

# The impact of COVID-19 on endoscopy and cancer screening: a focus on access and equity

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**Abstract:** The SARS-CoV2 pandemic has had a profound and lasting impact on healthcare delivery. Gastrointestinal endoscopy services were limited during the early phases of the pandemic, which has resulted in ongoing procedural backlog. Procedural delays have had continuing effects including delayed colorectal cancer (CRC) diagnoses and exacerbation of existing disparities in the CRC-screening and treatment pathways. In this review, we outline these effects as well as the variety of strategies that have been proposed to eliminate this backlog, including increased endoscopy hours, re-triaging of referrals, and alternative CRC-screening strategies.

**Keywords:** backlog, colorectal cancer, COVID-19, gastrointestinal endoscopy, health disparities, SARS-CoV-2

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The SARS-CoV2 (COVID-19) pandemic has had a profound impact on healthcare systems worldwide. In the first months of the pandemic, marked changes occurred in healthcare delivery and there were widespread cancellations of non-urgent gastrointestinal endoscopies in an effort to conserve healthcare resources and to protect staff and high-risk patients from becoming infected.<sup>1</sup> As vaccination became available and therapeutic options for treatment and prophylaxis have increased, the number of patients with severe disease requiring hospitalization has decreased.<sup>2</sup> Many of the societal changes that occurred at the early stages of the pandemic are now disappearing: mask mandates have lifted and the number of people participating in social distancing has decreased.<sup>3</sup> In fact, leaders at the World Health Organization in September 2022 stated that the end of the pandemic is 'in sight'.<sup>4</sup> While most state-mandated restrictions on non-essential procedures were lifted in the Spring of 2020,<sup>5</sup> the effects of the initial lockdown period and changes to endoscopy practice in the months that followed continue to reverberate.<sup>6-8</sup> Indeed, a recent review of literature on colonoscopy during the pandemic found that the number of surveillance colonoscopies decreased by between 44.6% and 79%.<sup>6</sup> A

return to prior practice patterns will not be sufficient to overcome pandemic-related delays in care for gastrointestinal diseases, and intentional, evidence-based public health strategies will be necessary to ensure timely and equitable care for our patients.

When the COVID-19 pandemic was declared in March 2020, the Centers for Medicare and Medicaid Services recommended all non-urgent gastrointestinal endoscopies be delayed.<sup>9</sup> This led to a sharp decrease in endoscopic procedures performed. In April 2020, the number of esophagogastroduodenoscopies and colonoscopies performed decreased by 82.6% and 92.0%, respectively, as compared to the same month in 2019.<sup>10</sup> Considered non-urgent procedures, colorectal cancer (CRC) screening and surveillance colonoscopies were profoundly impacted during this early phase of the pandemic. In April of 2020, only 23.9% of colonoscopies were performed for screening or surveillance as compared to 72.6% at baseline.<sup>10</sup> The proportion of procedures performed in a hospital setting also increased, another reflection of the changing indications for endoscopic procedures during this time period.<sup>10</sup>

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In the following months, endoscopic capacity slowly increased; however, capacity has not returned to pre-pandemic baselines.<sup>6</sup> This prolonged decrease in capacity created a growing backlog of procedures. In the United Kingdom's National Health Service (NHS), the total number of patients awaiting endoscopic procedures increased by a striking 72.6% in the first 6 months of the pandemic, from 102,891 in March 2020 to 177,557 in September 2020, despite steady improvement in endoscopic capacity to 84.5% of baseline by that time.<sup>11</sup> Modeling studies estimated that even with return to higher than previous (130–145%) capacity, it would take until November 2021 to catch up with colonoscopy backlog unless additional measures were taken to re-triage procedures.<sup>8,11</sup> A more recent UK modeling study reported that even by May 2021, only 21.3% of patients undergoing endoscopy were scheduled within the 18-week wait time standard, as compared to pre-pandemic goal of 92%. Per that model, capacity would need to increase by 55% to meet that wait time performance standard by 2026.<sup>12</sup>

While a variety of approaches have been proposed to increase endoscopic capacity, supranormal capacity, or even a return to pre-pandemic capacity, may not be achievable at many centers. Endoscopic capacity is still limited by a variety of factors, including staff shortages and hospital and outpatient capacity.<sup>13</sup> During the early pandemic, changes in workflow and cleaning protocols intended to reduce risk of viral spread significantly impacted room turnover and limited the number of cases that can be performed during usual hours. While many of these protocols are no longer required, enhanced cleaning protocols may still impact hospital-based facilities caring for COVID-19 patients with downstream effects on outpatient procedural capacity. Existing staffing shortages may not allow for extended hours, and re-purposing of staff to coordinate pre-procedure testing or to triage referrals will only add to strain on staffing. Thus, a multifaceted approach that aims to prioritize high-risk patients, re-triage select existing procedures, and reduce the burden of new referrals is more likely to be successful in eliminating this backlog of procedures than a focus on increased capacity alone (Table 1).

First and foremost, we must find a way to prioritize patients with high-risk features that increase

their risk for morbidity associated with procedural delay. Among patients referred for diagnostic colonoscopy, the rate of CRC is relatively low.<sup>14</sup> Even among patients with high-risk symptoms, such as those referred via the NHS's expedited 2-week wait time pathway, colonoscopy identifies cancer in 7% of patients.<sup>15</sup> The intentional choice to perform colonoscopy in a higher number of average-risk patients, accepting a lower yield, has been shown to decrease CRC incidence.<sup>14</sup> However, these analyses were performed when access was less strained. One potential solution to risk-stratify patients is utilizing a healthcare professional to identify high-risk patients and prioritize patients who are most likely to benefit from expedited screening. One method is direct communication with patients to assess for interval development of 'red flag symptoms' such as bleeding or unexplained weight loss. Higher fecal immunohistochemical test (FIT) cutoffs could be utilized to re-triage patients referred in with positive FIT or could be used as adjunct for those referred due to symptoms. A study in the UK's NHS estimated that using a FIT cutoff of 10 µg/g would decrease referrals via their expedited pathway to 18% of usual.<sup>11</sup> Re-triaging with this cutoff would allow for the existing procedural backlog to be eliminated in the same time period as an increase to 130% capacity.<sup>11</sup>

The recent changes in polyp surveillance guidelines also provide an opportunity to delay the scheduling of select surveillance colonoscopies. The 2020 American Gastroenterological Association guidelines for follow-up after colonoscopy and polypectomy recommended a change from 5 year to 7–10 year surveillance intervals for patients with low-risk adenomas (defined as 1–2 non-advanced adenomas <10 mm in size).<sup>16</sup> Given this recent change, 14.8–20.7% of patients with active referrals for surveillance colonoscopy could be safely delayed by at least 1 year.<sup>17</sup>

Re-triaging patients, while time intensive, may also identify patients who no longer require an exam – either due to resolved, low-risk symptoms or interval diagnosis by other means. Avoiding scheduling patients who no longer require a procedure would, accordingly, increase availability for those patients who still have procedural indications. It would also avoid unnecessary procedural risk in those patients who no longer require

**Table 1.** Strategies for overcoming endoscopic backlog.

Strategy	Barriers to implementation
Increased endoscopic capacity	
Extended hours	Limited by availability of staff, procedure facilities
Re-triaging/re-prioritization	
Symptom re-evaluation	Requires creation of agreed-upon criteria for procedural delay or cancellation; requires staff-hours for either manual check-in or creation of automated messaging
Re-timing surveillance endoscopies	No existing automated mechanism for re-triage; requires staff-hours
Adjusted FIT* cutoffs	Variety of proposed cutoffs, quantitative values may not be readily available for re-triage without submission of new sample
Reducing new colonoscopy referrals	
Increase utilization of FIT for primary screening	FIT order often must be provider-triggered; infrastructure for EHR <sup>§</sup> -triggered screening or mailed FIT may not be in place
*Fecal immunohistochemical test. §Electronic health record.	

a procedure. It should be acknowledged that methods for re-triaging should be individualized by institution and may be limited by staffing. Processes that could be automated or executed via the electronic health record may be preferable to those that require physician or staff-hours and would occupy time that could be alternatively allocated toward endoscopy hours. Artificial intelligence may be utilized to design algorithms to identify high-risk patients and prioritize endoscopic screening.<sup>18</sup>

In addition to re-triaging existing referrals, encouraging use of FIT as a primary screening strategy could limit additions to the procedure queue, particularly as we aim to catch up on the existing backlog. FIT is recommended by the U.S. Preventative Services Task Force as a method of primary CRC screening in an average-risk patient population.<sup>19</sup> Indeed, studies of pandemic utilization of colorectal screening tests identified that while colonoscopy rates declined, the number of FIT ordered increased above prior years.<sup>20,21</sup> While the absolute rate of CRC screening still decreased during the pandemic, the effect was smaller compared to breast cancer and cervical cancer screening, perhaps because FIT was available as an alternative modality and could thus counterbalance the decrease in screening colonoscopy.<sup>22</sup> However,

while FIT screening may require fewer health-care resources than colonoscopy, there are still equity and access to care issues to address.<sup>23</sup> It is important to implement evidence-based strategies to ensure that positive stool tests are promptly followed by colonoscopy, and that stool tests are distributed in an equitable and accessible manner.<sup>24</sup> In the United States, FIT screening is often provider-triggered at a clinic visit and the kit may require in-person pickup. Health systems must re-engage patients in screening, and this can be done outside of the routine wellness visit. Mailed FIT, specifically, has been shown to result in higher rates of screening particularly in underserved populations and could be a relatively low-cost intervention that bypasses the need for a physical visit to participate in screening.<sup>25</sup>

The strategies selected to address procedural backlog may vary by institution, but the urgency in addressing this issue is universal, as longer wait times will lead to delayed diagnoses and increased morbidity. CRC is the third-most common cancer worldwide and is often curable when diagnosed at early stages.<sup>26</sup> Because colonoscopy is the cornerstone of screening and surveillance programs, endoscopic delays will have trickle-down effects on the diagnosis, management, and prognosis for patients with CRC. A

single institution study found delayed diagnoses of gastrointestinal cancers in 5.4% (12/223) of endoscopies delayed by the initial shutdown and rescheduled by fall 2020. Comparative studies have found that the number of CRCs diagnosed decreased by 29–31% in the early days of the pandemic when compared to the same period in 2019.<sup>11,27,28</sup> As procedure capacity recovered, the difference decreased but remained significantly lower than baseline – 11% lower in July to November 2020 as compared to the same period in 2019.<sup>27</sup> Based on the degree of disruption in endoscopic services in 2020 and 2021, one model estimated that the initial disruption and delayed recovery to baseline could lead to 4190, 4580, or 6950 excess deaths depending on the time to recovery (6, 12, or 24 months).<sup>29</sup>

A major concern with prolonged delays in diagnosis is that delays may result in upstaging of cancer and decreased opportunities for curative therapy. In one Italian study, the percent of patients with stage IV disease at time of CRC diagnosis increased from 22 to 37% in 2020,<sup>28</sup> even though other European studies found a much smaller (2.5–7.4%) absolute increase<sup>30,31</sup> or no significant change<sup>32</sup> in staging at time of diagnosis. This discrepancy in findings may reflect longer delays in more affected health systems: while delays of <6 months may not have significant impact on staging at time of diagnosis, delays of 6–12 months are likely to result in upstaging.<sup>33</sup> While it is too early to fully assess the long-term ramifications on CRC mortality, one modeling study estimated that we may see a 15–16% increase in deaths by 5 years after CRC diagnosis.<sup>34</sup>

These effects may be magnified in vulnerable populations, including those from lower socioeconomic groups, racial and gender minorities, and rural underserved populations. Among racial minorities, blacks and American Indian and Alaska Natives have the highest incidence of CRC and experience higher mortality rates.<sup>35</sup> There are well-known effects of systemic racism, including disparities in access to and completion of colon cancer screening among black patients.<sup>36</sup> Prior to the pandemic, attention to these disparities and efforts to address systemic racism had begun to decrease the disparities seen in screening.<sup>36</sup> However, the scarcity of

available care caused by the pandemic and disproportionate burden of COVID-19 disease in vulnerable populations threatens to erode progress in addressing disparities.<sup>37,38</sup>

In summary, the COVID-19 pandemic has resulted in significant delays in completion of endoscopic procedures. Longer wait times have potential ramifications including delayed CRC diagnoses and increased mortality. These effects may be magnified in vulnerable populations who are already disproportionately affected by CRC. A multifaceted approach including increasing endoscopic capacity, careful triaging of procedures, and improved implementation of FIT-based screening programs may help clear this backlog and minimize excess morbidity associated with delays.

## Declarations

*Ethics approval and consent to participate*

Not applicable.

*Consent for publication*

Not applicable.

*Author contribution(s)*

**Julianna G. Gardner:** Writing – original draft; Writing – review & editing.

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