What is the future of training in surgery? Needs assessment of national stakeholders

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Background. *The Curriculum Committee of the American College of Surgeons-Accredited Educational Institutes conducted a need assessment to (1) identify gaps between ideal and actual practices in areas of surgical care, (2) explore educational solutions for addressing these gaps, and (3) shape a vision to advance the future of training in surgery.*
Methods. *National stakeholders were recruited from the committee members' professional network and interviewed via telephone. Interview questions targeted areas for improving surgical patient care, optimal educational solutions for training in surgery including simulation roles, and entities that should primarily bear training costs. We performed an iterative, qualitative analysis including member checking to identify key themes.*
Results. *Twenty-two interviewees included state/national board representatives, risk managers, multispecialty faculty/program directors, nurses, trainees, an industry representative, and a patient. Surgeons' communication with patients, families, and team members was raised consistently by stakeholders as a way to establish clear expectations regarding pre-, peri-, and postoperative care. Other comments highlighted the surgeon's development and demonstration and maintenance of cognitive and technical skills, including surgical judgment. Stakeholders also reiterated the critical need for surgeons to engage in on-going self-assessment and professional development to identify and remediate recognized limitations. Recommended learning modalities for meeting surgeons' needs included active learning (deliberate practice, diverse patient experiences), experiential learning (simulation), and peer and mentored learning (preceptorship).*
Conclusion. *This first formal needs assessment of education for surgeons points to opportunities for educational programs in patient-centered communication, learning models that match preferences of new generations of trainees, and training in interprofessional/interdisciplinary team communication and teamwork. (Surgery 2014;156:707-17.)*

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MULTIPLE DRIVING FORCES at the national level are shaping the future of training in surgery, leading to a shift in educational paradigm.[1-3] The societal demand for transparency, patient safety, quality, and patient-centered care is one such force. Regulatory demands mandate resident work-hour restrictions that significantly impact residents' core educational experiences. Surgery as a profession itself is calling for increased self-regulation to ensure that surgeons demonstrate and sustain their surgical competencies. New technologies are impacting patient care, teaching, and assessment of trainees' competencies. Last, the explosion of biomedical knowledge is placing a tremendous pressure on surgeons' ability to apply the most up-to-date, evidence-based practice in patient care.

Recognizing this watershed in the evolution of health care and medical education trends, the American Surgical Association established a Blue Ribbon Committee in 2004 to identify a set of recommendations to chart a new course for future training in surgery.[3] The proposed "New Educational Paradigm" aimed at producing a surgical workforce that could deliver competent, safe, and high-quality patient care. The committee proposed multipronged approaches, including a standardized national curriculum targeting the fundamentals of surgery, the establishment of surgical specialties that reflect the needs of communities, and the expansion of educational capacity via offering incentives to teaching faculty, providing faculty development, and investing in strengthening both educational and clinical research infrastructure.

Against this backdrop of competing forces impacting the way future surgeons are trained and certified, the Curriculum Committee of the American College of Surgeons-Accredited Educational Institutes (ACS-AEI) carried out a needs assessment study that involved interviewing a broad spectrum of national stakeholders to elicit their opinions and recommendations regarding the future of training in surgery. Specifically, the needs assessment was anchored in 3 aims: (1) Identify areas of surgical care in which gaps exist between ideal and actual practices, (2) propose educational solutions for addressing these gaps, particularly the role of simulation, and (3) put forth a vision of future training in surgery of a continuum of learners, from residents to surgeons in practice. We report key findings from the interviews based on a qualitative analysis of interview transcripts.

METHODS

The idea for the interview-based needs assessment was initially conceived during the ACS-AEI Curriculum Committee meeting in October 2010, held during the Annual ACS-AEI Postgraduate Course in Toronto, Canada. The committee membership consists of both surgical and nonsurgical education faculty from multiple institutions around the United States and Canada. The Committee agreed on the following categories of stakeholders as a subject pool in the needs assessment: (1) System based (hospital representatives), (2) professional (specialty board members, department heads, national surgical society members, practicing surgeons, industry representatives), and (3) health care/professional community-based (patients, trainees, allied health providers). Committee members identified interview candidates based on members' own local and national network of stakeholders.

The questions used during the semistructured interview process were crafted purposefully to employ a simple language that both clinician and nonclinician stakeholders could understand and answer. We developed the following 6 questions to be posed to interviewees:

1. How can surgeons improve patient care?
2. What do you think are the most important issues in the care of a patient having surgery?
3. What steps can be taken to address some of these problems?
4. How do surgeons learn best?
5. Among the issues mentioned, which ones might be most impacted by educational programs?
6. Who should pay for these programs?

In September 2011, committee members conducted 6 pilot telephone interviews. The interviews were audiotaped and transcribed. After reviewing the initial themes and trends identified from the pilot interviews, the committee decided to expand the scope of the study to interview a larger network of stakeholders. Subsequently, human subject approvals were sought and obtained at 9 committee members' institutions, including a master institutional review board application at the principal investigator's (S.K.) institution. The committee developed an interview script (see the online Supplementary Appendix) to ensure that the members conducted telephone interviews in a standard manner, minimizing potential member bias or influence during the interview process. The 30-minute phone interviews were audio-

Table I. Interview themes and quotes: How can surgeons improve patient care?

Theme	Description	Notable quotes
Enhance communication		
Patient and family		
Preoperative communication, including informed consent	Taking time to explain what to anticipate; projecting outcomes and costs; avoiding complex technical terms; engaging patients in shared decision making	"One of the biggest areas is communication—and that encompasses a variety of things—not only how you interact face to face with the patient but you disclose certain things, consent process and just being nice and good doctor–patient relationships" (Risk Management)
Postoperative care communication	Timing, clarity and thoroughness of postoperative instructions, expectations, follow-up; surgeon or other member of team communicate with patient	"The visibility of my surgeon after the process—I have had a scenario where the surgeon who actually did the surgery was not who I thought afterward and I was kind of disappointed in that—I want the surgeon to come in to see how I am feeling, how things are going versus maybe a nurse or one of his colleagues." (Patient)
Patient care team		
Preoperative team communication	Time-out, hand-off communications; setting expectations	"[A]nother area that actually can improve patient care is good team communication within—of all levels, whether it's a surgery assistant tech or another physician, the primary care person, the person hauling him in the ICU absolutely. Communication not only with patients but with health care providers I think is essential in training in that area." (Dean)
Intraoperative team communication	Employing concept of team versus captaincy; communication among members of surgical team; time for questions from team members	"I think it's also imperative and extremely beneficial when you see folks cross train other individuals. So that if one is sick and can't be there or work or takes a vacation, then it doesn't feel like there's a gap in the OR. And again it keeps us connected to adhesive, fluid communication…. during the operation that again leads to a more positive I would say attitude and environment and inevitably leads to more positive results." (Industry Representative)
Postoperative team communication	Enhanced communication; writing timely and appropriate notes; reading the notes of other caregivers/consultants	"I think we need to ensure our residents have panels of patients. If the patient needs to come back for a postoperative checkup, that resident and attending should be there. So really it's about being a team and a team that has some continuity." (PhD Surgical Educator)

Table I. (*continued*)

Theme	Description	Notable quotes
Focus on aspects of surgeon's ability		
Core knowledge and skills	Core fund of knowledge and cognitive aspects of surgery; core set of medical management; technical skills and basic understanding of medical systems	"[F]irst, does the person need to have the surgical procedure in the first place? The second would be is the planned surgical procedure of benefit to the patient?" (Medical Director)
Skill maintenance	Maintaining excellent technical skills; keeping "in shape" with regard to uncommon procedures, complex procedures or new procedures/techniques; life-long learning perspective	"I think this is probably a great time to be a surgeon with all the simulation and all the other opportunities to explore procedures independent from patients to reach confidence levels before you move to the next step and to go back and get refresher expertise." (Surgeon)
Surgical judgment	Surgical judgment and surgical maturity; knowing own limitations; asking for help and advice	"Know their own strength and weakness, their own outcomes of their surgery, in a very concrete specific way." (State Board Representative)
Other		
Outcomes-driven patient safety	Use of evidence-based medicine to guide medical management; Evaluate surgeon's performance against national benchmarks	"It's important that there's time spent with the surgeon talking to the rest of the team and trying to look at what processes we use as well, not just educational but how things are done in the daily basis, how patients arrive, what the timing is, and things like that, I think also have to be discussed, since they have an impact also on the patient care and also the efficiency of the department." (Risk Management)
Selection and monitoring of trainees	More rigorous selection process for candidates entering surgery programs and more rigorous "weeding out" process during training program	"I think at this point in time we probably have a certain sub set of kids who come into surgical specialty … that don't necessarily have the hand-eye, nor the hand coordination ability to become technically competent nor excellent surgeon. So the first thing that I would do is start a barrier to entry for surgical programs to be limited to people that actually have the skillsets to accomplish a successful surgical practice…. (otherwise) what do you do with a C surgeon in residency who becomes an F surgeon when new technology is introduced?" (Credentialing Committee Member)

ICU, Intensive care unit; *OR*, operating room.

Table II. Interview themes and quotes: What are most important issues in the care of a patient having surgery?

Theme	Description	Notable quotes
Communication		
Communication with patients and family	Surgeon personally communicating with patient about anticipated outcomes, recovery time; helping patients better take care of themselves postoperatively	"There would be more question and answer time—explaining more and that no question would be too stupid to ask for the patient. I think I see patients come out of the room feeling dumbfounded by medical terms…they just look puzzled… they need to feel comfortable to ask anything they like." (Nurse)
Team communication	Open communication among team members caring for a given patient; team members all on "same page" about care, expectations for a given patient; recognize other team members' strengths and weaknesses	"Recognizing they are part of a complex team, I think it's an important thing that surgeons sometimes lose track of…we sort of have this captain of the ship mentality which is sometimes a very valuable thing to have… but other times doesn't empower the other people in the team who would really be better, at certain moments, than the surgeon is…" (Surgery Board Member)
System-wide communication and coordination	Developing system-wide perspective including enhanced communication between and among areas performing [preoperative] imaging, lab and other studies	"How the surgeons develop relationships and have a team approach to caring for their patient. If the patient is not really cared just by the surgeon in isolation, so the surgeon having a lot of information transfer and discussion with other members of the team such as nursing, such as biomed, such as infection control, everybody that basically interfaces with our patient care with the surgeon." (Risk Management)
Knowledge and skills		
Comprehensive knowledge and skills	Thorough knowledge of field; diagnostic skills; being skilled and current in techniques and treatment	"We have to try to incorporate best practices that we can, be as evidence based as possible to try and keep up to date with the literature with what is the best way to do things—and I don't think it is always so easy. I mean you have a busy clinical practice and family life and all these things and at the same time have to keep learning." (Surgeon)
Surgical judgment	Patient selection (doing the right surgery on the right patient); assessing patient benefit from surgeries; knowing own strengths and weaknesses; knowing when to ask for help	"People go wrong and more mistakes and problems are created because patients have operations that really aren't indicated or are too complicated for that particular patient. They are too high risk and the surgeon gets in difficulty not because technically they don't know how to do it [but] because they are doing an operation the patient cannot tolerate." (Surgeon)
Professionalism/ethics	Surgeon's ability to self-assess and reflect on strengths and weaknesses	"(Surgeons are) extremely poor team players … learn what their strengths and weaknesses are and how to function in a team and quite frankly I think surgeons are hardheaded… and really don't understand their limitations outside the operating suite." (Credentialing Committee Member)

Table III. Interview themes and quotes: What steps can be taken to address some of these problems?

Theme	Description	Notable quotes
Learners in training		
Early training in communication and clinical skills	Education of learners from beginning (medical school and residency) in communication and good clinical skills as well as good pre- and postoperative education	"Years ago surgeons did not really pride themselves on communications other than telling people what to do- the current MDs grew up with mentors who did not foster any of these skills so we are a bit behind the curve in this- we have to break the gap. Earlier and more education about communication." (Resident)
Role of skills training centers	Use skills centers to teach surgical skills	"I think surgeons can improve patient care by simulation training that can incorporate not only technical skills but these other principles of communication and risk management related issues and disclosure and dealing with difficult situations." (Dean)
Practicing surgeons		
Incentivized educational program in communication	Provide some form of incentivized training in communication for practicing surgeons	"I don't see surgery communication as a topic for CME, rarely do I see it highlighted in a national meeting...understanding even about how it keeps you out of medical legal trouble, maybe that's getting pushed a bit more as there's more data on that, but I think somehow that needs to be part of the curriculum that surgeons accept..." (Resident)
Mandated training in communication	Require training in team communication protocols, such as "timeout" in which the patient care team discusses care plan/surgical procedure	"Because maybe in their mind they think they are doing great and they do not see a need for that so...mandated activity on effective communication- that's actually what it would be!" (Surgeon)
Link training and recertification with privileging	Link training and assessment (re-certification) to hospital privileging process as a requirement	"It is ridiculous to have such ad-hoc privileging process when you got such a rigorous and probably such an effective certification process. You should be able to link those two together." (Surgeon)
Training in self-assessment	Identify areas of strengths and areas of improvement; Knowing when to ask for help	"I think they [surgeons] could be much better asking for assistance- they have a reluctance to ask for help whether it is driven by insecurity or embarrassment or financial interest....But I think if we were a little more objective about our abilities and willingness to do the right thing for the right reason all the time. I think it might be better." (Board Representative)

(continued)

Table III. (*continued*)

Theme	Description	Notable quotes
Systems Level		
Team responsibility	Preoperative preparation and education handled by surgical teams	"…and then the team leadership…when you are in the OR the surgeon is usually the team leader. So leading that team and leading the team so patient safety is first and foremost and the outcome is right behind it." (PhD Surgical Educator)
Standardized process	Standardize informed consent process	"The patients need to be informed- having their support system be aware and informed and understand what the expectations are…… is really important." (Board Representative)
Outcomes-based quality monitoring	Quality improvement and improving outcomes – need a better way to get data - need to be able to make sure all providers are using same definition of data point (what is a surgical infection?)	"We have trouble getting data about whether we have issues- we need to be able to see our data and I think it needs to be provider specific…risk stratifying outcomes- I think we could make headway there." (Surgeon)

taped and contracted out for transcription services. The ACS-AEI central administrative office coordinated all aspects of the study logistics, including contacting possible interviewees, obtaining consent from them, arranging interviews, audio-taping, and handling transcription services. All identifying information regarding the interviewee names and institutional affiliations was removed during the transcription process to ensure anonymity.

The development and finalization of the transcript coding scheme followed the well-established qualitative research design methods.[4-6] The principal investigator initially coded the pilot transcripts based on the predominant themes and patterns of meanings associated with each interview question. Committee members were asked subsequently to verify these codes by applying them to the transcripts. Any disagreements and questions were reconciled via discussion in person and via email. After all scheduled interviews were complete beyond the pilot stage, 2 surgeons (J.T.P., J.M.E.) and 2 educators (S.K., C.N.) further refined and expanded the coding structure by reviewing the full set of transcripts. This iterative analytic method led to finalizing the coding process after there was a general agreement that a saturation point was attained; in other words, the existing coding scheme fully captured all observed themes and patterns of topics.

RESULTS

We first present a breakdown of interviewees by their professional roles followed by key findings from the interviews.

Number and profile of interviewees. A total of 22 telephone interviews were conducted, including the 6 pilot interviews. The interviewees were located in 10 U.S. states and 1 Canadian province. The breakdown of interviewee by role was as follows: 6 clinicians (surgery, anesthesia, nursing); 6 representatives from specialty boards, credentialing agencies, and risk management; 3 medical school and hospital leaders (dean, assistant dean, medical director); 3 PhD surgical educator faculty; 2 trainees (medical student, resident); 1 patient; and 1 industry representative.

Main interview results. Tables I–V include detailed themes and topics associated with the first 5 interview questions, definitions of the themes, and exemplar quotes from interviewees. For the last question (who should pay for these programs), responses were mixed and depended on who the interviewees regarded to be the beneficiary of training. As 1 interviewee stated, "It depends on

Table IV. Interview themes and quotes: How do surgeons learn best?

Theme	Description	Notable quotes
Ideal learning conditions		
Deliberate practice	Deliberate and repetitive practice; Learn from your mistakes; Master chunked tasks when learning a long and complicated procedure	"…it's going to have to be multiple times learning, doing and seeing the same things and different versions of it. So I think redundancy and multimodality are the two things that I would say are important to build into the [consortium] so that you cover all the basis of the people who learn by one method is better than (by) another method better." (Surgery Program Director)
Relevant learning materials	Subject material is focused, highly applicable; Must be seen as relevant to surgeon's practice	" if you're talking about knowledge that you need to be able to practice surgery that's different than knowing what percentage of patients have a certain thing going on – I mean those type of things are nice when you get those from some of the lecturers but the reality is how can you apply that clinically and so you really have to understand what you're trying to learn and why you're trying to learn it…"(Credentialing Committee-surgeon)
Teaching methods for creating optimal learning experiences		
Active learning	Workshops/Post-graduate courses/Hands-on training; Learn "by doing"; Small group discussion; Online learning.	"There has to be a foundation and then when you expose the surgeon to some sort of experience that allows them not only to experience what it is they've been learning about whether it's reading or doing an online program, so they don't only experience it, but they also get to manipulate the concept like literally with their hands, then I think that it nails it down better." (State Board Representative)
Simulation-based learning	Low and high fidelity simulation training modalities including the use of standardized patients; Simulation as a gatekeeper to determine who should not progress to the next level of training	"Simulation is the best for team dynamics… about stressful situations. We are able to say things that we might not say in "real life" break it down and really understand each other. When it happens again we are very much prepared and have a better understanding of what the other person is doing." (Nurse)
Use of surgeons' and patients' narratives	Scenario training with surgeon as observer of different scenarios for "sensitive" training issues, such as an area in which a surgeon is having technical complications or for emotionally charged communication situations	"Communication particularly empathetic communication is probably a tougher issue, I think we certainly have models, we use in the medical schools that allow effective communication or demonstrate ineffective communication with scenarios. Those can be played back, they can be reviewed, anything from bad to poor explanations to ineffective education for patients certainly can be demonstrated... whether they are internalized is a greater challenge." (Resident)
Mentored learning	Mentored learning to graduated responsibilities to independent practice	"We probably learn best when we are doing something and someone is …maybe looking over our shoulder….imparting us their experience." (Surgeon)
Emphasis on peer surgeons' role		
	Surgical champions who can educate other surgeons may generate a greater buy in	"Surgeon to Surgeon- or MD to MD- real win- win situation- there were practices that need to change and the way he (surgeon) presented the information they seemed willing to accept change so much better."(Risk Management)

Table V. Interview themes and quotes: Among the issues mentioned, which ones might be most impacted by educational programs?

Theme	Description	Notable quotes
Technical skill training	Technical skill training via active learning or simulation format; Hands-on practice; Exposure to uncommon, challenging, infrequently seen conditions.	"…the generation that had simulation…I did see a huge jump and what they're able to do, surgically just because they have that time in the simulation. So I really think again it's outside of the stressful environment and they have opportunities to experiment and do things that are very low stress area, and they're able to get to a certain level of proficiency before they actually have a patient which is I think is key…" (Risk Management)
Communication skill training	Communication skill training via active learning or simulation format; Shared decision making with patients	"…how does the shared decision making model gets introduced and adopted by surgical programs where there has been a culture that whatever the surgeon says is what should be done? …this patient centered-care model, that's the one that's going to be most impacted I think by educational programs. By introducing ways that physicians can engage with their patients on the shared decision model without giving the impression that the surgeon is giving up their autonomy (in) providing good surgical treatment for a patient." (Medical Director)
Teamwork/team communication skill training	Improvement in functioning of team and surgeon on team with team training; Reducing and managing disruptive behaviors	"… team training I do think there is a lot of value to and it's the kind of thing that you can't really learn on your own… you have to learn it ….with colleagues to get the impact of it…. just doing it by yourself doesn't teach you how to be better team member. So you kind of need some scenario based training for that so I do think there is value in that" (Risk Management)
Pre- and postoperative patient education	Culture change and educational focus; Redirection to patient-centered care model	"I think maybe patient feedback after a surgery to some type of evaluation assessment that's from an educational stand point. I think would be a great tool to use that way you can kind of get immediate feedback from the patient probably sort of rapid process from the very start to the very end. And then that information could be gathered and given to that surgeon and he or she could overlook and see what their deficiencies were and what they could do to better assist the next patient." (Patient)

the needs of the community, needs of the hospitals, the needs of individual surgeons." For training students and residents, interviewees suggested medical schools and residency programs pay for training. For practicing surgeons, the following list of potential payers were recommended: Whoever mandates training, hospitals, surgeons themselves, industry, specialty boards or societies/associations, the federal government, or combined sources of payers that include these entities and private philanthropy.

DISCUSSION

To our knowledge, the needs assessment study we report herein represents the first national interviews of a broad range of stakeholders whose opinions and recommendations were elicited for identifying critical issues for advancing the future of training in surgery. The qualitative analysis of the interview transcripts resulted in a set of themes and topics that were widely repeated across the interviewees. We found the key findings from the interviews to closely align with recommendations made in the literature as summarized herein.

Finding 1: Surgeons' consistent communication with and education of patients and families from the preoperative setting through postoperative follow-up care. We heard consistently from interviewees the essential role surgeons play in applying their comprehensive management skills, including communication and patient education roles in the care of the patient beyond technical management of procedural events.[2]

Finding 2: Surgeons initiating team communication and developing system-wide perspectives of patient care. The surgeon's role as a team leader and member was emphasized by the interviewees, who expect a surgeon to "listen, understand, discuss, and interact positively" with teams[2] and engage in multidisciplinary as well as interprofessional collaborations.[3]

Finding 3: Surgeons need to demonstrate, retool, and remediate competencies in core knowledge, skills, and surgical judgment. Acquisition and ongoing maintenance of surgeons' competencies highlighted in the interviews validate the need to self-regulate the profession and promote life-long learning[2] via continuous professional development.[3]

Finding 4: Use of multimodal educational approaches to make training efficient, relevant, and timely. Recognizing the need to engage surgeons in a learning environment that is conducive to active learning, the interviewees raised the importance of integrating the principles of adult education in designing hands-on and interactive educational experiences for trainees and surgeons.[1,3]

Finding 5: The indispensable and integral role of simulation training for procedural, patient interaction, and decision-making skills. Interviewees frequently brought up the increasing role simulation-based training is playing and will continue to play in augmenting trainees' experiences with uncommon problems and errors.[7] This recommendation for the active use of simulation in training is in line with the trends that link simulation interventions with improvement in patient outcomes[8] and instituting simulation-based maintenance of certification.[9]

Finding 6: Ability to recognize own limitations and areas needing help is a professionalism issue. Interviewees brought up on multiple occasions the critical importance of surgeons to self-assess potential limitations in cognitive, technical, and judgment domains where they may need help. This issue framed as professionalism is echoed in the national call for an honest professional assessment[2] and continuous self-assessment with practice analysis and outcomes tracking.[7]

These key findings from the interviews inform a framework for describing a surgeon's role as the "guardian of the surgical patient."[2] In the Figure, we propose this framework that encompasses multiple roles a surgeon is expected to carry out: Communicator with patients/family and team; educator of patients during pre- and postoperation; team leader/member who sets expectations and elicits team input; decision maker who exercises multiple levels of sound surgical judgment; and steward of resources at the systems level as well as own ability to maintain competencies and expertise. The effectiveness of the 21st-century surgeon will depend undoubtedly on these multifaceted roles in the care of a surgical patient. In this regard, we believe our study contributes to the steady pressure of cultural change in future training in surgery, particularly in the domain of surgeons' communication skills, which were predominantly addressed by our interviewees.

Our study had several limitations. First, we used a sample of interviewees based on an extensive network of professional colleagues and constituents that the ACS-AEI Curriculum Committee members could easily mobilize. By identifying a priori main categories of interviewee groups, we attempted to ensure that a sufficient number of interviewees were identified in each stakeholder group. Furthermore, the sample size of 22 was deemed sufficient after we reached a saturation point in data analyses that yielded few new themes
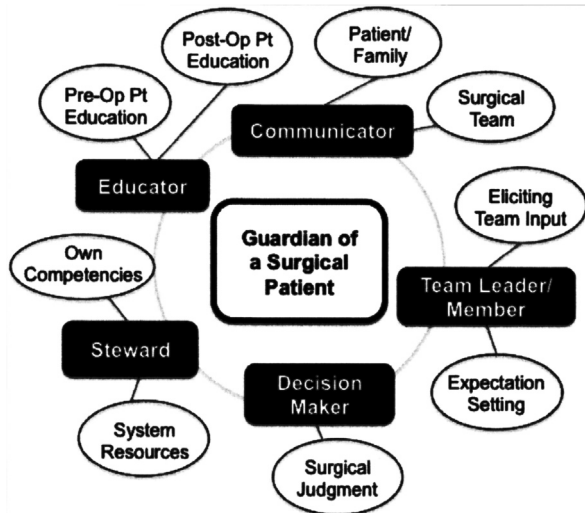
Figure. Conceptual framework of a guardian of a surgery patient.

in light of the convergence of major findings from the interviews. The team's adherence to the principle of saturation of themes helped to minimize any bias that resulted in a particular set of themes being exaggerated or discarded from the data analyses. Second, we relied solely on a qualitative research method involving interviews instead of applying a mixed method of both qualitative and quantitative data sources. The use of the latter approach could have facilitated a more easily quantifiable data collection from a large sample of subjects as well as a hypothesis-driven inquiry. The committee deliberated carefully the pros and cons of each method and proceeded with telephone interviews as the main data collection source to elicit rich layers of opinions from stakeholders.

The future of training in surgery stands at a critical crossroads of the rapidly evolving landscapes of health care and medical education. Although an efficient and effective implementation of multiple recommendations offered by stakeholder interviewees deserves attention, there are many barriers and challenges that need to be addressed at the same time. The interviewees in our study identified duty-hour restrictions as the key barrier that compromised trainees' educational experiences with procedural training, exposure to uncommon and complex cases, and longitudinal patient care experiences. Other barriers included the resource intensive nature of simulation training, faculty's reliance on traditional teaching methods that are mismatched with learning preferences of the new generation

of trainees, surgeons' time constraints that interfere with optimal patient interaction and education, lack of structured methods to certify residents as independent surgeons, lack of formal on boarding programs for surgeons into a new care model, lack of transparent channels to report incompetent surgeons, and lack of standard processes for introducing new technologies. The ongoing national dialogue that redefines the future of training in surgery needs to fully address these barriers and challenges. In doing so, it contributes to charting a course for producing an enduring generation of "guardians of the surgical patient."

SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at http://dx.doi.org/10.1016/j.surg.2014.04.047.

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