

## Short Communication

# All systems are interrelated: Multilevel interventions with indigenous communities

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## ARTICLE INFO

## Keywords:

Indigenous health  
Clinical trials  
American Indian  
Native American  
Multilevel interventions  
Multilevel frameworks

## ABSTRACT

Colonial historical trauma and ongoing structural racism have impacted Indigenous peoples for generations and explain the ongoing health disparities. However, Indigenous peoples have been engaging in multilevel, clinical trial interventions with Indigenous and allied research scientists resulting in promising success. In this paper, National Institutes of Health funded scientists in the field of Indigenous health have sought to describe the utility and need for multilevel interventions across Indigenous communities (Jernigan et al., 2020). We posit limitations to the existing socioecological, multilevel frameworks and propose a dynamic, interrelated heuristic framework, which focuses on the inter-relationships of the collective within the environment and de-centers the individual. We conclude with identified calls for action within multilevel clinical trial research.

## 1. Introduction

Indigenous peoples, including American Indian, Alaska Native, and Native Hawai'ian populations, comprise a diverse group of individuals within the United States. They have been resilient in maintaining and revitalizing their cultures, overall well-being, and traditional ecological knowledges; despite systemic colonial pressures to eradicate them. However, historical trauma, systemic marginalization, and ongoing oppression continue to undergird ongoing Indigenous health disparities in diabetes, cardiovascular health, mental health, reproductive health, environmental health, and substance use disorders. These health disparities are reflective of complex, multilevel, sociopolitical challenges found to impact individual, interpersonal, community and societal risks in Indigenous communities. Indigenous cultures differ from Western European cultures in terms of these varying levels of influence. For instance, Indigenous persons' cultural health beliefs, spirituality, and community influence behavior differently than those of other non-Indigenous cultures. Given complexities related to societal-level historical trauma, systemic racism/discrimination, and Federal American

Indian policies, Indigenous health needs remain unique and complex. Historically, Western science has framed Indigenous health risk and protective factors within the Social Ecological Model, which has informed numerous multilevel prevention and health intervention programs within Indigenous communities [1–4]. Recent scholarship in the field of Indigenous health has identified how Indigenous historic and sociocultural differences may be conceptualized within the National Institutes of Health - Minority Health and Health Disparities (NIMHD) Research Framework, a multilevel, multi-dimensional model that is a hybrid of the Socioecological model and the National Institute on Aging Health Disparities Research framework [5]. The authors, as funded by the National Institutes of Health (NIH) and partnered with the Intervention Research to Improve Native American Health (IRINAH) consortium, have sought to describe the utility and needs for multilevel interventions across Indigenous communities [6], while recognizing that current frameworks remain within a Western framing of socioecological levels of influence. We posit limitations as related to aspects of the Socioecological multilevel frameworks (e.g., hierarchical, disconnected pseudo-relationship between individual, interpersonal,

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community, organizational, and policy/environment) when conducting multilevel interventions in Indigenous communities. Hence, we propose a dynamic, interrelated heuristic framework that focuses on the interrelationships of the collective within the environment with less focus on the individual.

As scholars collaborating with Indigenous communities, we have witnessed the utility of multilevel interventions. Multilevel interventions can target and intervene between multiple risks and/or protective factors for health at multiple levels within the human ecology. They can also address individuals' historical and present environmental conditions, where they work, live, thrive, or play, or as commonly referred to as the *social determinants of health* (SDOH). The SDOH have been found to be significantly correlated with Indigenous health disparities [6–8]. The NIMHD Research framework addresses domains of influence (i.e., biological, behavioral, physical/built environment, sociocultural environment, as well as healthcare systems) and their affect on health outcomes from the individual to the population level [5]. While multilevel health interventions for Indigenous populations are useful, they must also reflect Indigenous communities' unique socioecological, cultural contexts [6]. Given Indigenous peoples' historical, sociocultural influences, and sovereign status as domestic dependent nations; their social determinants of health specific may vary from white settler populations in the U.S., as well as from other ethnic, racial U.S. populations who have been systematically oppressed and marginalized. Increasingly, Indigenous communities have sought to exercise tribal health sovereignty [9], or self-governance in terms of their health and wellbeing through developing and testing complex health interventions. These multilevel interventions often develop from partnerships with Indigenous and non-Indigenous scholars, yet rigorous, culturally relevant frameworks are needed to guide these approaches.

## 2. Developing Indigenous multilevel interventions

Multilevel interventions can provide a culturally appropriate approach for Indigenous groups if they so desire. However, conducting multilevel interventions is complex. Several barriers to multilevel interventions in relation to the social determinants of health such as shortage of access to data and validated measurement tools have been identified [6]. Jernigan and colleagues have further argued that mitigating these barriers requires time for community leader collaborations, identification of the most challenging issues, financial resources, support for community-level and multilevel interventions, more evidence and plans for sustainability [6]. Indigenous communities have further been found to have varying concepts of health and systems of influence, which need to be considered when designing multilevel interventions. [1]

We note that several multilevel interventions have been tested and may be effective in reducing risk behaviors that can lead to negative health outcomes among Indigenous groups. Two studies funded by NIH have documented ways in which multilevel preventive interventions were able to reduce alcohol use among Native adolescents [24,25]. One study combined a community organizing intervention aimed at reducing alcohol access with a school-based screening and brief intervention at the individual level. That intervention was effective in reducing 30-day alcohol use and heavy episodic drinking among American Indian teens in the Cherokee Nation [24]. The second study, Moore and colleagues found that a multilevel intervention was successful in reducing past 30-day drinking as well as heavy episodic drinking in rural California Indian reservation communities [25]. Hence, multilevel interventions hold promise in Indigenous communities, especially in regards to reducing substance use.

Though the NIMHD Research Framework has utility in addressing health disparities in Indigenous communities, recent evidence supports grounding intervention science in Indigenous paradigms, referring to the ontological, epistemological, and methodological beliefs and practices of Indigenous peoples [10–12]. Indigenous paradigms often

support collectivism, relationality, and subjective, diverse knowledge promoting the interconnectedness of people with the natural and built environment and spiritual world in which they exist [13]. Cultural concepts of kinship and interrelatedness between humans, animals, Mother Earth and the environment have been argued as core to Indigenous persons' wellbeing [11,14]. Research supports that connection to the natural world directly influences Indigenous persons' wellbeing and health outcomes. For example, Indigenous children directly view the health of "Mother Earth" as defining their personal health [19]. Moreover, Indigenous women view land health, including environmental contamination and wellness, as integral and bidirectionally influencing their individual wellness and ability to become healthier [11,20]. Therefore, designing multilevel interventions inclusive of the land that incorporate Indigenous views and land-based expertise is necessary. This includes the need to develop holistic land-health metrics in program evaluation, for example level of environmental pollutants. These areas of evaluation for Indigenous community-level interventions differ from Western frameworks by targeting the natural environment and how it contributes to health [13,15,16]. Indigenous communities often consider relationships with the natural world as interwoven with individual health [11,14,17,18]. Hence, multilevel interventions need to consider the overlapping domains of influence from the natural environment to the core braid as depicted in Fig. 1, and their influence on health outcomes.

Considering Indigenous concepts and experiences working within Indigenous communities, the Indigenous and allied authors have collaborated with an Indigenous artist to develop Fig. 1, *Indigenous Holistic Health and Wellness Multilevel Framework*. This proposed holistic paradigm suggests that health interventions with Indigenous communities have strong interrelationships and multiple interconnected systems, which can be targeted to reduce health disparities, differing from other populations who culturally focus more on the individual. Through an Indigenous specific socioecological lens, this figure symbolizes situates the individual as a braid intertwined with the family, kinship, tribe, and culture. This holistic view of self expands current approaches to multi-level interventions and does not consider the individual void of their social context. Hence, the relationship between the individual, family, kinship, tribe, culture, remains at the center of many Indigenous people's worldviews, as guided by the teachings and experiences of one's ancestors represented in the first realm [16]. These ancestral

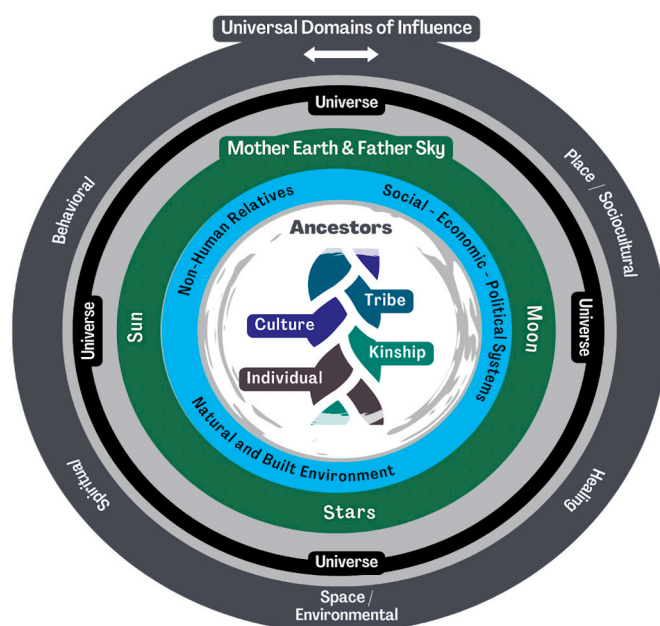


Fig. 1. Indigenous Holistic Health and Wellness Multilevel Framework.

teachings, history, and consideration of one's future ancestors have been part of several multilevel interventions [14,19,20]. Though not a domain easily targeted for change, the incorporation of ancestors into health interventions is often culturally appropriate and could improve effectiveness. Within this framework, the braid is next surrounded by the human created systems of influence, as previously reflected within the NIHMD Multilevel Research Framework, (i.e., social, economic, political, etc.) and the naturally built environment, which can also impact Indigenous health behavior, status, and access [5]. Yet our framework extends prior frameworks by including consideration of the non-human kin (i.e., animals, plants, waters, lands), and their direct influence on the braid of self and wellbeing [10,13,14,17,20,26].

Though not often assessed alongside individual health outcomes, environmental health that integrates closeness to nature and the land presents prominently as an area to target for Indigenous peoples. Therefore, multilevel interventions might target ecological restoration as well and its impact on individual health, for instance. Though outside the influence of health interventions, the external kin of Mother Earth and Father Sky, moon, stars, and sun are also recognized as influencing Indigenous health and the braid within the greater universe [16]. Again these teachings may be interwoven into multilevel interventions as deemed appropriate by the community and may also include assessment of the health of Mother Earth (i.e., water, sky, or earth pollutants, or land restoration for instance) as part of the outcomes. Whereas in the outer realm, the Universal Domains of Influence are situated to indicate the areas of change on the individual, familial, kinship, tribal, and cultural levels. Within these domains, multi-level interventions may target behavioral factors that include an Indigenous sense of place, as seen in other research [11,20]. This may further include designing multilevel interventions centered upon Indigenous teachings and stories related to place and health (e.g., sky, moon, star stories, etc.). Furthermore, healing mechanisms can be targeted for improving health, and assessing how these culturally specific elements influence. As aforementioned, environmental space, or locations, may be targeted and considered culturally valid areas to assess as related to health. Spiritual and behavioral factors may also be targeted and, or assessed in multilevel interventions, as deemed appropriate by the community. Hence, this holistic paradigm extends the socioecological multilevel framework to include aspects of Indigenous culture and the impact of the land, earth, and water that is influential and holistic in an intervention's design, development, and assessment.

### 3. Facilitators for Indigenous multilevel interventions

Though the authors propose a holistic Indigenous multi-level framework, we strongly advocate for community engagement when working with Indigenous populations at all stages of research. This remains of utmost importance, especially given that high levels of community engagement have been linked with high levels of implementation effectiveness and favorable health outcomes [21,22]. Furthermore, shared decision-making increases sustainability and long-term health outcomes, [23] especially within multilevel interventions.

Given some confusion in the existing literature, the authors further advocate for clear differentiation between such terms as 'community level interventions,' which are often used synonymously with 'community-engaged research.' Both community-engaged research and multi-level interventions are needed to help mitigate Indigenous health disparities. In one scoping review of multilevel diabetes prevention and treatment interventions for Indigenous peoples [1], "community-based / community-engaged" and "multilevel" best practices were identified to include interventions that are community-engaged interventions supported/centered *and* multilevel – and these are not mutually inclusive. For example, there are excellent community-engaged health interventions for Indigenous people that are exclusively based within a school; this would not be considered a multilevel approach. Conversely, there could be multilevel interventions that are not community- engaged

but target several systems for change (e.g., patients, healthcare providers, and population health outcomes). We advocate for both community engagement and multilevel interventions, with the community's needs and guidance centering these approaches [1]. Additionally, our *Indigenous Holistic Health and Wellness Multilevel Framework* may be utilized to guide the cultural framing, but only through engaging in equitable partnership with the community. Because some communities may differ in how they perceive levels of influence, utmost care must be taken to respectfully listen and receive adequate feedback prior to developing such approaches and assure that this framework is applicable.

Finally, the authors advocate for community-level health change given that Indigenous health interventions may prioritize multiple areas of change. Given that designing multilevel interventions is complicated and has many overlapping areas to measure, research designs that include appropriate multilevel measurement are often limited. Many times, this lack of measurement and subsequent dissemination of findings does not capture the complexities of interventions occurring within Indigenous communities. For instance, the NIH R01 Yappalli [20] team led an outdoor experiential health promotion leadership intervention among Choctaw women to reduce their substance use and obesity risks, as well as improve overall well-being. While doing so, they targeted individual behaviors using a motivational interviewing approach. At the same time, they prioritized family and community behavior change by having participants develop and run one community health intervention. The project focused on the measurement of individual level change but did not assess community and societal level change. However, subsequent participant interviews and informal feedback indicate that substantial community impact occurred; although this was not formally assessed as part of the grant, such feedback may illuminate larger systemic changes. Through developing an Indigenous multilevel intervention as guided by community engagement and the *Indigenous Holistic Health and Wellness Multilevel Framework*, researchers can develop and validate measures that include culturally-specific areas of impact.

### 4. Concluding calls for action

As a call for action, the authors have identified gaps and proposed solutions to advance the field of research. First, multilevel solutions need to be evaluated beyond the sociocultural individual-level health behavior and outcomes (e.g., clinical markers or health education solely targeting individual behavior change). For example, outcomes of a health-related intervention may include holistic community health and environmental-based outcomes. Measures and outcomes need to be developed through community engagement, as Indigenous-centered qualitative, quantitative, or mixed methods evaluation may be more aligned with traditional ways of knowing for Indigenous communities [10,26]. However, the researcher must determine this through collaborative engagement. To develop community engaged, multilevel interventions, it takes time to gain trust and buy-in from multiple sectors of any given community. Key stakeholders from each sector may have their own agenda and needs; and, in order to establish synergetic 'win-win' relationships, strong community engagement practices are warranted. These practices take both time and a flexible agenda, as to meet the nimble, dynamic needs of any given community. Many times, grant-funded projects cannot pivot to match a community's' dynamic needs, hence research scientists are further needed to advocate for responsive funding, as timelines are prudent to support these interventions. Mindful of the multiple domains and levels of influences on health and promise of existing multilevel interventions, we conclude that community and environmental-engaged multilevel intervention projects are worth the extra effort because they aim to honestly reflect and begin to address the complex contexts for holistic Indigenous health. We offer our *Indigenous Holistic Health and Wellness Multilevel Framework* as an initial conceptualization of multilevel interventions, which can be shared with Indigenous communities and used as appropriate.

## Funding

Funding for this commentary was provided by: NIH NIDA (PI: Walters; MPI Johnson-Jennings); NIH NIAAA R01AA023755 (PI: Moore); NIH NIDDK 1K01DK128023 (PI: Stotz); NIH NIMHD R01MD012701 (PI: Rink); NIH NIDA R01DA027176 & Canada Institute of Health Research – COVARR-NET (PI: Johnson-Jennings); Robert Wood Johnson Foundation Interdisciplinary Research Leaders program (Magarati; a 2021–2023 fellow).

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

No data was used for the research described in the article.

## Acknowledgements

The authors would like to thank our many community partners over the years for their commitment to improving the health of their people and communities, and for their belief in our collaborative research efforts. The authors would also like to thank the following National Institute of Health personnel involved in IRINAH for their inspiration in the writing of our commentary: Judith Arroyo, Dorothy Castille, Aria Crump, Kathy Etz, Nanci Hemberger, and Shobha Srinivasan. We thank Indigenous artist, Ms. Kelli Begay, for designing the figure presented in this commentary.

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