

Bowel screening uptake during the Sars-Cov-2 pandemic: Results from a primary care audit in the United Kingdom.

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Keywords

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Abbreviations

BCSP - Bowel Cancer Screening Program

CI - confidence interval

CRC - colorectal cancer

FIT - Faecal Immunochemical Test

gFOBT - guaiac Faecal Occult Blood Test

KPI - key performance indicators

OR - Odds Ratio

UK - United Kingdom

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What this paper adds: This paper demonstrated a good overall uptake of screening in the sampled population despite the COVID-19 pandemic. It also highlighted potential areas of improvement required in the male and 60-69 years old patients' subgroups.

Abstract:

Background: During the COVID-19 pandemic, the United Kingdom paused its bowel screening program for 6 months, a measure estimated to produce a 16% increase of avoidable colorectal cancer deaths. The aim of this audit was to observe the impact of COVID-19 on screening of a sample population in East Kent.

Method: Data from two primary care centres were retrospectively collected. The population sample included patients eligible for screening from

2019 to 2021. The primary outcome was uptake of screening; the secondary outcomes was the relation between gender or age and uptake. National standard of 52% was used as a comparator. Chi-square and univariate analysis were considered significant at p -value <0.05 .

Results: Overall, 6,919 patients were invited for screening of which 5,281 positively responded (76%). In 2019, 2020 and 2021 uptake was 73%, 75%, 80% respectively. In 2021 Screening uptake was significantly higher than 2019 ($p < .00001$). Subgroup analysis showed that women were more likely to engage with screening than men (77% vs 75%, $p.02$) and 60-69 years old patients were less likely to be compliant compared to those >70 years old (75% vs 78%, $p.02$).

Conclusions: This study showed a statistically significant upward trend for bowel screening uptake across 2019, 2020 and 2021. Furthermore, it highlighted that men and younger patients are less likely to engage screening compared to women and ≥ 70 years old patients. In-depth and larger studies may be needed to determine if this positive trend is truly representative of the general population.

Introduction/Background: Bowel cancer, also known as colorectal cancer (CRC) has been reported as the fourth commonest malignancy in the United Kingdom (UK), and the second leading cause of death due to cancer in the country (CRUK, 2018).

Bowel cancer if detected early carries a favourable 5-years survival rate of over 92% compared to only 10% in those cases of late diagnosis (CRUK, 2018). To aid early detection of CRC, Public Health England introduced in 2006 a national bowel screening programme, currently aimed at those individuals, men and women, aged 60 to 74 years old, registered with a General Practice in the UK (PHE, 2021b; NHSE, 2019). In 2019, screening methodology changed from guaiac Faecal Occult Blood Test (gFOBt) to Faecal Immunochemical Test (FIT) as, the latter, has been proven to carry a higher diagnostic accuracy, with higher specificity and sensitivity (NICE, 2017; Whyte *et al.*, 2018). Furthermore, due to an easier testing process for patients, screening uptake was reported consistently higher for FIT based on pilot studies (Whyte *et al.*, 2018; NHSE, 2019).

For bowel screening to be effective, the standards set by Public Health England recommend a minimum acceptable uptake $\geq 52\%$ and an achievable level $\geq 60\%$, where uptake is defined as the number of men and women invited for screening who adequately participate (PHE, 2021a).

Based on reports issued in February 2020 by Cancer Research UK, in the county of Kent (UK), the uptake for bowel screening was 62.3%, well above the set threshold and higher than the England average of 57.7% (CRUK, 2020). This report however was produced using data prior to the Coronavirus disease 19 (Covid-19)

pandemic declared by the World Health Organisation in March 2020 (Tedros, 2020).

In fact, in response to the public health crisis posed by Covid-19, the UK Government announced pausing of bowel cancer screening from March 2020 to August 2020, a measure estimated to lead to a 16% national increase in avoidable CRC deaths up to 5 years after diagnosis (Maringe *et al.*, 2020). With regards to screening the Rapid Cancer Registration Dataset showed a 32% decrease in number of CRC cases diagnosed via screening in England (CRUK, 2021).

The aim of this audit was to observe and evaluate the impact of Covid-19 on bowel screening uptake across two primary care centres in East Kent, a coastal and rural area of the UK.

Methods: A retrospective descriptive half cycle audit was performed using the local electronic database of two primary care centres. Anonymised data was pulled, analysed, and compared independently by two reviewers in form of crude number and percentages. No patient's identifiable information was retrieved and therefore no ethical approval was required according to Caldicott guidance. The population sample was selected among those patients eligible for bowel screening from 1st January 2019 until 31st December 2021.

The primary outcome measure was the uptake of bowel screening. The secondary outcomes were the relation

between gender or age and uptake. National standards key performance indicators (KPI) of 52% were used as a comparator.

Independence analysis was performed using Chi-square methods. Yates correction was used to minimise overestimation. Descriptive analysis and measure of association was performed with Odds Ratio with 95% Confidence Interval. A p -value $\leq .05$ was considered statistically significant.

Results: Overall, the total number of patients invited for screening from 2019 to 2021 were 6,919 across both surgeries. The total number of patients who positively responded was 5,281 (76%). As seen in *Table 1*, in 2019, 2020 and 2021 screening uptake was 73%, 75%, 80% respectively.

	Responders n(%)	Non responders n(%)
2019 (n=2379)	1726 (73)	653 (27)
2020 (n=1558)	1172 (75)	386 (25)
2021 (n=2982)	2383 (80)	599 (20)
Male (n=3325)	2498 (75)	827 (25)
Female (n=3594)	2783 (77)	811 (23)
60-69 (n=4324)	3260 (75)	1064 (25)
≥ 70 (n=2577)	2003 (78)	574 (22)

Table 1: Demographics of population studied

As shown in *Figure 1*, uptake has been consistently higher than minimum acceptable KPI standard of 52% and achievable level of 60% set by Public Health England (2021a). Overall, as shown in *Table 2*, a statistically significant relation between years was observed with increasing trend in number of responders across the period studied (X^2 , $N = 6919 = 41.0347$, $p < .00001$).

Specifically, no statistically significant difference was observed in terms of uptake between 2019 and 2020 ($p = .068$). On the contrary, a statistically significant number of patients were more compliant with screening in 2021 compared to 2019 ($p < .00001$).

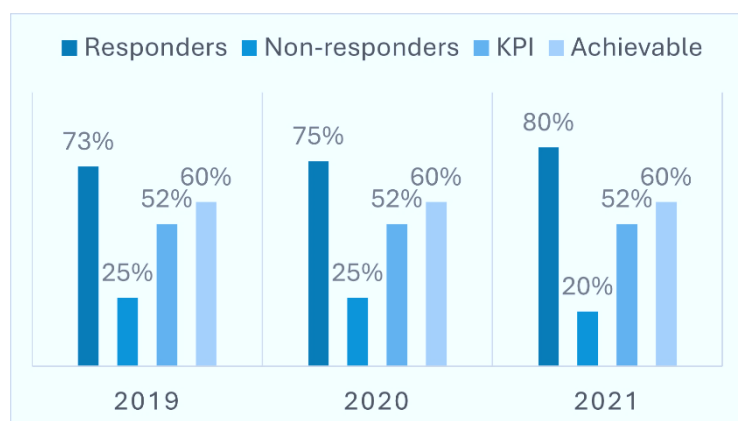


Figure 1: Study uptake percentages compared to Public Health England standard

Demographic analysis based on binary gender allocation, showed a statistically significant difference overall in terms of uptake between men and women, respectively 75% and 77% ($p = .02$).

	2019	2020	2021	
Responders	1726 (1815.80) [4.44]	1172 (1189.16) [0.25]	2383 (2276.04) [5.03]	$p < .00001$
Non-responders	653 (563.20) [14.32]	386 (368.84) [0.80]	599 (705.96) [16.20]	

Table 2 Contingency table for X^2 across the study period

Furthermore, age group analysis showed a statistically significant difference in screening uptake between patients aged 60-69 years old, 75%, compared to patients ≥ 70 years old, 78% ($p = .02$) across the study period.

Based on univariate analysis (*Table 3*), patients were significantly less likely to engage with bowel screening in 2019 compared to 2021 (OR 0.73; 95%CI 0.66-0.80; $p < .0001$); female patients were more likely to be compliant with screening compared to male patients (OR 1.10; 95%CI 1.01-1.10, $p = .024$); and ≥ 70 years old patients were more likely to undertake screening compared to the 60-69 years old patients (OR 1.10; 95%CI 1.01-1.20; $p = .028$).

Discussion: Based on the data obtained from this study, the uptake of bowel screening has been consistently higher than the minimal national standard for the past three years.

	OR	CI	p
2019 vs 2020	0.90	0.80-1.00	.064
2021 vs 2020	1.23	1.10-1.38	.0003
2019 vs 2021	0.73	0.66-0.80	<.0001
Female vs male	1.10	1.01-1.19	.024
≥70 vs 60-69	1.10	1.01-1.20	.028

Table 3: Univariate analysis

Interestingly, the data also show that significantly less patients (35% less) were invited for screening in 2020 compared to 2019. This reflects the UK government policy of stopping screening as a response to the Covid-19 health crisis (Maringe *et al.*, 2020).

In contrast, in the year 2021, the invitations for screening were almost doubled from 2020. This is also in line with the government policy of recovering from the previous year with the aim of reducing the predicted negative effects of stopping the screening programme (CRUK, 2021; Morris *et al.*, 2021).

Reassuringly, majority of eligible patients in the primary care centres are compliant with bowel screening, with increasing numbers every year. The increase in numbers can be attributed to different variables not directly addressed by this study, however, the introduction of the easier FIT kit as opposed to gFOBt may certainly be considered a key aspect contributing to

a higher uptake, as shown by pilot studies (Moss *et al.*, 2017; Whyte *et al.*, 2018).

Another potential aspect to consider which may have positively contributed to increased uptake is the inability to access the General Practice surgeries and Lower Gastrointestinal services at the height of the pandemic (Loveday *et al.*, 2021). A mitigating manoeuvre used to reduce the impact of delayed two-week-wait referrals has been, indeed, the use of triage FIT to streamline access to endoscopy for those true positive cases and reduce the incidence of hospital-acquired Covid-19 (Loveday *et al.*, 2021).

In terms of demographics, even though the data collected showed good results in terms of uptake in both gender and age subgroups, it also demonstrated that those aged 60 to 69 years old and male patients are less likely to be compliant with bowel screening compared to female patients and 70 years or older patients. This is in keeping with findings from a previous systematic reviews and meta-analysis conducted by Clarke *et al.* (2015) where uptake of bowel cancer screening was significantly lower in men compared to women (HR 0.84; 95%CI 0.75–0.95; $p < .01$).

In the literature, potential interventions have been suggested to mitigate subgroup differences and increase uptake (Duffy *et al.*, 2017). As suggested by Benton *et al.* (2017), these may include primary care endorsed 3-months reminder letters in addition to reminders sent by the

regional screening hubs; which has been shown to significantly increase BCSP uptake (aRR 2.18; 95%CI, 1.79-2.66; $p=.001$). Furthermore, according to Hirst *et al.* (2017) the use of text message or automated call systems in primary care following the initial invite has been shown to produce a significant increase in compliance amongst first-time invitees (aOR 1.29; 95%CI 1.04-1.58; $p.02$).

Lastly, health promotion in primary care endorsed phone calls has been shown to produce increased screening compliance amongst men (OR 1.59; 95%CI 1.16-2.18, $p.004$) and women (OR 1.78; 95%CI 1.34–2.37; $p<.001$) in the 61-70 years of age subgroup (Shankleman *et al.*, 2014).

Limitations: The specific contributing variables for uptake in our population were not assessed with this study and can be attributed to many different factors that should be analysed with an in-depth population cohort study. Another limitation of this study was the small population sample relative to a specific socioeconomic area, therefore results cannot be generalized to wider macro areas.

Furthermore, we did not perform adjusted nor multivariate analysis to reduce confounding factors and bias. We believe however that this audit shows some important findings and trends, as it demonstrates a subgroup where potential targeted interventions can be rolled out to increase compliance and could be used as a starting point for further audit and

quality improvement projects within primary care, especially in the centres where the population sample belonged to. Further larger cohort studies are warranted to assess if our findings reflect the general UK population.

Conclusion: The government decision to stop bowel cancer screening in the UK in response to the Covid-19 pandemic, has been projected to significantly impact on diagnosis of CRC in the UK. The aim of this audit was to evaluate the impact of Covid-19 on bowel screening uptake for eligible patients in a rural and coastal area in East Kent. The results of the study showed consistently high level of screening uptake before, during and after the outbreak of Covid-19. The levels obtained are well above the minimum national standards.

Unfortunately, due to significant changes to the bowel screening programme between 2019 and 2020, major temporal confounding bias could not be eliminated to evaluate the significance of the data analysed. The secondary outcomes observed are in line with previously published literature whereby male patients and 60 to 69 years old patients are less likely to be compliant with screening compared to female patients and 70 years old patients and above. To properly evaluate and compare the impact of Covid-19 following the introduction of FIT, we recommend further auditing from 1st January 2021 to 31st December 2023. In conclusion, this paper albeit does not introduce new information and it is unlikely to produce a change in

local practices related to bowel screening, it observes and highlights important local trends that may be ground for further in-depth and larger studies thus to determine ways of targeting those specific subgroup where bowel screening compliance can be improved.

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