

## ORIGINAL CONTRIBUTION

# Motivations and Barriers Toward Implementation of a Rectal Cancer Synoptic Operative Report: A Process Evaluation

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**BACKGROUND:** The use of synoptic reporting has been shown to improve documentation of critical information and provide added value related to data access and extraction, data reliability, relevant detail, and completeness of information. Surgeon acceptance and adoption of synoptic reports has lagged behind other specialties.

**OBJECTIVE:** This study aimed to evaluate the process of implementing a synoptic operative report.

**DESIGN:** This study was a mixed-methods process evaluation including surveys and qualitative interviews.

**SETTINGS:** This study focused on colorectal surgery practices across the United States.

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**PATIENTS:** Twenty-eight board-certified colorectal surgeons were included.

**INTERVENTIONS:** The synoptic operative report for rectal cancer was implemented.

**MAIN OUTCOME MEASURES:** Acceptability, feasibility, and usability were measured by Likert-type survey questions and followed up with individual interviews to elicit experiences with implementation as well as motivations and barriers to use.

**RESULTS:** Among all study participants, 28 surgeons completed the electronic survey (76% response rate) and 21 (57%) completed the telephone interview. Mean usability was 4.14 (range, 1–5; SE, 0.15), mean feasibility was 3.90 (SE, 0.15), and acceptability was 3.98 (SE, 0.18). Participants indicated that substantial administrative and technical support were necessary but not always available for implementation, and many were frustrated by the need to change their workflow.

**LIMITATIONS:** Most surgeon participants were male, white, had >12 years in practice, and used Epic electronic medical record systems. Therefore, they may not represent the perspectives of all US colon and rectal surgeons. In addition, as the synoptic operative report is implemented more broadly across the United States, it will be important to consider variations in the process by electronic medical record system.

**CONCLUSIONS:** The synoptic operative report for rectal cancer was easy to implement and incorporate into workflow, in general, but surgeons remained concerned about additional burden without immediate and tangible value. Despite recognizing benefits, many participants indicated they only implemented the synoptic operative report because it was mandated by the National



Accreditation Program for Rectal Cancer. See **Video Abstract** at <http://links.lww.com/DCR/B735>

## MOTIVACIONES Y BARRERAS HACIA LA IMPLEMENTACIÓN DE UN INFORME OPERATIVO SINÓPTICO DE CÁNCER RECTAL: UNA EVALUACIÓN DEL PROCESO

**ANTECEDENTES:** Se ha demostrado que el uso de informes sinópticos mejora la documentación de información crítica y proporciona un valor agregado relacionado con el acceso y extracción de datos, la confiabilidad de los datos, los detalles relevantes y la integridad de la información. La aceptación y adopción de informes sinópticos por parte de los cirujanos se ha quedado rezagada con respecto a otras especialidades.

**OBJETIVO:** Evaluar el proceso de implementación de un informe operativo sinóptico.

**DISEÑO:** Evaluación de procesos de métodos mixtos que incluyen encuestas y entrevistas cualitativas.

**AJUSTES:** Prácticas de cirugía colorrectal en los Estados Unidos.

**PACIENTES:** Veintiocho cirujanos colorrectales certificados por la junta.

**INTERVENCIONES:** Implementación del informe operatorio sinóptico de cáncer de recto.

**PRINCIPALES MEDIDAS DE RESULTADO:** Aceptabilidad, viabilidad y usabilidad medidas por preguntas de encuestas tipo Likert y seguidas con entrevistas individuales para obtener experiencias con la implementación, así como motivaciones y barreras para el uso.

**RESULTADOS:** Entre todos los participantes del estudio, 28 cirujanos completaron la encuesta electrónica (tasa de respuesta del 76%) y 21 (57%) completaron la entrevista telefónica. La usabilidad media fue 4,14 (rango = 1-5, error estándar (EE) = 0,15), la factibilidad media fue 3,90 (EE = 0,15) y la aceptabilidad fue 3,98 (EE = 0,18). Los participantes indicaron que se necesitaba un apoyo administrativo y técnico sustancial, pero que no siempre estaba disponible para la implementación y muchos se sintieron frustrados por la necesidad de cambiar su flujo de trabajo.

**LIMITACIONES:** La mayoría de los cirujanos participantes eran hombres, blancos, tenían >12 años en la práctica y usaban sistemas de registros médicos electrónicos de Epic. Por lo tanto, es posible que no representen las perspectivas de todos los cirujanos de colon y recto de EE. UU. Además, a medida que el informe operativo sinóptico se implemente de manera más amplia en los EE. UU., Será importante considerar las variaciones en el proceso por sistema EMR.

**CONCLUSIONES:** El informe quirúrgico sinóptico para el cáncer de recto fue en general fácil de implementar e incorporar en el flujo de trabajo, pero los cirujanos seguían preocupados por la carga adicional sin valor inmediato y tangible. A pesar de reconocer los beneficios, muchos participantes indicaron que solo implementaron el informe operativo sinóptico porque era un mandato del Programa Nacional de Acreditación para el Cáncer de Recto. Consulte **Video Resumen** en <http://links.lww.com/DCR/B735> (*Traducción—Dr. Xavier Delgado*).



**KEY WORDS:** Implementation; Improvement science; Rectal cancer; Synoptic report; Surgery.

As cancer care becomes increasingly multidisciplinary, clinicians require clear communication and a common language more than ever before. Traditional narrative operative reports, however, may lack essential details or contain redundant information.<sup>1-3</sup> Use of a synoptic operative report (SOR) has been shown to improve the documentation of critical elements of the operation and to provide added value related to data access and extraction, data reliability, relevant detail, and completeness of information.<sup>1,3-6</sup> Although many physician specialties have embraced synoptic reporting to communicate findings and interventions, surgical documentation practices have been slower to change.

Despite the known benefits of SORs, they can be difficult to implement into electronic medical record systems and into users' workflow. Implementation and utilization require physician acceptance and behavior change, whether voluntary or mandated, as well as administrative and technical support. Individual-level surgeon motivators for change may include the desire for access to organized and succinct information within SORs, potential for positive impact on patients, and skill mastery.<sup>7,8</sup> Other key elements associated with successful implementation are stakeholder involvement, inclusion of champions or respected colleagues, a collaborative team-based approach, and management of the change process.<sup>8-10</sup> Although financial incentive plans can be helpful, they do not provide sufficient motivation to change longstanding physician behavior. Rather, a sense of commitment or buy-in is critical to changing physician practice, and motivating behavior change should focus on improvement of clinical outcomes and minimization of costs.<sup>9,11,12</sup>

Previously, we examined the content of rectal cancer operative reports before and after implementation of the National Accreditation Program for Rectal Cancer's SOR and elicited surgeon suggestions for improvement.<sup>1</sup> The present study aimed to evaluate the *process* of implementation, specifically focusing on usability, feasibility,

and acceptability of the SOR and the main motivations or barriers to future use. Without such knowledge, resources and implementation efforts may be wasted.

## **METHODS**

### **Study Design**

A convergent mixed-methods process evaluation of the rectal cancer SOR was conducted from January to October 2018. The aim of this evaluation was to assess the usability, feasibility, and acceptability of implementing the SOR at representative medical institutions across the United States and to identify strengths and weaknesses of deployment and uptake. This study was approved by the Stanford University Research Compliance Office.

### **Development and Deployment of SOR**

The SOR for rectal cancer was developed using the approved American Society of Colon and Rectal Surgeons rectal cancer checklist along with colorectal surgery experts and key stakeholder involvement.<sup>13</sup> Following iterative discussion by the SOR committee, the SOR was revised to include 19 items (and their possible response options) critical for rectal cancer operative care. After approval by the National Accreditation Program for Rectal Cancer (NAPRC) executive committee, the SOR was built into Epic as a SmartPhrase and shared in the Epic community library for US institutions to access (<https://www.youtube.com/watch?v=dydmT3PKaag>). Participants at institutions using non-Epic systems were provided a checklist and the response options to fit into their systems electronically or to include in their dictations.

### **Participant Recruitment and Settings**

Colorectal surgeons from US academic hospitals were invited to participate in the process evaluation. The surgeon recruitment strategy and full cohort have been described previously.<sup>1</sup>

### **Quantitative Survey Data Collection and Management**

Participants were asked to complete the following tasks for this study: submit 5 operative reports before and 5 operative reports after SOR implementation, complete a brief electronic survey, and participate in an optional phone interview.

After submitting the first postimplementation operative report, participants completed an electronic survey that defined and queried 3 key domains of implementation: usability (“ease of access and use, the extent to which the SOR is efficient and intuitive”), feasibility (“the extent to which using the SOR works in your practice”), and acceptability (“the extent to which the SOR provides a relative advantage and is credible as an addition to the operative note”). Usability, feasibility, and acceptability were selected based on implementation research guidelines.<sup>14</sup>

Participants responded to 14 statements using a 1 to 5 Likert-type scale (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree) along with being given the option to respond with free text to prompts about implementation, use, and content of the SOR.

### **Qualitative Interview Data Collection and Management**

Following SOR implementation and submission of at least 2 operative reports using the SOR, participants were invited to give their perspectives in a semistructured phone interview with questions pertaining to usability, feasibility, and acceptability. Qualitative data collected through interviews captured participants’ experiences and allowed participants to express their attitudes, motivations, and barriers in particular situations. This data collection was intended to enable future adoption and use of the rectal cancer SOR.<sup>7</sup> Surgeons were also asked specifically about their future use of the SOR and their reasons for or against continued use. The interview guide was pilot tested with colorectal surgeons who were using the SOR but not participating in the study and was revised for clarity (<http://links.lww.com/DCR/B736>).

Phone interviews were conducted April through October 2018. A single member of the research team (S.B.) with graduate-level training in qualitative research conducted the interviews, which ranged from 10 to 57 minutes in length, with an average of 19 minutes. Interviews were audio-recorded and transcribed verbatim by a third-party transcription service. The interviewer reviewed all transcripts and removed any identifying nouns before transcripts were coded. Each participant was given an identification number to maintain anonymity.

Participants were excluded from the phone interview if they did not submit at least 2 rectal cancer operative reports after implementation of the SOR, if they refused the telephone interview, or if they were unable to schedule it within the study period.

### **Data Analysis and Mixed-Methods Integration**

A codebook was created inductively using the first one third of the transcripts. The research team met to review the first 7 interviews, and, through iterative discussions, agreed on the codes and themes in the codebook. To ensure the rigor of the codebook, 2 members of the research team (A.M.M. and S.S.B.) independently coded all remaining transcripts and discussed coding strategies until consensus was reached for interrater agreement. For coding consistency, all transcripts were then re-coded using the final codebook. The research team then performed thematic analysis on the coded data to obtain themes. NVivo version 12 was used to organize all qualitative data and analyses. Qualitative themes were verified by searching for disconfirming or contradictory statements and through triangulation among transcripts and cross-compared with quantitative responses.

Descriptive statistics (mean, SE, and range) of the survey responses were calculated using R Studio version 1.0.153. Quantitative survey results were integrated with qualitative data by each domain—acceptability, usability, and feasibility—through a joint display.

## RESULTS

Among 37 surgeon participants, 28 completed the electronic survey (76% response rate) and 21 (57%) completed the telephone interview (Table 1). The majority of participants (75%) used Epic electronic medical record (EMR) systems, whereas 14% used AllScripts and 11% used Cerner. The majority of surgeon participants were in practice for more than 12 years (65%) and were male (84%).

### Usability, Feasibility, and Acceptability of the Rectal Cancer SOR

Overall, participants ranked the SOR relatively well in each domain (Fig. 1). Mean usability was 4.14 (range, 1–5; SE, 0.15), mean feasibility was 3.90 (SE, 0.15), and acceptability was 3.98 (SE, 0.18). The median for all survey statements was 4 to 4.5 with an interquartile range of 1 to 2.

#### Usability

In general, participants reported that the SOR was easy to access (82%) and intuitive for use once it had been accessed (86%), but fewer felt that it was efficient (75%). During interviews, surgeons commented that the SOR was “less onerous” (S20) than expected and that it was “very easy to do” (S02) using the Epic SmartPhrase.

#### Feasibility

Feasibility scores were lowest among the 3 domain categories. Although most surgeons (79%) responded that

the SOR is practical to use, fewer (61%) stated that it was convenient. Qualitative findings highlighted that inclusion of photographs in the SOR altered workflow for some. Surgeon respondents pointed out the added work and time of including the SOR: “Basically, the reason people say, ‘I’m not sure if I’m gonna use it,’ or, ‘It stinks,’ or stronger language than that [laughter], is that if the solution is to create more work for the surgeon, a predictable outcome of it [is] you’re not gonna have adoption” (S17).

#### Acceptability

Measures of acceptability had a larger range (mean values, 3.71–4.25) than the other domains. Eighty-eight percent of respondents felt that the SOR was appropriate for use with rectal cancer procedures, but only 64% said the SOR *should* be used based on the current culture of patient safety. Most surgeons reported that the SOR is credible (86%) and should be used consistently (75%). Some surgeons stated that having all the SOR items in a report would lead to “a better idea of what the quality of the surgery is that the patient got” (S03), whereas other surgeons described the SOR as lacking in detail and indicated that it required accompaniment of a traditional narrative component.

#### Implementation

##### Implementation Into the EMR

Surgeons expressed varying opinions about implementation of the SOR into their EMR (Table 2). Some participants experienced seamless implementation into their institutions’ EMR systems, stating that “it was very straightforward” (S02). Although some surgeons utilized their EMR/information technology support staff, others were able to create the electronic SOR on their own: “I just did it all myself—I mean, it’s pretty simple... if I could do it, it’s not hard” (S17). Conversely, other surgeons experienced tremendous difficulty or delay while working with their institution’s EMR/information technology staff. A few surgeons experienced institutional roadblocks that prevented them from making changes to their EMR system during our study period; these participants described a workaround process of dictating each of the SOR elements.

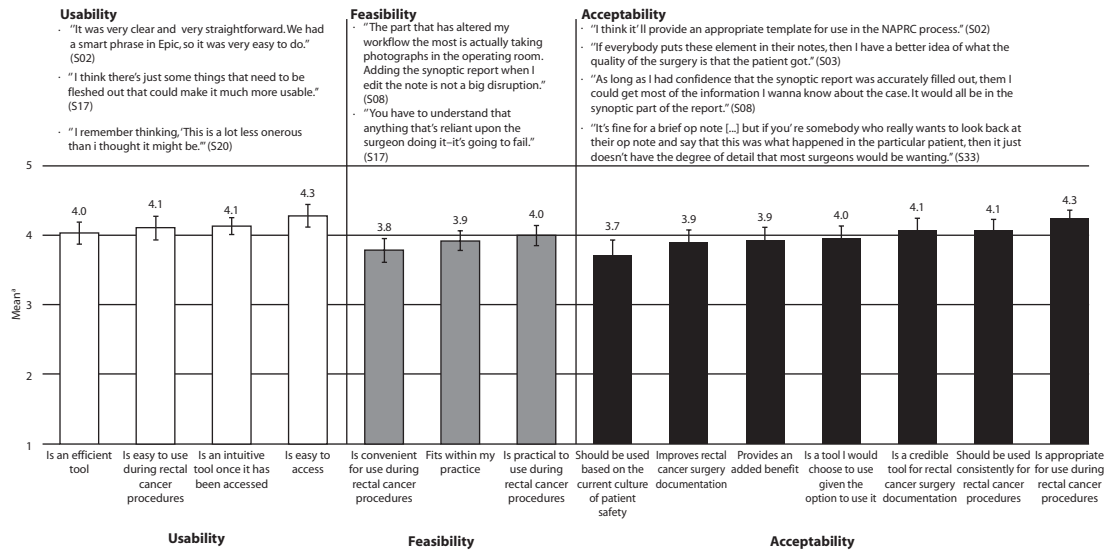
##### Implementation Into Surgeon Workflow

Surgeon respondents described a variety of processes to incorporate the SOR into their normal documentation workflow. Some surgeons stated that as use of the SOR became a familiar routine, they completed it before the rest of their dictation to “align” (S05) their thoughts, or they embedded the SOR into their standard operative note. Others commented about how the requirement of photographed specimens added to their work in the operating room, therefore altering their workflow. In addition,

**TABLE 1.** Study participant characteristics

Characteristics	Total participants	Completed survey	Completed interview
Number of surgeons	37	28	21
Sex, n (%)			
Male	31 (84)	24 (86)	18 (86)
Female	6 (16)	4 (14)	3 (14)
Race, n (%)			
Non-Hispanic White	30 (81)	24 (86)	18 (86)
Other	7 (19)	4 (14)	3 (14)
Electronic medical record system (n = 28 from survey responses), n (%)			
Epic	21 (75)	21 (75)	16 (76)
AllScripts	4 (14)	4 (14)	2 (10)
Cerner	3 (11)	3 (11)	3 (14)
Years in practice, n (%)			
<6 y	5 (14)	4 (14)	3 (14)
6–12 y	8 (22)	5 (18)	2 (10)
>12 y	24 (65)	19 (68)	16 (76)





**FIGURE 1.** A joint display of process (usability, feasibility, acceptability) scores and surgeon respondent perspectives. <sup>a</sup>Mean calculated as an average of the following response options: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree. NAPRC = National Accreditation Program for Rectal Cancer.

**TABLE 2.** Implementation of the synoptic operative report

*Implementation into electronic medical record (EMR)*

Surgeon independently implemented in EMR

“It’s very easy to add in... I just have to go back into my SmartPhrase manager and add it in.” (S03)

“I just did it all myself—I mean, it’s pretty simple. You just type it in and all that stuff’s in bold and the other stuff that populates is not in bold, and I put [in] dot phrases...I mean, and trust me, this was in the first week of Epic, so [laughter], if I could do it, it’s not hard.” (S17)

Information technology department implemented into EMR

“You know, it took some time to—IT departments have their own priorities, so—based on that it took a little time for them to get to it. But once they got to it, it was, uh, fairly straightforward... basically, I mean, I just met with our IT guy and I told him what we needed and he—you know, at first actually he was a little bit confused because he didn’t know that there was the Epic library and where he could find that synoptic op report.” (S05)

“We had a little challenge with that because for some reason, our Epic people could not find it in the Epic Community Library. And so we, we created it ourselves and that was not too hard. We just had to find a tech person [because] I didn’t know how to do it myself, and so, um, I just had to find somebody, uh, from our Epic team to do it.” (S08)

*Implementation into surgeon workflow*

Workflow solutions

Surgeons adjusting personal workflow

“What was interesting for me is that I frequently did the synoptic op report first. Just the first one or two I decided to do the synoptic op report first. So that kind of aligned my thoughts about the case a little bit more cogently.” (S05)

“The part that has altered my workflow the most is actually taking photographs in the operating room.... It ends up taking a couple of minutes out of the case. It is a part of better documentation for the case. That’s probably disrupted it the most.” (S08)

Surgeons providing colleagues reminders to use

“I just told the other people in my group to use that dot phrase. And so I tell people about it at [the division] meeting. And then maybe a month or two later, I sent a follow-up email asking people whether they had started using it or not and reminding them what the dot phrase was.” (S08)

“Someone just said—yeah, like, ‘Type this in,’ and then I typed in like, literally, like, I think I typed in like dot NAP, and then it was there.” (S20)

Workflow without EMR implementation

Additional burden on surgeons

“Because we’re on an Allscripts, I didn’t have it as an embedded document. So as—you’ve seen my notes. What I did, I dictated my regular op note. But then I put in a section—synoptic op note, and I went and did it. So that’s automatically more cumbersome—because all of the headers I had to dictate. For instance, one, period, clinical stage, colon. You know? So it made it way more cumbersome than it would have been if it had been a built-in.” (S19)

Surgeons find a routine

“I usually just am in the habit of dictating the operative—full operative reports after the case or at the end of the day. And I just carried this, uh, piece—piece—this piece of paper in my locker in the operating room, and I just bring it out when I’m doing a rectal cancer case and follow it... Yeah, you know, it’s become part of my routine now. Um, I think that I did have one case when I forgot to use it early on. But since then, I think I’ve been pretty good.” (S12)

“[Another doctor] provided me with this nice little laminated card that’s got the 23 items. And so, like I said, I go through the—what our institution requires for notes. And I’ve just been saying syno-synoptic op report and then dictating these 23 items. And I would guess it adds at least probably a minimum of 5 minutes to the oper—to the dictation time.” (S19)

**TABLE 3.** Motivations and barriers to use of the synoptic operative report

Theme	Motivations	Barriers
Time/efficiency	<p><i>Faster location or extraction of information</i></p> <p>"You want to be able to have it so that it's digestible very quickly. Someone can very quickly pull up the page and look at something in 10 seconds and move on. And know what they're talking about." (S17)</p> <p>"It may make the MDT discussion quicker because a lot of the elements that are discussed in the MDT, would already be in that note so people could review it in advance, for example." (S29)</p> <p>"I don't think it's gonna change the way I read other people's operative reports in clinical care, but I think it'll change the way that we draw out information for registries and, and record keeping." (S49)</p> <p><i>Completing the synoptic operative report is quick</i></p> <p>"I think it's gotten a little quicker to use. At first, I wasn't sure how to upload the photographs 'cause I'm putting the photographs in the note, along with the synoptic report. And, that's gotten a bit quicker 'cause now I know how to do it better... I would say it's, it's probably a little quicker." (S08)</p> <p>"I was like, 'Oh, it's, it's like super easy dot phrase.' And it took probably less than a minute." (S20)</p>	<p><i>Provides burden without value</i></p> <p>"There is nothing in it for me, personally. That's the other problem trying to get people to do this. If you're a busy clinical surgeon in private practice, there is nothing in this for you. It does nothing to make your life better, and it really does nothing to improve the care of the patient that you just operated on...It's just the, the time involved." (S19)</p> <p>"I just think it's so rudimentary... it's duplicating work the way it is at the moment... It's an additional step in workflow. So for those of us who would have done a very complete operative note, this is an additional burden...the negative of this is just that it's an extra workflow stuff that is an added, unfunded mandate to what people do. And that will turn people off, following practices like this." (S31)</p>
Regulatory oversight	<p><i>Surgeons include the synoptic operative report for accreditation</i></p> <p>"So we all know that this is a required piece of our accreditation application. So that's the reason why people are motivated here to do it. I'm not sure how motivated people would be if they were not applying for accreditation... I think that people will do this if they want to get NAPRC accreditation. I think that it's gonna be hit-or-miss for others." (S08)</p> <p>"Well, I think if it's mandated, if they want to be accredited, they'd have to do it. I think beyond that, I think people will revert back to what their usual practices are." (S40)</p>	<p><i>Fear of oversight may prevent surgeon uptake</i></p> <p>"The negative outcome is that if for some reason a surgeon deviates from this because of a good clinical reason, quite honestly, you could get lawyers saying, 'Look, this, this is a standard guideline. Obviously, this must be the standard of care. And because you deviated from the standard of care, you must have committed malpractice.'" (S03)</p> <p>"It smacks of all the things [surgeons] don't like. It's somebody telling them what to do. They don't like that. It smacks of 'Big Brother'. They don't like that. It smacks of changing what they currently do. They don't like that. And it suggests to them that what they do could be improved, and they definitely don't like that." (S47)</p>

MDT = multidisciplinary team; NAPRC = National Accreditation Program for Rectal Cancer.

surgeons mentioned both teaching others at their institution how to use the SOR and reminding them to use it during the initial phase of implementation.

Surgeon participants who were unable to develop an electronic SOR commented on the extra burden of dictating all the SOR items, stating it can be "more cumbersome" (S19). However, these participants were also able to describe the routine they eventually developed, including tricks such as keeping a laminated dictation card in their lockers.

### **Motivations, Facilitators, and Barriers to Use of the SOR**

During the interviews, surgeon respondents commented on several factors that would motivate them or facilitate their use of the SOR, along with noting many potential barriers to its uptake (Table 3). Occasionally, similar features were cited as both motivators and barriers. Some surgeon respondents also reported that "for the more junior surgeons, [the SOR] is a constant reminder of what proper elements need to be in their note," but for their own

documentation practices, "it is repetitive to what [they] already have been doing in [their] op notes" (S03).

### **Time/Efficiency**

Surgeon respondents displayed sensitivity to the time required to complete the SOR and also the time to extract information. Many surgeons identified how the SOR could create a concise summary of important clinical information and present it in an organized manner, such as to support the work of auditors, registrars, or multidisciplinary teams. Some also stated that when reading an operative report, they'd "just skip to the synoptic part" (S20). Some surgeons felt the SOR was quick to complete, mentioning that it only required 1 to 5 minutes. However, other surgeons felt this additional step and any added time to their documentation practice was burdensome: "it'll be a contributor to yet another major bureaucratic boondoggle that promotes burnout" (S02). They stated how the SOR created repetitive work for surgeons who already document the SOR information in their traditional reports.

One participant provided the following comment related to a surgeon's time:

If the solution is that you've created something that allows you to extract information easily, and simultaneously makes less work for the surgeon, then you'll have a home run [...] Everybody is busy. They want to do a good job, and they want to invest the least amount of time to get the information and to give the information. (S17)

### **Regulatory Oversight**

Many surgeons mentioned that NAPRC accreditation is a driving motivator for their utilization and support of the SOR. Surgeons also mentioned that many would not choose to use the SOR if it were not part of the NAPRC accreditation. Although accreditation may encourage surgeons and institutions to adopt the rectal cancer SOR, fear of oversight was frequently described as a barrier to SOR use. Surgeons felt the SOR should not have any punitive effects, nor should it be used as a measure of malpractice if surgeons deviate from the standard of care.

### **Community Building**

A few participating surgeons shared how utilization of the rectal cancer SOR provides a sense of contribution to their community. One surgeon expressed how the NAPRC and SOR create a feeling of connection within the rectal cancer surgery community. Others noted that using the SOR offers a "warm fuzzy feeling of helping humanity" (S19) and supporting the greater good:

It's the right thing to do for the patient. It's the right thing for the health care system. It's the right thing for the other members of the treatment group. It's the right thing for follow-up for the patient. (S22)

### **Data Quality/Research**

The final theme focused on improving data quality and allowing for future research. Many participating surgeons indicated that the SOR would create "a more useful repository—accurate, and consistent" for clinical information. One participant said, "As somebody who studies quality of care for cancer, the report then becomes a way to do quality assessments" (S08). Other surgeons reiterated this belief, stating that "the synoptic operative report is actually gonna allow research to occur" (S22) and that "it's gonna be able to help surgeons participate as coauthors in studies" (S29). One participant echoed the previous comment about the SOR being the "right thing to do," stating it "is the right thing to do for accuracy of data and collection of data and subsequent analysis of data" and that it "will ensure quality and integrity of data sets" (S47).

## **DISCUSSION**

As cancer care becomes increasingly complex, medical documentation practices are transitioning to include more standardized templates, including synoptic reports,

to reduce the omission of important information and to normalize reporting. After deployment of the rectal cancer SOR to multiple US institutions, we found that surgeons were satisfied with the SOR in 3 domains of usability, feasibility, and acceptability.

The implementation process varied by participant institution; some participants noted nearly seamless implementation of the SOR into their EMR systems, whereas others were ultimately unsuccessful and utilized alternative strategies to record the SOR elements. Surgeons noted 4 main contributors to their anticipated future use of the SOR: time/efficiency, regulatory oversight, community building, and data quality/research. Although the time/efficiency and regulatory oversight themes elicited both motivators and barriers for use, community building and data quality/research were positive influencers.

Across health care fields, synoptic reporting has become widespread and has shown consistent benefits to the quality of documentation,<sup>2,15–19</sup> with increasing acceptance among physicians.<sup>20,21</sup> Analogous to the motivations that emerged in our study of operative reports, synoptic pathology reports have been shown to benefit the user (pathologists) by reducing errors and omissions, to benefit the report recipients by providing organized and succinct information, and to benefit data users by enabling structured data sets.<sup>22</sup>

We also found that ease of incorporation into the EMR was a key to successful uptake. Our findings align with previous reports that a health care system's support structure, information technology infrastructure, and collaborative culture can either improve or impede the implementation and adoption process.<sup>8,23</sup> Finally, our study also noted that regulatory oversight (accreditation by the NAPRC in this case) provided additional motivation, because many respondents volunteered that they would not choose to implement the SOR otherwise. Thus, although individual physician perspectives are important to adoption, the system within which a physician works also largely contributes to successful or unsuccessful implementation.

Our study is not without limitations, which should be noted. The majority of surgeon participants were male, were white, and had >12 years in practice. Therefore, the perspectives captured through our survey and interview may not be representative of the underlying population of US colon and rectal surgeons.<sup>24</sup> In addition, it is likely that surgeons with more years in practice may be more resistant to changing their documentation methods because they have established routines, whereas newer surgeons may be more likely to adopt the SOR because of comfort with technology, the EMR system, and adjusting practices. The participants in this study used 3 different EMR systems. Although the majority used Epic, those who used other systems faced added challenges. They could not access the SOR in the Epic community library, and their interface with the SOR may have looked different than the visual aids that were developed to help with implementation. As the SOR is

implemented more broadly across the US, it will be important to consider variations in the process by EMR system.

## CONCLUSION

Busy and experienced surgeons in our cohort responded positively to the practicality of the rectal cancer SOR and its overall ease of use. Acceptability varied among surgeons, mostly related to the perceived additional work, disruption to the postoperative workflow, and difficulty with integration into the EMR. Despite acceptance, usability, feasibility, and acknowledgement of multilevel benefits, many surgeons indicated that they would not implement the SOR without additional regulatory oversight.

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