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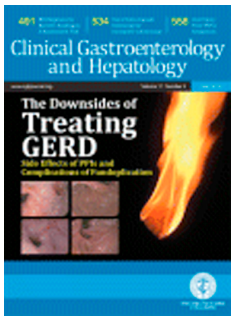


Plans to Reactivate Gastroenterology Practices Following the COVID-19 Pandemic: A Survey of North American Centers

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# Plans to Reactivate Gastroenterology Practices Following the COVID-19 Pandemic: A Survey of North American Centers

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**Abbreviations:**

PPE: Personal Protective Equipment
IQR: Interquartile Range
ASC: Ambulatory surgery center
POC: Point-of-Care

**WHAT YOU NEED TO KNOW:**

**Background:** Endoscopy services were markedly reduced due to the COVID-19 pandemic. While practices are now developing plans to safely reintroduce elective endoscopy, barriers and strategies have not been described.

**Findings:** Only one-half of North American practices anticipate pre-procedure SARS-CoV-2 testing; when testing is performed and is negative, approximately 50% of practices continue to use N95 masks for PPE.

**Implications for Patient Care:** There is significant variability in pre-procedure testing and PPE use in North America, suggesting a need for more widespread availability of tests with superior performance characteristics.

**ABSTRACT:**

**Background and Aims:** Practices dramatically reduced endoscopy services due to the COVID-19 pandemic. As practices are now considering reintroduction of elective endoscopy, we conducted a survey of North American practices to identify reactivation barriers and strategies.

**Methods:** We designed and electronically distributed a web-based survey to North American gastroenterologists consisting of seven domains: institutional demographics, impact of COVID-19 on endoscopy practice, elective endoscopy resumption plans, anesthesia modifications, personal protective equipment (PPE) policies, fellowship training and telemedicine use. Responses were stratified by practice type: ambulatory surgery center (ASC) or hospital-based.

**Results:** In total, 123 practices (55% ASC-based and 45% hospital-based) responded. At the pandemic's peak (as reported by the respondent), practices saw a 90% drop in endoscopy volume with most centers planning to resume elective endoscopy a median of 55 days after initial restrictions. Declining community prevalence of COVID-19, PPE availability, and pre-procedure SARS-CoV-2 testing availability were ranked as the three primary factors influencing reactivation timing. ASC-based practices were more likely to identify pre-procedure testing availability as a major factor limiting elective endoscopy resumption (p=0.001). Pre-procedure SARS-CoV-2 testing was planned by only 49.2% of practices overall; when testing is performed and negative, 52.9% of practices will continue to utilize N95 masks.

**Conclusion:** This survey highlights barriers and variable strategies for reactivation of elective endoscopy services following the COVID-19 pandemic. Our results suggest that more widespread access to pre-procedure SARS-CoV-2 tests with superior performance characteristics is needed to increase provider and patient comfort in proceeding with elective endoscopy.

**Keywords:** COVID-19; Endoscopy Operations; Personal Protective Equipment; Safety

## INTRODUCTION

The rapid spread of SARS-CoV-2 throughout North America has massively disrupted the healthcare system. Due to the high transmissibility and virulence of SARS-CoV-2, hospitals shifted all available resources to preparing for and managing patients with COVID-19. To both protect personnel and preserve the personal protective equipment (PPE) needed to manage the population of patients suffering from COVID-19, most centers stopped performing elective ambulatory procedures during the pandemic[1]. Given that a significant volume of endoscopic procedures revolves around disease prevention and screening (and are thus elective), the practice of gastroenterology was dramatically impacted.

In a previous survey, the North American Alliance for the Study of Digestive Manifestations of COVID-19 found that two-thirds of practices were performing less than 10% of their usual endoscopic volumes during the pandemic[2]. However, endoscopy is essential to the prevention, treatment, and palliation of gastrointestinal illness. This creates a competing need to resume “usual” clinical operations while ensuring patient and provider safety.

Despite a universal desire to return to usual endoscopic and clinical care, there is a paucity of guidance on how practices should plan to safely reintroduce elective endoscopy. Thus, we conducted a survey of North American gastroenterology groups to assess current and anticipated approaches to recovering from the COVID-19 pandemic.

## METHODS

### *Study Design*

This was a survey of North American practices conducted between April 24, 2020 and May 8, 2020. At the institutional level this was a cross-sectional analysis, however given that institutions responded at various points in time during the survey period, this was not a cross-sectional study in aggregate. This study was a web-based survey and was exempt from institutional review board approval. The survey was conducted via the RedCap data capture platform hosted by Washington University School of Medicine in St Louis, MO. The survey was distributed to potential respondents via a web link, without requiring login credentials. Survey respondents were asked to confer with institutional or group leaders prior to filling out the survey. If multiple responses were completed from a single institution, the investigators directly corresponded with respondents to reconcile any inconsistencies.

### *Survey Development, Validation and Beta Testing*

The initial survey was developed through electronic communication by four investigators (VMK, ZLS, BJE, RNK) and then beta tested by the remaining authors to establish face and content validity. The survey was modified after this beta testing to improve ease of administration and clarity.

### *Survey Distribution*

Given the rapidly evolving nature of the COVID-19 pandemic, and the need to ensure timely and widespread circulation of the survey, a multifaceted approach to

dissemination was utilized. The survey was distributed via email to gastroenterologists throughout the United States and Canada. The email list was developed by the study team in order to capture maximum diversity of both geography and practice settings. Additionally, all co-investigators directly contacted community and academic colleagues through email, text message and other personal communications to encourage survey participation. The survey was also promoted on social media platforms (Twitter and physician-only Facebook groups). Finally, to ensure a diversity of responses, the investigators worked with a large ambulatory surgery center (ASC) management group (AMSURG, Nashville, TN) to directly distribute the survey to gastroenterology practices within their portfolio.

*Survey Items*

The survey consisted of 59 questions divided into seven domains: institutional demographics, impact of COVID-19 on endoscopy practice, logistical plan for resumption of elective endoscopy, impact of COVID-19 on anesthesia services, PPE policies, fellowship training and use of telemedicine (Appendix 1).

*Response Stratification*

Responses were stratified according to primary site of endoscopy practice: hospital-based vs. ASC-based. Practices performing ≥50% of procedures in an ASC were classified as ASC-based, while others were classified as hospital-based.

*Statistical Analysis*

Individual item survey responses are reported as a proportion of participants completing the question. For example, the number of respondents answering "yes" to a telemedicine question was divided by the total number of responses to the question. Categorical variables were compared using Chi-squared test where appropriate. A two-sided p value of 0.05 was required for statistical significance. All analysis was performed using SPSS statistics version 25.0 (IBM Corp, Armonk, NY).

## RESULTS

*Practice demographics*

A total of 130 individuals responded to the survey. After reconciling duplicate responses from the same practices, the final sample consisted of 123 unique practices comprising 1379 gastroenterologists in 32 US states and 4 Canadian provinces (Figure 1). Approximately half (50.4%) of the responses were from independent group practices, followed by academic medical center practices (28.5%), non-academic hospital-employed practices (14.8%), and US Veteran's Health Administration hospitals (5.7%). The median practice size was 8 physicians (interquartile range [IQR] 5-15). The majority of practices (55%) performed >50% of their endoscopic procedures at an ambulatory surgical center (ASC). A minority of the respondents (36%) represented practices involved with training gastroenterology fellows. Nearly half (48.8%) of practice locations were described as urban followed by suburban (37.7%) and rural (13.8%) practice settings.

*Impact of COVID-19 on Endoscopy Practice*

Prior to the COVID-19 emergency, participating centers performed a median of 150 (IQR 100-250) endoscopic procedures per week. Complete cessation of elective endoscopy due to the pandemic was undertaken by 98% of hospital-based and 96% of the ASC-based practices. Overall endoscopy volumes decreased markedly due to the pandemic with practices performing approximately 10% of their usual volume during the peak of the pandemic (median 15 procedures; IQR 5-35). When compared to practices that are primarily hospital-based, practices that work primarily in ASCs experienced a significantly higher drop in procedure volumes (ASC 91% decrease vs. hospital based 83% p=0.01); furthermore, ASCs were more likely to stop endoscopy completely during the peak of COVID-19 restrictions (supplementary Figure 1). In the 44 teaching centers, gastroenterology fellows were completely removed from endoscopy in two-thirds (66.6%) of programs.

*Planned Resumption of Endoscopy Practice*

At the time of survey completion, only 27.6% of practices had resumed elective endoscopy. Practices reported that the median planned (or actual, when elective endoscopy had already resumed) duration of halting non-emergent endoscopy was similar for ASCs (55 days; IQR 47-62) and hospital-based endoscopy units (54 days; IQR 44-63). Respondents were asked to identify the three most important factors influencing the decision of when to resume elective endoscopy. The top factors were: declining community prevalence of COVID-19 infections (79.5%), increased availability of PPE (74.6%), and availability of pre-procedure COVID-19 testing (68.9%; Table 1). ASC-based centers were more likely than hospital-based centers to cite availability of

pre-procedure SARS-CoV-2 testing as one of the three main factors limiting the resumption of elective endoscopy (56.7% vs. 83.6%, p=0.001).

Only 3.3% of centers anticipated returning to 100% of their pre-COVID-19 endoscopy volume within 4 weeks of survey completion; most centers (77.5%) anticipated operating at approximately 25-49% of pre-COVID-19 volumes within 4 weeks from the time of survey response. However, 38.2% expected to return to ≥100% of their pre-COVID-19 endoscopy volumes three months after survey administration (i.e., late July/August) (Figure 2). The most frequently cited barriers to increasing procedure volumes after initial resumption of elective endoscopy were limited capacity for COVID-19 testing (69%), patient reluctance to undergo elective endoscopy due to COVID-19-related safety concerns (65.9%) and limited PPE supplies (54%) (Table 1). The projected rebound in endoscopy volumes was similar for hospital-based and ASC-based practices.

*Rescheduling Procedures Deferred During COVID-19 Restrictions*

Most practices anticipated employing interventions to catch up on the backlog of elective procedures created by the COVID-19 pandemic. 63.9% of centers planned to extend operating hours on *weekdays* and 56.6% centers planned to perform outpatient endoscopy on *weekends* (Table 2). ASC-based practices were more likely to offer weekend endoscopy sessions (67.2% vs. 43.6%, p=0.009); while hospital-based practices were more likely to offer stool-based testing in place of average risk screening

colonoscopy (25.5% vs. 4.5%, p=0.001) or adjust (lengthen) surveillance colonoscopy intervals based on the 2020 multi-society guidelines (21.8% vs. 4.5%, p=0.004).

*COVID-19 Patient and Staff Screening*

The vast majority (82.8%) of practices planned to screen all patients for COVID-19 prior to or on arrival at the endoscopy lab. COVID-19 testing by real-time polymerase chain reaction (RT-PCR), point-of-care (POC) testing and/or serology was planned prior to all procedures (either on the days preceding or on day of procedure) in 49.2% centers; 45% of responding centers planned to perform RT-PCR testing 2-3 days prior to endoscopy, while 8.1% anticipated offering same day PCR or POC testing prior to endoscopy (Table 3). Only a minority (10.6%) of centers anticipated serologic testing of staff at the time of their response.

Hospital-based practices were more likely to plan COVID-19 testing (RT-PCR, POC testing, and/or serology) prior to all procedures than ASC-based practices though this did not reach significance (58.2% vs 41.8%, p=0.07). Conversely, more ASC-based practices than hospital-based practices are planning to screen for symptoms of COVID-19 (74.6% vs. 54.5%, p=0.02) and perform temperature checks (80.6% vs. 54.5%, p=0.002) on arrival at the endoscopy lab. More ASC-based centers plan to routinely screen staff for COVID-19 symptoms (71.6% vs. 50.1%, p=0.013).

*Physical Distancing in Endoscopy Lab*

Two-thirds of centers (67.5%) planned to increase time allotted for procedures to allow for the anticipated increase in room turnaround time. To allow for physical distancing in the endoscopy unit, the most frequently anticipated changes were: not allowing anyone except for the patient in the endoscopy center (87%); using only every other pre/post procedure bay (41.8%); and assigning dedicated work stations to each staff member (37.4%; Table 4). There were no significant differences between ASC and hospital-based centers with regards to anticipated use of physical distancing measures.

*Changes in Airway Management During Endoscopic Procedures*

Alterations in airway management (from conventional nasal cannula oxygen delivery) for upper GI endoscopic procedures (EGD, enteroscopy, EUS, ERCP) were being employed/anticipated in 47.2% of centers. In 7 practices (5.8%), general endotracheal anesthesia was being mandated for all upper endoscopy procedures. Although this rate did not differ between hospital-based versus ASC-based practices, teaching centers were more likely than non-teaching centers to use general endotracheal anesthesia for all upper procedures (13% vs. 1.2%; $p<0.001$). In the remaining practices, anesthesia planned to utilize oxygen delivery masks and/or mechanical barriers to reduce exposure risk via aerosolization. Overall, there was no significant difference in airway management between ASC-based and hospital-based groups.

*Personal Protective Equipment*

With the resumption of elective endoscopy, universal use of surgical masks in common areas will be required for staff in 94.2% of practices and for patients in 82.6%. For

asymptomatic patients who undergo a negative COVID-19 test prior to the procedure, nearly half (45.5%) of centers are (or anticipate) recommending the use of surgical masks by healthcare workers during endoscopic procedures; in contrast, 52.9% will continue the use of N95 respirators after negative testing. For those situations where routine COVID-19 pre-procedure testing for asymptomatic patients is not being performed, 71.5 % are recommending use of N95 masks with 20.3% utilizing surgical masks. With regard to eye protection, 97.5% centers required eye protection for all procedures, with full face shields being used in 73.2%. There was no significant difference in planned PPE use between hospital-based and ASC-based centers.

*Use of Telemedicine*

Prior to the COVID-19 pandemic, 19% of practices were using telemedicine in some fashion, with hospital-based practices more likely to utilize telemedicine compared to ASC-based centers (27.2% vs. 12.1%, p=0.03). This increased to nearly all practices utilizing telemedicine during the pandemic (99.2%). Following the lifting of COVID-19 restrictions, 85.8% of centers anticipate continuing to use telemedicine. Again, hospital-based practices are more likely than ASC-based practices to plan on continued use of telemedicine (92% vs. 80%, p=0.046) after the pandemic. Most practices (72.3%) were using video calls (vs. phone call) for the majority of their telemedicine visits.

## DISCUSSION

Resumption of elective endoscopy requires a complex, multifaceted approach wherein practices implement systematic SARS-CoV-2 testing, optimize the inventory of PPE,

and maintain appropriate physical distancing. Thus, we hypothesized that there would be significant variability in the approach to reactivating elective endoscopy in North America. Indeed, in this survey of 123 North American practices representing 1379 gastroenterologists, we found many barriers to resuming elective endoscopy over the coming months as well as areas of significant variability in reactivation protocols.

Gastrointestinal endoscopy is a primary modality for the early detection of colorectal, gastroesophageal, and pancreatic disease. Modeling suggests that the prolonged cessation of endoscopic services will result in a significant increase in advanced malignancy[3, 4] and uncontrolled gastrointestinal disease. We found that during the peak of the COVID-19 pandemic, practices were operating at approximately 10% of typical volume. Thus, it is essential for endoscopic practices to increase delivery of endoscopic services while ensuring provider and patient safety. While most practices expected to restart elective endoscopy after a delay of approximately 8 weeks, only 40% expected re-establishing their usual volumes of endoscopy within the next 3 months. The most common barriers to resuming elective endoscopic services related to two interlocking concerns – the limited capacity for SARS-CoV-2 testing and the parallel concern that patients themselves may be unwilling to return for elective care. In total, this prolonged reduction in elective endoscopy volume will create a backlog of patients which may negatively impact patient care, unless novel strategies are quickly identified and implemented.

Regarding screening patients prior to gastrointestinal endoscopy, numerous strategies have been proposed including symptom assessment and/or RT-PCR testing prior to arrival to the endoscopy center or clinic, or symptom screening and/or testing upon arrival[5]. We found great variability between endoscopy practices regarding anticipated pre-procedure screening protocols. There has been increasing guidance favoring routine screening, generally via RT-PCR, prior to any endoscopic procedure[6, 7]. The rationale for this pre-procedure testing is that any patient who tests positive can have their procedure delayed, reducing exposure to staff and other patients. We found that routine testing by RT-PCR or serology was planned in only 49.2% of practices with a suggestion of greater use in hospital-based practices. Overall, these data show that there is a need for increased standardization of pre-procedure SARS-CoV-2 testing.

There has been extensive international attention regarding optimal PPE strategies for endoscopic procedures and the associated shortage of adequate supplies[8]. Thus, despite existing guidelines, we suspected that significant variability in PPE use persists nationally. In fact, we found that practices differed markedly in type of PPE used for patients who tested *negative* for SARS-CoV-2. While recent guidance has suggested that surgical masks can be utilized in this setting[9], there remains a significant false negative rate for RT-PCR testing and concern for infection between the time of testing and the procedure. This has prompted many practices to advocate for continued N95 use despite a “negative” test. We found that 53% of practices were using N95 respirators in patients who tested negative for SARS-CoV-2 whereas 45% of practices recommended use of surgical masks in this setting. We anticipate that development and

adoption of POC tests with superior performance characteristics will be needed to substantively change PPE practice patterns. Again, these findings emphasize the need for standardized recommendations and clear guidance on how best to integrate SARS-CoV2 testing into ambulatory gastroenterology practice.

There are numerous strengths to this survey. We solicited only a single survey response from each practice; thus, our 123 respondents represent the practice patterns of 1379 North American gastroenterologists. Furthermore, we distributed our survey using a variety of modalities (including personal communication) specifically to obtain a diversity of responses from a variety of practice settings; this is highlighted by the fact that the majority of respondents were from independent-group practices, yielding more generalizable findings. However, there are key limitations. The management of COVID-19 is rapidly evolving; thus, select practice patterns may evolve from the time the survey administration to data analysis. To mitigate this risk, we left our survey open for a short response time (2 weeks). Additionally, as this is a survey study, it may be susceptible to recall bias with regards to endoscopy volumes and COVID-19 disease burden. Finally, we were unable to independently assess practice pattern differences of teaching versus non-teaching institutions as these practice types correlated significantly with hospital-based and ASC-based practices, respectively.

In summary, we have shown that there are significant concerns regarding the ability of practices to quickly and safely resume elective procedures and increase endoscopy volume. This is highlighted by variability in how practices have planned for reactivation.

Our results suggest that the most pressing need is ready access to pre-procedure testing which can reliably exclude SARS-CoV-2, so that both providers and patients feel comfortable resuming elective endoscopy.

Table 1. Considerations in Resuming Elective Endoscopy

| **Please select the THREE most important factors that influenced/will influence your decision to resume elective endoscopic procedures?** | | | | |
|---|---|---|---|---|
| | **Total (n=122)** | **ASC (n=67)** | **Hospital-based (n=55)** | **p-value** |
| Availability of COVID-19 testing | 84 (68.9%) | 38 (56.7%) | 46 (83.6%) | 0.001 |
| Community prevalence of COVID-19 | 97 (79.5%) | 53 (79.1%) | 44 (80%) | 0.9 |
| Patients advocating for resumption of endoscopy | 35 (28.7%) | 21 (31.3%) | 14 (25.5%) | 0.47 |
| Institutional financial considerations | 29 (23.8%) | 13 (19.4%) | 16 (29.1%) | 0.21 |
| Physician financial considerations | 17 (13.9%) | 10 (14.9%) | 7 (12.7%) | 0.7 |
| PPE availability | 91 (74.6%) | 52 (77.6%) | 39 (70.1%) | 0.39 |
| | | | | |
| **What do you see as barriers to increasing endoscopic procedure volume once cleared to restart operations by institution/local government? (check all that apply)** | | | | |
| Inadequate PPE availability | 66 (54%) | 34 (50.7%) | 32 (58.2%) | 0.4 |
| Limited COVID-19 testing capacity | 85 (69%) | 43 (64.2%) | 42 (76.4%) | 0.15 |
| Inadequate nursing/support staff | 18 (14.6%) | 5 (7.5%) | 13 (23.6%) | 0.012 |
| Financial constraints | 12 (9.8%) | 7 (10.4%) | 5 (9.1%) | 0.8 |
| Patient safety concerns | 80 (65.9%) | 43 (64.2%) | 37 (67.3%) | 0.72 |
| Staff safety concerns | 45 (36.6%) | 24 (35.8%) | 21 (38.2%) | 0.79 |
| Limited anesthesia coverage | 13 (10.6%) | 4 (6%) | 9 (16.4%) | 0.064 |

Table 2. Plans to reduce backlog of elective procedures post-COVID-19 pandemic

| **How do you plan to catch up for procedures postponed due to COVID-19 (check all that apply)** | | | | |
|---|---|---|---|---|
| | **Total (n=122)** | **ASC (n=67)** | **Hospital-based (n=55)** | **p-value** |
| Stool-based testing | 17 (13.9%) | 3 (4.5%) | 14 (25.5%) | 0.001 |
| Adapt colon cancer surveillance intervals to 2020 multi-society guidelines | 15 (12.3%) | 3 (4.5%) | 12 (21.8%) | 0.004 |
| Extended weekday hours of operations | 78 (63.9%) | 44 (65.7%) | 34 (61.8%) | 0.66 |
| Weekend endoscopy | 69 (56.6%) | 45 (67.2%) | 24 (43.6%) | 0.009 |
| Open additional procedure rooms | 28 (23%) | 13 (19.4%) | 15 (27.3%) | 0.3 |
| Hire additional endoscopy lab staff | 4 (3.3%) | 2 (3%) | 2 (3.6%) | 0.8 |
| Overbook endoscopy time slots | 16 (13.1%) | 8 (11.9%) | 8 (14.5%) | 0.67 |
| No defined plan | 30 (24.6%) | 16 (23.9%) | 14 (25.5%) | 0.84 |

Table 3. Planned pre-procedure screening of patients for COVID-19 prior to endoscopy

| **Which of the following approaches to screen patients for COVID-19 prior to endoscopy are being considered? (check all that apply)** | | | | |
|---|---|---|---|---|
| | **Total (n=122)** | **ASC (n=67)** | **Hospital-based (n=55)** | **p-value** |
| Symptoms screen prior to arrival for endoscopy | 76 (62.2%) | 52 (77.6%) | 34 (50.7%) | 0.057 |
| Symptom screen on arrival at endoscopy lab | 80 (65.5%) | 50 (74.6%) | 30 (54.5%) | 0.02 |
| Temperature check on arrival in endoscopy lab | 84 (68.8%) | 54 (80.6%) | 30 (54.5%) | 0.002 |
| COVID-19 RT PCR testing 2-3 days prior to procedure | 55 (45.1%) | 25 (37.3%) | 30 (54.5%) | 0.057 |
| COVID-19 RT PCR testing day of procedure | 7 (5.7%) | 3 (4.5%) | 4 (7.3%) | 0.5 |
| Serologic testing prior to procedure | 2 (1.6%) | 1 (1.5%) | 1 (1.8%) | 0.9 |
| Point of care testing day of procedure | 7 (5.7%) | 3 (4.5%) | 4 (7.3%) | 0.28 |
| Any COVID-19 testing (PCR, serology, and/or point of care) | 60 (49.2%) | 28 (41.8%) | 32 (58.2%) | 0.07 |

Table 4. Planned physical distancing measures in endoscopy lab

| **What social distancing measures will you be implementing/have you implemented in your endoscopy unit? (check all that apply)** | | | | |
|---|---|---|---|---|
| | **Total (n=122)** | **ASC (n=67)** | **Hospital-based (n=55)** | **p-value** |
| Allow only patients into the endoscopy center | 107 (87.7%) | 62 (92.5%) | 45 (81.8%) | 0.073 |
| Use every other pre/post procedure bay | 51 (41.8%) | 33 (49.3%) | 18 (32.7%) | 0.66 |
| Assign dedicated nurse to each patient from admission to discharge | 30 (24.9%) | 19 (28.4%) | 11 (20%) | 0.29 |
| Cohort endoscopy lab staff | 43 (35.2%) | 23 (34.3%) | 20 (36.6%) | 0.82 |
| Limit trainee involvement | 31 (25.4%) | 9 (13.4%) | 22 (40%) | 0.001 |
| Assign dedicated work stations to each staff member | 46 (37.7%) | 30 (44.8%) | 16 (29.1%) | 0.075 |

Figure 1: Geographic Distribution of Participating Centers

Figure 2: Anticipated Recovery of Endoscopy Volumes After Lifting of COVID-19 Restrictions

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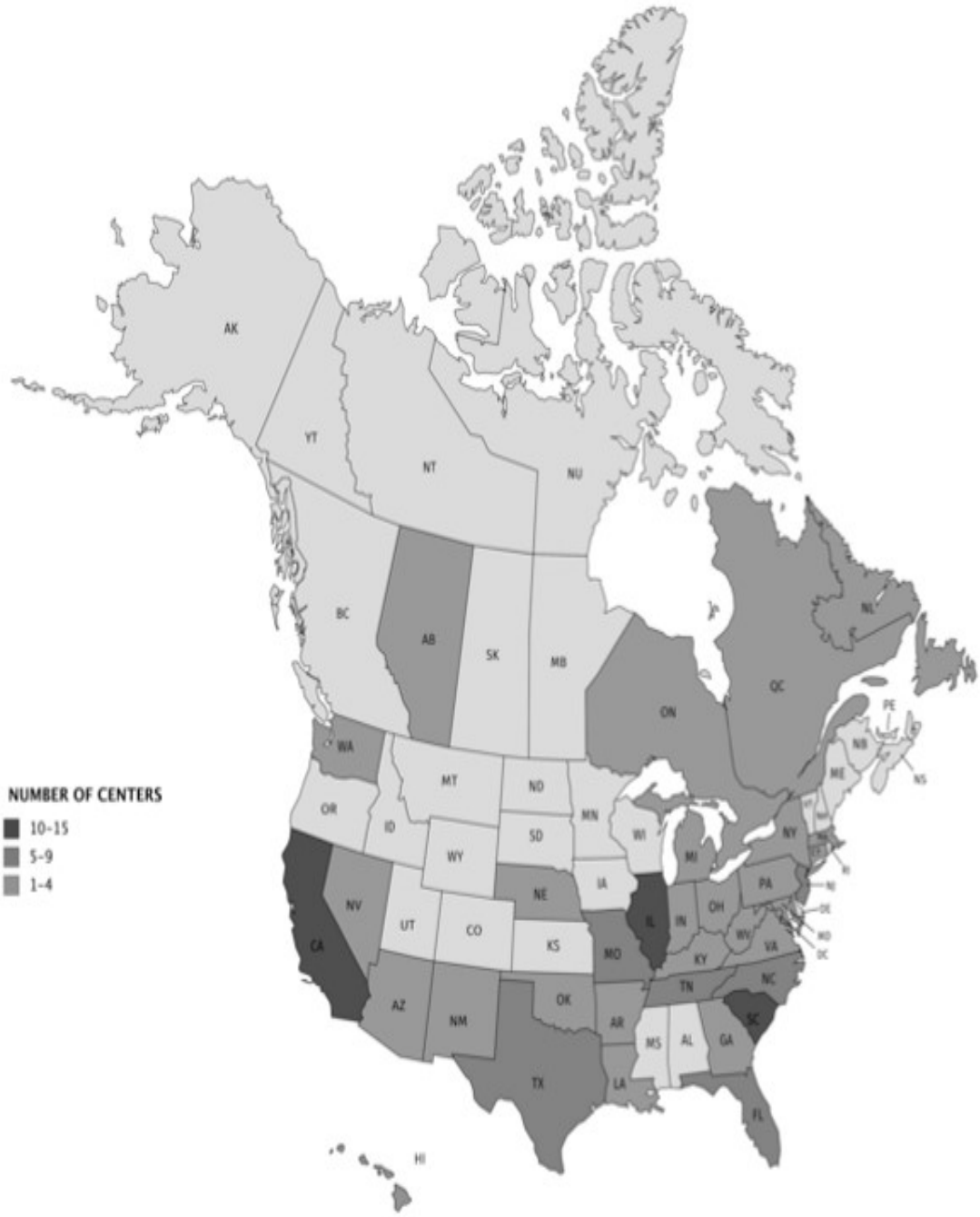
NUMBER OF CENTERS
10-15
5-9
1-4
AK
YT
NT
NU
BC
AB
SK
MB
ON
QC
NL
PE
NB
NS
ME
WA
OR
CA
ID
NV
MT
WY
UT
AZ
CO
NM
ND
SD
NE
KS
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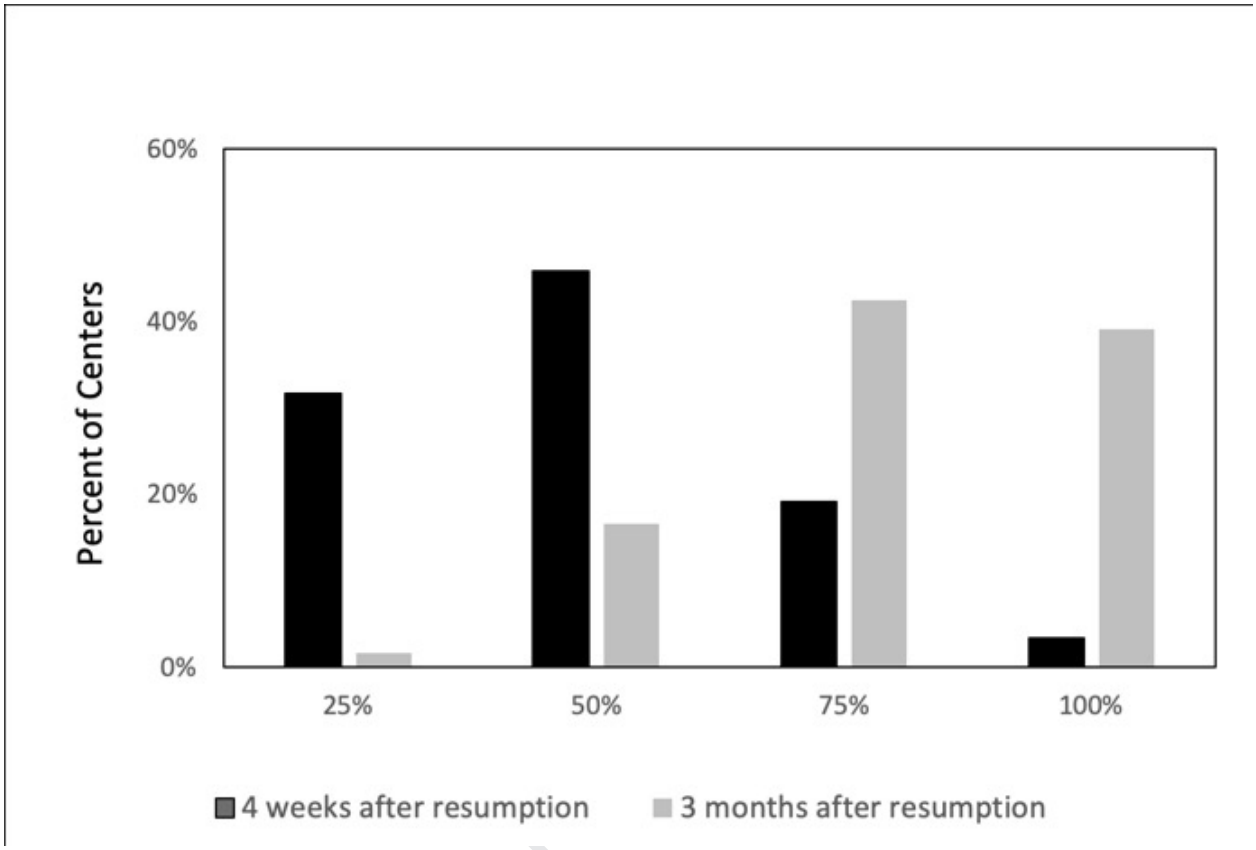
NC
SC
GA
FL
PA
NY
HI


60%
40%
20%
0%
Percent of Centers
25%
50%
75%
100%
4 weeks after resumption
3 months after resumption