Supplementary Online Content

eFigure 1. Survey Instrument

SURVEY: The Surgical Safety Checklist Revisited

Record ID _____

Part 1: Respondent and institution characteristics

Q1.1 Please indicate your gender:

◯ Female ◯ Male ◯ Other ◯ Prefer not to disclose

Please state your gender:

_____

Q1.2 Please indicate your age:

◯ < = 30 ◯ 31-40 ◯ 41-50 ◯ 51-60 ◯ 61-70 ◯ > 70 ◯ Prefer not to disclose

Q1.3 I am a: (check all that apply)

☐ Clinician on the peri-operative team ☐ Health administrator

Q1.4 [Clinician survey only] Please indicate your role on the peri-operative team:

◯ Surgeon ◯ Anesthesiologist ◯ Nurse ◯ Other role

[Clinician survey only] Please indicate your "other" role:

_____

Q1.5 [Clinician survey only] Please indicate the number of years you have been in practice:

◯ 0-5 ◯ 6-10 ◯ 11-20 ◯ 20 or more

Q1.6 [Administrator survey only] Please indicate your title related to your administrative role:

_____

Q1.7 [Administrator survey only] Please indicate the number of years you have been in an administrative role:

◯ 0-5 ◯ 6-10 ◯ 11-20 ◯ 20 or more

Q1.8 Please indicate the country your primary institution is located in:

◯ Canada ◯ USA ◯ United Kingdom ◯ New Zealand ◯ Australia

Q1.9 My primary institution is a(n):

◯ Acute care hospital ◯ Ambulatory surgical center ◯ Other type of hospital

Please indicate the "other" type of hospital:

_____

If your primary institution is an acute care hospital, it has:

◯ Greater than or equal to 200 beds ◯ Fewer than 200 beds ◯ I am unsure ◯ Not applicable

Q1.10 Is your hospital affiliated with a post-secondary institution?

◯ Yes ◯ No ◯ I am unsure

Part 2: Perceived Checklist impact

Q2.1 Is the Surgical Safety Checklist used at your institution?
(If no, you may end the survey.)

◯ Yes ◯ No ◯ I am unsure

Please consider how the Checklist has impacted your institution.

Q2.2 How has the Checklist impacted patient safety?

◯ Negative impact ◯ No impact ◯ Positive impact ◯ I am unsure

Q2.3 How has the Checklist impacted health system efficiency?

◯ Worsened efficiency ◯ No impact ◯ Improved efficiency ◯ I am unsure

Q2.4 How has the Checklist affected team communication?

◯ Worsened communication ◯ No impact ◯ Improved communication ◯ I am unsure

Q2.5 How has the Checklist affected teamwork?

◯ Worsened teamwork ◯ No impact ◯ Improved teamwork ◯ I am unsure

Q2.6 If you or a close family member were undergoing surgery would you want the Checklist used?

◯ Yes ◯ No ◯ I am unsure

Part 3: Feedback on Checklist format and implementation

Q3.1 At my institution, the Checklist is used:

◯ All the time ◯ Some of the time ◯ Rarely ◯ Never ◯ I am unsure

Q3.2 When Column 1 of the Checklist is used (Before induction of anesthesia), it is completed with:

◯ All items addressed
◯ Most items addressed
◯ Roughly half of the items addressed
◯ Few points addressed
◯ No points addressed

Q3.3 When Column 2 of the Checklist is used (Before skin incision), it is completed with:

◯ All items addressed
◯ Most items addressed
◯ Roughly half of the items addressed
◯ Few points addressed
◯ No points addressed

Q3.4 When Column 3 of the Checklist is used (Before patient leaves the operating room), it is completed with:

◯ All items addressed
◯ Most items addressed
◯ Roughly half of the items addressed
◯ Few points addressed
◯ No points addressed

Q3.5 Please indicate your agreement with the following statements:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I am unsure
I feel self-conscious about speaking up about a patient or safety concern during Checklist completion.	◯	◯	◯	◯	◯	◯
I received adequate training toward participating in the Checklist.	◯	◯	◯	◯	◯	◯
As a team member, I am responsible for making sure the Checklist is completed.	◯	◯	◯	◯	◯	◯
I am satisfied with the way the Checklist is used by my team.	◯	◯	◯	◯	◯	◯
I do NOT feel confident about my role in the Checklist process within my team.	◯	◯	◯	◯	◯	◯
My clinical colleagues are supportive of using the Checklist.	◯	◯	◯	◯	◯	◯
Organizational leadership is NOT supportive of using the Checklist.	◯	◯	◯	◯	◯	◯
It is beneficial to engage patients in the Checklist process.	◯	◯	◯	◯	◯	◯
When we complete the Checklist, everyone stops what they are doing and fully participates.	◯	◯	◯	◯	◯	◯

Q3.6 At your institution, who USUALLY leads the Checklist? (check all that apply)

☐ Surgeon ☐ Anesthesiologist ☐ Circulating nurse ☐ Scrub nurse ☐ Other person

Please specify the "other person" who leads the Checklist:

_____

Q3.7 Which team members SHOULD lead the Checklist? (check all that apply)

☐ Surgeon ☐ Anesthesiologist ☐ Circulating nurse ☐ Scrub nurse ☐ Other person

Please specify the "other person" to lead the Checklist:

_____

Q3.10 The following methods are used at my institution to encourage Checklist use: (check all that apply)

☐ In-person educational sessions (e.g. Grand Rounds Lecture)
☐ Webinar-based educational sessions
☐ Hard-copy educational materials
☐ Team-based training (e.g. Low and High-Fi Simulation)
☐ Audit-and-feedback intervention with practice data
☐ Other method

Please specify the "other" method:

_____

Q3.11 Which strategies do you feel are most helpful to affect meaningful Checklist use? (check all that apply)

☐ In-person educational sessions (e.g. Grand Rounds Lecture)
☐ Webinar-based educational sessions
☐ Hard-copy educational materials
☐ Team-based training (e.g. Low and High-Fi Simulation)
☐ Audit-and-feedback intervention with practice data
☐ Other method

Please specify the "other" method:

_____

Part 4: WHO Surgical Safety Checklist Item Evaluation

Please refer to the World Health Organization Surgical Safety Checklist (2009), attached, to respond to the following questions.

Q4.1 Regarding Section 1: Before Induction of Anesthesia (first column):

	This item should remain in a future version of the Checklist.	This item is unnecessary.
"Has the patient confirmed his/her identity, site, procedure, and consent?"	◯	◯
"Is the site marked?"	◯	◯
"Is the anesthesia machine and ◯ medication check complete?"	◯	
"Is the pulse oximeter on the ◯	◯ patient and functioning?"	
"Does the patient have a known ◯ allergy?"	◯	
"Does the patient have a difficult ◯ airway or aspiration risk?"	◯	
"Does the patient have a risk of >500 mL blood loss?"	◯	◯

Q4.2 In Section 1, are there components you would suggest adding?

_____

Q4.3 Please share any additional comments you may have about Section 1:

_____

Q4.4 Regarding Section 2: Before Skin Incision (Column 2):

	This item should remain in a future version of the Checklist.	This item is unnecessary.
"Confirm all team members have introduced themselves by name and role."	○	○
"Confirm the patient's name, procedure, and where the incision will be made."	○	
"Has the antibiotic prophylaxis been given within the last 60 minutes?"	○	
"Anticipated Critical Events, Surgeon: What are the critical or non-routine steps?"	○	○
"Anticipated Critical Events, Surgeon: How long will the case take?"	○	○
"Anticipated Critical Events, Surgeon: What is the anticipated blood loss?"	○	○
"Anticipated Critical Events, Anesthetist: Are there any patient-specific concerns?"	○	○
"Anticipated Critical Events, Nursing Team: Has sterility (including indicator results) been confirmed?"	○	○
"Anticipated Critical Events, Nursing Team: Are there equipment issues or any concerns?"	○	○

Q4.5 In Section 2, are there components you would suggest adding?

_____

Q4.6 Please share any additional comments you may have about Step 2:

_____

Q4.7 Regarding Section 3: Before Patient Leaves Operating Room (Column 3):

	This item should be included in a future version of the Checklist.	This item is unnecessary.
"Nurse verbally confirms the name of the procedure"	◯	◯
"Nurse verbally confirms completion of instrument, sponge and needle counts."	◯	◯
"Nurse verbally confirms ◯ specimen labelling (read specimen labels aloud, including patient name)"	◯	
"Nurse verbally confirms ◯ whether there are any equipment problems to be addressed"	◯	
"What are the key concerns for ◯ recovery and management of the patient?"	◯	

Q4.8 In Section 3, are there components you would suggest adding?

_____

Q4.9 Please share any additional comments you may have about Section 3:

_____

Part 5: Modification of the WHO Surgical Safety Checklist at your Institution

Q5.1 To your knowledge, has your institution modified the Checklist compared to the World Health Organization version?

◯ Yes ◯ No ◯ I am unsure

Q5.2 Do different versions of the Checklist exist based on case or patient factors (e.g. different Checklists for short or long cases; for specific types of procedures, etc.)?

◯ Yes ◯ No ◯ I am unsure

Please describe:

_____

Q5.3 Do you feel that your institution's modification of the Checklist has been effective?

◯ Yes ◯ No ◯ I am unsure

Q5.4 In what format has your institution chosen to implement the Checklist? (check all that apply)

- ☐ Paper checklist to be manually checked off for each case
- ☐ Paper checklist to be referred to only with no checking off of items for all cases
- ☐ Electronically displayed checklist to be manually checked off for each case
- ☐ Electronically displayed checklist to be referred to only for all cases
- ☐ Electronically displayed checklist in which some items are automatically checked off or altered (e.g. by the patient's electronic health record, sensors, etc.)
- ☐ Poster of the checklist on the wall in the OR and/or holding area
- ☐ Other format

Please specify the "other" format:

_____

Q5.5 Which format(s) do you feel are most effective? (check all that apply)

- ☐ Paper checklist to be manually checked off for each case
- ☐ Paper checklist to be referred to only with no checking off of items for all cases
- ☐ Electronically displayed checklist to be manually checked off for each case
- ☐ Electronically displayed checklist to be referred to only for all cases
- ☐ Electronically displayed checklist in which some items are automatically checked off or altered (e.g. by the patient's electronic health record, sensors, etc.)
- ☐ Poster of the checklist on the wall in the OR and/or holding area
- ☐ Other format

Q5.6 What suggestions do you have toward revising the Checklist implementation process at your institution?

_____

Please provide any additional comments you may wish to share regarding Checklist format:

_____

Q5.7 Please indicate your agreement with the following statements:

	Disagree	Neutral	Agree	I am unsure
Our Checklist is difficult to use.	○	○	○	○
It is easy for all members of the team to read the Checklist items.	○	○	○	
Our Checklist is visually appealing.	○	○	○	○
It is easy to identify Checklist items that are and are not applicable in a specific case.	○	○	○	
We sometimes skip an ITEM by mistake when using our Checklist.	○	○	○	
We sometimes skip a SECTION of the Checklist by mistake.	○	○	○	○

Q5.8 Please describe any issues that impact your center or your health system that you feel could be addressed with a checklist:

_____

Part 6: Ending

Our study's purpose is to revise the existing Surgical Safety Checklist to make it more effective in contributing to patient safety during surgery. Your experience and opinions would help us greatly. Would you be willing to be interviewed?

◯ Yes
◯ No

Please provide your e-mail:

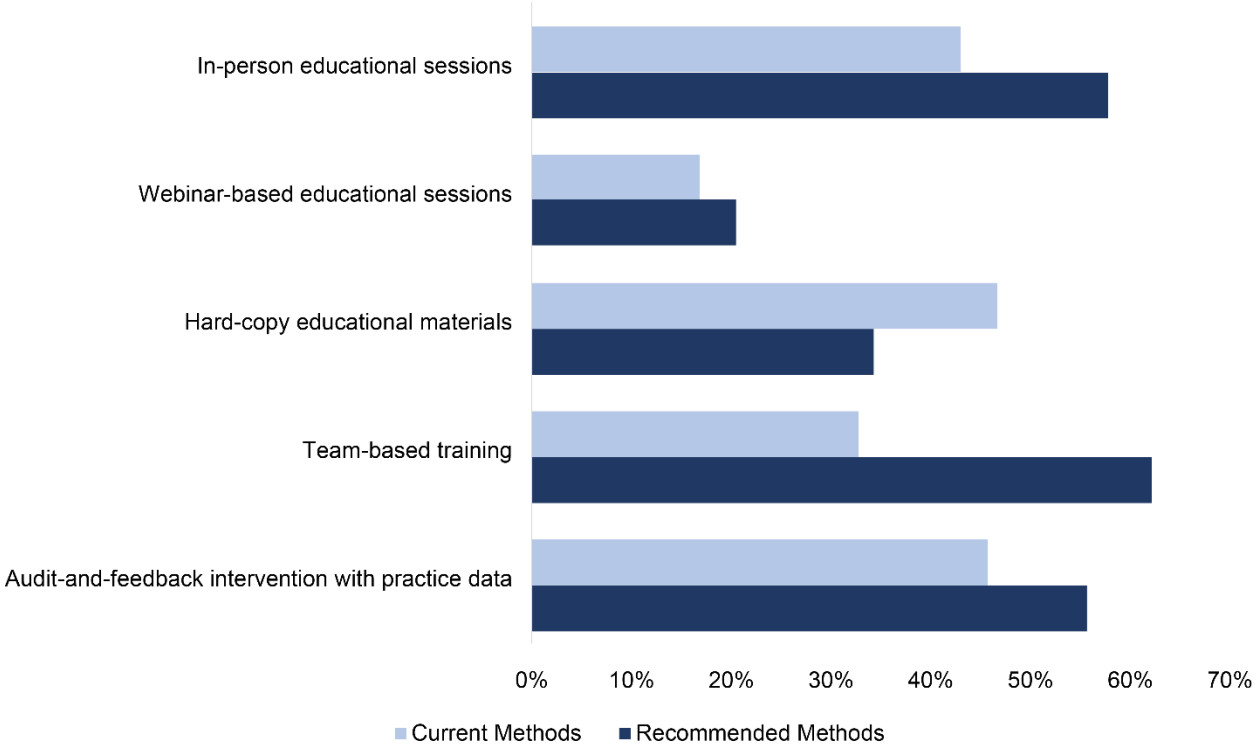
_____

Please provide your phone number:

_____

Thank you for your participation!

eFigure 2. Current and most helpful Checklist training strategies.



eTable 1. Medical professional societies who distributed the survey

Society	Country	Survey Distributed (Yes/No)	Membership
American Academy of Orthopaedic Surgeons	USA	Yes	39000
American Society of Surgical Physician Assistants	USA	Yes	4064
Association of periOperative Registered Nurses	USA	Yes	41000
Australian and New Zealand College of Anaesthetists	AUS & NZ	Yes	3200
Australian and New Zealand Society of Cardiac and Thoracic Surgeons	AUS & NZ	Yes	Unavailable
Australian Society of Orthopaedic Surgeons	AUS	Yes	1600
Australian Society of Plastic Surgeons	AUS	Yes	382
Canadian Anesthesiologists' Society	CAN	Yes	2924
Canadian Association of Thoracic Surgeons	CAN	Yes	137
Canadian Society of Plastic Surgeons	CAN	Yes	627
Council on Surgical and Perioperative Safety	USA	Yes	100000
New Zealand Society of Otolaryngology Head and Neck Surgery	NZ	Yes	118
Operating Room Nurses Association of Canada	CAN	Yes	2101
Royal Australasian College of Surgeons	AUS	Yes	7000

eTable 2a. Responses to Likert scale questions regarding perceptions of checklist impact stratified by *clinical role*.

	Nurses			Surgeons/Anesthesiologists			
	Negative	**Neutral**	**Positive**	**Negative**	**Neutral**	**Positive**	**p-value**
	N (%)	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	
Impact of the Checklist on Patient Safety	8 (0.9)	66 (7.5)	801 (91.5)	8 (1.9)	73 (17.1)	347 (81.1)	<0.001
Impact of the Checklist on Efficiency	79 (9.6)	225 (27.3)	520 (63.1)	143 (33.3)	173 (40.2)	114 (26.5)	<0.001
Impact of the Checklist on Communication	20 (2.2)	90 (10)	791 (87.8)	13 (2.7)	72 (14.8)	401 (82.5)	0.022
Impact of the Checklist on Teamwork	28 (3.2)	191 (21.9)	653 (74.9)	20 (4.3)	136 (28.9)	314 (66.8)	0.007

eTable 2b Responses to Likert scale questions regarding perceptions of checklist impact stratified by *institution type*

	Ambulatory			Acute Care			
	Negative	**Neutral**	**Positive**	**Negative**	**Neutral**	**Positive**	**p-value**
	N (%)	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	
Impact of the Checklist on Patient Safety	2 (1.0)	31(15)	173 (84.0)	18 (1.3)	129 (9.6)	1203 (89.1)	0.051
Impact of the Checklist on Efficiency	30 (14.7)	74 (36.3)	100 (49.0)	217 (16.8)	412 (31.8)	665 (51.4)	0.424
Impact of the Checklist on Communication	4 (1.9)	39 (18.3)	170 (79.8)	35 (2.4)	159 (11.0)	1255 (86.6)	0.008
Impact of the Checklist on Teamwork	1 (0.5)	64 (32.2)	134 (67.3)	56 (4.0)	334 (23.9)	1010 (72.1)	0.003

Table 2c Responses to Likert scale questions regarding perceptions of checklist impact stratified by *country*

	Canada	USA	

	Negative	Neutral	Positive	Negative	Neutral	Positive	p-value
	N (%)	N(%)	N(%)	N(%)	N(%)	N(%)	
Impact of the Checklist on Patient Safety	2 (0.5)	47 (12.2)	335 (87.2)	13 (1.2)	107 (9.6)	997 (89.3)	0.194
Impact of the Checklist on Efficiency	78 (21.4)	124 (34.0)	163 (44.7)	140 (13.0)	342 (31.9)	591 (55.1)	<0.001
Impact of the Checklist on Communication	8 (1.9)	37 (8.8)	377 (89.3)	28 (2.4)	147 (12.5)	998 (85.1)	0.091
Impact of the Checklist on Teamwork	8 (2.0)	97 (23.8)	302 (74.2)	42 (3.7)	289 (25.6)	796 (70.6)	0.152

eTable 3. Responses to Likert scale questions regarding checklist safety culture (N=2032).

	Disagreement	Neutral	Agreement	Missing/ Unsure
	N (%)	N (%)	N (%)	N (%)
Organizational leadership is NOT supportive of using the Checklist.	1496 (73.8)	135 (6.6)	141 (6.9)	260 (12.8)
My clinical colleagues are supportive of using the Checklist.	278 (13.6)	295 (14.5)	1215 (59.8)	246 (12.1)
I am satisfied with the way the Checklist is used by my team.	436 (21.5)	320 (15.7)	1022 (50.3)	254 (12.3)
When we complete the Checklist, everyone stops what they are doing and fully participates.	545 (26.8)	275 (13.5)	965 (47.5)	247 (12.2)
As a team member, I am responsible for making sure the Checklist is completed.	123 (6.1)	107 (5.3)	1547 (76.1)	255 (12.5)
I do NOT feel confident about my role in the Checklist process within my team.	1487 (73.2)	152 (7.5)	145 (7.1)	248 (12.2)
I feel self-conscious about speaking up about a patient or safety concern during Checklist completion.	1502 (73.9)	70 (3.4)	225 (11.1)	235 (11.6)
I received adequate training toward participating in the Checklist.	241 (11.9)	258 (12.7)	1284 (63.2)	249 (12.3)
It is beneficial to engage patients in the Checklist process.	130(6.4)	201 (9.9)	1421 (81.1)	280 (13.8)

eTable 4a. Responses to Likert scale questions regarding checklist safety culture stratified by *clinical role*.

	Nurses			Surgeons/Anesthesiologists			
	Disagreement	Neutral	Agreement	Disagreement	Neutral	Agreement	p-value
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Organizational leadership is NOT supportive of using the Checklist.	786 (85.1)	67 (7.3%)	71 (7.7)	423 (84.4)	42 (8.4)	36 (7.2)	0.716
My clinical colleagues are supportive of using the Checklist.	163 (17.6)	147 (15.8)	618 (66.6)	61 (12)	100 (19.7)	346 (68.2)	0.009
I am satisfied with the way the Checklist is used by my team.	239 (25.9)	152 (16.5)	533 (57.7)	104 (20.6)	105 (20.8)	295 (58.5)	0.027

When we complete the Checklist, everyone stops what they are doing and fully participates.	299 (32.1)	155 (16.6)	477 (51.2)	132 (26.1)	74 (14.6)	300 (59.3)	0.013
As a team member, I am responsible for making sure the Checklist is completed.	51 (5.5)	36 (3.9)	843 (90.6)	43 (8.5)	45 (8.9)	416 (82.5)	<0.001
I do NOT feel confident about my role in the Checklist process within my team.	784 (84.0)	65 (7.0)	84 (9.0)	434 (85.9)	50 (9.9)	21 (4.2)	<0.001
I feel self-conscious about speaking up about a patient or safety concern during Checklist completion.	768 (81.9%)	44 (4.7%)	126 (13.4%)	451 (89.1%)	14 (2.8)	41 (8.1)	0.001
I received adequate training toward participating in the Checklist.	108 (11.6)	105 (11.3)	717 (77.1)	93 (18.4)	118 (23.4)	294 (58.2)	<0.001
It is beneficial to engage patients in the Checklist process.	47 (5.2)	81 (8.9)	782 (85.9)	51 (10.2)	93 (18.7)	354 (71.1)	<0.001

eTable 4b. Responses to Likert scale questions regarding checklist safety culture stratified by *institution type*

	Ambulatory			Acute Care			
	Disagreement	**Neutral**	**Agreement**	**Disagreement**	**Neutral**	**Agreement**	**p-value**
	N (%)	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	
Organizational leadership is NOT supportive of using the Checklist.	191 (89.3)	11 (5.1)	12 (5.6)	1241 (83.7)	116 (7.8)	126 (8.5)	0.111
My clinical colleagues are supportive of using the Checklist.	26 (12.1)	23 (10.7)	166 (77.2)	239 (16.0)	255 (17.1)	1001 (67.0)	0.009
I am satisfied with the way the Checklist is used by my team.	31 (14.6)	33 (15.5)	149 (70.0)	386 (25.9)	269 (18.1)	835 (56.0)	<0.001
When we complete the Checklist, everyone stops what they are doing and fully participates.	51 (23.6)	29 (13.4)	136 (63.0)	470 (31.5)	229 (15.3)	795 (53.2)	0.023
As a team member, I am responsible for making sure the Checklist is completed.	9 (4.2)	7 (3.3)	198 (92.5)	107 (7.2)	91 (6.1)	1289 (86.7)	0.055
I do NOT feel confident about my role in the Checklist process within my team.	182 (85.0)	15 (7.0)	17 (7.9)	1239 (82.9)	131 (8.8)	124 (8.3)	0.668
I feel self-conscious about speaking up about a patient or safety concern during Checklist completion.	180 (83.3)	6 (2.8)	30 (13.9)	1263 (84.0)	58 (3.9)	183 (12.2)	0.591
I received adequate training toward participating in the Checklist.	21 (9.8)	22 (10.2)	172 (80.0)	211 (14.1)	225 (15.1)	1058 (70.8)	0.020
It is beneficial to engage patients in the Checklist process.	14 (6.6)	26 (12.2)	173 (81.2)	109 (7.4)	168 (11.5)	1188 (81.1)	0.870

eTable 4c. Responses to Likert scale questions regarding checklist safety culture stratified by *country*

	Canada			USA			
	Disagreement	**Neutral**	**Agreement**	**Disagreement**	**Neutral**	**Agreement**	**p-value**
	N (%)	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	
Organizational leadership is NOT supportive of using the Checklist.	367 (85.3)	32 (7.4)	31 (7.2)	1010 (84.2)	91 (7.6)	99 (8.3)	0.782
My clinical colleagues are supportive of using the Checklist.	67 (15.2)	66 (15.0)	307 (69.8)	195 (16.2)	194 (16.1)	815 (67.7)	0.724
I am satisfied with the way the Checklist is used by my team.	117 (26.8)	84 (19.2)	236 (54.0)	285 (23.7)	209 (17.4)	707 (58.9)	0.210
When we complete the Checklist, everyone stops what they are doing and fully participates.	152 (34.9)	87 (20.0)	197 (45.2)	342 (28.4)	169 (14.0)	694 (57.6)	<0.001
As a team member, I am responsible for making sure the Checklist is completed.	25 (5.7)	31 (7.1)	382 (87.2)	87 (7.3)	70 (5.8)	1041 (86.9)	0.381
I do NOT feel confident about my role in the Checklist process within my team.	381 (87.2)	37 (8.5)	19 (4.3)	985 (81.8)	105 (8.7)	114 (9.5)	0.003
I feel self-conscious about speaking up about a patient or safety concern during Checklist completion.	367 (84.0)	18 (4.1)	52 (11.9)	1016 (83.6)	47 (3.9)	153 (12.6)	0.914
I received adequate training toward participating in the Checklist.	75 (17.1)	89 (20.3)	274 (62.6)	139 (11.6)	143 (11.9)	920 (76.5)	<0.001
It is beneficial to engage patients in the Checklist process.	30 (6.9)	53 (12.3)	349 (80.8)	84 (7.1)	134 (11.3)	964 (81.6)	0.873

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eTable 5. Currently used and most helpful Checklist training strategies.

	Percent of cases			
Choice	**Q3.10[a]**	**Q3.11[b]**	**% Change**	**p-value**
In-person educational sessions	43.0%	57.8%	14.8%	<0.001
Webinar-based educational sessions	16.8%	20.5%	3.6%	<0.001
Hard-copy educational materials	46.7%	34.3%	-12.4%	<0.001
Team-based training	32.7%	62.1%	29.4%	<0.001
Audit-and-feedback intervention with practice data	45.7%	55.7%	9.9%	<0.001
Other method	11.9%	5.7%	-6.2%	<0.001

[a]Q3.10 The following methods are used at my institution to encourage Checklist use:

[b]Q3.11 Which strategies do you feel are most helpful to affect meaningful Checklist use?

eTable 3. Which surgical team members are involved in leading the Checklist process at their institution (more than one member may lead).

	Nurses		Surgeons/Anesthesiologists		
Choice	**N**	**Percent***	**N**	**Percent***	**p-value**
Surgeon	331	32.5%	304	57.5%	<0.001
Anesthesiologist	145	14.2%	121	22.9%	<0.001
Circulating Nurse	786	77.1%	301	56.9%	<0.001
Scrub Nurse	61	6.0%	31	5.9%	0.921
Other Person	33	3.2%	16	3.0%	0.820
TOTAL	1293	100.0%	749	100.0%	

*Indicates the percent of the clinical group that identifies the specific profession as involved in leading the checklist