

## Increasing cervical cancer screening among US Hispanics/Latinas: A qualitative systematic review

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### **Abstract:**

Hispanic/Latina women experience the highest cervical cancer incidence rates of any racial/ethnic group in the USA and tend to present with more severe cases and experience higher mortality compared to most other populations. The goals of this qualitative systematic review were to explore existing interventions to increase cervical cancer screening among US Hispanics/Latinas and to identify characteristics of effective interventions and research gaps. Six online databases were searched from their inception through June 30, 2013, using designated search terms and keywords. Peer-reviewed articles that documented an intervention designed to improve screening for cervical cancer among Hispanics/Latinas ages 18 years and older living in the USA were reviewed. Data were abstracted using a standardized form to document intervention characteristics and results. Forty-five articles, describing 32 unique interventions, met inclusion criteria. Identified interventions consisted primarily of educational programs and/or provision of screening. Interventions used lay health advisors (LHAs), clinic-based outreach/delivery strategies, partnerships with churches, and mass media campaigns. Twelve interventions resulted in significant increases in cervical cancer screening rates. Interventions developed utilizing theory, applying community-based participatory research approaches, and using LHAs were identified as having the greatest potential for improving cervical cancer screening among Hispanics/Latinas. There continues to be a need for the development of interventions in geographic areas with new and emerging Hispanic/Latino populations and that are comprehensive, follow participants for longer periods of time, and broaden the roles and build the capacities of LHAs.

**Keywords:** Cervical cancer | Screening | Hispanic/Latino | Women | Intervention | Systematic review

### **Article:**

## Introduction

As the largest and fastest growing minority group in the USA, attention to the health needs of the Hispanic/Latino population is critical [1, 2]. Of particular concern among Hispanic/Latina women are disproportionately high rates of cervical cancer incidence and mortality.

Hispanic/Latina women experience one of the highest cervical cancer incidence rates of any racial/ethnic group, nearly double that of non-Hispanic/Latina white women [3]. In addition, Hispanics/Latinas tend to present with more severe cases of cervical cancer [4] and experience higher mortality rates (3.0/100,000) compared to other populations (2.1/100,000 for non-Hispanic/Latina whites) [3].

Such poor cervical cancer outcomes among Hispanics/Latinas can, in part, be attributed to low rates of screening [5, 6] and follow-up after abnormal cervical cancer screening results [3, 7]. Cervical cancer is typically preventable if precancerous lesions are detected and treated early. Therefore, regular cervical cancer screening and follow-up are critical. Current recommendations indicate that women should have regular cervical cancer screening starting at age 21 through at least age 65. Women ages 21 to 29 at average risk should be screened using a Pap test every 3 years. Women ages 30 years and older should continue to receive Pap tests every 3 years or should receive cotesting (a Pap test with human papillomavirus (HPV) test) every 5 years [3]. It is estimated that 88 % of Hispanics/Latinas in the USA have never had cervical cancer screening compared to 95 % of non-Hispanic/Latina whites [4]; similarly, as of 2010, 74.7 % of Hispanics/Latinas compared to 79.1 % of non-Hispanic/Latina whites reported receiving cervical cancer screening in the previous 3 years [3]. Furthermore, cervical cancer screening rates are 25–40 % lower among foreign-born Hispanics/Latinas (particularly those born in Mexico and Central America) compared to Hispanics/Latinas born in the USA [8]. Lower adherence to cervical cancer screening recommendations, including lower rates of cervical cancer screening, knowing one's screening results, and follow-up after an abnormal or inconclusive screening, contributes to greater cervical cancer mortality among Hispanics/Latinas, with recently immigrated and uninsured Hispanics/Latinas at greatest risk [9, 10].

Barriers to cervical cancer screening among Hispanics/Latinas are numerous and include individual-, sociocultural-, and system-level factors. Individual-level factors influencing screening behaviors among Hispanics/Latinas include lack of understanding of cervical cancer etiology and prevention, including HPV vaccination, and poor awareness of health screening services and treatment options [11–20]. Research also suggests that some Hispanics/Latinas may have low levels of self-efficacy related to communication with health care providers and sexual partners, which may affect adherence to screening recommendations [12, 15]. Embarrassment, fear of pain, hopelessness surrounding a possible cancer diagnosis, and concerns about deportation have also been identified as negatively impacting screening [5, 21, 22]. Distrust of the health care system and providers [23–26], low levels of acculturation [27], low educational attainment [28, 29], foreign birth, low income, and language constraints [5, 30] are also relevant barriers for Hispanics/Latinas.

Hispanic/Latino cultural beliefs and social norms also may affect cervical cancer screening behaviors. Dignity, respect, and fatalism are attributes that may affect cervical cancer screening. For example, if Hispanics/Latinas feel that their dignity is threatened during screening [31] or if

they are concerned that asking questions and being assertive with health care providers may be regarded as disrespectful [12, 31–33], they may be less likely to seek cervical cancer screening, understand the importance of cervical cancer screening, receive their screening results, and seek follow-up care as warranted. Fatalism may similarly affect screening, as some Hispanics/Latinas may believe that cancer is not preventable [34, 35]. Traditional gender roles that encourage some women to remain pure, endure suffering, and be obedient to men, combined with machismo, which prescribes men to be perceived as powerful and appear dominant [31, 36–38], may dissuade Hispanics/Latinas from discussing sex and sexual health. This dynamic may result in some Hispanics/Latinas feeling less powerful in their relationships with partners [23, 32, 39–41] and health care providers [42]. Such gender roles also may be detrimental if male partners are uncomfortable with women attending gynecological exams [42].

Further, system-level barriers such as access to health services, lack of health insurance, and limited transportation and childcare options can also affect cervical cancer screening behaviors [4, 5].

Despite numerous studies reporting on the importance of and barriers to cervical cancer screening among Hispanics/Latinas in the USA, less is known about the development and effectiveness of interventions designed to increase cervical cancer screening among this population. We reviewed cervical cancer screening interventions designed for Hispanics/Latinas in the USA using an established qualitative systematic review approach [43, 44]. This systematic approach allowed us to identify characteristics of effective interventions and gaps in the existing cervical cancer prevention science.

## **Materials and Methods**

This qualitative systematic review included a search of the literature using online electronic databases [43]. The review was overseen by a team of researchers with extensive experience in health behavior intervention development, implementation, and evaluation and in sexual and reproductive health within the rapidly growing immigrant Hispanic/Latino community in the southeastern USA [38, 44–50]. Six databases were used: PubMed, CINAHL, EBSCO Academic Search Premier, ProQuest, JSTOR, and PyschInfo. Databases were searched from their inception through June 30, 2013. Each database was searched using the following Boolean terms and keywords: (Hispanic OR Latino OR Latina) AND (women OR woman OR female) AND (“cervical cancer” OR HPV OR “human papilloma virus” OR “human papillomavirus”) AND (intervention OR program). In addition, citations from the bibliographies of identified papers were analyzed and relevant citations were selected for review. English-language peer-reviewed journals were used.

In order to be included in the review, papers had to document an intervention designed to improve screening for cervical cancer among Hispanic/Latina women ages 18 years and older living in the USA. Interventions were included if they were designed for and implemented with Hispanics/Latinas exclusively or if they were designed for Hispanics/Latinas along with other groups and at least 50 % of the identified participants were Hispanic/Latina. Papers that did not report sufficient information to be abstractable were excluded. Although some interventions were

described in multiple papers, relevant information abstracted from each paper was combined to review each intervention only once.

### Data Collection and Abstraction

An abstraction form was used to document each intervention's name, a description of the intervention (e.g., theories used and components) and participants, the intervention setting, the evaluation study design, and screening outcomes.

### Results

A total of 795 abstracts were identified. After initial screening of all abstracts, 66 papers were identified for closer review. Cross-referencing these papers yielded 18 additional references. In total, 45 articles met the inclusion criteria (including multiple papers for the same intervention) for a total of 32 unique interventions. The interventions and their key characteristics are summarized in Table 1.

About two thirds of the interventions (n=23) targeted Hispanics/Latinas exclusively [11, 51–84]; the remainder targeted a broader sample of multiethnic women [85–94]. Eight interventions were based exclusively or partly in Texas [11, 51–54, 56, 67, 68, 70, 83, 91, 92], seven in California [11, 54, 63–65, 85, 87, 88, 93], six in Arizona [59–61, 73, 74, 77, 78, 84, 94], four in New York [57, 58, 80, 81, 83, 89, 90, 93], and two in Washington state [70–72]. Additional intervention sites included Colorado [86], New Mexico [11, 54], Arkansas [57, 58, 80, 81], Illinois [55], Virginia [69], Pennsylvania [66], Florida [62], Georgia [75, 76], and Alabama [79]. The interventions included one-time intervention sessions or activities [57, 58, 62, 68, 72, 77, 78, 80–82, 88, 90, 94]; multiple-session or multiple-contact programs [11, 54, 59–61, 63–66, 73–76, 79, 84]; and programs with ongoing activities over a specified period of time, such as media campaigns, system protocol changes, or material distribution [51–53, 55, 56, 67, 69, 72, 83, 85–87, 89, 91–93]. Breast cancer screening was jointly targeted along with cervical cancer screening in more than half (n=18) of the interventions [11, 51–56, 58–65, 69, 73, 74, 77, 78, 82–84, 89, 91, 92].

Thirteen of the interventions described one or more specific behavioral theories that informed the intervention; social cognitive or social learning theory (n=9) was the most commonly used [51–53, 57, 58, 63, 70–72, 75–78, 80, 81, 83, 91, 92]. Other theories included the health belief model (n=4) [51–53, 66, 70, 71, 79], the theory of reasoned action (n=2) [51–53, 70, 71], the transtheoretical stages of change model (n=1) [70, 71], diffusion of innovations (n=1) [51–53], social influence theory (n=1) [88], popular education (n=1) [75, 76], and adult education theory (n=1) [68]. In addition, eight studies described using conceptual frameworks and intervention development strategies either in conjunction with or independently of specific theoretical foundations [11, 54, 57, 58, 66, 70, 71, 73, 74, 79–82, 94], and six were based on existing interventions [55, 57, 58, 72–74, 77, 78, 80, 81, 83]. The frameworks described included community-based participatory research (CBPR) or community-based participatory action (n=7) [11, 54, 57, 58, 66, 70, 71, 73, 74, 80–82, 94], intervention mapping (n=3) [11, 54, 70, 71, 79], the PEN-3 model (n=3) [57, 58, 79–82], and empowerment (n=1) [82].

**Table 1.** Review of cervical cancer screening interventions among Hispanic/Latina women in the USA

Study	Location	Description of participants	Theoretical foundation	Intervention development strategy	Intervention components	Outcome evaluation design	Cervical cancer screening outcomes	Joint targeting of breast cancer screening
Bastani et al. [85]	CA	Multiethnic female health department patients; ≥18 years old (N=18,642, 57.5 % Hispanic)	N.D.	N.D.	System changes to hospital and clinic protocols, physician and patient education, and expanded capacity	Quasi-experimental nonequivalent control group design over 2.5 years	↑ screening (p<0.05) in some clinical settings	No
Batal et al. [86]	CO	Female urgent care patients; 18–70 years old (N=197; 52 % Hispanic)	N.D.	N.D.	System changes to routinely offer screening to clinic patients needing a pelvic exam	Experimental two-group randomized trial with pretest and 6-month follow-up	↑ screening (p<0.01)	No
Burger et al. [87]	CA	Uninsured women; >18 years old (N=126; 83 % Hispanic)	N.D.	N.D.	Educational pamphlet and free screening and excision services offered to clinic patients	Single group with pretest and immediate posttest	N.D.	No
Byrd et al. [70]; Byrd et al. [71]	TX; WA	Women of Mexican origin (N=613)	HBM; TRA; TTM; SCT	CBPR; IM	LHAs led one-on-one educational sessions that included a video only, a flip chart only, or a video and flip chart	Experimental four-group randomized trial evaluating intervention and specific intervention materials with pretest and 6-month follow-up	↑ screening in intervention groups (p<0.0001) results in two out of three sites	No
Davis et al. [88]	CA	Female parishioners; ≥21 years old (educational sessions N=943; 35 % Hispanic; screening sessions N=490; 76 % Hispanic)	SIT	N.D.	LHAs from participating churches led one-time educational sessions, and free screening was conducted at church	Baseline assessment of screening history with tracking of follow-up screening rates	98 % of Hispanic women identified for screening and an additional 94 Hispanic women presented for screening	No
Dietrich et al. [89]	NY	Low-income and minority female health center patients; 50–69 years old (N=1,413; 63 % Spanish primary language)	N.D.	N.D.	Clinic staff conducted outreach using repeated phone calls over an 18-month period	Experimental two-group randomized trial with pretest and 3-month follow-up	↑ screening (p<0.001)	Yes
Duggan et al. [72]	WA	Hispanic female health center patients; 21–64 years old (N=600)	SCT	Intervention video from Byrd et al. [70]; Byrd et al. [71]	LHAs led one-time one-on-one educational sessions using a video and helped participants	Experimental parallel randomized trial evaluating LHA	<i>Outcome data not available</i>	No

Study	Location	Description of participants	Theoretical foundation	Intervention development strategy	Intervention components	Outcome evaluation design	Cervical cancer screening outcomes	Joint targeting of breast cancer screening
					schedule screening or participants were shown a video only	intervention and video only		
Fernández et al. [54]; Fernández et al. [11]	CA; TX; NM	Hispanic farmworker women; ≥50 years old (N=497)	N.D.	CBPR; IM	LHAs led one-time one-on-one educational sessions and made follow-up phone calls with participants	Quasi-experimental with intervention and comparison communities and with pretest and 6-month follow-up	↑ screening (p<0.05)	Yes
Fernández-Esquer et al. [51]; Ramirez et al. [52]; McAlister et al. [53]	TX	Mexican-American women; ≥18 years old (N=1,804)	SLT; DOI; HBM; TRA	N.D.	LHAs served as role models in mass media campaign messages and distributed intervention materials	Quasi-experimental with intervention and comparison communities and with pretest, 24-month follow-up, and 36-month follow-up	↑ screening among women <40 years old who had previously not adhered to screening recommendations (p<0.05)	Yes
Frank-Stromborg et al. [55]	IL	Rural Latina women (N=81)	N.D.	Intervention model from Navarro et al. [63]	LHAs promoted 5-day program that included educational sessions, free transportation, screening, translation, and childcare	Single group with pretest and immediate posttest	N.D.	Yes
Hansen et al. [56]	TX	Hispanic women; >18 years old (N=141)	N.D.	N.D.	Cancer survivor LHAs promoted screening within social networks	Tracking screenings over 13 months	43 out of 141 women contacted by the LHAs received screening	Yes
Hunter et al. [84]	AZ	Uninsured Hispanic women ≥40 years old (N=101)	N.D.	N.D.	LHAs conducted home visits to follow-up with patients who had received screening postcard reminding them to schedule their next annual screening or patients received reminder postcard only	Experimental two-group randomized trial	Trend toward higher rate of screening in intervention group than in comparison group (N.S.)	Yes
Larkey [59]	AZ	Latina women; ≥18 years old (N=457)	N.D.	N.D.	LHAs led six bimonthly church- and home-based	Single group with pretest and immediate posttest	39 % of participants who had previously not adhered to	Yes

Study	Location	Description of participants	Theoretical foundation	Intervention development strategy	Intervention components	Outcome evaluation design	Cervical cancer screening outcomes	Joint targeting of breast cancer screening
					small-group educational sessions		screening recommendations had received screening by posttest	
Larkey et al. [73]; Larkey et al. [74]	AZ	Latina women due for cancer screening; ≥18 years old (N=1,006 randomized; N=509 evaluable)	N.D.	CBPR; intervention model from Larkey [59]	LHAs led seven weekly social support group or one-on-one educational sessions	Experimental two-group cluster-randomized trial comparing social support group and one-on-one interventions with pretest, 3-month follow-up, and 15-month follow-up	Trend toward higher screening rates in one-on-one intervention (N.S.)	Yes
Lopez and Castro [60]; Castro et al. [61]	AZ	Hispanic female church members; ≥18 years old (N=447)	N.D.	N.D.	LHAs led church-based small-group educational sessions and helped facilitate screening	Experimental two-group randomized trial with pretest and 12-month follow-up	N.S.	Yes
Luque et al. [75]; Watson-Johnson et al. [76]	GA	Hispanic farmworker women (N=7 LHAs)	Popular Education; SCT	N.D.	LHAs were trained using two-session curriculum	N.D.	N.D.	No
Meade et al. [62]	FL	Hispanic farmworker women; ≥18 years old (N=65)	N.D.	N.D.	LHAs led one-time small-group educational sessions and helped schedule screenings	Single group with pretest, immediate posttest and 6-week follow-up	50 % of participants eligible for screening had received screening by 6-week follow-up	Yes
Moore-Monroy et al. [94]	AZ	Predominantly Latina women; ≥18 years old (study 1 N=174; study 2 N=837, 96.8 % Hispanic or Latina)	N.D.	CBPA	LHAs led one-time one-on-one and small-group educational sessions	N.D.	N.D.	No
Morgan and Levin [90]	NY	Female home health care attendants (N=1,411; 61.8 % Hispanic)	N.D.	N.D.	One-time in-service training program	N.D.	N.D.	No
Navarro et al. [63]	CA	Latina women (N=512)	SLT	N.D.	LHAs led 12 weekly small-group educational sessions	Experimental two-group cluster-randomized trial with pretest, immediate posttest, 12-month follow-	Trend toward higher rate of screening in intervention group than in comparison group (N.S.)	Yes

Study	Location	Description of participants	Theoretical foundation	Intervention development strategy	Intervention components	Outcome evaluation design	Cervical cancer screening outcomes	Joint targeting of breast cancer screening
						up, and 24-month follow-up		
Navarro et al. [64]; Navarro et al. [65]	CA	Latina women (N=311 primary participants and N=269 “learning partners”)	N.D.	N.D.	LHAs led 12 weekly and 2 monthly small-group educational sessions and participants shared information with up to 2 additional “learning partners”	Single group with pretest and 6-month follow-up	↑ screening among primary participants (p<0.01) and “learning partners” (p<0.05) (statistically significant)	Yes
Nuño et al. [77]; Nuño et al. [78]	AZ	Hispanic women; ≥50 years old (N=381)	SCT	Intervention model from Lopez and Castro [60] and Castro et al. [61]	LHAs led one-time small-group educational sessions with optional booster course after 1 year	Experimental two-group randomized trial	↑ screening within past 2 years (p=0.007)	Yes
O’Brien et al. [66]	PA	Hispanic women; 18–65 years old (N=120)	HBM	CBPR	LHAs led two small-group educational sessions	Experimental two-group delayed intervention randomized trial with pretest and 6-month follow-up	↑ screening (p=0.004)	No
Ramirez et al. [67]	TX	Hispanic women (N=212)	N.D.	N.D.	LHAs served as role models in mass media campaign messages and distributed intervention materials	Quasi-experimental with intervention and comparison communities with as pretest and 24-month follow-up	↑ screening adherence (p<0.018)	No
Saad-Harfouche et al. [58]; Sudarsan et al. [80]; Jandorf et al. [81]; Jandorf et al. [57]	AR; NY	Latina women (87 %) and men (13 %); >18 years old; predominantly Spanish-speaking (N=1,233); primary analysis only included data from women	SCT	CBPR; PEN-3 Model; adaptation of intervention promoting BC screening among African-American women [111]	LHAs, including cancer survivors, led one-time small-group educational session and helped navigate screening	Experimental two-group cluster-randomized trial with pretest, immediate posttest, 2-month follow-up, and 8-month follow-up	↑ screening (p=0.08) at 2 month follow-up within smaller sub-study of women	Yes
Scarinci et al. [79]	AL	Latina immigrant women (N=543)	HBM	PEN-3; IM	LHAs led six small-group and two one-on-one educational sessions	Experimental 2-group cluster-randomized trial with pretest, immediate posttest, 12-month follow-up, and 24-month follow-up	<i>Outcome data not available</i>	No

Study	Location	Description of participants	Theoretical foundation	Intervention development strategy	Intervention components	Outcome evaluation design	Cervical cancer screening outcomes	Joint targeting of breast cancer screening
Sheridan-Leos [68]	TX	Hispanic women (N=100)	Adult education theory	N.D.	Interactive game played in small groups with an instructor	Qualitative posttest with sample of participants	N.D.	No
Suarez et al. [92]; Suarez et al. [91]	TX	Mexican-American and black women; 40–70 years old (N=189; 56.6 % Mexican-American)	SLT	N.D.	LHAs served as role models in campaign messages and distributed intervention materials	Pretest and posttest at beginning and end of 2.5-year intervention period with random sample of participants	N.S.	Yes
Suarez et al. [83]	TX	Mexican-American women; ≥40 years old (2 independent samples of 923 each for pretest and posttest)	SCT	Intervention model from Fernández-Esquer et al. [51], Ramirez et al. [52], and McAlister et al. [53]	LHAs served as role models in campaign messages and distributed intervention materials	Quasi-experimental with intervention and comparison communities and with pretest and 3-year follow-up	N.S.	Yes
Warren et al. [69]	VA	Latina women; ≥40 years old (N=928)	N.D.	N.D.	One-time small-group education sessions and free screening services and educational programs offered 1 day per month	Tracking number of screenings provided over 6-month intervention period	928 screening visits completed (439 first-time participants)	Yes
White et al. [82]	AL	Foreign-born Latina immigrant women (N=782)	N.D.	CBPR; Empowerment Model; PEN-3 Model	LHAs organized one-time luncheons in churches facilitated by physicians and cancer survivors; participants were able to schedule low-cost and free screening appointments and follow-up care	Tracking of screenings	80 % of participants scheduled a screening appointment; 65 % of those who scheduled appointments attended the visit	Yes
Yancey et al. [93]	CA; NY	Predominantly African-American and Latina female community health center patients (N=1,744; 65.1 % Latina)	N.D.	N.D.	Educational videos in clinic waiting rooms	Quasi-experimental 1-week-on-1-week-off design	↑ screening (p<0.05)	N.D.

*CBPA* community-based participatory action, *CBPR* community-based participatory research, *DOI* diffusion of innovations, *HBM* health belief model, *IM* intervention mapping, *LHA* lay health advisor, *N.D.* not described, *N.S.* not significant, *SCT* social cognitive theory, *SIT* social influence theory, *SLT* social learning theory, *TRA* theory of reasoned action, *TTM* transtheoretical model

## Intervention Strategies

A number of intervention strategies were used across the different interventions, with many employing multiple strategies. The use of community members as lay health advisors (LHAs) was the most commonly used strategy, although the number and role of LHAs varied greatly across studies. Of the 32 interventions, 24 included the participation of at least one LHA (e.g., community outreach worker or *promotora*), either as the sole intervention strategy [11, 54, 56–59, 62–66, 70, 71, 73–81, 94] or in combination with other strategies [51–53, 55, 60, 61, 67, 72, 82–84, 88, 91, 92]. The LHAs were cancer survivors [56–58, 80–82], members of churches [55, 60, 61, 88], and/or volunteer or paid community members who generally represented the target population [11, 51–54, 57–59, 62–67, 70–84, 91, 92, 94]. Responsibilities of LHAs across the different interventions included the following: recruiting eligible women [55, 60, 61, 63, 73, 74, 79, 82, 88, 94]; coordinating support services (e.g., childcare and transportation) [73, 74, 82, 88]; serving as community role models by participating in mass media campaign messages [51, 52, 67, 83, 91, 92]; distributing intervention materials such as community bulletins, flyers, educational pamphlets, and information about local providers and screening resources [51–53, 55, 57, 58, 67, 70–74, 79–83, 91, 92, 94]; delivering one-on-one [11, 54, 70–74, 79, 94] and small group [57–66, 73, 74, 77–81, 94] educational sessions; providing general outreach and reminding women about screening appointments [56, 72–76, 79, 84]; and navigating and facilitating screening services for women [57, 58, 60, 61, 73, 74, 77, 78, 80–82].

Clinic-based strategies were the second most common type of intervention, used in nine of the interventions [55, 69, 72, 82, 84–87, 89, 93]. Such strategies included the organization of free (limited-time or ongoing) screening services [55, 69, 82, 84, 87]; modifications to screening and/or clinic policies and protocols (e.g., providing single-visit screening/excision services, routinely offering cervical cancer screening to women needing a pelvic exam, expanding clinic hours, and realigning office responsibilities) [72, 85–87, 95]; and clinic-based outreach and/or educational programs (e.g., delivery of invitation/reminder postcards, phone calls, vouchers for follow-up care, and presentation of educational videos to patients) [84, 89, 93, 95]. In several of the interventions (n=3), LHAs helped to implement clinic-based strategies by promoting and orienting community members to clinic services [55, 82, 84].

In addition, five interventions involved partnerships with churches and/or were church-based [55, 60, 61, 69, 82, 88]. These interventions predominantly consisted of educational interventions delivered by LHAs [60, 61, 82, 88]. One such intervention also included free screening conducted at the church [88] and another offered participants free and reduced cost screenings at local providers [82]. Partnerships with Hispanic/Latino-serving churches were also used to recruit for community screening programs [55, 69].

Other intervention strategies included mass media campaigns (often in combination with community outreach through volunteers or LHAs) [51–53, 67, 83, 91, 92], in-service training programs for home-health attendants [90], and the development and implementation of an educational and cervical cancer game [68].

## Intervention Evaluation

All of the interventions reported some type of evaluation activities, and 30 interventions reported outcome evaluation methods. Study designs included tracking of screenings (n=4) [56, 69, 82, 88], qualitative posttests (n=1) [68], single group pretest and posttests (n=5) [55, 59, 62, 64, 65, 87], pretest and posttests with random samples of participants (n=1) [91, 92], and quasi-experimental (n=6) [11, 51–54, 67, 83, 85, 93] and experimental (n=12) [57, 58, 60, 61, 63, 66, 70–74, 77–81, 84, 86, 89] designs. Follow-up periods ranged from 6 weeks [62] to 3 years postintervention [51–53, 83], with the most common follow-up period being 6 months (n=6) [11, 54, 62, 64–66, 70, 71, 86]. Screening was assessed using self-report [11, 51–54, 57–67, 70, 71, 73, 74, 77, 78, 80, 81, 83, 84, 91–93] or clinic-based tracking and medical record review [56, 69, 82, 85, 86, 88, 89]. Other evaluation activities included measuring participant satisfaction (n=3) [68, 90, 94] and process evaluation (n=4) [68, 75, 76, 90, 94].

Outcomes described included number of cervical cancer screenings provided or proportion of sample receiving screening [56, 59, 62, 69, 82, 88], knowledge of cancer prevention and screening tests [11, 54, 55, 57, 58, 60–62, 64–66, 68, 70, 71, 75, 76, 80, 81, 87, 90–92], perceived acceptability of cervical cancer screening [87], patient-provided quality ratings of medical care [87], levels of social support [73, 74], and self-efficacy to receive and promote cervical cancer screening [75, 76]. Seventeen studies tested for changes in cervical cancer screening rates; of those studies, significant increases in screening rates were reported in 12 interventions [11, 51–54, 57, 58, 64–67, 70, 71, 77, 78, 80, 81, 85, 86, 89, 93]. The majority of studies reporting significant results for changes in cervical cancer screening employed experimental [57, 58, 63, 66, 70, 71, 77, 78, 80, 81, 86, 89] or quasi-experimental [11, 51–54, 67, 85, 93] research designs with comparison groups and multiple assessment points. Only one of the five studies involving a single-group design demonstrated significant results related to cervical cancer screening [64, 65].

## **Discussion**

Through this review, we were able to identify characteristics of effective interventions to increase cervical cancer screening among Hispanics/Latinas in the USA, as well as gaps in the existing cervical cancer prevention science that should be addressed.

### **Key Components of Effective Interventions Identified**

#### *The Use of Theory*

Of the 12 interventions that resulted in significant increases in cervical cancer screening, five described the use of behavioral theory [51–53, 57, 58, 66, 70, 71, 77, 80, 81]. Such results provide support for the use of theory and call for more description of interventions' theoretical foundations and how interventions apply theory to understand and address specific individual-level, social, and cultural barriers to cervical cancer screening. As theory-based interventions typically achieve a higher level of success than those without a theoretical foundation [96], the findings of this review suggest that even greater use of theory would be beneficial for increasing cervical cancer screening among Hispanics/Latinas in future interventions. Furthermore, theory-based interventions help to explain and understand the processes that lead to positive outcomes

and increase the likelihood that efficacious interventions can be adapted for other populations [96].

### *The Use of CBPR*

Four of the 12 successful interventions used CBPR as part of their intervention development strategy [11, 54, 57, 58, 66, 70, 71, 80, 81]. Traditional “outside-experts” (e.g., researchers) may have limited appreciation of how contexts and individuals interact. Thus, understanding and intervening on the complex behavioral, situational, and environmental factors that influence screening may benefit from the multiple perspectives, experiences, and expertise of community members, organization representatives, business leaders, and academic researchers. Blending the lived experiences of community members, the experiences of organization representatives based in service provision, and sound science has the potential to develop deeper and more informed understandings of cancer screening disparities and produce more relevant and more likely successful and impactful interventions designed to promote community health and reduce health disparities. CBPR is a collaborative research approach designed to ensure and establish structures for colearning, reciprocal transfer of expertise, sharing of decision-making power, and mutual ownership of the processes and products of research. CBPR helps to ensure that interventions are more authentic, successful, and tailored in addressing health disparities, particularly among vulnerable communities [45, 97, 98].

### *The Use of LHAs*

Several interventions demonstrating significant increases in cervical cancer screening (n=6) consisted of one-on-one or small-group educational sessions delivered either exclusively by LHAs [11, 54, 64–66, 70, 71, 77, 78] or by LHAs in combination with program staff [57, 58, 80, 81]. In other intervention efforts with significant results, LHAs were involved in mass media campaigns (n=2) [51–53, 67]. LHAs are thought to be effective because they are part of the communities in which they work, have an understanding of community strengths and needs, are able to communicate effectively with other community members, and can promote health in culturally congruent ways, using their knowledge of traditional health practices and cultural identity [44].

The majority of the effective LHA interventions involved LHAs interacting with participants at multiple sessions or carrying out ongoing activities in the community (n=5) [11, 51–54, 64–67]. This finding suggests that interventions involving repeated contact with LHAs over a longer period of time may be more successful than one-time events for ensuring that barriers to screenings are addressed and for behavior change to take place.

In some successful interventions, LHAs met with community members one-on-one, and in others, they carried out activities with small groups. This finding suggests that both types of interactions are valuable and can be carried out effectively by LHAs. In future interventions, LHAs may be trained to be more flexible to meet the needs of their peers, for example, conducting one-on-one or group activities to reach specific community members and to address individual barriers based on what they determine is needed and meaningful to promote behavior change.

The remaining four interventions that resulted in statistically significant improvements in cervical cancer screening rates were clinic-based, involving system changes or outreach to existing patients [85, 86, 89, 93]. The effectiveness of clinic-based and system-wide strategies may in part reflect implementation among a sub-population of Hispanics/Latinas who had already successfully accessed clinical care, either at the time of the intervention or at some time in the past. As limited access to health services continues to be a leading barrier to cervical cancer screening among this population [5, 30], such interventions may have limited effect on improving cervical cancer screening rates among this group. Nevertheless, the positive effects of these interventions draw attention to the continued need for access-enhancing and multilevel interventions among Hispanics/Latinos in the USA. Because LHAs are capable of referring community members to local service providers, they can play an important role in ensuring that clinic-based changes reach a broader population.

### Gaps in the Literature

Efforts to expand the body of evidence surrounding cervical cancer screening interventions for Hispanics/Latinas exist, but need to be strengthened especially as they relate to targeting a more diverse population (e.g., region and age), broadening outcomes (e.g., accurate interpretation of screening results and engaging in appropriate and future care after screening), and strengthening study design (e.g., longer follow-up period) [99].

#### *There Is a Need for Intervention Studies in New Receiving Communities*

The majority of identified interventions were implemented in US regions and states with well-established Hispanic/Latino populations and communities. In light of research that suggests that cervical cancer screening rates are 25–40 % lower among foreign-born women (particularly women born in Mexico and Central America) compared to women born in the USA [8, 18], research to test the feasibility and effectiveness of interventions to improve cervical cancer screening and prevention in areas with emerging or less-established immigrant Hispanic/Latino communities—where barriers to cervical cancer screening may be exaggerated or unique from those in other communities—is needed. This is particularly true in the Southeast, which has experienced the most rapid growth within the immigrant Hispanic/Latino population in recent years. These immigrant Hispanics/Latinos tend to be more recently arrived, be more likely to be from rural Mexico and Central America, have lower literacy levels, and be less acculturated than those who have settled in traditional immigration destinations, such as Arizona, California, New York, and Texas. Moreover, health systems in this region have limited bilingual and bicultural infrastructure and are just beginning to respond to the health needs of this population [38, 100].

#### *There Is a Need to Broaden Outcome Measures*

Although screening is an important step to prevent cervical cancer, there are other related outcomes that should be measured as well, including whether women receive and accurately interpret their screening results in order to know whether subsequent care (such as further testing and treatment) is needed. Additionally, cervical cancer screening is not a onetime behavior, but one that is repeated on a regular basis. Although increased screening is essential to addressing

cervical cancer disparities, it is also important that Hispanics/Latinas know and understand their results in order to know when to have their next cervical cancer screening and to schedule appropriate follow-up care. Among Hispanics/Latinas who access cervical cancer screening, even fewer receive their results, seek follow-up after an abnormal or inconclusive result, or continue to maintain routine screenings according to guidelines for their age group [101–106]. Some studies have explored clinic-based strategies to increase follow-up among Hispanics/Latinas with abnormal cervical cancer screening results [55, 72, 95, 107, 108], and in the future, both clinic-based and community-based educational interventions and LHA interventions should include strategies to ensure that Hispanics/Latinas not only receive routine screenings but also know their results and schedule and receive follow-up care as needed.

### *There Is a Need for Longer Follow-up Periods*

In light of the ongoing need for cervical cancer screening during the life course, there is a need for studies that follow Hispanics/Latinas for longer periods of time. Among the studies reviewed, some follow-up periods were as short as 6 weeks postintervention, and the most common follow-up period was 6 months. This length of follow-up may have been inadequate to fully capture program effects and/or the longer term impact and sustainability of results. Longitudinal studies that follow women over a longer time period will help determine whether they are engaging in appropriate care and following screening guidelines.

### *There Is a Need for Comprehensive Interventions with Broad Focus on Sexual and Reproductive Health*

Another suggestion for improving cervical cancer screening is to create more comprehensive sexual and reproductive health interventions. Research has indicated that some Hispanics/Latinas want and need sexual and reproductive health interventions that are comprehensive and do not focus on one aspect of reproductive health [109]. Interventions should focus not only on specific behavior related to sexual and reproductive health but also offer guidance on a variety of related topics, including sexual and reproductive health resources, what to expect during sexual and reproductive health screening visits, anatomy and fundamental reproductive health information, disease transmission and prevention, and condom use and negotiation skills. The effective interventions identified in this review exhibit a trend toward comprehensive interventions with multiple foci; for example, half of the effective interventions targeted breast cancer screening as well as cervical cancer screening [11, 51, 53, 54, 57, 58, 64, 65, 67, 77, 78, 80, 81, 89]. Future interventions should continue to further build on this approach.

### *There Is a Need for Increased Understanding of LHA Roles and Responsibilities*

Among the effective interventions, most of the LHA roles were limited to education. LHAs can engage in more than education only and also assist individuals with needs that are difficult for professionals to address, serve as opinion leaders to change norms that negatively impact health and help-seeking, and advocate for community change [46, 110]. Future research should build capacity of community members (e.g., LHAs) to take on a variety of roles and responsibilities to reduce cervical cancer screening disparities.

## Limitations

There were several limitations to this review. The literature search was subject to publication bias and may not have captured all interventions designed to improve cervical cancer screening among Hispanics/Latinas in the USA. For example, the review did not include potentially effective interventions that have not been published or unpublished studies with null findings that could provide important information about what does and does not work to promote cervical cancer screening among Hispanic/Latina communities. In addition, white papers and publications in Spanish and other languages were not included but could be supplemental sources of data about characteristics of effective interventions and research gaps. Furthermore, because reporting of intervention components, development approaches, evaluation methods, and other characteristics is not standardized across all studies and publications, information of varying levels of detail was abstracted about the different interventions included in the review, which may have affected results.

## Conclusions

Findings from this review point to a need for expanded and more rigorous evaluation of interventions to improve cervical cancer screening among Hispanic/Latina women in the USA. Given the studies reviewed, interventions involving LHAs and using behavioral theory and CBPR approaches appear to have the most promise for promoting cervical cancer screening among Hispanic/Latina women. However, there continues to be a need for the development, implementation, and evaluation of interventions in geographic areas with new and emerging Hispanic/Latino populations (e.g., the southeastern USA) and that are comprehensive and promote screening within the larger and more relevant context of sexual and reproductive health; follow participants for longer periods of time for evaluation; assess whether Hispanics/Latinas obtain and understand their cervical cancer screening results; and broaden the roles of LHAs in order to build capacity and reduce health disparities within a vulnerable and neglected population.

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## References

1. United States Census Bureau (2002) Demographic trends in the 20th century. <http://www.census.gov/prod/2002pubs/censr-4.pdf>. Accessed 20 Jun 2014
2. United States Census Bureau (2011) Overview of race and Hispanic origin: 2010 Census briefs. <http://www.census.gov/prod/cen2010/briefs/c2010br-02.pdf>. Accessed 20 Jun 2014
3. American Cancer Society (2012) Cancer Facts & Figures for Hispanics/Latinos 2012–2014. <http://www.cancer.org/acs/groups/content/@epidemiologysurveillance/documents/document/acspc-034778.pdf>. Accessed 20 Jun 2014

4. Flores K, Bencomo C (2009) Preventing cervical cancer in the Latina population. *J Womens Health* 18(12):1935–1943. doi:10.1089/jwh.2008.1151
5. Scarinci IC, Beech BM, Kovach KW, Bailey TL (2003) An examination of sociocultural factors associated with cervical cancer screening among low-income Latina immigrants of reproductive age. *J Immigr Health* 5(3):119–128
6. Zhou J, Enewold L, Peoples GE et al (2010) Trends in cancer screening among Hispanic and white non-Hispanic women, 2000–2005. *JWomens Health* 19(12):2167–2174. doi:10.1089/jwh.2009.1909
7. Ell K, Vourlekis B, Muderspach L et al (2002) Abnormal cervical screen follow-up among low-income Latinas: project SAFE. *J Womens Health Gend Based Med* 11(7):639–651. doi:10.1089/152460902760360586
8. Tsui J, Saraiya M, Thompson T et al (2007) Cervical cancer screening among foreign-born women by birthplace and duration in the United States. *J Womens Health* 16(10):1447–1457. doi:10.1089/jwh.2006.0279, 2002
9. Sheinfeld Gorin S, Heck JE (2005) Cancer screening among Latino subgroups in the United States. *Prev Med* 40(5):515–526
10. Abraído-Lanza AF, Chao MT, Gates CY (2005) Acculturation and cancer screening among Latinas: results from the national health interview survey. *Ann Behav Med* 29(1):22–28. doi:10.1207/s15324796abm2901\_4
11. Fernandez ME, Gonzales A, Tortolero-Luna G et al (2009) Effectiveness of Cultivando la Salud: a breast and cervical cancer screening promotion program for low-income Hispanic women. *J Inf* 99(5):936–943
12. Koval AE, Riganti AA, Foley KL (2006) CAPRELA (cancer prevention for Latinas): findings of a pilot study in Winston-Salem, Forsyth County. *NC Med J* 67(1):9–15
13. Watts LA, Joseph N, Wallace M et al (2009) HPV vaccine: a comparison of attitudes and behavioral perspectives between Latino and non-Latino women. *Gynecol Oncol* 112(3):577–582. doi:10.1016/j.ygyno.2008.12.010
14. Otero-Sabogal R, Stewart S, Sabogal F et al (2003) Access and attitudinal factors related to breast and cervical cancer rescreening: why are Latinas still underscreened? *Health Educ Behav* 30(3):337–359. doi:10.1177/1090198103030003008
15. Boyer LE, Williams M, Calker LC, Marshall ES (2001) Hispanic women's perceptions regarding cervical cancer screening. *J Obstet Gynecol Neonatal Nurs* 30(2):240–245

16. Bair RM, Mays RM, Sturm LA, Zimet GD (2008) Acceptability of the human papillomavirus vaccine among Latina mothers. *J Pediatr Adolesc Gynecol* 21(6):329–334. doi:10.1016/j.jpag.2008.02.007
17. Paskett ED, Tatum C, Rushing J et al (2004) Racial differences in knowledge, attitudes, and cancer screening practices among a triracial rural population. *Cancer* 101(11):2650–2659. doi:10.1002/cncr.20671
18. Luque JS, Castañeda H, Tyson DM et al (2010) HPV awareness among Latina immigrants and Anglo-American women in the southern United States: cultural models of cervical cancer risk factors and beliefs. *NAPA Bull* 34(1):84–104. doi:10.1111/j.1556-4797.2010.01053.x
19. Ford JL (2011) Racial and ethnic disparities in human papillomavirus awareness and vaccination among young adult women. *Public Health Nurs* 28(6):485–493. doi:10.1111/j.1525-1446.2011.00958.x
20. Gerend M, Shepherd J (2011) Correlates of HPV knowledge in the era of HPV vaccination: a study of unvaccinated young adult women. *Women Health* 51(1):25
21. Byrd TL, Chavez R, Wilson KM et al (2007) Barriers and facilitators of cervical cancer screening among Hispanic women. *Ethn Dis* 17(1):129
22. Coronado GD, Thompson B, Koepsell TD et al (2004) Use of Pap test among Hispanics and non-Hispanic whites in a rural setting. *Prev Med* 38(6):713–722. doi:10.1016/j.ypmed.2004.01.009
23. Gurman TA, Becker D (2008) Factors affecting Latina immigrants' perceptions of maternal health care: findings from a qualitative study. *Health Care Women Int* 29(5):507–526. doi:10.1080/07399330801949608
24. Sheppard VB, Zambrana RE, O'Malley AS (2004) Providing health care to low-income women: a matter of trust. *Fam Pract* 21(5):484–491
25. Pinto RM, McKay MM, Escobar C (2008) “You’ve gotta know the community”: minority women make recommendations about community-focused health research. *Women Health* 47(1):83–104. doi:10.1300/J013v47n01\_05
26. Sheppard V, Wang J, Yi B et al (2008) Are health-care relationships important for mammography adherence in Latinas? *J Gen Intern Med* 23(12):2024–2030. doi:10.1007/s11606-008-0815-6
27. Shah M, Zhu K, Wu H, Potter J (2006) Hispanic acculturation and utilization of cervical cancer screening in the US. *Prev Med* 42(2): 146–149. doi:10.1016/j.ypmed.2005.10.002

28. Garcés-Palacio IC, Scarinci IC (2012) Factors associated with perceived susceptibility to cervical cancer among Latina immigrants in Alabama. *Matern Child Health J* 16(1):242–248. doi:10.1007/s10995-010-0737-x
29. Simard EP, Fedewa S, Ma J et al (2012) Widening socioeconomic disparities in cervical cancer mortality among women in 26 states, 1993–2007. *Cancer* 118(20):5110–5116. doi:10.1002/cncr.27606
30. Scarinci IC, Garcia FAR, Kobetz E et al (2010) Cervical cancer prevention. *Cancer* 116(11):2531–2542. doi:10.1002/cncr.25065
31. Rothenberg BA (1995) Understanding and working with parents and children from rural Mexico: what professionals need to know about child-rearing practices, the school experience, and health care concerns. CHC Center for Child & Family Development, Menlo Park
32. Wilcher RA, Gilbert LK, Siano CS, Arredondo EM (2003) From focus groups to workshops: developing a culturally appropriate cervical cancer prevention intervention for rural Latinas. In: Torres I, Cernada G (eds) *Sexual and reproductive health promotion in Latino populations: Parteras, promotoras y poetas—case studies across the Americas*. Baywood, Amityville, pp 81–100
33. Gloria AM, Peregoy JJ (1996) Counseling Latino alcohol and other substance users/abusers cultural considerations for counselors. *J Subst Abus Treat* 13(2):119–126. doi:10.1016/0740-5472(96)00035-9
34. Arredondo EM, Pollak K, Costanzo PR (2008) Evaluating a stage model in predicting monolingual Spanish-speaking Latinas' cervical cancer screening practices: the role of psychosocial and cultural predictors. *Health Educ Behav* 35(6):791–805. doi:10.1177/1090198107303250
35. Behbakht K, Lynch A, Teal S et al (2004) Social and cultural barriers to Papanicolaou test screening in an urban population. *Obstet Gynecol* 104(6):1355–1361. doi:10.1097/01.AOG.0000143881.53058.81
36. Ayala GX, Ornelas I, Rhodes SD et al (2009) Correlates of dietary intake among men involved in the MAN for health study. *Am J Mens Health* 3(3):201–213. doi:10.1177/1557988308317138
37. Royster MO, Richmond A, Eng E, Margolis L (2006) Hey brother, how's your health? a focus group analysis of the health and health-related concerns of African American men in a southern city in the United States. *Men Masculinities* 8(4):389–404. doi:10.1177/1097184X04268798
38. Rhodes SD, Hergenrather KC, Griffith DM et al (2009) Sexual and alcohol risk behaviours of immigrant Latino men in the Southeastern USA. *Cult Health Sex* 11(1):17–34. doi:10.1080/13691050802488405

39. Harvey SM, Beckman LJ, Browner CH, Sherman CA (2002) Relationship power, decision making, and sexual relations: an exploratory study with couples of Mexican origin. *J Sex Res* 39(4): 284–291. doi:10.1080/00224490209552152
40. Amaro H, Raj A (2000) On the margin: power and women's HIV risk reduction strategies. *Sex Roles* 42(7):723–749. doi:10.1023/A:1007059708789
41. Tortolero-Luna G, Byrd T, Groff JY et al (2006) Relationship between English language use and preferences for involvement in medical care among Hispanic women. *J Womens Health* 15(6): 774–785. doi:10.1089/jwh.2006.15.774
42. Gregg J, Centurion T, Aguillon R et al (2011) Beliefs about the pap smear among Mexican immigrants. *J Immigr Minor Health* 13(5): 899–905. doi:10.1007/s10903-009-9301-4
43. Meade M, Richardson W (1998) Selecting and appraising studies for systematic review. In: Mulrow CD, Cook D (eds) *Systematic reviews: synthesis of best evidence for health care decisions*. ACP, Philadelphia, pp 81–90
44. Rhodes SD, Foley KL, Zometa CS, Bloom FR (2007) Lay health advisor interventions among Hispanics/Latinos: a qualitative systematic review. *Am J Prev Med* 33(5):418–427. doi:10.1016/j.amepre.2007.07.023
45. Rhodes SD (2012) Demonstrated effectiveness and potential of community-based participatory research for preventing HIV in Latino populations. In: Organista KC (ed) *HIV prevention with Latinos*. Oxford University Press, New York, pp 83–102
46. Rhodes SD, Daniel J, Alonzo J et al (2012) A snapshot of how Latino heterosexual men promote sexual health within their social networks: process evaluation findings from an efficacious community-level intervention. *AIDS Educ Prev* 24(6):514–526. doi:10.1521/aeap.2012.24.6.514
47. Rhodes SD, Hergenrather KC, Bloom FR et al (2009) Outcomes from a community-based, participatory lay health adviser HIV/STD prevention intervention for recently arrived immigrant Latino men in rural North Carolina. *AIDS Educ Prev* 21(5 Suppl):103–108. doi:10.1521/aeap.2009.21.5\_suppl.103
48. Rhodes SD, Kelley C, Simán F et al (2012) Using community-based participatory research (CBPR) to develop a community-level HIV prevention intervention for Latinas: a local response to a global challenge. *Womens Health Issues* 22(3):e293–e301. doi:10.1016/j.whi.2012.02.002
49. Rhodes SD, McCoy TP, Vissman AT et al (2011) A randomized controlled trial of a culturally congruent intervention to increase condom use and HIV testing among heterosexually active immigrant Latino men. *AIDS Behav* 15(8):1764–1775. doi:10.1007/s10461-011-9903-4

50. Rhodes SD, Tanner A, Duck S et al (2012) Female sex work within the rural immigrant Latino community in the southeast United States: an exploratory qualitative community-based participatory research study. *Prog Commun Health Partnersh* 6(4):417–427. doi:10.1353/cpr.2012.0054
51. Fernández-EsquerME, Espinoza P, Torres I et al (2003) A su salud: a quasi-experimental study among Mexican American women. *Am J Health Behav* 27(5):536–545. doi:10.5993/AJHB.27.5.5
52. Ramirez AG, McAlister A, Gallion KJ et al (1995) Community level cancer control in a Texas barrio: part I—theoretical basis, implementation, and process evaluation. *J Natl Cancer Inst Monogr* 18:117–122
53. McAlister AL, Fernandez-Esquer ME, Ramirez AG et al (1995) Community level cancer control in a Texas barrio: part II—base-line and preliminary outcome findings. *J Natl Cancer Inst Monogr* 18: 123–126
54. Fernández ME, Gonzales A, Tortolero-Luna G et al (2005) Using intervention mapping to develop a breast and cervical cancer screening program for Hispanic farmworkers: cultivando la salud. *Health Promot Pract* 6(4):394–404. doi:10.1177/1524839905278810
55. Frank-Stromborg M, Wassner LJ, Nelson Met al (1998) A study of rural Latino women seeking cancer–detection examinations. *J Cancer Educ* 13(4):231–241. doi:10.1080/08858199809528552
56. Hansen LK, Feigl P, Modiano MR et al (2005) An educational program to increase cervical and breast cancer screening in Hispanic women: a Southwest Oncology Group study. *Cancer Nurs* 28(1):47
57. Jandorf L, Bursac Z, Pulley L et al (2008) Breast and cervical cancer screening among Latinas attending culturally specific educational programs. *Prog Commun Health Partnersh* 2(3):195–204. doi:10.1353/cpr.0.0034
58. Saad-Harfouche FG, Jandorf L, Gage E et al (2011) Esperanza y vida: training lay health advisors and cancer survivors to promote breast and cervical cancer screening in Latinas. *J Community Health* 36(2):219–227. doi:10.1007/s10900-010-9300-3
59. Larkey L (2006) Las mujeres saludables: reaching Latinas for breast, cervical and colorectal cancer prevention and screening. *J Community Health* 31(1):69–77. doi:10.1007/s10900-005-8190-2
60. Lopez V, Castro F (2006) Participation and program outcomes in a church-based cancer prevention program for Hispanic women. *J Community Health* 31(4):343–362. doi:10.1007/s10900-006-9016-6

61. Castro FG, Elder J, Coe K et al (1995) Mobilizing churches for health promotion in Latino communities: *Companeros en la Salud*. *J Natl Cancer Inst Monogr* 18:127
62. Meade CD, Calvo A, Cuthbertson D (2002) Impact of culturally, linguistically, and literacy relevant cancer information among Hispanic farmworker women. *J Cancer Educ* 17:50–54. doi:10.1080/08858190209528793
63. Navarro AM, Senn KL, McNicholas LJ et al (1998) *Por La Vida* model intervention enhances use of cancer screening tests among Latinas. *AmJ PrevMed* 15(1):32–41. doi:10.1016/S0749-3797(98)00023-3
64. Navarro AM, McNicholas LJ, Cruz M et al (2007) Development and implementation of a curriculum on cancer screening for small groups of Latino women. *J Cancer Educ* 22(3):186–190. doi:10.1080/08858190701428588
65. Navarro AM, Raman R, McNicholas LJ, Loza O (2007) Diffusion of cancer education information through a Latino community health advisor program. *Prev Med* 45(2–3):135–138. doi:10.1016/j.ypmed.2007.05.017
66. O’Brien MJ, Halbert CH, Bixby R et al (2010) Community health worker intervention to decrease cervical cancer disparities in Hispanic women. *J Gen Intern Med* 25(11):1186–1192. doi:10.1007/s11606-010-1434-6
67. Ramirez AG, Villarreal R, Mcalister A et al (1999) Advancing the role of participatory communication in the diffusion of cancer screening among Hispanics. *J Health Commun* 4(1):31–36. doi:10.1080/108107399127075
68. Sheridan-Leos N (1995) Women’s Health Lotería: a new cervical cancer education tool for Hispanic females. *Oncol Nurs Forum* 22(4):697–701
69. Warren AG, Londoño GE, Wessel LA, Warren RD (2006) Breaking down barriers to breast and cervical cancer screening: a university-based prevention program for Latinas. *J Health Care Poor Underserved* 17(3):512–521. doi:10.1353/hpu.2006.0114
70. Byrd TL, Wilson KM, Smith JL et al (2012) Using intervention mapping as a participatory strategy: development of a cervical cancer screening intervention for Hispanic women. *Health Educ Behav* 39(5):603–611. doi:10.1177/1090198111426452
71. Byrd TL, Wilson KM, Smith JL et al (2013) AMIGAS: a multicity, multicomponent cervical cancer prevention trial among Mexican American women. *Cancer* 119(7):1365–1372. doi:10.1002/cncr.27926
72. Duggan C, Coronado G, Martinez J et al (2012) Cervical cancer screening and adherence to follow-up among Hispanic women study protocol: a randomized controlled trial to increase the uptake of cervical cancer screening in Hispanic women. *BMC Cancer* 12(1):170. doi:10.1186/1471-2407-12-170

73. Larkey LK, Gonzalez JA, Mar LE, Glantz N (2009) Latina recruitment for cancer prevention education via community based participatory research strategies. *Contemp Clin Trials* 30(1):47–54. doi:10.1016/j.cct.2008.08.003
74. Larkey LK, Herman PM, Roe DJ et al (2012) A Cancer screening intervention for underserved Latina women by lay educators. *J Womens Health* 21(5):557–566. doi:10.1089/jwh.2011.3087
75. Luque JS, Mason M, Reyes-Garcia C et al (2011) Salud es vida: development of a cervical cancer education curriculum for promotora outreach with Latina farmworkers in rural southern Georgia. *Am J Public Health* 101(12):2233–2235. doi:10.2105/AJPH.2011.300324
76. Watson-Johnson LC, Bhagatwala J, Reyes-Garcia C et al (2012) Refinement of an educational toolkit to promote cervical cancer screening among Hispanic immigrant women in rural southern Georgia. *J Health Care Poor Underserved* 23(4):1704–1711. doi:10.1353/hpu.2012.0150
77. Nuño T, Martinez ME, Harris R, García F (2011) A promotora-administered group education intervention to promote breast and cervical cancer screening in a rural community along the U.S.–Mexico border: a randomized controlled trial. *Cancer Causes Control* 22(3):367–374. doi:10.1007/s10552-010-9705-4
78. Nuño T, Castle PE, Harris R et al (2011) Breast and cervical cancer screening utilization among Hispanic women living near the United States-Mexico border. *J Womens Health* 20(5):685–693. doi:10.1089/jwh.2010.2205
79. Scarinci IC, Bandura L, Hidalgo B, Cherrington A (2012) Development of a theory-based (PEN-3 and health belief model), culturally relevant intervention on cervical cancer prevention among Latina immigrants using intervention mapping. *Health Promot Pract* 13(1):29–40. doi:10.1177/1524839910366416
80. Sudarsan NR, Jandorf L, Erwin DO (2011) Multi-site implementation of health education programs for Latinas. *J Community Health* 36(2):193–203
81. Jandorf L, Ellison J, Shelton R et al (2012) Esperanza y vida: a culturally and linguistically customized breast and cervical education program for diverse Latinas at three different United States sites. *J Health Commun* 17(2):160–176
82. White K, Garces IC, Bandura L et al (2012) Design and evaluation of a theory-based, culturally relevant outreach model for breast and cervical cancer screening for Latina immigrants. *Ethn Dis* 22(3): 274–280
83. Suarez L, Roche RA, Pulley LV et al (1997) Why a peer intervention program for Mexican-American women failed to modify the secular trend in cancer screening. *Am J Prev Med* 13(6):411–417

84. Hunter JB, de Zapien JG, Papenfuss M et al (2004) The impact of a promotora on increasing routine chronic disease prevention among women aged 40 and older at the U.S.-Mexico border. *Health Educ Behav* 31(4 suppl):18S–28S. doi:10.1177/1090198104266004
85. Bastani R, Berman BA, Belin TR et al (2002) Increasing cervical cancer screening among underserved women in a large urban county health system: can it be done? what does it take? *Med Care* 40(10):891
86. Batal H, Biggerstaff S, Dunn T, Mehler PS (2000) Cervical cancer screening in the urgent care setting. *J Gen Intern Med* 15(6):389–394. doi:10.1046/j.1525-1497.2000.08001.x
87. Burger RA, Monk BJ, Van Nostrand KM et al (1995) Single-visit program for cervical cancer prevention in a high-risk population. *Obstet Gynecol* 86(4, Part 1):491–498. doi:10.1016/S0029-7844(95)80003-4
88. Davis DT, Bustamante A, Brown CP et al (1994) The urban church and cancer control: a source of social influence in minority communities. *Public Health Rep* 109(4):500–506
89. Dietrich AJ, Tobin JN, Cassells A et al (2006) Telephone care management to improve cancer screening among low-income women. *Ann Intern Med* 144(8):563–571
90. Morgan C, Levin G (1995) A cancer-prevention intervention for disadvantaged women: design and implementation. *J Cancer Educ* 10(3):168–175. doi:10.1080/08858199509528361
91. Suarez L, Nichols DC, Brady CA (1993) Use of peer role models to increase pap smear and mammogram screening in Mexican-American and black women. *Am J Prev Med* 9(5):290–296
92. Suarez L, Nichols DC, Pulley L et al (1993) Local health departments implement a theory-based model to increase breast and cervical cancer screening. *Public Health Rep* 108(4):477–482
93. Yancey AK, Tanjasiri SP, Klein M, Tunder J (1995) Increased cancer screening behavior in women of color by culturally sensitive video exposure. *PrevMed* 24(2):142–148. doi:10.1006/pmed.1995.1027
94. Moore-Monroy M, Wilkinson-Lee AM, Verdugo L et al (2013) Addressing the information gap developing and implementing a cervical cancer prevention education campaign grounded in principles of community-based participatory action. *Health Promot Pract* 14(2):274–283. doi:10.1177/1524839912454141
95. Brewster WR, Anton-Culver H, Ziogas A et al (2002) Recruitment strategies for cervical cancer prevention study. *Gynecol Oncol* 85(2):250–254. doi:10.1006/gyno.2002.6592
96. Glanz K, Rimer BK, Viswanath K (2002) Theory, research, and practice in health behavior and health education. In: *Health behavior and health education*, 3rd ed. Wiley, San Francisco, pp 23–40

97. Cashman SB, Adeky S, Allen AJ 3rd et al (2008) The power and the promise: working with communities to analyze data, interpret findings, and get to outcomes. *Am J Public Health* 98(8):1407–1417. doi:10.2105/AJPH.2007.113571
98. Rhodes SD, Duck S, Alonzo J et al (2013) Intervention trials in community-based participatory research. In: Blumenthal DS, DiClemente RJ, Braithwaite R, Smith S (eds) *Community-based participatory research: issues, methods, and translation to practice*. Springer, New York, pp 157–180
99. Martínez-Donate AP (2009) Using lay health advisors to promote breast and cervical cancer screening among Latinas: a review. *WMJ* 108(5):259–262
100. Painter T (2008) Connecting the dots: when the risks of HIV/STD infection appear high but the burden of infection is not known—the case of male Latino migrants in the southern United States. *AIDS Behav* 12(2):213–226. doi:10.1007/s10461-007-9220-0
101. Paskett ED, McLaughlin JM, Reiter PL et al (2010) Psychosocial predictors of adherence to risk-appropriate cervical cancer screening guidelines: a cross sectional study of women in Ohio Appalachia participating in the Community Awareness Resources and Education (CARE) project. *Prev Med* 50(1–2):74–80. doi:10.1016/j.ypmed.2009.09.001
102. Eggleston KS, Coker AL, Luchok KJ, Meyer TE (2007) Adherence to recommendations for follow-up to abnormal pap tests. *Obstet Gynecol* 109(6):1332–1341. doi:10.1097/01.AOG.0000266396.25244.68
103. Breitkopf CR, Catero J, Jaccard J, Berenson AB (2004) Psychological and sociocultural perspectives on follow-up of abnormal Papanicolaou results. *Obstet Gynecol* 104(6):1347–1354. doi:10.1097/01.AOG.0000143872.07081.84
104. Ell K, Padgett D, Vourlekis B et al (2002) Abnormal mammogram follow-up: a pilot study women with low income. *Cancer Pract* 10(3):130–138
105. Cardin VA, Grimes RM, Jiang ZD et al (2001) Low-income minority women at risk for cervical cancer: a process to improve adherence to follow-up recommendations. *Public Health Rep* 116(6):608–616
106. Hunt LM, De Voogd KB, Soucy MD, Longworth JC (2002) Exploring loss to follow-up: abnormal pap screening in Hispanic patients. *Cancer Pract* 10(3):122–129
107. Marcus AC, Kaplan CP, Crane LA et al (1998) Reducing loss-to-follow-up among women with abnormal pap smears: results from a randomized trial testing an intensive follow-up protocol and economic incentives. *Med Care* 36:397

108. Percac-Lima S, Benner C, Lui R et al (2013) The impact of a culturally tailored patient navigator program on cervical cancer prevention in Latina women. *J Womens Health* 22(5):426–431. doi:10.1089/jwh.2012.3900
109. Cashman R, Eng E, Simán F, Rhodes SD (2011) Exploring the sexual health priorities and needs of immigrant Latinas in the southeastern United States: a community-based participatory research approach. *AIDS Educ Prev* 23(3):236–248. doi:10.1521/aeap.2011.23.3.236
110. Eng E, Smith J (1995) Natural helping functions of lay health advisors in breast cancer education. *Breast Cancer Res Treat* 35(1):23–29
111. Erwin DO, Spatz TS, Turturro CL (1992) Development of an African–American role model intervention to increase breast self–examination and mammography. *J Cancer Educ* 7(4):311–319. doi:10.1080/08858199209528188