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Strategies Addressing Barriers to Clinical Trial Enrollment of Underrepresented Populations: a Systematic Review

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Abstract

Background: Underrepresentation of racial and ethnic minorities in clinical trials remains a reality while they have disproportionately higher rates of health disparities.

Objective: The purpose of this study was to identify successful community-engaged interventions that included health care providers as a key strategy in addressing barriers to clinical trial enrollment of underrepresented patients.

Design: A systematic review of the literature on interventions addressing enrollment barriers to clinical trials for racial and ethnic minorities was performed in Ovid MEDLINE, EBSCO Megafire, and EBSCO CINAHL. The systematic review identified 360 studies, and 20 were selected using the inclusion criteria. An iterative process extracted information from the eligible studies.

Results: The 20 selected studies were analyzed and then grouped by first author, nature of the clinical research initiative, priority populations, key strategies, and study outcomes. Nine of the

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studies addressed cancer clinical trials and 11 related to chronic medical conditions, including diabetes, hypertension management, and chronic kidney disease. The key strategies employed were categorized according to their presumed impact on barriers incurred at distinct steps in study recruitment: clinical trial awareness, opportunity to participate, and acceptance of enrollment. The strategies were further categorized by whether they would address barriers associated with minority perceptions of the research process and barriers related to how studies were designed and implemented.

Conclusion: Multiple and flexible strategies targeting providers and participants at provider sites and within communities might be needed to enroll underrepresented populations into clinical trials.

Keywords

Recruitment; Clinical Trials; Minority

INTRODUCTION

It has been twenty years since the National Institutes of Health (NIH) Revitalization Act of 1993 was signed into law and resulted in the NIH policy requiring “that women and members of minority groups and their subpopulations must be included in all NIH-funded clinical research.” [1] During these two decades, there have been many approaches to address these disparities, [2–6] yet the underrepresentation of women and racial and ethnic minorities in clinical trials remains a reality while they have disproportionately higher rates of chronic diseases. [2, 7, 8] A recent review reaffirmed that barriers continue to exist to enrolling these populations. [9]

To address these barriers more effectively, recent reviews have emphasized the importance of interventions at multiple levels, both at the community, participant, and provider level. [10–12] Recognizing the complex and interwoven barriers between these settings, Robinson and Trochim [13] solicited perspectives of barriers across stakeholders, including health professionals, researchers and lay community members, and looked for congruence among the stakeholder groups. By using concept mapping, a mixed methods approach, they could address the multiple barriers of enrollment and found barriers both within the research system and within the communities, as was found in other reviews. [10, 12, 14] Following up on these findings, the purpose of the present study was to identify interventions that have been described in the literature that addressed multiple levels of barriers. Additionally, because of the importance described in the literature regarding barriers to access to clinical trials at the provider site, [15–17] this review also included studies that focused on access to clinical trials through provider sites. Therefore, the objective of this review was to recognize the importance of addressing multiple barriers to enrollment and to outline which strategies address barriers within the research system, at provider sites, and within the community so that future investigators could readily assess which strategies could be relevant to their needs for promoting underrepresented enrollment into clinical trials.

METHODS

Search strategy and selection criteria

Two experienced librarians (PJE, DL) with expertise in systematic literature reviews conducted an electronic search with input from the research team. The databases used were Ovid MEDLINE, EBSCO Megafire, and EBSCO CINAHL. The timeframe for the search was January 2001 to October 2013. A mix of text words and controlled vocabulary (subject headings) was used and included the following terms: population (e.g., ethnic groups, minorities, underrepresented), clinical trial, methods or barriers to engagement and recruitment, and outcomes or effectiveness of intervention. Studies were included that addressed minorities' perceptions of the research process. Studies that targeted providers, communities, and specific minority communities were included (n=360).

Figure 1 shows a flow chart that details manuscript inclusion. The search results were imported into EndNote (Thomson Reuters Bibliographic Database Manager) and duplicate citations were removed (n=282). Studies eligibility was determined by two investigators independently (CH, JBB) based on the manuscript titles and abstracts (n=242). Disagreements for a study's inclusion were resolved by consensus. After the literature screening, 183 articles were excluded based on the following : full text articles were unavailable, articles were actually poster presentation, or articles did not meet the criteria of being a clinical research study. A full text review was conducted on the remaining 59 articles eligible by three investigators on the study team (CH, JD, JBB). The full text articles excluded did not target health care providers to increase study participant enrollment, did not have an identified community, and did not focus on a specific clinical trial. The final independent cross-check was conducted by CH.

Extraction and Synthesis

An iterative process was used to create a standardized procedure to extract information from the eligible studies. Data were grouped by first author, nature of initiative, priority populations, key strategies, and study outcomes. After the initial grouping, the data were summarized into strategies that addressed barriers at the level of the research system, at provider sites, and within the community.

RESULTS

Description of the Publications Included for Review

A total of 360 studies were reviewed and only 21 met inclusion criteria of health care providers as a major component for clinical trial enrollment. Table 1 summarizes the characteristics of the recruitment efforts: first author, type of initiative, population of interest, fundamental strategies used to increase enrollment of underrepresented populations, and main study outcomes. Nine publications described enrollment efforts into cancer clinic trials: one targeted a specific cervical cancer prevention randomized clinical trial (RCT) [18], one was a RCT on reducing the risk of developing invasive breast cancer [19], while the other seven were designed to create an infrastructure or environment that supported enrollment into available cancer trials for which patients were eligible. [20–26] Of the

remaining eleven publications, one[27] was designed to support the infrastructure for community-based clinical trials related to diabetes and hypertension management. The other publications reported on enrollment efforts for specific trials related to patient management for chronic conditions (n=7) [28–34], an observational study of chronic kidney disease [35], hormonal therapy[36] and sexually-transmitted infections. [37]

Table 2 categorizes strategies employed by initiatives according to their presumed impact on barriers incurred at distinct steps in study recruitment [13]: clinical trial awareness, opportunity to participate, and acceptance of enrollment. The strategies were further categorized by whether they would address barriers inherent in the research system and methodology (that is, how studies are designed and implemented), including whether they addressed providers and staff as means to overcome the barriers to potential research participants directly. Table 2 also indicates strategies that were designed to address barriers associated with minority perceptions of the research process, which generally took place in the community setting.

Strategies Addressing Clinical Trial Awareness: Participants

In promoting clinical trial awareness, a frequent strategy that was used to enroll participants in trials addressing the management of chronic conditions was to engage key community members prior to study protocol development or study start and to make modifications to the protocol or implementation plan based on community feedback. [19, 28–30, 34] For example, Andreae and colleagues [28] partnered with an ongoing community coalition to get input on study design as well as advice on recruitment approaches for enrollment into a community-based diabetes self-management program. Baquet and colleagues implemented a similar approach of engaging with various community stakeholders and levels of community activity prior to developing a program that would more generally support recruitment of underserved minorities into cancer RCTs. [20] Several efforts included educational programs to inform communities about the nature of clinical trials and address their mistrust of the research process, including those working to increase enrollment generally into cancer clinical trials, [20, 21, 24, 25] and one focused on specific clinical trials. [21] In one instance, Guadagnolo and colleagues [21] employed community research representatives embedded in American Indian communities to provide cancer education, network with local health resources, and develop liaisons between the cancer center and tribal governments. Baquet and colleagues [20] reported on their program to provide both community educational programs, such as having nurse community educators, and provider education on clinical trials through nurse and physician continuing medical education (CME) programs. Their goal was to improve health and research literacy and trust in research as a method to address health disparities. Vicini and colleagues [25] added an effective minority outreach program to their existing Community Clinical Oncology Program (CCOP) to educate minority community members about cancer screening and treatment and the opportunities for clinical trial participation in order to decrease health care disparities and increase representation of these groups in the clinical trials process. To promote awareness directly to potential participants at the provider site or in the community, multiple programs used materials and direct outreach that emphasized culturally sensitive content and style like having materials in the community's primary language. [19, 21, 25, 29, 30, 33–36]

Strategies Addressing Clinical Trial Awareness: Providers

Regarding raising health care provider awareness, in a third of programs, the principal investigator (PI), community research staff, or coordinators met face-to-face with health care providers prior to study start to explain the study, address concerns, and gain a commitment to assist with recruiting and enrollment. [22, 28, 29, 32, 33, 35, 36] A successful strategy to engage community providers in this process involved leveraging a prior relationship with the PI or with a respected provider association to make the contact. [19, 23, 31] Cold calling, letters, and faxing information were not found to be effective methods of obtaining provider involvement. [25] The CCOP reported by Vicini and colleagues met frequently with physicians from the medical oncology and radiation oncology departments, provided them with a handbook of open trials, and placed a list of available trials on the charts of patients being seen by them at the day of the visit. [25]

Since provider assurance of assistance in recruiting was not always correlated with successful participant recruitment, most effective were efforts that did not require provider action to make participants aware of the clinical trial. It was more effective to rely on mechanisms, such as participant response cards, where patients interested in clinical trials could call a toll-free number about the trial, or the presence of research staff in the health care provider offices to create awareness of the clinical trial for providers and patients. [19–22, 29, 35] Another effective strategy was sending letters, approved and signed by the providers to patients, making them aware of the study and then having study staff follow up with them. [30, 32–35] Warner and colleagues reported that enrollment was faster after they changed the provider-approval procedure from an active one where providers had to agree to include patients in the study to a passive one where providers could notify research staff if they wanted to exclude specific patients within ten business days of being notified of the patient eligibility status. [33]

Strategies Addressing Opportunities to Participate

A major strategy used by nearly every program to overcome barriers that diminish the opportunity for underrepresented minorities to enroll in clinical trials was to engage providers, hospitals, and/or participants in the underserved communities. [18–25, 27–32, 35–37] In several programs, prior to study enrollment, investigators consulted with community providers, patients and staff regarding the study intervention, materials, and/or enrollment strategies. [26, 28–30] Several studies pilot-tested recruitment approaches prior to study start or modified their methods and recruitment sites when they were not meeting enrollment targets. [19, 28, 29, 33, 37] Andreae and colleagues used a staggered intervention-start date with rolling enrollment of practices and participants over nine months. However, they found that they still had to supplement their focus on the provider with participant- and community-based efforts. These efforts included asking individuals who signed an interest card to refer additional potential participants within their own social networks and identifying and incentivizing (\$5 gift card/referral enrolled) community recruiters to tap into their social networks for potential participants. [28] Bailey and colleagues also described how they needed to reassess their recruitment strategy after study start. They decided to add provider sites in underserved areas, including urban hospitals and community clinics, to reach their targeted population. [18] Twelve programs managed trials within the community

rather than at an academic setting to create more opportunities for trial enrollment. [19, 20, 22, 25, 27, 28, 30–34, 37]

Ten programs arranged for regular interactions between the study researchers and community practice providers and staff to address study issues. [19, 20, 25, 27, 28, 30, 33, 35, 36] Wiemann and colleagues indicated the importance of educating the provider staff about clinical trial methodology and research practices so that they would understand and be supportive of the trial, especially a double-blinded study. [37] However, central to successful enrollment of participants from providers' offices and clinics was providing research staff, such as nurses and coordinators, on location as well as having research staff follow-up with patients identified by providers. [25, 38–49] Nearly half of the programs hired research staff from the community or individuals who reflected community and cultural demographics to perform these functions. [19, 21, 28–30, 32, 33, 35–37] The research nurses and coordinators played key roles in identifying potential participants and in approaching them to participate in the study. Bailey and colleagues indicated, in their study of cervical cancer prevention, that the nurse practitioner functioned primarily as an educator and then study recruiter. [18] In the program described by Baquet and colleagues, the initiative included support for full-time nurse clinical research associates to perform the required regulatory, data collection and reporting. [20]

Strategies Addressing Opportunities to Participate and Barriers to Acceptance

The use of a patient navigation program was also very effective in identifying people from underrepresented populations who were willing to participate in clinical trials. For example, Holmes and colleagues developed a new role for an oncology nurse navigator to collaborate with community providers to increase African American participation in cancer clinical trials. The oncology nurse navigator screened and engaged African American cancer patients in the offices of their community physicians and recruited them into clinical trials, while also addressing barriers that patients encountered in the process. [22] Two other programs took place at local or regional hospitals. Guadagnolo and colleagues reported on a program where all new patients presenting at a regional cancer center were evaluated by research staff for consideration of clinical trial enrollment status. The program referred all patients who identified as American Indian to a patient navigation program, comprised of trained, culturally competent staff. [21] Wujcik and Wolff [26] described collaboration between an academic medical center and a public general hospital to create a proactive system to screen newly diagnosed cancer patients for clinical trial eligibility at the public general hospital. At the time of program initiation, 25% of the community was African American. Identified patients were assigned to a research nurse for follow-up and patient navigation through the hospital system with an emphasis on clinical trial participation. The research nurse worked with the physician to address any patient barriers to study enrollment and participation, such as transportation. It was noteworthy, that all three programs using patient navigators to identify and enroll patients highlighted that a major barrier to clinical trial enrollment was the lack of availability of suitable trials. [21, 22, 26]

Several programs found it helpful to provide reimbursement to providers for recruitment and study expenses. [22, 27, 29] For example, Holmes and colleagues provided a monthly

stipend to the medical oncologist because of high referral rates to offset the oncology nurse navigator's use of office space, supplies and utilities. [22] Ezeugwu and colleagues reported the need to provide study stipends to compensate physician practices for their time and effort in the enrollment of participants. [27]

DISCUSSION

Since the NIH required in 1993 that its sponsored clinical research include women and minority groups, studies have identified many barriers to enrolling underserved populations into clinical trials. [2, 5, 7, 13] Commonly identified barriers for underserved communities include fear and lack of trust of clinical research, and lack of awareness, referral, and access to clinical research opportunities. [2, 5, 7, 13, 50–53] During these past two decades, it has become clear that multiple strategies are needed to address these multiple barriers, which fall into the categories of study design, at provider enrollment sites, for the individual, and within the community. [10–12, 54] Moreover, it has become clear that it is necessary to address recruitment strategies at the time of study design to ensure appropriate enrollment rather than as an afterthought.

Successful programs placed importance on spending time before study protocol design completion or implementation to develop recruitment strategies. Usually, this time was spent engaging with the key community stakeholders, like medical professionals and other community leaders and members. For instance, McCaskill-Stevens and colleagues reported that they hired full-time community outreach coordinators for a select number of participating sites. In addition to educating and enrolling participants, the coordinators identified effective recruitment strategies and disseminated study findings to the sites. [19]

A few initiatives reported the need for active monitoring and flexibility during recruitment efforts to adapt to providers not enrolling sufficient number of participants and to participant constraints, such as where and when to have conversations about trial enrollment and follow-up visits and how to maintain contact with participants. While this approach may have taken longer initially, considering the common experiences in delays and difficulties in recruiting, especially underrepresented populations, overall, these efforts appeared to be worthwhile in achieving recruitment targets. It was noteworthy that while one group found it more costly than anticipated to recruit underrepresented participants due to increased staffing and incentive needs, another found that basing the clinical trial in the community resulted in an estimated halving of cost per enrolled patient. [22, 36]

Reflecting the complexity in recruitment, successful approaches combined strategies, focusing on providers and potential participants at the provider site and in the communities, as well as issues of trust in the community. Several programs [19, 20, 25, 28] used strategies for each stakeholder at each step in the recruitment process, including an emphasis on gaining community trust and providing community and provider education and on staying in close contact with providers, as well as providing necessary research staff infrastructure. Although a preliminary assessment, it appeared that the greater the risk of the intervention (e.g., evaluations of drug therapy), the greater the need to develop multiple strategies, particularly including providers. For more participant-initiated interventions, such as diet or

exercise programs, there was less need to focus on providers and more need to directly attract participants either through the provider sites or within the communities.

In recruiting community providers to be involved in clinical trials, it was important for the academic researchers to cultivate trust and a working relationship. Strategies that did not involve direct personal outreach were less effective in increasing provider engagement in clinical trial recruitment. On-site meetings to explain the study and address provider concerns, such as fear of losing patients to the academic site or time constraints within busy community practices, helped to increase provider engagement. Researchers indicated that it was more effective to contact providers where there was a prior relationship (for example, through a previous study) or through a trusted community physician organization. In communicating with providers, it was important to put the focus on adding value to the provider-patient relationship by expanding treatment options available to patients and to create a noncompetitive relationship with community providers, respectful of their relationships with their patients. Some researchers indicated that it was helpful to engage providers with useful resources, including CME programs, patient education materials, and/or study stipends to compensate for the time and resources spent by providers and their staff in participating in research. Frequent communication with providers on the progress of the study and on their own patients was also important.

We also found that putting emphasis on the provider as the key to recruitment and enrollment required supportive infrastructure so that the provider did not have to actively recruit or enroll. For example, research coordinators, patient navigators, and other research staff were needed for the strategy to be effective. This need was evident whether the trials were for patient management of chronic conditions or for cancer trials. This interpretation was confirmed by a recent review of the National Cancer Institute's Community Clinical Oncology Program (CCOP) that found that having a team of staff dedicated to enrolling patients in control and prevention trials was associated with significantly greater enrollment than having no dedicated staff. [51] For cancer trials, the more integrated the recruitment was in the patient care process, the more successful the enrollment.

Successful enrollment strategies also focused on using different approaches to meet the needs of the individual participants. Key strategies involved community education about clinical trials to address mistrust of clinical research, placing enrollment and treatment sites within the communities to reduce the need for participants to travel distances outside of their communities, use of nurse navigators and other research staff to address specific barriers, including cost and transportation assistance, and offering more flexible hours so that participants did not have to miss work to enroll.

While the strength of this review is that we identified which strategies have been used to address which types of barriers, including multiple barriers and multiple strategies, one of the major limitations of this analysis is that the recruiting efforts we analyzed were not rigorously tested interventions. Only one was designed to compare the effectiveness of different strategies. [31] The others reported on strategies they had designed to improve enrollment into a clinical trial or to create infrastructure to increase enrollment. Moreover, while we present the major outcomes from these efforts, in general, the overall results were

interpreted “lessons learned,” but do not reflect rigorous analysis. Another limitation is that we focused only on U.S.-based programs and so cannot generalize beyond these. Nevertheless, some of the reported outcomes were appreciably better than those previously reported. For example, Guadagnolo and colleagues reported that their program to enroll American Indians into cancer clinical trials, which included research staff reviewing each chart for eligibility and assigning those who self-identified as American Indians to patient navigators, resulted in 10% of American Indian new cancer patients enrolled in a trial, three times greater than previously reported national accrual rates for American Indians [21]

Prior reviews of recruitment strategies found an emphasis of building on community relationships, partnering with community providers, and using multiple recruitment strategies. [4, 6, 55] Paskett and colleagues [4] reported on the experiences of projects that actively recruited minority and underserved populations as part of The Centers for Population Health and Health Disparities initiative. They found that more than 70% of the projects engaged in community outreach to address recruitment problems. Similar to our findings, strategies included multiple approaches, like partnering with community representatives and organizations; presenting to groups of potentially eligible individuals, where they emphasized the benefits of the research to the community; providing incentives and personalized recruitment materials, and holding meetings with physicians. They also reported the need for protocol changes in response to not meeting recruitment targets.

In conclusion, considering that the recruiting efforts we analyzed were not rigorously tested interventions, there is a need for a more systematic and rigorous approach to determine the best approach for improving minority recruitment. Based on the “lessons learned” from these studies, it seems that multiple and flexible strategies targeting providers and participants at provider sites and communities should be evaluated. Further evaluation will be necessary, however, to determine whether comprehensive engagement strategies are economically or logistically sustainable, and whether there might be a negative impact on community-research relationships if interventions cannot be continued after study completion.

On the other hand, approaches that systematically identify and address each potential participant in the process of accessing medical care seem to be very effective in engaging with patients and enrolling them into clinical trials. In fact, these programs, for example through the use of patient navigators at the health provider setting, were so successful in enrolling participants into clinical trials that the barrier to enrollment became not having appropriate studies for the individuals to enter, either because the sites were not enrolling for studies matching the needs of these individuals or because the entry criteria were too limiting. Jacobs and colleagues confirmed that a greater number of cancer control trials available was associated with significantly greater enrollment. [51] Key additional challenges, then, relate to the fragmented nature of recruiting into clinical trials, with too few trials available consistently at provider sites for willing potential participants and to protocols that may be designed with entrance criteria that do not take into consideration the co-morbid conditions of underrepresented populations.

References

- [1]. National Institutes of Health. Policy and Guidelines on The Inclusion of Women and Minorities as Subjects in Clinical Research – Amended. In: Health NIO, editor. Washington, D.C.: Department of Health and Human Services; 2001.
- [2]. Coakley M, Fadiran EO, Parrish LJ, Griffith RA, Weiss E, Carter C. Dialogues on diversifying clinical trials: successful strategies for engaging women and minorities in clinical trials. *Journal of women's health*. 2012;21:713–6.
- [3]. Ockene IS, Tellez TL, Rosal MC, Reed GW, Mordes J, Merriam PA, et al. Outcomes of a Latino community-based intervention for the prevention of diabetes: the Lawrence Latino Diabetes Prevention Project. *American journal of public health*. 2012;102:336–42. [PubMed: 22390448]
- [4]. Paskett ED, Reeves KW, McLaughlin JM, Katz ML, McAlearney AS, Ruffin MT, et al. Recruitment of minority and underserved populations in the United States: the Centers for Population Health and Health Disparities experience. *Contemporary clinical trials*. 2008;29:847–61. [PubMed: 18721901]
- [5]. Spiker CA, Weinberg AD. Policies to address disparities in clinical trials: the EDICT Project. *Journal of cancer education : the official journal of the American Association for Cancer Education*. 2009;24 Suppl 2:S39–49. [PubMed: 20024825]
- [6]. Yancey AK, Ortega AN, Kumanyika SK. Effective recruitment and retention of minority research participants. *Annual review of public health*. 2006;27:1–28.
- [7]. Kwiatkowski K, Coe K, Bailar JC, Swanson GM. Inclusion of minorities and women in cancer clinical trials, a decade later: Have we improved? *Cancer*. 2013;119:2956–63. [PubMed: 23674318]
- [8]. Swanson GM, Bailar JC 3rd. Selection and description of cancer clinical trials participants--science or happenstance? *Cancer*. 2002;95:950–9. [PubMed: 12209677]
- [9]. Rivers D, August EM, Sehovic I, Lee Green B, Quinn GP. A systematic review of the factors influencing African Americans' participation in cancer clinical trials. *Contemporary clinical trials*. 2013;35:13–32. [PubMed: 23557729]
- [10]. Durant RW, Wenzel JA, Scarinci IC, Paterniti DA, Fouad MN, Hurd TC, et al. Perspectives on barriers and facilitators to minority recruitment for clinical trials among cancer center leaders, investigators, research staff, and referring clinicians: enhancing minority participation in clinical trials (EMPaCT). *Cancer*. 2014;120 Suppl 7:1097–105. [PubMed: 24643647]
- [11]. Burlew K, Larios S, Suarez-Morales L, Holmes B, Venner K, Chavez R. Increasing ethnic minority participation in substance abuse clinical trials: lessons learned in the National Institute on Drug Abuse's Clinical Trials Network. *Cultural Diversity & Ethnic Minority Psychology*. 2011;17:345–56. [PubMed: 21988575]
- [12]. Gwadz MV, Colon P, Ritchie AS, Leonard NR, Cleland CM, Riedel M, et al. Increasing and supporting the participation of persons of color living with HIV/AIDS in AIDS clinical trials. *Curr HIV/AIDS Rep*. 2010;7:194–200. [PubMed: 20737252]
- [13]. Robinson JM, Trochim WM. An examination of community members', researchers' and health professionals' perceptions of barriers to minority participation in medical research: an application of concept mapping. *Ethnicity & health*. 2007;12:521–39. [PubMed: 17978947]
- [14]. Burlew AK, Weekes JC, Montgomery L, Feaster DJ, Robbins MS, Rosa CL, et al. Conducting research with racial/ethnic minorities: methodological lessons from the NIDA Clinical Trials Network. *Am J Drug Alcohol Abuse*. 2011;37:324–32. [PubMed: 21854274]
- [15]. Howerton MW, Gibbons MC, Baffi CR, Gary TL, Lai GY, Bolen S, et al. Provider roles in the recruitment of underrepresented populations to cancer clinical trials. *Cancer*. 2007;109:465–76. [PubMed: 17200964]
- [16]. Joseph G, Dohan D. Recruiting minorities where they receive care: Institutional barriers to cancer clinical trials recruitment in a safety-net hospital. *Contemp Clin Trials*. 2009;30:552–9. [PubMed: 19580887]
- [17]. Schmotzer GL. Barriers and facilitators to participation of minorities in clinical trials. *Ethn Dis*. 2012;22:226–30. [PubMed: 22764647]

- [18]. Bailey JM, Bieniasz ME, Kmak D, Brenner DE, Ruffin MT. Recruitment and retention of economically underserved women to a cervical cancer prevention trial. *Applied nursing research : ANR*. 2004;17:55–60. [PubMed: 14991556]
- [19]. McCaskill-Stevens W, Wilson JW, Cook ED, Edwards CL, Gibson RV, McElwain DL, et al. National Surgical Adjuvant Breast and Bowel Project Study of Tamoxifen and Raloxifene trial: advancing the science of recruitment and breast cancer risk assessment in minority communities. *Clinical trials*. 2013;10:280–91. [PubMed: 23335675]
- [20]. Baquet CR, Henderson K, Commiskey P, Morrow JN. Clinical trials: the art of enrollment. *Semin Oncol Nurs*. 2008;24:262–9. [PubMed: 19000600]
- [21]. Guadagnolo BA, Petereit DG, Helbig P, Koop D, Kussman P, Fox Dunn E, et al. Involving American Indians and medically underserved rural populations in cancer clinical trials. *Clinical trials*. 2009;6:610–7. [PubMed: 19933720]
- [22]. Holmes DR, Major J, Lyonga DE, Alleyne RS, Clayton SM. Increasing minority patient participation in cancer clinical trials using oncology nurse navigation. *American journal of surgery*. 2012;203:415–22. [PubMed: 21996347]
- [23]. McCaskill-Stevens W, Pinto H, Marcus AC, Comis R, Morgan R, Plomer K, et al. Recruiting minority cancer patients into cancer clinical trials: a pilot project involving the Eastern Cooperative Oncology Group and the National Medical Association. *Journal of clinical oncology : official journal of the American Society of Clinical Oncology*. 1999;17:1029–39. [PubMed: 10071298]
- [24]. Michaels M, Weiss ES, Guidry JA, Blakeney N, Swords L, Gibbs B, et al. “The promise of community-based advocacy and education efforts for increasing cancer clinical trials accrual”. *Journal of cancer education : the official journal of the American Association for Cancer Education*. 2012;27:67–74. [PubMed: 21938600]
- [25]. Vicini F, Nancarrow-Tull J, Shah C, Chmielewski G, Fakhouri M, Sitarek SA, et al. Increasing accrual in cancer clinical trials with a focus on minority enrollment: The William Beaumont Hospital Community Clinical Oncology Program Experience. *Cancer*. 2011;117:4764–71. [PubMed: 21455995]
- [26]. Wujcik D, Wolff SN. Recruitment of African Americans to National Oncology Clinical Trials through a clinical trial shared resource. *Journal of health care for the poor and underserved*. 2010;21:38–50. [PubMed: 20173284]
- [27]. Ezeugwu CO, Laird A, Mullins CD, Saluja DS, Winston RA. Lessons learned from community-based minority health care serving system participation in an NIH clinical trial. *Journal of the National Medical Association*. 2011;103:839–44. [PubMed: 22364051]
- [28]. Andreae SJ, Halanych JH, Cherrington A, Safford MM. Recruitment of a rural, southern, predominantly African-American population into a diabetes self-management trial. *Contemporary clinical trials*. 2012;33:499–506. [PubMed: 22349456]
- [29]. Burns D, Soward AC, Skelly AH, Leeman J, Carlson J. Effective recruitment and retention strategies for older members of rural minorities. *The Diabetes educator*. 2008;34:1045–52. [PubMed: 19075086]
- [30]. Eakin EG, Bull SS, Riley K, Reeves MM, Gutierrez S, McLaughlin P. Recruitment and retention of Latinos in a primary care-based physical activity and diet trial: The Resources for Health study. *Health education research*. 2007;22:361–71. [PubMed: 16963726]
- [31]. Ellis SD, Bertoni AG, Bonds DE, Clinch CR, Balasubramanyam A, Blackwell C, et al. Value of recruitment strategies used in a primary care practice-based trial. *Contemporary clinical trials*. 2007;28:258–67. [PubMed: 17030154]
- [32]. Rosal MC, White MJ, Borg A, Scavron J, Candib L, Ockene I, et al. Translational research at community health centers: challenges and successes in recruiting and retaining low-income Latino patients with type 2 diabetes into a randomized clinical trial. *The Diabetes educator*. 2010;36:733–49. [PubMed: 20729512]
- [33]. Warner ET, Glasgow RE, Emmons KM, Bennett GG, Askew S, Rosner B, et al. Recruitment and retention of participants in a pragmatic randomized intervention trial at three community health clinics: results and lessons learned. *BMC public health*. 2013;13:192. [PubMed: 23496916]

- [34]. Wisdom K, Neighbors K, Williams VH, Havstad SL, Tilley BC. Recruitment of African Americans with type 2 diabetes to a randomized controlled trial using three sources. *Ethnicity & health*. 2002;7:267–78. [PubMed: 12772546]
- [35]. Lora CM, Ricardo AC, Brecklin CS, Fischer MJ, Rosman RT, Carmona E, et al. Recruitment of Hispanics into an observational study of chronic kidney disease: the Hispanic Chronic Renal Insufficiency Cohort Study experience. *Contemporary clinical trials*. 2012;33:1238–44. [PubMed: 22841929]
- [36]. Hays J, Hunt JR, Hubbell FA, Anderson GL, Limacher M, Allen C, et al. The Women's Health Initiative recruitment methods and results. *Annals of epidemiology*. 2003;13:S18–77. [PubMed: 14575939]
- [37]. Wiemann CM, Chacko MR, Tucker JC, Velasquez MM, Smith PB, DiClemente RJ, et al. Enhancing recruitment and retention of minority young women in community-based clinical research. *Journal of pediatric and adolescent gynecology*. 2005;18:403–7. [PubMed: 16338606]
- [38]. Bailey JM, Bieniasz ME, Kmak D, Brenner DE, Ruffin MT. Recruitment and retention of economically underserved women to a cervical cancer prevention trial. *Applied Nursing Research*. 2004;17:55–60. [PubMed: 14991556]
- [39]. Baquet CR. A model for bidirectional community-academic engagement (CAE): overview of partnered research, capacity enhancement, systems transformation, and public trust in research. *Journal of Health Care for the Poor & Underserved*. 2012;23:1806–24. [PubMed: 23698691]
- [40]. Burns D, Soward AC, Skelly AH, Leeman J, Carlson J. Effective recruitment and retention strategies for older members of rural minorities. *Diabetes Educator*. 2008;34:1045–52. [PubMed: 19075086]
- [41]. Eakin EG, Bull SS, Riley K, Reeves MM, Gutierrez S, McLaughlin P. Recruitment and retention of Latinos in a primary care-based physical activity and diet trial: The Resources for Health study. *Health Education Research*. 2007;22:361–71. [PubMed: 16963726]
- [42]. Ezeugwu CO, Laird A, Mullins CD, Saluja DS, Winston RA. Lessons learned from community-based minority health care serving system participation in an NIH clinical trial. *Journal of the National Medical Association*. 2011;103:839–44. [PubMed: 22364051]
- [43]. Hays J, Hunt JR, Hubbell FA, Anderson GL, Limacher M, Allen C, et al. The Women's Health Initiative recruitment methods and results. *Annals of Epidemiology*. 2003;13:S18–77. [PubMed: 14575939]
- [44]. Holmes DR, Major J, Lyonga DE, Alleyne RS, Clayton SM. Increasing minority patient participation in cancer clinical trials using oncology nurse navigation. *American Journal of Surgery*. 2012;203:415–22. [PubMed: 21996347]
- [45]. Lora CM, Ricardo AC, Brecklin CS, Fischer MJ, Rosman RT, Carmona E, et al. Recruitment of Hispanics into an observational study of chronic kidney disease: The Hispanic Chronic Renal Insufficiency Cohort Study experience. *D - 101242342*. 2012;33:1238–44.
- [46]. McCaskill-Stevens W, Wilson JW, Cook ED, Edwards CL, Gibson RV, McElwain DL, et al. National Surgical Adjuvant Breast and Bowel Project Study of Tamoxifen and Raloxifene trial: advancing the science of recruitment and breast cancer risk assessment in minority communities. *Clinical Trials*. 2013;10:280–91. [PubMed: 23335675]
- [47]. Rosal MC, White MJ, Borg A, Scavron J, Candib L, Ockene I, et al. Translational research at community health centers: challenges and successes in recruiting and retaining low-income Latino patients with type 2 diabetes into a randomized clinical trial. *Diabetes Educator*. 2010;36:733–49. [PubMed: 20729512]
- [48]. Warner ET, Glasgow RE, Emmons KM, Bennett GG, Askew S, Rosner B, et al. Recruitment and retention of participants in a pragmatic randomized intervention trial at three community health clinics: Results and lessons learned. *BMC Public Health*. 2013;13:1–11. [PubMed: 23280303]
- [49]. Wiemann CM, Chacko MR, Tucker JC, Velasquez MM, Smith PB, DiClemente RJ, et al. Enhancing recruitment and retention of minority young women in community-based clinical research. *Journal of Pediatric & Adolescent Gynecology*. 2005;18:403–7. [PubMed: 16338606]
- [50]. Fu S, McQuinn L, Naing A, Wheler JJ, Janku F, Falchook GS, et al. Barriers to Study Enrollment in Patients With Advanced Cancer Referred to a Phase I Clinical Trials Unit. *Oncologist*. 2013.

- [51]. Jacobs SR, Weiner BJ, Minasian LM, Good MJ. Achieving high cancer control trial enrollment in the community setting: an analysis of the Community Clinical Oncology Program. *Contemporary clinical trials*. 2013;34:320–5. [PubMed: 23295315]
- [52]. Lebensburger JD, Sidonio RF, Debaun MR, Safford MM, Howard TH, Scarinci IC. Exploring barriers and facilitators to clinical trial enrollment in the context of sickle cell anemia and hydroxyurea. *Pediatric blood & cancer*. 2013;60:1333–7. [PubMed: 23418000]
- [53]. Penberthy L, Brown R, Wilson-Genderson M, Dahman B, Ginder G, Siminoff LA. Barriers to therapeutic clinical trials enrollment: differences between African-American and white cancer patients identified at the time of eligibility assessment. *Clinical trials*. 2012;9:788–97. [PubMed: 23033547]
- [54]. Robinson JM, Trochim WM. An examination of community members', researchers' and health professionals' perceptions of barriers to minority participation in medical research: an application of concept mapping. *Ethnicity & Health*. 2007;12:521–39. [PubMed: 17978947]
- [55]. UyBico SJ, Pavel S, Gross CP. Recruiting vulnerable populations into research: a systematic review of recruitment interventions. *Journal of general internal medicine*. 2007;22:852–63. [PubMed: 17375358]
- [56]. Andreae SJ, Halanych JH, Cherrington A, Safford MM. Recruitment of a rural, southern, predominantly African-American population into a diabetes self-management trial. *D - 101242342*. 2012;33:499–506.
- [57]. Wisdom K, Neighbors K, Williams VH, Havstad SL, Tilley BC. Recruitment of African Americans with type 2 diabetes to a randomized controlled trial using three sources. *Ethnicity & Health*. 2002;7:267–78. [PubMed: 12772546]
- [58]. Ellis SD, Bertoni AG, Bonds DE, Clinch CR, Balasubramanyam A, Blackwell C, et al. Value of recruitment strategies used in a primary care practice-based trial. *D - 101242342*. 2007;28:258–67.
- [59]. McCaskill-Stevens W, Pinto H, Marcus AC, Comis R, Morgan R, Plomer K, et al. Recruiting minority cancer patients into cancer clinical trials: a pilot project involving the Eastern Cooperative Oncology Group and the National Medical Association. *Journal of Clinical Oncology*. 1999;17:1029–39. [PubMed: 10071298]
- [60]. Guadagnolo BA, Petereit DG, Helbig P, Koop D, Kussman P, Fox Dunn E, et al. Involving American Indians and medically underserved rural populations in cancer clinical trials. *Clinical Trials*. 2009;6:610–7. [PubMed: 19933720]
- [61]. Merriam PA, Tellez TL, Rosal MC, Olendzki BC, Ma Y, Pagoto SL, et al. Methodology of a diabetes prevention translational research project utilizing a community-academic partnership for implementation in an underserved Latino community. *BMC Medical Research Methodology*. 2009;9:20. [PubMed: 19284663]
- [62]. Michaels M, Weiss ES, Guidry JA, Blakeney N, Swords L, Gibbs B, et al. The promise of community-based advocacy and education efforts for increasing cancer clinical trials accrual". *Journal of Cancer Education*. 2012;27:67–74. [PubMed: 21938600]
- [63]. Baquet CR, Ellison GL, Mishra SI. Analysis of Maryland cancer patient participation in National Cancer Institute-supported cancer treatment clinical trials. *Journal of Health Care for the Poor & Underserved*. 2009;20:120–34. [PubMed: 19711497]
- [64]. Wujcik D, Wolff SN. Recruitment of African Americans to National Oncology Clinical Trials through a clinical trial shared resource. *Journal of Health Care for the Poor & Underserved*. 2010;21:38–50. doi: 10.1353/hpu.0.0251. [PubMed: 20173284]

Figure 1.
Flow Diagram for Literature Selection and Inclusion

Table 1.
Initiatives to Increase Enrollment in Clinical Trials among Underrepresented Populations

First Author [ref]; Title	Nature of Initiative	Priority Populations	Key Strategies	Outcomes
Andrae [21]; Recruitment of African Americans for a diabetes intervention study in the Rural South	Enrollment into community-based diabetes self-management cluster RCT	Rural African Americans with type 2 diabetes	<ul style="list-style-type: none"> Partnership with community members / leaders / organizations prior to protocol development Pilot tested recruitment approaches with adjustment of methods to maximize success Hiring research staff from within community Involvement of local community primary care practices and identifying a PCP practice champion to promote recruitment and facilitate communication with research team Community member recruitment strategies, including asking participants to refer others and use of community recruiters, incentivized with \$5 per community (non-practice) referral 	<ul style="list-style-type: none"> 12 community practices participated/15 approached 424 subjects enrolled/759 expressing interest 58.9% (n=226) were referrals from community members 17.4% (n=67) were referrals from primary care 23.7% (n=91) were referrals from community coordinators or data collection staff
Bailey [11]; Recruitment of patients for a cervical cancer prevention trial	Enrollment into cervical cancer prevention RCT	Predominantly underserved women (over 55% reported a household income of \$20,000/year)	<ul style="list-style-type: none"> Recruitment took place in different settings, including an inner city hospital Use of a nurse practitioner primarily as an educator, with recruitment to the study considered a secondary goal 	<ul style="list-style-type: none"> It required 4 years to recruit the target of 176 participants. Nearly 90% of eligible women agreed to participate when approached by research nurse practitioner 99.3% retention rate
Baquet [13]; Clinical trials: the art of enrollment	Comprehensive support for recruitment into cancer RCTs	Minority cancer researchers and students, rural and minority communities	<ul style="list-style-type: none"> Partnership with community members / leaders / organizations prior to protocol development Community programs and events Education/training for community members and providers Infrastructure for trial regulatory and data collection Full-time nurse clinical research coordinator and nurse community educator and patient navigation 	Between 2000 and 2006, enrollment in clinical trials on the Eastern Shore of Maryland increased 20-fold and the number of open protocols increased 40-fold.
Burns [22]; Effective recruitment and retention strategies for older minorities	Recruitment into diabetes management RCT	Rural African American women with type 2 diabetes 55 years old	<ul style="list-style-type: none"> In-person working with community providers, clinic staff and church leaders before and during study recruitment 	<ul style="list-style-type: none"> 27% recruited from health centers and outpatient clinics

First Author [ref]; Title	Nature of Initiative	Priority Populations	Key Strategies	Outcomes
			<ul style="list-style-type: none"> Community advisory board provided feedback on cultural sensitivity of patient materials and recruitment strategies Direct recruitment at providers/clinics by study nurses consistently present Flyers for potential participants at providers with envelopes for response and toll-free phone number Educational materials provided as incentive to providers 	<ul style="list-style-type: none"> 73% from community engagement (churches, senior centers, health fairs), word of mouth, ads, diabetes support groups In-person outreach to providers was necessary for effective recruitment Recruiting from HCPs was the most effective recruiting method
Eakin [23]; Recruitment and retention of Latinos in a primary care-based physical activity and diet trial: The Resources for Health study	Enrollment in physical activity and dietary intervention RCT	Low-income Hispanic/Latinos with one or more chronic health conditions	<ul style="list-style-type: none"> Solicited input and support from community members / leaders / organizations prior to study start Established community partnership for feedback and referral Bilingual staff, culturally adapted and translated materials Formal structure for regular interaction with research personnel Providers wrote letters of support, which were followed up with direct calls from project staff to recruit eligible patients 	<ul style="list-style-type: none"> 33% of the original pool of 605 patients agreed to participate and completed baseline assessment 78% of those reached by phone and eligible for study participation
Ellis [24]; Value of recruitment strategies used in a primary care practice-based trial	Multiple strategies to recruit physicians in primary care practices, including minority physicians, to collaborate in software-based cardiovascular risk management RCT	Primary care patients with high cholesterol and/or blood pressure	<ul style="list-style-type: none"> Support of community leaders 6 opt-in strategies; 3 opt-out and 1 combined strategies were used to enroll providers, including: <ul style="list-style-type: none"> Opt-in: advertisements and editorial; distribution of recruitment materials; faxed invitation; mailed materials to minority physicians; opinion-leader email; in-person presentations to provider professional meetings Opt-out: Cold calls to physician practice managers; presentations to physician practice groups; study investigators contacted practices that had previously enrolled in prior studies Combined: Use of interest survey among PCPs with prior relationship with a provider organization 	<ul style="list-style-type: none"> Response to the six opt-in strategies was 0.40% (53 responses from 13,290 placements) yielding 34% (18 / 53) of recruited PCPs Response to opt-in of combined strategy was 51% (90 responses from 176 surveys sent to PCPs) yielding 21% (19 / 90) of recruited PCPs Most PCP partners recruited through in person meetings (42%) and previous relationships (33%). These two methods were the most cost-effective. Specific mail strategy to recruit minority physicians yielded 1% of recruited practices, while 15% of recruited practices were predominantly minority practices.
Ezeugwu [20];	Academic — minority-serving	Racial/ ethnic minority primary	<ul style="list-style-type: none"> Formal structure for regular interaction with research personnel 	<ul style="list-style-type: none"> >800 minority patients enrolled over a 3 year period

First Author [ref]; Title	Nature of Initiative	Priority Populations	Key Strategies	Outcomes
Lessons learned from community-based minority health care serving system participation in an NIH clinical trial	health care system partnership to support overall recruitment into RCTs and improve management of diabetes and hypertension in minority patients	care patients with diabetes and/or hypertension	<ul style="list-style-type: none"> • Reimbursement / stipend for expenses of practices • PI met directly with physicians to discuss potential roles as clinical researchers • Provided nurse research coordinator • Physicians and nurse research coordinators matched demographics of priority populations 	<ul style="list-style-type: none"> • <5% of partner health care system physicians able to participate in study, but participating physicians were committed and enthusiastic
Guadagnolo [14]; Involving American Indians and medically underserved rural populations in cancer clinical trials	Support overall recruitment into cancer RCTs	American Indians with cancer	<ul style="list-style-type: none"> • Community research representatives embedded in communities • Translated patient education materials into Lakota language • Hospital-based patient navigators educated about trials • Charts reviewed by research staff to physician consultation for potential protocol eligibility 	<ul style="list-style-type: none"> • 10% of American Indian new cancer patients were enrolled into a trial. • This percentage is 3-fold higher than reported national accrual rates for American Indians
Hays [29]; The Women's Health Initiative	Enrollment into long-term RCT, and if ineligible or unwilling to enter RCT, then entered observational study of hormone therapy and/or dietary intervention	Racial/ ethnic minority women: goal was to enroll minority groups in at least the same proportion as they existed in the general population	<ul style="list-style-type: none"> • Clinical centers with expertise and access to specific minority groups selected as recruitment sites • Use of bilingual recruiters • Recruiters matched demographics of minority populations • Mass mailings, community presentations, media placement 	<p>Little racial variability in proportion of women randomized to the clinical trial after completing initial screening form, with 20% of Black, 19% of Hispanic, and 18% of Caucasian women completing the randomization process.</p> <ul style="list-style-type: none"> • Minority women were recruited into the clinical trial in the same proportion (18.5%) as was found in the U.S. population-18.2% at that time
Holmes [15]; Increasing minority patient participation in cancer clinical trials using oncology nurse navigation	Support overall recruitment into breast cancer RCTs	African American women with breast cancer	<ul style="list-style-type: none"> • On-site recruitment at community-physician offices by oncology research nurse navigator • Reimbursement / stipend for practice's expenses • Collaboration with physician professional network • Educational grants for physician professional network referrals 	<ul style="list-style-type: none"> • 86% of eligible patients were enrolled to 1 or more research protocols • The estimated cost per enrolled patient was about half the expected per patient cost at an academic or cancer center
Lora [28]; Recruitment of Hispanics into an observational study of chronic kidney disease: the Hispanic Chronic Renal Insufficiency	Enrollment into a prospective observational cohort study	Hispanic adults with mild to moderate chronic kidney disease	<ul style="list-style-type: none"> • Partnered with community organizations regarding awareness • Community research representatives embedded in communities 	<ul style="list-style-type: none"> • Community- and academic-based primary care clinics: largest sources of participants screened (45.9% and 22.4%) and highest yield of persons screened (38.2% and 24.5%)

First Author [ref]; Title	Nature of Initiative	Priority Populations	Key Strategies	Outcomes
Cohort Study experience			<ul style="list-style-type: none"> Meeting with community providers to explain study and goals Review of medical records to identify potential participants Letter from provider introducing the study with follow up from research staff Presence of research staff at most clinic sessions at hospital site Reimbursement for time and transportation, and mailing of test results to primary care physicians Encouraged discussion of the study with family members 	<ul style="list-style-type: none"> Community- and academic-based nephrology clinics: highest enrollment yield from individuals screened (68.1%, 61.9%) Health fairs, church, and media advertisement: source of smallest number of participants screened and lowest enrollment yield
McCaskill-Stevens (1999) [16]; Recruiting minority cancer patients into cancer clinical trials: a pilot project involving the Eastern Cooperative Oncology Group and the National Medical Association	Support overall recruitment into cancer RCTs via close collaboration with the National Medical Association	Physicians serving African Americans with cancer	<ul style="list-style-type: none"> Sequence of 5 workshops with physicians, 6 to 9 months apart, emphasizing finding solutions to increase enrollment of underrepresented patients into clinical trials Interviewing physicians serving minority populations to understand barriers to recruitment 	<ul style="list-style-type: none"> Increased understanding of barriers to enrolling patients into cancer RCTs among African American physicians 69% of NMA physicians cited mistrust of the medical center sponsoring the trial as a main barrier (including fear of losing the patient and lack of respect for minority physicians). Among physicians, willingness to collaborate to improve participation of African American patients and investigators
McCaskill-Stevens (2013) [12]; National surgical adjuvant breast and bowel project study of tamoxifen and raloxifene trial: advancing the science of recruitment and breast cancer risk assessment in minority communities	Enrollment into a trial to reduce the risk of developing invasive breast cancer	Post-menopausal women with a 5-year predicted breast cancer risk of 1.66% based on the modified Gail Model	<ul style="list-style-type: none"> Each participating site submitted a detailed plan describing recruitment efforts directed at minority and underserved populations Selected sites hired full-time community outreach coordinators to educate and enroll minority women, identify effective enrollment strategies, and disseminate this information to other sites Ongoing meetings, workshops, panels, operations manual, web site resources emphasizing minority recruitment importance and tools Monthly summaries of each site's overall and minority accrual Targeted and culturally sensitive media, brochures, pamphlets 	<ul style="list-style-type: none"> Of the 91,325 risk-eligible women, 19,747 (21.6% overall, 23.3% Hispanic/Latina, 14.2% African Americans/blacks, 13.7% 'others', and 57.4% whites) signed consent forms and were randomized. Doubled the minority enrollment compared to that in the prior Breast Cancer Prevention Trial from 3.5% to 6.5% Increased the awareness of breast cancer risk assessment in minority communities.

First Author [ref]; Title	Nature of Initiative	Priority Populations	Key Strategies	Outcomes
Michaels [17]; The promise of community-based advocacy and education efforts for increasing cancer clinical trials accrual	Support overall recruitment into cancer RCTs	Underserved populations with cancer	<ul style="list-style-type: none"> • Training and educational activities focused on cancer clinical trials through community members, leaders, organizations, and PCPs • Clinical research staff trained in outreach, recruitment and retention, especially for minority and underserved populations • Training depended on training trainers within the targeted groups • Provided access to CCT matching service, including toll-free phone number for matching service as a means to follow impact of training 	<ul style="list-style-type: none"> • Exceeded goals for training community and PCP trainers • Recruited only 50% of targeted clinical research staff trainers • Surveys of community leaders did not show significant positive outcomes on knowledge or influencing others, although most reported that they shared their information with others • Positive change in knowledge and attitude of role of PCP in CCTs • Research staff showed significantly positive changes in cultural competency regarding recruiting and in intended advocacy efforts • 48 new patient profiles added to matching service over 2 years associated with the program, 6.8% increase compared to growth in the same geographic areas • 39 new patient profiles added through toll-free phone associated with the program, 26.8% increase compared to changes in the same geographic area
Rosal [25]; Translational research at community health centers: challenges and successes in recruiting and retaining low-income Latino patients with type 2 diabetes into a randomized clinical trial	Enrollment into diabetes self-management behavioral intervention RCT	Low-income Hispanic/Latino with type 2 diabetes	<ul style="list-style-type: none"> • On-site recruitment by research staff at community health clinics trained by study staff • Use of clinic-based physician liaisons and bilingual, bicultural site research coordinators (SRC) • Computerized screening and recruiting tracking system • PCP-written letters to patients with referral to SRC for follow up 	<ul style="list-style-type: none"> • 60% of potential participants approved by PCPs completed screening interview • More than 90% of eligible participants were enrolled • 93% of enrolled participants completed participation
Vicini [18]; Increasing accrual in cancer clinical trials with a focus on minority enrollment	Comprehensive support for recruitment into cancer RCTs	Metropolitan Detroit area's 5 major ethnic/minority populations: the African-American, Arab-American and Chaldean, Hispanic/Latino, Native American, and South East Asian communities	<ul style="list-style-type: none"> • Community Clinical Oncology Program CCOP, including frequent educational and informational sessions with physicians, handbook of open trials, summaries listing trials open for specific patients placed on charts at time of visit, CCOP staff assisting participants with enrollment • Minority Outreach Program with efforts added synergistically to community resources to provide culture-specific, bilingual cancer 	Significant difference in average accrual of minorities during the years before and after development of the CCOP and MOP ($p<0.01$): from 5.4% to 10.2% in average annual enrollment.

First Author [ref]; Title	Nature of Initiative	Priority Populations	Key Strategies	Outcomes
			education, prevention, and screening information in a culturally competent manner	
Warner [26]; Recruitment and retention of participants in a pragmatic randomized intervention trial at three community health clinics: results and lessons learned	Enrollment into a 2-year weight loss and hypertension management RCT	Obese adults from minority communities with hypertension	<ul style="list-style-type: none"> Medical record review to identify potential participants at three community health clinics in minority communities Letters from provider that were followed up by bi-lingual research assistants with phone calls to Spanish-speaking and by a call center for English-speaking patients because of the required call volume Regular communication with clinic staff and PCPs For retention: newsletters and social gatherings for participants and extra incentives to participants with previous missed visits 	<ul style="list-style-type: none"> < 5% of potentially eligible participants actively refused study enrollment (130 of 2631) 365 (77%) of those eligible and with scheduled baseline visit appointments completed their baseline visit and were randomized Actual enrollment was 71.2% Black and 13.2% Hispanic 86.0% retention at 24-months, but lower at earlier visits
Wiemann [30]; Enhancing recruitment and retention of minority young women in community-based clinical research	Enrollment into behavioral intervention to promote screening for sexually transmitted infection RCT	African American and Hispanic / Latina women	<ul style="list-style-type: none"> Regular meetings between PI and clinic staff to review role of each staff member in study Clinic intake clerks identified potentially eligible participants Study coordinator and research staff recruited in clinic waiting rooms, and were flexible regarding time needs of subjects to complete enrollment 	<ul style="list-style-type: none"> Recruited 376 subjects, 47% of eligible patients 239 (64%) enrolled the same day, and 137 (36%) enrolled by return appointment
Wisdom [27]; Recruitment of African Americans with type 2 diabetes to a randomized controlled trial using three sources	Enrollment into a diabetes self-management intervention RCT	Rural African Americans	<ul style="list-style-type: none"> Partnership with community members / leaders / organizations (faith-based organizations) before project initiated Active engagement in community events by study staff Letters sent to eligible patients via health system 	<ul style="list-style-type: none"> Highest recruitment yield through health system Participants recruited from faith-based organizations had most active participation
Wujcik [19]; Recruitment of African Americans to national oncology clinical trials through a clinical trial shared resource	Creation of clinical trials shared resource to support overall recruitment into cancer RCTs	African Americans	<ul style="list-style-type: none"> Potential barriers were identified prior to project initiation Research staff identified and contacted potentially eligible participants. Staff research nurse navigator performing needs assessment and clinical trial screening Use of clinical tracking database 	<ul style="list-style-type: none"> From 2001–2007, 1,125 patients screened. 68% of those eligible for a study agreed to participate in a clinical trial A study was available for 343 (30%) and 233 (21%) enrolled. Of those on study from 2005–2007, 61% were African American, 36% White, 2% Hispanic, and 1% Asian Pacific Islander

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Table 2

Summary of Strategies to Overcome Barriers to Enrolling Underrepresented Populations in Clinical Trials

Strategies Addressing Barriers to Clinical Trial Awareness	Addressing Study Design and Implementation ¹⁰ Targeting		Addressing Minority Perceptions of the Research Process ¹⁰ Targeting
	Providers/Staff	Research Participants	Communities
Partnership with community members, leaders, organizations prior to protocol development, study start and/or recruitment strategies or after study start to make adjustments if enrollment targets were not met	[20, 40, 48, 56]	[46]	[20, 25, 40, 46, 56, 57]
Outreach to providers directly, through community provider organizations, or through trusted provider associations	[25, 44, 46, 48, 56, 58, 59] [45]		
Community research staff embedded in the communities doing education and networking with providers and community organizations	[47]		[20, 46, 56, 60]
Use of community members and/or community coordinators to recruit participants		[43, 56]	[43, 46]
Training and educational programs regarding clinical trials in general or specific ones	[20, 25, 42, 49, 61, 62]	[20]	[20, 25, 62]
Material and direct outreach, with an emphasis on culturally sensitive material and in the native language		[40, 41, 43, 45, 46, 48, 57, 60]	[25, 45, 46, 57]
Community providers sent letters of support and/or invitations to participate with follow-up from study staff		[41, 45, 47, 48, 57]	

Strategies Addressing Barriers to Opportunity to Participate	Addressing Study Design and Implementation ¹⁰ Targeting	
	Providers/Staff	Research Participants
Recruiting at local, community practices caring for underrepresented populations	[25, 38, 40–47, 49, 56, 58–60, 62, 63]	[46–48, 57, 62, 64]
Consultation with patients, providers, and staff regarding the study intervention and/or materials	[41, 56, 64]	[40, 41, 46, 56]
Pilot testing recruitment approaches prior to study start or with adjustments of methods and/or recruitment sites if enrollment targets were not met	[48, 49, 56]	[40, 46, 48, 56]
Regular interactions between study researchers and community practice providers and staff to address study issues	[25, 39, 41–43, 45, 46, 48, 49, 56]	
Hiring research staff from within the community or who reflected community demographics	[40, 41, 43, 45, 47, 49, 56, 60]	[45, 46, 48]
Provided study research nurse and other research staff at community practices to recruit and educate patients	[25, 38–40, 42]	[20, 38, 40, 42–49]
Provided patient navigators, either at community practices or at the academic center/hospital site	[44, 64]	[44, 60, 64]
Provided infrastructure at community practices, such as research nurse coordinators and support for data collection	[20, 25]	[48]
Incentives to participants and/or to providers (e.g., educational materials or grants) for recruitment and/or reimbursement for recruiting and study expenses	[40, 42, 44, 56]	[38, 40, 43, 45, 48, 49]

Strategies Addressing Barriers to Acceptance of Enrollment	Addressing Study Design and Implementation ¹⁰ Targeting	
	Providers/Staff	Providers/Staff
Management of trials in community rather than academic settings	[20, 25, 41, 42, 44, 47, 49, 56, 58]	[25, 46, 48, 57]

Strategies Addressing Barriers to Acceptance of Enrollment	Addressing Study Design and Implementation ¹⁰ Targeting	
	Providers/Staff	Providers/Staff
Oncology nurse navigators or research staff members assumed responsibility to meet patient needs to participate		[25, 44, 47, 64]
Transportation assistance		[25, 41, 43–45, 48, 49, 57, 64]

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