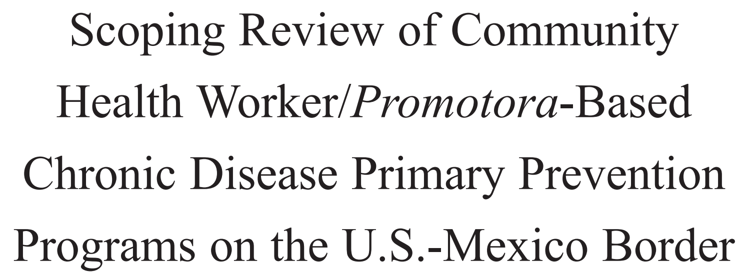

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Avance de Investigación

EL COLEGIO
DE SONORA

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U.S.-Mexico Border Center of Excellence to Counter Chronic Disease

Scoping review of community health worker/*promotora*-based chronic disease primary prevention programs on the U.S.-Mexico Border

Introduction

The transformation of the epidemiologic profile at the turn of the century, coupled with the continuing increase of chronic disease worldwide, has serious impacts on the personal, socio-cultural and economic costs of disease (WHO 2008). Complex issues and interactions at the U.S.-Mexico border, including health systems disparities, an intense exchange between a diversity of cultures, the paradoxes of global interdependence, and a shared impact of disease make effective chronic disease prevention a challenge (Rodríguez-Saldaña 2005). Knowledge is required about available health promotion resources in the region and how they navigate across and within nations and communities (Bowman and Vinicor 2005). This report identifies the need to develop, implement, evaluate and reproduce effective, sustainable community-based interventions in order to successfully reinforce and increase the implementation of necessary health promotion activities, including primary and secondary prevention to counter chronic disease. It is rooted in other reviews which have recognized the success of community health workers (CHWS)/*promotoras de salud*[1] in promoting healthy lifestyle changes and reducing the burden of chronic disease (Gibbons and Tyrus 2007; Lewin et al. 2005; Nemcek and Sabatier 2003; Swider 2002).

The specific objectives of this report are to:

- identify existing community health worker chronic disease primary prevention programs[2] on both sides of the U.S.-Mexico border;
- describe how they measure success and/or effectiveness and discuss what evidence-based programs could be implemented in other sites;
- understand the issues of empowerment, advocacy and the role of *promotoras* and health institutions in chronic disease prevention, and
- explore the interaction between national and local public health policy.

Results will inform the activities to be carried out as part of the U.S.-Mexico Border Center of Excellence to Counter Chronic Disease. More specifically, El Colegio de Sonora and the University of Arizona Mel and Enid Zuckerman College of Public Health will implement and

[1] Although there are many labels used to refer to community health promoters in Mexico and the U.S. (as explained in the following section of this review), throughout the review the authors will interchangeably use a complementary, bilingual term—community health worker/*promotora de salud*—which articulates and highlights issues inherent to the concept of community health promotion. The term "community health worker" emphasizes the essential function they play within the health system, regardless of whether they are volunteers, while the use of the feminine "*promotora*" calls attention to the predominance of women in this role and the gender issues this entails.

[2] We understand primary prevention to be oriented to the prevention of the disease, whereas in secondary prevention the focus is on early diagnosis and disease management.

evaluate a community-based chronic disease primary prevention project based on the *Pasos Adelante* program. The program adapted for Mexico is called *Camino a la Salud*.

Pasos Adelante is an educational curriculum facilitated by *promotoras* which focuses on chronic disease prevention and walking groups. The program was developed and implemented by the University of Arizona Mel & Enid Zuckerman College of Public Health as part of the CDC-funded Border Health Strategic Initiative (BHSI) and more recently implemented as part of the Canyon Ranch Center for Prevention and Health Promotion. The curriculum, *Pasos Adelante* /Steps Forward, is an expansion of the NHLBI curriculum, *Su Corazón, Su Vida*, with an increased emphasis on diabetes and encouraging participant advocacy. A new focus on walking groups was also added to the curriculum. The curriculum includes the following sessions:

1) Are you at risk for heart disease;
2) Be more physically active;
3) Are you at risk for diabetes;
4) What you need to know about high blood pressure, salt and sodium;
5) Eat less fat, saturated fat, and cholesterol;
6) Maintain a healthy weight;
7) Is your community healthy?;
8) Glucose and sugar;
9) Make healthy eating a family affair;
10) Eat healthier – even when time or money is tight;
11) Enjoy living smoke-free; and
12) Review and graduation.

The CHW-led walking groups are designed to engage participants in a coordinated effort to increase physical activity through social support. Toward the end of the 12 week program, the *promotoras* stop walking with the groups but encourage them to continue. This pattern of involvement is meant to encourage the participants to continue to walk together once the program ends.

This review—which includes information from academic and gray literature, as well as key informant surveys—looks at CHW/*promotora* programs working in primary prevention of chronic disease on both sides of the U.S.-Mexico border, the specific results generated, and the longer-term impact of these programs at the individual and community level. Our specific discussion is oriented towards the characteristics needed for successful community health worker programs to prevent chronic disease, and we include some suggested criteria to define "successful program".

Methods

Our methodology evolved as our literature review and conceptual discussions progressed. We began by looking at systematic reviews which create an evidence base for the effectiveness of CHW/*promotora* interventions (Lewin et al. 2005; Gibbons and Tyus 2007; Nemcek and Sabatier

2003; Swider 2002). This document is a systematic review in that it is "a systematic, transparent process for gathering, synthesizing, and appraising the findings of studies on a particular topic or question," (Sweet and Moynihan 2007, 5) with the purpose of providing impartial, evidence-based data for policy decision-making. However, in order to sidestep common misconceptions about the characteristics of systematic reviews (they focus on clinical medicine, only admit randomized control trials, etc.), as well as address the real limitations of systematic reviews (they are confined to a very specific question and must consider the quality of the included studies), the team chose to use a scoping study methodology, which addresses broader topics and seeks to map the available literature, as well as identify gaps in the literature (Arksey and O'Malley 2005).

In order to answer our study questions, we conducted a search of academic literature on primary chronic disease prevention programs at the U.S.-Mexico border which use CHW/*promotora* interventions. We consulted the PubMed, Scielo, LILACS, CINAHL-EBSCO and ProQuest databases using all keywords related to community health workers, chronic disease prevention, and U.S.-Mexico border. A total of 397 articles were encountered (see Appendix 1: Description of literature search). Duplicate articles, articles published before 1980, and projects not implemented directly in the border region were eliminated, leaving 44 total articles (see Appendix 2: Literature search results). Because our interest is specifically to implement the *Pasos Adelante* program, we limited our review to heart disease and diabetes primary prevention, and thus refined the search results further by reviewing article abstracts and eliminating articles on cancer prevention or disease management, as well as articles which did not describe the results of a specific border intervention (see Appendix 3: Articles reviewed). However, articles which did not report on a specific intervention but which discussed issues of empowerment, policy implications, cultural considerations—topics we consider relevant to the adaptation and implementation of the *Pasos Adelante* methodology for Mexico—we did not discard but included as references for the background and discussion sections of this review.

There is a preponderance of articles published in the U.S. journals which describe the interventions on the U.S. side of the border. Our academic literature search yielded no articles which described *promotora* programs on the Mexican side of the border, although we did find articles which discuss national policies for chronic disease prevention. We used key informant questionnaires to gather more information on major CHW/*promotora* chronic disease prevention programs on both sides of the border, as well as gather information on training mechanisms, intervention methodology, evaluation mechanisms, funding, recruitment, and advocacy strategies, among others. The key informants also provided information on the broader issues of empowerment, policy and culture explored in this review, as well as helped identify relevant gray literature (see below for discussion).

As we sought to answer the general questions of this review based on the literature, we began to develop new questions oriented towards empowerment, advocacy, the role of *promotoras* and how they are defined, the role of the health institutions and the interaction between national and local public health policy, among others. We are now looking at two different discussions. The first concerns the results of the available literature on outcomes assessment and evaluation of programs with p*romotora* involvement for primary prevention of chronic disease. Most of the articles we reviewed were behavioral, outcome-oriented interventions which did not include a

broader discussion with a different body of literature which is more policy-oriented and philosophical, and which addresses questions about community and institutional change and not only individual outcomes. These articles are commonly excluded from systematic reviews because the study design is usually qualitative, not outcome-oriented, and more conceptual/theoretical in the questions they seek to answer. However, our review includes several articles relevant to empowerment, advocacy, policy, and the identity/role of *promotoras*.

The Role of *Promotoras* in Chronic Disease Prevention in a Transborder Setting

Non-communicable chronic diseases have received much worldwide attention recently, particularly their prevention through lifestyle changes. Cardiovascular disease, diabetes mellitus, and malignant neoplasms are among the leading causes of death on both sides of the U.S.-Mexico border (PAHO 2007). One of the main objectives of the World Health Organization's *2008-2013 Action Plan for the Global Strategy for the Prevention and Control of Non-Communicable Diseases* is "to promote interventions to reduce the main shared modifiable risk factors for non-communicable diseases: tobacco use, unhealthy diets, physical inactivity and harmful use of alcohol" (WHO 2008). It also considers policy change at all levels, research, monitoring, and inter-institutional and community partnerships as indispensable elements for the prevention and control of NCDs. The U.S. Center for Disease Control and Prevention considers chronic disease the public health challenge of the 21st century and identifies lack of physical activity, poor nutrition, tobacco use and excessive alcohol consumption as the leading causes (CDC 2009). Its comprehensive prevention strategy emphasizes well-being (education, social support, and healthy policies and environments), policy promotion, health equity, research translation, and workforce development. Mexico's *National Health Program* 2007-2012 (Secretaría de Salud 2007) states that 33% of deaths among Mexican women and 26% of deaths among Mexican men are caused by three illnesses: diabetes mellitus, ischemic heart disease and cerebro-vascular illnesses, and considers the prevention of metabolic syndrome a priority for the health system at all levels. Mexico's *National Health Prevention and Promotion Strategy* puts forward a combination of primary prevention (to avoid or reduce new cases of illness), secondary prevention (early detection and timely treatment) and tertiary prevention (to reduce the physical or mental effects of disease) strategies to counter chronic disease.

On the U.S.-Mexico border, diabetes is the second leading cause of death in the Mexican border states (see Appendix 4: Mortality rates in Mexican border states) and the sixth leading cause of death in the U.S. border states, while cardiovascular disease is the leading cause of death on both sides. Common issues such as persistent inequalities, acculturation, migration, changes in communities' social fabric and a lack of social security and health care access make the prevention and care of chronic disease on both sides of the border a major challenge, exacerbated by the convergence of two disparate health systems and the heterogeneity and inequality of border communities.

The United States-Mexico border is one of the longest, most populated and busiest borders in the world. This border runs relatively east-west for over three thousand kilometers (3,169 kms. or 1,969 miles) from the Pacific Ocean to the Gulf of Mexico, traversing mountains, des-

erts and cities. It separates four U.S. border states (California, Arizona, New Mexico and Texas) from six Mexican border states (Baja California, Sonora, Chihuahua, Coahuila, Nuevo León and Tamaulipas) and is crossed by approximately two hundred and fifty million people every year. Economic activities range from agriculture, industry associated to *maquiladora* manufacturing, and tertiary services including tourism, education, health and municipal services.

The La Paz Treaty defined the border region as the area 100 kilometers north and south of the international boundary. It has a population of around 12 million people and includes fifteen pairs of sister cities in 44 U.S. counties and 80 Mexican municipalities. Since many of the border characteristics and exchange of goods and people are present in other cities in the region, the area is often increased to include 100 kilometers north and 300 kilometers south of the border, as does the Border Environmental Certification Commission (BECC) which certifies cities for loans from the North American Development Bank, created under the North American Free Trade Agreement in 1994.[3]

Although the border region has a clear geographic definition, it is more difficult to conceptualize its sociocultural limits. Spanish and English are commonly spoken by citizens and residents on both sides of the border. Celebrations of 5 de mayo (a Mexican celebration) are frequent in the U.S. border states and sometimes as far away as Chicago. Mexican food is the typical fare in many U.S. border cities, as are Mexican movies, music and art. Frequent cultural activities, especially those that are organized around family life, birthdays, anniversaries, and *quinceañeras* that include *piñatas, menudo, tamales, carne asada* and *cerveza* follow many traditional Mexican traditions. Meanwhile, in Mexico, U.S. movies and TV series, fast food restaurants and shopping malls have multiplied, and hamburgers, hot dogs and pizzas—often high in fats and sodium—are a frequent and inexpensive food option, along with traditional fare. Open air markets are disappearing and being replaced by mega supermarkets due to their convenience and standardization of merchandise. However, there is no complete fusion of identities at the border. Rather, cultural identities are renegotiated and reinforced by the presence of national governments, even more present currently due to the high amount of exchange of goods and people and the levels of violence related to the illicit traffic of drugs, arms and humans.

This multifaceted panorama has been described previously with regards to border health (Denman et al. 2004; Denman, Monk and Ojeda 2004). The border must be conceptualized as a

> …contentious and complex space in material and symbolic ways. It is a focal point for political and economic debates related to migration, commercial transactions (both legal and illegal), and economic development that come together in concerns about national and human security. It is a border that is at once highly fluid, yet tightly bounded, where policies and public opinion grapple with restricting some movements while facilitating others and reveal numerous inconsistencies. Its population is diverse, in terms of class, ethnicity, immigration history, legal status, generation, and gender. Some live in large cities, others in small towns or sparsely populated rural regions. The region symbolizes the encounter of asymmetrical but interrelated worlds and presents the challenges of addressing multifaceted inequalities and inequities (citing Bustamante 1989; Bronfman et al. 1988; Staudt and Coronado 2002) (Monk et al. 2009).

3 For more information, visit http://www.cocef.org/english/index.html.

In this context, community health workers/*promotoras de salud*, due to their proximity to their communities of origin and knowledge of local (and sometimes national or international) health systems, function as cultural brokers and public health advocates. They are a vital part of public health efforts at the border and beyond. Since the 1960s, CHWs throughout the world have been characterized as community leaders who share the language, socioeconomic status and life experiences of the community members they serve. Several national and international governmental bodies have recognized CHWs as a promising strategy to address glaring health inequities among marginalized population groups who are beyond the reach of the health care system (World Bank 1981; Smedley et al. 2002; WHO 2009). In the U.S., CHWs work primarily with Hispanic, African American and Non-Hispanic White populations and are more likely to serve uninsured (71%) and immigrant (49%) populations (HRSA 2007). They have demonstrated significant effectiveness in primary and secondary prevention of hypertension (Brownstein et al. 2005; Brownstein et al. 2000; Kuhajda et al. 2006), cancer (Hunter et al. 2004), diabetes (Norris et al. 2006), asthma (Viswanathan et al. 2009), child immunizations (Lewin et al. 2005; Viswanathan et al. 2009), and HIV/AIDS prevention (Nyamathi et al. 2001). They have also demonstrated effect in increased access to care through case finding, appropriate use and follow up of certain screenings (mammography, pap smear) (Staten et al. 2004; Viswanathan et al. 2009) and medication adherence (hypertension, tuberculosis) (Swider 2002; Brownstein et al. 2005).

Community health workers in the U.S. are more likely to be middle-aged women of color, with moderate educational attainment who often go without increases in their wages proportional to educational level, work experience, or tenure (HRSA 2007). Furthermore, health and retirement benefits are not usually part of their employment package compared to other health professionals (HRSA 2007). CHWs are more often working as volunteers than paid employees for programs serving uninsured and immigrant populations. CHWs working in cancer, cardiovascular disease, diabetes and high blood pressure are also more likely to be volunteers and less likely to be paid employees compared to those CHWs working in nutrition, women's health, pregnancy/prenatal care and child health (HRSA 2007). Although five major models of care utilizing CHWs have been documented and include member of the case delivery team, navigator, screening and health education provider, outreach/enrolling/informing agent and organizer, there is a dearth in the literature demonstrating exactly how CHW are fully financially incorporated into the health care system.

Only since the 1990s has the Community Health Worker model emerged in the United States as a promising and effective strategy in addressing health inequities among marginalized population groups beyond the reach of the health care system. There are an estimated 85,000 CHWs working in over 6, 300 health and social service agencies in all 50 states. In January 2009, CHWs obtained an occupational workforce code by the Bureau of Labor Statistics. Community Health Workers are now distinguished from health educators as a detailed occupation under the major, minor and broad group headings of Community Health and Social Service; Counselors, Social Workers and Other Community and Social Service Specialists; and Counselors, respectively. CHWs were counted, for the first time, as Community Health Workers in the 2010 U.S. Census. CHWs are considered 5-40% of workers engaged in counseling, substance abuse, educational-vocational counseling, health education, and other health and community services (HRSA 2007).

The social and human assistant field is projected to grow much faster than the average for all occupations between 2004 and 2014 and was ranked among the most rapidly growing lines of work in the United States (HRSA 2007). The current U.S. definitions broadly accepted but inconsistently used by most public health researchers and evaluators are offered by two national entities, the Health Resources Services Administration (HRSA) and the Community Health Worker Section of the American Public Health Association (APHA). These national bodies predominately fund (HRSA) and advocate (APHA) for Community Health Worker activities and professional development in the United States. The seminal *Community Health Worker National Workforce Study* defines CHWs and *promotoras* in the following ways:

> **Community health worker**s are lay members of communities who work either for pay or as volunteers in association with the local health care system in both urban and rural environments and usually share ethnicity, language, socioeconomic status, and life experiences with the community members they serve. They have been identified by many titles such as community health advisors, lay health advocates, "*promotores(as),*" outreach educators, community health representatives, peer health promoters, and peer health educators. CHWs offer interpretation and translation services, provide culturally appropriate health education and information, assist people in receiving the care they need, give informal counseling and guidance on health behaviors, advocate for individual and community health needs, and provide some direct services such as first aid and blood pressure screening (HRSA 2007, iii-iv).

Promotoras are then broken out from the HRSA Community Health Worker definition as:

> The terms ***promotores*** and ***promotoras*** are used in Mexico, Latin America and Latino communities in the United States to describe advocates of the welfare of their own community who have the vocation, time, dedication and experience to assist fellow community members in improving their health status and quality of life. Recently, the term has been used interchangeably, despite some opposition, with the term community health workers (HRSA 2007, iv).

The larger definition of CHWs suggests they "work" for pay or as volunteers and embody innate cultural "skills" (language, ethnicity, life experiences), learned skills (interpretation, translation, advocacy, health education, counseling) and some technological skills (first aid, blood pressure screening). Although subsumed in the CHW definition, the *promoto*r or *promotora* is characterized as an advocate for the welfare of their own community with existing vocation, experience, time and motivation to conduct both individual and community level advocacy work.

The American Public Health Association-Community Health Worker Section, an advocacy body of the public health professional association which "seeks to promote the community's voice within the health care system through development of the role of new professionals/ Community Health Advisors and other community-based professionals" (APHA 2010), does not differentiate *promotoras* and defines Community Health Workers as:

> A Community Health Worker is a frontline public health worker who is a trusted member of and/or has an unusually close understanding of the community served. This trusting relationship enables the CHW to serve as a liaison/link/intermediary between health/social services and the community to facilitate access to services and improve the quality and cultural competence of service delivery. A CHW also builds individual and community capacity by increasing health knowledge and self-sufficiency through a range of activities such as outreach, community education, informal counseling, social support and advocacy (APHA 2010).

On both sides of the border, *promotoras* are often some of the most trusted members of their communities, which allows them to facilitate access and engagement between individuals or communities and a complicated and dynamic health and social service system. CHWs are expected to build individual and community capacity through knowledge and self sufficiency. This emerging role definition assumes that the CHWs or *promotoras* have the personal and professional autonomy and interconnectedness within the larger system to which her community requires access. These definitions assume the participant/community lacks the knowledge or self-sufficiency to engage with the system appropriately or timely. The CHW or *promotora* thus becomes the key unlocking the system to the individual/community member and in turn the key to making the system responsive to the community it is striving to serve.

In Mexico, this perceived attribute of *promotoras* has been appropriated by the national health system. Mexico has a national health promotion program conducted by the Ministry of Health (from here on Secretaría de Salud). The national Secretaría de Salud defines federal guidelines for the health prevention and promotion activities which are to be followed by all public health institutions: Instituto Mexicano del Seguro Social (IMSS, which covers private sector workers), Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado (ISSSTE, for federal workers), and local state public sector workers' programs. Mexico's national policy is set out in the *Estrategia nacional de promoción y prevención para una mejor salud* (Secretaría de Salud 2008) and is signed on to by all health and social security institutions in Mexico. The national health program is based on five action lines with four principal products, four different action programs and a strategic decalogue.

Principal products:

1) Guaranteed package of promotion and prevention services,
2) Socio-ecological model to counter determinants,
3) Continuous attention from the first contact,
4) Public policy which encourages health.

Action programs:

1) Education and Health,
2) Go Healthy, Return Healthy (for migrants),
3) Healthy Environments and Communities,
4) Health Promotion: A New Culture.

Strategic Decalogue			
Action lines		**Components**	
1	Guaranteed package of health promotion and prevention services	1	Interventions by age groups
		2	Personal knowledge of determinants of health and development of competencies for proper health management
2	Construction of a new culture for better health	3	A unique program of health communication
		4	Reform of community action for health
3	Reform of first contact health services	5	Strengthening supply for delivery of the guaranteed package of health promotion and prevention
		6	Human capital development in public health
4	Health: a state policy	7	Favorable environments for health
		8	Public policy for better health
5	Evidence and accountability	9	Advocacy and inter-sectoral management of health
		10	Generation of scientific evidence for decision making and accountability

The *Health Promotion Operational Model for Mexico* (Santos-Burgoa et al. 2009) addresses the lack of information systems and human resources diagnosed by the Pan-American Health Organization (PAHO 2007). The model translates the five core functions of the Ottawa Charter for Health Promotion into seven components which include:

1) Management of personal determinants for specific age groups and sex.
2) Health capacity-building and competence development.
3) Social participation for community action.
4) Development of healthy environments.
5) Advocacy.
6) Social marketing in health.
7) Evidence in health promotion.

Promotoras de salud carry out activities at the community level which support the public health system's overarching goals. However, the roles of health promotion staff are not always clear, with nurses, social workers and others carrying out activities we identify as *promotora* activities. Primary chronic disease prevention activities within the Secretaría de Salud's community health centers usually involves a staff member approaching clients in the waiting room and providing very basic oral and written information, or leading support groups for clients already diagnosed with a disease. Outside of the community health center, particularly in underserved urban and rural communities, the Secretaría de Salud has *auxiliares de salud*, volunteer members of the community who do disease detection and primary and secondary prevention. They are mostly female, are usually located in rural and poor urban areas, they work from home, and they serve as a bridge between the community and health services. The activities

they are trained to perform include keeping an updated census of their community—which implies documenting babies' weight, detecting and documenting diseases such as diabetes, high blood pressure, and breast cancer—and basic health prevention activities such as conferences, workshops, home visits, health fairs, etc. They also participate in the Secretaría de Salud's health promotion brigades, provide very basic medical services such as shots and immunizations, and dispense medication and birth control. These activities are reported to the Secretaría de Salud, which in turn reports them as services provided by the health system. However, their role as health advocates—referring clients to health services, helping them navigate the health system and gain access to public resources, and providing other type of emotional and economic support—is not documented or evaluated.

The Secretaría de Salud also has identified the need to create specific paid positions for employees whose job title is "*promotor de salud,*" and recognizes the challenges facing health promotion in the country:

> Currently health promotion in Mexico as both a field of action and knowledge has been relegated in the face of global development, epidemiological transitions and delivery of services… The profile of *promotor de salud* for the [federal] 'Sectorial Catalogue of Positions' for 2006, which includes medical, paramedical and similar positions, has not been updated to include the functions carried out by *promotores* according to current needs and the efficient delivery of services… [Because of this] deficit of personnel in health promotion in primary level health centers, occasionally the personnel with the code of *promotor* fulfills other functions (such as drivers or secretaries) [authors' translation] (Secretaría de Salud 2008, 55).

This is clearly an opportunity for projects such as *Camino a la Salud* to offer support for Secretaría programs to help move health promotion forward.

Participation in government programs are not the only opportunity for *promotoras*. They also participate in grassroots non-government organizations and as part of educational institutions in the primary prevention of chronic diseases, as described by the key informant surveys we carried out for this review, though comprehensive studies of *promotora* programs and characteristics in the Mexican context are lacking.

However, based on research conducted for a BS degree at the Universidad Autónoma de Baja California (Alfaro-Trujillo et al. 2010), observations can be made about promotoras in Tijuana which can be generalized to describe *promotoras* along the Mexican border. Beatriz Alfaro surveyed 121 *promotoras* with a self-applied questionnaire about their organization, their own sociodemographic characteristics and the activities their organization carries out. Her research questions were the following:

1. What type of community interventions with participation of *promotoras* are carried out in Tijuana?
2. What are the characteristics, perceptions and motivations of the *promotoras* in relation to community work?
3. What type of interventions do the community *promotoras* do and do these follow a specific model?

Of these *promotoras* from nine non-government associations in Tijuana who carry out health-related activities in the community, 97 percent are **female**, 68% **married**, 89% with 9 years of basic education or less, 79% were **born in states other** than Baja California, and half of them have a **salaried job**, one third as a *promotora*, one third in commerce and the rest in beauty salon, waitress, domestic worker, factory job, among others. Their training as community *promotoras* has been received, partially or completely, in the "Programa de Eduación y Formación para Promotoras Comunitarias" (61%) and also with workshops directed at *promotoras* mostly once or twice a month (70%), with 12% receiving training once every six months or less.

They have been **recruited** mostly by other *promotoras* or by hearing about it themselves from the organization (35%, 33%). Others were recommended by friends (14%). Sixty-one percent work as *promotoras* between 1 and 5 hours a week, 14% between 6 and 10 hours a week and 7% from 11 to 20 hours a week. Thirty percent have worked less than 2 years as a *promotora*, 14% from 3 to 5 years and 14% from 6 to 10 years. They receive supervision or are accompanied in their activities as *promotoras* always (50%), often (16%), sometimes (22%) and rarely (7%). They receive compensation always (44%), often (8%), sometimes (23%) and rarely 7%. Monetary **compensation** is given to about 40% of those who declare compensation and a little less than 40% receive in-kind compensation such as food, food coupons, and others.

The **priority health areas** that the organizations work on are: tuberculosis, sexual and reproductive health, blindness prevention, basic health and diabetes detection, nutrition, environmental health, and dental health. As can be observed from this list, few programs specifically address chronic disease prevention, although the activities considered in basic health programs were not identified. Only 10% of the *promotoras* interviewed work in an organization dedicated to diabetes detection.

The **specific activities** carried out by the *promotoras* include the following:

- participating in public health campaigns and distributing materials,
- one-on-one counseling,
- patient referral and accompaniment,
- taking vital signs,
- support for sick people and
- detection, among others.

As to the health issues commonly found, the *promotora*s identified nutrition, family planning, family violence, high blood pressure, diabetes, environmental health, cervical cancer, STDs, HIV, breast cancer, eyesight, and tuberculosis to be the most common problems.[4]

This is also reflected in the self-diagnosed health problems identified by the *promotoras* of their own health issues: 53% stress, 41% cavities, 40% eye problems, 40% back trouble, 34% overweight, 34% sadness, 19% sleep problems, among others. Only 12% reported they had very good health, 45% good health, or 36% regular health. In case of illness 22% go to a private doctor, 24% to IMSS, and 16% to the non-government organization where they work.

[4]The first five were identified most frequently. This was from a previously designed list of options.

Promotoras who participated in the focus groups carried out by Alfaro, Valles and Vargas (Alfaro-Trujillo et al. 2010) reported that their main satisfaction and motivation was to be of service to other people and to their community. They recognize that they are a fundamental part of the organization they work with and feel respected by their communities.

Scoping Review Results

The following section of this report looks specifically at information obtained through a systematic review of the literature (scoping review) which focuses on community health workers at the U.S.-Mexico border who carry out interventions for chronic disease prevention.

Overview of the Literature Search

A total of seven studies met the inclusion criteria (See Appendix 3). Research was published in the following journals between the years 1993-2005:

- Preventing Chronic Disease Public Health Research,
- Practice and Policy (3);
- HealthEducation and Behavior (2),
- Journal of Women's Health (2)

Funding agencies included :

- NHLBI-HRSA Bureau of Primary Health Care and Office of Rural Health Policy (1),
- W.K. Kellogg Foundation (1) and
- the Centers for Disease Control and Prevention (4), and
- one did not disclose funding source.

Research was conducted in five Arizona border towns located in Cochise, Yuma, Santa Cruz and Pima Counties; one in San Diego County in California and one in Texas (El Paso, Laredo). Two studies were multi-site, involving one or more cities in the states of Texas, Arizona, and California. None took place in New Mexico or Mexico. Programs were predominately based out of a community health center (5).

Intervention Focus

Five interventions focused on the primary prevention of cardiovascular disease and diabetes and targeted lifestyle interventions among low-income Hispanic women. Interventions targeted knowledge, attitude and behavior about heart-healthy practices (lowering blood pressure, cholesterol, blood glucose levels and BMI) through increased weekly intake of fruit and vegetables, and decreased intake of sweet drinks and soda. Programs implemented or modified the National Heart Lung and Blood Institute's (NHLBI) *Salud Para Su Corazón (Your Heart Your Health)*

curriculum (3) or the Well-Integrated Screening and Evaluation for Women Across the Nation (WISEWOMAN) Study (2). One developed a primary NCD prevention intervention based on theoretical behavior change models, one focused on leadership and empowerment as a pathway to the health of migrant farm workers, and two tested the effect of CHWs in improving annual primary care screenings and general access to care for either women over age 45 or migrant agricultural workers.

Study Design

Both quantitative and qualitative methods were used and included ethnography (multiple in-depth interviews, participant observation) in multiple sites over time (1); self-report and laboratory pre-post evaluation with a convenience sample at baseline, 3, 6 and 12 months (3); cross-sectional population-based randomized household survey (1); and a within-site randomization of patients to an intervention group (2). None were randomized case-control trials.

Study Participants

A range of approximately 27 to 1000 individuals with a mean age range of 49 to 55 years participated. Participants were classified as Hispanic and only one study reported that 86% of participants were born in Mexico. Three studies targeted low-income Hispanic women over the age of 40, while others recruited both men and women, with more women participants attending and completing the intervention.

Health Outcomes

Significant clinical outcomes for one pre-post convenience sample (N=85) included short-term (baseline to 6-month post-intervention) decrease in LDL and HbA1C. No short- or long-term (baseline to 12-months post-intervention) significant decrease in weight, BMI, systolic and diastolic blood pressure were found. A modified version of the same NHLBI *Su Corazón, Su Vida* curricula, using the same study design (N=216) found an increase in moderate to vigorous walking; weekly salad, vegetable, fruit and fruit juice intakes; and decreases in weekly sweetened hot drinks and sugary drinks. Significant behavioral outcomes in a small non-randomized convenience sample (N=116) demonstrated decreased sweet drink consumption and increase in family members being physically active together. Changes in fruit, vegetable, soft drinks, or low- and non-fat milk consumption were not significant. In a randomized population-based household cross-sectional study (N=98), women paired with a *promotora* (versus no contact with a *promotora* and mailer) were 35% more likely to return for an annual comprehensive health exam. The WISEWOMAN randomized (within study site) prospective study showed no significant difference between physical activity levels between intervention groups. Patients randomized to the CHW arm of the study significantly improved fruit and vegetable intake, although this group started with lower levels of fruit and vegetable intake compared to the other groups.

Study Limitations

Most studies described limitations to sample, size, ability to randomize, power to detect results, loss to follow-up and difficulties with systematic data collection.

Community Heath Workers/Promotora ***Involvement***

Promotora (*Promotora de Salud*) (4), Community Health Worker (2); and Camp Health Aide (1) were used to describe CHWs/*promotoras*. Five studies reported on gender and ethnicity of the *promotoras*, who were predominately Hispanic, bilingual women, and only one study reported an average age of the *promotoras* of 50-plus years. Veteran Description of prior training among *promotoras* working in the health interventions was vague and sparse. Studies reported CHWs familiar with either the curriculum, national guidelines, or having experience in translation and transportation of clients. Others described CHWs as bilingual, bicultural and being either an experienced CHW or a long-time member of the community.

Promotora ***Training as Part of Intervention***

Training programs for the *promotoras* in the selected articles mentioned the following sorts of training which vary as to hours, materials and distance support:

- NHLBI *Your Hear Your Life* (*Su Corazón, Su Vida):* 16-18 hours of training on Your Heart, Your Life (*Su Corazón, Su Vida)* curriculum lessons (totaling 8 lessons). Lead *promotoras* with previous training conducted the trainings.
- Camp Health Aides: 20 hours intensive, tapering down over time (no exact data provided). Topics: First aid, referrals for health and social services, translation, provides health education. Rooted in participatory learning.
- WISEWOMAN: intervention purpose, participant consent, confidentiality, data collection, documenting activities, coordinating efforts between community and health center staff 2.5 days; (1) Orientations to research activities (2) Cardiovascular health (3) Burden of CVD (4) National and State WISEWOMAN programs (5) human subjects protection (6) data collection.
- Pasos Adelante: 6 hours of training on the facilitation manual, CHWs participated in curriculum modification, some attended a weeklong *Su Corazon, Su Vida* training at a CHW annual conference. Worked in pairs (junior with senior CHW). Other trainings throughout the project were offered, *La Comunidad en Acción* Diabetes Training for Lay Health Diabetes and *La Union Familiar*: Workers Day long work session with CDE to develop curriculum with University. One-day training on curriculum flow (Playing roles, practicing delivery and coworker critique).

CHW Education and Experience

Studies do not explicitly describe CHW education and training. Some suggested the CHW had previous experience with the particular curriculum and or working in the issue of interest but

no details were provided. One study only mentioned previous experience in outreach, translation, and transportation of the client group. One only stated the CHW was well established in their agency and had conducted education previously.

Supervision

A description of the type and frequency of supervision of CHWs' work was not reported in any study. One study alluded that CHWs were encouraged to use the curriculum script if necessary, but that it was not required.

Duties

- Outreach and recruitment; group education, eight sessions once or twice a week over a 2-3 month period. No mention if *promotoras* collected evaluation data.
- Dedicate 20 hours of workweek to: first aid, referrals for health and social services, translation, provides health education.
- Visited study participants, asked about post card, reminded them they had a scheduled appointment, discussed barriers to keeping appointment, facilitated scheduling appointment, contacted three times if appointment missed, facilitated re-scheduling appointment, provided education materials and local recourses.
- Research: Recruitment, enrollment, counseling and following clients. Intervention: ¡*Vida Saludable, Corazón Contento*! In three, clinic-based, face to face 30-minute counseling sessions at 1, 2 and 6 months after enrollment.
- Other activities: educators, help participants solve challenges, referrals to resources for healthier lifestyles (smoking cessation, nutritional counseling, physical activity).
- Telephoned patients every 2 weeks to talk about (1) benefits of fruits and vegetables (2) reminder about behavior modification (3) assess patient's knowledge and behavior tips (4) invitation to bi-monthly walk. Lead bi-monthly walks, encourage patients to find a walking partner, linked patients with nearby neighborhoods.
- Two, 2-hour health education sessions. Conducted in school, churches, participants decided the class time and walking times. Recruit, pre evaluation, deliver five group and individual sessions, work with multiple ages and genders, talk to both diabetes, physical activity, food, cohesion, self efficacy.

Compensation

Only one study reported how and if CHWs were compensated. Camp Health Aides were given a modest educational stipend for their efforts.

Activities

All studies reported CHW's activities which included; patient referral and follow up (5), organization and logistics (4) provision of health education sessions (3), home visits (2), counseling (2), distribution of information (flyers) (2), and research (1).

Intervention Sites

Intervention study sites were predominately based out of a community health center or community clinic, participant's home, and/or a community based organization.

Number of Promotoras Participating in Intervention

The number of CHWs required in the intervention was unclear and vaguely reported in selected studies. Four authors reported between 2 to 250 recruited and trained CHWs for the intervention.

Hours per Week Promotora Works

Only one study reported on the number of hours a week a *promotora* dedicated to the projects. The study reported *promotoras* working 20 hours a week.

Individual Communication Strategies

Four of seven studies reported mechanisms for individual communication by the CHW, which included home visits (2), face-to-face interview in doctor's office (2), face-to-face interview in a hospital (1), telephone only (1).

Group Communication

Four of seven studies reported mechanisms for group communication by the CHW, which included groups discussion (3), health fairs (1).

Mass Communication Strategies

No study reported mass communication strategies used by the CHW.

Advocacy Strategies

CHW advocacy was not reported directly for any study. None of the studies which included a curriculum described advocacy as part for the curriculum specifically. Leadership training was the intervention for the Camp Health Aides. *Pasos Adelante* reported CHWs reported out monthly to the community policy coalition.

In summary, the seven studies reviewed provide limited information regarding *promotora* engagement, activities, duties, supervision, compensation, communication and advocacy strategies. More documentation in these areas would be critical to understanding how to develop and implement CHW programs.

Key Informant Interviews

Beyond a systematic review of the literature, it is also very important to learn about community health worker interventions for chronic disease prevention in the border region which have not been documented in the literature, particularly on the Mexican side of the border. Thus, key informants were identified and interviewed by the research team. They were selected among professionals from academic, government or non-government organizations based on their familiarity with CHW programs and interventions in the region.

Key informants were: Marcia Contreras (Instituto Sonorense de la Mujer), Maia Ingram and Jill Guernsey de Zapien (University of Arizona), Eva Moncada (Secretaría de Salud Pública de Sonora), Diana Munguía (El Colegio de Sonora), Lee Rosenthal (University of Texas-El Paso), Angélica Araujo (Universidad Autónoma de Ciudad Juárez), and Verónica Ávalos (Fronteras Unidas Pro salud). Additional information was provided by Beatriz Alfaro (Universidad Autónoma de Baja California).

The interview questionnaire was filled out by key informants and sent in via email, and additional information in some cases was provided face to face. The interview included the following general questions, as well as specific information on *promotora* program and intervention characteristics:

1. Which CHW/*promotora*-based chronic disease primary prevention programs are you aware of that work on the U.S.-Mexico border?
2. What is your opinion of CHW/*promotora* interventions and their effectiveness in preventing chronic disease?
3. What elements contribute to the success of CHW/*promotora* interventions?
4. What are the disadvantages of CHW/*promotora* interventions?
5. What is the most effective way to measure the impact and success of CHW/*promotora* interventions?

Key Informants Mexico

As described above, CHWs—whether paid or volunteer, as *promotores de salud* or *auxiliares de salud*—are part of the national health system. They are also present in non-government organizations which carry out chronic disease prevention and within the educational system.

Effectiveness of Programs

Within the Secretaría de Salud, community diabetes prevention is basically carried out in Centros de Salud (primarily in urban areas) and Clínicas de Sector (primarily in rural areas). Primary prevention is mostly carried out in clinic waiting rooms. All clients are approached by clinic staff (not necessarily a *promotora*), who take about 5 minutes to read a handout containing very basic information on chronic disease prevention (which clients get to keep) and are asked if they have questions. *Promotoras* also carry out this activity in *colonias* and schools when invited by a *colonia* committee or school official. The information provided does not

include methodology for the acquisition of skills resulting in long-term lifestyle change. For example, patients are told what not to eat, but are often not given healthy options. Family support is also an issue, since information is provided on an individual level. Diabetes prevention is mainly carried out in self-help groups with people who have already been diagnosed. Self-help groups are led by a doctor, nurse, or social worker, with health promotion staff participating by request. Again, the information provided is basic and does not include participative methodology which promotes lifestyle changes, nor does it involve the entire family and community in providing the foundation which makes permanent lifestyle change possible. Because it is conducted in the health centers it reaches a population that already has health problems and is not primary prevention-oriented.

Critical Elements of Success

Our key informant interviews also identified chronic disease primary prevention efforts being carried out by NGOs (such as Fronteras Unidas Pro Salud, in Tijuana) and universities (such as the Universidad Autónoma de Ciudad Juárez's Universidad Saludable program). In general, these interventions tend to be more empowerment oriented, that is, clients receive counseling and participate in activities that promote the adoption of healthy habits and promote community activities. These interventions are also more likely to be led by a client's peers.

In order for a *promotora* intervention to be successful, our key informants mentioned the need for adequate and permanent training: up-to-date information, methodology which stimulates creativity and the ability to adapt interventions to specific community and client needs, specialization in chronic disease prevention, and communication skills. They also mentioned a need for a spacious workspace dedicated to health promotion activities, where they can store materials and hold meetings and workshops. Effective *promotoras* must also have an altruistic ethic, be non-judgmental, be available to and trusted by the community, and above all, they must practice healthy eating and exercise habits.

Disadvantages

Among the issues which need to be addressed to make *promotora* interventions more effective, key informants identified the fact that many *promotoras* do not consider the individual situation of the client, the support of their family or the community infrastructure and social policies which affect their health. Interventions are not evaluated qualitatively or for impact, and it is difficult to improve them based on any kind of evidence. They normally do not reach the entire population or vulnerable groups who do not have access to health services. Finally, *promotoras* are usually very low in the health system hierarchy and are not involved in designing interventions.

Measurement of Impact and Success

Our key informants suggested that, in order to increase the evidence base for improving *promotora* interventions in Mexico, a comprehensive and permanent evaluation system would have to be implemented. Evaluation strategies should include not only the quantitative measures already implemented, but also participative and qualitative measures such as participative action-research/evaluation, qualitative client evaluations of all activities, observation of life-

style changes cross-referenced with health indicators, as well as forums where *promotoras* can carry out self-evaluation and provide feedback for policymakers.

Key Informants: U.S.

Key informant interviews in the U.S.-Mexico border region validate what is found in the literature identified in the scoping review. As shown in the literature, on the U.S. side of the border there are numerous mechanisms that are available to support *promotora* programs that focus on chronic disease on the border. Programs are found in community health centers, area health education centers, independent non-governmental organizations, and occasionally in health departments. Academic institutions also play an important role in supporting *promotora* programs. Among them are included the CDC-funded Prevention Centers at the University of Arizona and the University of San Diego. Additional programs are found at the University of Texas at El Paso and the University Texas at Houston's School of Public Health. While there is a variety of institutions along the border that serve as the home for *promotora* chronic disease prevention programs, the common financial support is from the U. S. federal government and not local or state-funded programs. On occasion, private foundations will support specific and small interventions at the local level.

Effectiveness of Programs

Referring again to the literature identified in the scoping review, there is some supporting evidence of the effectiveness of *promotora* programs in prevention of chronic disease (*Pasos Adelante* and *Su Corazón, Su Vida*) as well as secondary prevention programs in the U.S. border region. Key informants emphasized the important role *promotoras* play in creating ongoing support for people facing chronic disease and assisting them in accessing needed care in a timely way, but also practicing self-care. While this scoping review did not address secondary prevention, key informants mentioned the window of opportunity that exists for prevention with the entire family when one member of the family is diagnosed with diabetes. They further state the importance of their level of commitment to what they are doing, the independence and the flexibility of their roles in responding to ongoing challenges as they arise. When one looks specifically at the Arizona border, there is a long-term history that points to the importance of *promotoras* being able to connect community residents to health systems in ways that do not happen in communities where *promotora* programs are nonexistent.

Critical Elements of Success

Key informants indicate critical elements of success of *promotora* programs include the culture of the organization, the supervision of the program, and the skills and experience of the *promotoras* themselves. When an organization and supervisory staff are committed to community health and understand the strategic nature of the role of *promotoras*, they create a non-traditional environment of flexibility and independence that allows *promotoras* to engage and serve the community as pressing needs are presented. A skilled supervisor also understands the difference between a health educator and a *promotora* as well as the ability to provide a system for promotion which allows *promotoras* to grow personally and professionally.

When the programs are coordinated by supervisors inexperienced with *promotora* programs and only focused on meeting specific health outcomes, as required by funders, it is very difficult to provide the framework for independence and flexibility that are needed for this model to be effective. Very often program directors that practice traditional supervisory roles are skilled in the area of data collection and report preparation. Yet these same supervisors have difficulty working in an environment where *promotoras* require flexibility and independence to function effectively. Finally, the qualities and skills defined by the organization as needed to fulfill the role of a *promotora* are also critical to the success of the program.

Disadvantages

The only disadvantages of *promotora* interventions identified by the key informants include that they are labor-intensive for administrators; that they can often create more demand for services than are available as they attend to the needs they find in the community; and that the kind of documentation required by most funders does not capture the depth and breadth of the programs.

Measurement of Impact and Success

The most effective way to measure the impact and success of p*romotora* interventions according to key informants depends on what one wants to know. Health researchers in general are interested in health outcomes and health behavior and this can be very straightforward (blood pressure, cholesterol, glucose levels). But the success of *promotora* programs goes beyond simply documenting individual health outcomes and health behaviors and can focus on changes within the family, changes within medical protocol and clinical systems, changes at the systems level in the community, and the impact of programs on the *promotoras* themselves. In order to capture the total impact of these programs it is critical to utilize a socioecological model that examines all of these levels. For example, a *promotora* intervention may result in an individual improving his or her cholesterol levels and at the same time impact his or her family in terms of changing their nutritional habits. This same intervention may have resulted in changing clinic hours so that more people are able to access preventive care at the clinic. At the community level, this intervention may have lead to the mobilization of community members to seek and obtain resources to build a local walking path. Finally, this intervention may have increased dramatically the leadership skills and community development skills of the change agents themselves, i.e., the individual *promotoras*.

Discussion

As stated at the beginning of this report, the Mexico-U.S. border is a distinct region which embraces geographical, cultural, linguistic, and social elements which are unique to the region and distinctly different from both nations. The common issues such as persistent inequalities, acculturation, migration, changes in communities' social fabric and a lack of social security and health care access make the prevention and care of chronic disease on both sides of the border a major challenge, exacerbated by the convergence of two disparate health systems and the heterogeneity of border communities.

> It is a focal point for political and economic debates related to migration, commercial transactions (both legal and illegal), and economic development that come together in concerns about national and human security. It is a border that is at once highly fluid, yet tightly bounded, where policies and public opinion grapple with restricting some movements while facilitating others and reveal numerous inconsistencies. Its population is diverse, in terms of class, ethnicity, immigration history, legal status, generation, and gender. Some live in large cities, others in small towns or sparsely populated rural regions. The region symbolizes the encounter of asymmetrical but interrelated worlds and presents the challenges of addressing multifaceted inequalities and inequities (Monk et al. 2009, 799).

Thus, given the uniqueness of this region, it is important to examine the Community Health Worker model as a model for chronic disease prevention which understands and builds on the community context as the foundation for effective community prevention and community advocacy and determine the next steps for strengthening the model within the border region.

- The scoping review clearly shows the limited amount of information available regarding what programs are implemented at the border, how effective they are, how they are evaluated, and how they could be replicated at other sites.

- The U.S. literature is inadequate for understanding *promotora* models at a depth beyond individual health outcomes and behavioral changes.

- On the Mexican side, description of community health promotion and prevention of chronic disease is limited to description of national health promotion policy and programs (Acosta-Méndez et al. 2007; Santos-Burgoa et al. 2009). There is some literature describing *promotoras* ethnographically (e.g. Ramírez-Valles 1999, 2001 & 2003), but we could find no academic literature describing the impact of *promotora*-based chronic disease prevention interventions on basic health outcomes.

- With the exception of supplementary articles which focused on advocacy, policy, empowerment and frame alignment (Ingram et al. 2008; Meister et al. 2005; Booker et al. 1997; May and Contreras 2007; Ramírez-Valles 2003), the literature reviewed does not provide the information which associates this model with advocacy, community change and systems change, or empowerment at the individual and community level. The articles reviewed discuss individual outcomes but not as they relate to the acquisition of skills and abilities necessary to advocate for one's own health and/or the overall health of the community.

- The information generated by the key informant interviews, and to some extent by the academic literature on the U.S. side, leads us to believe there is a wealth of information not documented in peer-reviewed journals that supports the idea that these *promotora*-based primary prevention interventions provide the framework for impacting not just the individual level, but all the additional levels which are part of socioecological models: family, change agents, community and systems.

- The key informants also lead us to understand the critical elements of success. The primary element of success is inherent to the very definition of Community Health Workers/*promotoras* as community leaders who share the language, socioeconomic status and life experiences of the community members they serve. These characteristics of a CHW serve as the foundation that is required for this model to be effective. This foundation is based on building trust which comes from shared language, socioeconomic status and life experiences, and allows for building and strengthening the bridge between the health care system and the community.

- A second key element identified by U.S. literature is that on the U.S. side the discussions have gone beyond exploring the individual impact of *promotora* interventions to understanding additional elements which interact intrinsically with the individual level, particularly the organizational culture of the institutions *promotoras* work within and the programs in which they are embedded. This work has examined whether the organization/supervisory levels allow *promotoras* to fulfill their roles and carry out the activities that have a real impact in the community.

- The final critical element is sustainable, long-term funding at an institutional level, but any one of these critical elements in isolation will not be sufficient to have a real impact on the health of a community if other issues are not included, such as that of continued communication, the possibilities of bridging in the community, cultural and conceptual considerations and trust. The number one function is bridging, which is based on trust.

- There is a need for participatory evaluation that looks at the impact of the program at all levels (individual, family, change agents, community and systems change).

- *Pasos Adelante* and *Su Corazón, Su Vida* are the programs that the scoping review identifies as the most plausible starting point: using an intervention that on the U.S. side has demonstrated positive individual outcomes. We understand that we need to work on creating a foundation which validates the work of *promotoras* (as defined in this review), working to get the Secretaría de Salud to buy in to the *promotora* model by observing the culture of the organization and aligning it with what *promotoras* do, so that eventually—in the long-term—we can observe how this model impacts other levels: family, community and systems change.

In conclusion, this review and the resulting discussion points will be invaluable in terms of informing the implementation of the *Camino a la Salud* program. There is clearly an incredible opportunity for developing and implementing this adaption within Mexico in a systematic way and focusing on in-dividual outcomes. At the same time, we must build toward the broader level of changes in the family, change agents, the community and the health system. As partners, El Colegio de Sonora and the University of Arizona look forward to this opportunity to continue to build on our long history of binational and transborder collaboration and to contribute to new knowledge and action that will decrease the burden of chronic disease in the border region.

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Appendices

Appendix 1: Description of article searches

Appendix 2: Search results

Appendix 3: Articles reviewed

Appendix 4: Mortality rates in border states

Appendix 1: Description of literature search

Databases searched:

PubMed, Scielo, LILACS, CINAHL-EBSCO, ProQuest

Key words:

chronic disease OR noncommunicable disease OR enfermedades crónicas
AND
community health worker OR lay health worker OR promotor* OR auxiliar de salud
AND
Arizona OR New Mexico OR Texas OR California OR Baja California OR
Sonora OR Chihuahua OR Coahuila OR Nuevo León OR Tamaulipas OR
U.S.-Mexico OR U.S. Mexico border OR border

Total = 397

Excluded:
Duplicates
Articles published previous to 1980
Articles not specifically relevant to the border
Articles on cancer prevention and tobacco cessation

Total = 44

Article abstracts reviewed.
Excluded:
Articles on secondary prevention
Articles which did not describe the outcomes
of a specific intervention

Total = 7

Appendix 2: Literature search results

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Appendix 3: Articles reviewed

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Appendix 4: Mortality Rates in Mexican Border States*

	Baja California		Coahuila		Chihuahua		Nuevo León		Sonora		Tamaulipas		National	
1	Heart disease	78	Heart disease	102	Heart disease	112	Heart disease	97	Heart disease	112	Heart disease	96.5	Heart disease	86.9
2	Malignant tumors	57.9	Diabetes mellitus	87.4	Homicide	75.2	Malignant tumors	67.7	Malignant tumors	76.5	Diabetes mellitus	71	Diabetes mellitus	70.9
3	Diabetes mellitus	51.6	Malignant tumors	68	Malignant tumors	70	Diabetes mellitus	64.3	Diabetes mellitus	62	Malignant tumors	68.3	Malignant tumors	62.9
4	Accidents	38.2	Accidents	32.6	Diabetes mellitus	68.3	Cerebrovascular diseases	28.1	Accidents	42.3	Accidents	32	Accidents	36.4
5	Homicides	32.6	Cerebrovascular diseases	29.7	Accidents	55	Accidents	25.9	Cerebrovascular diseases	28.5	Cerebrovascular diseases	26.8	Liver diseases	29.6
6	Cerebrovascular disease	26.9	Liver diseases	21.3	Cerebrovascular diseases	26.7	Liver diseases	20.3	Liver diseases	17.6	Liver diseases	20.6	Cerebrovascular diseases	28.4
7	Liver disease	20.7	Chronic obstructive pulmonary disease	12.7	Liver diseases	23.8	Pneumonia and influenza	15.8	Homicides	16.4	Conditions originating in the prenatal period	14.1	Chronic obstructive pulmonary diseases	15.5
8	Conditions originating in the prenatal period	12.4	Pneumonia and influenza	10.5	Chronic obstructive pulmonary diseases	16.5	Chronic obstructive pulmonary diseases	14.1	Chronic obstructive pulmonary diseases	16	Chronic obstructive pulmonary diseases	13	Conditions originating in the prenatal period	13.8
9	Pneumonia and influenza	10.7	Renal failure	10.5	Conditions originating in the prenatal period	16.3	Conditions originating in the prenatal period	9.81	Pneumonia and influenza	13.8	Renal failure	9.45	Homicides	13.1
10	Chronic obstructive pulmonary disease	9.09	Homicides	7.57	Pneumonia and influenza	14.1	Renal failure	7.31	Conditions originating in the prenatal period	12.9	Homicides	8.46	Pneumonia and influenza	12.6

Source: Sistema Nacional de Información en Salud

*Mortality rate per 100,000 inhabitants