

Published: March 31, 2024

Citation: Behar, A., I., et al., 2024. Binational Academic-Service-Community Partnership: A Program to Train, Provide Services and Conduct Research for Sustainable Community Health in Rural Baja, California, Mexico. Medical Research Archives, [online] 12(3).

<https://doi.org/10.18103/mra.v12i3.5172>

Copyright: © 2024 European Society of Medicine. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

DOI:

<https://doi.org/10.18103/mra.v12i3.5172>

ISSN: 2375-1924

RESEARCH ARTICLE

Binational Academic-Service-Community Partnership: A Program to Train, Provide Services and Conduct Research for Sustainable Community Health in Rural Baja, California, Mexico

Alma I. Behar^{1*}, Stephanie Brodine¹, Richard S. Garfein², John P. Elder¹, Lorena S. Pacheco³, Esmeralda Iniguez-Stevens¹, David A. Hernandez-Ontiveros⁴, Marianne McKennett⁵, Linda S. Lloyd⁶, Orianna Bretschger⁶, Noe C. Crespo¹, Miguel A. Fraga⁴

¹San Diego State University, School of Public Health, 5500 Campanile Drive, San Diego, CA 92128.

²University of California San Diego, Herbert Wertheim School of Public Health and Human Longevity Science, 9500 Gilman Drive, La Jolla, CA 92093.

³Harvard T.H. Chan School of Public Health, 655 Huntington Ave., Building 2, Boston, MA 02115.

⁴Facultad de Medicina y Psicología de la Universidad Autónoma de Baja California, Calzada Universidad 14418, Mesa de Otoy, Tijuana, B.C., Mexico, C.P. 22390.

⁵University of California San Diego, Department of Family Medicine and Public Health, 9500 Gilman Drive, La Jolla CA 92093.

⁶Aquacycl, 1040 S Andreasen Dr, Ste 100, Escondido, CA 92029.

*aibehar@sdsu.edu

ABSTRACT

Background: *Viaje Interinstitucional de Integración Docente, Asistencial y de Investigación* (VIIDAI) is a binational community health collaboration involving transdisciplinary education, field training, and research efforts that promotes health and provides services to underserved populations in rural Mexico, while also fostering cultural competency in medical and public health students from the Mexico-U.S. border region.

Purpose: This paper describes the development and operation of the VIIDAI academic-community-service organization partnership and clinical and public health training program, and highlights the impact, challenges, road map, and powerful lessons of this binational effort.

Methods and Approaches: The VIIDAI partnership is a collaboration between San Diego State University, School of Public Health; Universidad Autónoma de Baja California Tijuana, School of Medicine and Psychology; University of California San Diego, School of Medicine; and Old Mission Rotary. Since 1998, VIIDAI has cooperatively implemented projects using a community-based participatory research approach, integrating community members with faculty, students, and health practitioners from the three universities alongside the Rotary to balance research and action for the mutual benefit of all partners involved. Epidemiologic investigations and interventions, health promotion, and clinical care are conducted with active community engagement during semiannual trips. Field activities are conducted in San Quintín, Baja California, Mexico within a rural, predominately indigenous community, targeting a variety of population-specific public health issues.

Results: Since its inception, over 3,300 faculty and students have participated in VIIDAI. The community has responded enthusiastically, with over 14,000 clinic visits and broad participation in health promotion interactions. These efforts have led to improvements in multiple indicators of community health, such as decreased prevalence of anemia; improved access to free potable water; increased numbers of students advancing to secondary schools; reduced family sizes and older age of first pregnancy; increased community interest and engagement in health issues and disease prevention; and increased visibility and empowerment among community leaders.

Conclusion: The success of the VIIDAI partnership can be attributed to five key elements: (1) stable, long-term leadership; (2) guidance from the host country; (3) equal partnership with the local community; (4) support from a non-academic service organization to help fulfill unmet needs; and (5) mutually beneficial involvement across all participants.

Keywords: Binational; transdisciplinary research; community-based participatory research; global health; cultural competency; education; population health.

Introduction:

Global public health and clinical training programs play a crucial role in addressing the complex challenges faced by our interdependent world. Students and faculty from academic institutions frequently engage in global health activities for the purpose of training while providing services and resources to underserved communities through mutually beneficial involvement by all participants¹. As such, these programs can be essential for equipping professionals with the knowledge, skills, and cultural competencies needed to prevent, detect, and respond to health threats on a global scale^{2,3}.

In this time of significant health disparities, global climatic disasters⁴, epidemics⁵, and conflicts⁶, the need for culturally competent clinical and public health practitioners who can work effectively in binational and multi-disciplinary teams is great⁷. Training programs foster teams of experts who can collaborate across nations, sharing best practices, implementing effective interventions, and building resilient health systems^{1,8}. By investing in global clinical and public health training, we empower individuals to tackle emerging health crises, promote disease prevention, and ultimately contribute to the well-being of communities worldwide⁹.

However, while global public health training programs are critical, they are not without their challenges. One significant issue is the risk of perpetuating colonialist dynamics^{10,11}, where Western-centric approaches dominate the curriculum, overlooking the diverse cultural contexts and indigenous knowledge that should be incorporated¹². Ensuring a lasting impact through global health projects

presents additional challenges, such as insufficient time to understand the true needs of the community, lack of rapport and trust from community, and/or too little time to design, implement, and evaluate meaningful projects. As such, striking a balance that values local perspectives, promotes inclusivity, addresses systemic inequities, and has a lasting impact is essential to ensuring that global clinical and public health training programs are not only impactful but also culturally sensitive and equitable^{13,14}.

These challenges can be addressed through academic-community partnerships that involve community-engagement¹⁵ and support of community stakeholders¹⁶⁻¹⁸. Involving the community through community based participatory research (CBPR)¹⁹ in implementing health programs can help address health inequalities. This approach is key, especially in resource-poor settings where community members lack adequate healthcare access. Community-based efforts are also context-specific, underlining the importance of the partnership to facilitate change while aligning global clinical and public health training, research, and practice. Partnerships that ignore local contexts in low-resource settings can be misguided and are, ultimately, unsustainable¹⁸.

This paper describes the model of a binational public health and clinical program that levies the strengths of academic institutions and a service organization working alongside community leaders and members. The *Viaje Interinstitucional de Integración Docente, Asistencial y de Investigación* (Journey to Inter-Institutional Field Experiences for Integration, Teaching, Health Services, and Research), or VIIDAI for its Spanish acronym, is a binational

community health partnership involving transdisciplinary education and research efforts. The VIIDAI program provides an opportunity for students and faculty to build clinical and public health skill sets and foster cultural competency, while promoting health and delivering services to underserved populations. Now, in its 26th year, VIIDAI can offer lessons learned to others committed to providing mutually beneficial and sustainable community health and global health training programs.

Program Description

DEVELOPMENT OF THE BINATIONAL PARTNERSHIP

The VIIDAI partnership was established in 1998 as a binational, transdisciplinary public health education and research collaboration. The working model, which has evolved over time, was initiated by the School of Medicine and Psychology (formerly Tijuana School of Medicine) in Tijuana, Baja California, Mexico (Universidad Autónoma de Baja California [UABC]) inviting two universities in San Diego, California with a School of Public Health (San Diego State University [SDSU]) and a School of Medicine (University of California San Diego [UCSD]), to join in field health operations in indigenous rural Baja California. The VIIDAI partnership was formalized through a Memorandum of Understanding between the three universities (Figure 1). From the inception of VIIDAI, a senior faculty member from each university has assumed an ongoing leadership role and faculty across disciplines (e.g., Public Health, Preventive Medicine, Reproductive Health, Anthropology, Engineering, etc.) participated to varying degrees, depending on the focus area(s) during each field experience.



Figure 1. Logo representing the binational academic partnership between the three universities.

Since its initiation, the mission of VIIDAI has been to facilitate binational collaborative projects that integrate Mexican and U.S. faculty and students from the three participating universities to deliver clinical services in a medically underserved community. These clinical services are run in parallel with community health assessments and health promotion activities that are designed to empower the community by having them take ownership of the health programs²⁰. Early on, it was recognized that a partnership with a service organization, such as Rotary International, could help to address needs that could not be met by the academic institutions. The San Diego-based La Mesa Sunrise Rotary Club initially joined VIIDAI, with a transition to Old Mission Rotary Club in 2008. Old Mission Rotary has provided support for clinical services (e.g., diagnostic equipment, dental equipment) and infrastructure for the community, as well as connections to Rotary clubs in Mexico to amplify their impact.

CLINICAL AND PUBLIC HEALTH SERVICE AND TRAINING ACTIVITIES

Field activities provide students and faculty with practical community health experience focusing on common health issues among

Mexico-U.S. border populations, with an emphasis on increasing cultural competency skills. The VIIDAI program activities are conducted with active community engagement during 4-day visits that take place each spring and fall. The first and last days involve travel, logistics organization with key community leaders, and clinic set-up/clean-up. Clinical care services and public health activities take place over a two-day period (i.e., days 2 and 3).

Clinical care services, led by UABC faculty and students, have expanded over time, and currently include primary care, obstetrics and gynecology (OB-Gyn), psychology, dentistry, and nutrition counseling. A basic laboratory provides testing for basic chemistries, anemia, pregnancy, infectious diseases, and parasites, as well as other conditions with available funding to describe the health status of the community. In addition, commonly used medications are brought to the clinic and provided free of charge. Linkage to local or, in some cases, regional clinical care is also important. The Baja California Public Healthcare Services Institute (ISESALUD for its Spanish acronym) assists in providing logistical support for patient referrals.

Before each trip, UABC medical students participate in various preparatory workshops and receive training in medical consultation, laboratory procedures, and/or use of equipment specific to their area of focus. Additionally, UCSD medical students enroll in an elective course to attend the VIIDAI trip and staff the free clinic. In the medical clinic, UABC and UCSD clinicians work in teams at every level of training, from medical students to medical residents to supervising faculty physicians. Both UCSD and UABC medical

students pair up to conduct a history and physical examination on each patient before presenting the patient to attending faculty physicians from both universities. Through this process, students can observe and compare practices that are customary at their partner's institution to their own, leading to an understanding and appreciation of the cultural context inherent in providing medical care. Students from UCSD also gain insight into how medicine is practiced in Mexico that they can apply when seeing patients in the U.S. who are accustomed to Mexico's healthcare system.

During the fall semesters, SDSU graduate students enroll in a global field epidemiology practicum to design and implement epidemiologic investigations during the VIIDAI trips. This usually involves developing data collection tools and executing quantitative and qualitative data collection activities. The spring semesters focus on the development and implementation of health promotion and education activities. Initially, epidemiology and health promotion projects were based on the perceived needs of the community and conducted independently. Over time it became evident that epidemiologic investigations (e.g., door-to-door surveys, needs assessments, focus groups), typically performed in the fall, could inform the spring health promotion activities and interventions. By sharing the results of the data collected and recommending interventions to the community leadership and community members, wide community support was ensured for implementation.

Beginning in 2021, with the establishment of the Herbert Wertheim School of Public Health and Human Longevity Science, UCSD also

began offering a VIIDAI course to graduate students in the spring quarter corresponding with the health promotion course offered at SDSU. The fact that UCSD's spring quarter begins and ends later than the SDSU spring semester allows the SDSU team more time prior to the trip to design and implement health promotion and education activities, while the UCSD team has more time to evaluate these activities and synthesize the findings. Working in this way, the two universities, in concert with UABC students and community leaders can comprehensively implement and evaluate these public health projects.

Faculty and students from UABC, UCSD, and SDSU take part in a 1-day seminar in which they discuss the specific public health topics that will be addressed during the trip. This time is used to integrate the binational teams of students who will conduct epidemiologic, health education, and clinical care activities. In addition to the practicum and seminar activities, students have occasional opportunities for conducting research projects (e.g., theses, dissertations), which are reviewed by the Institutional Review Boards (IRB) at all three academic institutions.

Multiple methods are used to track success, identify issues, and evolve the model. Regular communication between the leadership of all three VIIDAI components, which include conversations with the community lead, are crucial. The number of patients receiving clinical services is tracked, as is the number of community residents participating in the public health and clinical projects and research. Interim gatherings of the teams can result in minor enhancements. An in-person meeting with the community leadership on

every trip provides feedback on the perceived quality of the program elements, and ways to incorporate findings and next steps.

COMMUNITY SETTING

The VIIDAI program activities are conducted within the San Quintín region of Baja California, a predominately indigenous coastal municipality located 184 miles south of the Mexico-U.S. border (Figure 2). San Quintín is composed of rural *colonias* (neighborhoods) and migrant camps inhabited by immigrants primarily from the southern Mexican states of Oaxaca and Guerrero who relocated to find employment as farm workers in this large growing agricultural region. The municipality of San Quintín is the region with the lowest levels of socioeconomic status and health and well-being in the State of Baja California. As such, residents from rural *colonias* have limited access to health care and health education services.

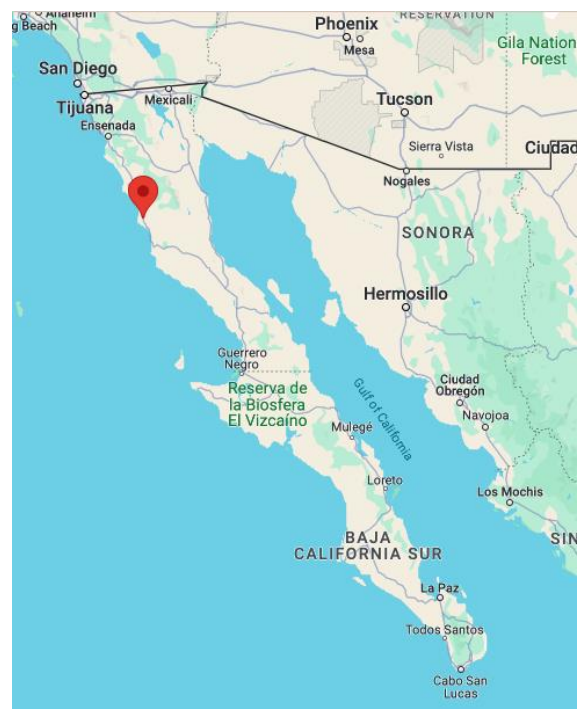


Figure 2. Map of San Quintín, Baja California, Mexico (Image courtesy of Google Maps).

Initially, VIIDAI began as a program that rotated communities every two years, and it was initiated in migrant camps. For the first three years (1998-2001), VIIDAI engaged directly with farm workers' employers, agricultural company owners, and government-assigned leaders. Although the need was great in the migrant camps, access to and communication with community members was limited. This lack of community participation prompted the joint decision to move the program from migrant camps that were frequently transient and unstable to an established *colonia* as the primary engagement site.

Community leaders from one of the initial *colonias* VIIDAI worked in, were particularly enthusiastic, immediately "adopting" the VIIDAI program into their community. Community leaders were capable of informing the university faculty and the Rotary Club about the issues of highest concern, and also communicated program trip dates to *colonia* members, ensuring robust participation. As such, since 2005, the VIIDAI program has been conducted exclusively in a *colonia* community of approximately 3,800 residents. The *colonia* has evolved and its current population is estimated at 4,400 residents. During each bi-annual VIIDAI trip, the primary school serves as the setting for clinical, dental, laboratory, and public health services, provided free of charge to all community members. An advantage of using the primary school as the setting for VIIDAI activities is that it is located within walking distance of all parts of the *colonia*, making clinical and public health services available to all its residents.

USE OF A COMMUNITY-BASED APPROACH
Guided by a CBPR approach¹⁹, VIIDAI involves active participation from not only academic

partners, but also community members, the Rotary Club, and at times, Baja California health officials to understand community-specific public health issues and integrate knowledge with effective interventions to improve the health of the community being served. The CBPR approach serves as a crucial bridge to mitigate the longstanding distrust of global public health research^{21,22} and for examining and addressing the health disparities experienced by the communities involved.

The community's indigenous leadership—headed by the school principal, with participation of teachers, and interested parents—welcome the VIIDAI team and the services provided. These key members participate as active collaborators of the program and provide input about specific health issues experienced by their own community. The community is notified in advance of the planned visit dates and specific projects. Although the Mexican government is highly proactive with public health programs to improve nutrition and family planning, these programs historically have not had the same level of penetration within indigenous communities. The VIIDAI program has also given visibility and empowerment to the *colonia*. The school principal is now an active consultant to the Mexican government on educational issues, and the primary school kitchen, remodeled by the Rotary Club, was awarded a five-year contract to provide meals for 7,000 children at 15 schools in the region. The *colonia* students all receive free meals, which also reinforces the importance of nutrition.

The principal of the elementary school in which the VIIDAI services and activities are centered, serves as the primary lead for the

community, along with select teachers and community members. The community leaders are engaged from conception through implementation of the projects, while providing input and feedback and assisting with communication with community members. The use of a CBPR approach has made it possible to address priority issues for the community, execute the projects in a culturally appropriate way, and disseminate findings. The overall model provides mutual benefit for all partners involved, with faculty and students gaining invaluable field clinical, public health, and research experience and the community gaining from the impact of the services provided and the targeted initiatives.

SOURCES OF FINANCIAL SUPPORT

The VIIDAI program has been supported through a variety of funding mechanisms. This includes grants, awarded through primarily non-governmental organizations (e.g., the Bixby Foundation), the Old Mission Rotary Club, and university funding. In addition, each academic semester, students pay a set fee that covers their travel expenses (i.e., transportation, room, and board). The UABC also provides institutional support to their students by providing transportation and covering a portion of the costs of materials and equipment. Individual grants and support by the Old Mission Rotary Club have provided considerable resources to build infrastructure for clinical and dental services and to implement community-oriented, high impact public health services. This includes laboratory diagnostics, dental equipment, a computer lab at the school, and support for field work including health education materials. The VIIDAI program has also benefitted from funding support from the U.S.

Health Resources and Services Administration (HRSA), as an arm of UCSD's Hispanic Centers of Excellence (HCOE), by awarding stipends for masters and doctoral level students (Hispanic Scholars) to assume leadership roles in the program – giving them a deeper experience as they address health disparity issues affecting this underserved community. The UCSD School of Medicine, the UCSD Herbert Wertheim School of Public Health, and Scripps Chula Vista Medical Center provide in-kind support by supplying faculty and paying for transportation and supplies. Medical supplies have been donated by AmeriCares.

Program Results and Lessons Learned

CONTINUOUS PROGRAM INVOLVEMENT

The binational academic partnership began with only 36 participants in 1998. Since then, approximately 145 U.S. and Mexican faculty and students from UABC, SDSU and UCSD have participated each trip in field public health training and clinical service activities. While VIIDAI returns to the community twice per year, grant funding has supported year-round projects. Therefore, contact with the community is continuous and not limited to the biannual field trips.

Since 1998, there have been 47 VIIDAI trips over which *colonia* residents have responded enthusiastically, with over 14,000 clinic visits and broad participation in health promotion interactions. Only three trips have been canceled in the past 26 years: one due to a violent farmworker strike and two due to the COVID-19 pandemic. To address the latter, at the request of the community leadership,

UABC faculty and students set up a Facebook page to keep the community up-to-date on COVID-19 health messaging. This effort was critical to demonstrate VIIDAI's commitment to maintaining a strong relationship with the community. Now, post-pandemic, the Facebook page continues to be used by community members and VIIDAI faculty and students – allowing ongoing communication around events and issues.

To date, a total of 3,353 faculty members and students have participated on VIIDAI trips. Students, particularly those in the six-year School of Medicine and Psychology program of UABC often go multiple times. In addition to School of Medicine and Public Health faculty and students from Epidemiology and Health Promotion/Behavioral Sciences, VIIDAI participants have included faculty and students from other disciplines, such as SDSU's Department of Anthropology, Center for Latin American Studies, and Department of Geography. Doctoral students, who can contribute as mentors and initiate research projects, may participate repeatedly.

SUPPORT FROM A NON-ACADEMIC SERVICE ORGANIZATION

The addition of a Rotary Club, as an equal partner, has also been transformational. The primary Rotary Club, Old Mission Rotary San Diego, can recruit additional U.S. Rotary Clubs, as well as Rotary International. Some projects have been sponsored by the Ensenada Rotary Club. Rotary Club funding has supported the delivery of clinical services, public health activities and interventions, and improvements to the infrastructure of the school. This has included laboratory diagnostic equipment and reagents, and dental equipment. Community leaders are

consulted for the specific needs and prioritization for school-based projects. Infrastructure for the school has been significant, including the remodeled industrial size kitchen, a computer lab, building additional classrooms, a library and classroom libraries. Some of these projects generated income for the school and community members -the remodeled kitchen is rented to host events and the addition of a covered space shelters kids during the day and converts to a theater. The Rotary partnership further cements the alliance and meets Rotary's goals of enhancing the learning environment while supporting the medical and public health objectives.

IMPACT ON COMMUNITY HEALTH

The VIIDAI program has targeted a variety of population-specific public health issues over the past two decades by responding to inputs from community leadership; tracking metrics to describe the health of the community; using clinical observations; and acting in response to findings from field assessment studies. One of the first research undertakings, at the request of the community leadership, was to assess and address teen pregnancies. The VIIDAI team received pilot funding from the Bixby Foundation (Grant #C03093) to support a community survey of women in the *colonia*. Results from this pilot study highlighted three key findings: (1) nearly two-thirds of women had their first child by age sixteen years; (2) families were large, up to twelve children; and (3) women and their partners had limited access to effective birth control.

These findings informed the development of a larger grant funded by Bixby Foundation in 2007 for a year-round intervention led by UABC faculty psychologists targeting 5th

grade students (i.e., peer educators) and adult community health workers (i.e., *promotores*). With approval from primary school teachers and parents, the 5th grade peer educators received training in the topic of reproductive health and were provided with developmentally-appropriate education materials (e.g., a flip chart and an artificial penis to demonstrate how to correctly put on a condom, and condoms), and a cell phone to have weekly calls with the UABC psychology team. The program was well received by *colonia* residents and was expanded to include students in the 6th grade and the secondary school. Program messaging included the importance of continued education, delaying sexual activity, and the benefits of smaller families. Curriculum for secondary school teachers was created and the teachers received in person training to empower them to take ownership of the program. This training was critical so that teachers could implement the program in the absence of VIIDAI faculty and students (i.e., between fall and spring in-person trips). A follow-up study conducted in 2018-2019 showed a marked reduction in family size. The study found that the median number of children overall was 3, which decreased with age such that women age 18-24 years had a median of 1 child, and no girls under 18 years had any children²³. Furthermore, the school principals reported that the proportion of children continuing their education by going to secondary and high school substantially increased. More recently, a concerning increase in teen pregnancy was observed corresponding to the COVID-19 pandemic, similar to other resource-poor areas. The VIIDAI leadership was alerted, and work has resumed in the area

of reproductive health, with activities targeting both parents and teens.

As an example of a well described metric, the prevalence of anemia is considered a 'snapshot' of community health²⁴. A community-based survey conducted in 2004-2005 in the *colonia* revealed that 42% of adult women and 70% of children less than two years of age had anemia. This resulted in a focus on nutrition, guiding health promotion projects and community sensitization. The Rotary Club funded a remodeled, high-capacity school kitchen with SDSU Anthropology faculty and students leading activities to revise the school menus and provide nutrition education to school cooks. A follow-up community survey in 2011-2012 showed a marked reduction in anemia: 23% in adult women and 43% in children less than two years of age²⁵. Additional data from a 2013-2014 study on the prevalence of diabetes (21.3%) and metabolic syndrome (53.1%) in the *colonia* fueled efforts to address nutrition and physical activity²⁶. Given the hard physical labor of farmworkers, identifying acceptable means for physical exercise is a challenge. As one example, a qualitative research study was conducted among women in the community to explore options for physical activity that would be desired – and the women requested Zumba classes. During the following VIIDAI trip, a certified Zumba instructor conducted a 'train the trainer' of select women in the community and the primary school donated after-school classrooms for the instructors to use.

Access to safe, potable water is also a global threat, with the *colonia* being no exception. An engineer, and the founder of the Aquacycl company in San Diego, joined VIIDAI in 2014

with the aim of addressing lack of access to clean water and wastewater treatment through installation of an innovative technology to treat and purify water, with the *colonia* as one of a number of test platforms. Initial studies on the *colonia*'s municipal water demonstrated the presence of chemicals, specifically high levels of sodium sulfates and sodium chlorides from seawater intrusion. Additionally, home-stored and school-stored water used for hygiene and other non-potable applications was shown to be contaminated with *E. coli* and fecal coliforms. Aquacycl received funding to install a reverse osmosis (RO) water treatment system at the school from the Old Mission Rotary Club and grants, donations and in-kind services from companies and individuals in California and Baja California, Mexico. By 2019, the school had free, potable water in the kitchen and two external faucets by using the RO system to purify the municipal water. In 2022, water access points were expanded throughout the school property to increase water intake by students and teachers. Aquacycl was one of three finalists in the Fix our Climate group for the 2023 Earthshot Prize, demonstrating the success research and entrepreneurship can achieve in an academic-community-Rotary Club partnership.

Currently, the VIIDAI program is emphasizing the importance of hydration to the students, teachers, and family members - which is now feasible given the reliable access to free, potable water. Activities include promoting reduced consumption of sugar-sweetened beverages that contribute to diabetes and dental caries. The VIIDAI program also responds to new public health threats. Rocky Mountain Spotted Fever (RMSF), which is

transmitted by the dog brown tick, is surging in Baja California^{27,28}. Untreated, RMSF has high mortality rates, particularly in children, despite the efficacy of doxycycline, an inexpensive antibiotic. Given the typical delay in the classic RMSF rash, heightened awareness among community members and health care providers is critical. A pilot project conducted with local health authorities, the Centers for Disease Control and Prevention (CDC), and VIIDAI confirmed a low level of awareness of the disease, including among health care providers. Importantly, the community was very receptive to RMSF-related health education and participated enthusiastically in a dog tick-collaring effort. Several Rotary Clubs, led by the Ensenada Rotarians, are funding a larger effort in 2024 for the broader San Quintín region, with hot spot mapping, community sensitization, and collaring of dogs. The VIIDAI program will be leading the intervention plan.

SCHOLARLY OUTCOMES

Over the past 26 years, the VIIDAI program has also had a number of scholarly accomplishments. A total of 38 applied research projects have been conducted to assess a variety of public health issues. This work has resulted in 21 conference presentations, the completion of 11 master's thesis projects and a doctoral dissertation among VIIDAI participants, and ten peer-reviewed publications, covering the following topical areas: research on neuropsychological assessment within resource-limited settings²⁹; prevalence of latent tuberculosis infection among adults³⁰; drug-scene familiarity and exposure to gang violence³¹; prevalence and correlates of diabetes and metabolic syndrome^{26,32}; prevalence and correlates of

anemia^{25,33,34}, knowledge, attitudes, and practices related to lead and lead exposures³⁵; and, reproductive and sexual health awareness and practices among adolescents and adults²³.

Conclusions

We describe a model that has evolved over time, levying a binational partnership between Mexico- and U.S.-based universities, local Rotary Clubs, and community leadership to train medical and public health students in their respective fields and in cultural competency, while positively impacting the health and welfare of the partnering community. The need for clinical and public health professionals who can work effectively in binational and multi-disciplinary teams continues to rise, with the increase in disease outbreaks and pandemics⁵, climatic events⁴, and geopolitical conflicts⁶. Positioning VIIDAI within the rural, predominantly indigenous region of San Quintín, Baja California, Mexico not only mirrors health and economic challenges witnessed globally, but also provides a cultural and socioeconomic diversity experience for Mexico- and U.S.-based faculty and students alike.

From the onset, the faculty of the Mexico-based university has served as the lead, facilitating communications with state and local ministries of health and medical providers, and ensuring compliance with medical and public health practice. Upon identifying a very receptive *colonia* leadership, continuing the program within that *colonia* has resulted in an engaged community, high levels of participation, the ability to carry out assessments and meaningful projects over time, and success

with the aspirations of the CBPR model. Early on, it was evident that the need for resources was great – to support the clinical and public health efforts as well as meeting the needs of the community and the school in which VIIDAI is based. Research grants allowed purchase of portable laboratory equipment, however engagement of Rotary Clubs and Rotary International expanded clinical capabilities, providing full dental chairs and equipment, and contributed to much needed infrastructure for the school. In essence, a CBPR approach promoted a reciprocal relationship between the three universities, Old Mission Rotary Club, and the community, fostering a sense of ownership and trust that is essential for advancing equitable and impactful program outcomes¹⁶.

Over the last 26 years, VIIDAI has ensured a lasting impact in the community by taking time to understand community needs; investing time in the development and implementation of health projects that are meaningful; and gaining community trust through consistent and reliable communication. Thus, VIIDAI addresses several of the challenges commonly faced in global health training programs that aim to foster cultural competency among clinical and public health practitioners, while promoting transborder health and delivering services to medically underserved populations in the Mexico-U.S. border region.

Conflict of Interest Statement:

The authors have no conflicts of interest to declare.

Funding Statement:

Funding and additional support were provided by Rotary District 5340 grants and Old Mission Rotary Club (San Diego) from their 2 Foundations, Rotary District 4100 (NW Mexico), Ensenada Centenaria Rotary Club, Rotary International, and the Fred J. Bixby Foundation (Grant #C03093).

Acknowledgements

We wish to acknowledge all the efforts that have taken place and those that continue in the binational partnership described in this publication. We thank the residents of the colonia in San Quintín, Baja California for their trust and continuous participation throughout the years. Special thanks to Professor Javier Martínez Hernández, school principal of Escuela Primaria Federal Bilingüe 'Salvador Díaz Mirón' for his support, leadership, and

service as a key community liaison. We also thank the Baja California Public Healthcare Services Institute (ISESALUD) for their assistance in providing logistical support for patient referrals and follow-ups. Funding and additional support -instrumental for the implementation of high impact public health services and community infrastructure- was provided by Rotary District 5340 grants and Old Mission Rotary Club, from their two Foundations Rotary District 4100 (NW Mexico), Ensenada Centenaria Rotary Club, and Rotary International. Special thanks to Bob James, Stan Vogelsang, and Gerry Hosenkamp of Old Mission Rotary Club. We also thank students and faculty from San Diego State University, Universidad Autónoma de Baja California in Tijuana, and University of California San Diego for their participation and contributions to field activities since VIIDAI's inception. And finally thanks to the support of GFWC Women's Club, Redwood City, CA.

References:

1. Scarlett HP, Nisbett RA, Stoler J, et al. South-to-north, cross-disciplinary training in global health practice: ten years of lessons learned from an infectious disease field course in Jamaica. *The American journal of tropical medicine and hygiene*. 2011;85(3):397.
2. Bloom DE, Cadarette D. Infectious disease threats in the twenty-first century: strengthening the global response. *Frontiers in immunology*. 2019;10:549.
3. Ebi KL, Frumkin H, Hess JJ. Protecting and promoting population health in the context of climate and other global environmental changes. *Anthropocene*. 2017;19:1-12.
4. El-Sayed A, Kamel M. Climatic changes and their role in emergence and re-emergence of diseases. *Environmental Science and Pollution Research*. 2020;27:2233 6-22352.
5. Baker RE, Mahmud AS, Miller IF, et al. Infectious disease in an era of global change. *Nature Reviews Microbiology*. 2022;20(4):193-205.
6. Garry S, Checchi F. Armed conflict and public health: into the 21st century. *Journal of Public Health*. 2020;42(3):e287-e298.
7. Adams LV, Wagner CM, Nutt CT, Binagwaho A. The future of global health education: training for equity in global health. *BMC medical education*. 2016;16:1-7.
8. Frenk J, Chen L, Bhutta ZA, et al. Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. *The lancet*. 2010;376(9756):1923-1958.
9. Kumar S, Preetha G. Health promotion: an effective tool for global health. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*. 2012;37(1):5.
10. Holst J. Global Health—emergence, hegemonic trends and biomedical reductionism. *Globalization and health*. 2020;16(1):1-11.
11. Greene J, Basilico MT, Kim H, Farmer P. Colonial medicine and its legacies. *Reimagining global health: an introduction*. 2013;1:33-73.
12. Bleakley A, Brice J, Bligh J. Thinking the post-colonial in medical education. *Medical education*. 2008;42(3):266-270.
13. Walker RJ, Campbell JA, Egede LE. Effective strategies for global health research, training and clinical care: a narrative review. *Global Journal of Health Science*. 2015;7(2):119.
14. Crump JA, Sugarman J, Training WGoEGfGH. Ethics and best practice guidelines for training experiences in global health. *The American journal of tropical medicine and hygiene*. 2010;83(6):1178.
15. O'Mara-Eves A, Brunton G, Oliver S, Kavanagh J, Jamal F, Thomas J. The effectiveness of community engagement in public health interventions for disadvantaged groups: a meta-analysis. *BMC public health*. 2015;15:1-23.
16. Cyril S, Smith BJ, Possamai-Inesedy A, Renzaho AM. Exploring the role of community engagement in improving the health of disadvantaged populations: a systematic review. *Global health action*. 2015;8(1):29842.
17. Haldane V, Chuah FL, Srivastava A, et al. Community participation in health services development, implementation, and evaluation: A systematic review of empowerment, health, community, and process outcomes. *PloS one*. 2019;14(5):e0216112.

18. Ramaswamy R, Kallam B, Kopic D, Pujic B, Owen MD. Global health partnerships: building multi-national collaborations to achieve lasting improvements in maternal and neonatal health. *Globalization and Health*. 2016;12(1):1-8.
19. Israel BA, Schulz AJ, Parker EA, Becker AB. Review of community-based research: assessing partnership approaches to improve public health. *Annual review of public health*. 1998;19(1):173-202.
20. Pratt B. Towards inclusive priority-setting for global health research projects: recommendations for sharing power with communities. *Health Policy and Planning*. 2019;34(5):346-357.
21. Ezezika OC. Building trust: a critical component of global health. *Annals of Global Health*. 2015;81(5):589-592.
22. Kerasidou A. The role of trust in global health research collaborations. *Bioethics*. 2019;33(4):495-501.
23. Espinosa da Silva C, Santibanez, M., Lee, A.R.S., Pacheco, L.S., Brodine, S., Fraga, M.A., Desmarais, T.B., Crespo, N.C., Martínez Hernandez, J., McKennett, M., Garfein, R.S. Reproductive and Sexual Health Awareness and Practices among Adolescents and Adults in a Rural Farming Community in Baja California, Mexico: a Quantitative and Qualitative Investigation. *Sexual and Reproductive Health Matters*. In press.
24. Collaborators GA. Prevalence, years lived with disability, and trends in anaemia burden by severity and cause, 1990–2021: findings from the Global Burden of Disease Study 2021. *The Lancet Haematology*. 2023;10(9):e713-e734.
25. Moor MA, Fraga MA, Garfein RS, et al. Decreased anemia prevalence among women and children in Rural Baja California, Mexico: A 6-year comparative study. *Journal of community health*. 2016;41:780-789.
26. Pacheco LS, Hernández-Ontiveros DA, Iniguez-Stevens E, et al. Prevalence and correlates of diabetes and metabolic syndrome in a rural indigenous community in Baja California, Mexico. *BMC public health*. 2018;18(1):1-11.
27. Kjemtrup AM, Padgett K, Paddock CD, et al. A forty-year review of Rocky Mountain spotted fever cases in California shows clinical and epidemiologic changes. *PLoS Neglected Tropical Diseases*. 2022;16(9):e0010738.
28. Foley J, Álvarez-Hernández G, Backus LH, et al. The emergence of Rocky Mountain spotted fever in the southwestern United States and northern Mexico requires a binational One Health approach. *Journal of the American Veterinary Medical Association*. 2024;1(aop):1-7.
29. Bousman CA, Salgado H, Hendrix T, Fraga M, Cherner M, Group V. Assessing neuropsychological performance in a migrant farm working Colonia in Baja California, Mexico: A feasibility study. *Journal of immigrant and minority health*. 2011;13:742-747.
30. Garfein RS, Burgos JL, Rodriquez-Lainz A, et al. Latent tuberculosis infection in a migrant agricultural community in Baja California, Mexico. *Journal of immigrant and minority health*. 2011;13:940-947.
31. Volkmann T, Fraga MA, Brodine SK, et al. Drug-scene familiarity and exposure to gang violence among residents in a rural farming community in Baja California, Mexico. *Global public health*. 2013;8(1):65-78.

32. Goodman D, Fraga MA, Brodine S, Ibarra M-d-I-L, Garfein RS. Prevalence of diabetes and metabolic syndrome in a migrant Mixtec population, Baja California, Mexico. *Journal of immigrant and minority health*. 2013;15:93-100.
33. Moor M, Brodine S, Garfein R, et al. Individual and community factors contributing to anemia among women and children living in a rural community in Baja California, Mexico. *Annals of Global Health*. 2015;81(1):116-116.
34. Moor MA, Fraga MA, Garfein RS, et al. Individual and community factors contributing to anemia among women in rural Baja California, Mexico. *PloS one*. 2017;12(11):e0188590.
35. Welton M, Rodriguez-Lainz A, Loza O, Brodine S, Fraga M. Use of lead-glazed ceramic ware and lead-based folk remedies in a rural community of Baja California, Mexico. *Global health promotion*. 2018;25(1):6-14.