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Impact of Coronavirus Disease 2019 on Screening Colonoscopy Utilization in a Large Integrated Health System



Coronavirus disease 2019 (COVID-19)-related backlogs in high-volume gastrointestinal endoscopic procedures, such as colonoscopy, are projected to lead to a rise in avoidable cancers. Almost one-third of colonoscopies performed in Veterans Health Administration (VHA), the largest integrated health system in the United States, are for screening. However, colonoscopy is not the only option for colorectal cancer (CRC) screening. Indeed, the US Preventive Services Task Force endorses several different testing modalities, including annual fecal immunochemical testing (FIT), as alternatives to colonoscopy for average-risk screening.¹ A recent simulation study projected that increasing FIT-based screening during COVID-19 could mitigate the consequences of reduced screening rates during the pandemic on CRC outcomes.² Such an approach also could address longer term endoscopy access challenges in settings where endoscopy demand exceeds capacity. This is particularly important considering recent changes to US Preventive Services Task Force guidelines recommending initiating screening at age 45 (previously age 50).¹ In the VHA alone, this change is estimated to increase the number of screening-eligible patients by 280,000, further exacerbating existing and creating new endoscopy access challenges. Recognizing the potential of this colonoscopy-to-FIT strategy to reduce endoscopy demand in the face of severely constrained resources during the pandemic and improve overall access for the highest need patients, the VHA issued a March 2020 national directive mandating preferential use of stool-based CRC screening in average-risk patients during the pandemic.

Here, we aimed to evaluate impacts of COVID-19 on VHA screening colonoscopy use and assess facility-level variation and potential explanatory factors. We also sought to better understand the relationship between changes in screening colonoscopy use and overall facility capacity to explore the sustainability of this colonoscopy-to-FIT approach as a mechanism to address more chronic endoscopy access challenges.

This was a retrospective cohort study of veterans undergoing screening colonoscopy from October to December 2019 (“pre-COVID”) and October to December 2020 (“COVID”). Screening colonoscopies were identified using a previously validated algorithm.³ We then calculated the overall and facility-level proportions of all colonoscopies performed for screening during each period and the change in facility-level proportion pre-COVID and COVID. Predicted facility-level estimates were calculated using shrinkage estimates to adjust for facility procedural volume. We also examined facility characteristics associated with this change⁴ (Supplementary Methods).

During the study period, 99,595 total colonoscopies were performed at 117 VHA facilities. Of these, 28,082 (28.2%) were screening colonoscopies (pre-COVID, 18,681;

COVID, 9401). System-wide, there was a 9.3% decrease (95% confidence interval [CI], -10.5% to -8.1%) in the mean (adjusted) facility-level proportion of screening procedures pre-COVID and COVID. Most facilities modestly decreased screening colonoscopy use in the COVID period, with wide variation across facilities (interquartile range, -14.8% to -4.6%) (Figure 1). At the same time, average monthly FIT volume increased by 7.9% before and after COVID-19 (pre-COVID, 31,604 FIT per month; COVID, 34,109 FIT per month).

Most VHA facilities included in the analysis were high complexity and academically affiliated (Supplementary Table 1). Higher complexity facilities achieved larger relative decreases in screening colonoscopy use than the lowest complexity facilities (Supplementary Table 2). However, even these higher complexity facilities decreased screening colonoscopy use by only ~25%. Similarly, academically affiliated facilities achieved larger relative reductions in screening colonoscopy use (-28%; 95% CI, -33% to -22%) than nonacademically affiliated facilities (-15%; 95% CI, -23% to -6%). Facilities that had failed to regain their pre-COVID capacity by the fourth quarter of 2020 were no more likely to decrease screening colonoscopy use than those that had regained their capacity ($P = .8231$). The proportion of screening procedures increased 0.4% (95% CI, -3% to 4%) for every 10% additional regained capacity. Geographic region did not significantly impact facility-level screening colonoscopy use ($P = .4168$).

Here, we evaluated impacts of COVID-19 on VHA screening colonoscopy use and facility characteristics associated with these changes. Although we found a modest (9.3%) decrease in the overall proportion of screening procedures by the fourth quarter of 2020, VHA facilities clearly did not maximize the opportunity to accomplish a marked, system-wide reduction in screening colonoscopy demand by shifting to an underused, evidence-based alternative screening modality (FIT). This occurred despite a national VHA policy directive strongly encouraging widespread adoption of a stool-based CRC screening strategy to enhance overall endoscopy access. Furthermore, there was significant facility-level variation, with the greatest reduction in screening colonoscopy use occurring at higher complexity, academically affiliated sites. However, even these facilities were able to achieve only ~25% relative reduction in screening colonoscopies. Although not

Abbreviations used in this paper: COVID-19, coronavirus disease 2019; CRC, colorectal cancer; FIT, fecal immunochemical testing; VHA, Veterans Health Administration.

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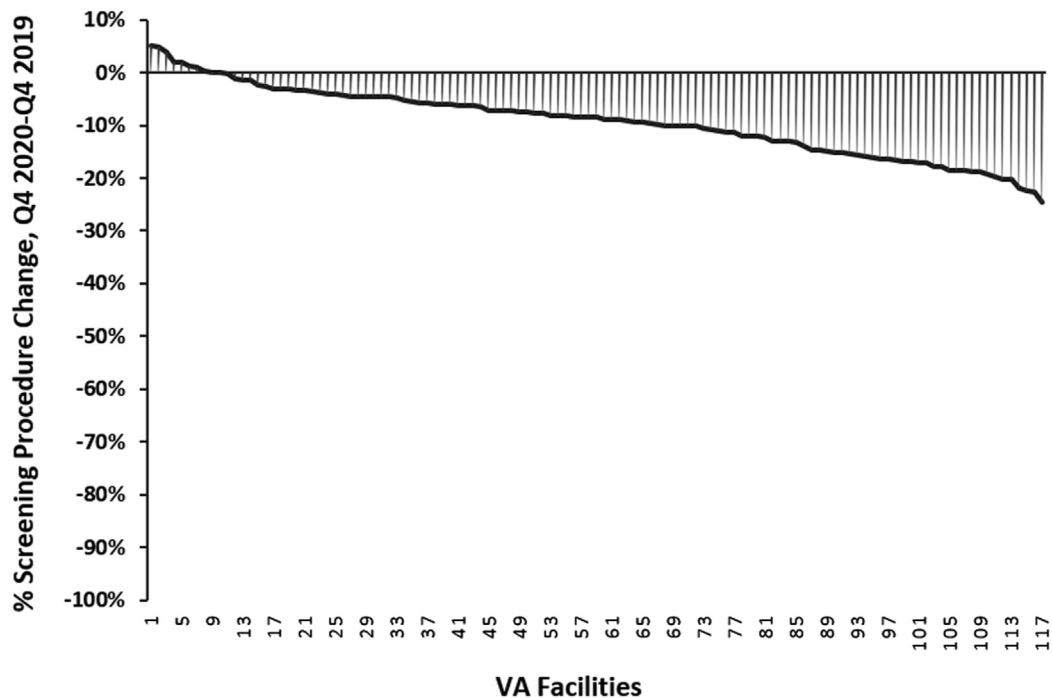


Figure 1. Adjusted change in facility-level proportion of screening colonoscopies pre-COVID (fourth quarter [Q4] 2019) vs COVID (Q4 2020) by facility (highest to lowest).

captured electronically, site-level differences in pre-procedure COVID-19 testing requirements (potentially impacting site willingness to perform and/or patient willingness to undergo colonoscopy) also could contribute to this variation.

The reasons for this modest response are likely multifaceted. First, amid a raging pandemic, it is plausible that some sites simply were unaware of the national directive strongly encouraging systematic adoption of a stool-based screening strategy, perceived more pressing priorities, and/or failed to appreciate the link between reducing screening colonoscopy volume and addressing their acute endoscopy access challenges. This would not be surprising because demand-side interventions are often overlooked in favor of expanding capacity/increasing supply in addressing access challenges. Second, some sites may have lacked pre-existing, robust, collaborative relationships between gastroenterology primary care, and other key stakeholders, which are essential for coordinating a stool-based screening program. Finally, although sites may have had underlying motivation for change, a reflection of the VHA's intense focus on improving specialty care access over time, facility leadership and staff may have lacked the time, resources, and/or implementation tools to facilitate enhanced FIT uptake.

Although extreme pandemic-related care disruptions provided short-term motivation for change at these sites, these data suggest that whatever changes facilities were able to make in response to acute COVID-19-related resource constraints and the national directive were not and will not be sustainable in the long term. Sustainability of this facility-level stool-based screening strategy will require a more systematic approach that leverages principles of

implementation science, requires culture change, and promotes greater stakeholder engagement. Accomplishing such culture change and stakeholder engagement will necessitate multimodal strategies including collaboration with frontline providers and patients at the facility level, measurement of performance, and feedback.⁵

Despite acute COVID-19–related endoscopy access challenges and a related national policy directive, VHA facilities achieved only a modest reduction in the proportion of screening colonoscopies with substantial facility-level variation, suggesting poor system-wide uptake of this colonoscopy-to-FIT strategy. Future work should focus on developing multilevel implementation strategies to provide facilities with effective tools to enhance uptake and sustainability of stool-based CRC screening to reduce colonoscopy demand and improve overall endoscopy access for high-need patients, particularly in integrated healthcare systems and other settings with limited endoscopy access.

Supplementary Material

Note: To access the supplementary material accompanying this article, visit the online version of *Gastroenterology* at www.gastrojournal.org and at <https://doi.org/10.1053/j.gastro.2022.02.034>.

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References

1. US Preventive Services Task Force. *JAMA* 2021; 325:1965–1977.
2. Issaka RB, et al. *JAMA Netw Open* 2021;4: e216454.
3. Fisher DA, et al. *Dig Dis Sci* 2010;55:1721–1725.
4. U.S. Department of Veterans Affairs. <https://www.va.gov/directory/guide/region.asp?ID=1053>. Accessed June 15, 2021.
5. Health Affairs Forefront. <https://www.healthaffairs.org/doi/10.1377/hblog20171117.664355/full/>. Accessed May 12, 2021.

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Conflicts of interest

The authors disclose no conflicts.

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Supplementary Methods

The Veterans Affairs Ann Arbor Institutional Review Board deemed this study exempt from review. This was a retrospective cohort study of veterans undergoing screening colonoscopy from October to December 2019 (“pre-COVID”) and October to December 2020 (“COVID”). Screening colonoscopies were identified using a previously validated algorithm to ascertain screening indication from administrative data.¹ We then calculated the overall and facility-level proportions of all colonoscopies performed for a screening indication during each period and the change in facility-level proportion of screening colonoscopies before and after COVID-19. Predicted facility-level estimates were calculated using shrinkage estimates to adjust for facility procedural volume.

We also examined facility characteristics associated with this change, including VHA facility complexity score (ranging from 1a [highest] to 3 [lowest]), geographic region,² academic affiliation, and capacity (comparing third quarter 2020 procedural volume with third quarter 2019 volume to calculate the proportion of pre-COVID and fourth

quarter 2019 capacity recovered in the fourth quarter of 2020). Procedure-level data were aggregated by facility and time period. We fit a generalized estimating equation negative binomial model with the number of screening colonoscopies as the outcome, total number of colonoscopies as the offset, and geographic region, time period (fourth quarter 2019 and fourth quarter 2020), facility complexity, academic affiliation, capacity, and interactions of time period with facility complexity, academic affiliation, and capacity as predictors. The model assumed that observations from the same facility were correlated with an exchangeable covariance structure. Data analysis was performed using SAS, version 9.4 (SAS Institute Inc, Cary, NC) and STATA 16 (StataCorp, College Station, TX).

References

1. Fisher DA, et al. *Dig Dis Sci* 2010;55:1721–1725.
2. U.S. Department of Veterans Affairs. <https://www.va.gov/directory/guide/region.asp?ID=1053>. Accessed June 15, 2021.

Supplementary Table 1. Characteristics of VHA Facilities Included in the Analysis

Characteristics	Value
Region	
North Atlantic	32 (28)
Continental	20 (17)
Midwest	26 (22)
Pacific	20 (17)
Southeast	18 (16)
Facility complexity	
High	77 (66)
Medium	24 (21)
Low	15 (13)
Academic affiliation	
Yes	112 (97)
No	4 (3)
Capacity, %	
Mean (SD)	51 (21)
Median (interquartile range)	47 (36–63)

Values are n (%) unless otherwise defined.

Supplementary Table 2. Relative Change in Proportion of Screening Colonoscopies in Q4 2020 (as Compared With pre-COVID Baselines, Q4 2019) by Facility Characteristic

	Pre-COVID (Q4 2019) proportion of screening colonoscopy	COVID (Q4 2020) proportion of screening colonoscopy	Relative change
% (95% confidence interval)			
Facility complexity			
High	31 (28–36)	24 (20–28)	–24 (–31 to –17)
Medium	35 (30–40)	26 (21–31)	–26 (–34 to –18)
Low	36 (31–41)	31 (25–38)	–14 (–24 to –2)
Academic affiliation			
Yes	33 (31–35)	24 (22–26)	–28 (–33 to –22)
No	35 (29–43)	30 (24–38)	–15 (–23 to –6)

Only significant interactions are included in the table. Q4, fourth quarter.