Communication from the ASGE Standards of Practice Committee

GUIDELINE

ASGE American Society for Gastrointestinal Endoscopy

ASGE guideline on minimum staffing requirements for the performance of GI endoscopy

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This document was reviewed and approved by the Governing Board of the American Society for Gastrointestinal Endoscopy (ASGE)

Efforts to increase patient safety and satisfaction, a critical concern for health providers, require periodic evaluation of all factors involved in the provision of GI endoscopy services. We aimed to develop guidelines on minimum staffing requirements and scope of practice of available staff for the safe and efficient performance of GI endoscopy. The recommendations in this guideline were based on a systematic review of published literature, results from a nationwide survey of endoscopy directors, along with the expert guidance of the American Society for Gastrointestinal Endoscopy (ASGE) Standards of Practice Committee members, ASGE Practice Operation Committee members, and the ASGE Governing Board. (Gastrointest Endosc 2020;■:1-7.)

In this era of value- and quality-based healthcare, a key focus of the gastroenterology profession has been the quality of GI endoscopy, driven by a common desire both to promote best practices among endoscopists and to foster evidence-based care for our patients while being good stewards of health resources.[1] Fulfillment of these goals requires ongoing training and assessment of competency of all endoscopy staff as well as periodic evaluation of staffing models in GI endoscopy. Although staffing requirements for the performance of GI endoscopy should be based on what is needed to ensure safe and efficient performance of the individual procedure, staffing at endoscopy units may vary depending on practice setting and perceived regulatory (federal, state, and local) and accreditation requirements.

Nonphysician staff perform a variety of key duties during GI endoscopy, such as administration of sedation, patient monitoring, manipulation of endoscopic devices (eg, forceps, snares, wires), specimen collection, and documentation. Prior research has highlighted the importance of having experienced endoscopy unit staff with respect to colonoscopic polyp detection and colonoscopy outcomes, including avoidance of complications.[2,3] Unfortunately, there is a paucity of literature on what constitutes an appropriate staffing level to achieve these outcomes. Specifically, studies addressing the relationship between endoscopy unit staffing levels and patient outcomes are lacking. The Joint Commission and the Accreditation Association for Ambulatory Health Care do not define staffing requirements or specific qualifications of endoscopy staff members (excluding the endoscopist and any accompanying anesthesia provider). Existing guidelines from various societies on endoscopy staffing are variable and largely based on expert opinion.[4-9] The level of education, training, and scope of practice of endoscopy room staff members (ie, registered nurses [RNs], licensed practical nurses [LPNs], and unlicensed assistive personnel [UAP]) is highly variable. Although guidelines from other agencies and societies exist for staffing in the operating room, the endoscopy unit is a distinctly different area, performing different procedures with different adverse event rates and type of anesthesia as compared with surgery.[10-12] There is no evidence to support directly applying staffing requirements from an operating room guideline to an endoscopy unit.

The aim of this document is to provide guidance on minimum staffing requirements and scope of practice of ancillary procedural room staff for the safe and efficient performance of GI endoscopy. Recommendations in this guideline were based on a systematic review of published literature, results from a nationwide survey of endoscopy directors, and expert guidance from the American Society

for Gastrointestinal Endoscopy (ASGE) Standards of Practice (SOP) committee members, ASGE Practice Operation (PO) committee members, and the ASGE Governing Board. This replaces the previous ASGE guidelines with regards to staffing during endoscopic procedures.[4,9] Recommendations for preprocedural and postprocedural staffing are outlined in previous ASGE guidelines.[9]

METHODS

The following databases were searched for relevant studies: OVID Embase, OVID MEDLINE, and the EBSCO Cumulative Index to Nursing and Allied Health Literature. The literature search used text words and subject headings for GI endoscopy combined with staffing, nurse's role, allied health personnel, accreditation, and competence. The search was supplemented by accessing the "related articles" feature of PubMed, with articles identified on PubMed as the references. Additional references were obtained from the bibliographies of identified articles and from recommendations of expert consultants. Searches were not limited by study design. Case reports, comments, editorials, letters, notes, and conference abstracts were removed where possible. The search was limited to English language documents published from database inception until August 4, 2019. Our initial search criteria (Supplementary Appendix, available online at www.giejournal.org) identified 1456 articles. However, on further review, no well-designed prospective or randomized trials or case series were identified.

Survey instrument development

To inform this guideline, a survey was developed by the ASGE SOP committee and approved by the ASGE Governing Board on November 1, 2017. An a priori decision was made to use the results of this survey to guide the final recommendations in conjunction with expert opinion of the ASGE SOP and the ASGE PO committee members and the ASGE Governing Board members. Our goal was to define minimum staffing, which we define as the minimum number of staff that need to be present in the room to perform the procedure in a safe and efficient manner regardless of the time of the day.

The survey instrument was constructed over the course of 6 months. Item choice was informed by the members of the ASGE SOP committee. Domains were proposed by content experts and revised using an iterative process and included the following:

A. Current opinion of minimum staffing for routine and advanced endoscopic procedures depending on type of sedation (without sedation, moderate sedation, endoscopist-directed deep sedation, anesthesia-assisted sedation);
B. Acceptable tasks that can be performed by different staff members during endoscopic procedures;
C. Minimum training and the role of UAPs during endoscopic procedures;

Content validity was established by select experts in the field. Face validity was assessed by detailed review by the Executive Committee members of the ASGE Governing Board and PO committee members. An online version of the survey was developed using https://www.projectredcap.org. Pilot testing was performed among 39 individuals (about 10% of the total anticipated participants) represented by varying members of the ASGE SOP committee, ASGE Governing Board, and endoscopy unit medical directors for linguistic, internal, and external validation of the questionnaire. There were 36 complete responses, and the suggested changes were taken into consideration.

The final survey instrument consisted of 71 items designed to provide details regarding type of facility and location, number and distribution of procedures performed, training and practice patterns of UAPs, current knowledge and familiarity with institutional and ASGE policies and guidelines on minimum staffing, and variability in staffing based on procedure (routine and advanced) and sedation type (Supplementary Appendix). This study was approved by the Institutional Review Board at Cedar-Sinai Medical Center.

Survey distribution, data collection, and management

A link to the web-based survey was sent by e-mail by the ASGE. No patients were involved in this study. No personal information was accessed regarding participants. All data collected were anonymous, and participants were able to voluntarily choose to participate and/or not respond to any question in the survey. No names or institutions were included in the survey.

Study participants

The survey questionnaire was distributed to physician directors of endoscopy units across the United States to determine current minimum staffing at their endoscopy units, scope of practice of available staff, and their opinions of minimum staffing in endoscopy units for safe and efficient endoscopy. The initial target population for the study included medical directors of endoscopy units that were part of the ASGE Unit Recognition Program. This program honors units that have demonstrated a commitment to delivering quality and safety as reflected in their unit policies, credentialing, staff training, competency assessment, and quality improvement activities. At the time of the survey instrument development, there were 400 ASGE Unit Recognition Program endoscopy units across 44 states. A response rate of <25% after a total of 4 attempts from these units was the a priori cutoff to initiate distribution of this survey to the 330 ASGE committee members, requesting them to forward the survey to their respective endoscopy unit medical directors. Because of the initial response rate of <25%, this survey was forwarded to

additional endoscopy unit medical directors by the ASGE committee members for a total of 730 endoscopy unit medical directors.

Survey definitions

For the purpose of the survey, minimum staffing was defined as the minimum number of staff needed in the room to perform the procedure in a safe and efficient manner regardless of the time of the day. Routine procedures refer to EGD and colonoscopy with or without routine interventions (eg, biopsy sampling, polypectomy, hemostasis, tattoo spot injection, etc) and including both nonemergent and emergent cases. Advanced endoscopic procedures included EUS with or without FNA, ERCP, EMR, endoscopic submucosal dissection, peroral endoscopic myotomy, luminal stent placement, PEG tube placement, and deep enteroscopy. A floating RN is a nurse who can accommodate unit staffing in response to variability in patient care needs. An endoscopy technician is a healthcare support personnel who assists physicians and nurses in GI diagnostic procedures and is synonymous with an UAP. Our survey did not assess the role of an LPN.

Statistical analysis

Study data were collected and managed using REDCap electronic data capture tools hosted at the Cedars-Sinai Medical Center. Descriptive statistics were used to analyze the results of this survey. Categorical data are presented as proportions.

Drafting of recommendations

The results of the survey were reviewed and discussed in detail by the ASGE SOP committee members during 2 consecutive biannual committee meetings (Nov 16-18, 2018 and March 29-31, 2019). After the first meeting, a preliminary draft of results and recommendations was circulated among the ASGE SOP committee members and 2 members of the ASGE PO committee. During the second meeting, detailed review of the comments and entire document was performed, and the recommendations were discussed in detail again, taking into consideration feedback from various members. When 100% consensus was not achieved, voting among the ASGE SOP members was used with the majority vote determining whether each recommendation should be a "we recommend" versus "we suggest," with the former a stronger recommendation. The final approval was provided by the ASGE Governing Board in November 2019.

RESULTS

Baseline characteristics

Responses were received from the directors of 193 endoscopy facilities (191 complete surveys and 2 partially completed surveys) located in 34 states in the United States for a response rate of 26.4% (193/730). Supplementary Appendix Table 1 (available online at www.giejournal.org) highlights the baseline characteristics of the endoscopy units. Most respondents were medical directors of ambulatory surgical centers (59.6%), followed by hospital-based units (20.7%), hospital outpatient surgical centers (9.8%), and office-based endoscopy units (19, 9.8%). The number of rooms in the endoscopy units was <2 (5.2%), 2 to 4 (66.3%), and >4 (22.3%). The number of procedures performed each month was >500 in 114 units (59.1%), between 200 and 500 in 67 units (34.7%), and between 100 and 200 in 9 units (4.7%). All endoscopy units performed colonoscopy and upper endoscopy, whereas 27.4% performed EUS, 24.2% performed ERCP, and 34.7% performed the other advanced procedures.

Minimum staffing of endoscopy units during routine procedures

For routine procedures, survey respondents were asked if their current minimum staffing differed depending on the type of sedation and, if so, what it currently was (Supplementary Appendix Table 2, available online at www.giejournal.org) and their opinion on what it should be (Supplementary Appendix Table 3, available online at www.giejournal.org). They were also asked about tasks currently performed by endoscopy room staff during routine procedures (Supplementary Appendix Tables 4 and 5, available online at www.giejournal.org). In 120 units (62.2%), the minimum staffing did not differ for routine procedures based on the type of sedation. In 72 units (37.3%), the minimum staffing did differ based on the type of sedation.

Minimum staffing recommendations for routine procedures depending on the type of sedation (Table 1) were as follows:

1. Endoscopy without sedation

Recommendation: For patients undergoing routine procedures without sedation, we suggest a minimum staffing of 1 endoscopy staff member (UAP or RN) in the room.

2. Endoscopist-directed moderate sedation

Recommendation: For patients undergoing routine procedures with endoscopist-directed moderate sedation, we recommend a minimum of 1 RN in the room who may assist with the technical portion of the endoscopic procedure, provided these tasks can be interrupted.

3. Endoscopist-directed deep sedation (propofol)

Recommendation: For patients undergoing routine procedures with endoscopist-directed deep sedation, we recommend a minimum of 1 RN in the room and a second endoscopy staff member (UAP or RN) be present during any interventional component of the procedure.

4. Endoscopy with anesthesia provider

Recommendation: For patients undergoing routine procedures with anesthesia provider–assisted sedation, we recommend a minimum of 1 endoscopy staff member (UAP or RN) in the room.

TABLE 1. Summary of recommendations

Routine procedures*
For patients undergoing routine procedures without sedation, we suggest a minimum staffing of 1 endoscopy staff member (UAP or RN) in the room.
For patients undergoing routine procedures with endoscopist-directed moderate sedation, we recommend a minimum of 1 RN in the room to assist with the technical portion of the endoscopic procedure, provided these tasks can be interrupted.
For patient undergoing routine procedures with an aesthesia provider–assisted sedation, we recommend a minimum of 1 endoscopy staff member (UAP or RN) in the room.
Advanced procedures†
For patient undergoing advanced procedures with endoscopist-directed moderate sedation, we recommend a minimum of 1 RN in the room and a second endoscopy staff member (UAP or RN) to be present during any interventional component of the procedure
For patient undergoing advanced procedures with endoscopist-directed deep sedation, we recommend a minimum of 1 RN in the room and a second endoscopy staff member (UAP or RN) to be present during any interventional component of the procedure.
For patient undergoing advanced procedures with an anesthesia provider–assisted sedation, we suggest a minimum of 1 endoscopy staff member (UAP or RN) in the room.
Endoscopy technician scope of practice
With appropriate training and under the supervision of the physician, we recommend that a UAP can safely assist with all endoscopic techniques including but not limited to the following interventions: obtaining a tissue specimen via a biopsy forceps, operating a snare during snare polypectomy, submucosal injection for lifting, submucosal injection of tattoo agents, luminal injection of agents, submucosal injection of medication, and injecting contrast during ERCP. This may vary depending on state regulations.

RN, Registered nurse; *UAP*, unlicensed assistive personnel.
*Routine procedures refer to EGD/colonoscopy ± routine interventions (eg, biopsy sampling, polypectomy, hemostasis, tattoo spot injection).
†Advanced procedures refer to EUS with or without FNA, ERCP, EMR, endoscopic submucosal dissection, peroral endoscopic myotomy, luminal stent placement, PEG, and deep enteroscopy.

Discussion. Having 2 endoscopy staff members, preferably an RN and a UAP, in support of routine procedures was selected most by survey respondents, regardless of the type of sedation. With any recommendation, the committee took into consideration cost implications, current practices, current evidence, if any, and efficiency. Considering the cost implications of having 1 staff members, 1 being an RN, in the room and the lack of evidence to support such a practice, the panel decided to make a recommendation for an "endoscopy staff member" rather than an RN when endoscopy is performed without sedation or with an anesthesia provider. Based on local and state regulations and individual site staffing models, the 1 individual person may need to be an RN. Of note, in a recent survey of managers and directors at 65 ambulatory surgical centers and endoscopy units in Texas, Agrawal et al[13] noted that when an anesthesia specialist administers sedation, less than one-fourth of the ambulatory endoscopy units have an RN present during the procedure. Furthermore, an RN, when present, did not perform tasks commensurate with their education and training.

The recommendations regarding endoscopist-directed moderate and deep sedation are in line with the ASGE guidelines for sedation and anesthesia in GI endoscopy[14] and the American Society of Anesthesiologists practice guidelines.[15] The American Society of Anesthesiologists practice guidelines state that "A designated individual, other than the practitioner performing the procedure, should be present to monitor the patient throughout procedures performed with sedation/analgesia. During deep sedation, this individual should have no other responsibilities. However, during moderate sedation, this individual may assist with minor, interruptible tasks once the patient's level of sedation/analgesia and vital signs have stabilized, provided that adequate monitoring for the patient's level of sedation is maintained" (pg. 1009).[15] If non-interruptible interventions are anticipated in advance, then that second individual should be available in the GI suite at the beginning of the procedure so they are immediately available when called on. Having additional staff members would likely be helpful, especially when it comes to turning the room around.

Our survey did not include the role of an LPN. The committee believed that because an LPN works under the supervision of a doctor or nurse and performs basic nursing care and medication administration, then at the minimum they would be interchangeable with a UAP and, depending on state regulations, may be interchangeable with an RN in certain situations. The presence of an RN in all endoscopy procedures with regards to cost of procedure and outcome measures, including safety, needs to be validated in future outcomes research. The committee also recognizes that, occasionally, a resident trainee, especially a gastroenterology fellow trainee, may appropriately take the place of a nurse or UAP, depending on local regulations.

A recent practice guideline for moderate procedural sedation and analgesia regarding the availability of an individual responsible for patient monitoring states "Assure that a designated individual other than the practitioner performing the procedure is present to monitor the patient throughout the procedure. The individual responsible for monitoring the patient should be trained in the

recognition of apnea and airway obstruction and be authorized to seek additional help. The designated individual should not be a member of the procedural team but may assist with minor, interruptible tasks once the patient's level of sedation/analgesia and vital signs have stabilized, provided that adequate monitoring for the patient's level of sedation is maintained" (pg. 443).[16] Interestingly, it does not specify that that individual needs to be a nurse.

Minimum staffing of endoscopy units during advanced procedures

For advanced procedures, survey participants were queried on the current minimum staffing requirements and if this differed based on the type of sedation. Among 93 respondents, 33 reported no difference in staffing by sedation type in their current practice for advanced endoscopic procedures (Supplementary Appendix Table 6, available online at www.giejournal.org). The opinions on what minimum staffing should be when performing advanced endoscopic procedures with different types of sedation administration are noted in Supplementary Appendix Table 7 (available online at www.giejournal.org).

Minimum staffing recommendations for advanced endoscopic procedures depending on the type of sedation (Table 1) are as follows:

1. Endoscopist-directed moderate sedation

Recommendation: For patients undergoing advanced procedures with endoscopist-directed moderate sedation, we recommend a minimum of 1 RN in the room and a second endoscopy staff member (UAP or RN) be present during any interventional component of the procedure.

2. Endoscopist-directed deep sedation

Recommendation: For patients undergoing advanced procedures with endoscopist-directed deep sedation, we recommend a minimum of 1 RN in the room and a second endoscopy staff member (UAP or RN) be present during any interventional component of the procedure.

3. Endoscopy with an anesthesiology provider

Recommendation: For patients undergoing advanced procedures with an anesthesia provider–assisted sedation, we recommend a minimum of 1 endoscopy staff member (UAP or RN) be in the room.

Discussion. Similar to the routine procedures above, survey respondents believed that having 2 endoscopy staff members, preferably an RN and a technician, was needed when performing advanced endoscopic procedures, regardless of the type of sedation. With any recommendation, the committee took into consideration cost implications, current practices, current evidence, if any, and efficiency. One area of debate was whether there was a need to have both staff members in the room the entire time or only during the interventional component. Overwhelmingly, the vote was for the second staff member to be present during the interventional component of the procedures. If such an intervention is anticipated in advance, then that second individual should be available in the GI lab suite at the beginning of the procedure so they are immediately available when called on.

As for the rational for only 1 staff member when anesthesia is administered by an anesthesiology provider, it should be no different from endoscopist-directed deep sedation. In both situations, 1 person is dedicated to monitoring the patient (the RN with endoscopist-directed deep sedation and the anesthesiology provider when they provide the sedation), and the additional staff member can assist with the interventional component. Some states may require that a nurse be in the room if sedation is provided by a medical doctor, but a second RN may not be necessary if sedation is provided by an anesthesia provider.

Although these are minimum standards, the committee recognizes that based on complexity and indication of the procedure, additional staff may occasionally be required. For example, for patients undergoing a complex ERCP, the second staff member may need to be present from onset of the procedures, whereas other procedures, such as EUS, may not require the second staff member until the interventional phase. Certain procedures may require additional staff, such as in double-balloon enteroscopy procedures where 1 staff member is dedicated to holding the overtube. The committee also recognizes that occasionally a resident trainee, especially a gastroenterology fellow trainee, may appropriately take the place of a nurse or UAP, depending on local regulations.

Training of endoscopy technicians for routine and advanced procedures

Formal training of endoscopy technicians (UAPs) participating in routine procedures was reported by 84% of survey respondents. With regards to the type of formal training, 70% selected "standardized onsite training/institution curriculum based" training, 26% selected "observation," and less than 4% selected "formal training outside of the endoscopy unit." For advanced procedures (eg, ERCP, EUS, stent placement, etc), formal training of UAPs was reported by 63% of respondents. The formal training included "standardized onsite training/institution curriculum based" (69%), "observation" (21%), and "formal training outside of the endoscopy unit" (10%).

Role of endoscopy technicians during endoscopic procedures

Respondents were also asked their opinion on whether an endoscopy technician can safely assist with various tasks irrespective of their institutional policy and 177 responded (Fig. 1).

Recommendation: With appropriate training and under the supervision of the physician, we recommend

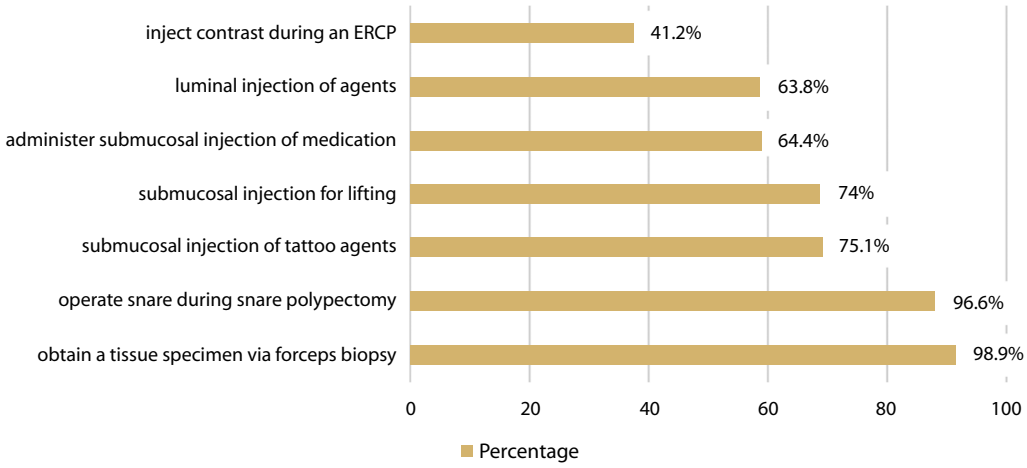

Figure 1. Opinion on what functions endoscopy technician can perform.

that a UAP can safely assist with all endoscopic techniques including but not limited to the following interventions: obtaining a tissue specimen via a biopsy forceps, operating a snare during snare polypectomy, submucosal injection for lifting, submucosal injection of tattoo agents, luminal injection of agents, submucosal injection of medication, and injecting contrast during ERCP. This may vary depending on state regulations.

Discussion. The role of a UAP during endoscopic procedures is usually driven by state regulations and possibly local hospital policies. The committee took into consideration the absence of data on patient safety and satisfaction, lack of evidence of adverse outcomes of having a UAP perform these duties, burden to the medical system, barrier to access, cost implications of using an RN instead of a UAP, and the existing precedence for use of UAP. The panel agreed with the survey results and decided to make a recommendation for allowing UAPs to assist with all endoscopic techniques with appropriate training and under the supervision of the physician. Survey respondents were not given the option of having access to a floating UAP.

As for the type of training of UAPs, there is no standard training or current certification requirements. However, based on the survey, 70% of respondents had standardized onsite training/institution curriculum to achieve certain competency level. The Society of Gastroenterology Nurses and Associates, for example, has a 7.0-contact-hour online program (https://www.sgna.org/Education/Associates-Technicians/Associates-Program) after which successful participants receive a certificate and are recognized as a GI Technical Specialist. The committee also recognizes that occasionally a resident trainee, especially a gastroenterology fellow trainee, may appropriately take the place of a nurse or UAP, depending on local regulations.

FUTURE DIRECTIONS

Patient outcomes, cost-effectiveness, role of electronic health records, resource utilization, and efficiency studies, among others, on the above recommendations, as related to both staffing and the role of UAPs in endoscopic procedures, would be valuable and will guide future recommendations. Consideration should be given to creating a curriculum and training courses for UAPs, especially for advanced endoscopic procedures.

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SUPPLEMENTARY APPENDIX TABLE 1. Characteristics of respondents and units for the minimum staffing in endoscopy unit survey

Survey response (total surveys distributed = 730)	Respondents/units (%)
Total responses received	26.4
Complete response	98.9
Partial response	1.0
Familiarity with institutional staffing policies	
Familiar	94
Not familiar	6
Familiarity with ASGE staffing guideline	
Familiar	70
Not familiar	30
Setting	
Ambulatory surgical center	59.6
Hospital based	20.7
Hospital outpatient surgical center	9.8
Office-based unit	9.8
Rooms in endoscopy unit	
<2	5.2
2-4	66.3
>4	22.3
No. of procedures each month	
>500	59.1
Between 200 and 500	34.7
Between 100 and 200	4.7
Procedures performed	
Colonoscopy and upper endoscopy	100
EUS	27.4
ERCP	24.2
Other types of procedures*	34.7
Minimum staffing differs based on sedation type	
Yes	62.1
No	37.3

*EMR, endoscopic submucosal dissection, peroral endoscopic myotomy, luminal stent placement, PEG tube placement, and deep enteroscopy.

SUPPLEMENTARY APPENDIX TABLE 2. Self-reported existing minimum staffing during routine procedures when staffing differs based on sedation type and when it is consistent regardless of sedation

Staffing	No sedation (n = 39)	Moderate sedation (n = 37)	Endoscopist-directed deep sedation (propofol) (n = 0)	Anesthesiology provider (medical doctor and/or certified RN anesthetist) (n = 59)	Units with same staffing for all procedures (n = 97)
Endo RN alone	25.6	16.2	N/A	10.2	11.3
Floating RN alone	0	0	N/A	0	3.1
Second endo RN	0	8.1	N/A	3.4	6.2
Endo tech/assistant alone	5.1	0	N/A	10.2	10.3
Endo RN + floating RN	0	13.5	N/A	5.1	4.1
Endo RN + tech	51.3	43.2	N/A	45.8	49.5
Floating RN + tech	18	19	N/A	25.4	15.5

Values are percents.
RN, Registered nurse; *N/A*, not available.

SUPPLEMENTARY APPENDIX TABLE 3. Surveyed opinion on minimum staffing during routine procedures

Staffing	Without sedation (n = 89)	Moderate sedation (n = 84)	Endoscopist-directed deep sedation (propofol) (n = 2)	Anesthesiology provider (medical doctor and/or certified RN anesthetist) (n = 157)
Endo RN alone	18	14.3	0	9
Floating RN alone	0	0	0	1
Second endo RN	3.3	8.3	0	3.2
Endo tech/assistant alone	17	1.2	0	20
Endo RN + floating RN	8.9	8.3	0	5
Endo RN + tech	37	66.7	100	33
Floating RN + tech	16	1.2	0	29

Values are percents.
RN, Registered nurse.

SUPPLEMENTARY APPENDIX TABLE 4. Tasks currently performed by endoscopy room staff during routine procedures when staffing *differs* with sedation type*

Staffing	Time out (n = 39)	Chart vitals (n = 34)	Drawing up medication (N/A)	Sedation administration (N/A)	Document endoscopic accessories (n = 35)	Label specimens (n = 37)	Assist with procedures (incl. biopsy sampling) (n = 37)
Without sedation							
Endoscopist	74.3	0	N/A	N/A	14.3	2.7	5.4
Endo RN	66.6	85.3	N/A	N/A	71.4	64.9	32.4
Floating RN	5.1	8.8	N/A	N/A	5.7	5.4	2.7
Second endo RN	0 %	0	N/A	N/A	0 %	0	0
Endo tech	33.3	8.8	N/A	N/A	28.6	45.9	78.4
Endoscopist-directed moderate sedation (total respondents = 37)							
Endoscopist	62.1	2.7	2.7	13.5	10.8	5.4	5.4
Endo RN	70.2	91.9	86.5	86.5	72.9	64.9	27
Floating RN	2.7	2.7	2.7	2.7	5.4	5.4	2.7
Second endo RN	13.5	8.1	8.1	8.1	8.1	8.1	8.1
Endo tech	27	0	0	0	16.2	40.5	75.7
Medical doctor anesthesiologist (total respondents = 10)							
Endoscopist	70	0	0	0	30	10	0
Endo RN	50	40	10	10	70	70	30
Floating RN	0	0	0	0	0	0	0
Second endo RN	0	0	0	0	0	0	0
Endo tech	50	0	0	0	10	30	70
Anesthesia medical doctor	70	70	90	90	0	0	10
Independent certified RN anesthetist (total respondents = 25)							
Endoscopist	60	4	0	0	8	4	8
Endo RN	48	24	20	4	52	52	20
Floating RN	4	0	4	0	8	8	4
Second endo RN	0	0	0	0	0	0	0
Endo tech	32	0	0	0	44	48	80
Certified RN anesthetist	44	80	92	96	0	4	12
Certified RN anesthetist under medical doctor anesthesiologist (total respondents = 24)							
Endoscopist	20.8	0	0	0	8.3	0	0
Endo RN	50	20.8	12.5	0	62.5	50	12.5
Floating RN	4.2	0	0	0	4.2	12.5	0
Second endo RN	0	0	0	0	0	0	4.2
Endo tech	4.2	0	0	0	16.7	37.5	79.2
Certified RN anesthetist	20.8	79.2	87.5	100	0	0	0
Anesthesia medical doctor	0	0	0	0	0	0	4.2

Values are percents.
RN, Registered nurse; *N/A*, not applicable.
*Please note that empty cells represent missing data and questions left unanswered by respondents, thus the total percentage of some columns maybe less than 100%. Furthermore, as more than 1 endoscopy room staff member may be involved in the same task, the total percentages in each column may exceed 100%.

SUPPLEMENTARY APPENDIX TABLE 4. Continued

Assist with snare closure (n = 37)	Submucosal injection (lifting agents) (n = 36)	Submucosal injection (medication) (n = 35)	Submucosal injection (tattoo) (n = 36)	Luminal injection of agents (n = 35)	Contrast injection during ERCP (N/A)
10.8	13.9	14.3	11.1	13.3	N/A
29.7	38.9	48.6	41.7	36.7	N/A
2.7	8.3	14.3	8.3	13.3	N/A
0	0	0	0	0	N/A
75.7	38.9	40	52.8	46.7	N/A
8.1	5.4	8.1	N/A	N/A	N/A
24.3	40.5	54	N/A	N/A	N/A
2.7	5.4	5.4	N/A	N/A	N/A
8.1	10.8	10.8	N/A	N/A	N/A
75.7	48.6	37.8	N/A	N/A	N/A
0	10	10	10	10	10
30	40	40	40	20	0
0	20	30	20	20	0
0	0	0	0	0	0
60	20	20	20	20	40
10	10	10	10	10	10
8	8	4	4	8	4
20	32	36	32	12	16
4	8	12	8	4	0
0	0	0	0	0	4
80	60	64	64	36	8
12	8	4	8	4	0
0	0	0	0	0	0
12.5	41.7	41.7	37.	25	20.8
0	0	4.2	0	4.2	8.3
4.2	4.2	8.3	4.2	8.3	0
79.2	45.8	33.3	0	50	41.7
0	0	0	50	0	0
4.2	4.2	4.2	4.2	4.2	4.2

SUPPLEMENTARY APPENDIX TABLE 5. Tasks currently performed by endoscopy room staff during routine procedures when staffing is *consistent* regardless of sedation type (97 respondents)*

	Time out	Chart vitals	Drawing up medication	Sedation administration	Document endoscopic accessories	Label specimens	Assist with procedures (incl. biopsy sampling)
Endoscopist	46.4	1.0	1.0	11.3	5.2	2.1	1.0
Endo RN	56.7	58.8	58.8	56.7	43.3	41.2	20.6
Floating RN	4.1	4.1	4.1	1.0	2.1	1.0	2.1
Second endo RN	11.3	7.2	8.2	7.2	9.3	12.4	7.2
Endo tech	24.7	5.2	1.0	0	17.5	34.0	59.8

Values are percents.
RN, Registered nurse.
*Please note that the total percentage of some columns maybe less than 100% because not all respondents answered all questions. Also, as more than 1 endoscopy room staff member may be involved in the same task, the total percentages in each column may exceed 100%.

SUPPLEMENTARY APPENDIX TABLE 6. Existing minimum staffing during advanced procedures when staffing differs based on sedation type and when it is consistent regardless of sedation type

Staffing	Moderate sedation (n = 5)	Endoscopist-directed deep sedation (propofol) (n = 0)	Anesthesiology provider (medical doctor and/or certified RN anesthetist) (n = 5)	Units with same staffing for all procedures irrespective of sedation type (n = 33)
Endo RN alone	0	N/A	0	0
Floating RN alone	0	N/A	0	0
Second endo RN	0	N/A	0	15.2
Endo tech/assistant alone	0	N/A	0	0
Endo RN + floating RN	0	N/A	20	9.1
2 Endo RN + floating RN	40	N/A	0	0
Endo RN + tech	60	N/A	60	60.6
Floating RN + tech	0	N/A	0	15.2
Endo RN + tech + floating RN	0	N/A	20	0

Values are percents.
RN, Registered nurse; *N/A,* not available.

SUPPLEMENTARY APPENDIX TABLE 7. Surveyed opinion on minimum staffing during advanced procedures

Staffing St	Moderate sedation (n = 10)	Endoscopist-directed deep sedation (propofol) (n = 3)	Anesthesiology provider (medical doctor and/or certified RN anesthetist) (n = 28)
Endo RN alone	0	0	11
Floating RN alone	0	0	0
Second endo RN	10	0	14.3
Endo tech/assistant alone	0	0	7.1
2 Endo RN + floating RN	10	0	0
Endo RN + tech	80	66.7	57
Floating RN + tech	0	33.3	10.7
Endo RN + tech + floating RN	0	0	0

Values are percents.
RN, Registered nurse.

SUPPLEMENTARY APPENDIX TABLE 5. Continued

Assist with snare closure	Submucosal injection (lifting agents)	Submucosal injection (medication)	Submucosal injection (tattoo)	Luminal injection of agents	Contrast injection during ERCP
1.0	6.2	6.2	5.2	8.2	4.1
33.3	34.0	36.1	34.0	20.6	12.4
2.1	5.2	7.2	5.2	3.1	0
7.2	5.2	5.2	5.2	4.1	3.1
57.7	38.1	28.9	36.1	36.1	17.5

SUPPLEMENTARY APPENDIX 1. SURVEY ON MINIMUM STAFFING IN ENDOSCOPY UNITS

For the purposes of this survey

1. Minimum *staffing* means the minimum number of staff that needs to be present in the room to perform the procedure in a safe and efficient manner regardless of the time of the day.
2. *Routine procedures* refer to "EGD/colonoscopy ± routine interventions (eg, biopsy sampling, polypectomy, hemostasis, tattoo spot injection, etc). This includes both nonemergent and emergent cases.
3. In this survey, an *endoscopy technician* is synonymous with an unlicensed assistive personnel (UAP).

**You have the option to save your responses and return at a later time to edit/finish the survey.*

Thank you!

1. What type of endoscopy facility do you predominantly work at (location of >50% of your endoscopic procedures)?
   a. Ambulatory surgical center
   b. Hospital outpatient surgical center
   c. Office based
   d. Hospital based

2. In what state is your endoscopy unit located? (Fill in answer.)
3. How many endoscopic procedure rooms are in your endoscopy facility?
   a. 1
   b. 2
   c. 3
   d. 4
   e. 5
   f. Other _____

4. Approximately what percentage of each of the following procedures contribute to the total case load on a monthly basis in your endoscopy unit? Must add up to 100%.
   a. Colonoscopy
   b. Upper endoscopy
   c. EUS
   d. ERCP
   e. Other

5. Approximately how many total endoscopic procedures are performed in your endoscopy facility each month?
   a. 100-200
   b. 201-300
   c. 301-400
   d. 401-500
   e. > 500

6. Do your endoscopy technicians receive formal training before being able to independently assist with routine endoscopic procedures?
   a. Yes
   b. No

7. If you answered "yes" to the above question, please clarify type of formal training:
   a. Observation
   b. Standardized onsite training/institution curriculum based
   c. Formal training outside of your endoscopy unit

8. In your opinion, can an endoscopy technician safely assist with the following tasks irrespective of your institutional policy? (Check all that apply.)
   a. Obtaining a tissue specimen via forceps biopsy
   b. Closing the snare during snare polypectomy
   c. Submucosal injection of medication (eg, Botox, epinephrine, glue, etc)
   d. Submucosal injection for lifting (saline and dye agents)
   e. Submucosal injection of tattoo agents
   f. Luminal injection of agents (eg, contrast, dye for chromoendoscopy, simethicone, etc)
   g. Inject contrast during an ERCP

9. Are you familiar with the current policy at your institution regarding minimum staffing in the procedure room in your endoscopy facility?
   a. Yes
   b. No

10. Are you familiar with the ASGE's "Minimum staffing requirements for the performance of GI endoscopy" guideline?
    a. Yes
    b. No

11. Does your current minimum staffing for routine procedures differ at your unit depending on the sedation type (no sedation vs moderate sedation vs endoscopy-directed deep sedation vs sedation administered by an anesthesia provider)
    a. Yes (if you selected this answer, please proceed to Question 12 on Page 4)
    b. No (if you selected this answer, please proceed to Question 43 on Page 14)

12. Of all the procedures performed in your endoscopy unit, what percentage is performed with the following types of sedation? Must add up to 100%.
    a. No sedation
    b. Endoscopist-directed moderate sedation
    c. Endoscopist directed deep sedation
    d. Sedation administered by an Anesthesia provider

At this point in the survey, the surveyed will be directed to the appropriate sections based on their answer to Question 12 (eg, any section answered ≥1%).

Please note: The following questions are for routine procedures defined as EGD/colonoscopy ± routine interventions (eg, biopsy sampling, polypectomy, hemostasis, tattoo spot injection, etc).

NO SEDATION

13. What is your current minimum staffing when a routine procedure is performed without sedation? (Check all that apply.)
    a. Endoscopy RN (present the entire time monitoring sedation)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant
14. When a procedure is performed without sedation, who performs the following tasks? (Check all that apply.)

	Endoscopist	Endoscopy RN (present entire time)	Floating RN	Second endoscopy RN (present entire time, assisting)	Endoscopy technician
Time out and verification					
Charting vitals					
Documenting endoscopic accessories used (for billing)					
Labeling of specimens					
Assist with procedure including biopsy sampling					
Assist with snare closure					
Submucosal injection of lifting agent					
Submucosal injection of medication					
Submucosal injection of tattoo					
Luminal injection of agents					

15. If an endoscopy RN is present at all times during an endoscopic procedure performed without sedation, what are the reasons? (Check all that apply.)
    a. Administration of sedation medication if needed
    b. Patient safety is increased
    c. Institutional regulatory requirement
    d. Other regulatory requirement (professional societies, accreditation agencies)
    e. Documentation during endoscopy
    f. Don't know why

16. What in your opinion should be the minimum staffing when a procedure is performed without sedation? (Check all that apply.)
    a. Endoscopy RN (present the entire time monitoring sedation)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant

Please note: The following questions are for routine procedures defined as EGD/colonoscopy ± routine interventions (eg, biopsy sampling, polypectomy, hemostasis, tattoo spot injection, etc).

MODERATE SEDATION

17. When moderate sedation is administered by the endoscopist, what other staff are present during procedure to assist with the case? (Check all that apply.)
    a. Endoscopy RN (present entire time monitoring sedation)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant
18. When moderate sedation is administered by the endoscopist, who performs the following tasks? (Check all that apply.)

	Endoscopist	Endoscopy RN (present entire time)	Floating RN	Second endoscopy RN (present entire time, assisting)	Endoscopy technician
Time out and verification					
Charting vitals					
Drawing medications					
Sedation medication administration					
Documenting endoscopic accessories used (for billing)					
Labeling of specimens					
Assist with procedure including biopsy samples					
Assist with snare closure					
Submucosal injection of lifting agent					
Submucosal injection of medication					
Submucosal injection of tattoo					
Luminal injection of agents					
Contrast injection during ERCP					

19. If an endoscopy RN is present at all times during a moderate sedation case, what are the reasons? (Check all that apply.)
    a. Administration of sedation medication if needed
    b. Patient safety is increased
    c. Institutional regulatory requirement
    d. Other regulatory requirement (professional societies, accreditation agencies)
    e. Documentation during endoscopy
    f. Don't know why

20. In your opinion, what should be the minimum staffing when an endoscopist administers moderate sedation? (Check all that apply.)
    a. Endoscopy RN (present the entire time monitoring sedation)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy assistant or technician
    e. Fellow in lieu of a second endoscopy RN
    f. Fellow in lieu of an endoscopy technician

21. In your endoscopy unit are any *complex endoscopic procedures performed* with moderate sedation? (Check all that apply.)
    a. EUS ± FNA
    b. ERCP
    c. EMR
    d. ESD
    e. POEM
    f. Stent placement (EGD/colonoscopy)
    g. PEG placement
    h. None of these procedures is performed at this endoscopy facility

22. Does the minimum staffing in the endoscopy room change based on the complexity of the endoscopic procedure being performed?
    a. Yes
    b. No (if you selected this answer, skip to Question 25 on Page 8)

23. What is your current minimum staffing for an advanced endoscopic procedure with moderate sedation? (Check all that apply.)
    a. Endoscopy RN (present entire time)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant

24. If you are performing an advanced endoscopic procedure with moderate sedation, what, in your opinion, should be the minimum staffing? (Check all that apply.)
    a. Endoscopy RN (present entire time)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant

Please note: The following questions are for routine procedures defined as EGD/colonoscopy ± routine interventions (eg, biopsy sampling, polypectomy, hemostasis, tattoo spot injection, etc).

ENDOSCOPIST-DIRECTED DEEP SEDATION (PROPOFOL)

25. When *deep sedation* (propofol) is administered by the endoscopist, what other staff is/are present during procedure to assist with the case? (Check all that apply.)
    a. Endoscopy RN (present entire time monitoring sedation)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant

26. When *deep sedation* is administered by the endoscopist, who performs the following tasks (Check all that apply.)

	Endoscopist	Endoscopy RN (present entire time)	Floating RN	Second endoscopy RN (present entire time, assisting)	Endoscopy technician
Time out and verification					
Charting vitals					
Drawing medications					
Sedation medication administration					
Assist with procedure including biopsy sampling					
Assist with snare closure					
Labeling of specimens					
Assist with procedures (biopsy sampling, snares etc.)					
Submucosal injection of lifting agent					
Submucosal injection of medication					
Submucosal injection of tattoo					
Luminal injection of agents					
Contrast injection during ERCP					

27. If you have an endoscopy RN present at all times during an endoscopist-directed deep sedation case, what are the reasons? (Check all that apply.)
    a. Administration of sedation medication if needed
    b. Patient safety is increased
    c. Institutional regulatory requirement
    d. Other regulatory requirement (professional societies, accreditation agencies)
    e. Documentation during endoscopy
    f. Don't know why

28. What in your opinion should be the minimum staffing when an endoscopist administers deep sedation? (Check all that apply.)
    a. Endoscopy RN (present entire time monitoring sedation)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant
    e. Fellow in lieu of a second endoscopy RN
    f. Fellow in lieu of an endoscopy technician

29. In your endoscopy unit are any *complex endoscopic procedures performed* with endoscopist-directed deep sedation? (Check all that apply.)
    a. EUS ± FNA
    b. ERCP
    c. EMR
    d. ESD
    e. POEM
    f. Stent placement (EGD/colonoscopy)
    g. PEG placement
    h. None of these procedures is performed at this endoscopy facility

30. Does the minimum staffing in the endoscopy room change based on the complexity of the endoscopic procedure being performed?
    a. Yes
    b. No (if you selected this answer, skip to Question 33 on Page 11)

31. What is your current minimum staffing for an advanced endoscopic procedure with endoscopist-directed deep sedation (propofol)? (Check all that apply.)
    a. Endoscopy RN (present entire time)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant

32. In your opinion, what should be the minimum staffing when a complex procedure is performed under endoscopist-directed deep sedation? (Check all that apply.)
    a. Endoscopy RN (present entire time monitoring sedation)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant

SEDATION ADMINISTERED BY ANESTHESIOLOGY PROVIDER

33. If sedation is administered with anesthesiology assistance, please clarify which approach is used for majority of the endoscopy procedures.
    a. Sedation administered by a medical doctor anesthesiologist
    b. Sedation administered by an independent certified RN anesthetist
    c. Sedation administered by certified RN anesthetist under medical doctor supervision

Please note: The following questions are for routine procedures defined as EGD/colonoscopy ± routine interventions (eg, biopsy sampling, polypectomy, hemostasis, tattoo spot injection, etc).

34. When sedation is administered by an anesthesiology provider, what is your current minimum staffing? (Check all that apply.)
    a. Anesthesia provider (medical doctor)
    b. Endoscopy RN (present entire time monitoring sedation)
    c. Floating RN (ie, RN available if needed)
    d. Second endoscopy RN (present entire time, assisting)
    e. Endoscopy technician or assistant

35. When sedation is administered by an anesthesiology provider (certified registered nurse anesthetist), who performs the following tasks? (Check all that apply.)

	Endoscopist	Endoscopy RN (present entire time)	Floating RN	Second endoscopy RN (present entire time, assisting)	Endoscopy technician	Certified RN anesthetist	Anesthesia medical doctor
Time out and verification							
Charting vitals							
Drawing medications							
Sedation medication administration							
Documenting endoscopic accessories used (for billing)							
Labeling of specimens							
Assist with procedure including biopsy sampling							
Assist with snare closure							
Submucosal injection of lifting agent							
Submucosal injection of medication							
Submucosal injection of tattoo							
Luminal injection of agents							
Contrast injection during ERCP							

36. If an endoscopy RN is present at all times along with an anesthesiology provider (certified RN anesthetist), what are the reasons? (Check all that apply.)
    a. Administration of sedation medication if needed
    b. Patient safety is increased
    c. Institutional regulatory requirement
    d. Other regulatory requirement (professional societies, accreditation agencies)
    e. Documentation during endoscopy
    f. Don't know why

37. In your opinion, what should be the minimum staffing when an *anesthesiology provider* (certified RN anesthetist) administers sedation? (Check all that apply.)
    a. Anesthesia provider (medical doctor)
    b. Endoscopy RN (present entire time monitoring sedation)
    c. Floating RN (ie, RN available if needed)
    d. Second endoscopy RN (present entire time, assisting)
    e. Endoscopy technician or assistant

38. In your endoscopy unit are any *complex endoscopic procedures performed* with an anesthesiology provider (certified RN anesthetist)? (Check all that apply.)
    a. EUS ± FNA
    b. ERCP
    c. EMR
    d. ESD
    e. POEM
    f. Stent placement (EGD/colonoscopy)
    g. PEG placement
    h. None of these procedures are performed at this endoscopy facility

39. Does the minimum staffing in the endoscopy room change based on the complexity of the endoscopic procedure being performed?
    a. Yes
    b. No (if you selected this answer, skip to Question 42)

40. If you answered "Yes" for the above question, what other staff is/are present during procedure to assist with complex cases? (Check all that apply.)
    a. Anesthesia provider (medical doctor)
    b. Endoscopy RN (present entire time monitoring sedation)
    c. Floating RN (ie, RN available if needed)
    d. Second endoscopy RN (present entire time, assisting)
    e. Endoscopy technician or assistant

41. In your opinion, what should be the minimum staffing when a complex procedure is performed with the assistance of an anesthesiology provider (certified RN anesthetist)? (Check all that apply.)
    a. Anesthesia provider (medical doctor)
    b. Endoscopy RN (present entire time monitoring sedation)
    c. Floating RN (ie, RN available if needed)
    d. Second endoscopy RN (present entire time, assisting)
    e. Endoscopy technician or assistant

42. Additional comments:

End of the survey! Thank you for taking the time to complete our survey!

Please note: You were directed to this set of questions because you selected "No" for Question 11 "Does your current minimum staffing for routine procedures differ at your unit depending on the sedation type (no sedation vs moderate sedation vs endoscopy-directed deep sedation vs sedation administered by an anesthesia provider)?"

43. What is your current minimum staffing when a routine procedure is performed (Check all that apply.)
    a. Endoscopy RN (present entire time)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant

44. When no sedation or sedation is administered by the endoscopist (moderate or deep sedation (propofol), who performs the following tasks? (Check all that apply.)

	Endoscopist	Endoscopy RN (present entire time)	Floating RN	Second endoscopy RN (present entire time, assisting)	Endoscopy technician
Time out and verification					
Charting vitals					
Drawing medications					
Sedation medication administration					
Documenting endoscopic accessories used (for billing)					
Labeling of specimens					
Assist with procedure including biopsy sampling					
Assist with snare closure					
Submucosal injection of lifting agent					
Submucosal injection of medication					
Submucosal injection of tattoo					
Luminal injection of agents					
Contrast injection during ERCP					

45. When sedation is administered by an anesthesiology provider, who performs the following tasks? (Check all that apply.)

	Endoscopist	Endoscopy RN (present entire time)	Floating RN	Second endoscopy RN (present entire time, assisting)	Endoscopy technician	Certified RN anesthetist	Anesthesia medical doctor
Time out and verification							
Charting vitals							
Drawing medications							
Sedation medication administration							
Documenting endoscopic accessories used (for billing)							
Labeling of specimens							
Assist with procedure including biopsy sampling							
Assist with snare closure							
Submucosal injection of lifting agent							
Submucosal injection of medication							
Submucosal injection of tattoo							
Luminal injection of agents							
Contrast injection during ERCP							

46. If an endoscopy RN is present at all times during a routine endoscopic procedure, what are the reasons? (Check all that apply.)
    a. Administration of sedation medication if needed
    b. Patient safety is increased
    c. Institutional regulatory requirement
    d. Other regulatory requirement (professional societies, accreditation agencies)
    e. Documentation during endoscopy
    f. Don't know why

47. Of all the routine procedures performed in your endoscopy unit, what percentage is performed with the following types of sedation? Must add up to 100% (any selection 1% or greater, please answer additional questions).
    a. No sedation (if >1% please also answer Question 48)
    b. Moderate sedation (if >1% please also answer Question 49)
    c. Deep sedation (if >1% please also answer Question 50)
    d. Anesthesia provider (if >1% please also answer Question 51)

48. If you are performing a routine procedure without sedation, what, in your opinion, should be the minimum staffing in the room with you? (Check all that apply.)
    a. Endoscopy RN (present entire time)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant

49. If you are performing a routine procedure with moderate sedation, what in your opinion should be the minimum staffing? (Check all that apply.)
    a. Endoscopy RN (present entire time)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy assistant or technician

50. If you are performing a routine procedure with endoscopist-directed deep sedation (propofol), what in your opinion should be the minimum staffing? (Check all that apply.)
    a. Endoscopy RN (present entire time)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant

51. If sedation is administered with anesthesiology assistance for routine procedures, please clarify which approach is used for the majority of the endoscopy procedures.
    a. Sedation administered by a medical doctor anesthesiologist
    b. Sedation administered by an independent certified RN anesthetist
    c. Sedation administered by a certified RN anesthetist under an anesthesiologist's supervision

52. If you are performing a routine procedure with the assistance of an anesthesiology provider, what in your opinion should be the minimum staffing? (Check all that apply.)
    a. Endoscopy RN (present entire time)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy R (present entire time, assisting)
    d. Endoscopy technician or assistant

53. In your endoscopy unit, are any advanced endoscopic procedures performed? (Check all that apply.)
    a. EUS ± FNA
    b. ERCP
    c. EMR
    d. ESD
    e. POEM
    f. Stent placement (EGD/colonoscopy)
    g. PEG placement
    h. Deep enteroscopy
    i. None of these procedures is performed at this endoscopy facility

If you selected Options A-H, please continue through the remaining questions.

If you selected "Option I (None)," then you are done! Thank you for taking time to complete the survey!

Additional comments:

Please note: The following questions are for advanced procedures

54. Does your current minimum staffing for advanced procedures differ at your unit depending on the sedation type (moderate sedation, endoscopy directed, anesthesia directed)?
    a. Yes (if you selected this answer, please continue to Question 61 on page 19)
    b. No (if you selected this answer, please continue to Question 55)

55. What is your current minimum staffing for advanced procedures? (Check all that apply.)
    a. Endoscopy RN (present entire time)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant

56. Of all the advanced procedures performed in your endoscopy unit, what percentage is performed with the following types of sedation? Must add up to 100% (any selection 1% or greater, please answer additional questions)

a. Moderate sedation (if >1% please also answer Question 57)
b. Deep sedation (if >1% please also answer Question 58)
c. Anesthesia provider (if >1% please also answer Question 59)

57. If you are performing an advanced endoscopic procedure with moderate sedation, what, in your opinion, should be the minimum staffing? (Check all that apply.)
a. Endoscopy RN (present entire time)
b. Floating RN (ie, RN available if needed)
c. Second endoscopy RN (present entire time, assisting)
d. Endoscopy technician or assistant

58. If you are performing an advanced procedure under endoscopist-directed deep sedation (propofol), what in your opinion should be the minimum staffing? (Check all that apply.)
a. Endoscopy RN (present entire time)
b. Floating RN (ie, RN available if needed)
c. Second endoscopy RN (present entire time, assisting)
d. Endoscopy technician or assistant

59. If sedation is administered with anesthesiology assistance for routine procedures, please clarify which approach is used for the majority of the endoscopy procedures.
a. Sedation administered by a medical doctor anesthesiologist
b. Sedation administered by an independent certified RN anesthetist
c. Sedation administered by a certified RN anesthetist under an anesthesiologist's supervision

60. If you are performing an advanced endoscopic procedure with the assistance of an anesthesiology provider, what in your opinion should be the minimum staffing? (Check all that apply.)
a. Endoscopy RN (present entire time)
b. Floating RN (ie, RN available if needed)
c. Second endoscopy RN (present entire time, assisting)
d. Endoscopy technician or assistant

End of the survey! Thank you for taking the time to complete the survey!

Additional comments:

Please note: You were directed to this set of questions because you selected "Yes" for Question 54 "Does your current minimum staffing for advanced procedures differ at your unit depending on the sedation type (moderate sedation, endoscopy directed, anesthesia directed)?

61. Of all the advanced procedures performed in your endoscopy unit, what percentage is performed with the following types of sedation? Must add up to 100% (any selection 1% or greater, please answer additional questions)
a. Moderate sedation (if >1% please go to Question 62)
b. Deep sedation (if >1% please go to Question 64)
c. Anesthesia provider (if >1% please go to Question 68)

62. In your endoscopy unit, what advanced endoscopic procedures are performed with moderate sedation? (Check all that apply.)
a. EUS ± FNA
b. ERCP
c. EMR
d. ESD
e. POEM
f. Stent placement (EGD/colonoscopy)
g. PEG placement
h. Deep enteroscopy
i. None is performed

63. What is your current minimum staffing for an advanced endoscopic procedure with moderate sedation? (Check all that apply.)
a. Endoscopy RN (present entire time)
b. Floating RN (ie, RN available if needed)
c. Second endoscopy RN (present entire time, assisting)
d. Endoscopy technician or assistant

64. If you are performing an advanced endoscopic procedure with moderate sedation, what, in your opinion, should be the minimum staffing? (Check all that apply.)
a. Endoscopy RN (present entire time)
b. Floating RN (ie, RN available if needed)
c. Second endoscopy RN (present entire time, assisting)
d. Endoscopy technician or assistant

65. In your endoscopy unit, what advanced endoscopic procedures are performed with endoscopist-directed deep sedation (propofol)? (Check all that apply.)
a. EUS ± FNA
b. ERCP
c. EMR
d. ESD
e. POEM
f. Stent placement (EGD/colonoscopy)
g. PEG placement
h. Deep enteroscopy

66. What is your current minimum staffing for an advanced endoscopic procedure with endoscopist-directed deep sedation (propofol)? (Check all that apply.)

a. Endoscopy RN (present entire time)
b. Floating RN (ie, RN available if needed)
c. Second endoscopy RN (present entire time, assisting)
d. Endoscopy technician or assistant

67. If you are performing an advanced procedure under endoscopist-directed deep sedation (propofol), what in your opinion should be the minimum staffing? (Check all that apply.)
    a. Endoscopy RN (present entire time)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant

68. If sedation is administered with anesthesiology assistance for advanced procedures, please clarify which approach is used for the majority of the endoscopy procedures.
    a. Sedation administered by a medical doctor anesthesiologist
    b. Sedation administered by an independent certified RN anesthetist
    c. Sedation administered by a certified RN anesthetist under an anesthesiologist's supervision

69. In your endoscopy unit what advanced endoscopic procedures are performed with an anesthesiology provider? (Check all that apply.)
    a. EUS ± FNA
    b. ERCP
    c. EMR
    d. ESD
    e. POEM
    f. Stent placement (EGD/colonoscopy)
    g. PEG placement
    h. Deep enteroscopy

70. What is your current minimum staffing for an advanced endoscopic procedure with an anesthesiology provider? (Check all that apply.)
    a. Endoscopy RN (present entire time monitoring sedation)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant

71. If you are performing an advanced endoscopic procedure with the assistance of an anesthesiology provider, what in your opinion should be the minimum staffing? (Check all that apply.)
    a. Endoscopy RN (present entire time)
    b. Floating RN (ie, RN available if needed)
    c. Second endoscopy RN (present entire time, assisting)
    d. Endoscopy technician or assistant

Additional comments:

End of the survey! Thank you for taking the time to complete our survey!

ASGE, American Society for Gastrointestinal Endoscopy; *RN*, registred nurse; *ESD*, endoscopic submucosal dissection; *POEM*, peroral endoscopic myotomy.