

Breast Cancer Screening During the COVID-19 Pandemic: Moving from Disparities to Health Equity

Ilana Richman MD MHS¹, Baylah Tessier-Sherman MPH², Deron Galusha MPH², Carol R. Oladele
PhD MPH^{1,2}, Karen Wang MD MHS^{1,2}

Affiliations:

1. Department of Medicine, Yale School of Medicine, New Haven CT, USA
2. Equity Research and Innovation Center, Yale School of Medicine, New Haven CT, USA

Corresponding Author:

Ilana Richman

367 Cedar St.

Harkness Hall A, Room 301a

New Haven, CT 06510, USA

ilana.richman@yale.edu

Abstract

The COVID-19 pandemic created unprecedented disruptions to routine health care in the United States. Screening mammography, a cornerstone of breast cancer control and prevention, was completely halted in the spring of 2020, and screening programs have continued to face challenges with subsequent COVID-19 waves. Although screening mammography rates dropped for all women during the pandemic, a number of studies have now clearly documented that reductions in screening have been greater for some populations than others. Specifically, minoritized women have been screened at lower rates than White women across studies, although the specific patterns of disparity vary depending on the populations and communities studied. We posit that these disparities are likely due to a variety of structural and contextual factors, including the differential impact of COVID-19 on communities. We also outline key considerations for closing gaps in screening mammography. First, practices, health systems, and communities must measure screening mammography use to identify whether gaps exist, and which populations are most affected. Second, we propose that strategies to close disparities in breast cancer screening must be multifaceted, targeting the health system/practice, but also structural factors at the policy level. Health disparities arise from a complex set of conditions, and multimodal solutions that address the complex, multifactorial conditions that lead to disparities may be more likely to succeed and are necessary for promoting health equity.

In the early months of the COVID-19 pandemic, breast cancer screening was substantially reduced or halted entirely in many regions the US, both to mitigate potential SARS-COV-2 exposure, and to redirect resources toward pandemic response. The impact on screening mammography use was immediate and dramatic. Across a range of health systems and geographies, screening rates fell precipitously, with almost complete cessation of screening in April 2020.^{1,2} The rapid reduction in screening generated substantial concern from clinicians, researchers, and from the general public alike. Anecdotes in the lay press about patients presenting with late-stage cancers echoed concerns about ripple effects of the pandemic.³ Many health systems, though, were able to adapt quickly to the pandemic and resumed screening within weeks to months. A modeling study which projected long-term effects of disruptions in screening and treatment suggested that the pandemic may only have a modest impact on breast cancer mortality.⁴

Although the return to screening came as welcome news, a second worrisome story soon emerged. The depth of disruption and speed of recovery from the pandemic's initial disruptions were uneven, resulting in significant disparities in breast cancer screening. A number of studies have since documented that reductions in breast cancer screening have been greater for women in minoritized populations. In some cases, disparities reflect a greater drop in screening rates, and in other cases, a slower return to pre-pandemic screening. Even after the early days of the pandemic, COVID-19 has continued to disrupt routine healthcare including screening mammography, creating ongoing opportunities for gaps in care to widen.⁵

In this commentary, we provide an overview of the recent literature demonstrating disparities in screening mammography during the COVID-19 pandemic and place these findings

in the broader context of breast cancer screening and screening disparities in the US. We also suggest approaches to closing these gaps, drawing on a multilevel framework for addressing health disparities. Understanding and addressing disparities will be critical for reducing inequities caused by the pandemic and closing screening gaps for all women.

Breast Cancer Screening, Disparities, and COVID-19

Breast cancer screening with mammography was introduced in the US in the early 1980s and became routine over the next decade. As screening mammography became commonplace, disparities emerged in which women of color, including Black, Asian, Pacific Islander, Native American and Latinx women, were less likely to be screened than White women.^{6,7} Minoritized women who were screened were also less likely to receive timely follow up for mammographic abnormalities.⁸ These differences were consequential, contributing to greater morbidity and mortality for under-screened populations.⁹ However, many of these gaps in screening closed over time.¹⁰ A range of policies and programs, including the National Breast and Cervical Cancer Early Detection program, and insurance coverage from Medicare and Medicaid all contributed to the reduction in screening disparities.¹¹⁻¹³ Health system and provider-directed efforts to systematically offer screening, as well as public health campaigns were also effective.¹⁴ Indeed, before the COVID-19 pandemic, biennial screening rates for women ages 50-74 were all between 71-74% for women who identified as Asian, Black, Hispanic, or White.¹⁵ Importantly, some disparities did remain pre-pandemic. Fewer Native American women aged 50-74 had undergone biennial screening, and women with lower incomes were screened at markedly lower rates.^{16,15}

During the COVID-19 pandemic, screening disparities re-emerged in some communities. Although screening rates dropped for all women during the early months of the pandemic, the reduction in screening was greater and the return to screening was slower for minoritized women across a range of health systems and contexts. For example, in our own health system, we observed that screening volumes during the initial phase pandemic (Spring 2020) had declined by 39% for Asian women, 40% for Black women, 41% for Latinx women and 33% for White women compared to volumes during the same period in 2019. (Figure 1).

Many other reports of disparities in breast cancer screening by race and ethnicity have emerged (Table 1). A large health system in Washington State reported greater declines in screening volumes among Black and Latinx women.¹⁷ Data from the Breast Cancer Surveillance Consortium, which captures screening data from six large registries around the US, showed slower return to baseline screening volumes among Asian and Latinx women.¹ A study of safety net screening programs suggested disparities were widest and most persistent for Native American and Asian women.¹⁸ A study of community health clinics, which largely serve women of color and other vulnerable populations, had slower return to pre-pandemic screening rates than other community practices.² A common theme of these studies is that minoritized women had greater reductions in screening than White women, though the studies importantly also showed considerable variation in which populations are most affected.

Mechanisms Driving Disparities

Although several studies have documented disparities in breast cancer screening during the COVID-19 pandemic, fewer have tried to elucidate mechanisms that have produced

disparities. One study of Boston area women indicated that women of color were more likely to cancel mammograms after the initial lockdown period, when routine screening mammography was returning to typical volumes.¹⁹ A second study of women in San Francisco reported that Black and Latinx women were less likely to attend scheduled mammography visits during COVID-19 “lockdown” periods.²⁰

Particularly early on in the pandemic, minoritized populations bore a greater share of morbidity and mortality from COVID-19.²¹ Women from hard-hit communities may have been reluctant to attend or reschedule non-urgent medical procedures, in order to reduce potential exposure to SARS CoV-2. A variety of other structural factors may have contributed to these disparities, including limited paid time off from work, greater representation in some sectors of the essential workforce including health care, limited transportation options, and competing priorities like caregiving.²² Health care facilities serving majority minority populations may have also faced greater strain during the pandemic. Although these factors may have contributed to disparities, challenges remain in understanding the root causes of observed disparities, as these factors are often not measured as part of routine clinical care.

Are Screening Disparities Consequential?

Despite initial worry, studies using established cancer screening simulation models have since suggested that the temporary decrement in screening may only have a modest long-term impact on breast cancer outcomes and that other factors, like access to treatment, are also important.⁴ However, we posit that the observed disparities in breast cancer screening are consequential for several reasons. First, there is early evidence that the observed disparities in

screening are associated with reductions in breast cancer detection, particularly for Asian, Latinx, and Black women.²³ Second, Black women are at greater risk of developing breast cancers with unfavorable features for which a longer interval between mammograms may be harmful.²⁴ Black women are also already at increased risk of breast cancer mortality, and even small decrements in screening may compound these disparities.²⁵

In addition, COVID-19 continues to disrupt routine care. A recent study of ambulatory care demonstrated that mammography rates again dipped in 2020-2021 coincident with a rise in COVID-19 cases. Use of mammography was lower during this second wave for women with Medicaid compare to other insurance types.⁵ Therefore, disparities may compound over time, as successive waves of COVID-19 continue to disrupt routine care.

Lastly and more generally, breast cancer screening rates may reflect the use of high value preventive services and primary care services beyond mammography per se. Breast cancer screening use is predictive of receipt of other kinds of high-value cancer screening.²⁶ Thus, mammography rates may be a signal that reflect broader patterns of care. Therefore, even if the decline in breast cancer screening rates actually translate into few excess breast cancer deaths, disparities in screening may reflect broader and more worrisome new or worsening disparities in access to routine care exacerbated by the pandemic.

A Framework for Potential Solutions

The varied patterns of disparity in breast cancer screening reported across multiple studies suggest the pandemic may have influenced receipt of care differently in different places. It also suggests that a single solution is unlikely to be successful for all communities,

given the variation observed. Rather, solutions should be guided by two principles. First, health care providers, practices, and communities must understand whether and what disparities exist. Second, multiple domains influence health disparities and therefore solutions must also address multiple domains. Given the multilayered, multifaceted nature of health disparities, solutions must come from multiple levels including the practice or health system and at the level of state and national health policy. Here we and draw on an established framework to identify and propose solutions to addressing screening disparities at multiple levels (Figure 2).²⁷

The Role of Measurement

Because health disparities may be different in each community, identifying disparities through measurement is a critical first step toward addressing disparities. Measuring receipt of screening, as well as disparities according to racial, ethnic, geographic, and socioeconomic characteristics is important for clinicians, health systems, and communities to be able to begin to address disparities.

Measurement, however, can be easier said than done. Despite the widespread use of electronic health records, obtaining accurate data on breast cancer screening for populations of interest is still a challenge. Health systems and electronic health records may not be designed for population health management. For example, electronic health records may capture who receives mammography (the numerator) but not patients in a community or population (the denominator). Electronic health records are also not designed or used with the goal of increasing health equity, and information on key demographic variables like race, ethnicity, and socioeconomic indicators may be inaccurate or missing. Health systems are even less likely to

collect information on structural determinants of health such as housing, neighborhood characteristics, or employment. Standardized reports that allow clinicians and groups to track progress may not show screening data according to key variables such as race, ethnicity, neighborhood, income, and insurance type. Thus, clinicians may not have the basic tools necessary to begin to evaluate their own performance.

Despite the challenges, measuring use of screening mammography is possible, and indeed, measuring receipt of breast cancer screening at the clinician, group, and health plan levels is already routine.²⁸ Quality measures have historically been an important tool for improving health care performance and for ensuring accountability and transparency. More recently, quality measure developers have begun to incorporate notions of equity by creating measures that can be stratified by race, ethnicity, or other dimensions, or that measure social and structural determinants of health.^{29,30} Such approaches could identify disparities in screening mammography and upstream causes. Moreover, building on established quality measurement programs may be important since such programs provide structure and incentives for measurement and performance improvement.

Lastly, although understanding disparities locally is critical to developing targeted health system responses, there is an important role for national measurement as well. Public health benchmarks, such as Healthy People 2030, set national goals for preventive care and increasingly have begun to incorporate health equity as an important dimension. Ongoing, established nationally representative surveys are used to track progress toward these goals and can be leveraged to identify and respond to disparities on the national level. Registries such as the Breast Cancer Surveillance Consortium could augment these efforts by providing granular,

high-quality information on screening. Such tools could be expanded to a greater set of geographic areas and augmented to focus on disparities and real-time surveillance.

Health System-Level Approaches

Most preventive care, including screening mammography, is delivered in the context of discrete clinical encounters, and clinician beliefs and behaviors can create or exacerbate disparities. Implicit bias, for example, is common and has been shown to influence patient-provider interactions, treatment recommendations, and patient outcomes.³¹ A number of frameworks have been proposed for addressing bias on the level of individual clinicians.^{32,33,34} These frameworks may help clinicians work toward equitable care by teaching clinicians to recognize and respond to racism and bias, to treat patients with respect and humility, and to advocate for patients.

As important as individual behaviors are, relying on individual clinicians alone to identify and reduce health disparities is unlikely to be successful. Rather, systematic approaches at the practice or health system level must be considered. A variety of methods have been successfully used prior to the pandemic to systematically engage women in screening, including patient navigation, education, outreach, and reminders through text messages, letters, and patient portal messages.³⁵ Such evidence-based approaches could be adapted to the current context to reengage women in screening.

Fundamentally changing the structure of care delivery may also facilitate screening. Several paradigms in breast cancer screening have already done this: mammography vans and patient scheduling of mammography without a physician's order are examples of ways of

reconfiguring care delivery to improve access.³⁶ Resuming and augmenting such programs may help close screening gaps. The pandemic also saw greater use of digital health tools including telemedicine, patient portals, and electronic self-scheduling.³⁷ Each of these tools are potentially valuable as a way to move care out of traditional settings and to make breast cancer screening more accessible and flexible. Fully realizing the promise of digital health tools will require design and deployment of systems that are accessible to all.³⁸

Should health systems use approaches that explicitly consider race or ethnicity when identifying patients for screening, triaging appointment requests, or providing support services to patients? The idea incorporating race or ethnicity into screening algorithms has been proposed as a way of reducing disparities in breast cancer outcomes.²⁴ The approach acknowledges that some patients, particularly Black women, experience racism that impacts health, and intensifying screening may help reduce health disparities downstream.²⁵ Such a framework could be extended or modified based on local conditions to acknowledge and address disparities that emerged during the pandemic.

However, incorporating race or ethnicity into screening protocols is complex and carries specific risks. In particular, incorporating race or ethnicity into screening triage decisions does not address the systemic racism that led to the disparity, but rather applies a downstream solution. Addressing health disparities without addressing the historical and present conditions that led to those disparities allows the status quo to persist, rather than creating more fundamental change. In addition, incorporating race into clinical screening protocols could be harmful, by encouraging clinicians to treat patients differently based on race, or by flattening important differences among women when they are grouped by crude categories of race or

ethnicity.³⁹ Given these considerations, in the context of pandemic-related disparities in mammography, it is not clear that the potential benefits would outweigh potential harms. Rather, approaches that leverage measurement to elucidate disparities along the health care continuum may be more successful.

Community- and Policy-Level Approaches

Although strategies to address disparities at the health system level may be valuable, they have a common, inherent limitation. Health system approaches do not fundamentally address the structural barriers to care that create and exacerbate disparities. Examples of these structural barriers include lack of health insurance, transportation, lack of a usual source of care, and difficulty taking time away from work or other responsibilities.

Strategies to address structural barriers may range from large-scale public policies to smaller programs designed to meet a community's need. For example, expansion of health insurance coverage through the Affordable Care Act has increased use of mammography and reduced disparities in late stage breast cancer diagnoses.^{12,40} Continuing to expand coverage for uninsured or underinsured populations is critical for continuing to address and reduce disparities. Paid time off from work can also allow women to get needed preventive care including breast cancer screening.⁴¹ Policies that require employers to offer paid time off work for health care would specifically benefit women who do not get such protections currently. Smaller, targeted programs designed to address specific community needs such as patient transportation, language interpretation, navigation, and free screening to women without health insurance have also been successful in improving uptake of screening mammography.⁴²

Lastly and critically, policies must continue to address the pandemic itself. SARS-CoV2 is likely to continue to circulate and the conditions which created these observed disparities in breast cancer screening remain. Many policies to address COVID-19 disparities have been proposed, including expanding health insurance coverage, increasing access to equitable, community-based health care, maintaining funding for and access to COVID-19-specific interventions (testing, vaccines, treatment), building systems to monitor community transmission, enhancing workplace protections, consistent use of non-pharmacologic interventions to reduce the spread of COVID-19, and addressing unmet social needs.^{43,44,45,46} Further, policies that have been effective in addressing the pandemic and pandemic disparities must be sustained.⁴⁷ These broad community and policy-level interventions are necessary not only for reducing morbidity and mortality from COVID-19 itself, but also for mitigating downstream disruptions to important preventive care like screening mammography.

Conclusions

The COVID-19 pandemic has been marked by striking disparities in morbidity and mortality from the virus itself.²¹ However, disruptions from COVID-19 to the health care system have also had secondary effects, including interruption of high-value care like routine breast cancer screening. Although many health systems were able to respond relatively quickly to reinstitute screening, the recovery has been uneven, with new health disparities emerging. Our overview of the literature suggests that although disparity is a common theme, the specifics of the disparity—which populations are affected—vary considerably by locality. Clinicians and health systems must understand the needs of their communities. Multilayered approaches that

use data to identify women who are overdue for screening and use specific community-centered strategies to both reengage women in care and lower barriers to screening may be most successful.

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Data Availability

Raw data used in this work are identifiable and contain protected health information and therefore cannot be shared under current use terms. Authors are able to share code used to analyze electronic health record data.

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Table 1: Studies Evaluating Disparities in Screening Mammography During the COVID-19 Pandemic

Cohort	N*	Timeframe	Summary of findings
Community health care system in Washington State ¹⁷	83,200	4/2019-12/2020	Greater decrease screening during the early pandemic period (2020) compared to the prior year (2019) for women of color including Asian (55% decrease), Black (54% decrease in screening), and Latinx (64% decrease) women compared to White women (49% decrease).
Yale New Haven Health System	62,277	1/2019-12/2020	Greater decrease in screening volumes for Asian women (39% decrease), Black women (40% decrease), Latinx women (41% decrease), and from baseline than White women (33% decrease).
National Cervical and Breast Early Detection Program ¹⁸	630,264	1/2015-6/2020	Greater decrease in screening and slower return to baseline for Asian (65% reduction) and Native American women (70% reduction) compared to White women (40% reduction)
North Carolina Mammography Registry ⁴⁸	39,444	1/2019-9/2020	Screening declined during the early pandemic but no definite disparities were identified (Screened population was 38% Black and 56% White pre-pandemic, with similar demographic composition during the pandemic).
Breast Cancer Surveillance Consortium ¹	461,083	1/2019 – 7/2020	Slower return to baseline screening rates for Latinx and Asian women. Screening volumes in July 2020 were 49% lower than in July 2019 for Asian women, 27% lower for Latinx women, 3% lower for Black women and 7% lower for White women.
San Francisco Safety-Net Hospital (Zuckerberg SF General) ²⁰	9,291	1/2019-1/2021	Black and Latinx women had highest proportion of scheduled mammograms that were not completed (62% and 39% respectively). Rates of mammography completion for Black women continued to decline during the pandemic and did not increase with reopening.
Brigham-Massachusetts General ⁴⁹	29,061	4/2019-11/2020	Lower baseline rates for Asian and Latinx patients, Slower return to baseline among Latinx patients (incidence rate ratio of 0.62 comparing screening rates in November 2020 vs November 2019).

Multipayer population ⁵	Approx. 14.5 million adults	3/2020-2/2021	Greater reductions in screening mammography for women with Medicaid or Medicare-Medicaid both in 2020 compared to women with Medicare or Commercial Insurance. In early 2021, differences again widened with COVID-19 resurgence (ratio of rate ratios 0.72 for women with Medicaid, 0.67 for dually-eligible women, and 0.85 for women with commercial insurance).
Multipayer population ⁵⁰	Approx. 320 million adults	3/2019-9/2020	Slower return to baseline rates of mammography for American Indian/Native Alaskan, Asian, and Latinx women.

*Some studies report mammograms while others report unique patients. Multipayer populations were not limited to those eligible for mammography.

Figure legends

Figure 1. Percent change in breast cancer screening in 2020 compared to 2019 volume within the Yale New Haven Health System. This figure depicts monthly screening volumes between 1/1/2020 and 12/31/2020 as a percent of monthly volume between 1/1/2019 and 12/31/2019. The total number of screening mammograms performed in 2020 was 23,181 and 35,479 in 2019. Data were extracted from the Yale New Haven Health System electronic medical record system and use of this data was approved by the Yale Human Investigation Committee. Racial and ethnic identifiers were based on self-report in the medical record.

Figure 2. Multilevel approach to measuring and addressing breast cancer screening disparities during the COVID-19 pandemic. This figure is a schematic depiction of multilevel interventions to improve equity in breast cancer screening. Measurement at the level of the clinician, practice, health system, or community can inform interventions which, in turn, improve equity.

Figure 1:

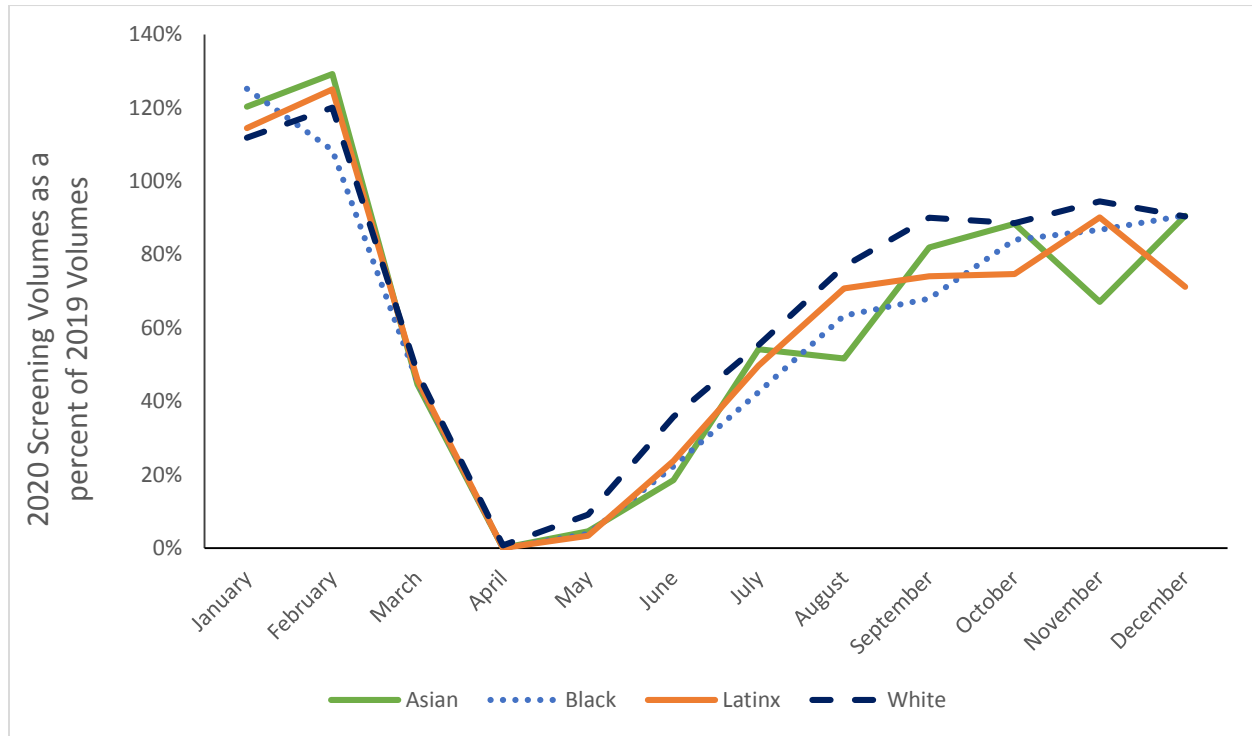


Figure 1:

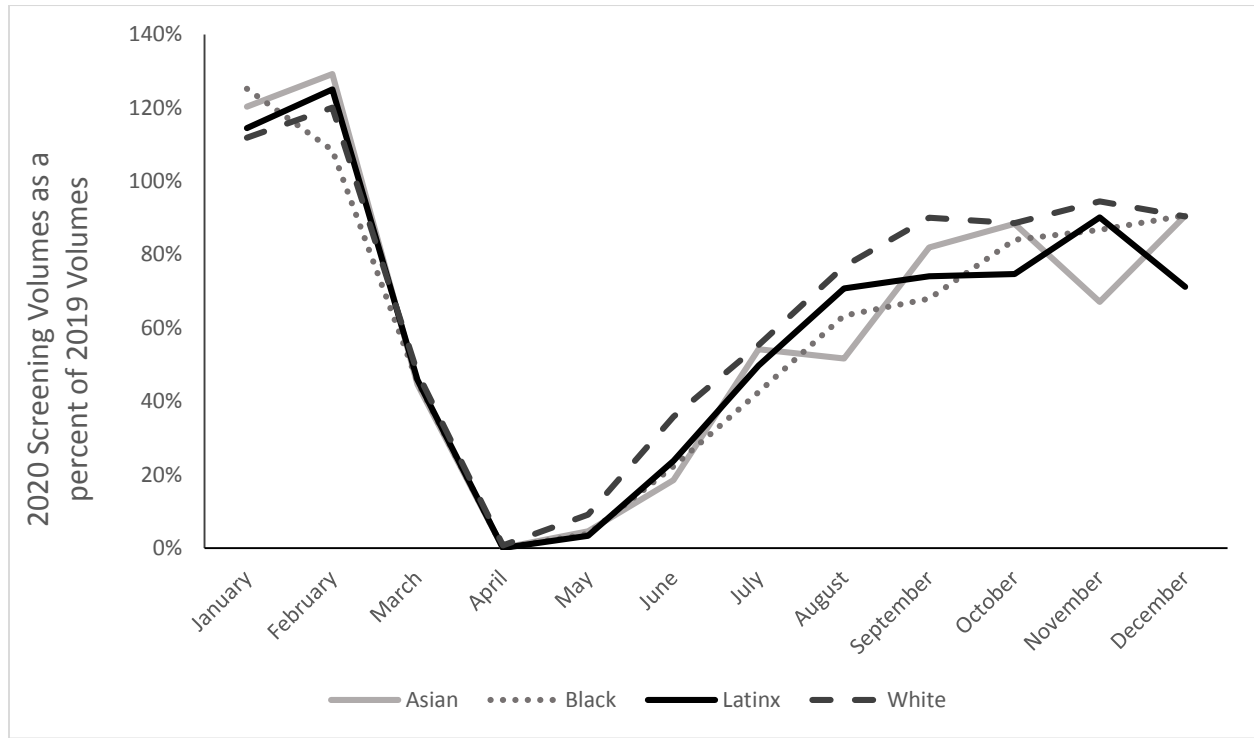


Figure 2:

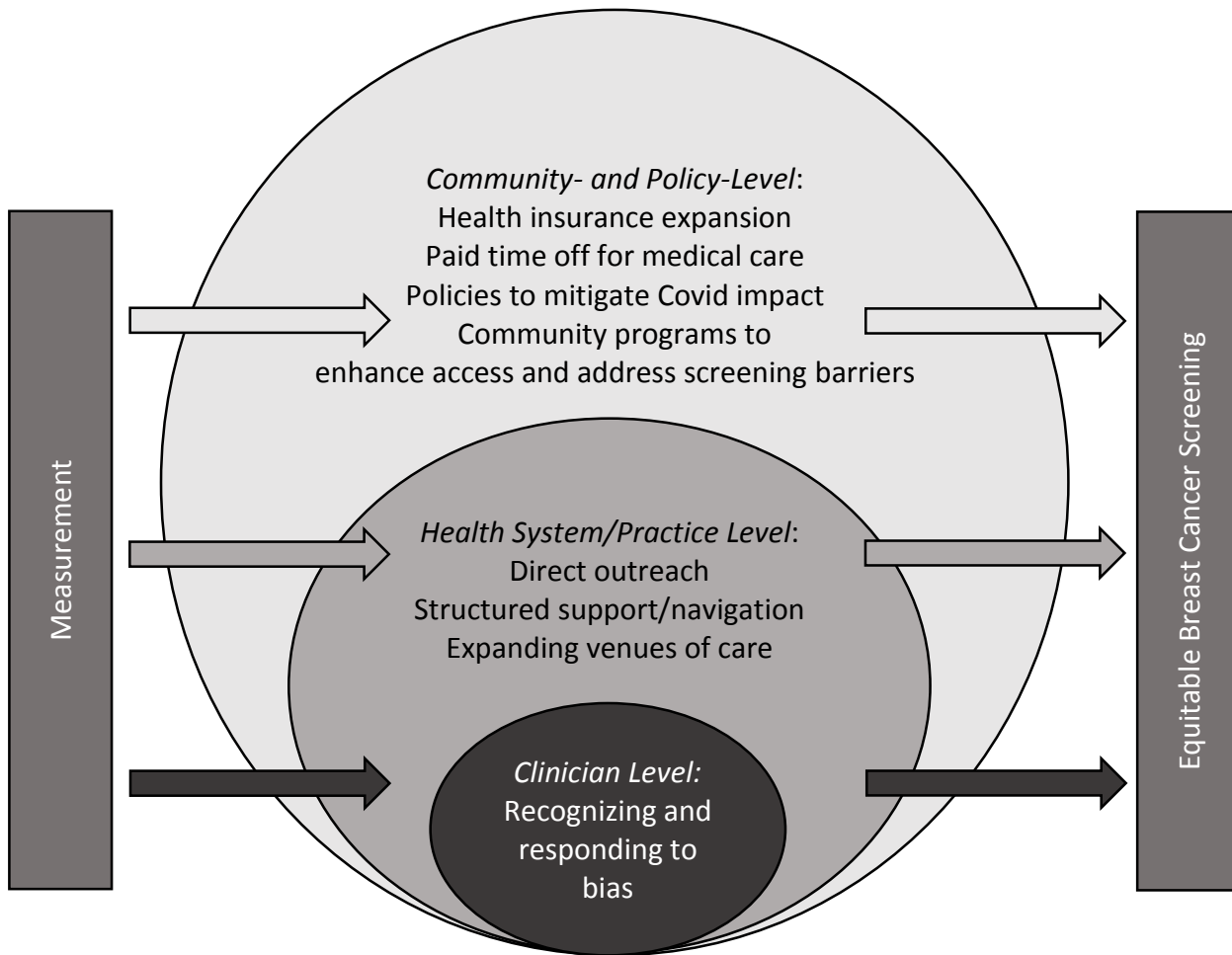


Figure 2:

