



Using Implementation Science to Adapt a Training Program to Assist Surgeons with High-Stakes Communication

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OBJECTIVE: Surgeons often conduct difficult conversations with patients near the end of life, yet surgical education provides little formalized communication training. We developed a communication tool, Best Case/Worst Case, and trained surgeons using a one-on-one resource intensive format that was effective but difficult to scale for widespread dissemination. We aimed to generate an implementation package to teach surgeons using fewer resources without sacrificing fidelity.

DESIGN, SETTING, AND PARTICIPANTS: We used the Replicating Effectiveness Programs framework to guide our implementation strategy and tested our intervention with 39 surgical residents at 4 institutions from September 2016 to June 2017. The implementation package consisted of: (1) instructional video, (2) checklist to assess competence, (3) learner manual, and (4) instructor manual. We focused on 3

implementation outcomes: feasibility, fidelity, and acceptability to participants.

RESULTS: Attendance rates ranged from 16% to 75%. Site leaders had little difficulty identifying suitable instructors; however, resident recruitment proved challenging. Sixty-nine percent of residents completed the post-training assessment and the mean score was 12.8 (range 8-15) using the 15-point checklist. Across sites, 69% strongly agreed that Best Case/Worst Case is better than how they usually approach high-stakes conversations and 100% felt prepared to use the tool after training. Instructors reported that the training provided residents with the necessary skills to perform the fundamental elements of Best Case/Worst Case.

CONCLUSIONS: Using implementation science we demonstrated that a resource intensive communication training intervention can be successfully modified for group-learning and wide-scale dissemination. However, we identified barriers to implementation, including challenges with feasibility and programmatic buy-in that inform not only resident education but also communication skills training more broadly. (J Surg Ed 76:165–173. © 2018 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: Education, Surgery, Communication, End-of-life

COMPETENCIES: Interpersonal and Communication Skills, Patient Care, Systems-Based Practice

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INTRODUCTION

Surgeons often have complex decision making discussions with seriously ill older adults and their families. These conversations can be challenging and the consequences of treatment decisions are profound; ineffective communication may contribute to unwanted care near the end of life.¹⁻⁶ Surgeons typically describe the surgical problem and disclose risks associated with surgery. Yet, this standard for informed consent does not provide the information patients need to engage in treatment decisions that align with their personal values and goals.^{3,7-10} Furthermore, surgeons have few opportunities for formal instruction on the conduct of preference-sensitive decision-making conversations in the setting of critical illness. To address this gap and facilitate shared decision making, our research group developed a communication tool called Best Case/Worst Case (BC/WC) for in-the-moment decisions with frail, older adults with life-threatening illness (Fig. 1).^{11,12} The BC/WC tool uses a technique called “scenario planning”^{13,14} and a graphic aid to illustrate treatment options, express uncertainty, and provide a strong message about prognosis. With this tool, surgeons use narrative to describe a best case, worst case, and most likely outcome of each treatment option to help patients

make decisions based on their values and preferences.¹⁵ We pilot tested this tool and found that surgeons can use BC/WC to improve shared decision making with hospitalized patients.^{11,16} Surgeons, patients, and families praised the tool for promoting dialogue about patient preferences and preparing patients for unwanted outcomes.

Teaching surgeons to use the BC/WC tool involved a resource intensive model that combined in-person didactic instruction and one-on-one coaching during practice with standardized patients.¹⁶ While effective,¹¹ this approach is challenging to replicate outside our institution and costly to implement on a larger scale. Although the tool appears simple, when we reviewed audio-recorded clinical conversations and feedback from surgeons, our data suggest that many surgeons falsely perceive that they already use BC/WC. As such, we worried that rapid uptake without attention to fidelity of enactment would blunt the efficacy of the intervention. Prior to widespread dissemination, we recognized the need to formalize an implementation package with fewer resource requirements to ensure that end users could employ the tool as designed.

Despite initial promise, many effective interventions fail during attempts to disseminate beyond the setting in which they were developed. The field of implementation

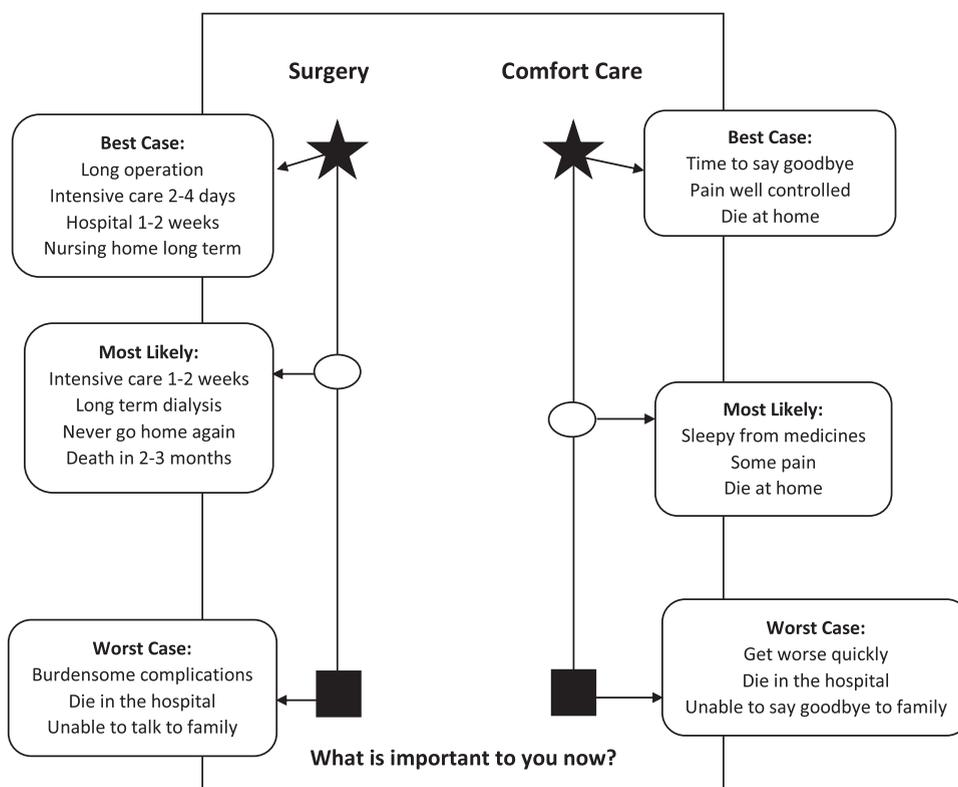


FIGURE 1. Best Case/Worst Case communication tool. The surgeon uses narrative to describe the best case, worst case, and most likely scenarios for surgery and an alternative treatment, such as comfort care. The surgeon generates a graphic aid describing potential outcomes of each treatment to use during the conversation with patients and families.

science seeks to address this research-to-practice gap by developing frameworks to implement and disseminate effective interventions widely across a variety of settings to reach end users.¹⁷ Using an implementation framework, we sought to adapt and standardize our individualized training strategy to teach learners in a group setting. We chose to develop and test our implementation package with surgical residents because patients regularly interact first with trainees who convey patient preferences to attending surgeons. Furthermore, many clinical skills are disseminated to residents through organized curricula, for example fundamentals of laparoscopic surgery (<https://www.flsprogram.org/>), which incorporate didactic content, skills practice, and competency evaluation. Thus, residents comprise an ideal cohort of learners for evaluation of a group training approach. Herein, we describe the results of implementation of our training program intervention, first revising the program at a single institution and then testing it at 4 surgical residency programs.

METHODS

We conducted a multisite study at 5 academic medical centers across the United States to modify and evaluate an implementation package designed to teach surgeons to use the BC/WC communication tool. Using our initial experience with one-on-one training, we modified this program for small group instruction with surgical residents and fellows at the University of Wisconsin. We then distributed our implementation package to collaborators at 4 academic institutions: University of California San Francisco, Northwestern University, University of Michigan, and University of Minnesota. We selected these sites based on personal contacts and interest expressed on behalf of the collaborators and sent the implementation package to the site leader at each institution. We limited enrollment to surgical residents in general surgery, cardiothoracic, vascular, or urology training programs and excluded interns as they lack adequate experience with complex clinical decision making and would presumably struggle to complete the BC/WC tool in practice. This study received Institutional Review Board approval at the University of Wisconsin and was deemed exempt by the IRB at participating institutions.

Implementation Package Development

We used the Replicating Effective Programs framework for healthcare interventions to develop an implementation package. The Replicating Effective Programs framework consists of 4 phases: preconditions, preimplementation, implementation, and maintenance and evolution¹⁷ (Table 1).

Preconditions

We designed our intervention to address a surgeon-identified need—barriers in surgeon-patient communication that contribute to unwanted care.⁶ Using Kolb's cycle of experiential learning and Ericsson's principles of deliberate practice and individual coaching,^{18,19} we initially trained 25 attending surgeons during individual one-on-one two-hour sessions and demonstrated improvements in shared decision making between surgeons and hospitalized patients.^{11,16} Working with experts in education to adapt this model for dissemination, we generated standardized didactic content and decreased resource demands by economizing on the use of standardized patients while preserving opportunities for practice and feedback.

Preimplementation

The redesigned intervention is a 2-hour program including didactic instruction, large group demonstration, and small group practice using role play (Fig. 2). This intervention is supported by the 4 core components of our implementation package: (1) instructional video (<https://www.youtube.com/watch?v=FnS3K44sbu0>), (2) checklist of 15 essential conversation elements, (3) learner manual, and (4) instructor manual with logistical guidance to organize a training session. The 10-minute video demonstrates key BC/WC elements and ensures uniformity of the didactic content. We created this video to show how BC/WC would work in practice for a frail older patient with serious surgical illness and to offer exemplar phrases surgeons can use in conversation. The checklist clearly delineates BC/WC elements for learners and provides a measure for coaches to assess learner performance post training (Appendix).

The learner manual includes a brief introduction and training agenda, step-by-step instruction for each element of BC/WC, and a description of the shared decision making theory supporting the BC/WC tool including references. We designed the instructor manual for use by individuals with expertise in palliative care, communication skills, and education. It outlines the training agenda, materials list, and contains a detailed description of the learning objectives and teaching strategies for each activity. We included exemplar phrases for coaches to use when giving feedback and highlighted common learner errors identified during the initial surgeon training, such as failure to break bad news or elicit patient values.^{16,20} The manual also contains vignettes for general, cardiothoracic, vascular, and urologic surgeons to use in role play.

Implementation

At the University of Wisconsin, we trained 3 cohorts of residents and fellows in general surgery, vascular surgery, and urology. After each session, we iteratively revised the

TABLE 1. Use of the Replicating Effective Programs Implementation Framework for the Development of the BC/WC* Implementation Package

Phase	Key Components	Elements of the Best Case/Worst Case Implementation Package
Preconditions	<ul style="list-style-type: none"> • Identify need • Identify effective intervention • Draft implementation package 	<ul style="list-style-type: none"> • Improve preoperative communication to reduce unwanted care near the end of life • BC/WC offers a strategy for surgeons to promote shared decision making • Adapt 1-on-1 training to a group format with role play
Preimplementation	<ul style="list-style-type: none"> • Define core elements • Logistics planning • Staff training 	<ul style="list-style-type: none"> • Checklist, instructional video, training manuals, logistic guidance • Integrate into educational conference time • Define instructor qualifications and generate training manuals
Implementation	<ul style="list-style-type: none"> • Process evaluation • Feedback and refinement • Establish ongoing support 	<ul style="list-style-type: none"> • Iterative revision after each training session • Focus groups with residents • Debriefing with coaches • Engage residency program leadership
Maintenance and evolution	<ul style="list-style-type: none"> • Organizational changes to sustain intervention • National dissemination • Recustomize delivery as need arises 	<ul style="list-style-type: none"> • Post-training assessment • Practitioner Opinion Survey • Create training video for instructors

*BC/WC = Best Case/Worst Case communication tool.

training program based on reach of the intervention, resident performance, debriefing with coaches, and focus groups with resident participants post-training. Due to poor attendance at the first 2 sessions, we made 2 primary changes. First, we permitted greater flexibility in session timing, allowing for completion in a single 2-hour block or 2 separate 1-hour blocks to accommodate existing education conferences and busy schedules. Second, we requested endorsement from residency program leadership and a commitment that other activities, such as technical skills training or required meetings would not overlap with this communication skills training.

Based on participant feedback, we created pocket cards outlining the core BC/WC elements which we included in the implementation package for distribution. To preserve the positive impact of using standardized patients, we wrote “character stems” for learners to use during role play of patients. These included the character’s fears and the specific activities he/she enjoys to facilitate realistic enactment of patient preferences. Finally, although we asked learners to review the video in advance, many did not. As such, we modified the training agenda to include group viewing of the video at the beginning of the session.

Maintenance and Evolution

At least 1 week after training, we tested residents with a standardized assessment of competence. Two coaches observed and independently scored the first 8 residents using BC/WC in simulation with the 15-point checklist.

Cohen’s kappa coefficient was 0.75, demonstrating substantial inter-rater agreement. Based on our pilot data from attending surgeons, we determined that a score of 10 or greater was necessary for competence.¹⁶

In preparation for dissemination, collaborators at participating institutions identified a need to supplement resources for local instructors. In response, we recorded a video intended for use only by instructors to demonstrate BC/WC enactment, role play, and coaching feedback. Thus, the final implementation package included instructional video for use during training, 15-point checklist, instructor and trainee manuals including hypothetical cases and character stems for role play, pocket cards, and a demonstration video for coach preparation (Fig. 2). We also distributed a separate document highlighting implementation challenges and solutions based on our initial testing at the University of Wisconsin.

Outcome Measures and Analysis

To test the implementation package, we prioritized 3 outcomes from a taxonomy proposed by Proctor²¹: feasibility of training, fidelity of enactment, and acceptability to participants (Fig. 3). To assess feasibility, we recorded attendance rates and debriefed with coaches at each site following training. We documented reported deviations from the implementation package and conducted open-ended interviews with coaches regarding implementation burdens such as time, recruitment, and scheduling challenges. To measure fidelity, each trained resident completed an assessment at least 1 week post-training

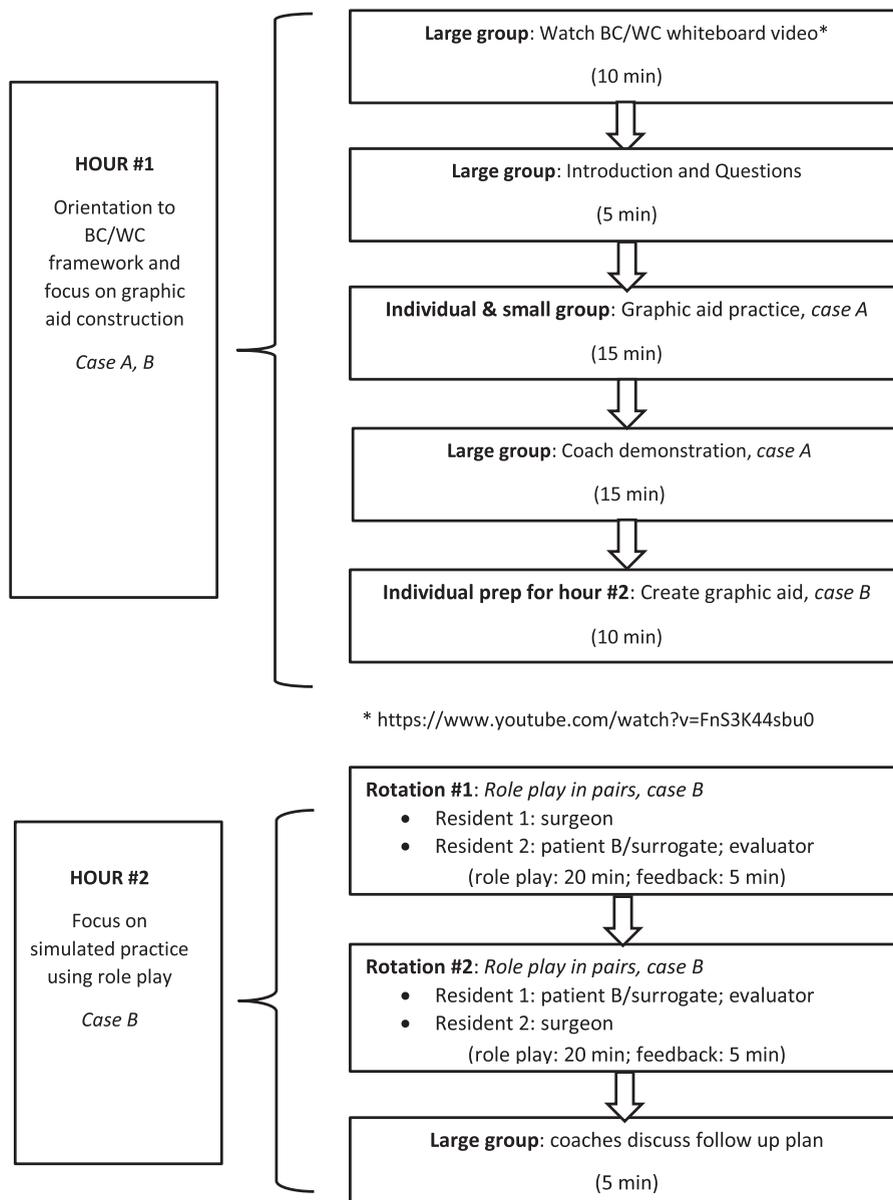


FIGURE 2. Structure of a 2-hour BC/WC training program.

using the checklist. To evaluate the acceptability of the tool and use in practice we administered the validated Practitioner Opinion Survey²² to residents 1 month after training. We recorded participant demographics and used descriptive statistics to summarize assessment scores and survey results.

RESULTS

Participants

Instructors specialized in surgery (9), palliative care (6), critical care (1), geriatrics (1), and education (2)

(Table 2). There were few obstacles to instructor recruitment; each site leader emailed invitations to potential instructors based on personal contacts and the reputation of individuals with expertise in communication, education, or palliative care. One site coordinator solicited recommendations from residents to generate a list of faculty perceived as excellent communicators as a strategy both to identify instructors and engage residents in the training program. Preparation for coaching varied. At 1 site, coaches read the instructor manual and watched the videos individually before meeting briefly as a group immediately prior to the training. At another site, coaches participated in a formal orientation consisting of a 1-hour session prior to the training to review the

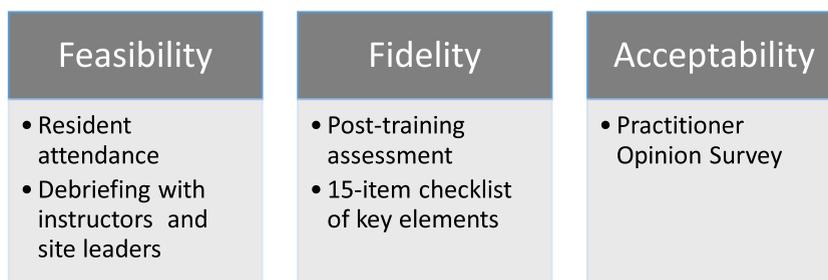


FIGURE 3. Implementation outcomes and corresponding study procedures to measure each outcome.

training manual, discuss coaching strategies including how to give feedback, and practice BC/WC using role play.

To reach residents for training, site leaders emailed all eligible residents with information about the training program and sought to establish buy-in from chief residents, the program director, or other attending surgeons to encourage attendance and generate enthusiasm. Prior to training, 3 sites used grand rounds presentations to introduce the department to BC/WC. To further incentivize attendance, site leaders provided food during the session and in 1 instance combined training with an ethics conference, encouraging residents to share personal experiences caring for frail, older patients.

Thirty-nine of 124 eligible residents participated across 4 sites. Most were general surgery residents (85%) and 36% of trainees were PGY 4 or above. Attendance rates ranged from 16% to 75%. Reach improved when the training was completed in a single 2-hour session as opposed to two 1-hour sessions. Programs that had protected resident didactic time, integrated into the weekly curricula, had better reach than those where

training took place outside of usual residency education or where resident education was not protected.

Post-training Assessments

Sixty-nine percent of trained residents completed the post-training assessment; all but 2 achieved competency in use of the communication tool. Mean score on the post-training assessment was 12.8 (range 8-15). The most commonly missed BC/WC elements were breaking bad news and writing “What is important to you now” on the graphic aid. Scheduling assessments was a significant challenge across all sites. In particular, site coordinators struggled to gather residents when there was no designated protected educational time or when residents were switching clinical rotations.

Resident Use of the Tool in Practice

Thirty of 39 residents completed the Practitioner Opinion Survey. Eighty-seven percent of respondents agreed or strongly agreed that BC/WC is easy to use and 77% reported that it is compatible with how they think things

TABLE 2. Participant Characteristics

Site	Residents (No. Participated/invited)	Postgraduate Year (PGY) Level	Surgical Specialty	Coaches (No.)	Resident to Coach Ratio
University of California San Francisco	17/37	PGY 2-3: 7	General	10	7:4 (session 1)
		PGY 4-5: 10		3 surgery 4 palliative care 1 critical care 1 geriatrics 1 education	10:3 (session 2)
Northwestern University	6/8	PGY 1-3: 2 PGY 4-5: 1 Fellow: 1 Research: 2	Vascular	3	2:1
University of Michigan	8/50	PGY 2-3: 1 PGY 4-5: 3 Research: 3 Unknown: 1	General	4	2:1
University of Minnesota	8/29	PGY 2-3: 3 PGY 4-5: 0 Research: 1	General	2 1 surgery 1 education	4:1

should be done. Sixty-nine percent of residents agreed or strongly agreed that using BC/WC is better than how they usually approach challenging decision making conversations. After training, 100% of residents responding felt prepared to use BC/WC with patients (2 residents left this question blank) and 54% reported that they had used BC/WC with at least 1 patient. Those who had not used BC/WC since training cited few clinical opportunities due to a research rotation or failure to encounter a patient who faced the type of clinical decision appropriate for BC/WC.

Instructor Debriefing

Instructors reported adherence to the program outlined in the implementation package with the exception of 1 session in which the instructors chose to eliminate the in-person demonstration; they felt the video was sufficient for learners to understand how to use the tool in practice. Instructors found the didactic video an effective teaching strategy that was well-received by residents. Furthermore, residents were able to simulate conversations using role-play and give feedback to their peers. Several instructors felt residents would benefit from a stronger foundation in communication skills and shared decision making before learning to use BC/WC. Specifically, they noted a need for instruction on strategies to respond to emotion.

Instructors reported that residents grasped the concepts of BC/WC within the 2 hours allotted for training but found uptake was considerably easier for senior-level residents. Generating the graphic aid was the most challenging aspect of BC/WC for many learners. Specifically, some residents struggled with positioning the most likely outcome and had trouble integrating the graphic aid into the decision making conversation. Instructors believed completion of the graphic aid before meeting with the patient would improve performance and provide a platform for residents to organize their conversation.

Overall, instructors praised the tool for improving complex high-stakes conversations. Training pushed residents to consider more than 1 treatment option and clearly defined essential elements of the decision-making conversation. Moreover, the training encouraged residents to provide information about quality of life and functional outcomes for patients as opposed to discrete risks.

DISCUSSION

We developed, refined, and tested an implementation package that was adapted at 1 institution and then used effectively at 4 other institutions to teach residents to use the BC/WC communication tool in a small group setting. This implementation package is freely available for use at <https://www.hipxchange.org/BCWC>. We are encouraged that nearly all residents who tested achieved competence.

Yet despite this successful skills translation our implementation strategy had limited reach, whereby only a small percentage of residents received the intervention and even fewer completed a formal assessment. Furthermore, our enthusiasm is tempered by the possibility that only those confident in their ability made the effort to schedule and complete the assessment. These findings have important implications for interventions to improve communication and surgical education more broadly.

Although we demonstrated that communication skills training is both acceptable to trainees and can be done with high fidelity, the feasibility of improving surgeon communication on a large scale may be threatened by lack of appreciation for this critical skill. Surgeons value technical dexterity and performance, yet communication is an integral part of a surgeon's armamentarium. Few surgeons would prefer to outsource the patient-doctor relationship to others and work only as a technician. Still, assumptions that the ability to communicate is innate or can be learned by passive absorption fall short, as the complexity and emotional frame of high-stakes decision making is far more difficult than casual conversation outside the healthcare setting. Similar to operating, difficult conversations require intentional preparation, execution, and review with real-time expert feedback.²³ The instructors in our study reinforced this notion, noting preconversation creation of the BC/WC graphic aid prepared learners for a more effective and comprehensive discussion. Although several residents at multiple sites were motivated to complete training and use the tool in practice, whether surgeons can invest in this critical skill outside the context of a research study remains an empirical question. This may hinge on surgeons' perceptions about the value of communication or how it is measured or reimbursed in clinical practice.

For surgical education more broadly, our study reveals gaps in resident participation and engagement that need to be bridged for successful translation of skills more generally. Although each site leader determined how best to integrate our implementation package into the existing curriculum, the considerable variability among the educational structure of each program had real impact on the reach of our intervention. The tension between clinical obligations and formal education served as a significant barrier to skills acquisition. Programs with protected time for didactic instruction had greater uptake particularly when there was a strong underlying cultural expectation for consistent attendance at educational activities. Even within this relatively small sample, receipt of formal instruction was inconsistent and likely has negative impact on downstream surgeon performance as learners missed opportunities for deliberate practice and personalized feedback.

Obtaining buy-in from the program director, respected faculty and chief residents can improve participation and help to overcome some of these structural hurdles, yet the impact of these adjuncts was limited.

This study has important strengths and limitations. Although we engaged each site with sufficient time to incorporate BC/WC training into the residency curriculum, there may not have been enough time to navigate long-standing educational agendas. We have previously demonstrated that patients and families value BC/WC because it demonstrates a clear treatment choice and provides opportunities to deliberate about options¹⁶ yet we were unable to measure the acceptability of this tool for patients with this study design. While BC/WC may be similarly received in conversations between patients and residents, how the interplay between patients, residents, and attending surgeons alters the effect of BC/WC on patients and families remains unknown. Finally, we prioritized 3 implementation measures given our initial concerns about the scalability of our intervention. We acknowledge other important outcomes, like costs and sustainability, were not captured in our data.

CONCLUSIONS

We developed, revised and tested an implementation package to effectively train groups of surgical residents to use the Best Case/Worst Case communication tool. Learners used the tool with high fidelity and instructors and learners found the training program acceptable. This program requires minimal resources and can be used to disseminate the communication tool broadly to residents and attending surgeons. However, feasibility barriers persist. Reach of this intervention may be limited by the value surgeons place on communication skills and deep-rooted notions about how residents and surgeons formally learn new skills.

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SUPPLEMENTARY INFORMATION

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