisting of GIH procedure schedulers, desk operations leaders, access management leaders, operation managers, a quality and process improvement analyst, a physician champion, and an application specialist was assembled to evaluate the current state process, to identify challenges of scheduling GIH procedures, and to design the future cross-site scheduling model. Lessons learned are consistent with the literature. Identifying the right champion, obtaining leadership commitment for all divisions involved, conducting an environmental scan to properly time and prioritize implementation, and fostering an open safe communication channel are all key elements to diffusion success witnessed in this project (Gerdsri et al., 2008).

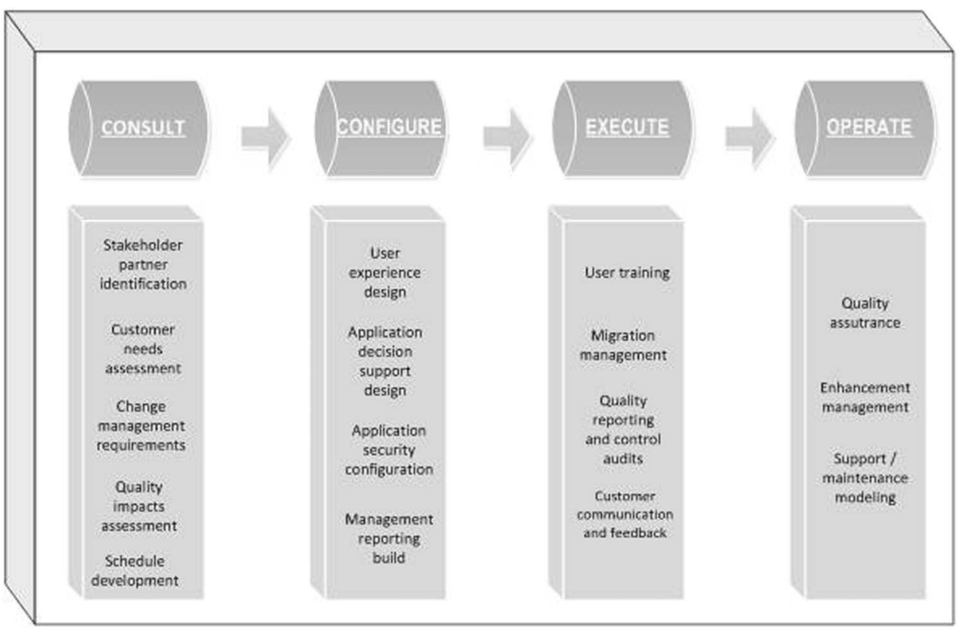
Diffusion was a critical component for implementation and spread throughout the organization. Institutional leadership selected the standardized methodology (Figure 1), which was modified from previously published diffusion methodology to fit the specific needs of this project.

Intervention

From October 1, 2012, to December 28, 2012, a plan was developed with the focus on the customer and end-user experience, in addition to the ongoing quality control and quality assurance from continued execution. Consistent with the research of Kettinger and colleagues (1997) on the 6 stages of business process change and methodologies, the cross-site team translated the vision as outlined by leadership, identified targets and goals for the pilot and implementations, assessed the current state for each customer, designed appropriate implementation and training steps, and regularly monitored the progress after the area moved to production. Initial diffusion processes included the following:

- Discernment of current scheduling practices provided by current GIH procedure schedulers—essentially taking their expertise and knowledge and documenting it on paper
- Identification of procedure focus—identifying which procedures would offer the greatest impact and maintain the scope of the practice for appointment coordinators
- Implementation of the RM decision tree (indication-based algorithm) to differentiate procedures—those that are complex rather than routine
- Establishment of quality control metrics—aligned to ensure patient safety while focusing on first-time

Figure 1. Cross-site diffusion and methodology.



right, ASA, length of call, and identification of scheduling trends
- Operationalization of a cross-site scheduling pilot within GIH—intentional to ensure decision tree functionality while ensuring patient safety through quality control checks
- Strategic utilization presented to divisions within the Department of Medicine (DOM) after a successful pilot within GIH—beginning with the areas that request the fewest procedures and progressing to those that request the most

The process began with a pilot involving a select number of current GIH patient appointment coordinators and clinical assistants to test the RM decision tree and practice cross-site scheduling. Nine team members were selected to test the future scheduling state and to provide the team with feedback. Quality control checks were conducted daily, and errors were tracked. Through this initial pilot, continual changes to RM were made to ensure that it was clear, concise, and easy for the scheduler to follow. While navigating the initial pilot, the team created a process that could be rolled out to the entire GIH and ultimately the entire DOM. Past scheduling data were reviewed to prioritize the rollout in a manner that would ensure proper quality assurance and error-reporting tools. After the initial implementation within GIH, divisions within the DOM with a historically small number of requested procedures were chosen next, with gradual incorporation of the largest referring divisions.

Those persons who were part of the initial pilot became the division champions for cross-site scheduling and took on the role of subject matter experts (SMEs) in the training and education of fellow team members within GIH. The SMEs worked to ensure that their colleagues felt confident about following the RM decision tree, appreciated the complexity of procedure scheduling, and were aware of the quality checks to ensure accuracy.

After the pilot study was completed, we established the rollout date for the non-GIH areas and initiated communications about it. We invited key team members to an initial meeting to discuss the concept, review quality metrics, and identify those who could act as SMEs. Each division engagement began with an information session for division leadership. The team provided details on the cross-site products and services to be offered throughout the project. Subsequent meetings included the identified SMEs/users and supervisors, with review of the decision tree and provision of education about scheduling and rescheduling/cancellation best practices. The goal of the education sessions was to impart ownership of this knowledge, which led to empowerment and accurate consistent results.

Quality Measures

In coordination with the Office of Access Management, the team assembled a query to report procedures that were cross-site scheduled. The query included the following metrics:

- Order throughput: total scheduled routine procedures through cross-site scheduling
- First-time right: percentage of procedures scheduled correctly on the first attempt (obtained through daily quality control audit reports) conducted by current procedure schedulers
- Error/defect rate: percentage of procedures scheduled correctly on patient arrival (identification of these errors was reported by ad hoc nursing team members)
- Call metrics
    - Abandon rate: caller hangs up before call being answered (standard is <5%)
    - Call volumes: total number of inbound calls (answered and unanswered)
    - Call duration: length of calls
    - ASA: length of time before call is answered (standard is <30 seconds)

- Time to schedule: wait time for patient and staff to receive scheduled appointment

Analysis

Many of these quantitative metrics were gathered as a result of the daily query. The time to schedule metric, which is an important patient satisfaction metric to support the goals of this project, was obtained through on-site observation and querying those who schedule.

The daily query was reviewed by current procedure schedulers, those with expertise and working knowledge, to ensure that procedures were scheduled accurately. Outside of physicians requesting a complex procedure, on-the-job training, and experience gave current procedure schedulers the ability to search for keywords and/or indications that would deem a procedure to be complex. This real-time quality review was not judged as additional workload because the goal of the process was to decrease the number of incoming calls and to create adequate time for this kind of review.

The GIH team wanted to ensure that the cross-site SMEs had the support they needed to be successful with the implementation. Thus, they built customer relationship management principles into the deployment plan and schedule to provide the support and customer-oriented maintenance processes. The team incorporated knowledge flows "for customers," "about customers," and "from customers" into every interaction and service (Gebert, 2003). Feedback from the first divisions to go live, based on their experience and the ease of integration into the area's processes, as well as on process suggestions and comments, was used to continuously improve the deployment approaches and tailor the application configuration to best fit the needs and deployment goals of the division staff. Although a formal knowledge database was not developed, the information was documented by the project team for future optimization opportunities.

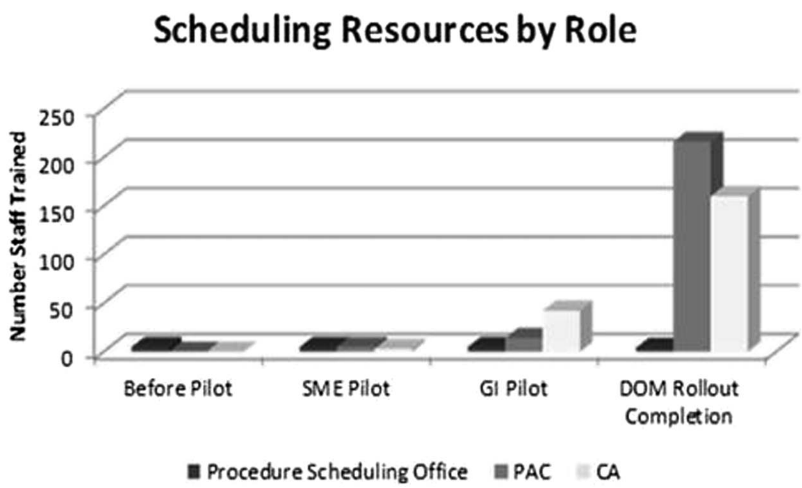
Results

The GIH service catalog indicates that of all procedure services, 9% are routine (average risk screening colonoscopy) and 74% are complex (chromoendoscopy). The remaining 17% of procedure services include procedures that could be classified as either routine or complex, depending on the acuity level and medical history of the patient. Over the course of the project, the number of personnel able to schedule routine procedures increased significantly, approximately 200 coordinators (Figure 2). As departments were added to cross-site scheduling, it resulted in an accompanying downstream increase in quality control audits. End points for measuring quality were highly variable, depending on the number of procedures cross-site scheduled by each department. Noteworthy results confirmed cross-site scheduling diffusion success in the steady increase of procedures cross-site scheduled (Figure 3A) and in the minimal number of errors detected (Figure 3B). While the number of errors increased with the number of procedures cross-site scheduled, the percentage was acceptable, given the increase in the number of procedures scheduled and in the number of staff now able to schedule. Initially, we were concerned that the number of errors might double or triple, but the percentage of errors remained, in essence, stable because the rate was counterbalanced by the increased number of procedures cross-site scheduled.

Order Throughput

Throughout the implementation (January 7, 2013, to August 30, 2013), the number of procedures cross-site scheduled increased from none to an average of 100 per week. Ultimately, as divisions scheduled more procedures with an error rate of less than 5%, they were transitioned off daily quality audits, whereby procedure schedulers were no longer validating a procedure was scheduled accurately.

Figure 2. **Deployment resource pool.**



First-Time Right and Defect/Error Rates

With no current metric available to determine baseline first-time right ratios, the team reviewed cross-site scheduling data and error rates daily to determine an end point at which teams would no longer be audited on a regular basis. This end point was then used as a standard for other areas and a tool to determine when it was appropriate to add other areas to the pool of cross-site schedulers. Initial data revealed a 0% error rate for first-time right data. The daily quality audits during the DOM rollout revealed few scheduling errors. As cross-site scheduling was rolled out to other divisions, accuracy remained high, but 1 error pattern clearly stood out. The need for anesthesia (not documented on the order but noted in the scheduling system) was the most commonly noted error; interestingly, it was most often noted by those scheduling within GIH. Therefore, the decision tree was modified to ensure that coordinators checked for anesthesia flags before beginning the cross-site scheduling process.

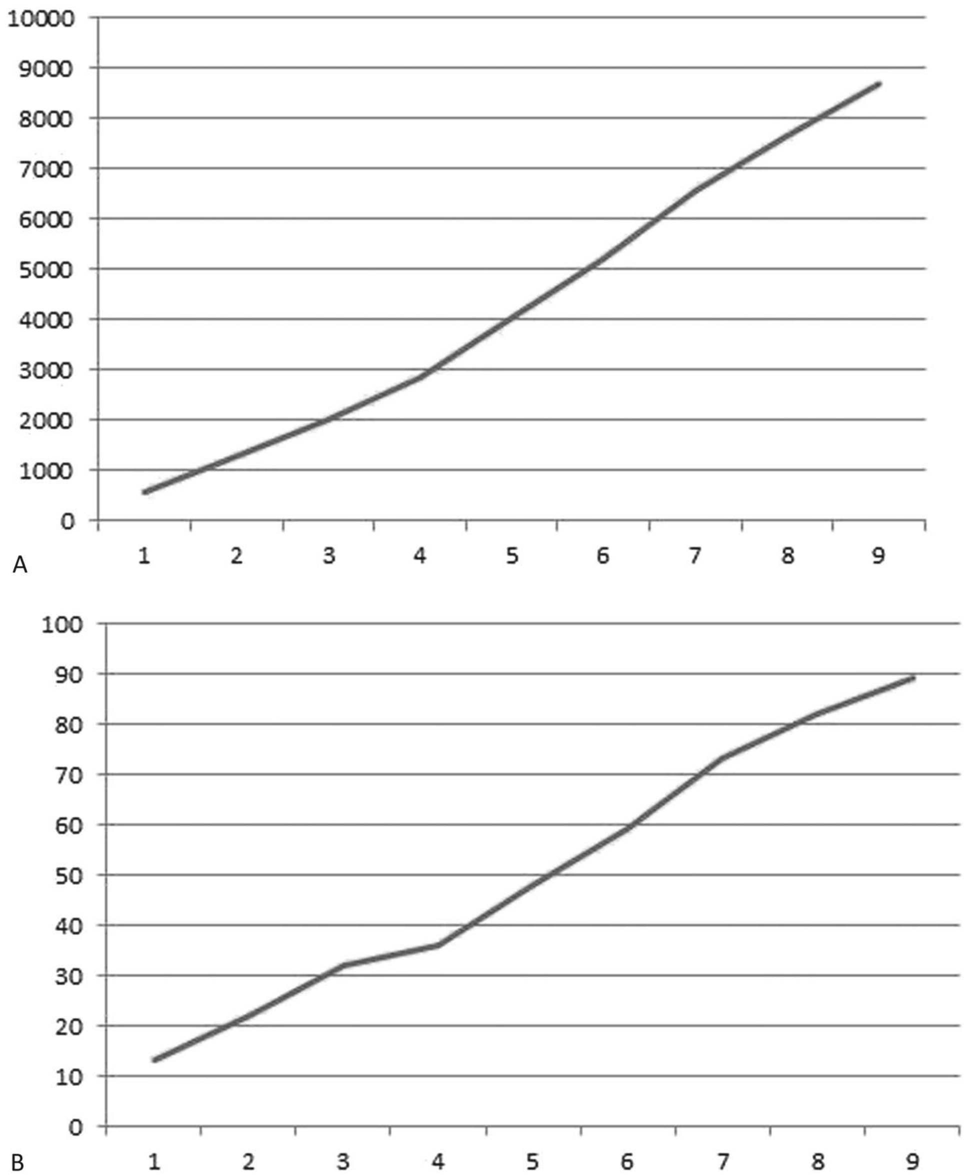
Call Metrics

Before the project, the ASA was >100 seconds. After successful rollout of cross-site scheduling, the ASA decreased to near-standard levels of approximately 38 seconds (Figure 4). The reduction in calls (average decrease of 200 calls per week) to the procedure scheduling office showed a dramatic decrease with the initial rollout within GIH (the largest referrer). Another call metric of note was the abandon rate (target of <5%), which showed modest improvements, understandably so because even callers who hung up still need to call back to have a procedure scheduled (particularly those that are complex or that require anesthesia-assisted sedation). Call duration saw the slightest change, which is important to note, given that complex procedures and those patients requiring anesthesia simply take longer to schedule and require enhanced coordination, thus result in longer call durations.

Time to Schedule

The metrics from January 2013 through August 2013 showed that a total of 7,444 minutes (just over 124 hours) of additional capacity was gained for clinical assistants and patient appointment coordinators through the DOM rollout (Figure 5). Financial gains in the amount of $3,631.93 occurred in time savings by cross-site scheduling and improved efficiency. This advance in time savings is expected to increase as other areas begin to cross-site schedule.

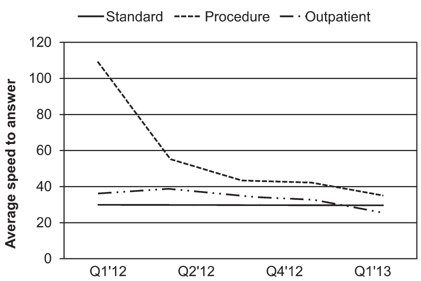
Figure 3. A, 2013 cross-site rollout progression displaying the steady increase of procedures cross-site scheduled (progression displayed per month). B, 2013 number of errors identified during rollout (progression displayed per month).



Discussion

Early on, cross-site scheduling efficiencies and barriers were noted in the GIH and DOM rollouts. Procedure scheduling barriers that were identified included (1) two coordinators needed to schedule 1 appointment; (2) unnecessary silos of knowledge held by 1 team member; (3) substantial hold times, resulting in patient delays and lost productivity; and (4) untapped technology resources to aid in scheduling.

Figure 4. **Average speed to answer (in seconds).**



The current procedure scheduling pool consists of 4 specialized schedulers trained in scheduling GIH-specific procedures. With the substantial decrease in call volumes, there is now the potential either to reduce the number of full-time employees, thereby resulting in cost savings for the institution, or to redistribute the full-time employees to other work areas currently lacking in manpower. We anticipate that complete rollout of cross-site scheduling to all areas within the DOM will result in a further decrease in calls to the scheduling office, thus allowing for improved skill-based work to facilitate the scheduling of complex procedures that require specialized training and expertise. The growing pool of schedulers trained in routine procedure scheduling will increase dramatically, thus improving efficiency, cost reduction in time to schedule, and reduced use of resources necessary to schedule a procedure.

Figure 5. **Total time savings (in minutes).**

One of the intended outcomes of this project was the identification of constraints, so as to facilitate improvement in this busy part of our clinical practice (Breen et al., 2002). Through successful implementation of the cross-site scheduling process, we were able to note several specific improvements, such as better resource utilization and productivity, skill-based workload distribution, tool enhancements to better facilitate information flow, and reduction of non–value-added activity in the patient's clinic experience. Although we were unable to measure any direct impact on patient satisfaction with the improved scheduling processes, we did find that results from patient satisfaction surveys over the time of the rollout suggested that patients were happy with the timeliness of their receipt of scheduled tests, an indirect means of measuring relevance of these changes for patients.

Pilot and diffusion strategies proved successful because the methodologies set forth initially were used and maintained, providing team support through disclosure, trust, and feedback to ensure safety and accountability. In addition, we chose to begin with divisions having a lower procedure demand to ensure that all components of the process were self-evident to users outside of GIH. As the project rolled out to the DOM, the quality scores remained high with few minor and no major scheduling errors resulting in patient delays. Although the team began under the multidisciplinary mindset, it evolved into more of a transdisciplinary structure, with all members contributing their own knowledge and expertise, and efforts were more collective in determining the best design, approaches, and deployment and diffusion strategies.

As previously mentioned, metrics obtained throughout the course of the DOM pilot demonstrated that allied health personnel, working within their scope of practice, produced a savings of $3,631.93 during the examined dates. This monetary savings resulted from a 1-minute decrease in idle nonproductive time spent awaiting the receipt of procedure confirmation.

Fellow patient appointment coordinators and clinical assistant team members were surveyed to provide feedback on cross-site training, scheduling tools, and general response to the process. Throughout the process, all teams followed the same path with notification of cross-site scheduling implementation, SME identification and training (including the training of coworkers), touchpoint meetings to review successes/challenges, and quality audit reviews. Feedback was consistently good, with users stating that the process was quick and efficient, the decision tree was user-friendly, and the system was flexible to allow patient choice at the time of initial contact. Indeed, the ability to cross-site schedule other routine GIH procedures was an often-cited request.

Success with this system was achieved because of the thoughtful nature of the rollout, including full disclosure of expectations and expected outcomes. A subset of end-users (or super users) was trained and became advocates for cross-site scheduling within their individual divisions, allowing them the confidence to train their counterparts. Quality measures and error rates were perceived as learning opportunities rather than as corrective actions meant to discourage cross-site scheduling. Communication lines were open and free-flowing through touchpoint meetings, and feedback and questions were encouraged. Multiple updates and changes were made to RM along the way because of user suggestions and feedback.

Conclusions

Involving 2 allied health professionals to schedule a procedure is not efficient, inadequately uses resources, and potentially causes a delay in patient care. We were able to put decision making into the hands of a single coordinator—while maintaining scope of practice—by using technology to determine the complexity of procedure and scheduling availability. This new process resulted in a decrease in call volume that, in turn, led to a substantial decrease in ASA for those trained GIH coordinators who truly needed to be scheduling complex procedures. Additional cost savings may ultimately be produced by potential decreases in the number of full-time employees required for scheduling. Because of the continued involvement of multiple work groups, the RM changes were viewed as favorable rather than as burdensome. Such technology could be used across other disciplines with procedures or tests that require specific scheduling knowledge.

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