

A. Cover Page

Title: ¡Mejoramiento a la Salud Comunitaria para niños de Milwaukee (CHIMC)-Tome Control-INMUNICE! (*Community Health Improvement for Milwaukee's Children (CHIMC): Take Control- IMMUNIZE!*)

Grant ID Number: Medical College of Wisconsin (ID 7453671)

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Abstract: Overall goal of this project is to increase immunization coverage for Hispanic/Latino children 4 years of age and younger, to reach the Healthy People 2020 goal of 90%. We propose to enhance community capacity to address health disparities and improve parents'/caregivers' knowledge about the safety and effectiveness of vaccines. Hispanic/Latinos are the fastest growing population in Milwaukee, according to U.S. Census data, representing 17% of the city's population. At 24 months of age, only 65% of Latino children are up-to-date with the 4 DTaP:3 IPV:1 MMR:3 Hib:3 HepB:1 VZV:4 pneumo antigen series. Utilizing a Community-Based Participatory Research (CBPR) approach, previously tested through the Community Health Improvement for Milwaukee's Children: Take Control IMMUNIZE (CHIMC-TCI!) project, we will incorporate a Knowledge-To-Action framework guided by CBPR principles to address immunization gaps. Culturally-relevant, web-based immunization platform will be adapted using an existing Toolkit and eLearning Café to benefit parents/caregivers and childcare providers. This multi-level approach will engage families, community members, childcare providers, and public health systems. Bilingual community members from targeted zip codes will be invited to become full partners to foster culturally-relevant, accessible immunization messages and educational material via the internet. Additionally, Milwaukee County's WIC Program and Children's Hospital of Wisconsin's Community Health Division will be vital partners to this Project. The evaluation will assess the effectiveness of community health assessments; beliefs and attitudes toward immunizations; immunization knowledge acquisition; and intentions to give age-appropriate immunizations. A dissemination plan for childcare providers serving this population will be an essential component to sustain immunization awareness.

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C. Reviewer Comments

- ***In the Full Proposal provide further details around findings from previous work.***

Since 2005, CHIMC has implemented Community-Based Participatory Research (CBPR) according to the Nine Principles of CBPR (see **Table 1, page 1**). Over the past decade, the CHIMC team conducted community health assessments, developed and customized community-focused interventions, and most recently conducted a dissemination plan specific to the African American community on the north side of Milwaukee. We have included further details around findings from previous work, specifically past accomplishments and outcomes in the Main Proposal section on **pages 7-11**. Additional accomplishments, specific to recruitment are outlined on **pages 3-5**. These past accomplishments serve as a model for our current project approach.

- ***Please provide a clearer description of what the project will entail in the program design and methods section of the Full Proposal. Also, be sure to include more detailed information on the Community Forward team Members (CFTs) collaboration.***

We have included a detailed description of the design and methods of the proposed *iMejoramiento a la Salud Comunitaria para niños de Milwaukee (CHIMC)-Tome Control- INMUNICE! (Community Health Improvement for Milwaukee's Children (CHIMC): Take Control- IMMUNIZE!)* project on **pages 6-7 and pages 12-13**. Additional details of the project may also be found in the narrative Workplan on **page 15** and the Workplan (in table format) thereafter. Finally, we have included more detailed information on the Community Forward Team Members (CFTs) throughout the Main Proposal section on **page 4, pages 6-8, and pages 12-14**.

- ***The outcome evaluation is unclear and needs to be much more explicit. How do you plan to measure the impact on knowledge of parents and caretakers? Clarify how the CBPR will affect change? How do you know this will increase knowledge?***

The CBPR approach is a necessary step in gaining health access to under-resourced communities (**pages 4-7**) and fostering acceptance of messaging. CBPR is central to ensuring that our intervention is culturally-relevant and responsive to the needs and priorities of the families in our target population (see **page 1** and **pages 6-8**). CBPR is also an “innovative strategy to reach underserved groups,” consistent with promising interventions for diverse ethnic communities.^{3,4,7} In our previous implementation of CHIMC-TCI!, the evaluation consisted of two types of measures: process and outcome (see **page 14**). For the *iCHIMC-TCI!* project, we will conduct statistical analyses to assess change in parents'/caregivers' knowledge using the pre-test as a baseline for comparison. **Table 3** on **page 9** and **Table 4** on **pages 10-11** illustrate previous results wherein change in parents'/caregivers' knowledge, attitudes, and beliefs were statistically significant (i.e. due to the CHIMC intervention rather than chance). We will also measure baseline Up-To-Date (UTD) immunization status against post-intervention UTD immunization status, utilizing appropriate statistical tests and analyses to determine whether the change in UTD immunization status is attributable to the CHIMC intervention (see Evaluation Design on **pages 14-15**).

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1. Overall Goal & Objectives:

The overall goal of the *¡Mejoramiento a la Salud Comunitaria para niños de Milwaukee (CHIMC-TCI!)-Tome Control-INMUNICE! (Community Health Improvement for Milwaukee's Children (CHIMC-TCI!): Take Control-IMMUNIZE!)* project is to address childhood immunization disparities in Hispanic/Latino children by using a web-based platform to promote knowledge exchange between parents/caregivers, academic researchers, and childcare providers. The goal of this project is aligned with the Pfizer Foundation's request for proposal (RFP) by addressing patient access to care and potentially having a significant impact on improved patient care and immunization outcomes. This proposal also supports the Medical College of Wisconsin's mission to be a national leader in the education and development of the next generation of physicians and scientists; to discover and translate new knowledge in the biomedical sciences; to provide cutting-edge, interdisciplinary and compassionate clinical care of the highest quality; and to improve the health of the communities we serve. The proposed project will examine the implementation of an education and community partnership project with researchers and community members that builds upon community strengths, and translates innovative, culturally-customized methods into health improvement.¹ Since 2005, CHIMC-TCI! has an established track record with the development of an infrastructure in partnership with various sectors of the community. Over the last decade, after conducting community health assessments, we developed and customized multi-level, community-focused interventions, and most recently conducted a dissemination plan specific to the African American community on the north side of Milwaukee. CHIMC-TCI! has set a precedent of training and engaging the Community Forward Team members to participate in all phases of the research processes: conceptual design, planning, implementation, evaluation, data collection and interpretation and dissemination of findings. Since community members living on the south side of Milwaukee face similar immunization disparities, it is critical to utilize and adapt effective tools to other low-income populations; specifically Hispanic/Latino children and families. The project will expand the Community Forward Team structure to include bilingual parents/caregivers over the first half of Year 1 to train and enhance awareness of the nine principles of Community-Based Participatory Research (CBPR). Those principles are summarized in **Table 1**.

Recognize community as a unit	Build on community strengths	Facilitate collaborative equitable partnership... <i>power-sharing</i>
Foster co-learning and capacity building	Balance knowledge generation with actions	Focus on local relevant public health problems
Build a cyclic and iterative process	Disseminate findings to all partners	Involve long-term process and sustainability

The following objectives will be addressed in this project:

Objective 1: Using a Community-Based Participatory Research (CBPR) approach, build community capacity by addressing health disparities for Hispanic/Latino populations to reach the Healthy People 2020 immunization goal.

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Objective 2: By December 31, 2017, increase parents'/caregivers' knowledge about the safety and effectiveness of childhood immunizations using a web-based, culturally-relevant CHIMC-TCI! Toolkit and eLearning Café.

Objective 3: By June 30, 2017, demonstrate the effectiveness of the CHIMC-TCI! Toolkit and eLearning Café for Hispanic/Latino children (19-35 months) in zip codes 53204 and 53215 indicated by a 25% increase in the 4:3:1:3:3:1:4 antigen series.

2. Current Assessment of need in target area (“what is versus what should be”)

Vaccinating infants and children is a key *health-protective behavior* and helps reduce the burden of debilitating diseases such as measles, rubella, tetanus, and polio, among others. Vaccination programs protect children’s health, and the health of the broader community, while reducing the costly effects of preventable diseases. Experts have documented immunization disparities by socio-demographic characteristics among children age 19-35 months in the United States.^{3,4} Public participation in vaccination programs has ebbed and flowed over several decades, due to conflicting messages about the safety and effectiveness of immunizations, misperception and beliefs about vaccines, cultural and linguistic isolation, and due to low levels of knowledge and exposure to vaccine preventable diseases. Healthy People 2020 has set forth an immunization coverage goal of 90% for the 4 DTaP:3 IPV:1 MMR:3 Hib:3 HepB:1 VZV:4 pneumo (4:3:1:3:3:1:4) antigen series. According to the Wisconsin Department of Health Services, Latino children, ages 19-35 months, that reside in zip codes 53204 and 53215, had an immunization rate of only 60.5% (53204) and 63.7% (53215) for the 4:3:1:3:3:1:4 antigen series in the year 2013. In 2014, Latino children ages 19-35 months had an immunization rate of 69% (53204) and 72% (53215) for the same antigen series (**Table 2**).

Table 2. Children with Up-To-Date (UTD) Immunization Status by Geographic Area (Healthy People 2020 Goal for the 4:3:1:3:3:1:4 antigen series for 19-35 months is 90%) ⁵				
	2013		2014	
	All	Latino	All	Latino
United States	73%	72%	72%	74%
Wisconsin	71%	70%	71%	71%
Milwaukee	60%	64%	62%	69%
53204	65%	64%	68%	72%
53215	59%	61%	63%	69%

Source: Centers for Disease Control and Prevention and Wisconsin Department of Health Services⁶

While Latino children’s immunization coverage was not disproportionately lower than all other children in zip codes 53204 and 53215, their coverage rates **remain substantially lower than the Healthy People 2020 goal of 90 percent**. There remains a gap in reaching the Healthy People 2020 immunization coverage goal in the south Milwaukee population of low-income, Latino children. Through analyzing a subgroup of low-income children enrolled at one of three WIC sites in zip codes 53204 and 53215, we found that more than 90% of children at the WIC sites in south Milwaukee have health insurance, yet the immunization rates in the 53204 and 53215 communities are not approaching 90 percent. **A preliminary examination of this target area does not suggest that vaccination coverage is tempered by health insurance**

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coverage. This observation not only suggests that health insurance coverage is not a strong determinant of immunization compliance in this area, but also suggests that there are **additional barriers** that need to be explicated within this target population. These vaccination trends reveal a unique opportunity to implement a community-partnered intervention focused on improving parents'/caregivers' knowledge about the safety and effectiveness of vaccines and building community capacity to address this health disparity.

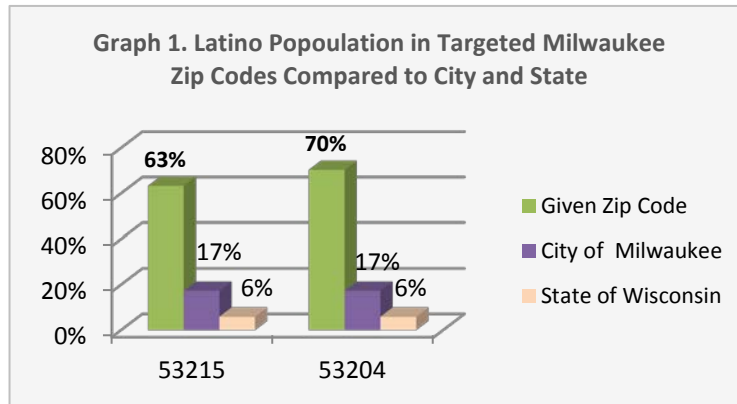
Preliminary data from three new proposed CHIMC-TCI! Partners: (Southside, Seeds of Health, and Sixteenth Street Community Health Center point to possible *individual* and *structural barriers* such as lack of resources, transportation, mother's level of education, and linguistic challenges, etc.^{7,8} However, we do not know the extent of these barriers and additional barriers may exist such as limited awareness of the safety and effectiveness of vaccines or attitudes of parents toward immunization practices, as we found in the CHIMC-TCI! project. Language preference is an important factor for transmitting health information with considerably larger disparities recognized for Spanish-preferring than English-preferring Hispanics. Additional analysis and direct feedback from Latino families in south Milwaukee is an important step in understanding the unique barriers to immunization compliance in this subpopulation. Rapid growth and mobility of the Latino/Hispanic subpopulations in the United States and the fact that immunization saves lives emphasizes the need to identify barriers to immunizations and to implement targeted strategies and interventions to address immunization disparities.

3. Target Audience with Plan for Recruitment and Scope of Impact:

Scope of Target Audience – Potential to Impact Goal

Based on the demographic composition of the 53204 and 53215 zip codes, **Latino families and children in south Milwaukee are an ideal target population to achieve our project goal.** According to 2013 American Community Survey (ACS) population estimates, there are 47,457 children under the age of five in the City of Milwaukee.⁹ Roughly half of those children (21,727) reside in the 10 existing CHIMC-TCI! zip codes. That is, children under the age of five account for approximately 46% of residents in north Milwaukee. Meanwhile, 2013 ACS population estimates indicate that there are 10,496 children under the age of five in zip codes 53204 and 53215 (south Milwaukee). Children and young adults constitute a much larger proportion of the population in south Milwaukee. For example, in north Milwaukee the mean number of children per zip code is 2,173, compared to an average of 5,248 children per zip code in south Milwaukee. In the current CHIMC-TCI! implementation areas, Latino residents comprise only 4.5% of the population. **In sharp contrast, there is a high concentration of Latino residents in zip codes 53204 and 53215, with Latinos accounting for 70% and 63% of the population, respectively.** In comparison, among the other 26 zip codes of inner-city Milwaukee, the proportion of Latino residents ranges from 5-20%. Subsequently, we have defined our target audience as Latino children and families living in zip codes 53204 and 53215 of Milwaukee, Wisconsin. These two zip codes were selected because they have the highest concentration of Latino residents in both the City of Milwaukee and in the State of Wisconsin, and constitute a prime location to partner with residents to implement a culturally-focused CHIMC-TCI! project (**Graph 1**).

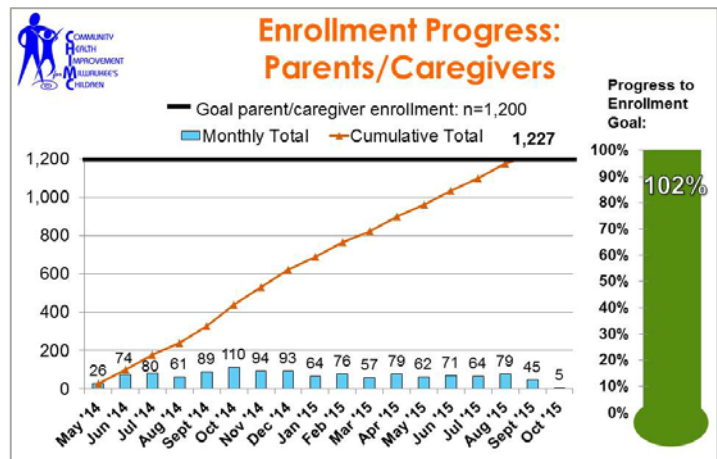
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Zip codes 53204 and 53215 provide an optimal target audience for the CHIMC-TCI! project not only due to the high population density of Latino residents, but also due to the proportion of Spanish-speaking residents in the area. According to enrollment data from the Southside, Seeds of Health and Sixteenth Street Community Health Center (WIC centers serving low-income residents in 53204 and 53215), 19%, 31% and 37% of enrolled individuals exclusively speak Spanish and need an interpreter if bilingual staff are not available. These data reinforce our approach to implement CHIMC-TCI! in the Spanish language, to recruit Latino community residents to serve as Community Forward Team (CFT) members, and to build community capacity in south Milwaukee to address health disparities. Spanish-speaking CFTs will add value to this project by advising in the development of the web-based Toolkit for parents/caregivers as well as the eLearning Café modules, and by directly interfacing with the institutional partners and CHIMC-TCI! staff in the target area.

Plan for Recruitment

The existing CHIMC-TCI! recruitment model consists of outreach staff and *Community Forward Team* (CFT) members canvassing local community organizations serving children and families for participants. These teams consented participants into the CHIMC-TCI! program, resulting in steady recruitment gains and high retention among CHIMC-TCI! enrolled participants. Partnering with CFTs is



consistent with the principles of CBPR and lends to **effective recruitment and retention results**. In fact, CHIMC-TCI! has recruited a total of 1,227 parents/caregivers, exceeding its original goal of 1,200 parents/caregivers (**Graph 2**). The 1,227 member cohort was 83% African American, 91% female, with a mean age of 28.9 years and median age of 27 years. Thirty-eight percent of parents/caregivers had completed some college or graduated college; meanwhile 46% of children lived in households with less than \$15,000 annually. Hispanic/Latino caregivers only represented 1% of the initial cohort.

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Building upon the existing CHIMC-TCI! recruitment model, we will set up weekly *recruitment stations* at three WIC centers in the 53204 and 53215 zip codes. These in-person recruitment efforts will be enhanced by “walking billboards” (t-shirts, backpacks, and other branded program insignia) that drive home the CHIMC-TCI! name and logo to reinforce our message. Recruitment efforts will be further supported by the CFT members who help to bolster participants’ enrollment. **Community Forward Team members are full and active partners in the CHIMC-TCI! project as volunteers from the target communities.** They already known to people within the community as someone that they can trust because they live, work, play, and worship directly in the community, CFTs enhance CHIMC-TCI!’s *credibility* among community members in our targeted geographic areas. The CFT comprises a unique element of the CHIMC-TCI! model that amplifies the reach and penetration of our research activities and promotes community capacity to address its own health disparities.

In addition to individual partners, CHIMC-TCI! works with institutions and community-based organizations to solidify our community presence. CHIMC-TCI! has strong relationships in north Milwaukee and parts of south Milwaukee, including partnerships with Children’s Hospital of Wisconsin, the City of Milwaukee Health Department, Wisconsin Department of Health Services - Wisconsin Immunization Registry (WIR), Milwaukee County Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Program, United Neighborhood Centers of Milwaukee (UNCOM), Milwaukee Area Health Education Center, Neighborhood House of Milwaukee, Hillside Family Center, and Aurora Family Services. Our existing partners, specifically the City of Milwaukee Health Department, will promote expansion into new sites integrated in our target zip codes: Sixteenth Street Community Health Center, Seeds of Health Community Health Center, and Southside Community Health Center. *These expanded partnerships will better position us to gain access to the targeted community of south Milwaukee and engender trust as we build relationships to recruit and enroll new Latino ¡CHIMC-TCI! participants.*

During the planning phases of this proposed project, our **existing CHIMC-TCI! partners assisted with feasibility, data collection, and other valuable feedback that informed this expansion.** Individual and institutional stakeholders have been involved in each step of this proposal’s development indicating a strong commitment and levels of engagement to the development of this new proposal for another subpopulation. We will continue to leverage these existing relationships to recruit and enroll Latino/Hispanic parents/caregivers and their children as *¡CHIMC-TCI!* participants from 53204 and 53215 zip codes.

Project Beneficiaries

Beyond the primary target population of enrolled parents/caregivers and children, we anticipate that the *¡CHIMC-TCI!* project will also benefit neighboring community residents, childcare center patrons, and a diverse assortment of clients who interface with the community-based organizations (CBOs) in our target area. In our experience with implementation of the third phase of the CHIMC-TCI! project—the English-only CHIMC-TCI!-Take Control: Immunize! (TCI!)—we discovered that our message generated significant audience impressions in the ten zip code project area in north Milwaukee. We anticipate similar community penetration with the *¡Mejoramiento a la Salud Comunitaria para niños de Milwaukee (CHIMC-TCI!)-Tome Control-INMUNICE! (Community Health Improvement for*

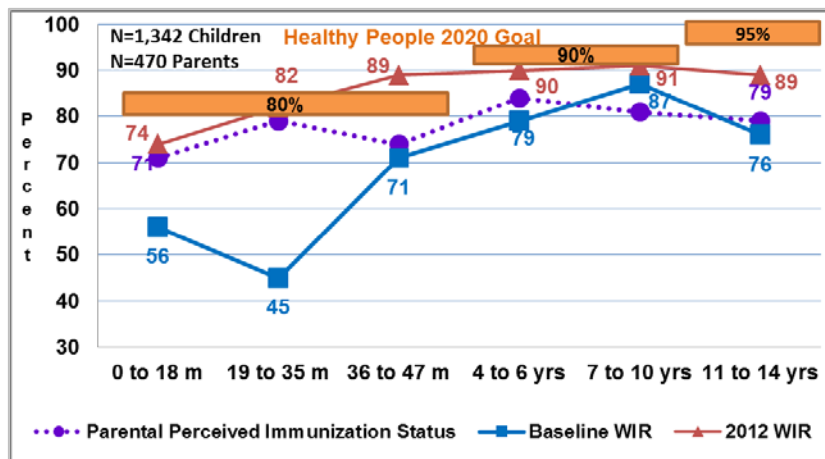
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Milwaukee’s Children (CHIMC-TCI!): Take Control-IMMUNIZE! project tailored for south Milwaukee’s Latino community. This “spillover” effect is due to the nature of implementing CBPR, which engages both institutional and individual stakeholders, maximizes community volunteers, and executes strong dissemination efforts. WIC Centers and childcare agencies in south Milwaukee, for example, are institutions that are key entry points for the at-risk families that we are targeting. Because WIC centers and childcare agencies are institutions that are already *fully integrated* into the community, they serve a dual purpose as an established, trusted entry point, and a relatively permanent fixture for sustained messaging and continual knowledge exchange beyond the funding period.

Model for Replication or Expansion

The **iCHIMC-TCI!** project is a feasible model to be replicated for adaptation in other communities, particularly other African American, low-income communities. Through this RFP, we seek to demonstrate the efficacy of the **iCHIMC-TCI!** model to enhance community capacity among Latino and Spanish-speaking Milwaukee residents to address their own health disparities. Using the Knowledge-To-Action framework, and on-the-ground methods such as co-learning, social marketing, and the *Community Forward Team (CFT)*, we anticipate seeing an increase in vaccination coverage in the Latino population in Milwaukee zip codes 53204 and 53215 to approach the 90% coverage goal outlined in Healthy People 2020. Our basis for this project aim is rooted in the health improvements we were able to generate within the ten (10) zip code project area of CHIMC-TCI! since the project began in 2005. During the CHIMC-TCI! implementation, our intervention was associated with an increase in immunization rates among CHIMC-TCI! enrolled participants in 19-35 month old toddlers from 45% at baseline to 82%, which was above the Healthy People 2020 goal of 80% at that time (**Graph 3**).¹⁰

Graph 3.
Proportion of Children Up-To-Date by Age Groups, Whose Parents/Caregivers Completed The Education Intervention



We now seek to produce similar results in the Latino community, specifically in a highly dense area where Latinos/Hispanics reside, south side Milwaukee, by engaging in knowledge exchange with Latino community members in 53204 and 53215, partnering with community agencies in those target areas, and adapting a web-based Toolkit and eLearning modules in the Spanish language with culturally-relevant delivery methods. Through building capacity within the community to be hands-on with instrument development, data collection, intervention delivery, data analysis and interpretation, and dissemination, we are maximizing the power of

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social capital and social marketing to strengthen the penetration of the *iCHIMC-TCI!* message. The multi-level, “blanketing” nature of the CHIMC-TCI! model is hallmark to the CBPR approach, and lends to CHIMC-TCI!’s staying power as well as its ability to *engender lasting change that is owned and initiated by community members*.

We believe that CHIMC-TCI! is a feasible model that can be replicated in many other communities outside of Milwaukee, regardless of the zip code. Currently, we are seeking support from the Pfizer Foundation to *validate the efficacy of this model for another at-risk population*: Latino families and children, as compared to African American families and children. The initial CHIMC-TCI! implementation protocol and educational materials were documented with rigor such that other sites can implement the model with fidelity. Not only is replicability embedded within the CHIMC-TCI! model, but also sustainability. The CHIMC-TCI! Immunization Toolkit and eLearning platforms remain as an online resource for parents/caregivers, childcare centers, and community agencies.

4. **Project Design and Methods: Expansion of CHIMC-TCI!**

Funded in 2005 by the National Institute on Minority Health and Health Disparities (NIMHD), Community Health Improvement for Milwaukee’s Children (CHIMC-TCI!) originated as a collaboration between community partners and academic researchers using the Community-Based Participatory Research (CBPR) approach among Milwaukee’s underserved African American population. As part of NIMHD’s commitment to foster sustainable efforts to eliminate health disparities, CHIMC-TCI! was awarded funds in 2005, 2008-2013, and 2013-2016 to conduct a community assessment, implement interventions to address health disparities, and disseminate findings, respectively.

Past Accomplishments:

PHASE I of the CHIMC-TCI! Project addressed building an infrastructure to conduct community assessment for health-related disparities; consensus building around CBPR principles; and implementation of a pilot study to focus on a specific health disparity. CHIMC-TCI! selected childhood immunization disparities starting in two local zip codes. The CHIMC-TCI! team conducted a community health assessment and identified immunization disparities as a concern for Milwaukee’s children. The targeted audience was predominately African American, low-income families on the north side of Milwaukee.¹¹ **Phase II of the CHIMC-TCI!** Project positioned the partnership to expand its interventions focused on immunization compliance to additional four zip codes. The partnership designed and developed interventions that utilized behavioral change models (education, social marketing, and theory of planned behavior) while following the community-based participatory approach. In addition, it also followed a strategic and tactical framework of Knowledge-to-Action. The operational structure consisted of a steering committee co-chaired by academic and a Community Forward Team (CFT) member, and two to four workgroups with similar leadership teams. The CFT consists of 12 to 18 community volunteers who work an average of 16 hours/month. They met regularly to debrief after the Steering Committee meetings in support of CHIMC-TCI! efforts and to mobilize additional community voices to speak to their perspective on immunizations. Interventions were customized to be culturally-relevant to the population. Participation of community volunteers and CFT members have enhanced CHIMC-TCI!’s recruitment, retention,

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implementation, evaluation and dissemination products. This current proposal aims to build upon the framework developed in a predominately African American community to offer similar tools and interventions to an underserved Hispanic/Latino population of children and families. Recognizing that Hispanic/Latino families are located on the south side of Milwaukee, we will target zip codes 53204 and 53215, where 68-70% of residents are of Hispanic/Latino descent. We will customize existing tools for this new population with input from community residents and extend invitations to Hispanic/Latino parents/caregivers to join the CFT and the CHIMC-TCI! Team in the development of the culturally-relevant tools that have demonstrated effectiveness in closing the gaps in immunization disparities for these families.

During Phase II, CHIMC-TCI! recruited 565 parents/caregivers and 1,533 children. The demographics of the population were approximately 90% females, 92% African American, 63.5% unemployed, and a median age of mothers being 30 years. The retention rates for the study ranged from 60% to 87% for different components of the study. Only 11% of the population was college graduates and 82% had access to internet via cellular phones. Primarily, mothers (~82%) made the immunization decisions in the households and a health care professional was a vital source for immunization information. Typically, parents' perceptions were that their children were up-to-date with their immunizations. Consistently, ***parents/caregivers perceived their child(ren) to have a higher immunization status than the actual immunization status documented in Wisconsin Immunization Registry (WIR)***. In fact, children ≤ 4 years of age had the greatest disparities from the HP2020 goals and from parents'/caregivers' perceptions of immunization status. Upon enrollment, parents/caregivers were offered individual (80%) or small group (20%) educational sessions on immunizations, which were conducted by CHIMC-TCI! outreach staff. With 83% of enrollees completing the educational sessions that covered the recommended childhood immunization schedules, their pre-/post-knowledge revealed significant positive changes ($p < .001$) between pre-/post-assessments. Children's immunization status was monitored quarterly after enrollment into the study.

*Social Marketing Campaign*¹²: Community and academic partners co-designed the social marketing message "*Take Control-Protect your Child with Immunizations*" and collaborated with Children's Community Health Plan of the Children's Hospital and Health System to distribute this message via billboards. In addition, branded outreach materials such as magnets, t-shirts, backpacks, pencils, hand sanitizers, etc., were distributed throughout the community. Cross-system collaboration to design messages increased the capacity to distribute culturally-relevant messages at the community level. Community penetration of the "*Take Control-Protect your Child with Immunizations*" message was evidenced by an 85% recognition rate amongst a random cohort of persons participating in intercept interviews. Interviewees were not enrolled in the CHIMC-TCI! study at the time of the interview. Therefore, social marketing messages proved to be an effective way to increase exposure to relevant, positive immunization messages. *Theory of Planned Behavior Change*: Small groups of 8-12 parent-/caregiver-child pairs consented to participate in identifying and addressing barriers and facilitators of immunization completion for children ≤ 4 years of age. Sessions were developed to build specific skills, knowledge through observational learning, modeling, mastery, social support, networking and planned actions. The sessions consisted of: orientation, health care system navigation, communicating with health care providers,

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assessing immunization records through WIR, social networking, action planning for immunization completion and a wrap-up. Skills that parents/caregivers are expected to master include: recognition of barriers and facilitators to immunization completion, how to address discrepancies between perceptions and documented immunization status, Internet access and utilization of WIR records, self-advocacy and negotiation skills to use in the health care system, and leveraging social support and deliberate planning to accomplish their goals. *Barriers* of immunizations were identified as situational, personal, and attributes, which include attitudes of hospital personnel; lack of resources such as limited awareness of the safety and effectiveness of vaccines, health insurance, and transportation; and attitudes of parents. Similarly, *facilitators* of immunizations were categorized as barriers to include having a good relationship with healthcare providers; parents'/caregivers' self-efficacy; and knowledge of healthcare resources. ***CHIMC-TCI! findings have been disseminated in local newspapers and newsletters, continuing medical education (CME) forums, on local radio and television programming, a book chapter, and in professional peer-reviewed journals.***

Re-assessment: CHIMC-TCI! participants (103) revealed that there were significant differences in responses to ***attitudes and beliefs about immunizations*** when comparing responses between enrollment and reassessment for six of the 110 questions (**Table 3**).

Table 3. Assessment Survey Questions	Enrollment Response	Reassessment Response	P values
I need to know about health issues so I can keep myself and my family healthy	84%	90%	0.029
I find good answers to my health questions	21%	36%	0.012
I make a point to read and watch stories about health	61%	78%	0.008
It is important to me that my child's other parent and I agree when making decisions about vaccinating our child	79%	75%	0.003
I have religious objections to immunizations	25%	13%	0.032
How important do you think immunizations are to the health of children	85%	95%	0.013

Note: p value <0.05 is considered statistically significant.

After the interventions in August 2012, the Wisconsin Immunization Registry documented that immunization up-to-date status for all children enrolled in the CHIMC-TCI! study (except for those aged birth to 18 months) **was not significantly different from Healthy People 2020 immunization goals**, demonstrating a positive influence on immunization status for children enrolled in the CHIMC-TCI! study. In fact, **immunization rates were increased by approximately 82% for children ages 19-35 months, over the four-year time period of the study.**

Phase III Dissemination:

The CHIMC-TCI! Team learned much from the interactions of academic and community members in a mutually accountable research/intervention model. Another grant was awarded to expand this process to benefit a larger population of children and families in Milwaukee encompassing a total of 10 north side zip codes. The Team continued to work with the CBPR principles and included 5 settlement house community-based organizations and 5 WIC sites.

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The geographic expansion currently includes 10 northside central city zip codes (53203, 53205, 53206, 53208, 53209, 53210, 53212, 53216, 53218, 53233). Currently, CHIMC-TCI! is engaging institutions and individuals (e.g., childcare agencies and community residents) in the dissemination of results through newsletters, radio and television messaging, and face-to-face interaction. In addition, ***the CHIMC-TCI! online Toolkit and eLearning platforms continue to provide education about the safety and effectiveness of immunizations.*** The CHIMC-TCI! Online Toolkit and eLearning platforms are key components of the dissemination phase, and have served as a resource for parents in our target population. The CHIMC team recruited 479 parents/caregivers (with unique usernames and passwords) to complete our eLearning sequence. The 479-member eLearning cohort is in many ways similar to the overall CHIMC-TCI! parent/caregiver cohort. CHIMC eLearning Café enrollees were 82.7% African American, 95% female, with a mean age of 29.8 years and median age of 28 years. Nearly 39% of parents/caregivers who finished eLearning had completed some college or graduated college. Hispanic/Latino caregivers represented less than 2.5% of the eLearning cohort.

Knowledge was measured using 15 true/false questions asked both during the pre- and post-test. McNemar’s paired test was used to compare the participant’s pre- and post-responses. After the CHIMC-TCI! web-based intervention, there were statistically significant improvements in 12 out of 15 survey questions. Preliminary data suggest that the CHIMC-TCI! eLearning Café is effective in increasing knowledge about the safety and effectiveness of immunizations. Significant improvements were seen in several questions, including but not limited to topics related to: herd immunity (19.2% correct pre-test and 51.25 correct post-test); that immunizations are not associated with autism (44.6% correct pre-test and 70.6% correct post-test); the need for appropriate intervals between doses (48.4% correct pre-test and 70.6% correct post-test); and other pre/post items listed in **Table 4** below. High pre-knowledge (characterized as over 80% of participants with correct responses) with no significant change was seen in questions related to: the Wisconsin Immunization Registry’s (WIR) provision of immunization records and tetanus or Tdap booster awareness. **Table 4** below illustrates parents’/caregivers’ change in immunization knowledge after completing the CHIMC-TCI! eLearning Café.

	Table 4: CHIMC-TCI! eLearning Pre-Post Knowledge Exchange	% Correct Responses (Pre)	% Correct Responses (Post)	P Value
1.	How Immunizations Work (n=296)	91.9%	95.6%	=.824*
2.	Herd Immunity (n=295)	18.6%	51.2%	≤0.001
3.	Getting immunized does not give disease (n=292)	41.4%	65.4%	≤0.001
4.	Safety of Receiving Multiple Immunizations (n=292)	28.7%	71.9%	≤.001
5.	WIR provide Immunization Record access (n=292)	90.4%	97.6%	≤0.001
6.	No vaccine for common cold (n=280)	44.2%	63.6%	=0.023
7.	Giving Hepatitis B Vaccine to Newborns (n=269)	84.9%	89.5%	=0.005
8.	Seasonal flu immunization (n=275)	71.1%	90.1%	≤0.001
9.	Purpose of MMR Vaccine (n=273)	71.1%	95.2%	≤0.001
10.	Purpose of Pneumococcal Vaccine (n=272)	39.3%	68.0%	≤0.001
11.	Immunizations not associated with autism (n=272)	44.9%	70.6%	≤0.001

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	Table 4: CHIMC-TCI! eLearning Pre-Post Knowledge Exchange	% Correct Responses (Pre)	% Correct Responses (Post)	P Value
12.	Need for appropriate intervals between doses (n=82)	48.8%	85.4%	≤0.001
13.	Aware of catch up schedule (n=82)	89.0%	90.2%	=.070*
14.	Role of HPV Vaccine in Preventing Cancer (n=110)	49.15	76.4%	≤0.001
15.	Aware of tetanus or Tdap booster (n=109)	80.7%	95.4%	≤0.001

* Not Statistically Significant. P value <0.05 is considered statistically significant.

CHIMC-TCI! parents/caregivers who completed the eLearning Café revealed an incremental change in immunization Up-To-Date (UTD) status. **Preliminary CHIMC-TCI! immunization outcome data shows that 67.2% of post-eLearning Café children (19-35 months) are UTD, compared to 62% of children in the City of Milwaukee.** In addition to measuring change (increase) in parents'/caregivers' post-eLearning knowledge, we also assessed parents'/caregivers' satisfaction with the eLearning Café platform. As shown in **Table 5**, the majority of parents (over 85%) were satisfied with the eLearning Café platform .

Table 5. CHIMC-TCI! Parents'/Caregivers' Satisfaction Rating for eLearning Café (Strongly Agree & Agree)	
Easy to Use	94.7%
Has Interactive Components	93.9%
Has Attractive Features That Appeal to Me	86.3%
Provides Information That Is Easy to Understand	92.4%
Provides Enough Information About Immunizations	94.4%
Provides Information That Is Relevant To My Child's Immunizations	91.6%
Provides Information That is Exactly What I Need	93.2%

During Phase III (dissemination), the CHIMC-TCI! team is also surveying child care agencies in north Milwaukee (registered on Young Star) to assess current immunization practices and determine whether trends in immunization compliance policies exist. Of the 93 child care agencies that the CHIMC-TCI! team has surveyed to date, 25.0% indicate that checking Up-To-Date (UTD) immunization status is a quarterly activity, 12.0% reported checking UTD status bi-monthly, and 23.9% indicated that checking UTD status is a monthly activity. Among child care agencies contacted, there was high interest (over 55% of responding child care agencies) in receiving the CHIMC-TCI! Toolkit, parent immunization checklist, and technical assistance in utilizing the Wisconsin Immunization Registry (WIR). Over the next months, the project team aims to complete surveys with another 150 eligible child care agencies. This key component of the dissemination phase will support sustained knowledge exchange of the CHIMC-TCI! project using an institutional point of entry.

Approach

Knowledge-to-Action (KTA) is a dynamic, iterative, and complex process concerning both knowledge creation and application with fluid boundaries between creation and action components. Knowledge creation consists of three components: inquiry, synthesis, and tools/product creation that is tailored to be more useful to the end users.^{13,14} KTA focuses on

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individuals and systems characteristics that contribute to successful change. KTA highlights the importance of adapting evidence to local contexts, which is one phase of the action cycle. Currently, Community Forward Team (CFT) members are persons from the past 10 targeted zip codes that have been engaged with CHIMC-TCI! since its inception. They have been vital members of the research team and actively involved in sharing invaluable knowledge about the community to researchers as they co-design the assessment tools, interventions such as customizing the eLearning Café, interpretation of findings, and dissemination inclusive of local media and peer-reviewed journals. **We propose to continue the CFT contribution in this expansion of CHIMC-TCI! to the 53204 and 53215 zip codes by inviting 4 bilingual CFT members to join the existing CFT.** We plan to establish mentee-mentor pairs within this expanded group to ensure that the new members are readily welcome into the CFT family.

Objective 1: Using a Community-Based Participatory Research (CBPR) approach, build community capacity by training four (4) bilingual CFT members to join the existing CFTs

Training and Community Capacity Building

To begin the ***¡Mejoramiento a la Salud Comunitaria para niños de Milwaukee (CHIMC-TCI!)-Tome Control-INMUNICE! (Community Health Improvement for Milwaukee's Children (CHIMC-TCI!): Take Control- IMMUNIZE!)*** project, we will hire bilingual ***¡CHIMC-TCI!*** staff and conduct a staff and volunteer orientation/grant kick-off meeting to review CBPR, ***¡CHIMC-TCI!*** processes, Immunization Toolkit, eLearning Café, and general procedures. CHIMC-TCI staff, partners, and CFTs will attend this initial meeting. CHIMC-TCI! staff will review the implementation plan and establish monthly project calendars to execute the project. The Community Forward Team (CFT) members are an essential component of the CHIMC-TCI! CBPR approach. **We will recruit bilingual CFTs from the 53204 and 53215 zip codes and team them with existing CHIMC-TCI! CFTs in mentor-mentee pairs.** CHIMC-TCI! staff will train new, bilingual CFTs in the CBPR method, the CHIMC-TCI! goals and the Immunization Toolkit. New CFTs will also benefit from ***peer-training and mentoring provided by the existing CHIMC-TCI! CFTs*** (many of whom have been involved in CHIMC-TCI! for ten years). After the training and orientation process, CHIMC-TCI! staff and CFTs will align with partnering WIC centers and childcare agencies in our target zip codes.

CHIMC-TCI! staff and existing CFTs will train new CFTs in the utilization of the technology-based framework to support sustainability far past the timeframe of this grant. Social media experts will train ***¡CHIMC-TCI!*** staff, community partners, and CFTs on how to strategically use social media technologies; how to craft effective tactical and targeted messages; how to design a cross-platform synced social media monitoring dashboard to monitor in real-time community conversations and sentiment feedback on Facebook; and overall engagement. In addition, the current CHIMC-TCI! staff has been trained on how to establish an actionable analytics evaluation plan using metrics monitoring tools for generating data and statistical reports. Existing CFTs have been trained on principles of CBPR; grant writing skills; guiding concepts in community health assessment; effective use of photovoice; conduction of focus groups; and other training as requested, including trauma-informed care and positive parenting. **We will encourage knowledge exchange between existing CHIMC-TCI! staff and CFTs and the new, bi-lingual CFTs.**

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Bilingual CFTs will play a significant role in intervention development. A substantial amount of time will be devoted to developing culturally-customized¹⁵ web-based Toolkit and eLearning content, as well as scripts and vocal recording for the eLearning. (Vocal recordings will be completed by a CFT member from the targeted community.) As the intervention tools are developed, *jCHIMC-TCI!* staff and CFT pairs will recruit and enroll community residents as *jCHIMC-TCI!* participants. *jCHIMC-TCI!* staff will conduct the informed consent process and will maintain records of consent documents (see *Plan for Recruitment* on page 5).

The CHIMC-TCI! Toolkit includes: a website URL for **CHIMC-TCI!MKE.com**, which continues to make CHIMC-TCI! a household name; and, (a) Recommended Immunization Schedule for children/adolescents and Catch-up Schedule; (b) Instructions on How to Utilize the Wisconsin Immunization Registry (WIR); (c) Tips on Locating Immunization Sites; (d) Flip charts on Immunizations (English, Spanish) to be used by trainers; (e) Linkages to Credible Bilingual Immunization Materials; (f) Immunization bilingual education (English, Spanish) with pre-/post-test; and (g) a take-home checklist for scheduling childhood immunizations. All tools can be used by parents/caregivers and CBO staff to enhance immunization compliance and they will be encouraged to adopt and promote the use of this web-based site.

Upon introduction to the *jCHIMC-TCI!* web-based learning content, *jCHIMC-TCI!* participants will complete pre-and post- assessments to gauge knowledge, attitudes, and beliefs regarding immunizations. Differences in pre- and post- knowledge will be analyzed to assess the efficacy of the *jCHIMC-TCI!* education tools. *jCHIMC-TCI!* staff will also evaluate the effectiveness of the *jCHIMC-TCI!* Toolkit and eLearning Café for Hispanic/Latino children (19-35 months) in 53204 and 53215 indicated by a 25% increase in the 4:3:1:3:3:1:4 antigen series. Through a partnership with the Wisconsin Department of Health Services, this outcome will be monitored using the Wisconsin Immunization Registry (WIR). See **Workplan** for further details.

Strategies and Tactics

Objective 2: By December 2017, increase parents'/caregivers' knowledge about the safety and effectiveness of childhood immunizations using a web-based culturally-relevant Toolkit and eLearning Café.

It is essential to use approaches that emanate from the affected community, thus increasing the likelihood of sustainability and durable action. *jCHIMC-TCI!* will continue with the established and relevant workgroups, such as Communication Strategies and Tactics (CST) and the Evaluation/Dissemination (D&E) workgroups while expanding their cultural capacities with Latino/Hispanic members. We will plan and implement strategies and further immunization coverage for Latino/Hispanic preschoolers. These strategies and tactics will be designed with input from CFTs, as community experts¹⁶, to disseminate relevant messages on childhood immunizations. *jCHIMC-TCI!* staff and focus groups, made up of Hispanic/Latino families (parents/caregivers) enrolled in *jCHIMC-TCI!*, will share their expertise and preferences to inform the development of a strategic, cross-platform social media campaign that will be designed to disseminate, monitor, and evaluate highly targeted bilingual messages for *jCHIMC-TCI!*. Some of the social and mobile media tactics and technology will be used in the campaign, including Twitter, Facebook, blogs, and location-based technologies. Strategically crafted and targeted tactical messages will be disseminated through CHIMC-TCI! social media accounts. The

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use of social media tactics allow for immediate and measurable community engagement and interaction with *iCHIMC-TCI!*. Interactions will be tracked through use of a social media dashboard that will be created without cost using a variety of free online tools. Subsequently, local strategies can be adopted by key stakeholders such as healthcare providers, public policymakers, and leaders of community organizations to address immunization disparities with Latino/Hispanic communities.

5. Evaluation Design

Changing behaviors is a complex process that requires the evaluation of individuals and their interactions with the entire healthcare system, including systematic barriers to change and targeting of those involved in decision-making, including patients, clinicians and policymakers. This project is committed to a rigorous scientific evaluation to address the goal to increase and sustain the immunization completion rates among children ≤ 4 years of age in the City of Milwaukee to meet or exceed the HP 2020 immunization goal of 90% by disseminating knowledge generated through the assessment and offer intervention options tailored to this local population. The evaluation will be multi-faceted and will encompass mixed methods using both qualitative and quantitative data analysis. Throughout the evaluation, community members will engage in all phases of the project including selection of instruments and processes, design of intervention and outcome measures, interpretation of data, input into the analysis, dissemination of findings and sustainability of new knowledge within impacted populations and communities.

Objective 3: By June 30, 2017, demonstrate the effectiveness of the CHIMC-TCI! Toolkit and eLearning Café for Hispanic/Latino children (19-35 months) in 53204 and 53215 by a 25% increase in the 4:3:1:3:3:1:4 antigen series.

There will be essentially three types of evaluation measures, using the logic model approach: (1) process measures, (2) output measures, and (3) outcome measures. **Process Measures. Objective 1.** We will measure increasing community capacity and training by using the Coalition Self Assessment Survey (CSAS) developed by Erin Kennedy (2000). In addition an evaluation is administered after each meeting to assess meeting effectiveness. Capacity building and training is also measured by tracking meeting attendance and the frequency of recruitment and outreach activities. **Output Measures. Objective 2.** With CFT and community partners' input, we will adopt and measure the effectiveness of our social media and social marketing (e.g., "walking billboards") communications strategies and the reach of these media forms. Upon enrollment, participants will be assessed for: (a) attitudes and beliefs about immunizations, (b) self-efficacy, (c) stress measures, and (d) perceived discriminatory practices. After the intervention, we will measure parents'/caregivers' knowledge of vaccinations and intentions to immunize their children using a validated 15-item (post) instrument. Finally, we will assess parents' eLearning Café satisfaction using a 7-item instrument. **Outcome Measures. Objective 3.** The primary outcome will be population rates of immunization. We will document participants' immunization status in the Wisconsin Immunization Registry (WIR) through quarterly monitoring of immunization rates. The project team will provide parent/caregiver reminders for children identified as behind in age-appropriate immunizations.

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Data will be entered into a REDCap (<http://www.project-redcap.org/>) database allowing menu driven options, built-in checks and generation of reports. REDCap is an internet-based, HIPPA compliant database and the data reside on a network central server, which is backed up nightly. Logistic regression will be used to examine the pattern of missing data. When data appear to be missing at random (MAR), multiple imputation or mixed models for longitudinal data will be utilized. If the data appear to not be MAR, sensitivity analysis, incorporating expert opinion by selection of possible scenarios will be utilized. Where possible, using the free software Randomize (Piantadosi), random subsamples which will address the question of interest will be selected but community preferences and limitations will be considered.

Summary statistics such as mean, median, standard deviation, range and correlation and plots will be used to examine distributions and interrelationships. Ninety-five percent confidence intervals will be reported to enhance interpretation of relevance. To satisfy parametric assumptions, transformations with justifications and otherwise use non-parametric tests will be performed. When formulating regression models, we will use trees and community information to determine possible interactions. Regression will be used to examine pre-post changes where the post measures will be dependent and the pre measures and demographic variables are independents. For mixed models, we will initially examine autocorrelation but allow for unstructured variance, covariance matrices. Statistical software employed for data analysis will be: Cytel StatXact12, SAS version 9.213, Salford System CART14 for trees, and SPSS Version 19.0 and Plus.15 The power calculation used is PASS 2008.16. Overall, a mixed-method approach will be taken qualitative and quantitative assessments will inform the formulation and selection of surveys and in turn information from the surveys may lead to additional qualitative investigation.

Dissemination and Sustainability Plan

CHIMC-TCI! partners believe that keeping immunizations up-to-date (UTD) is ultimately a local issue that must be addressed within each community at various points of care (CBOs, health departments, WIC, childcare centers, etc.). We will hire community health workers (CHWs) to interact with community partners and the CFT members by providing immunization education for parents/caregivers, and supporting agencies' efforts to ensure childhood immunizations are kept up-to-date. Activities of the CHWs will be enhanced by the CFT members, each designated across two WIC sites and the Department of Health site. CFT members will be trained to build community awareness regarding the dissemination strategies and tactics. Each site will make a computer available for public use to query their children immunization information, and will provide instructions on the use of WIR and how to review WIR records. In addition to locating staff onsite, we will develop and disseminate a ***jCHIMC-TCI!*** Immunization Toolkit inclusive of the eLearning Café as a web-based platform that has the potential to be utilized after the funding level is no longer available.

6. Detailed Workplan and Deliverables Schedule:

The ***jCHIMC-TCI!*** workplan consists of identifying bilingual individuals to join the partnership. Primary activities include training, recruitment, outreach, intervention, pre and post assessment, and ongoing Wisconsin Immunization Registry (WIR) tracking. Additional details and activities are outlined in **Table 6** below.

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7. Detailed Workplan and Deliverables Schedule:

Table 6. Timeline for <i>jCHIMC-TCI!</i>	Year 1		Year 2	
Hire bilingual staff and formalize partner's MOUs				
Provide orientation for new staff on CBPR, <i>jCHIMC-TCI!</i> processes, Immunization Toolkit, eLearning Café, and CFTs sessions				
Invite 4 CFT members from zip codes 53204 and 53215 and team them with existing CFT members in mentor-mentee pairs				
Amend existing <i>jCHIMC-TCI!</i> protocol, and obtain Institutional Review Board (IRB) approval (See attached IRB approval letter.)				
Align <i>jCHIMC-TCI!</i> staff and CFT members with partnering childcare agencies				
Develop and conduct training sessions for relevant topics to build community capacity such as community health specialist with 4 local bilingual citizens				
Conduct focus groups with translator on barriers and facilitators of keeping immunization up-to-date (UTD) in areas 53204 and 53215				
Review Communication Strategies and Tactics with <i>jCHIMC-TCI!</i> staff				
Assemble a Communication Strategies & Tactics Workgroup to meet monthly				
Co-design culturally-tailored strategies and tactics for dissemination of immunization information				
Dissemination and Evaluation Workgroup to meet monthly				
Monitor immunization status of children 0-18 mos.; 19-35 mos.; 36-48 mos.; and >48 months; quarterly, via the Wisconsin Immunization Registry				
Build consensus upon measurement tools and indicators				
Recruit and consent participants				
Conduct assessment of participants' demographics, barriers and facilitators of keeping immunization up to date (UTD)				
Implement culturally-tailored strategies and tactics for different cohorts				
Analyze program data using qualitative and quantitative methods				
Interpret data using CBPR principals and recognition of cultural relevance				
Assess impact of strategies on end-users				
Disseminate study results to local, regional and national audiences				
Assess adoption of <i>jCHIMC-TCI!</i> strategies and Toolkit into CBOs policies/practices				
Document sustainability of dissemination strategies among partners and the community				

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