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Cancer screening adherence after the COVID-19 pandemic: Global challenges and outcomes

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ABSTRACT

Background/Purpose: The spread of the novel Coronavirus (SARS-CoV-2) has caused major problems for cancer screening services around the world. This has led to delayed diagnoses, more advanced stages of cancer at diagnosis, and an expected increase in cancer deaths. This review looks at how the pandemic has affected cancer screening around the world. It also looks at how people are recovering and what new treatments and policies are being used to get more people screened. **Methods:** A thorough search was done on PubMed, Scopus, and Google Scholar. Also, the keywords included "breast/cervical/colorectal cancer testing" and "COVID-19." The article contains articles published between January 2019 and June 2025. The articles published between 2021 and 2025 were given priority. Thirteen studies met the requirements for inclusion in this review. **Results:** At the start of the pandemic, there were big decreases in cancer screenings. For different cancers and places, reductions of 50-94% were seen. The cuts were especially bad for screenings for cervical and breast cancer. The recovery was uneven. Guidelines were more often followed in high-income countries by 2021-2022, however, low- and middle-income countries (LMICs) continued to face significant challenges until 2023. Disparities in guideline adherence worsened along racial, economic, and geographic lines. After the pandemic, people were more likely to continue following the rules if they were taught new ways to do so or given support through telehealth. **Originality:** The review analyses cancer screening disruptions and recovery (2019-25) in high-, middle- and low-income health systems.

Keywords: cancer screening, COVID-19 pandemic, screening adherence, breast cancer, colorectal cancer, cervical cancer, health disparities, global oncology.

1. INTRODUCTION

Cancer is one of the leading causes of illness and death worldwide. In 2022, it caused an expected 20 million new cases and nearly 10 million deaths. Programs that check for cancer in groups of people are important for public health. These programs can find cancer earlier, when it's easier to treat, and can save lives. These

programs work best when people keep participating. People need to continue using the programmes, and the programmes need to continue running.

At the start of 2020, the global community faced an unprecedented challenge: a worldwide pandemic triggered by the novel coronavirus, since referred to as "covid-19". Lockdown measures, the redirection of health resources towards managing the pandemic, patients' fear of going to hospital, and the temporary suspension of non-essential care all led to a significant decrease in cancer screening worldwide. Studies in many countries found that there were 50–94% fewer tests for breast, cervical, and colorectal cancers in the early part of the pandemic in 2020. Tests about the cervical cancer dropped a lot, by about 90%, and tests for colorectal cancer dropped by around 50% (Walker et al., 2021; Elemen et al., 2023; Villain et al., 2021). The problems from these disruptions were not just logistical. They directly led to cancer being diagnosed later, the disease being more advanced when discovered, and more cancer-related deaths expected over the next decade (Shah et al., 2025; Croswell et al., 2021).

Recovery from the pandemic-related disruption to screening has been different for everyone. Those with digital infrastructure and centralized screening registries, such as high-income countries, started to recover in 2021–22. continued to experience backlogs, with screening rates remaining below pre-pandemic levels well into 2022–2023 (Croswell et al., 2021; Gupta et al., 2025). In poor and middle-income countries, which already had weak and under-resourced cancer screening programs before the pandemic, the disruptions caused by the pandemic were worse and lasted longer. This made the inequalities in cancer outcomes that already existed before the pandemic worse (Basu et al., 2021; Villain et al., 2021; Matthew et al., 2021). People who are in need of screening have a harder time getting it. These people include minorities, people with low income, people without health insurance, and people who live in rural areas.

2. REVIEW METHODS

Four major databases were used to search for information. PubMed, Scopus and Google Scholar. The search was for publications from the start of 2019 to the end of June 2025, with priority given to publications from 2021 to capture evidence from the pandemic and its impact.

The following keywords and combined keyword strings were employed: "cancer screening AND COVID-19 pandemic", "breast cancer screening AND COVID-19", "cervical cancer screening AND COVID-19", "colorectal cancer screening AND COVID-19", "cancer screening adherence AND pandemic", "cancer screening disparities AND COVID-19", "cancer screening recovery AND post-pandemic", "cancer screening low-and-middle-income countries AND COVID-19", "organized screening programs AND COVID disruption", "telehealth AND cancer screening".

Inclusion criteria:

Rates, frequency, and challenges associated with cancer testing
Approaches to improving access to testing
Types of cancer screening (breast, cervical, colorectal)

Exclusion criteria:

Conference reports with incomplete text
Studies focusing solely on cancer treatment
Single-case reports
Studies that do not address the impact of the novel Coronavirus (SARS-CoV-2)
Publications dated 2018 or earlier

Thirteen studies met all necessary standards and are discussed in this review. Figure 1 is the PRISMA diagram of the search process. Figure 1 shows the process of searching for literature and selecting studies for the present review. Records were found in four different databases.

Figure 1 illustrates the PRISMA 2020 flow diagram. This diagram explains how the studies were identified, screened, and included for the present review. We found a total of 578 records in four different databases. After removing 156 duplicate records, 422 unique records remained for title and abstract screening. Of these, 279 records were excluded for being off-topic, published in a language other than English, published before 2019, or lacking screening-related outcome data. The other 143 reports were checked to see if they met

the requirements. Of the 143 reports assessed, 130 were excluded for the following reasons: absence of screening-specific data (n = 54), lack of peer review (n = 15), duplicate publication (n = 15), and incomplete or unextractable data (n = 46). Thirteen studies met all criteria, and were included.

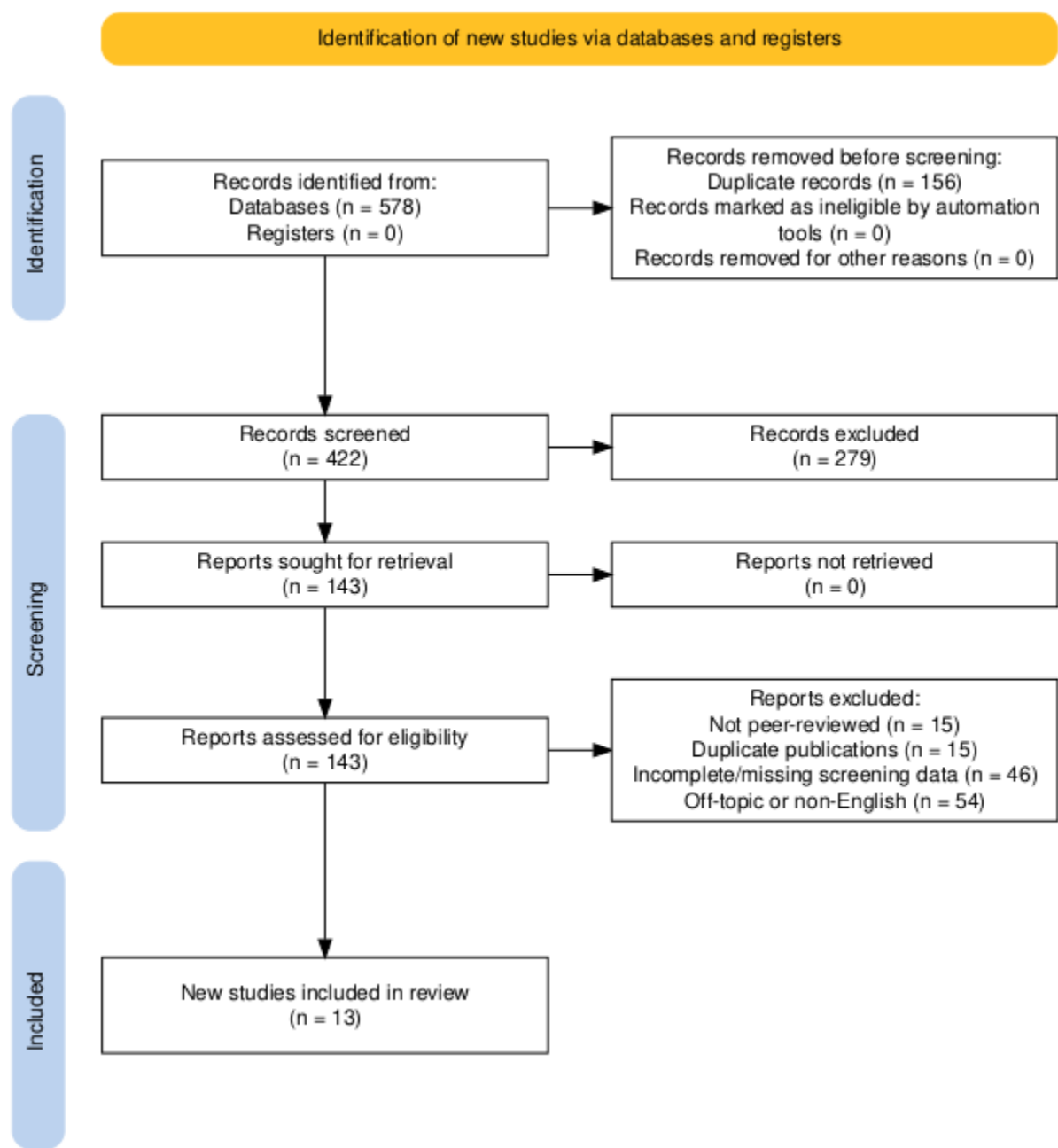


Figure 1. PRISMA 2020 flow diagram

3. RESULTS AND DISCUSSION

The pandemic caused big problems for cancer screening programs all over the world. A global meta-analysis by Shah et al., (2025) summarized data from 43 countries. It estimated that delays and disruptions in all stages of cancer care services increased substantially during the pandemic. Among all the affected domains, screening services were the most severely affected.

Walker et al., (2021) did a study of the whole population in Ontario, Canada. They found that the number of cancer screenings for breast, cervical, and colorectal cancer went down 70–90% during the first months of the pandemic (March–April 2020). The numbers only came back to where they were for a little while at the end of that year. These findings are similar to what was reported by many

healthcare systems in the United States. During the same period, federally qualified healthcare centers saw a 86–94% drop in breast, colorectal, and cervical cancer screenings compared to the three-year average before the pandemic (Croswell et al., 2021; Shah and McElfish, 2022). The economic and healthcare system disruptions also created other problems that made it harder for people to get screened. This included fewer GPs, more use of endoscopy suites and mammography equipment, and fewer labs offering diagnostic testing and follow-up services (Basu et al., 2021; Shah et al., 2025). These issues caused long periods of service interruptions even after the strict lockdown rules had ended (Villain et al., 2021; Matthew et al., 2021), shows this Table 1.

Table 1. Magnitude of COVID-19 pandemic impact on cancer screening volumes by cancer type

Cancer Type	Reduction at Peak Disruption	Primary Contributing Factors	Recovery Timeline
Cervical cancer	~90% [cite:67]	Suspension of gynecological services, patient fear, lockdowns	Partial by 2022; incomplete in LMICs
Breast cancer	~77% [cite:67]	Mammography center closures, elective care suspension	Partial by 2021–2022
Colorectal cancer	~50% [cite:67]	Colonoscopy/endoscopy reallocation, patient hesitancy	Partial recovery by 2022
Lung cancer	~56% [cite:64]	Reduced primary care referrals, CT capacity limitations	Slow; persistent delays

Impact on Low- and Middle-Income Countries

The interruption of cancer screening programs was especially severe in LMICs, where these programs were less well-established, more reliant on external funding, and more susceptible to weaknesses in healthcare systems. Villain et al., (2021) conducted a survey in 40 LMICs as part of the IARC COVIID-19 Impact Study Group. They found that about 50–60% of cancer screening programs in the countries were completely stopped during the early pandemic phase. Another 30% of the programs were much less active. Countries with screening programs for the whole population were somewhat better prepared than those that only did screening when people asked for it. But almost all of them had problems, no matter what kind of program they had.

Basu et al., (2021) explained that LMICs face different challenges in recovering from pandemics. For example, they don't have the same digital tools for remote screening as other countries. They also have smaller workforces that can't handle the extra work from the pandemic. On top of that, they have to focus on other public health issues. Matthew et al., (2021) wrote about the specific problems in managing cancer care in poor countries. They said that problems with the cancer care workforce, equipment, and supply chains got worse because of the pandemic.

Post-Pandemic Recovery: Trajectories and Persistent Gaps

Croswell et al., (2021) explained how the United States recovered from the pandemic in terms of cancer screening. There was an increase in screening numbers at the end of 2020, but this increase was not consistent across different types, regions, and demographics. Colonoscopies showed results more slowly than other tests, namely fecal immunochemical testing (FIT) and multitarget stool DNA testing (mt-sDNA). This is because there are always fewer endoscopes available for use (Gupta et al., 2025; Croswell et al., 2021). Mammography, the cervical cytology recovery was made difficult by a lack of staff, long waitlists for appointments, and stricter rules about disinfecting equipment (Shah and McElfish, 2022; Gabriele et al., 2024). By 2021, an estimated 4.4 million fewer women in the United States received cervical cancer, and 1.1 million fewer received breast cancer screening compared to 2019 levels. That means that the recovery which happened during the first year after the pandemic was not very complete (Croswell et al., 2021; Gabriele et al., 2024).

Gupta et al., (2025) examined how often people in the USA were screened for colorectal cancer from 2018 to 2024. They found that by 2022, the number of screenings had returned to about the same level as before the pandemic. However, some groups of people still did not get screened as often as they should. These groups included people without a regular primary care physician, people with lower incomes, and people of color. These findings are in line with the results of Nwankwo et al., (2022), who showed that Black and Medicaid-insured patients had bigger and longer-lasting decreases in colorectal cancer screening compared to White and privately

insured patients. Importantly, Gupta et al., (2025) found a group of people who had not been screened for colorectal cancer before the pandemic and had not been screened in 2024. These people are at an increased risk of finding out they have late-stage colorectal cancer. Table 2 shows this finding is important because it shows how delays in screening can lead to more serious health problems over time. Studies have shown that delays in diagnosis often mean that the cancer is more advanced when it is found, and patients have a lower chance of survival (Shah et al., 2025; Basu et al., 2021).

Table 2. Post-pandemic cancer screening recovery strategies and their effectiveness

Strategy	Kind of cancer	Evidence	References
Mass media campaigns	Breast, the cervical, colorectal	Moderate; increases short-term uptake	Gabriele et al., (2024)
Patient navigation programs	All types	Strong; reduces disparities	Croswell et al., (2021)
Telehealth screening counseling	Cervical, colorectal	Moderate; increases access in rural areas	Wentzensen et al., (2021)
Stool-based CRC testing (FIT/mt-sDNA)	Colorectal	Strong; lower-barrier alternative to colonoscopy	Gupta et al., (2025)
HPV self-sampling	Cervical	Strong in high-burden settings; emerging in LMICs	Bilalaga et al., (2025)
Educational outreach to minority communities	All types	Strong when culturally tailored	Nwankwo et al., (2022)

Health Disparities in Cancer Screening Adherence

One of the most concerning developments during the pandemic was the decline in cancer surveillance (Nwankwo et al., 2022; Bilalaga et al., 2025). A 2022 study found Black patients, Medicaid recipients and those attending community health centres experienced a much greater and longer-lasting decline in colorectal cancer testing compared to white patients with private insurance. While the pandemic did not stop cancer screenings for everyone, it did make it more difficult for some people to access care (Croswell et al., 2021; Shah et al., 2025; Villain et al., 2021).

Bilalaga et al., (2025) found that not going to cervical cancer screening was much more common among people who have trouble understanding medical information, younger people, and communities where people don't trust the healthcare system. These problems made worse by people avoiding healthcare because of the pandemic. Wentzensen et al., (2021) confirmed that these disruptions widened the gap between people who followed the guidelines and people who didn't. The people who followed the guidelines had more education, lived in cities, and had insurance. This is likely to lead to more cases of cervical cancer in the future. Many people are not motivated to get screened, and the most common reason for not getting screened is the belief that it is "not urgent." This shows that we need to educate patients in need.

Cervical and Breast Cancer Screening: Specific Challenges

Elmes et al., (2023) study of how the pandemic affected screenings for breast and cervical cancer - the review found large, consistent declines in mammography and cervical cytology volumes in the acute pandemic phase (2020), followed by varied recovery. Wentzensen et al., (2021) noted that the pandemic created challenges and opportunities for cervical cancer screening, with the crisis speeding up the uptake of HPV-based self-sampling and telehealth screening pathways. Shah and McElfish found that the rules for medical care during the pandemic were not clear, which caused patients and doctors to be uncertain and led to a continued decrease in following the rules (Shah and McElfish, 2022).

The best and longest-lasting improvements in screening adherence for breast, colorectal, and cervical cancer were achieved through interventions like educational materials, counseling, navigation, and outreach (Gabriele et al., 2024). Interventions using facts and

reassurance worked better than those that only discussed cancer risk. Community-based interventions worked especially well for populations that don't have many resources (Gabriele et al., 2024; Nwankwo et al., 2022). Recovery campaigns need to be adapted to the inequalities caused by the pandemic (Bilalaga et al., 2025; Wentzensen et al., 2021). Digital health tools helped people in the digital age follow their health plans (Shah and McElfish, 2022; Basu et al., 2021; Croswell et al., 2021). Table 3 shows the overview of the studies.

Table 3. Overview of key studies on cancer screening during and after the pandemic

Author (Year)	Type of study	Region	Kind of cancer	Key Finding
Shah et al., (2025)	Systematic review/meta-analysis	Global (43 countries)	All types	Pandemic disruption to screening.
Villain et al., (2021)	Cross-sectional survey	LMICs (40 countries)	Breast, cervical, colorectal	50–60% programs fully suspended; LMICs more severely affected
Walker et al., (2021)	Population-based study	Ontario, Canada	Breast, cervical, colorectal	70–90% volume decline during lockdown; partial recovery 2020
Croswell et al., (2021)	Analysis/review	USA	All types	Recovery was uneven; inequalities widened during the pandemic.
Elmes et al., (2023)	Systematic review	Multi-regional	Breast, cervical	Large declines; recovery varies by strategy.
Gabriele et al., (2024)	Analysis	Italy/Europe	Breast, colorectal, cervical	A multi-component education is key to ensuring adherence.
Gupta et al., (2025)	Longitudinal retrospective	USA	Colorectal	By 2022, volumes had recovered, but minorities still faced challenges.
Nwankwo et al., (2022)	Retrospective cohort	USA	Colorectal	Black, Medicaid patients showed greater and more persistent declines
Bilalaga et al., (2025)	Survey study	USA	Cervical (HPV)	Higher non-adherence in low health literacy and younger groups
Wentzensen et al., (2021)	Review	USA	Cervical	Disparities widened; HPV self-sampling as recovery opportunity
Basu et al., (2021)	Review	Global	All types	LMICs face structural barriers to screening recovery
Shah & McElfish (2022)	Scoping review	USA	All types	Guideline heterogeneity contributed to patient/provider uncertainty

Matthew et al., (2021)	Review	Global South	All types	Pre-existing deficits worsened; cancer registry gaps hinder recovery
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4. CONCLUSION

The pandemic caused the biggest disruption to cancer screening services in recent history, and screening volumes fell by 50–94% at the height of the disruption. This has led to undiagnosed cancers, backlogged services, and widened health disparities that continue to challenge health systems into 2025. The evidence shows that this impact was not the same for everyone. People in low- and middle-income countries, racial and ethnic minority communities, people without insurance, and people who have limited health literacy experienced more disruption and slower recovery.

In high-income countries, screening services have been partially and unevenly restored, leaving the most vulnerable populations facing ongoing challenges. In low- and middle-income countries (LMICs), recovery is not complete across different screening tools, and the long-term effects on cancer cases and deaths are expected to continue for many years. At the beginning of the pandemic, it became clear that cancer screening programs had problems. The pandemic also showed ways to make these programs stronger. For example, more people were able to get HPV tests, and more people were able to get stool tests for colorectal cancer. These tests were easier to access. The pandemic also showed that digital tools can help patients remember to get screened.

The field will focus on: (1) Screening those most affected by the pandemic; (2) Educating the public about health issues. These programmes should be tailored to the needs of those who need them most. (3) Improve systems for counting cancer cases in low- and middle-income countries (LMICs), so we can determine how many people have not been screened. (4) Create robust screening programmes that can be implemented during future public health crises. (5) Carefully study ways to help people recover from the effects of the pandemic. We should use data to ensure that our efforts reduce disparities rather than exacerbate them.

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Conflict of interest

The authors declare that they have no conflicts of interest, competing financial interest or personal relationship that could have influenced the work reported in this paper.

Data and materials availability

All data associated with this study will be available based on the reasonable request to the corresponding author.

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