Cureus
Part of SPRINGER NATURE

Open Access Review Article

Mammography Utilization and Multilevel Barriers to Breast Cancer Screening Among Underserved Women in the United States: A Narrative Review

Review began 08/17/2026
Review ended 11/07/2026
Published 11/19/2026

© **Copyright** 2026
Saeid. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

DOI: 10.7759/cureus.119970

Eenas Alhashimi Saeid [1, 2]

1. Public Health, Grand Canyon University, Phoenix, USA 2. Department of Medicine, University of Tripoli, Tripoli, LBY

Corresponding author: Eenas Alhashimi Saeid, dreenassaeid@gmail.com

Abstract

Equitable breast cancer screening requires more than a recommendation to undergo mammography: patients must be able to access the examination and complete timely diagnostic evaluation of any abnormal findings. This structured narrative review synthesizes US evidence on mammography utilization, disparities, barriers, and intervention strategies, emphasizing publications from 2014 through August 2026 alongside selected seminal studies. Drawing on national surveillance, professional guidance, observational research, systematic reviews, and randomized trials, we present an author-developed six-domain framework that distinguishes individual, interpersonal, healthcare-access, health-system/organizational, community, and policy/societal determinants; financial constraints and structural exclusion cut across all of these domains. Increased mammography screening rates are associated with fewer adverse social needs. Patient navigation interventions may also improve breast cancer screening uptake, although their effectiveness varies across interventions and settings. Other supported approaches include community health workers, mobile mammography, actionable reminders, structural-barrier reduction, and coordinated systems for diagnostic follow-up. We propose measurable, equity-stratified indicators spanning the pathway from eligibility identification to diagnostic resolution. Future work should assess patient costs, access, intervention implementation, and sustained completion of the entire screening pathway.

Categories: Public Health, Preventive Medicine, Oncology
Keywords: breast cancer screening barriers, health-care equity, health disparities, mammography, patient navigation, rural health, social determinants of health (sdoh), underserved populations

Introduction And Background

Breast cancer is the most commonly diagnosed cancer among women in the United States, and it remains the second leading cause of cancer death in this group [1,2]. Recent American Cancer Society (ACS) surveillance also shows that population averages conceal important inequities: Black women have a slightly lower breast cancer incidence than White women but a substantially higher mortality rate, reflecting differences in tumor biology, stage at diagnosis, access to diagnostic evaluation, treatment delivery, and broader social conditions [1]. These disparities make equitable delivery of screening and timely follow-up an essential component of breast cancer control, not a secondary implementation concern [1,2].

Mammography is the principal population-based imaging test for screening average-risk women for breast cancer [3,4]. In 2024, the US Preventive Services Task Force (USPSTF) recommended biennial mammography for women aged 40 through 74 years and concluded that the evidence is insufficient to assess the balance of benefits and harms of screening women aged 75 years or older, or of supplemental ultrasonography or MRI solely for dense breasts [3,4]. The ACS recommends annual screening for women aged 45-54 years, gives women aged 40-44 years the option to begin annual screening, and recommends that women in good health either switch to biennial screening at age 55 years or continue annual screening [5].

The American College of Radiology and Society of Breast Imaging (ACR/SBI) recommend annual mammography beginning at age 40 years for average-risk women and stress formal risk assessment by age 25 years [6]. The American College of Obstetricians and Gynecologists (ACOG) updated its guidance to recommend that average-risk individuals begin routine mammography at age 40 years [7]. The National Cancer Institute (NCI) similarly identifies mammography as the standard screening examination and emphasizes that screening decisions should incorporate age, risk, benefits, and potential harms [8]. Together, these sources establish mammography as the central screening modality, although they differ in interval, age thresholds, and shared decision-making details [3-8].

Guidelines alone do not guarantee equitable screening. Insurance coverage, income, employment conditions, transportation, neighborhood resources, language access, and health-system design determine whether a recommendation can be implemented [9,10]. National cancer-disparities evidence shows that inequities accumulate across prevention, diagnosis, treatment, and survivorship [11]. The term “underserved” is used here to describe a mismatch between available services and population needs, rather

than an intrinsic characteristic of individuals or communities [9-11]. For example, an insured patient may obtain a no-cost screening mammogram but be unable to afford diagnostic imaging after a callback [12].

Previous breast-imaging reviews have described access disparities and determinants [10]; however, a persistent implementation gap remains: specific access barriers, health-system accountability, and diagnostic resolution are seldom integrated within one operational framework. This review therefore has three objectives: (1) to summarize contemporary US mammography use and barriers among underserved populations; (2) to organize interdependent barriers in an explicit six-domain socioecological framework that separates healthcare access from organizational performance; and (3) to connect evidence-based interventions to measures spanning identification, screening completion, abnormal-result follow-up, and diagnostic resolution. The resulting framework is an author-proposed synthesis, not an empirically validated causal model [9-13].

Review

This structured narrative review considered English-language publications indexed in PubMed/MEDLINE, emphasizing January 2014 through August 2026 and including selected earlier seminal evidence. Search concepts included mammography and breast cancer screening combined with utilization, disparities, low income, insurance, employment, rural access, immigration, limited English proficiency, health literacy, mistrust, disability, sexual and gender minority populations, social determinants, navigation, community health workers, mobile screening, reminders, and diagnostic follow-up. The supplementary table in the Appendix reports these search domains and an illustrative PubMed expression reconstructed from the documented concepts rather than a verbatim archived query. The precise date of the final search was not documented.

Additional sources included US professional guidelines, federal surveillance, public health programs, and evidence-based implementation resources: the Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance System (BRFSS) [14] and National Breast and Cervical Cancer Early Detection Program (NBCCEDP) [15]; the USPSTF [3]; ACS [5]; NCI [8]; Health Resources and Services Administration (HRSA) [16]; and Community Preventive Services Task Force (CPSTF) [17]. Social-determinants terminology was informed by Healthy People 2030 [18] and the Accountable Health Communities framework [19]. Current professional guidance issued in 2026 was also considered [20,21].

The focus was on US populations eligible for screening mammography, particularly groups experiencing systemic access barriers. Priority was given to contemporary US surveillance, official guidelines, systematic reviews/meta-analyses, randomized trials of screening interventions, and observational or implementation studies reporting screening access, completion, adherence, or diagnostic follow-up. Earlier studies were retained when they were foundational or when contemporary evidence was sparse. Reference lists of major reviews and guidance documents were used to identify additional studies.

Reports focused only on post-treatment outcomes were outside the central scope unless they directly informed screening-to-diagnosis continuity. Evidence was synthesized narratively by outcome and by six conceptual domains, and estimates from different study designs were not pooled. Guideline recommendations, descriptive surveillance associations, observational findings, and randomized intervention estimates are differentiated in the text and in a table. No prespecified systematic-review protocol, duplicate independent eligibility screening, formal study-level risk-of-bias appraisal, or de novo meta-analysis was performed. Scientific presentation was guided by relevant quality criteria from the SANRA (Scale for the Assessment of Narrative Review Articles) for narrative reviews [22].

1. Screening context and the meaning of utilization

Current US recommendations agree that mammography is an important screening modality, but they differ on initiation, interval, and the interpretation of benefits and harms [3-8,20,21]. USPSTF guidance recommends biennial mammography at ages 40-74 years [3], whereas ACR/SBI and the American Society of Breast Surgeons support annual screening starting at age 40 [6,21]. The 2026 American College of Physicians guidance favors shared decision-making at ages 40-49 and biennial screening at ages 50-74 [20]. Women with hereditary susceptibility, substantial family history, prior chest irradiation, or other high-risk conditions may need risk-based earlier or supplemental imaging [6,8]. Symptoms warrant diagnostic assessment, not screening [8]. Table *1* presents selected guidance and operational implications; these differences should not be interpreted as a single universal clinical schedule.

Organization	Recommendation	Key equity implication
USPSTF (2024) [3]	Biennial mammography from age 40 through 74; evidence insufficient for age ≥ 75 and for supplemental ultrasound or MRI solely because of dense breasts [3,4]	Grade B screening recommendation supports preventive coverage under many plans, but equitable delivery still requires access to diagnostic resolution after abnormal results [3,12]
American Cancer Society [5]	Annual mammography at ages 45-54; option to begin annual screening at ages 40-44; at age ≥ 55, transition to biennial screening or continue annually while in good health [5]	Choice-based recommendations require understandable counseling and reliable access so that shared decision-making does not depend on health literacy or continuity of care [5,9,10]
ACR/SBI [6]	Annual mammography beginning at age 40 for average-risk women; risk assessment by age 25, with particular attention to groups at elevated risk [6]	Earlier risk assessment can identify high-risk individuals who might otherwise be missed by family-history-only or opportunistic approaches [6]
ACOG [7]	Initiate routine mammography screening at age 40 for average-risk individuals; subsequent interval should reflect current guidance and shared decision-making [7]	Implementation depends on clinician recommendation, accessible scheduling, and continuity of preventive care [7,23,24]
American College of Physicians (2026) [20]	Ages 40-49: discuss individual risk, values, and uncertainty; if screening is chosen, use biennial mammography. Ages 50-74: biennial screening	Distinct counseling and scheduling approaches can change how uptake is counted and how age-eligible populations are defined [20]
American Society of Breast Surgeons (2026) [21]	Annual mammography starting at age 40 for average-risk women; formal risk assessment after age 25	Access to annual appointments and risk stratification should be evaluated without assuming uniform coverage or local capacity [21]

TABLE 1: Selected US breast cancer screening recommendations relevant to average-risk women

ACOG: American College of Obstetricians and Gynecologists; ACR: American College of Radiology; MRI: magnetic resonance imaging; SBI: Society of Breast Imaging; USPSTF: US Preventive Services Task Force

Precise terminology matters here. Healthcare access denotes the practical ability to obtain services, including eligibility, affordability, availability, and geographic reach; screening utilization describes receipt of mammography within a defined interval, often self-reported in surveillance; completion denotes the performance of a scheduled screening examination; and adherence denotes repeated screening at the interval specified by an applicable recommendation [10,14,25,26]. Abnormal-result follow-up refers to subsequent assessment, whereas diagnostic resolution refers to the completion of the indicated workup or to a documented clinical disposition. Self-reported mammography within the past one or two years does not perfectly distinguish screening from diagnostic examinations and may be subject to recall and social-desirability bias [25,26]. Equity dashboards should therefore track separate denominators for eligibility, contact, appointment, completed screening, result communication, and diagnostic resolution rather than treating these outcomes as equivalent [9,10,13].

2. Contemporary US patterns of mammography use

A 2022 BRFSS analysis found substantial geographic variation in self-reported mammography within the preceding two years: among women aged 50-74 years, jurisdiction-level estimates ranged from 64.0% to 85.5% [25]. A separate analysis of 2012 and 2020 data documented state variation over time [26]. In the BRFSS study, health insurance and having a personal healthcare provider were associated with recent mammography [25]. These descriptive associations do not establish causality and cannot isolate the independent effects of insurance from related structural conditions.

In jurisdictions administering the BRFSS Social Determinants and Health Equity module, the median jurisdiction-level mammography prevalence among women aged 50-74 years was 83.2% for those reporting no measured adverse social determinants of health or health-related social needs and 65.7% for those reporting three or more; the 17.5-percentage-point difference between the groups [25]. These values are medians of jurisdiction-specific prevalences, not unweighted or nationally pooled individual-level rates. Figure *1* illustrates the published contrast, which is consistent with cumulative access burden but does not itself demonstrate a causal effect [25].

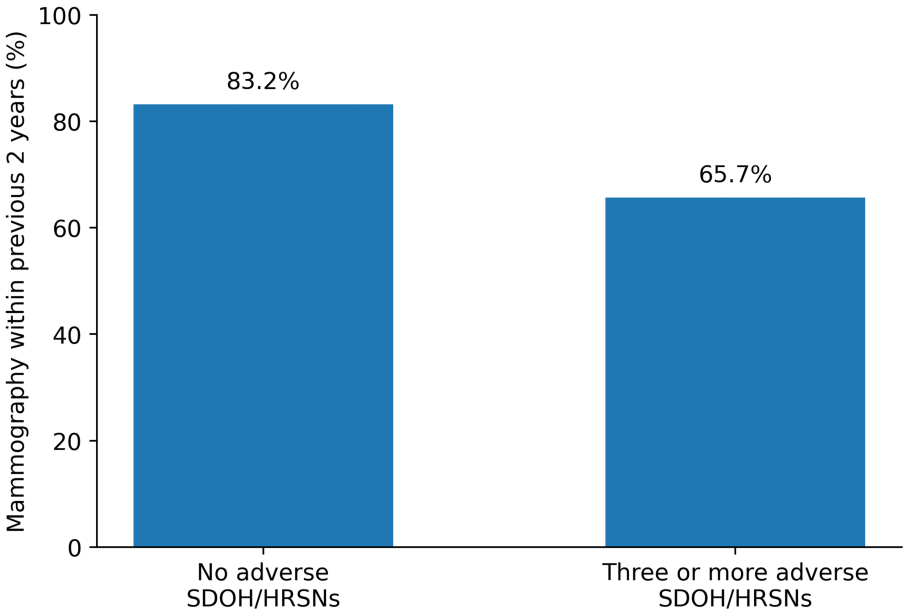

FIGURE 1: Mammography use by cumulatively measured adverse SDOH and HRSNs

Bars represent the median jurisdiction-level percentage of women aged 50-74 years reporting mammography within the prior two years in the 2022 BRFSS social-determinants analysis: 83.2% with no measured adverse SDOH/HRSNs and 65.7% with three or more (17.5-percentage-point difference). These are not national pooled percentages

BRFSS: Behavioral Risk Factor Surveillance System; HRSNs: health-related social needs; SDOH: social determinants of health

Adapted from published estimates in Miller et al. [25]

The same cross-sectional survey identified potentially actionable associations. Among women aged 50-74 years, reporting cost as a barrier to healthcare was associated with higher adjusted odds of no recent mammogram (odds ratio (OR): 2.11; 95% confidence interval (CI): 1.80-2.47) [25]. Social isolation, life dissatisfaction, lost or reduced employment hours, receipt of Supplemental Nutrition Assistance Program benefits, and unreliable transportation were also associated with nonuse. Among women aged 40-49, cost, employment disruption, and social isolation were prominent correlates [25]. Qualitative and observational work similarly links access to socioeconomic circumstances [27]; however, associations across heterogeneous studies should not be interpreted as causal intervention effects.

The coronavirus disease 2019 (COVID-19) pandemic served as a natural stress test for screening systems. Breast screening volumes fell sharply during early pandemic disruption, and recovery was uneven across clinical settings and populations [28]. National evidence also documented unequal changes in preventive screening across racial and ethnic groups [29]. The experience demonstrated the vulnerability of systems that depend primarily on opportunistic preventive visits rather than on registries, proactive outreach, and mechanisms for rescheduling missed care [28]. Table *2* summarizes selected quantitative indicators that illustrate the scale and multidimensional nature of current inequity [1,13,25,26,30].

Indicator	Estimate	Interpretation
State-level mammography prevalence, women 50-74 years, 2022 [25]	64.0%-85.5%	Substantial geographic variation shows that national averages mask large jurisdictional differences [25,26]
Median jurisdictional mammography prevalence, no measured adverse SDOH/HRSNs [25]	83.20%	Median across jurisdictions in the BRFSS social-needs module; not a national pooled rate [25]
Median jurisdictional mammography prevalence, ≥ 3 measured adverse SDOH/HRSNs [25]	65.70%	17.5-percentage-point difference in median jurisdictional prevalence; descriptive association, not causal effect [25]
Cost as a barrier to care; adjusted odds of no mammogram, age 50-74 [25]	OR: 2.11 (95% CI: 1.80-2.47)	Cost was the strongest measured independent correlate of nonuse in this national analysis [25]
Black-White breast cancer mortality difference [1]	Black women approximately 38% higher mortality	Breast cancer mortality difference reflects disparities across the care continuum, not a screening-only effect [1,30-32]
Patient navigation effect on breast screening [13]	RR: 1.50 (95% CI: 1.30-1.75); predicted absolute increase 13.8 percentage points	Meta-analysis of breast-screening randomized trials; heterogeneity substantial (I^2 = 88.0%) [13]

TABLE 2: Selected contemporary indicators of breast cancer and mammography inequity

BRFSS: Behavioral Risk Factor Surveillance System; CI: confidence interval; HRSNs: health-related social needs; OR: odds ratio; RR: risk ratio; SDOH: social determinants of health

3. A multilevel framework for understanding barriers

We propose an author-developed six-domain socioecological framework encompassing (1) individual, (2) interpersonal, (3) healthcare access, (4) health-system and organizational, (5) community and neighborhood, and (6) policy and societal determinants (Figure *2*). Healthcare access concerns whether a person can obtain and afford services; health-system organization concerns how a service is delivered, communicated, and followed through. The domains are analytically distinct but not mutually exclusive. Financial strain operates across household budgets, employment and paid-leave arrangements, transportation and childcare costs, coverage eligibility, cost-sharing, and institutional billing practices. Likewise, immigration-related exclusion, language policy, residential segregation, and safety-net disinvestment act across community, access, and policy levels [9-12,25,27,31,32]. Accessibility barriers affecting women with disabilities represent additional health-system and organizational determinants [33]. The framework is a synthesis of reviewed evidence, not a validated model or hierarchy of causal effects. The objective is to locate modifiable points of intervention without attributing noncompletion solely to individual knowledge or motivation.

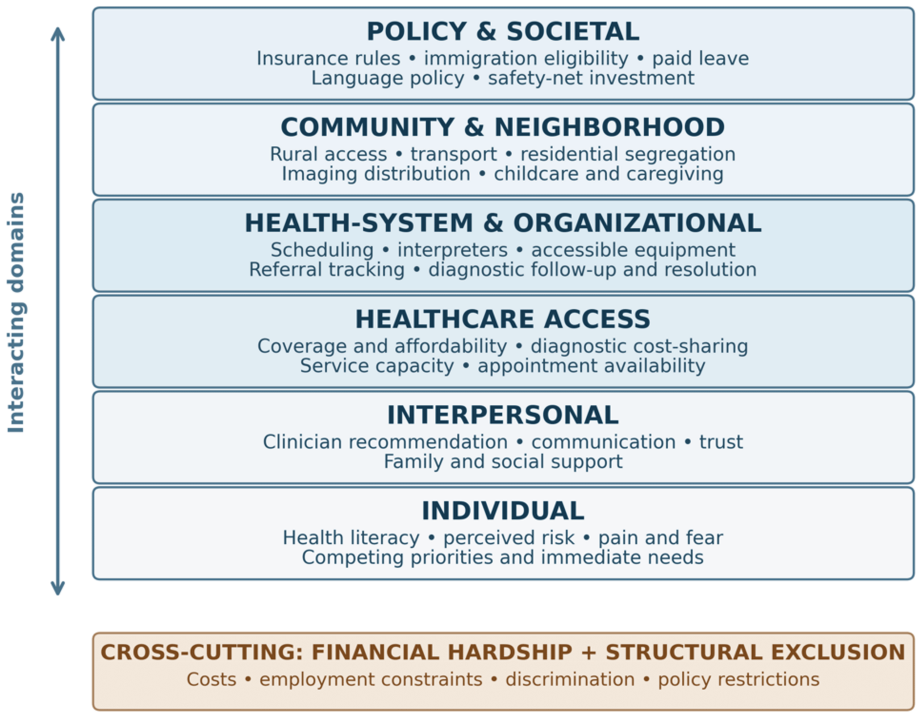

FIGURE 2: Author-developed six-domain framework for barriers to mammography screening and diagnostic resolution

Healthcare access (coverage, affordability, service availability, and practical eligibility) is distinguished from health-system and organizational determinants (scheduling, interpreters, accessible equipment, referrals, result communication, and closed-loop follow-up). Financial hardship and structural exclusion are cross-cutting influences, not additional mutually exclusive domains. The arrangement is a conceptual synthesis of evidence [9-12,23,25,27,31-33]; it has not been empirically validated. Interventions should respond to the mechanisms and domains implicated in local access gaps [17]

3.1. Individual-Level Barriers

Understanding of asymptomatic screening, eligibility, breast density, and the distinction between screening and diagnostic mammography can influence participation [10,23]. Fear may involve discomfort, embarrassment, radiation, cancer detection, subsequent treatment, or expected costs; prior painful or disrespectful encounters can exacerbate avoidance [10,23]. Financial hardship can alter immediate priorities, but is not primarily an individual-level failing: household decisions reflect employment, insurance, childcare, transport, and system design. Thus, patient education and supportive communication should accompany practical assistance rather than substitute for it [9,10,25].

3.2. Interpersonal Barriers

Clinician recommendations and understandable discussions can facilitate screening, whereas fragmented care, limited continuity, rushed visits, and dismissive interactions can weaken trust and referral follow-through [23,24,34]. Family and social networks may support transportation, childcare, interpretation, or encouragement; conversely, social isolation may remove needed support and was associated with lower use in national surveillance [25]. Professional interpretation should be available rather than placing the responsibility for clinical communication on accompanying relatives [10,35-37].

3.3. Healthcare-Access Determinants

Access refers to real-world eligibility and ability to obtain screening and indicated diagnostic services. Uninsurance, gaps in Medicaid or safety-net eligibility, high deductibles, uncertain network participation, and diagnostic cost-sharing can prevent a person from using otherwise available imaging [9,10,12,15,25]. Underinsurance matters because screening may be covered without comparable protection for the subsequent diagnostic mammogram, ultrasound, biopsy, or specialist evaluation [12]. Employment loss can interrupt insurance; unpredictable shifts and lack of paid leave increase the effective cost of attending an appointment. Geographic access requires local appointment capacity and transport that are physically and financially feasible [9,25,38-40]. These determinants should be measured through coverage, out-of-pocket

exposure, wait times, appointment availability, and successful referral completion rather than attributed to patient motivation.

3.4. Health-System and Organizational Determinants

Once a service is nominally accessible, operational design determines whether it is completed. Barriers include complicated referrals, long telephone waits, online-only scheduling, limited evening appointments, inconsistent prior-image transfer, and reminders not linked to booking [10,27]. Language-discordant instructions, unavailable interpreters, inaccessible mammography equipment or changing spaces, limited transfer assistance, and insufficient appointment time can exclude patients with communication or disability-related needs [10,33,35-37]. Diagnostic workup may span imaging, pathology, insurance authorization, and specialty referral; without assigned responsibility and escalation for unresolved abnormalities, patients can be lost to follow-up [10,12,13]. Organizational accountability should include appointment success, equitable accommodation, result communication, and completed diagnostic resolution.

3.5. Community and Neighborhood Determinants

Transportation insecurity may reflect limited public transit, vehicle access, long travel distances, parking expenses, weather, and inaccessible transportation [25]. Rural residents can encounter long trips and limited local capacity, while some urban neighborhoods remain poorly served despite proximity to major medical centers [10,38-40]. Childcare, caregiving, neighborhood safety, broadband access, residential segregation, and uneven distribution of imaging services shape practical reach [9-11]. Missed work is an economic burden arising partly from neighborhood opportunities and employment policy, illustrating the interdependence of domains [9,25].

3.6. Policy and Societal Determinants

Insurance design, public program eligibility, Medicaid policy, employer-sponsored coverage, and paid-leave rules determine both entry to screening and downstream financial exposure [9,10,12,15]. Lack of insurance can preclude a usual source of care; underinsurance and diagnostic cost-sharing may disrupt follow-up even when screening mammography is fully covered [12,25]. Immigration-related eligibility restrictions and concerns about navigating public systems, insufficiently enforced language access, residential segregation, and unequal investment in imaging and safety-net infrastructure are structural determinants that must be named rather than buried under individual characteristics [9,11,31,32]. Employment instability, irregular shifts, and lack of paid leave can compound transportation and childcare expenses [9,25]. Policies should be evaluated across the full screening-to-diagnostic-resolution continuum and monitored for differential impacts by insurance, language, race/ethnicity, disability, and place [9-11]. Table *3* links the six domains and cross-cutting mechanisms to measurable indicators.

Level	Representative barriers	Mechanism	Potential indicator
Individual	Knowledge, perceived risk, pain/fear; immediate financial strain [10,23,25]	Concerns, expected distress, competing needs	Informed choice; reported pain; scheduling attempts
Interpersonal	Continuity, communication, clinician recommendation, social support [23-25]	Unclear guidance or lack of practical assistance	Recommendation recorded; interpreter referral; support needs
Healthcare access	Uninsured/underinsured status; diagnostic charges; coverage eligibility; appointment availability [9,12,15,25]	Financial exposure or unavailable care despite nominal eligibility	Coverage type; wait time; out-of-pocket cost; successful booking
Health-system and organizational	Complex referrals; limited hours; interpreter gaps; inaccessible equipment; poor recall tracking [10,13,33]	Operational attrition, exclusion, unresolved abnormalities	Referral completion; interpreter delivery; accommodation; diagnostic resolution
Community and neighborhood	Rural distance; transport; childcare; segregation; facility distribution [9-11,25,38-40]	Travel, time, and indirect costs reduce reach	Travel time; local imaging capacity; missed work; transport support
Policy and societal	Paid leave; insurance design; immigration eligibility; language policy; safety-net investment [9,11,12,31,32]	Structural exclusion and unequal resource allocation	Leave availability; policy coverage; eligibility gaps; safety-net reach
Cross-cutting mechanisms (not a separate domain)	Affordability and structural exclusion affect several domains [9-12,25]	Compounded barriers across screening and follow-up	Stratified total patient costs, access gaps, and follow-up delay

TABLE 3: Six-domain barriers to mammography and diagnostic resolution, cross-cutting mechanisms, and candidate indicators (author-developed synthesis)

All categories can interact; the cross-cutting row is not a seventh socioecological domain

4. Populations requiring context-specific approaches

4.1. Black Women - Barriers and Context

Black women experience higher breast cancer mortality than White women despite slightly lower incidence, and this disparity spans tumor subtype, diagnostic delay, care delivery, and structural conditions [1,30-32]. Evidence and gaps: Screening participation alone does not explain the mortality difference, and studies focusing only on screening may miss inequities in diagnostic resolution and treatment [1,31,32]. Program response: Pair risk assessment and accessible screening with timely interpretation, tracked follow-up of abnormal findings, and equitable links to definitive care [30-32].

4.2. Hispanic/Latina and Immigrant Women - Barriers and Context

Language, insurance eligibility, transport, work schedules, unfamiliarity with referral systems, and concern about costs or immigration-related restrictions vary substantially by community and immigration history [9,10,36,37]. Evidence and gaps: Reviews report heterogeneous populations and interventions; evidence from one language or national-origin group may not generalize to another [36,37]. Program response: Co-design outreach with trusted partners; offer qualified interpreters, language-concordant navigation, transparent costs, directly bookable appointments, and closed-loop follow-up [35-37].

4.3. American Indian and Alaska Native Women - Barriers and Context

Geographic isolation, under-resourced referral networks, and relationships among tribal, federal, and regional health systems can compound general financial and transport barriers [41]. Evidence and gaps: Available studies are context-specific and may not represent all tribal communities [41]. Program response: Respect tribal sovereignty, partner in intervention design with tribal health systems, and connect local screening or mobile programs to dependable diagnostic referral, results communication, and follow-up [41].

4.4. Rural Women - Barriers and Context

Limited breast-imaging capacity, longer travel, transportation costs, and constrained local diagnostic services can affect both initial and repeat screening [10,38-40]. Evidence and gaps: Reviews of mobile

mammography show promising reach into underserved groups, but reach should not be conflated with longitudinal adherence or timely diagnostic resolution [38,39]. Program response: Combine mobile or outreach services with quality assurance, prior-image transfer, navigators, reliable callback systems, and formal agreements for diagnostic imaging and biopsy [13,38-40].

4.5. Women With Disabilities - Barriers and Context

Positioning limitations, inaccessible devices, changing rooms, transportation, communication barriers, short appointment slots, and inaccurate assumptions about screening needs may inhibit participation [33]. Evidence and gaps: Published evidence identifies persistent service-access gaps, while evaluation of specific accommodations remains comparatively limited [33]. Program response: Offer appropriate positioning and transfer assistance, accessible facilities, longer visits when needed, trained staff, professional sign-language interpretation, and supported decisions tailored to individual needs [33].

4.6. Sexual and Gender Minority Populations - Barriers and Context

Noninclusive environments, discrimination, inconsistent provider knowledge, and administrative records that do not reflect relevant anatomy may create obstacles [42-44]. Evidence and gaps: Findings are heterogeneous and often based on smaller samples; overlapping barriers affecting Black sexual minority women deserve attention [42,43]. Program response: Use anatomy-, age-, risk-, hormone-, and surgery-informed clinical assessment for breast/chest screening, inclusive communication, and appropriately protected subgroup monitoring rather than assumptions based only on a gender marker [44].

5. Interventions to improve screening equity

Intervention evidence must be matched to the mechanism preventing screening or diagnostic resolution [17]. Randomized trials and meta-analyses can estimate effects on screening; community or implementation evaluations often provide information about reach and feasibility rather than direct comparative effectiveness. CPSTF recommendations support multicomponent programs combining approaches to demand, service access, and provider delivery [17]. A reminder will not remove a deductible or replace an interpreter, and a mobile unit without reliable diagnostic referral cannot guarantee resolution [12,17,25]. Consequently, Table *4* separates study design and evidence from implementation considerations; comparisons across interventions are descriptive, not a formal ranking.

Intervention	Evidence/expected effect	Equity strengths	Implementation risks
Patient navigation [13,45-47]	2025 meta-analysis: 30 randomized breast-screening trials, n = 34,744; RR: 1.50 (95% CI 1.30-1.75), predicted +13.8 percentage points, I^2 = 88%; follow-up RR: 1.23 (95% CI: 1.15-1.41; 3 trials) [13]	Individualized barrier resolution; can extend through abnormal-result follow-up [13,45]	Considerable heterogeneity; resource and referral integration required; no head-to-head superiority claim [13,45]
Community health workers [17,48]	CPSTF recommendation plus systematic review/economic evidence; effects differ by implementation and setting [17,48]	Trusted and potentially culturally/language-concordant outreach [17,48]	Undercompensation, limited scheduling authority, and short-term funding can weaken impact [48]
Mobile mammography [38-40]	Systematic and narrative reviews support reach; limited direct evidence on durable adherence and follow-up [38-40]	Reduces travel and can place services in trusted community settings [38,39]	Repeat adherence and diagnostic follow-up can be poor if the mobile service is not integrated with longitudinal care [38-40]
Client reminders/direct scheduling [34,49]	Systematic-review evidence of benefit for screening uptake; modalities and study settings heterogeneous [34,49]	Scalable and can reduce forgetfulness or procedural uncertainty when linked to scheduling [34,49]	Outdated contact information, digital exclusion, privacy concerns, and language discordance can limit reach [9,10]
Reduced structural barriers [17,34]	CPSTF-supported approaches include service-hours, scheduling, and administrative changes [17,34]	Directly reduces opportunity cost and administrative friction [17,34]	Requires operational redesign and may depend on transportation or cross-sector partnerships [25]
Provider reminders/audit-feedback [24,34]	Evidence syntheses support provider recommendation and delivery; population outcomes depend on access [24,34]	Reduces dependence on patient initiative and improves system accountability [24,34]	Alert fatigue and downstream access barriers can persist after referral [24,34]
Multicomponent intervention [17]	CPSTF recommends multicomponent strategies; cannot infer a single component effect [17]	Addresses demand, access, and provider delivery simultaneously [17]	More complex implementation, attribution, and startup requirements [17]

TABLE 4: Type of evidence, effects, equity strengths, and implementation limitations of selected interventions (not a head-to-head ranking)

CI: confidence interval; CPSTF: Community Preventive Services Task Force; RR: risk ratio

5.1. Patient Navigation

A 2025 systematic review and meta-analysis identified 30 randomized trials of breast-screening navigation (34,744 participants) and reported increased screening (risk ratio [RR], 1.50; 95% CI, 1.30-1.75), with a model-predicted absolute 13.8-percentage-point increase [13]. Between-trial heterogeneity was substantial (I^2 = 88.0%), limiting prediction of a uniform local effect. Three trials evaluating follow-up after abnormal breast screening (n = 1,008) yielded RR 1.23 (95% CI, 1.15-1.41; I^2 = 12.6%) [13]. This provides direct randomized evidence for navigation compared with usual care or active controls, not proof that navigation is superior to every alternative strategy. Earlier synthesis and individual trials also support improved mammography participation in selected settings [45-47].

Navigation models differ in scope: barrier assessment, education, direct booking, insurance and cost assistance, transport coordination, language services, reminders, accompaniment, and abnormal-result tracking [13,45-47]. Variation in navigator authority, local service capacity, populations, and comparator care should be considered when transferring estimates to a new program [13,45]. Navigators should be integrated with referral and follow-up workflows, with clear ownership of incomplete diagnostic episodes.

5.2. Community Health Workers and Trusted Messengers

CPSTF findings and supporting reviews favor community health workers who offer education, culturally appropriate communication, reminders, and practical service linkage [17,48]. This evidence includes program evaluations and evidence syntheses that are not directly comparable with the navigation trial meta-analysis.

Integration into referral workflows, fair compensation, training, and sustainable funding are important implementation conditions [48].

5.3. Mobile Mammography

Systematic and narrative reviews suggest mobile services can increase geographic reach among low-income, uninsured, and historically underscreened populations [38,39]. However, reach and convenience are not equivalent to demonstrated sustained adherence or diagnostic follow-up. Programs require image quality assurance, records transfer, recall protocols, and dependable diagnostic partners; pairing mobile services with navigation can address barriers beyond distance [13,38-40].

5.4. Reminders, Direct Scheduling, and Small Media

Provider reminders and audit/feedback interventions improve the recommendation and delivery of cancer screening [24,34]. Client reminders, one-on-one education, and small-media interventions also increase screening use, particularly when messages are actionable and linked to scheduling [34,49]. Digital outreach should be language-concordant, readable, privacy-sensitive, and supplemented by non-digital options because portal enrollment, broadband, stable telephone access, and digital literacy are not universal [9,10].

5.5. Reducing Access, Structural, and Financial Barriers

Evidence summarized by CPSTF supports organizational changes such as simpler scheduling, additional service times or locations, and removal of nonmedical obstacles [17,34]. Extended hours, workplace accommodation, childcare, and transportation assistance may reduce indirect costs and time away from paid work [9,25]. Cost counseling must differentiate screening coverage from possible diagnostic mammography, ultrasound, biopsy, and pathology charges; insurance enrollment, financial assistance, and navigation should be available before and after callbacks [12,15]. Addressing employment instability, lack of paid leave, and insurance gaps generally requires collaboration beyond the imaging department.

5.6. Provider-, System-, and Access-Level Interventions

Registries, clinician prompts, performance feedback, direct scheduling, and recall tracking can reduce dependence on opportunistic preventive visits [24,34]. These workflow interventions should be integrated with insurance verification, language services, physical accessibility, and funded diagnostic capacity rather than evaluated solely by number of referrals [10,12,13]. Figure *3* shows the author-developed closed-loop pathway from identifying eligible patients to diagnostic resolution; its stages are recommended implementation steps, not estimates of effect [9,10,13,17].

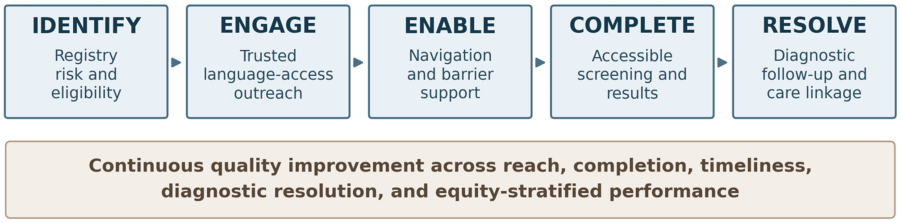

FIGURE 3: Author-developed equity-oriented screening-to-diagnostic-resolution pathway

The sequence - identify, engage, enable, complete, resolve - illustrates proposed implementation actions based on surveillance, screening-access, and intervention literature [9,10,13,17,24,34]. Screening completion does not represent diagnostic resolution. Performance and equity should be monitored at every transition [9,50]; the diagram is not an empirically validated intervention model

6. Policy and programmatic levers

The NBCCEDP is a US safety-net mechanism for breast and cervical cancer screening and diagnostic services among eligible people with low incomes and inadequate insurance [15]. Program evaluations document its reach while indicating that available resources historically cover only a proportion of potentially eligible individuals [51]. Expansion requires financing, referral capacity, community partnerships, and links with Medicaid and imaging centers [15,51]. Importantly, program eligibility and enrollment assistance should be assessed alongside actual availability of appointments and diagnostic services.

Coverage policy should address the entire screening-to-diagnosis episode, not only the first mammogram.

Although qualifying preventive screening is generally covered without patient cost-sharing in many plans, subsequent diagnostic imaging and biopsy may generate expenses, and observational evidence associates higher cost-sharing with lower use of diagnostic breast imaging [3,12]. Insurance status should therefore be differentiated as uninsured, insured but underinsured, and insured with adequate diagnostic coverage. Policy levers include reducing diagnostic cost-sharing, simplifying prior authorization when applicable, and supporting navigation and financial assistance [12,15].

Employment status belongs explicitly in access and policy analyses. Unemployment may reduce access to employer-sponsored insurance; unstable or hourly employment, shift unpredictability, and lack of paid leave can make even a no-cost mammogram difficult to attend [9,25]. Paid leave, flexible appointment hours, childcare, accessible transport, and predictable scheduling are cross-sector interventions rather than substitutes for high-quality breast-imaging services [9,25]. Immigration-related eligibility exclusions, discriminatory service distribution, and language-access policies likewise require institutional and policy remedies, not just additional patient education [9,11,31,32].

Equity evaluation should use domain-specific and pathway-specific measures instead of relying on one overall mammography rate [9-11]. Access indicators include insurance eligibility, network participation, travel time, out-of-pocket exposure, and appointment availability; organizational indicators include referral completion, interpreter provision, physical accessibility, result notification, and diagnostic-resolution intervals. Health systems and payers should stratify measures where feasible by race/ethnicity, preferred language, insurance, disability, rurality, and neighborhood deprivation with safeguards for privacy and small cell sizes [9-11,33]. Table *5* assigns responsibilities across clinical, access, and policy stakeholders.

Stakeholder	Priority actions
Primary care practices	Risk/eligibility registry; clear recommendation and direct scheduling; address insurance and referral eligibility; offer professional interpretation [3,6,9,10,24,35]
Breast imaging centers	Assess available appointment capacity; accessible equipment and extended slots; explain diagnostic bills; communicate results and track resolution [10,12,13,33]
Health systems	Separate access dashboards from workflow dashboards; fund navigation and follow-up; audit insurance gaps, interpreters, and abnormal-result closure [9,10,13,19]
Public health departments	Identify underserved service areas; co-design mobile sites; enroll eligible individuals in NBCCEDP; establish diagnostic partners [15,17,35-41,51]
Payers and policymakers	Assess insurance restrictions, diagnostic cost-sharing, paid leave, transport, and immigrant eligibility; support navigator/CHW sustainability [9,12,13,25,48,51]
Researchers	Disaggregate upstream access from completed screening and diagnostic resolution; study employment, patient costs, and intersectionality [9,11,12,25,50]

TABLE 5: Recommended actions by stakeholder

CHW: community health worker; NBCCEDP: National Breast and Cervical Cancer Early Detection Program

7. Designing an equity-oriented mammography program

An equity-oriented mammography program should operate as a coordinated clinical pathway, not a set of disconnected outreach activities [9,10,17]. A validated registry should identify average-risk screening candidates while separating high-risk surveillance and symptomatic diagnostic evaluation [3,6,8]. Local assessment should then identify which of the six domains impedes access or completion-insurance and affordability, service availability, organizational workflows, social support, neighborhood conditions, or policy restrictions-rather than assuming low uptake indicates low motivation [9-11,25].

Outreach should lead to practical barrier assessment and immediate scheduling [13,17]. Communication must be understandable, culturally responsive, and language-concordant, including explanation of the difference between routine screening and a diagnostic callback [13,35-37]. When problems involve insurance, employment, transport, childcare, disability access, or prior painful experiences, the response should include concrete supports: benefits assistance, cost estimates, flexible slots, transportation, interpreters, accessible equipment, and appropriate examination time [12,13,15,25,33].

Diagnostic capacity and responsibility for follow-up should be established before substantially increasing screening volume [10,13]. The pathway should include agreements for diagnostic mammography, ultrasound, biopsy, pathology, and treatment referral, as appropriate. Every abnormal finding requires

recorded patient notification, a responsible team, an escalation process, and a documented disposition [10,12,13]. Mobile programs must meet the same expectations for prior-image transfer, recalls, and follow-up [38-40].

Continuous quality improvement should separately evaluate access, screening completion, adherence, diagnostic follow-up, and diagnostic resolution. Indicators should measure both average performance and inequities within groups, while patient experience and indirect costs inform whether apparent access is meaningful [9-12]. Community partners should participate in selecting locations, adapting language and disability accommodations, and interpreting performance data [35-37,41]. The central implementation question is whether the healthcare and social systems created a feasible, respectful pathway to timely resolution-not merely whether the individual accepted a screening recommendation.

8. Measurement and evaluation

Aggregate screening rates may improve while access or diagnostic delays worsen in particular groups [9-11]. RE-AIM-Reach, Effectiveness, Adoption, Implementation, and Maintenance-offers an evaluation structure for assessing whom programs serve, what they achieve, how organizations deliver them, and whether benefits persist [50]. We propose augmenting RE-AIM with separate access and diagnostic-resolution indicators aligned with the six-domain framework. This is an implementation recommendation, not a validated measurement scale.

Reach is the proportion of eligible people contacted, scheduled, and screened, and whether participants resemble the broader eligible population [50]. Effectiveness includes changes in documented screening completion and, where feasible, adherence, timely diagnostic resolution, detection, stage, and patient experience [13,50]. Financial exposure should be measured at screening and after callback; insurance type, employment constraints, language accessibility, and service availability should be analyzed as upstream access determinants rather than hidden within demographic adjustment [9,12,25].

Timeliness measures can include eligibility to screening, abnormal result to diagnostic imaging, diagnostic assessment to biopsy where indicated, and biopsy to treatment linkage [10,13]. Operational measures include completed referrals, interpreter use, reasonable accommodations, navigation fidelity, no-show patterns, and closed-loop result tracking [13,33]. Estimates should be reported with appropriate denominators, follow-up windows, and uncertainty when available. Table *5* and Table *6* distinguish stakeholder action from measurable program outcomes.

Domain	Suggested measures
Reach	Proportion of eligible people contacted, scheduled, and screened; representativeness versus the eligible population[50]
Effectiveness	Absolute and relative change in screening; diagnostic resolution; cancer detection; stage at diagnosis; patient-reported understanding or anxiety when available [13,50]
Equity	Differences in screening and diagnostic resolution by race/ethnicity, language, insurance, disability, rurality, and deprivation, using locally relevant categories [9-11]
Timeliness	Days from eligibility identification to screening; abnormal result to diagnostic imaging; diagnostic imaging to biopsy; biopsy to treatment linkage [10,13]
Implementation	Navigation fidelity; interpreter use; successful transportation support; no-show rate; accessibility accommodations; closed-loop tracking completion [13,33]
Acceptability	Patient trust, respect, pain experience, cultural safety, understanding, and willingness to return[10,13,33]
Cost	Program cost per additional person screened; patient out-of-pocket and indirect costs; cost per completed diagnostic resolution [12,48]
Sustainability	Navigator/community health worker retention; reimbursement; repeat screening; continued community partnership; maintenance of registry and tracking workflows [13,48,50]
Healthcare access	Uninsured/underinsured percentages; scheduling availability; coverage/eligibility failures; appointment lead time; transport accessibility; direct and diagnostic out-of-pocket costs [9,10,12,25]
Diagnostic resolution	Proportion of abnormal results with completed workup or documented disposition; median days to completion; proportion exceeding locally defined thresholds; lost-to-follow-up rate [10,12,13]

TABLE 6: Core metrics for equity-oriented mammography programs

9. Research gaps and future directions

Future research should measure the entire screening-to-diagnostic pathway instead of only receipt of a mammogram [10,13]. Completion of the screening image without communication and resolution of abnormal findings may not deliver its intended clinical benefit. Prospective and pragmatic studies should assess the timing of diagnostic imaging, biopsy, and referral while accounting for direct patient charges and indirect costs, including travel, lost wages, and caregiving [12,25,48].

Intersectional analysis is needed because broad labels such as 'underserved' or 'minority' can hide variation by language, immigration experience, tribal affiliation, disability, rural residence, sexual orientation, gender identity, and insurance [9,11,33,36,37,41-44]. Studies should document denominators and protect privacy in small subgroups. Combining neighborhood, organizational, and policy measures with patient-reported experiences may more clearly distinguish pathways into care than demographic categories alone.

Implementation research should determine which components of navigation and multicomponent programs are necessary for different access barriers, populations, and organizational capacities [13,17,45]. The high between-trial heterogeneity of navigation effects and the scarcity of direct intervention comparisons argue against ranking programs solely by pooled effects from different literatures [13]. Pragmatic comparative studies should measure sustainability, diagnostic-resolution performance, and incremental costs as well as screening uptake [12,13,48].

Emerging breast-imaging technologies should undergo explicit equity evaluation [10]. Digital breast tomosynthesis, artificial intelligence, risk-adapted strategies, and supplemental imaging may improve aspects of detection, but differential availability, insurance coverage, algorithm performance, and referral capacity could also create new disparities [10]. Evaluation should therefore include access and performance across diverse populations, equipment, and clinical settings rather than assuming that technological improvement is automatically equitable [10].

Policy changes provide opportunities for natural experiments at population scale [12,25]. State-level changes in diagnostic cost-sharing, Medicaid coverage, paid leave, transportation programs, and mobile-service reimbursement can be linked to screening and follow-up outcomes if implementation timing and comparison groups are carefully defined [12,25]. Such studies would help determine which structural interventions have effects large enough to change population disparities rather than only individual behavior [9,25].

10. Strengths and limitations of this review

This review integrates contemporary US surveillance, professional guidance, population-specific literature, trial-based intervention evidence, and implementation research into an author-developed six-domain framework. It distinguishes healthcare access from organizational processes, treats financial and structural constraints as cross-cutting, and examines the screening-to-diagnostic-resolution continuum. The review provides proposed operational indicators rather than claiming that the conceptual framework has been independently validated.

Several limitations should be considered. The narrative design lacks the reproducibility of a protocol-driven systematic review; the date of the last search and an archived verbatim query were not documented, and the supplementary search expression was reconstructed from the reported search concepts. English-language selection and reference chaining may introduce language and selection bias. No duplicate independent screening or formal risk-of-bias assessment was performed, and included research uses heterogeneous definitions of utilization, adherence, and follow-up [25,42-44]. BRFSS screening estimates are self-reported and cross-sectional, so observed associations are not causal effects [25]. Navigation trials show substantial heterogeneity for screening ($I^2 = 88.0\%$) [13]; evidence for some populations and structural interventions is observational or implementation-focused. No original statistical synthesis or head-to-head comparative ranking was undertaken. Thus, the review offers an evidence-informed conceptual and implementation synthesis rather than an exhaustive quantitative comparison.

Conclusions

Mammography inequities reflect the cumulative effects of financial, interpersonal, healthcare-access, organizational, community, and policy barriers across the screening continuum. Improving screening equity therefore requires addressing insurance gaps, employment constraints, language barriers, immigration-related exclusion, residential segregation, and unequal access to healthcare resources, rather than focusing solely on individual knowledge or motivation. An effective equity-oriented approach should integrate proactive identification of eligible patients, trusted communication, accessible and flexible screening services, individualized support in overcoming barriers to care, and coordinated follow-up through diagnostic resolution. Patient navigation and other multilevel interventions can help link these components into a continuous and responsive screening pathway. Ultimately, progress toward equitable breast cancer screening should be evaluated not only by overall mammography utilization but also by equitable access, screening completion, timely diagnostic resolution, and sustained participation across underserved

populations.

Appendices

Reporting element	Description/reconstructed implementation
Database and other sources	PubMed/MEDLINE as principal database; CDC BRFSS and NBCCEDP, USPSTF, ACS, ACR/SBI, ACOG, ACP, ASBrS, NCI, HRSA, CPSTF, and relevant reference lists
Publication time window	Original searches emphasized January 2014–August 2026; earlier seminal papers retained where relevant
Language and geography	English-language publications; emphasis on US populations, US surveillance, and US guideline or implementation evidence
Population	People eligible for screening mammography, with focus on populations experiencing inadequate access or follow-up; high-risk and symptomatic pathways distinguished
Search domains	Mammography/breast screening AND (utilization OR disparities OR access OR underserved OR social needs OR insurance OR low income OR employment OR rural OR immigrant OR language OR disability OR LGBTQ OR navigation OR mobile mammography OR reminder OR diagnostic follow-up)
Illustrative PubMed query (reconstructed; not historical search log)	("Mammography"[MeSH Terms] OR mammograph*[Title/Abstract] OR "breast cancer screening"[Title/Abstract]) AND (disparit*[Title/Abstract] OR underserved[Title/Abstract] OR access[Title/Abstract] OR insurance[Title/Abstract] OR employment[Title/Abstract] OR rural[Title/Abstract] OR immigrant*[Title/Abstract] OR language[Title/Abstract] OR disabilit*[Title/Abstract] OR navigation[Title/Abstract] OR "community health worker*"[Title/Abstract] OR mobile[Title/Abstract] OR reminder*[Title/Abstract] OR "diagnostic follow-up"[Title/Abstract]) AND ("2014/01/01"[Date - Publication] : "2026/08/31"[Date - Publication]) AND english[Language]
Selection and synthesis	Prioritized guidelines, surveillance, systematic reviews/meta-analyses, randomized trials, and US observational/implementation literature; evidence grouped narratively by outcomes and conceptual domain
Methods not undertaken	No registered protocol, documented screening counts, dual independent selection, formal risk-of-bias scoring, or de novo meta-analysis

TABLE 7: Summary of reported search domains and narrative selection approach

The example PubMed search expression is reconstructed from these concepts; it is not a verbatim historical search record. The exact final search date, saved search string, retrieval counts, and exclusion log were not available for independent verification

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Eenas Alhashimi Saeid

Acquisition, analysis, or interpretation of data: Eenas Alhashimi Saeid

Drafting of the manuscript: Eenas Alhashimi Saeid

Critical review of the manuscript for important intellectual content: Eenas Alhashimi Saeid

Supervision: Eenas Alhashimi Saeid

Disclosures

Conflicts of interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

Acknowledgements

The author used OpenAI ChatGPT solely to assist with grammar, writing clarity, and sentence structure. The author independently reviewed and verified all scientific content, analyses, interpretations, facts, and references and takes full responsibility for the accuracy and integrity of the manuscript.

References

1. Giaquinto AN, Sung H, Newman LA, et al.: Breast cancer statistics 2024. CA Cancer J Clin. 2024, 74:477-95. 10.3322/caac.21863
2. Siegel RL, Giaquinto AN, Jemal A: Cancer statistics, 2024. CA Cancer J Clin. 2024, 74:12-49. 10.3322/caac.21820
3. Nicholson WK, Silverstein M, Wong JB, et al.: US Preventive Services Task Force. Screening for breast cancer: US Preventive Services Task Force recommendation statement. JAMA. 2024, 331:1918-30. 10.1001/jama.2024.5534
4. Henderson JT, Webber EM, Weyrich MS, Miller M, Melnikow J: Screening for breast cancer: evidence report and systematic review for the US Preventive Services Task Force. JAMA. 2024, 331:1931-46. 10.1001/jama.2023.25844
5. American Cancer Society. Recommendations for the early detection of breast cancer . (2026). Accessed: July 23, 2026: https://www.cancer.org/cancer/types/breast-cancer/screening-tests-and-early-detection/american-cancer-society-recomme....
6. Monticciolo DL, Malak SF, Friedewald SM, et al.: Breast cancer screening recommendations inclusive of all women at average risk: update from the ACR and Society of Breast Imaging. J Am Coll Radiol. 2021, 18:1280-8. 10.1016/j.jacr.2021.04.021
7. American College of Obstetricians and Gynecologists: Age to initiate routine breast cancer screening: ACOG Clinical Practice Update. Obstet Gynecol. 2025, 145:e40-4. 10.1097/AOG.0000000000005757
8. National Cancer Institute. Mammograms. (2025). Accessed: November 15, 2026: https://www.cancer.gov/types/breast/screening/mammograms.
9. Alcaraz KI, Wiedt TL, Daniels EC, Yabroff KR, Guerra CE, Wender RC: Understanding and addressing social determinants to advance cancer health equity in the United States: a blueprint for practice, research, and policy. CA Cancer J Clin. 2020, 70:31-46. 10.3322/caac.21586
10. Fazeli S, Narayan AK, Mango VL, Wahab R, Mehta TS, Ojeda-Fournier H: Access to breast cancer screening: disparities and determinants-AJR Expert Panel narrative review. AJR Am J Roentgenol. 2025, 225:e2432151. 10.2214/AJR.24.32151
11. Islami F, Guerra CE, Minihan A, et al.: American Cancer Society's report on the status of cancer disparities in the United States, 2021. CA Cancer J Clin. 2022, 72:112-43. 10.3322/caac.21703
12. Hughes DR, Espinoza W, Fein S, Rula EY, McGinty G: Patient cost-sharing and utilization of breast cancer diagnostic imaging by patients undergoing subsequent testing after a screening mammogram. JAMA Netw Open. 2023, 6:e234893. 10.1001/jamanetworkopen.2023.4893
13. Nelson HD, Cantor AG, Pappas M, Blackie K, Yu Y, Fu R: Patient navigation services for breast and cervical cancer screening and follow-up: a meta-analysis. JAMA Intern Med. 2025, 185:976-85. 10.1001/jamainternmed.2025.1590
14. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System . (2025). Accessed: November 15, 2026: https://www.cdc.gov/brfss/.
15. Centers for Disease Control and Prevention. National Breast and Cervical Cancer Early Detection Program . (2025). Accessed: November 15, 2026: https://www.cdc.gov/breast-cervical-cancer-screening/.
16. Health Resources and Services Administration. Women's Preventive Services Guidelines . (2025). Accessed: November 15, 2026: https://www.hrsa.gov/womens-guidelines.
17. Community Preventive Services Task Force: CPSTF findings for cancer prevention and control. The Community Guide. (2025). Accessed: November 15, 2026: https://www.thecommunityguide.org/pages/task-force-findings-cancer-prevention-and-control.html.
18. Healthy People 2030: Social determinants of health. US Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (2025). Accessed: November 15, 2026: https://health.gov/healthypeople/priority-areas/social-determinants-health.
19. Centers for Medicare and Medicaid Services. The Accountable Health Communities Health-Related Social Needs Screening Tool. (2025). Accessed: November 15, 2026: https://www.cms.gov/priorities/innovation/files/worksheets/ahcm-screeningtool.pdf.
20. Qaseem A, Harrod CS, Balk EM, Etxeandia-Ikobaltzeta I, Crandall CJ: Screening for breast cancer in asymptomatic, average-risk adult females: a guidance statement from the American College of Physicians (Version 2). Ann Intern Med. 2026, 179:842-56. 10.7326/ANNALS-25-05116
21. American Society of Breast Surgeons: position statement on screening mammography and supplemental imaging. (2026). Accessed: November 15, 2026: https://www.breastsurgeons.org/docs/statements/asbrs-screening-mammography-2026-04-06.pdf.
22. Baethge C, Goldbeck-Wood S, Mertens S: SANRA-a scale for the quality assessment of narrative review articles. Res Integr Peer Rev. 2019, 4:5. 10.1186/s41073-019-0064-8
23. Peek ME, Han JH: Disparities in screening mammography. Current status, interventions and implications . J Gen Intern Med. 2004, 19:184-94. 10.1111/j.1525-1497.2004.30254.x
24. Baron RC, Melillo S, Rimer BK, et al.: Intervention to increase recommendation and delivery of screening for breast, cervical, and colorectal cancers by healthcare providers a systematic review of provider reminders. Am J Prev Med. 2010, 38:110-7. 10.1016/j.amepre.2009.09.031
25. Miller JW, King JA, Trivers KF, Town M, Sabatino SA, Puckett M, Richardson LC: Vital Signs: mammography use and association with social determinants of health and health-related social needs among women - United States, 2022. MMWR Morb Mortal Wkly Rep. 2024, 73:351-7. 10.15585/mmwr.mm7315e1
26. Howard DH, Tangka FK, Miller J, Sabatino SA: Variation in state-level mammography use . Public Health

Rep. 2024, 139:59-65. 10.1177/00333549231155876
27. Henderson LM, O'Meara ES, Haas JS, et al.: The role of social determinants of health in self-reported access to health care among women undergoing screening mammography. J Womens Health (Larchmt). 2020, 29:1437-46. 10.1089/jwh.2019.8267
28. Fedewa SA, Cotter MM, Wehling KA, Wysocki K, Killewald R, Makaroff L: Changes in breast cancer screening rates among 32 community health centers during the COVID-19 pandemic. Cancer. 2021, 127:4512-5. 10.1002/cncr.33859
29. Alba C, Zheng Z, Wadhera RK: Changes in health care access and preventive health screenings by race and ethnicity. JAMA Health Forum. 2024, 5:e235058. 10.1001/jamahealthforum.2023.5058
30. Fayanju OM, Edmonds CE, Reyes SA, Arciero C, Bea VJ, Crown A, Joseph KA: The Landmark Series-Addressing disparities in breast cancer screening: new recommendations for Black women. Ann Surg Oncol. 2023, 30:58-67. 10.1245/s10434-022-12535-8
31. Reeder-Hayes KE, Jackson BE, Kuo TM, et al.: Structural racism and treatment delay among Black and White patients with breast cancer. J Clin Oncol. 2024, 42:3858-66. 10.1200/JCO.23.02483
32. Daly B, Olopade OI: A perfect storm: how tumor biology, genomics, and health care delivery patterns collide to create a racial survival disparity in breast cancer and proposed interventions for change. CA Cancer J Clin. 2015, 65:221-38. 10.3322/caac.21271
33. Keegan G, Rizzo JR, Joseph KA: Disparities in breast cancer among patients with disabilities: care gaps, accessibility, and best practices. J Natl Cancer Inst. 2023, 115:1139-44. 10.1093/jnci/djad130
34. Sabatino SA, Lawrence B, Elder R, et al.: Effectiveness of interventions to increase screening for breast, cervical, and colorectal cancers: nine updated systematic reviews for the guide to community preventive services. Am J Prev Med. 2012, 43:97-118. 10.1016/j.amepre.2012.04.009
35. Fung J, Vang S, Margolies LR, Li A, Blondeau-Lecomte E, Li A, Jandorf L: Developing a culturally and linguistically targeted breast cancer educational program for a multicultural population. J Cancer Educ. 2021, 36:395-400. 10.1007/s13187-019-01643-x
36. Dumky H, Fridell K, Leifland K, Metsälä E: Breast cancer screening and immigrant women-a scoping review of attendance, knowledge, barriers and facilitators. Nurs Open. 2023, 10:5843-56. 10.1002/nop2.1865
37. Rauch JI, Daniels J, Robillard A, Joseph RP: Breast cancer screening among African immigrants in the United States: an integrative review of barriers, facilitators, and interventions. Int J Environ Res Public Health. 2024, 21:32-4. 10.3390/ijerph21081004
38. Vang S, Margolies LR, Jandorf L: Mobile mammography participation among medically underserved women: a systematic review. Prev Chronic Dis. 2018, 15:E140. 10.5888/pcd15.180291
39. Trivedi U, Omofoye TS, Marquez C, Sullivan CR, Benson DM, Whitman GJ: Mobile mammography services and underserved women. Diagnostics (Basel). 2022, 12:26-8. 10.3390/diagnostics12040902
40. Brooks SE, Hembree TM, Shelton BJ, Beache SC, Aschbacher G, Schervish PH, Dignan MB: Mobile mammography in underserved populations: analysis of outcomes of 3,923 women. J Community Health. 2013, 38:900-6. 10.1007/s10900-013-9696-7
41. Jerome-D'Emilia B, Gachupin FC, Suplee PD: A systematic review of barriers and facilitators to mammography in American Indian/Alaska Native women. J Transcult Nurs. 2019, 30:173-86. 10.1177/1043659618793706
42. Heer E, Peters C, Knight R, Yang L, Heitman SJ: Participation, barriers, and facilitators of cancer screening among LGBTQ+ populations: a review of the literature. Prev Med. 2023, 170:107478. 10.1016/j.ypmed.2023.107478
43. Malone J, Snguon S, Dean LT, Adams MA, Poteat T: Breast cancer screening and care among Black sexual minority women: a scoping review of the literature from 1990 to 2017. J Womens Health (Larchmt). 2019, 28:1650-60. 10.1089/jwh.2018.7127
44. Mehta TS, Thompson J, Applegate JM, Wahab RA: Cultural competence in the care of LGBTQ+ patients: a primer for breast/chest centers. J Breast Imaging. 2023, 5:473-9. 10.1093/jbi/wbad012
45. Nelson HD, Cantor A, Wagner J, et al.: Effectiveness of patient navigation to increase cancer screening in populations adversely affected by health disparities: a meta-analysis. J Gen Intern Med. 2020, 35:3026-35. 10.1007/s11606-020-06020-9
46. Phillips CE, Rothstein JD, Beaver K, Sherman BJ, Freund KM, Battaglia TA: Patient navigation to increase mammography screening among inner city women. J Gen Intern Med. 2011, 26:123-9. 10.1007/s11606-010-1527-2
47. Marshall JK, Mbah OM, Ford JG, et al.: Effect of patient navigation on breast cancer screening among African American Medicare beneficiaries: a randomized controlled trial. J Gen Intern Med. 2016, 31:68-76. 10.1007/s11606-015-3484-2
48. Attipoe-Dorcoo S, Chattopadhyay SK, Verughese J, Ekwueme DU, Sabatino SA, Peng Y: Engaging community health workers to increase cancer screening: a Community Guide systematic economic review. Am J Prev Med. 2021, 60:e189-97. 10.1016/j.amepre.2020.08.011
49. Baron RC, Rimer BK, Coates RJ, et al.: Client-directed interventions to increase community access to breast, cervical, and colorectal cancer screening a systematic review. Am J Prev Med. 2008, 35:S56-66. 10.1016/j.amepre.2008.04.001
50. Glasgow RE, Vogt TM, Boles SM: Evaluating the public health impact of health promotion interventions: the RE-AIM framework. Am J Public Health. 1999, 89:1322-7. 10.2105/ajph.89.9.1322
51. Howard DH, Tangka FK, Royalty J, et al.: Breast cancer screening of underserved women in the USA: results from the National Breast and Cervical Cancer Early Detection Program, 1998-2012. Cancer Causes Control. 2015, 26:657-68. 10.1007/s10552-015-0553-0