



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

## Screening and Surveillance Colonoscopy and COVID-19: Avoiding More Casualties



The coronavirus disease-19 (COVID-19) pandemic has had an unprecedented impact on usual medical care in the United States. Shelter at home orders, surge planning, and explicit recommendations from government agencies such as the Centers for Medicare and Medicaid Services to put a hold on elective medical procedures have markedly disrupted medical care. The impact on preventive cancer screenings has been dramatic. For example, average weekly colorectal cancer (CRC) screening volumes have been estimated to have decreased by 86% before versus after COVID-19 began to impact the United States in an analysis of electronic health record data from 39 health systems spanning 23 states.<sup>1</sup> In addition to government-mandated restrictions on elective procedures, patients may not perceive preventive health measures as an important priority during the pandemic, which can result in lower rates of CRC screening and surveillance.

The pandemic impacts CRC screening and surveillance in several important ways. First, in the United States, the vast majority of CRC screening is accomplished through delivery of screening colonoscopy. Cessation of most elective procedures throughout the country has resulted in dramatic decreases in screening colonoscopy. Second, the impact of colonoscopy restrictions affects other forms of CRC screening. If an individual has abnormal fecal immunochemical test (FIT), FIT-DNA, or computed tomography colonography, the risk of CRC is increased for that individual, and colonoscopy is recommended by every guideline group throughout the world. The restrictions on colonoscopy

use have resulted in delay of colonoscopy in these high-risk patients. Delays in diagnostic colonoscopy after abnormal screening test results may become even more relevant if patients shift toward using noninvasive screening options through the course of the pandemic. Finally, for patients with prior CRC or adenomas, surveillance is recommended as part of the CRC screening continuum.<sup>2</sup> Restrictions on colonoscopy use have resulted in delayed surveillance.

From a public health perspective, the dramatic decreases in CRC incidence and mortality observed over the last 20 years attributed largely to marked increases in exposure to colonoscopy through screening, abnormal test follow-up, and surveillance are in jeopardy.<sup>3</sup> Sustained decreases in screening, diagnostic, and surveillance colonoscopy participation could lead to increases in CRC incidence and mortality, because patients will still be at risk for CRC based on known risk factors such as age, diet, and lifestyle. From a clinical practice perspective, sustained decreases in screening and surveillance colonoscopy could lead to a large disruption of practice paradigms, in which colonoscopy represents both a major source of revenue, and a major point of pride for gastroenterologists as a contribution to public health. For example, screening of asymptomatic individuals for CRC has been estimated to account for 38% of the >14 million colonoscopies performed in the United States annually.<sup>4,5</sup> From a patient perspective, decreased access to screening is expected to result in missed or delayed cancer diagnoses; one model has estimated that 18,000 patients will have delayed CRC diagnosis owing to COVID-19 over just a 3-month period.<sup>6</sup> These delays pose a risk for CRC stage progression, increased need for more morbid and expensive treatments, and ultimately, a risk for poorer CRC outcomes.

## Viability of Screening and Surveillance Colonoscopy in a COVID-19-Adapted World

The viability of colonoscopy as the primary strategy for CRC screening, and of delivery of diagnostic and surveillance colonoscopy in a COVID-19-adapted world is uncertain. Several patient, primary provider, health system, and contextual factors contribute to this uncertainty.

### *Patient Factors*

Our population is struggling with basic needs issues such as job, food, and housing security, likely making preventive health care a low priority. Among individuals who are interested in preventive screening, many are expected to lose the health insurance required to pay for screenings and surveillance tests such as colonoscopy. In the near term, obtaining a colonoscopy may be more complicated in many settings, because some are requiring separate preprocedure visits to confirm absence of COVID-19 infection. Specific to screening, although participation in noninvasive tests such as fecal occult blood tests is low in the United States,<sup>3,7</sup> patients interested in screening may increasingly ask about noninvasive options. Noninvasive, less expensive options such as FIT may be even more preferred by underinsured and uninsured patients. Interest in noninvasive tests might be driven by greater reluctance on the part of patients to visit health care systems to have invasive tests owing to perceived risk of exposure to COVID-19.

### *Primary Care Provider Factors*

In general, a focus on managing issues such as delayed care for chronic conditions and the mental health impact of COVID-19 may decrease bandwidth to recommend CRC screening. Primary care providers have generally favored recommending screening colonoscopy as the primary strategy for CRC screening.<sup>8</sup> It remains

**Table 1.** Strategies for Shaping a COVID-19–Adapted Future for CRC and Prevention

Remind patients and providers that CRC screening saves lives.

Ensure participation by offering patients multiple options for screening.

Expand the pool of patients participating in screening.

For individuals with greater than average CRC risk based on an abnormal screening test, family history of CRC, or prior history of adenoma or CRC, prioritize and emphasize importance of colonoscopy follow-up.

Make endoscopy as safe as possible.

Prepare for a future in which the role of colonoscopy in screening will shift increasingly toward diagnosis, therapy, and surveillance, and away from asymptomatic screening.

COVID, coronavirus disease-19; CRC, colorectal cancer.

to be seen whether primary care provider perceptions of risk for contracting COVID-19 from health care facilities, or knowledge of the additional steps required on the part of patients to complete colonoscopy may decrease enthusiasm for recommending colonoscopy as a primary screening strategy. Concerns about these issues might also lead to deferrals of consultations for diagnostic colonoscopy after abnormal screening tests, or surveillance colonoscopy among those with a history of adenomas or CRC.

### System Factors

Layoffs and furloughs within clinics and health systems secondary to COVID-19 may impact the capacity to fully reopen for CRC screening and surveillance, because the process for rehiring takes time, and it is possible that some workers, such as nurses, medical assistants, and schedulers, will find other jobs during the layoff period. Furloughed workers may be more likely to resume their positions, assuming they have not obtained other positions. Workflow is less efficient as existing staff spend additional time to protect patients and health care providers from COVID-19. Schedulers may spend additional time explaining new COVID-19 precautions designed to ensure safety, such as preprocedure COVID-19 screening, so that scheduling takes longer. Also, case volume per day may be decreased, because additional time may be required in some procedure sites for donning and doffing personal protective equipment, and to allow for sufficient air exchanges and

deeper procedure room cleanings between cases.

### Contextual Factors

The science of CRC screening has evolved markedly since the initiation of promoting colonoscopy as a screening test. Previously, there was greater uncertainty about the value of noninvasive tests relative to colonoscopy for screening. Evidence has now consistently shown that programmatic use of the FIT can decrease incidence and mortality,<sup>9,10</sup> with some models showing benefits similar to colonoscopy.<sup>11</sup> The sensitivity of 1 FIT-DNA test has been shown to be 92% for CRC and 42% for advanced polyps.<sup>12</sup> New blood- and stool-based screening tests for CRC using assessment of genomic and other “omics” factors are being tested in large multicenter trials. The current availability of noninvasive tests and the future promise of new biomarkers could impact participation rates in screening colonoscopy if patients elect for noninvasive tests or hold out for future innovations.

## Predicting and Shaping the Future of COVID-19–Adapted CRC Screening and Prevention

The long-term impact of COVID-19 on CRC screening and prevention, including screening colonoscopy, will ultimately be determined by the extent to which these patient, provider, system, and contextual factors are temporary versus persistent, and how patients, providers, and systems react.

Given the dramatic disruptions to society associated with COVID-19, it seems unlikely that a uniform focus on getting screening colonoscopy participation up to and beyond pre-COVID-19 levels will achieve the greatest public health benefit with respect to CRC screening, or that such a uniform focus will be the most financially beneficial to gastroenterology practices. Accordingly, several strategies may be considered to shape the future of CRC screening and prevention, and mitigate the impact of reduced colonoscopy participation on GI practices (Table 1).

### Remind Patients and Providers that CRC Screening Saves Lives

The evidence base to support impact of CRC screening is robust, and has not been altered by COVID-19.

### Ensure Participation by Offering Patients Multiple Options for Screening

As we interact with patients referred for screening colonoscopies who are reluctant to schedule a procedure, offer a noninvasive test such as FIT. The switch to a noninvasive test such as FIT does not have to be messaged as a permanent option. For example, patients could be told:

*I see you are not ready to schedule your screening colonoscopy. You can get up to date with screening by doing a FIT now. If the test is normal, we will recon- tact you in a year to discuss your preferred option for continuing*

*screening. If the FIT is abnormal, we will know you are at increased risk for polyps and cancer, and that you should proceed with the colonoscopy now.*

We can also work with our primary care colleagues to make sure they feel empowered to discuss noninvasive options for screening when they sense reluctance to be screened with colonoscopy. Indeed, these conversations may be an opportunity to elicit a patient's long-term preferences for participating in CRC screening. Keeping patients engaged with CRC screening will provide them with the immediate benefit of being up to date with screening and risk stratified, and may help to keep CRC screening as an active part of their preventive health consciousness.

### *Expand the Pool of Patients Participating in Screening*

System-based strategies such as mailed invitations to participate in CRC screening with a FIT for all patients not up to date have been widely successful in increasing screening rates and identifying patients at increased risk requiring diagnostic colonoscopy.<sup>13,14</sup> Mailed FIT outreach usually packages several evidence-based strategies for addressing patient-level barriers to screening by delivering education on importance of screening, providing completion reminders, and eliminating the structural barrier of having to attend a clinic visit to complete screening.<sup>15</sup> Some mailed programs have included the option of deferring FIT in lieu of immediately scheduling a screening colonoscopy, based on patient preference. Mailed programs require a clinician champion, and gastroenterologists are well-positioned to bring this and other interventions for optimizing screening participation to attention of clinic and health system leaders.

### *Prioritize and Emphasize Importance of Colonoscopy for High Risk Patients*

For individuals with greater than average CRC risk based on an abnormal screening test, a family

history of CRC, or a prior history of adenoma or CRC, we need to prioritize and emphasize the importance of colonoscopy follow-up. Evidence suggests that staying up to date with diagnostic colonoscopy after an abnormal FIT, as well as screening and surveillance colonoscopy for those with a family or personal history that increases risk, is a powerful strategy for optimizing prevention.

### *Make Endoscopy as Safe as Possible*

Best practices for the safe resumption of endoscopy have been identified.<sup>16,17</sup> Patients should be made aware of the steps taken to reduce risk for nosocomial transmission of COVID-19. As we deal with uncertain times, a single super spreader event at an endoscopy center owing to failure to follow best practices could set back dramatically patient willingness to participate in colonoscopy.

### *Prepare for a Future Shift in Role of Colonoscopy*

Preparations for a future in which the role of colonoscopy in screening will shift increasingly toward diagnosis, therapy, and surveillance, and away from asymptomatic screening should be made. We need to do the best possible job with ensuring patients receive diagnostic colonoscopy after abnormal noninvasive tests, and that patients at an increased risk remain up to date with colonoscopy, and in making sure that all colonoscopies are done with the highest possible quality. This requires systems to ensure complete follow-up of patients to colonoscopy, a redoubled focus on addressing quality issues such as optimizing adenoma detection rates, and a commitment to expanding our skills. For example, rates of surgical referral for benign polyps are too high given that colonoscopic polypectomy results in similar rates of cure with lower rates of complications. Endoscopic mucosal resection of benign polyps is associated with a severe adverse event rate of 1% and a recurrence rate of 14%, with most recurrences manageable endoscopically,<sup>18,19</sup> whereas surgery for benign

polyps is associated with a mortality rate of nearly 1% and morbidity rates of 14% to 25%.<sup>20,21</sup> Most gastroenterologists have the skills or capacity to develop the skills to manage complex polyps ourselves. Advocacy efforts should remove barriers such as copays and cost sharing for diagnostic colonoscopies incident to abnormal noninvasive tests, and also focus on optimizing reimbursement for high-quality colonoscopy and complex interventions such as advanced polypectomy.

## Conclusion

Nearly overnight, COVID-19 has disrupted health care at every level, including our ability to decrease the incidence of and mortality from CRC. Although it is unclear the degree to which screening colonoscopy will be another casualty of COVID-19, and the extent to which diagnostic and surveillance colonoscopy will be impacted, we do have a chance to shape the future of CRC screening and prevention. By leveraging the multiple options and strategies that exist for promoting CRC screening, redoubling our commitment to making colonoscopy as effective as possible, and advocating for policies which reduce barriers for patients and reward our role in CRC prevention, we have the opportunity to continue to reduce CRC incidence and mortality in a COVID-adapted world.

*SAMIR GUPTA*

Department of Clinical Medicine  
Division of Gastroenterology,  
Department of Internal Medicine  
Moore's Cancer Center  
University of California San Diego  
San Diego, California

*DAVID LIEBERMAN*

Department of Medicine  
Division of Gastroenterology and  
Hepatology  
Oregon Health and Science University  
Portland, Oregon

## References

1. Epic Health Research Network. Delayed cancer screenings. May 4, 2020. Available from:



- <https://ehm.org/delays-in-preventive-cancer-screenings-during-covid-19-pandemic/>. Accessed May 16, 2020.
2. Gupta S, Lieberman D, Anderson JC, et al. Recommendations for follow-up after colonoscopy and polypectomy: a consensus update by the US Multi-Society Task Force on Colorectal Cancer. *Gastroenterology* 2020; 158:1131–1153.e1135.
  3. Siegel R, Miller K, Goding Sauer A, et al. Colorectal cancer statistics, 2020. *CA Cancer J Clin* 2020; 70:145–164.
  4. Lieberman D, Holub J, Eisen G, Kraemer D, Morris C. Utilization of colonoscopy in the United States: results from a national consortium. *Gastrointest Endosc* 2004; 62:875–883.
  5. Joseph D, Meester R, Zauber A, et al. Colorectal cancer screening: estimated future colonoscopy need and current volume and capacity. *Cancer* 2016;122:2479–2486.
  6. Institute I. Shifts in healthcare demand, delivery, and care during the COVID-19 era. Tracking the impact in the United States. Available from: [www.iqvia.com](http://www.iqvia.com). Accessed June 6, 2020.
  7. Morbidity and Mortality Weekly Reports. QuickStats: percentage of adults aged 50–75 years who met colorectal cancer (CRC) screening recommendations — National Health Interview Survey, United States, 2018; 2020. [www.cdc.gov/mmwr/volumes/69/wr/mm6911a7.htm?s\\_cid=mm6911a7\\_w#suggestedcitation](http://www.cdc.gov/mmwr/volumes/69/wr/mm6911a7.htm?s_cid=mm6911a7_w#suggestedcitation).
  8. Zapka J, Klabunde CN, Taplin S, et al. Screening colonoscopy in the US: attitudes and practices of primary care physicians. *J Gen Intern Med* 2012;27:1150–1158.
  9. Chiu H, Chen S, Yen A, et al. Effectiveness of fecal immunochemical testing in reducing colorectal cancer mortality from the One Million Taiwanese Screening Program. *Cancer* 2015; 121:3221–3229.
  10. Rossi P, Vicentini M, Sacchetti C, et al. Impact of screening program on incidence of colorectal cancer: a cohort study in Italy. *Am J Gastroenterol* 2015;110:1359–1366.
  11. Knudsen A, Zauber A, Rutter C, et al. Estimation of benefits, burden, and harms of colorectal cancer screening strategies: modeling study for the US Preventive Services Task Force. *JAMA* 2016;315:2595–2609.
  12. Imperiale T, Ransohoff D, Itzkowitz S, et al. Multitarget stool DNA testing for colorectal-cancer screening. *N Engl J Med* 2014; 370:1287–1297.
  13. Jager M, Demb J, Asghar A, et al. Mailed outreach is superior to usual care alone for colorectal cancer screening in the USA: a systematic review and meta-analysis. *Dig Dis Sci* 2019; 64:2489–2496.
  14. Levin T, Corley D, Jensen C, et al. Effects of organized colorectal cancer screening on cancer incidence and mortality in a large community-based population. *Gastroenterology* 2018; 155:1383–1391.e1385.
  15. Gupta S, Coronado CD, Argenbright K, et al. Mailed fecal immunochemical test outreach for colorectal cancer screening: summary of a Centers for Disease Control-sponsored summit. *CA Cancer J Clin* 2020;70:283–298.
  16. American Society for Gastrointestinal Endoscopy. Guidance for resuming GI endoscopy and practice operations after the COVID-19 pandemic. Available from: [www.asge.org/home](http://www.asge.org/home); 2020. Accessed June 7, 2020; 2020.
  17. Digestive Health Physicians Association. Joint AGA/DHPA guidance: recommendations for resumption of elective endoscopy during the COVID-19 pandemic. Available from: [www.dhpassociation.org/2020/04/27/aga-dhpa-resume-endoscopy-covid19/](http://www.dhpassociation.org/2020/04/27/aga-dhpa-resume-endoscopy-covid19/); 2020. Accessed June 7, 2020; 2020.
  18. Hassan C, Repici A, Sharma P, et al. Efficacy and safety of endoscopic resection of large colorectal polyps: a systematic review and meta-analysis. *Gut* 2016;65:806.
  19. Kaltenbach T, Anderson JC, Burke CA, et al. Endoscopic removal of colorectal lesions—recommendations by the US Multi-Society Task Force on Colorectal Cancer. *Gastroenterology* 2020;158:1095–1129.
  20. Ma C, Teriaky A, Sheh S, et al. Morbidity and mortality after surgery for nonmalignant colorectal polyps: a 10-year nationwide analysis. *Am J Gastroenterol* 2019; 114:1802–1810.
  21. Peery A, Shaheen N, Cools K, et al. Morbidity and mortality after surgery for nonmalignant colorectal polyps. *Gastrointest Endosc* 2018; 87:243–250.e242.

---

#### Acknowledgments

The authors thank Ms Hanin Yassin for assistance with manuscript preparation.

#### Conflicts of interest

The authors disclose no conflicts. Dr. Gupta consults for Freenome and Guardant, and receives study sponsorship from Epigenomics. Dr. Lieberman consults for Freenome and Cap-Check

#### Funding

Supported by the National Institutes of Health/ National Cancer Institute: UG3CA233314; R37 CA 222866-02 and VA Health Services Research and Development: 5 I01 HX 001574-04 and C-19 20-394.

#### Most current article

© 2020 by the AGA Institute  
0016-5085/\$36.00

<https://doi.org/10.1053/j.gastro.2020.06.091>