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Article

Utilizing a Social Ecological Health Promotion and Community Based Participatory Research Frameworks to Engage Highly Diverse Populations for Recruitment in the *All of Us* Precision Medicine Program

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Abstract: In response to the National Institutes of Health (NIH) *All of Us* Medicine Research Initiative, the Precision Medicine Research (PreMeR) Diversity Consortium was formed by four institutions from the Research Centers in Minority Institutions (RCMI) Translational Research Network (RTRN). This synergistic approach proposed evidence-based, best practices used by experienced researchers to engage, recruit and retain diverse populations in the *All of Us* initiative. Conceptualization of the proposed approach was aided by social influence theories to better understand how people's beliefs and opinions should be modified to affect change leading to action [1]. The Social-Ecological Model (SEM), for Health Promotion [2], from Stokols [1] and Community-Based Participatory (CBPR) Models[3],[4] guided proposed engagement, recruitment, and retention strategies contextualized with the individual, interpersonal, organizational, community, and policy spheres of influence. The PreMeR produced a partnership to evaluate and improve the effectiveness of current engagement, recruitment, and retention strategies for minority participation in scientific studies. This approach illustrates the need to incorporate multiple methods of engagement to reach a diverse audience to participate in scientific research. Engagement, recruitment, and retention strategies in community and biomedical research must be viewed as community engaged public health interventions, utilizing the same theoretical principles and approaches.

Keywords: community engagement, health disparities, precision medicine, participant recruitment

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1. Introduction

The recently formed Consortium to Enhance Diversity in Precision Medicine Research brought together four institutions from the Research Centers in Minority Institutions (RCMI) Translational Research Network (RTRN**)**. These institutions were Georgetown-Howard University Center of Clinical and Translational Science, Meharry Medical College, the University of Hawaii (UH), and the University of Texas at El Paso (UTEP). The goal of this consortium was to synergize expertise, share resources and develop innovative approaches to facilitate the engagement of highly diverse populations for participation in the National Institutes of Health (NIH) *All of Us* Precision Medicine Research Initiative.

The Mission of the Research Centers in Minority Institutions (RCMI) is to improve the health of minorities and reduce health inequities among under-served populations. The RCMI programs are housed within 16 institutions serving underserved health disparity populations and underrepresented students (ISUPs). In 2007, the RCMI Translational Research Network (RTRN**)** was established to promote inter-institutional collaborations among the RCMI institutions so as to foster research that improves the health of underserved and vulnerable populations. One of the aims of the RTRN is to translate gained knowledge in culturally and linguistically appropriate and cost-effective ways back into the targeted communities that reflect our evolving demographics.

In keeping with the missions for the RCMI program and RTRN, the Precision Medicine Research (PreMeR) Diversity Consortium was formed in response to the National Institutes of Health (NIH) *All of Us* Precision Medicine Request for Applications (RFA). The objective of the *All of Us* Research Program is to build a diverse cohort of one million people across the United States (U.S.) and U.S. territories that will participate in longitudinal, long-term research studies to better understand factors that contribute to individual health and disease. The *All of Us* Research Program aims to accelerate the pace of precision medicine research by building a cohort of one million individuals who contribute biologic samples, survey data, and personal health information. The collected biomarkers and results of these studies will significantly increase the biomedical data repository that researchers use to advance precision medicine.

One of the initial activities of the *All of Us* Research Program was to select collaborating partners who could engage, recruit, and retain volunteers to the program and/or engage, educate, and enable healthcare professionals to enroll their patients or patients' family members into the program. The PreMeR Diversity Consortium was formed in response to this opportunity and build upon a decade of RTRN experience that leveraged expertise and resources from across RCMI institutions. The goal of the PreMeR Consortium was to synergize expertise, share resources and innovative approaches to facilitate the engagement of highly diverse populations for participation in the *All of Us* Precision Medicine Research Initiative. The purpose of this paper is to describe the PreMeR Consortium engagement strategy which can serve as a framework that can be adapted for use by inter-institutional partnerships focused on engaging diverse populations in research.

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2. Materials and Methods

To leverage these richly diverse communities to meet the goals of assuring diversity of representation in the *All of Us* Research Program, we proposed three specific aims in response to the funding opportunity announcement:

Specific Aim 1: Engage diverse individuals from four distinct geographic regions of the United States through culturally tailored information about the *All of Us* Research Program using traditional channels and social media, virtual and traditional social networks, healthcare networks, and regional and national engagement and educational activities.

Specific Aim 2: Enroll participants into the *All of Us* Research Program, with emphasis on a volunteer program

Specific Aim 3: Retain >80% of enrolled participants. Identify and amplify personal reasons for participating; thereby encouraging the high rate of retention proposed in this objective.

2.1. Overall Impact

To achieve these goals, the PreMeR Consortium proposed to refine and implement culturally-tailored approaches to inform and engage diverse populations using a variety of information channels and formats (Table S1). The objectives were to interlink informational and educational activities conducted under Aim 1 and to seamlessly connect individuals with enrollment opportunities under Aim 2. Also the proposed approaches involved substantive and meaningful engagement of individual participants by identifying and amplifying personal reasons for participating in the program; thereby encouraging the high rate of retention proposed in Aim 3.

Table S1. SEM Strategies for Participant Recruitment[a]

Institution and highest % ethnicity	Individual Level	Interpersonal Level	Organizational Level	Community Level	Policy Level
Howard University (African American)	1) Culturally & linguistically appropriate materials	1) Community Ambassadors 2) Family event tools 3) Community liaisons	1) Greek life organizations 2) Local, regional, and national organizations	1) Faith-based organizations 2) Barber and beauty shops 3) Social media 4) Community Advisory Board	1) All of Us Precision Medicine Research Initiative 2) The National Institutes of Health
Meharry Medical College (African American)	1) Culturally & linguistically appropriate materials	1) Family event tools 2) Community liaisons	1) University faculty, staff, and students 2) Greek life organizations 3) Alumni organizations	1) Faith-based organizations 2) Barber and beauty shops 2) Social media	1) All of Us Precision Medicine Research Initiative 2) The National Institutes of Health
The University of Hawaii	1) Culturally & linguistically	1) Community Ambassadors 2) Community	1) University faculty, staff, and students	1) Social media	1) All of Us Precision Medicine

(Asian & Pacific Islanders)	appropriate materials	liaisons	2) Greek life organizations		Research Initiative 2) The National Institutes of Health
The University of Texas at El Paso (Hispanics)	1) Culturally & linguistically appropriate materials	1) Community Health workers/Promotoras de salud 2) Community liaisons	1) University faculty, staff, and students 2) Federally qualified housing communities 3) Federally Qualified Health Communities 3) Greek organizations	1) Faith-based organizations 2) Social media 3) Native American tribe 4) Non-profits	1) All of Us Precision Medicine Research Initiative 2) The National Institutes of Health

[a] CBPR is included recruitment at all levels of SEM

2.2 Program Design

The Social-Ecological Model (SEM) for Health Promotion serves as a key theoretical model for the PreMeR Consortium to engage and recruit diverse communities to meet the goals of the *All of Us* RFA to build a diverse cohort of one million US who will participate in research studies. The PreMeR Consortium recruitment strategies proposed for *All of Us* were conceptually and theoretically driven by the SEM and principles of community based participatory research (CBPR). The contributions of SEM for Health Promotion and the CBPR Models to project activities are outlined below.

2.2.1. The Social-Ecological Model for Health Promotion (SEM)

The SEM for Health Promotion contextualized the approaches that our multi-institutional collaboration devised in order to reach highly diverse populations for participation in the *All of Us* Precision Medicine Research Initiative. Conceptualization of this approach was aided by social influence theories, which include the ways in which people's beliefs and opinions are modified to one's perceptions ; hence their subsequent actions would affect change in their ambiance [1].

The SEM for Health Promotion [1] is premised on four key assumptions: 1) a person's physical and social environments interact with individual attributes to influence behavior; 2) the conceptualization of the environment must take into account the complexity of multiple dimensions of interaction (e.g. perceived attributes, social climate, physical characteristics, etc.); 3) people interact with their environments at all levels (individual, interpersonal, organizational, community, and policy); and 4) there is reciprocal influence between the person and the environment [5]. These key assumptions are critical for engaging diverse communities because, collectively, the assumptions respect the individuality that arises from a person's life context.

The SEM for Health Promotion has been used by the Centers for Disease Control and Prevention (CDC) to understand the multi-faceted and complex influences on behavior that lead to violence and is now used within public health to understand factors across the various levels that

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influence health outcomes [6]. The Colorectal Cancer Control Program adapted the Stokols [1] Health Promotion SEM to address the various levels of influence required to prevent colorectal cancer. The Colorectal Cancer Control Program SEM includes the five levels proposed by Stokols: *individual*, *interpersonal, organizational, community*, and *policy*. The *individual* level is the center and focal point of the model and accounts for the ways that factors such as age, education, and income influence individual behavior [6]. The remaining four levels, *interpersonal, organizational, community,* and *policy* surround the *individual* and represent the levels of influence that must be addressed and targeted, to affect the health and well-being of the *individual* (Figure S1).

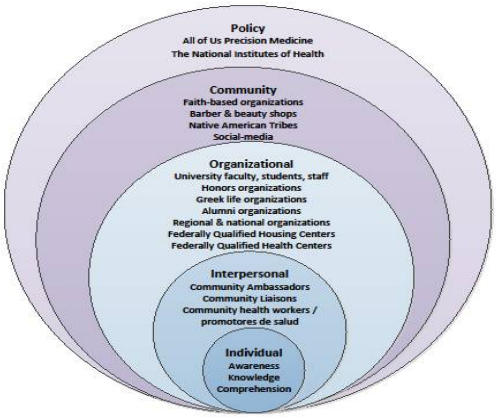

Figure S1. The SEM for engagement, recruitment, and retention

These levels of influence aligned with our recruitment framework for the *All of Us* initiative. The Colorectal Cancer Control SEM aided in operationalizing and teasing out the community engagement approaches to be considered in order to reach diverse populations. The framework facilitated our proposed recruitment strategies by providing a better understanding of how an *individual's* health and behaviors are influenced by the interactions of the *interpersonal, organizational, community, and policy* levels (see Figure S1 and Table S1 for levels of influence).

2.2.2. Community-Based Participatory Research (CBPR)

Israel et al [3] outline nine principles of CBPR while at the same time recognizing that no one set of CBPR is applicable to all partnerships. Their CBPR principles indicate that the community is a unit of identity, the partnership is equitable and collaborative in all phases of the research, there is a balance of research and action for the mutual benefit of all partners who have a commitment to systems development through cyclical and iterative processes, and there is a long-term commitment to sustainability. CBPR is recognized as an equitable approach that engages diverse partners in strategies aimed at gaining multiple perspectives so as to address community-identified concerns. These principles were important in developing the culturally-appropriate program's strategic approaches.

2.3 Overview of Our Approach

The SEM, in association with Israel and Wallerstein CBPR approaches serve as the main theoretical models for the PreMeR Consortium to engage and recruit diverse communities to meet the goals of the *All of Us* RFA to build a diverse cohort of one million US persons who will participate in research studies. According to Wallerstein et al.'s Community Based Participatory Research

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Model [4], our proposed research engagement and recruitment approach and strategies themselves become their own intervention. To meet the PreMeR Consortium aims, research recruitment and retention was our primary (final) outcome, which is the "Intervention and Research" phase of the CBPR model. The outcomes of "Intervention and Research" processes are culture-centered interventions and partnership synergy. We also recognize the Contexts (e.g., Social and Structural, Health Issue Importance, Collaboration Trust and Mistrust) that have created and developed our respective Partnership Processes (i.e., Individual Characteristics, Relationships, Partnership Structures) [4].

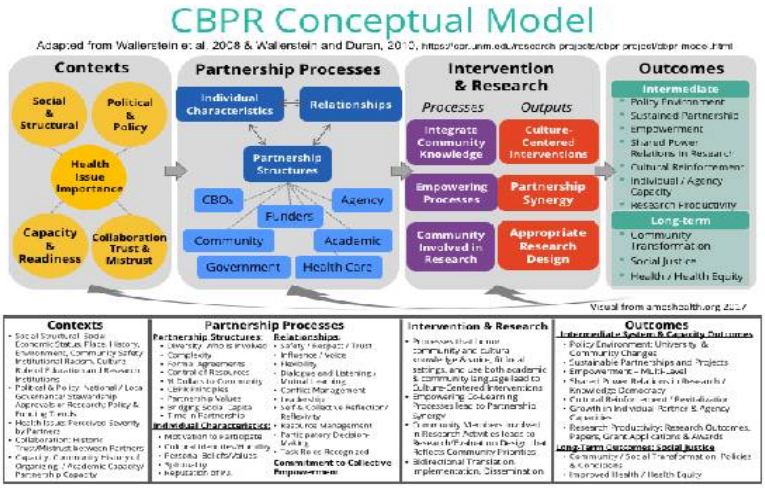

Figure S2. Wallerstein et al.'s Community Based Participatory Research Model

3. Results

3.1 Creation of the Consortium

This *All of Us* Precision Medicine Research Initiative RFA led to the formation of the PreMeR Consortium, a collaboration between four institutions from the Research Centers in Minority Institutions (RCMI) Translational Research Network (RTRN). These four RTRN institutions have diverse populations that experience health disparities, and scientists with extensive experience in reaching and working within their highly diverse communities. The consortium includes two Historically Black institutions (Meharry Medical College and Howard University), a Hispanic Serving Institution (The University of Texas at El Paso), and an Asian and Pacific Islander serving institution (The University of Hawaii). Each institution brought unique strengths and capacities to the Consortium.

3.2 Program Context: The Consortium Institutions

These institutions provide the context for the work, the first phase in the Wallerstein et al model [4]. Key characteristics of the four collaborating institutions are described below, and later, their similarities and differences.

Meharry Medical College (Meharry-MMC) is a Historically Black College with a mission to serve the underserved. Founded in 1876, Meharry was established as the Medical Department of Central Tennessee College to meet the needs of African Americans suffering from physical and

mental illness resulting from the Civil War. Since that time, Meharry has expanded in both physical infrastructure and reputation to meet the needs of its communities. Meharry is an accredited institution that bestows medical, dental, and research degrees. Many of Meharry's outreach programs aim to improve the quality of life for uninsured and underinsured communities. Meharry has national reach through its graduates who practice in urban and rural areas of the country, through its structured Alumni Association (with 38 chapters), and through the national/international readership of its Journal on Health Care for the Poor and Underserved. Meharry collaborates in strategic partnerships with likeminded organizations that aim to eliminate health disparities and strive for excellence in education, research, and patient care.

Howard University represents the DC region and collaborative role in the Georgetown-Howard Universities Center for Clinical and Translational Science (GHUCCTS). GHUCCTS is a regional clinical research consortium that includes five medical research institutions (Georgetown, Howard, MHRI, the DC Veteran's Administration Medical Center, and Oak Ridge National Laboratories). The GHUCCTS has affiliations with two Practice-Based Research Networks. The Community Advisory Board represents diverse populations including patients, African American and Hispanic communities, youth and older adults, people with disabilities, sexual and gender minorities, community-based primary care providers, and health and social advocacy organizations. Additionally, GHUCCTS has established strong partnerships with local, regional and national organizations.

The University of Texas at El Paso (UTEP) is located within the city of El Paso, Texas, which is situated along the U.S.-Mexico border directly across from Ciudad Juarez, Mexico. In 2017, the population of El Paso County was estimated to be 837,918, with Hispanics of primarily Mexican origin comprising 82% of the population, followed by Whites 12%, African Americans 4%, and Other 2% [11]. Gender distribution for El Paso County is 50.4% female and 49.6% male [9]. According to the U.S. Census Bureau [12], 72% of the population spoke another language at home other than English. The median income in El Paso for years 2011-2015 was $41,637 with 20.3% of the population living below the federal poverty line [12]. The region includes Ysleta Pueblo de Sur, the tribal home of the Tiguas. Located in El Paso, the tribal community numbers 3,462 including 1,650 males and 1,812 females with 59% of the tribal members being between the ages of 18 – 64 [12].

The UTEP is a Hispanic Serving Institution, with a student enrollment of 23,922 students and is the only research doctoral university in the United States with a predominantly Mexican-American student population [13]. The UTEP is part of the University of Texas System and serves far-west Texas, southern New Mexico, and northern Mexico [15]. Located at the UTEP, the Border Biomedical Research Center (BBRC) is a preeminent institute focusing on health and biomedical issues affecting the people of the El Paso/Juárez region of the Texas-Mexico border. This Center provides infrastructure support to all researchers at UTEP with interests in neuroscience and metabolic disorders, infectious diseases and immunology, toxicology, and cancer. The BBRC investigators seek to promote a greater understanding of health disparities, as well as provide novel therapeutic strategies to better the health of the people within this region and nation well into the 21st century. The BBRC is funded by the National Institutes of Health (NIH) Research Centers in Minority Institutions (RCMI) program.

The *University of Hawaii (UH)* is an Asian American and Native Hawaiian Pacific Islander Serving Institution supporting the state of Hawaii and US Pacific Territories. The University of

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Hawaii (UH) serves as a RTRN Research Coordinating Center (RCC) for Community Engagement Cluster activities. Community engaged research functions through the UH RCC are carried out through the Community Engagement Key Function, Research Cluster, and Steering Committees. Additionally, UH has a Community Engagement Core supported by an RMATRIX grant for its communities. The Community Based Research Core promotes research in Hawaii's Asian and Pacific Islander communities ensuring that procedures respect principles of community engaged research, such as building on strengths and their engagement as partners.

3.3. Similarities and Differences between the Consortium Institutions

There are similarities between the partnering institutions in that they work with vulnerable, diverse, and underserved populations. Furthermore, the communities that the PreMeR institutions serve have been largely underrepresented in scientific research for various reasons, including: 1) lack of trust in the scientific community [7]; 2) lack of understanding of cultural and linguistic differences between ethnic minorities that result in unsuccessful communication during recruitment, enrollment, and retention [8]; and 3) language barriers in terms of recruitment materials [9] [10]. These four institutions represent minority serving institutions that have diverse geographical and racial/ethnic communities as described below.

Meharry Medical College has been working with urban communities through Community Health Centers in Nashville, Memphis, and Chattanooga, Tennessee, which were brought together as part the Community Networks Program Center (CHCs) Program funded by the NCI, to extend our reach of underserved in these urban centers. The CHCs provide services to the most underserved. The demographic indicators for combined regions is 44.4% African American, 8% Hispanic, 1.8% East and South Asian, 8.9% foreign born, and 16.9% of low-income individuals. Combined, the population estimate is 1,466,163.

The DC region represented by Howard University is important due to the substantial related disparities experienced by black residents who comprise 48% of the DC population. Compared to white DC residents, blacks have higher rates of infant mortality (9.9 vs. 1.7) and reduced adult life expectancy (-15 years for men, -9 years for women). Howard University has a teaching hospital with a predominately (86%) African American population. The affiliation with GHUCCTS brings the capacities of the MedStar Research Institute (MHRI) and its network of 10 tertiary care facilities and over 125 clinical sites. Five MHRI hospitals have patient populations that are >50% African American; with two of these being >70% African American. Low socio-economic residents comprise approximately 17% of DC's population, however Howard Hospital's public payer mix is about 46%.

The estimated adult population for the region is 3,115,958. Non-Hispanic whites make up about 46% of the regional population, followed by black (25%), Hispanic (15%) and Asian (10%) ethnicities. About 23% of regional residents are foreign born and 27% speak a language other than English at home with about 12% being Spanish speaking. (US Census, 2014, 2015, 2016). Within the city of Washington, DC (population 681,170), 46% of residents are black, followed by non-Hispanic white (36%), Hispanic (11%) and Asian ethnicities (4%).

The University of Texas at El Paso works with a majority Mexican origin population, of which immigration status is a fundamental issue that keeps individuals from seeking healthcare much less participating in research studies. The Mexican origin population is also highly mobile and traverses the U.S. – Mexico border to see family and seek healthcare. Lastly, a majority (72%) of the

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population speaks another language at home, which can be a barrier to healthcare and participating in research studies [9].

The Asian and Pacific Islander communities represented by the University of Hawaii include geographically isolated areas of the US Territories: American Samoa, Guam, the Commonwealth of Northern Mariana Islands, and the State of Hawaii.. Asians and Pacific Islanders experience persistent health disparities, especially when subgroups are disaggregated, e.g., Filipinos, Native Hawaiians, Samoans. Death rate in the US for cardiovascular disease is 192.7 while it is 243.4 in American Samoa and 223.1 in Guam.

There are also distinct differences between the communities where the PreMeR Consortium would work on factors related to their underrepresentation in research studies. These differences therefore required distinct proposed approaches and program content to recruit community members in research.

For example, Meharry Medical College and Howard University work with predominantly African Americans, many of whom have a distrust of science due to historically unethical research studies conducted without consent. The infamous and "ethically unjustified" Tuskegee Syphilis experiment among an initial group of 600 "Negro males" that left 399 Black men, who had been diagnosed with Syphilis, without proper treatment even when penicillin became available for treatment and worst of all, no informed consent or way of quitting the study [14]. Furthermore, the harvesting of cells without the knowledge or consent of Henrietta Lacks, a Black woman, whose cervical cancer cells (HeLa cells) have been used for medical research and commercial purposes since her death in 1951 instilled further distrust of the scientific community [15].

The Hispanic American, Asian American, and Pacific Islander communities represented by the University of Texas-El Paso and the University of Hawaii have immigrant members who need translated and culturally relevant materials [8][9]. Pacific Islander communities also historically are concerned with misrepresentation of their community and want research results shared directly with them [8].

3.4 Program Content: the SEM Levels of Influence

The recruitment approaches proposed for each of the communities represented by each participating investigator are listed in Table S1. Overlaps and differences in content associated with specific details at each geographic site are noted. Table S1. illustrates the proposed techniques across the four SEM levels which illustrate how an individual is engaged across the ethnically diverse communities. Although all institutions have a higher percentage of certain ethnicities, all other ethnicities were included in the recruitment plans.

The SEM spheres (Figure S1) represent the types of approaches that must be included for successful engagement, recruitment, and retention. At the **individual level**, the goal is to assure that all activities address awareness, knowledge, and comprehension. Materials should communicate that the *All of Us* Precision Medicine Research Initiative expressly values diversity and inclusivity in culturally and linguistically appropriate ways.

The **interpersonal level** is considered the primary level for all activities because of the personalized interactions between the participant, ambassadors, liaisons, and community health workers. Trust is established, leading to the dissemination of information and acceptance which facilitates a participant's informed decision about the benefits of participating in the research programs such as the *All of Us* Precision Medicine Research Initiative.

The PreMeR Consortium was embedded within institutions serving underserved health disparity populations and underrepresented students (ISUPs). Recognizing the diverse student population within the institutions, at the **organizational level**, one of the Consortium's approaches was to address the influence of campus social interactions within established organizations. This plan also included recruitment efforts through local, regional and national organizations, alumni organizations, Federally Qualified Health Centers and Federally Qualified Housing Communities. These sectors are highly populous and have well established networks and infrastructure which facilitates participant recruitment.

Recruitment strategies at the **community level** can have capacity to sustain engagement, recruitment, and retention because of the social interactions that occur naturally within these groups. At this level, the influence of the organizations and the interactions reflect the culture within the respective communities.

The *All of Us* Precision Medicine Research Initiative represents the **policy level.** Through its leadership structure, the *All of Us* Program determines the policies that govern the engagement, recruitment, and retention activities. Moreover, the *All of Us* Medicine Research Initiative determines the priorities for resource allocation and most importantly, driving the research that ultimately impacts treatments and prevention aimed at improving the health of society.

3.5 The CBPR Models

Our proposed activities and processes to meet the *All of Us* goals and PreMeR Consortium aims aligned with the CBPR Models to create a community engaged intervention aimed at achieving "Intervention and Research" and contextual outcomes according to Wallerstein et al.'s, CBPR Model [4] and Israel et al.'s principles of community engagement [3]. The PreMeR Consortium proposed recruitment and retention activities that integrate community knowledge and involvement to achieve project aims of community research participation and 80% retention in diverse geographic, cultural, and racial/ethnic communities nationally. Accordingly, our academic collaboration established a foundation for future culture centered interventions addressing our diverse communities, as well as partnership synergy among the academic collaborators.

The Intervention and Research activities and outcomes [4] underscore that recruitment and retention strategies in biomedical research requires deliberate attention that is necessary to achieve desirable community engaged outcomes, such as cultured centered interventions and partnership synergy. Therefore, research recruitment and retention activities are an intervention in and of itself, in the development and implementation of precision medicine and other biomedical research.

4. Discussion

This *All of Us* Precision Medicine Research Initiative RFA led to the formation of the Precision Medicine Research Diversity Consortium, a collaboration between four institutions from the Research Centers in Minority Institutions (RCMI) Translational Research Network (RTRN). This collaboration yielded an opportunity to examine best practices in participant recruitment strategies, using our respective CBPR approaches among diverse populations. RCMI affiliation and the RTRN initiative catalyzed collaboration of four diverse institutions across the US that otherwise would not have been possible, serving as an opportunity to engage with interdisciplinary researchers from across the U.S. The combined years of experience, of the PreMeR Consortium in working with diverse and underserved populations was a beneficial experience for collaborating scientists. We gained great insight from each other in a team science approach as we proposed

strategies for the *All of Us* program development and implementation. We also learned from each other best practices in reaching, recruiting, and retaining diverse and underserved populations for research.

Our proposed activities and processes to meet the *All of Us* Precision Medicine Research Initiative goals and the PreMeR Consortium aims aligned with the CBPR Model creating a community engaged intervention aimed at achieving "Intervention and Research" outcomes [4]. The PreMeR Consortium proposed recruitment and retention activities that integrate community knowledge and involvement to achieve project aims of community research participation and 80% retention in diverse geographic, cultural, and racial/ethnic communities nationally. Accordingly, our academic collaboration established a foundation for future culture centered interventions addressing our diverse communities, and partnership synergy among the academic collaborators. Our collaborative team is currently developing a joint research proposal to examine our common and unique CBPR approaches to engage our respective communities in a multi-site diabetes prevention research trial. CBPR and participatory evaluation models [4], [16] will serve as the framework for collaborative intervention development, implementation, and evaluation toward CBPR partnership and health outcomes

The Intervention and Research activities and outcomes underscore that recruitment and retention strategies in biomedical research requires deliberate attention that is necessary to achieve desirable community engaged outcomes, i.e., culture-centered interventions and partnership synergy. Therefore, research recruitment and retention activities are an intervention in and of itself, in the development and implementation of precision medicine and other biomedical research.

5. Conclusion

A "one size fits all" approach is not compatible when attempting to engage diverse underserved populations to participate in scientific research and interventions, and this approach can be a model for reaching vulnerable populations. The partnership established between the four collaborating institutions, the results obtained, and insights gained by the researchers as a result of the PreMeR Consortium have initiated future work. Accordingly we can demonstrate relevant differences between our populations.

The process of engaging diverse populations for research recruitment, and retention must be viewed as an intervention development and implementation, utilizing the same theoretical principles and approaches to mitigate risk factors at the *individual*, *interpersonal*, *organizational*, *community*, and *policy* levels. The Social Ecological Model for The Colorectal Cancer Control Program [17] delineates the factors that affect health outcomes across the five levels. Applying the SEM for Health Promotion and CBPR Model in recruitment techniques for research can more compatibly and beneficially engage highly diverse and underserved populations. This multi-level engagement approach allows scientists who engage in community based participatory research to reach a broader cross-section of the population. Incorporating multiple levels of participant engagement for research recruitment and retention is well suited for highly diverse and complex communities. Operationalizing multiple methods of community engagement through the SEM for Health Promotion and adapting best practices in culturally and linguistically appropriate ways (aligning with the CBPR Model), provides greater likelihood that research recruitment and retention is successful.

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