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. 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 (e.g., 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. 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. The level of education, training, and scope of practice of endoscopy room staff members (i.e., 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. 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).
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. Recommendations for preprocedural and postprocedural staffing are outlined in previous ASGE guidelines.

**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) 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.project-redcap.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 Cedars-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 nonemergency 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 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.
**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 member, 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\(^ {15}\) 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

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**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 anesthesia 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.

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\(\text{RN, Registered nurse; UAP, unlicensed assistive personnel.}\)

*Advanced procedures refer to EUS with or without FNA, ERCP, EMR, endoscopic submucosal dissection, peroral endoscopic myotomy, luminal stent placement, PEG, and deep enteroscopy.

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\(\text{Routine procedures refer to EGD/colonoscopy \pm routine interventions (eg, biopsy sampling, polypectomy, hemostasis, tattoo spot injection).}\)

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PG. 1009.
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). 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 anesthesiology 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 anesthesiology 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 (e.g., 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**
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.

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

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**

<table>
<thead>
<tr>
<th>Survey response (total surveys distributed = 730)</th>
<th>Respondents/units (%)</th>
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<tbody>
<tr>
<td>Total responses received</td>
<td>26.4</td>
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<td>Complete response</td>
<td>98.9</td>
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<td>Partial response</td>
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<tr>
<td>Not familiar</td>
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<tr>
<td>Familiarity with ASGE staffing guideline</td>
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<tr>
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<td>Colonoscopy and upper endoscopy</td>
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<td>Other types of procedures*</td>
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<td>37.3</td>
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*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

<table>
<thead>
<tr>
<th>Staffing</th>
<th>No sedation (n = 39)</th>
<th>Moderate sedation (n = 37)</th>
<th>Endoscopist-directed deep sedation (propofol) (n = 0)</th>
<th>Anesthesiology provider (medical doctor and/or certified RN anesthetist) (n = 59)</th>
<th>Units with same staffing for all procedures (n = 97)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endo RN alone</td>
<td>25.6</td>
<td>16.2</td>
<td>N/A</td>
<td>10.2</td>
<td>11.3</td>
</tr>
<tr>
<td>Floating RN alone</td>
<td>0</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>3.1</td>
</tr>
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<td>Second endo RN</td>
<td>0</td>
<td>8.1</td>
<td>N/A</td>
<td>3.4</td>
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<tr>
<td>Endo tech/assistant alone</td>
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<td>0</td>
<td>N/A</td>
<td>10.2</td>
<td>10.3</td>
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<td>4.1</td>
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<td>18</td>
<td>19</td>
<td>N/A</td>
<td>25.4</td>
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</tr>
</tbody>
</table>

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

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

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

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**

<table>
<thead>
<tr>
<th>Staffing</th>
<th>Time out (n = 39)</th>
<th>Chart vitals (n = 34)</th>
<th>Drawing up medication (N/A)</th>
<th>Sedation administration (N/A)</th>
<th>Document endoscopic accessories (n = 35)</th>
<th>Label specimens (n = 37)</th>
<th>Assist with procedures (incl. biopsy sampling) (n = 37)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Without sedation</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Endoscopist</td>
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<td>Endo RN</td>
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<td>85.3</td>
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<td>N/A</td>
<td>71.4</td>
<td>64.9</td>
<td>32.4</td>
</tr>
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<td>Floating RN</td>
<td>5.1</td>
<td>8.8</td>
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<td>N/A</td>
<td>5.7</td>
<td>5.4</td>
<td>2.7</td>
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<td>Second endo RN</td>
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<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td>0 %</td>
<td>0</td>
<td>0</td>
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<td>Endo tech</td>
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<td>N/A</td>
<td>28.6</td>
<td>45.9</td>
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<td><strong>Endoscopist-directed moderate sedation (total respondents = 37)</strong></td>
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<td></td>
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<td>Endoscopist</td>
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<td>2.7</td>
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<td>5.4</td>
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<td>86.5</td>
<td>86.5</td>
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<td><strong>Medical doctor anesthesiologist (total respondents = 10)</strong></td>
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<td>70</td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Assist with snare closure (n = 37)</th>
<th>Submucosal injection (lifting agents) (n = 36)</th>
<th>Submucosal injection (medication) (n = 35)</th>
<th>Submucosal injection (tattoo) (n = 36)</th>
<th>Luminal injection of agents (n = 35)</th>
<th>Contrast injection during ERCP (N/A)</th>
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</table>
### SUPPLEMENTARY APPENDIX TABLE 5. Tasks currently performed by endoscopy room staff during routine procedures when staffing is consistent regardless of sedation type (97 respondents)*

<table>
<thead>
<tr>
<th>Time out</th>
<th>Charting vital</th>
<th>Drawing up medication</th>
<th>Sedation administration</th>
<th>Document endoscopic accessories</th>
<th>Labeling specimens</th>
<th>Assist with procedures (incl. biopsy sampling)</th>
</tr>
</thead>
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<tr>
<td>Endoscopist</td>
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<td>1.0</td>
<td>11.3</td>
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<td>58.8</td>
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<td>41.2</td>
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<td>4.1</td>
<td>1.0</td>
<td>2.1</td>
<td>1.0</td>
</tr>
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<td>11.3</td>
<td>7.2</td>
<td>8.2</td>
<td>7.2</td>
<td>9.3</td>
<td>12.4</td>
</tr>
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<td>0</td>
<td>17.5</td>
<td>34.0</td>
</tr>
</tbody>
</table>

Values are percents.

*RN, Registered nurse.

*Please note that the total percentage of some columns may be 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

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

Values are percents.

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

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

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

Values are percents.

RN, Registered nurse.
## SUPPLEMENTARY APPENDIX TABLE 5. Continued

<table>
<thead>
<tr>
<th>Assist with snare closure</th>
<th>Submucosal injection (lifting agents)</th>
<th>Submucosal injection (medication)</th>
<th>Submucosal injection (tattoo)</th>
<th>Luminal injection of agents</th>
<th>Contrast injection during ERCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>6.2</td>
<td>6.2</td>
<td>5.2</td>
<td>8.2</td>
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<td>33.3</td>
<td>34.0</td>
<td>36.1</td>
<td>34.0</td>
<td>20.6</td>
<td>12.4</td>
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<td>2.1</td>
<td>5.2</td>
<td>7.2</td>
<td>5.2</td>
<td>3.1</td>
<td>0</td>
</tr>
<tr>
<td>7.2</td>
<td>5.2</td>
<td>5.2</td>
<td>5.2</td>
<td>4.1</td>
<td>3.1</td>
</tr>
<tr>
<td>57.7</td>
<td>38.1</td>
<td>28.9</td>
<td>36.1</td>
<td>36.1</td>
<td>17.5</td>
</tr>
</tbody>
</table>
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 endoscopist-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.)

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

14. When a procedure is performed without sedation, who performs the following tasks? (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
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

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.)
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? (Check all that apply.)
   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
   e. Fellow in lieu of a second endoscopy RN
   f. Fellow in lieu of an endoscopy technician

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

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 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.)

<table>
<thead>
<tr>
<th>Time out and verification</th>
<th>Endoscopy RN (present entire time)</th>
<th>Floating RN</th>
<th>Second endoscopy RN (present entire time, assisting)</th>
<th>Endoscopy technician</th>
<th>Certified RN anesthetist</th>
<th>Anesthesia medical doctor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charting vitals</td>
<td>Endoscopist</td>
<td></td>
<td></td>
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<tr>
<td>Drawing medications</td>
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<td></td>
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<tr>
<td>Sedation medication admin</td>
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<tr>
<td>Documenting endoscopic accessories used (for billing)</td>
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<tr>
<td>Labeling of specimens</td>
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<tr>
<td>Assist with procedure including biopsy sampling</td>
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<tr>
<td>Assist with snare closure</td>
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<tr>
<td>Submucosal injection of lifting agent</td>
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<tr>
<td>Submucosal injection of medication</td>
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<tr>
<td>Submucosal injection of tattoo</td>
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<td>Luminal injection of agents</td>
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<tr>
<td>Contrast injection during ERCP</td>
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</tbody>
</table>
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.)
When sedation is administered by an anesthesiology provider, who performs the following tasks? (Check all that apply.)

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