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# Addressing Disparities in Cancer Screening among US Immigrants: Progress and Opportunities

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## Abstract

The United States (US) is home to 47 million foreign-born individuals, which currently represents over 14% of the US population. With greater length of US residence, immigrants experience increased risk for chronic disease including selected cancers; yet, they are less likely to access preventive healthcare services and undergo cancer screening. As a result, there have been concerted efforts to address disparities in cancer screening in immigrant populations. This mini-review describes current progress in promoting participation in cancer screening among US immigrants and explores potential opportunities for improving impact. Of the 42 studies included in the review, the majority targeted Asian and Latino immigrant populations and included some form of culturally-specific educational programming, often delivered in-person by community health workers and/or using a multimedia format. Twenty-eight of the 42 studies also offered navigation assistance to help overcome logistical and access barriers to care, and these studies yielded somewhat greater increases in screening. Yet, despite considerable effort over the past 20+ years, screening rates remain well below national goals. Opportunities to harness digital health tools to increase awareness and engagement, evaluating non-clinic-based screening paradigms to promote greater participation, and increasing efforts to address the needs of other immigrant subgroups are likely to have beneficial outcomes. Together, these strategies may help reduce inequities in access and uptake of cancer screening in US immigrant populations.

### Keywords

cancer screening; interventions; US immigrants; navigation; health disparities

## INTRODUCTION

The United States (US) is home to a vibrant and diverse immigrant population of approximately 47 million individuals (1). Although foreign-born individuals represented 14.4% of the US population in 2015 (2), they remain marginalized in the healthcare system (3). Disparities in cancer prevention and screening, which are well-documented and have continued to persist over time (4–7), have been attributed to numerous factors including lack

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of insurance and structural barriers to healthcare, language difficulties, and cultural norms that may hinder uptake of preventive health services (8–10). As a result, cancer screening rates remain unacceptably low among US immigrants, who are less likely than US-born individuals to undergo screening for cervical, breast, and colorectal cancers (4, 11, 12).

Given that adherence to evidence-based cancer screening guidelines can help identify cancers at an earlier stage, when they are more likely to be effectively treated -- and in some cases prevented -- there have been varied efforts to address disparities in cancer screening in immigrant populations. Given the multitude of factors that may contribute to such disparities, the National Institute on Minority Health and Health Disparities (NIMHD) established a research framework (13)(14) to characterize the multiple “domains” of influence (biological, behavioral, physical environment, sociocultural environment, and health care system) that may act across various “levels” of influence (individual, interpersonal, community, and societal) to impact health (Table 1). For example, in the context of cancer screening, disparities may arise due to individual beliefs and attitudes pertaining to screening behavior (behavioral-individual), familial norms about preventive health (behavioral-interpersonal) or community norms (sociocultural environment-community) that hinder or promote screening, limited English language proficiency (sociocultural environment-individual) or insurance status (health care system-individual), limited access to care in one’s community (healthcare system-community), and state and federal policies pertaining to uninsured or undocumented individuals (behavioral-societal and health care system-societal). Due to its utility in conceptualizing multidomain and multilevel approaches to reducing health disparities, this framework was used to guide the summary of studies reviewed below (13).

## METHODS

A literature search was conducted using the National Library of Medicine’s PubMed search engine. The search included articles published through June 2019. We used the Boolean operator “AND” to identify combinations of search terms including: immigrant, migrant, refugee (first terms) with cancer screening or screening intervention (second terms). The electronic search was supplemented with a manual search of reference lists from reviews and related papers. We identified 747 articles through the database search and an additional 27 from reference lists. We included articles that: (1) were published in English; (2) conducted in the United States; (3) evaluated an intervention on breast, cervical, or colorectal (CRC) cancer screening behavior outcome; and (4) focused on a foreign-born population. Articles were excluded if they were: (1) review papers or non-empirical in nature (commentaries, editorials, or descriptions of program development); (2) observational or non-intervention studies; (3) focused primarily on economic outcomes (e.g., costs of screening) or attitudes and intention, and did not include a behavioral outcome; (4) designed to modify cancer-related screening other than breast, cervical, or CRC screening (e.g., prostate cancer screening, hepatitis B virus [HBV] screening or vaccination); or (5) did not specify that the intervention was designed for, or included, immigrant populations. We assessed 91 full-text articles for eligibility and excluded 49 that did not meet inclusion criteria, resulting in 42 empirical studies included in this review (see Supplementary Figure 1).

Articles used varied terminology when referencing the study populations, and it is acknowledged that there are important and meaningful differences across refugee, migrant, and immigrant populations. ‘Immigrant’ is commonly used to represent a foreign-born individual, and can include ‘migrants’ who re-locate for economic opportunities or employment. A ‘refugee’ is an individual who has been forced to leave his or her home country due to war, violence, or persecution. The majority of studies reviewed used the term ‘immigrant’ to broadly characterize foreign-born study participants, with only a few studies distinguishing among refugees (e.g., (15, 16) and migrant workers (17). Moreover, we acknowledge that significant heterogeneity can exist within each of these groups with respect to participants’ legal status (e.g., unauthorized immigrant, permanent resident, naturalized citizen). Given the sensitive nature of collecting such information from study participants, the vast majority of studies reviewed did not report participant legal status, but instead reported country of origin and/or years in the US. Thus, in this mini-review, we use the term ‘immigrant’ broadly to refer to foreign-born study participants, and use more specific terms for individual studies as appropriate.

## RESULTS

Of the 42 studies included in this review, 16 targeted breast cancer screening (Supplementary Table 1), 12 focused on cervical cancer screening (Supplementary Table 2), 9 were CRC screening interventions (Supplementary Table 3), and 5 studies targeted multiple screening behaviors (Supplementary Table 4). The outcome of screening behavior was primarily captured at the *Individual* level, with only a handful of studies assessing *Interpersonal* (18) or *Community* level outcomes (19, 20), including those studies in which the “community” was broadly defined as an organization (e.g., healthcare clinic) that served a predominantly immigrant or refugee population (16, 21). As a result, all interventions included components directed at the *Individual* level of influence, with a primary focus on *behavioral* and *sociocultural environment* domains. Twenty-eight studies (66.7%) also addressed the *healthcare system* domain by providing navigation support or offering mobile screening services (i.e. mobile mammography van). Below we summarize study findings according to selected NIMHD Framework domains and discuss opportunities and directions for further investigation.

### Interventions Targeting Behavioral and Sociocultural Environment Domains

Nearly all interventions included some form of educational programming and targeted the behavioral and sociocultural environment by addressing individual knowledge gaps and beliefs pertaining to screening behavior, providing information about screening and strategies for overcoming psychosocial barriers to screening (behavioral domains), and offering translated educational materials that were culturally appropriate and consistent with the cultural identity of that population (sociocultural environment). In many studies, the interventions were delivered by lay health workers (also commonly referred to as lay health educators or community health workers) or respected members of the community, such as religious leaders, which also increased the sociocultural acceptability of the information and strategies being presented.

The largest number of studies focused on breast cancer screening, with slightly over half targeting Asian American immigrant populations (Chinese, Korean, Vietnamese, Filipino) (Supplementary Table 1). Of the 16 breast cancer screening interventions, 5 primarily targeted the behavioral and sociocultural environment domains. These studies reported varying levels of success, with rates of mammography screening ranging from 37.9% to 56% post-intervention (e.g., (18, 22, 23). Most intervention programs were conducted at community sites, including some in religious organizations and settings. For example, a study of predominantly foreign-born Muslim women found that a mosque-based intervention was feasible and acceptable (23), with 37.9% of women subsequently obtaining a mammogram within 1 year following the program.

Interventions to increase cervical cancer screening (Supplementary Table 2) or CRC screening (Supplementary Table 3) have been mostly conducted with Asian American immigrant populations. The majority of these intervention programs were delivered by community members (trained as lay health workers), many of whom were immigrants themselves and were familiar with the cultural norms of that community. Cervical cancer screening interventions that targeted behavioral and sociocultural environment domains reported screening rates ranging from 24%−62% (17, 24, 25). CRC screening interventions that focused on the behavioral and sociocultural environment domains reported somewhat higher screening rates of 45% to 78.1% (21, 26–28).

## Interventions Addressing Health Care System Domains

Given that health care access barriers can significantly impede participation in cancer screening, more than half of the interventions reviewed also addressed factors in the *health care system* domain, mostly through the provision of navigation assistance to address insurance issues, language barriers, and limited access to care. In fact, the majority of breast and cervical cancer screening interventions offered some navigation support, usually in the form of providing assistance with obtaining low-cost or free screenings. The 11 breast cancer screening interventions that addressed health care system domains were associated with increased screening rates, although improvements were modest in some cases, with post-program screening rates varying from 31.9% to greater than 80%. One study that offered screening through various mechanisms, including a mobile mammography van, had the highest rates of success, with 80% of uninsured women and 100% of insured women obtaining a mammogram (15).

Cervical cancer screening interventions that provided navigation support also reported increases in screening, with rates ranging from 39% to greater than 80%. More recent studies have offered home-based human papillomavirus (HPV) DNA testing as an option to increase screening participation, and this approach has been relatively well-accepted with participation ranging from 65.5% to 81.0% (29–31). Among CRC screening interventions targeting health care system factors, only one offered navigation assistance, but several provided home-based screening tests such as fecal occult blood test (FOBT) kits (32) as a strategy for addressing access barriers. Overall, these CRC screening interventions yielded increased screening rates ranging from 55% to 85%. Thus, across both cervical and colorectal cancer screening studies, offering a home-based screening option was effective in significantly increasing screening participation in predominantly immigrant communities.

Finally, five studies addressed multiple cancer screening behaviors (Supplementary Table 4), and these programs targeted migrant workers (33) or Latino immigrant populations (20, 34–36). All five studies addressed behavioral, sociocultural environment, and health care system domains and were intended to increase breast, cervical, and (in 2 studies) CRC screening rates. Although all studies reported increases in screening participation (from pre- to post-program or in comparison to a control group), screening rates were modest and remained below Healthy People 2020 national goals (37).

## Looking Beyond the Individual Level of Influence

The majority of interventions reviewed targeted the individual, but 3 studies were identified in which the intervention also addressed interpersonal-level factors to enhance screening uptake (18, 19, 38). For example, a breast cancer screening intervention for Korean American immigrant women included the women’s spouses in order to promote spousal support for screening (18). The intervention consisted of a 30-minute Korean language DVD that presented information about breast cancer and screening, examples of spousal support for wives’ cancer screening, and recommendations for screening from a male Korean American physician. Other components of the intervention included a homework activity (e.g., list and discuss things that a husband can do to support the wife’s breast cancer screening) completed by the couple at home. At 15-months post-program, women in the intervention group (56%) were more likely to obtain a mammogram compared to the control group (42%) (18).

Another study targeted the patient-provider relationship to increase CRC screening rates among Latino immigrants (38). Patients in a primary care clinic received a Spanish-language educational video on CRC screening and risk factors. Following the video, patients were provided a paper reminder to give to their physician indicating that they had received CRC education and were eligible for screening (38). The intervention group had a completed screening rate of 55%, whereas only 18% of participants in the control group obtained screening. In addition, physicians in the intervention group were more likely to recommend CRC screening (61%) compared to physicians in the control group (41%). Among patients who received a physician recommendation, 90% completed screening, compared to only 26% in the control group (38), thus demonstrating the positive impact of targeting the interpersonal patient-provider relationship.

Relatively few studies captured community-level outcomes. Two studies that assessed intervention effects on breast (19) and cervical (20) cancer screening at the city level reported modest increases in screening. In other studies, the “community” was defined as a clinic population (16, 21, 39). A refugee patient navigation program was found to be effective in increasing breast cancer screening rates among Somali, Arabic, and Serbo-Croatian refugee women to levels that were comparable to English- and Spanish-speaking women presenting at the same clinic (39). Importantly, screening rates among refugee women attending this clinic remained high up to 5 years after the program had ended (16).

## OPPORTUNITIES AND NEXT STEPS

The majority of studies reviewed demonstrated some success, although in many cases screening rates remained suboptimal. Selected interventions that included navigation support were able to achieve somewhat higher screening rates, which is not surprising given that structural and practical barriers to screening are among the most often cited factors influencing screening behavior in immigrant populations (40). All interventions targeted individual-level factors and were directed at influencing multiple domains including the behavioral, sociocultural environment, and/or health care system domains. In contrast, relatively few studies were carried out at the interpersonal, community, or societal levels. Although several studies reported meaningful progress in reducing disparities in screening rates, it has been challenging to close the persistent gap in cancer screening among US immigrants. Thus, in order to achieve US national goals for screening, we explore various opportunities for promoting participation in cancer screening and in targeting communities at greatest need.

### Digital Health and Social Media to Increase Reach at the Individual and Community Levels

The majority of interventions has been conducted in-person, but such programs can be labor- and time-intensive to implement. The use of digital tools and social messaging apps, which has been growing steadily worldwide (41), may help facilitate greater engagement with and enhance dissemination of evidence-based programs. Indeed, there has been considerable interest in harnessing digital tools to encourage and improve a range of health behaviors, including cancer screening behaviors (42–45). For example, a 7-day text messaging intervention to increase cervical cancer screening was evaluated among Korean American women (43). Findings revealed a significant increase in knowledge about cervical cancer risk factors and screening guidelines, as well as a 23% increase in Pap test receipt. This approach offers the advantage of being widely disseminable and potentially less costly to implement.

Social media also reaches a large number of users daily, many of whom are members of racial and ethnic minority communities. WhatsApp is a social messaging app with approximately 1.5 billion monthly users worldwide (46), and it is the most widely used social messaging app across the majority of Caribbean and African countries (47). Studies have demonstrated that WhatsApp can be effectively used to deliver interventions that increase health-related knowledge and behaviors related to oral cancer prevention (48) and promote smoking cessation (49). Similarly, WeChat is a social media app that is highly popular in China with over 1 billion daily active users (50). Similar to WhatsApp, WeChat has also been explored as a tool for providing health information (51), and studies are currently evaluating a WeChat-based intervention for improving well-being among cancer patients (52). Many US immigrants utilize these applications to stay connected with friends and family members in other countries (53); thus, these tools may offer promising new possibilities for reaching immigrant communities and delivering culturally-appropriate, evidence-based interventions to improve participation in cancer screening.

## Self-Sampling Exemplars to Address Health Care System Access Barriers

Many cancer screening exams occur in a clinic setting. A notable exception is CRC screening, which includes an option for home-based sample collection. Uptake of CRC screening in immigrant populations is often more likely to occur in the form of home-based screening (e.g., FOBT, FIT) than clinic-based colonoscopy due to access and other structural barriers (27, 28). Some studies have taken this approach one step further, by mailing test kits directly to patients, a strategy that has been found to be successful in promoting CRC screening in low-income, racially diverse populations (54). Drawing upon these successes, a similar approach could be considered for cervical cancer screening. National guidelines now support primary high-risk human papillomavirus (hrHPV) testing every 5 years as an evidence-based approach for cervical cancer screening in women 30–65 years of age (55). Given that self-collected samples for hrHPV testing yields comparable accuracy to clinician-obtained samples (56), allowing provisions for home-based sample collection may offer a reasonable option for women who are not able to access clinic-based screening. In fact, several US studies have reported uptake of HPV self-sampling to be relatively high among underscreened and unscreened immigrant women. Among Somali immigrant women, participation in self-sampling for HPV testing was 65.6% compared to only 19.4% for clinic-based Pap testing (29). Similarly, among predominantly immigrant women in South Florida, rates of self-sampling were as high as 71.6% among women who received a mailed kit, and even higher (81.0%) among women who received the kit in-person from a community health worker (31). The high acceptability of self-sampling, particularly among immigrant populations, suggests that home-based screening options may offer an efficacious approach for increasing screening coverage in US populations that have traditionally had limited access to health care or experienced significant barriers to screening.

## Dearth of Interventions Beyond the Individual Level

Given that health behaviors are often not only a function of individual-level factors, but also community and societal-level factors, there remain many opportunities to implement broader initiatives to improve screening participation. One approach to support and efficiently carry out such efforts may involve the use of sophisticated geospatial tools to help identify geographic areas and communities experiencing high disparity. Geographic information system (GIS) technologies can be applied to detect and visualize patterns of healthcare utilization and outcomes (57), and communities are now employing GIS to map area cancer screening resources. For example, the Tampa Bay Community Cancer Network (TBCCN) plotted colonoscopy clinics across several counties in their region (58). This information was shared with community partners to identify the availability of CRC screening and diagnostic services across local communities, in order to facilitate access. In Canada, such tools have been combined with population-level administrative data to create maps of cancer screening (59) that can help pinpoint locations where more intensive screening interventions are warranted. Accordingly, public health programs could then be implemented in a more targeted, and potentially cost-efficient, manner.

Finally, we will not see significant improvements in cancer screening rates if societal-level policy barriers are not addressed. At present, many state and federal policies supporting cancer screening do not extend to unauthorized immigrants (i.e. those who entered the US without inspection or have expired visas) who are ineligible for Medicaid and various benefits provided under the Patient Protection and Affordable Care Act. In addition, current policy changes under consideration, which have led to increased racism, discrimination (60) and fear among US immigrants (even among those who are legal residents) (61), may contribute to decreased use of preventive healthcare (62, 63). Proposed changes to the “Public Charge Rule” (64) may dissuade immigrants from obtaining preventive health care (65, 66), if it will negatively impact their application to become a lawful permanent resident. While the immigration policy debate wages on, communities and healthcare organizations are taking steps to ensure that foreign-born individuals feel safe in obtaining healthcare for themselves or their family members, without fear of deportation (67). And national groups continue to press Congressional leaders to work toward a solution that would ensure that immigrants and refugees can access necessary medical, mental health and social services (68).

## Concluding Remarks

Significant progress has been made to address disparities in cancer screening among US immigrants, but more remains to be done. Programs to encourage participation in cancer screening have become increasingly sophisticated, moving beyond traditional health education programs to those that incorporate navigation services, utilize multimedia resources, and/or address multilevel factors. Nevertheless, despite considerable effort, many studies have resulted in only modest increases and screening rates continue to fall short of national goals. In addition, there has been limited research on the needs of migrant workers, refugees, and non-Hispanic Black immigrants and greater attention to these populations is warranted. Moving forward, harnessing the dynamic changes in technology and science into innovative interventions may prove to be impactful for increasing reach and engagement beyond the individual level to the broader community and societal level. Finally, healthcare professionals and public health practitioners should seek opportunities to partner with public health organizations, policy makers, and the communities they serve to ensure that laws and regulations (66) do not harm or discourage immigrant populations from obtaining beneficial, cost-effective, and life-saving preventive care.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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## Table 1.

Adapted NIMHD Minority Health and Health Disparities Research Framework (https://www.nimhd.nih.gov/about/overview/research-framework.html)

| | | **Levels of Influence** | | | |
|---|---|---|---|---|---|
| | | **Individual** | **Interpersonal** | **Community** | **Societal** |
| **Domains of Influence** *(Over the Lifecourse)* | **Biological** | Biological Vulnerability and Mechanisms | Caregiver-Child Interaction<br>Family Microbiome | Community Illness Exposure<br>Herd Immunity | Sanitation<br>Immunization<br>Pathogen exposure |
| | **Behavioral** | Health Behaviors<br>Coping Strategies<br>Attitudes about Screening | Family Functioning<br>School/Work Functioning | Community Functioning | Immigration Policies and Laws |
| | **Physical/Built Environment** | Personal Environment | Household Environment<br>School/Work Environment | Community Environment<br>Community Resources & Organizations | Societal Structure |
| | **Sociocultural Environment** | Sociodemographics<br>Limited English<br>Cultural Identity<br>Response to Discrimination | Social Networks<br>Family/Peer Norms<br>Interpersonal Discrimination | Community Norms<br>Immigrant Enclaves<br>Local Structural Discrimination | Societal Norms<br>Societal Structural Discrimination |
| | **Health Care System** | Insurance Coverage<br>Health Literacy<br>Treatment Preferences | Patient-Clinician Relationship<br>Medical Decision-Making | Availability of Services<br>Safety Net Services | Quality of Care<br>Health Care Policies |
| **Health Outcomes** | | **Individual Health** | **Family/ Organizational Health** | **Community Health** | **Population Health** |