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Cancer screening in the U.S. through the COVID-19 pandemic, recovery, and beyond

Jennifer M. Croswell[a,*], **Douglas A. Corley**[b], **Jennifer Elston Lafata**[c], **Jennifer S. Haas**[d], **John M. Inadomi**[e], **Aruna Kamineni**[f], **Debra P. Ritzwoller**[g], **Anil Vachani**[h], **Yingye Zheng**[i]
National Cancer Institute Population-based Research to Optimize the Screening Process (PROSPR) II Consortium

[a]Division of Cancer Control and Population Sciences, National Cancer Institute, USA

[b]The Permanente Medical Group, Kaiser Permanente, Northern California, USA

[c]University of North Carolina Lineberger Comprehensive Cancer Center and Eshelman School of Pharmacy, USA

[d]Division of General Internal Medicine, Massachusetts General Hospital, USA

[e]Department of Internal Medicine, University of Utah School of Medicine, USA

[f]Kaiser Permanente Washington Health Research Institute, USA

[g]Institute for Health Research, Kaiser Permanente Colorado, USA

[h]Department of Medicine, Perelman School of Medicine at the University of Pennsylvania, USA

[i]Public Health Sciences Division, Fred Hutchinson Cancer Research Center, USA

Abstract

COVID-19 has proved enormously disruptive to the provision of cancer screening, which does not just represent an initial test but an entire process, including risk detection, diagnostic follow-up, and treatment. Successful delivery of services at all points in the process has been negatively affected by the pandemic. There is a void in empirical high-quality evidence to support a specific strategy for administering cancer screening during a pandemic and its resolution phase, but several pragmatic considerations can help guide prioritization efforts. Targeting guideline-eligible people who have never been screened, or those who are significantly out of date with screening, has the potential to maximize benefits now and into the future. Disruptions to care due to the pandemic could represent an unparalleled opportunity to reassess early detection programs towards an explicit, thoughtful, and just prioritization of populations historically experiencing cancer disparities. By focusing screening services on populations that have the most to gain, and by careful and deliberate planning for the period following the pandemic, we can positively affect cancer outcomes for all.

[*]Corresponding author at: Healthcare Assessment Research Branch, Healthcare Delivery Research Program Division of Cancer Control and Population Sciences, National Cancer Institute, USA. croswellj@nih.gov (J.M. Croswell).

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1. Introduction

As the number of U.S. COVID-19 cases rapidly increased in early 2020, many healthcare systems responded to concerns over SARS-CoV-2 infection risks, hospital bed capacity, and personal protective equipment supply by pausing non-emergent care. Medical societies recommended deferment of cancer screening and even diagnostic evaluation of abnormal screens, in some situations (Colorectal Cancer Alliance, 2020; ASCCP, 2020; Mazzone et al., 2020). Accordingly, cancer screenings plummeted; one study of 11 million people found that the monthly proportion of age-eligible persons screened for breast, lung, cervical, or colorectal cancer dropped 62–96% in April-May of 2020 compared to April-September 2019, depending on cancer site (Corley, 2020). Over the remainder of 2020, screening rates began to creep back as non-emergent care resumed, but most healthcare systems did not return to previous levels of screening and related services (Mast and del Rio, 2020; Patt et al., 2020; Van Haren, 2020), likely due to a heterogeneous mix of COVID-19 case surges, resulting or continuing capacity constraints, and patient reluctance to seek out medical care due to perceived or real infection risk (Patt et al., 2020; Cancino et al., 2020; Bakouny, 2021).

Cancer screening is more than the receipt of an isolated test. It encompasses an entire process, including risk assessment, detection, diagnosis, treatment, and follow-up (i.e., surveillance) to realize improved health outcomes (Beaber et al., 2015). Optimal screening balances potential harms and benefits along that *full continuum* for each person. The COVID-19 pandemic negatively affected this balance, but delays in screening, follow-up, and treatment may bring their own potential harms related to longer-term cancer outcomes (Sharpless, 2020).

Little evidence-based guidance exists to optimize the cancer screening process during a pandemic, as well as during its recovery phase (i.e., via mass vaccination). The population-level goal of cancer screening is to identify those at sufficiently high risk of an adverse cancer outcome to balance the risks of intervening. During the COVID-19 pandemic recovery phase, there is the additional consideration of how best to prioritize limited but improving access to care along the screening continuum in a population that experienced protracted service disruptions. Even before the COVID-19 pandemic, the worried well were sometimes overscreened (Moss et al., 2020) while access was insufficient for those at greater absolute risk (Carey et al., 2020). The systemic pandemic-induced delays in screening, diagnostic evaluation and surveillance, and treatment, along with greater capacity constraints, have created a population backlog for these services. Given a current lack of scientific evidence and prior practical experience, a pragmatic approach to weighing individual risks and benefits, using transparent criteria for prioritization, is likely the best present option to achieve safe, effective, efficient, and equitable cancer screening care during the ongoing pandemic and vaccination period.

2. Key considerations

2.1. Focus on sub-populations most likely to benefit within established clinical practice guidelines

Through ongoing disruptions to and resulting reductions in capacity for health care services, the pandemic fosters new, but not uniform, risks of poor outcomes across the cancer screening process that deserve careful consideration as we seek to optimize screening during this time.

2.2. Prioritize groups in need of diagnostic and treatment services

It is critical to first ensure that any backlog of diagnostic evaluations or surveillance for previously positive screening tests and deferred treatments for cancer diagnoses are addressed. Individuals that have been waiting for diagnostic and treatment services are likely at higher and more imminent risk for poor cancer outcomes than the broader screen-eligible population experiencing screening delays.

2.3. Prioritize screening for underserved groups

Capacity constraints for screening services will likely persist during the vaccine rollout period. As a logical next step in a supply-constrained environment, deliberately prioritizing guideline-eligible populations who have never been screened and increasing efforts to decrease screening barriers for these groups have high potential to optimize the population-level net benefit of screening. The time following systemic disruptions to health care access and delivery is opportune to thoughtfully reconsider how to increase access to preventive care to underserved groups. There is evidence that groups hit hardest by the pandemic in the United States are those who already face worse cancer outcomes, primarily due to historical structural inequities that reduce their access to health care (Thronson et al., 2020; Balogun et al., 2020; Curtice and Choo, 2020). Blacks, Latinos, Native American communities (and especially members of the Navajo Nation), those employed in minimum-wage settings and lacking insurance, among other groups, have been disproportionally affected by COVID-19—both infection rates and associated deaths have been substantially higher for these populations, compared to whites, throughout the pandemic (Chen and Krieger, 2021; Bassett et al., 2020). A serious risk of not re-defining our approach to cancer screening as healthcare systems move back towards usual capacity, and providing these services based primarily on who independently and actively seeks them (i.e., a passive approach to reimplementation), is that we are likely to further intensify cancer disparities.

2.4. Prioritize groups who are very overdue for screening

Beyond prioritizing underserved populations who have experienced barriers to screening uptake, it is also worth targeting individuals who have prior screening histories but are significantly out-of-date. Although there have been multiple public entreaties for preventive care activities to resume by clinicians citing their concerns that COVID-19-related screening delays will lead to a “tsunami” of later-stage cancer diagnoses (Hogan and Glanz, 2020; Carrington, 2020), it is worth considering that modest delays for individuals adherent to an ongoing program of screening may not ultimately be that impactful. Modeling studies

(Sharpless, 2020; Maringe et al., 2020) as well as studies tracking expected versus observed cancer cases (Dinmohamed et al., 2020; Park et al., 2020) suggest there is a significant reservoir of undiagnosed cancers due to the pandemic-related screening drop; however, the most salient question is whether and which diagnostic delays will ultimately make a substantive difference in terms of cancer outcomes (e.g., treatment-related morbidity, quality of life, and cancer deaths).

Randomized trial data to define optimal screening intervals are generally not available and, due to variable interpretation of or reliance on existing observational evidence or modeling studies, there is often not consensus as to the most effective screening frequency. For example, biennial breast cancer screening has been recommended in some U.S. clinical practice guidelines (Siu and USPSTF, 2016; Qaseem et al., 2019) (although not others) and an interval of 2–3 years is generally accepted as standard in European national screening programs (European Commission, 2020; National Health Service UK, 2018). In the case of cervical cancer screening, guidelines have recommended lengthening screening intervals (by different amounts depending on test chosen), noting based on large cohort studies that the risk of cervical intraepithelial neoplasia (CIN) 3 or cervical cancer in females with a negative prior human papillomavirus (HPV) test remains extremely low for at least 5 years (Katki et al., 2011; Fontham et al., 2020; U.S. Preventive Services Task Force, 2018). Where uncertainty exists as to potential small incremental benefits to be gained from more frequent screening, during a time of limited capacity, prioritize those who are overdue, rather than coming due, and use the longest recommended rescreening interval to define overdue. This optimizes possible gains.

As greater proportions of the population are vaccinated, the attendant potential risks related to COVID-19 will decrease, and, over time, healthcare capacity issues will decline. At this point, decisions regarding additional groups to prioritize for cancer screening become more nuanced but should continue to prioritize those who are at greatest risk for cancer from the perspective of both etiology and structural inequity.

An important challenge to implementing an approach where these populations are consciously prioritized for cancer screening services is that reliable information about a patient's prior screening history may not always be available in current registries or electronic health records, depending on the healthcare setting.

2.5. Re-define populations most likely to experience harm

Even within guideline-eligible parameters, population-based screening subjects many individuals to an intervention with no possible benefit, as the majority do not have cancer (or pre-cancerous lesions) at the time of screening. Cancer screening attempts to balance a low but very impactful probability of benefit in any given individual with the more frequent but variably serious risks of adverse consequences that accompany screening, resulting diagnostic evaluation, surveillance, and treatment. The COVID-19 pandemic affects this balance in important ways; it increases the overall likelihood of experiencing a harm because of the attendant risk of SARS-CoV-2 infection associated with in-person care.

Carefully consider existing medical co-morbidities associated with adverse outcomes from COVID-19. The Centers for Disease Control and Prevention (CDC) has created two elevated risk categories for individuals with certain underlying medical conditions: those where evidence most clearly supports an increased risk of severe illness associated with SARS-CoV-2 infection, and those where evidence is less certain but suggests concern for the potential for increased risk of severe illness (Centers for Disease Control and Prevention, 2020a). Table 1 provides a list of the relevant conditions associated with each risk category. Individuals with multiple chronic conditions may be at even higher risk of adverse outcomes after SARS-CoV-2 infection, although research that considers more than a single condition approach is needed (Tisminetzky, 2020).

As an example, many individuals eligible for lung cancer screening also have chronic obstructive pulmonary disease; all have a heavy smoking history. Both are also risk factors for complications due to COVID-19 that might easily overwhelm any potential benefit of screening (Leung et al., 2020; Polverino, 2020). For patients with known lung pathology or at high risk for pulmonary dysfunction due to infection, a rational approach is outreach and/or assistance to ensure these individuals have been or become fully vaccinated, and pursue or resume lung cancer screening at that point. An alternate approach for those not willing or able to be vaccinated, while awaiting herd immunity, might be an emphasis on smoking cessation interventions (still the best means of reducing lung cancer mortality) instead of lung cancer screening; virtual visits are well-suited to the delivery of behavioral or pharmacological cessation support.

Even as subgroups of the overall population receive vaccination, consider whether the mitigation of the infection risk is enough to result in screening producing a net benefit for an individual. Ensure that populations being prioritized during increasing screening reimplementation are comprised of subgroups within established guideline eligibility criteria who are likely to experience the greatest absolute magnitude of benefit from intervening. For example, screening is clearly effective in reducing colorectal cancer incidence and mortality and has received an “A” rating (i.e., high certainty of substantial net benefit) by the U.S. Preventive Services Task Force (USPSTF) for adults up to 75 years. However, between the ages of 76 and 85, the USPSTF has concluded that the net benefit is small and does not recommend screening in individuals over 85 years (U.S. Preventive Services Task Force, 2016). These older adults may have their SARS-CoV-2 infection risk mitigated early in the vaccination timeline, and yet, given diminishing probabilities of net benefit (due to decreasing life expectancy to realize benefit and increasing likelihood of diagnostic- and treatment-related complications), would largely not be populations to prioritize as screening capacity ramps back up.

2.6. Tailor risk-benefit assessments to overall SARS-CoV-2 risks in the local environment

SARS-CoV-2 incidence rates and COVID-related hospitalizations and deaths vary substantially across the U.S., as does vaccination prevalence; each of these contribute to the estimation of the overall pandemic-related risk accompanying the provision of cancer screening in individual communities. There is little directly applicable evidence to guide clinicians in individualizing patient risk assessments in the context of this pandemic, and the

lack of knowledge places a significant burden on health systems to balance these choices together with staffing demands for testing, caring for, and vaccinating for SARS-CoV-2. That said, a community with a 14-day average of 300 cases per 100,000 people should necessarily weight the overall potential harms of screening differently than an area with <5 per 100,000, as should a setting where a preponderance of the eligible population has been vaccinated, versus minimal uptake. National-, state-, and county-level data on these indicators, as well as more basic vaccination administration statistics, can be found, when data are available, at the CDC website and the Johns Hopkins Coronavirus Resource Center, among other places (John Hopkins University, Coronavirus Resource Center, 2020; Centers for Disease Control and Prevention, 2020b).

The CDC has released a framework for the provision of non-COVID-19 health care during the pandemic (Centers for Disease Control and Prevention, 2020c). This framework emphasizes balancing the potential for patient harm caused by deferral of a service versus the degree of SARS-CoV-2 community transmission present at that time. The CDC suggests 3 categories or levels of potential harm to consider within the context of 3 levels of community transmission (see Table 2). One shortcoming of this framework is that it does not objectively define “substantial,” “minimal to moderate,” and “no to minimal” community transmission based on available indicators. Given that there are no specific evidence-based recommendations to gauge SARS-CoV-2 transmission risks associated with the increasing provision of non-emergent, in-person healthcare services, it may be reasonable to consider using core indictor thresholds suggested by the CDC for school openings (Centers for Disease Control and Prevention, 2020d) (i.e., number of new cases per 100,000 persons within the prior 14 days and percentage of RT-PCR tests positive during that same time period) as a means of obtaining a rough sense of the overall SARS-CoV-2 transmission risk in the community (see Table 3), to better define the transmission thresholds to consider for non-COVID-related care.

A pragmatic approach could be to focus on the core indicators and pause cancer screenings during periods of highest risk (i.e., >200 new cases per 100,000 persons and test positivity >10%, both in the past 14 days), which would align with the CDC care framework cell that intersects “substantial community transmission” and “deferral of in-person care unlikely to result in patient harm.” (Note that diagnostic or treatment interventions in the cancer screening process would not fall into the CDC’s “unlikely potential for harm with deferral” category, and these individuals would benefit from follow-up care as soon as possible.) During periods of lowest risk (i.e., up to 20 new cases per 100,000 persons and test positivity <5% over 14 days), which would align with the CDC care framework cells of “no to minimal community transmission” and “deferral of care unlikely to result in patient harm,” cancer screenings, based on subgroup prioritizations previously discussed, could be resumed to the maximum extent available (with mitigation measures in place). Intermediate transmission risk levels (“minimal to moderate community transmission” on the CDC care framework) could be a marker for the need to individually assess whether patients with comorbid conditions placing them at elevated risk for adverse COVID-19-related outcomes (see Table 1) should be targeted or deferred from screening during those periods.

The above suggestions are, as previously noted, not firmly evidence-based and require the use of information from another setting with limited applicability. Studies that could better define healthcare clinic-based disease transmission probabilities under different levels of community spread would be useful in preparing for the next pandemic. Modeling studies could also contribute to a more granular understanding of the potential trade-offs between variable individual risks associated with COVID-19 in conjunction with medical conditions and the probability of benefiting from cancer screening.

2.7. When possible, use screening modalities that do not require an in-person visit

For example, colonoscopy must be performed in clinic, requires a patient chaperone, and has a small potential for bleeding or perforation that may require hospital admission; all of which increase SARS-CoV-2 exposure risk for patients and clinicians. At-home fecal immunochemical testing can provide an exposure-free alternative and has the potential to expand screening capacity during a time of reduced endoscopic capacity. However, it is not helpful to remotely screen for colorectal cancer if diagnostic follow-up (i.e., colonoscopy) will not be readily available or would result in a high-risk patient incurring a serious COVID-19-related outcome intended to be avoided by at-home screening. Adapting pre-screening counseling and educational activities that are needed prior to facility-based testing for provision virtually is another way to reduce SARS-CoV-2 exposure risk. This may be particularly feasible in the context of lung cancer screening where a shared decision-making counseling visit is required for Medicare reimbursement. A pre-screening televisit may also be helpful to identify individuals either at very high risk of a poor outcome in the absence of screening (e.g., guideline-eligible populations who have never been screened, those with prior abnormal or high-risk findings, and those very overdue for routine screening) or at lower risk of an adverse outcome due to a deferment (e.g., those who previously participated in a regular program of screening).

2.8. Where in-person visits cannot be avoided, continue aggressive virus mitigation measures, even during vaccine rollout

The American Medical Association, based on guidance from the CDC, created a checklist to assist healthcare settings with these efforts (American Medical Association, 2020). Mitigation measures include modified/reduced office schedules to reduce total volume and density of individuals inside at one time; limiting patient companions; requiring masks and social distancing (including rearranging furniture and staff workflow to accommodate greater spacing); designating separate “sick” and “well” patient areas; remote screening questionnaires for patients visiting the clinic; teletriage to verify the need for in-person visits; and SARS-CoV-2 testing for staff at regular intervals, as well as for patients prior to visits if resources permit. Additional mitigation measures suggested more broadly by the CDC include increasing ventilation through opening doors and windows as able; creating cohorts of healthcare teams to minimize personnel mixing; and use of physical barriers (plexiglass guards and partitions) to limit contact. As mass vaccination programs ramp up, these mitigation measures should continue, given the currently unclear role vaccinated individuals, if subsequently infected, may still play in transmission of the SARS-CoV-2 virus. These mitigation efforts will likely have an ongoing impact on capacity for cancer screenings. Given limited capacity, it is also important to be mindful that visits for active

health concerns should not be inadvertently delayed because of trying to expand preventive care services.

2.9. Leverage in-person problem-focused visits

To provide cancer screening—where the patient's potential SARS-CoV-2 exposure risk is balanced by other health-related benefits. For example, a 40-year-old female visiting their gynecologist for new onset pelvic pain may additionally benefit from the provision of cervical cancer screening during the same visit if due or imminently coming due. A virtual discussion (by a nurse or other support staff) in advance of an in-person visit would allow for time to inventory the individual's preventive healthcare needs, and to communicate with them how to maximize the benefit that could be obtained from their visit. This would allow the patient and provider to prepare for optimal acute and preventive care services during their time together. This strategy may be a useful approach to maintaining a limited amount of cancer screening during periods when higher risk thresholds of SARS-CoV-2 transmission have been reached in the community.

2.10. Harness opportunities created by the pandemic as well as mass vaccination campaigns to introduce innovative means of delivering cancer prevention

The pandemic presents a critical chance to implement new or underutilized methods that may circumvent some of the traditional structural inequities that reduce access to cancer screening. Many existing barriers to cancer screening among socioeconomically disadvantaged populations (e.g., time off work limitations, transportation concerns) have likely been further exacerbated by the pandemic. The approval and implementation of home human papillomavirus testing could expand use, especially among underserved populations (Kobetz et al., 2018; Winer et al., 2019).

Where virtual modalities cannot accommodate screening methods, mobile imaging units for mammography or lung cancer screening may provide more accessible settings and help with the successful prioritization of disadvantaged populations for preventive care activities (Spak, 2020).

Critically, community SARS-CoV-2 immunization campaigns could serve as an effective means to successfully reconnect underserved individuals back into healthcare systems for cancer prevention efforts. During the recommended 15-min observation period vaccinated individuals wait at the vaccination site (to monitor for possible post-injection reactions), professional or community/lay healthcare workers could be enlisted to assess patient eligibility for cancer screening services and past use of such services and provide relevant educational materials and appointments for future virtual or in-person follow-up for cancer prevention services, where indicated.

2.11. Clearly communicate potential SARS-CoV-2 exposure risks and how they are being mitigated to patients

COVID-19 has understandably produced pronounced anxiety and fear for many. The uncertainty inherently associated with the pandemic has been stressful, not only due to what is not known about the virus, but due to the resulting feeling of a loss of control

over one's life associated with the consequences of (necessary) public health interventions to contain its spread. Further, COVID-19 is occurring in an age of social media, where misinformation and myths can proliferate rapidly and where the general public may have difficulty knowing what constitutes trustworthy sources and reliable guidance (Zarocostas, 2020). If people (correctly or otherwise) believe that COVID-19-related risks are greater than the benefits of completing cancer screening, they will not prioritize screening. The most recent ASCO National Cancer Opinion Survey found two-thirds of individuals who reported delaying or cancelling a cancer screening test during 2020 did so by their own personal choice (decisions which may have been rational depending on personal circumstances and the prevalence of SARS-CoV-2 in their communities at the time) (Slater, 2020).

Effective communication during the COVID-19 pandemic and through the vaccination period is critical to support positive and informed choices by patients related to their preventive care. This is an especially important point when considering the overall approach of prioritizing underserved populations as the first step in resuming and expanding screening capacity and activities. Health entities will need to partner with these groups in order to understand their needs and develop messaging that will best engage and inform them about cancer screening efforts during and after the pandemic. The National Institutes of Health Office of Behavioral and Social Sciences Research convened a panel of experts in health communication to discuss strategies around COVID-19 vaccination; several other researchers have specifically published on what would be effective health communication practices during the pandemic (Finset et al., 2020; Porat et al., 2020; Igoe, 2020; Chou et al., 2020). Many of these communication principles are relevant for discussions around cancer screening during this period. Table 4 provides a list of strategies for clinicians to help patients better assess and understand their own personal COVID-19 risks balanced against potential individual benefits of cancer screening.

3. Relevant resources

In addition to the information by the Centers for Disease Control and Prevention and the American Medical Association already presented, several advocacy organizations and professional societies have also provided their own guidance related to cancer screening during the pandemic. Select examples include:

- American Cancer Society: Cancer Screening During the COVID-19 Pandemic (American Cancer Society, 2020)
- American College of Surgeons Commission on Cancer, American Cancer Society, and National Comprehensive Cancer Network: Resuming Cancer Screening and Care during COVID-19 (American College of Surgeons Commission on Cancer, American Cancer Society, and National Comprehensive Cancer Network, 2021)
- American Society of Clinical Oncology: Cancer Screening, Diagnosis, Staging & Surveillance (American Society for Clinical Oncology, 2021)

- International Agency for Research on Cancer: Cancer Screening in the Coronavirus Pandemic Era: Adjusting to a New Situation (World Health Organization, 2021)

4. Conclusion

COVID-19 has proved disruptive to the provision of the cancer screening process. Although the rapid development of highly efficacious vaccines was a tremendous scientific achievement, the slow, uneven rollout of vaccination campaigns beginning in December 2020 made apparent that necessary considerations regarding rational, prioritized provision of non-urgent care, including cancer screening, would need to continue for some time. Successful delivery of services at all points in the cancer screening process has been negatively affected by COVID-19. The void in empirical evidence to support a specific strategy for administering cancer screening during the pandemic, as well as during its recovery period, poses challenges for patients, practitioners, and healthcare systems.

To help mitigate the situation, we highlight several pragmatic principles that can help guide how best to prioritize cancer screening delivery during an ongoing period of constraints and disturbances to usual care processes. Prioritizing guideline-eligible people who have never received the cancer screening test of interest, or those who may have been screened previously, but are significantly out of date, has the potential to maximize the potential benefits of our efforts now and into the future and begin to reduce cancer disparities (American Cancer Society Network, 2018). Other principles highlight the need to explicitly consider the risks of offering screening to individuals with comorbidities that put them at increased probability of a poor outcome from a COVID-19 diagnosis; a rough but practical approach to gauging local community risks of SARS-CoV-2 and putting those in context with individual patient needs; offering specific ideas for how to mitigate infection risks either through virtual services or novel ways to link people to the inclinic setting; and suggestions for clear and effective communications about balancing the benefits of cancer screening with an individual’s fears and objective risks of infection.

Importantly, the disruptions to care stemming from the pandemic could represent an unparalleled opportunity to systematically reassess early detection and prevention programs, towards an explicit, thoughtful, and just prioritization of populations historically experiencing cancer disparities. In the process, we could better adjust away from overscreening of low-risk populations or those that might experience net harm from the intervention (for example, by deliberately putting soft stops for clinicians into an electronic health record when, compared with guideline recommendations, an attempt is made to order a screening test too frequently or outside of the age range).

Making such a change to the system will not be easy. As the USPSTF notes in their 2021 commentary on addressing systemic racism, there are a “pervasive set of societal and interpersonal practices within and outside health care that foster discriminatory practices to create systematic disadvantage and health inequities….Even when deemed unintentional, well-documented structural inequities are evident within the healthcare ecosystem that span the entire prevention-to-treatment continuum” (Doubeni et al., 2021). Periods of

disruption create the potential to deliberately reflect on and change previously entrenched processes and practices. Unfortunately, we have not seen this play out in another dimension of preventive care in 2021; namely, SARS-CoV-2 mass vaccination efforts in the U.S. Despite national recommendations for a risk-tiered approach to prioritizing populations, at the beginning of the recovery period, some healthcare systems and individual providers entrusted with rollout chose to use scarce vaccine allotments to bring to the front of the line staff able to work entirely remotely, to Board members and donors to hospitals and academic centers, and to spouses and friends (Rosenthal, 2021). In Dallas, local leaders attempted to prioritize communities of color in the most vulnerable ZIP codes, where COVID-19 had hit particularly hard, but were threatened with reduced vaccine allocation by the state unless other areas of the city were included as well (Platoff and Garnham, 2021). Most states are not accurately tracking coronavirus vaccinations by race/ethnicity (if at all) (Krieger et al., 2021); early available data indicates that vaccination patterns by race and ethnicity are inverted to delivery to provide the greatest benefit. For example, in Mississippi in January 2021, Blacks accounted for about 42% of COVID-19 deaths but represented only 15% of those vaccinated. In the same state and time, Whites accounted for 54% of COVID-19 deaths but made up 71% of the vaccinated population (Ndugga et al., 2021).

We can stop perpetuating similar systemic inequities as we provide and expand care delivery along the cancer screening process during the time of pandemic recovery. By focusing screening services on populations that have the most to gain in cancer outcomes during a time when care processes are continuing to experience disruptions, and by careful and explicit planning for the period immediately following the pandemic, we have the unique ability to reduce historical disparities and positively affect cancer outcomes for all.

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Table 1

Underlying medical conditions potentially or definitely associated with an increased risk of severe illness from SARS-CoV-2.[a]

Evidence demonstrates increased risk	Evidence suggests/is concerning for increased risk
Cancer	Moderate-to-severe asthma
Chronic kidney disease	Cerebrovascular disease
Chronic obstructive pulmonary disease	Hypertension
Down syndrome	Immunocompromise from bone marrow transplant, immune deficiencies, HIV, corticosteroid or other Immunomodulator use
Heart conditions (e.g., heart failure, coronary artery disease, cardiomyopathies)	Neurologic conditions such as dementia
Immunocompromise from solid organ transplant	Liver disease
Obesity (BMI >30)	Overweight (BMI >25 but <30 kg/m2)
Pregnancy	Pulmonary fibrosis
Sickle cell disease	Thalassemia
Current smoker	Type I diabetes mellitus
Type II diabetes mellitus	

[a]From the CDC. COVID-19: People with certain medical conditions. 2020 [cited 2020 December 17]; Available from: https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html.

Table 2

CDC framework for provision of non-COVID-19 health care during the COVID-19 pandemic.

Potential for patient harm with care deferral	No to minimal community transmission	Minimal to moderate community transmission	Substantial community transmission
Highly likely	Provide care without delay while resuming regular care practices.	Provide care without delay; consider if your facility can provide the patient's care, rather than transferring them to a facility less affected by COVID-19.	Provide care without delay; consider if feasible to shift care to facilities less heavily affected by COVID-19.
Less likely	Resume regular care practices while continuing to utilize telehealth if appropriate.	If care cannot be delivered remotely, work towards expanding in-person care to all patients in this category. Utilize telehealth if appropriate.	If care cannot be delivered remotely, arrange for in-person care as soon as feasible with priority for at-risk[a] populations. Utilize telehealth if appropriate.
Unlikely	Resume regular care practices while continuing to utilize telehealth if appropriate.	If care cannot be delivered remotely, work towards expanding in-person care as needed with priority for at- risk[a] populations and those whose care, if continually deferred, would more likely result in patient harm. Utilize telehealth if appropriate.	If care cannot be delivered remotely, consider deferring until community transmission decreases. Utilize telehealth if appropriate.

[a]Those with serious underlying health conditions, those most at-risk for complications from delayed care, and those without access to telehealth services.

Table 3

CDC core indicators and thresholds for risk of introduction and transmission of COVID-19.[a]

Core indicators	Lowest risk	Lower risk	Moderate risk	Higher risk	Highest risk
Number of new cases per 100,000 persons within the last 14 days	<5	5 to <20	20 to <50	50 to ≤200	>200
Percentage of RT-PCR tests that are positive during the last 14 days	<3%	3 to <5%	5 to <8%	8 to ≤10%	>10%

[a]Note that this table was originally developed by the CDC to apply to school settings.

Table 4

Communication considerations for preventive care during COVID-19.

1.	Use accurate, truthful, and transparent messages:
	• Communicate uncertainty clearly and openly
	• Don’t exaggerate, and do not over- or under-reassure individuals
	• Lay out risks and potential consequences with an appropriate tone
	• Be specific: provide numbers and context, where possible
2.	Use messaging that provokes positive (self-worth, self-care), not negative (fear, shame) emotions
3.	Understand your audience (class, age, risk, communication style), engage individual perspectives, and tailor the message to reach them
4.	Acknowledge emotions; provide information empathically
5.	Respect people’s self-determination to make their own cancer screening decisions
6.	Be aware of questions, knowledge gaps, and misinformation in your community (e.g., monitor social media) and be able to counter and correct myths