Increased Scholarship in Community-Based Participatory Research:

New Directions for Effective Place-Based Decision Making

By

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A dissertation submitted in partial fulfillment of

The requirements for the degree of

Doctor of Philosophy

(Environment and Resources)

at the

UNIVERSITY OF WISONSIN-MADISON

2013

Date of final oral examination: 12/2/13

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Introduction

Community-based participatory research (CBPR) dates back to the 1940's and has firm footing in social and political movements, first of Kurt Lewin, and later, Paulo Friere, as a way of integrating empirical knowledge with community voices, and community generated problems and solutions (Minkler et al. 2010). In his 1947 paper on social change and group dynamics, Kurt Lewin wrote about the new levels of development of social science. He states that the main aims of this development were to integrate social science, move from individual to group dynamics and develop new instruments for social science research (Lewin 1947). Lewin's assertion influenced future social science and pedagogical thinking about power, beliefs of domination and praxis. This is the beginning of action research, which not only seeks to solve current problems, but also includes participation in the 'human-world' relationship and involvement by people and groups (Friere 1970). Paulo Friere, in the 1970's, began to shift from research *on* people to participation in research *with* people; his approach stressed that people should speak up about their own experiences in order to transform their own environments (Minkler et al. 2010).

Over the last couple of decades, new CBPR efforts have built upon this history. While there are numerous definitions of CBPR, the Kellogg Foundation captures similarities across definitions in defining CBPR as a "collaborative approach to research that equitably involves all partners in the research process

and recognizes the unique strengths that each brings. CBPR begins with a research topic of importance to the community, has the aim of combining knowledge with action and achieving social change to improve health outcomes and eliminate health disparities" (Kellogg Health Scholars Foundation [Internet]). The term "community engaged research" (CER) often refers to community involvement in decision-making. Community engagement engages local people in identifying issues and solutions that will benefit their lives. This happens by community members being directly involved in generating data that address local problems, which in turn promotes capacity for affecting local policy and decision making (O'Brien, et. a. 2011). Referring to Community Engaged Research initiatives, the National Institutes of Health asserts, "Community and academic partners need to understand the definition of 'community' and what community engagement involves in their program." (NIH Website [Internet]). Building this shared language is a vital step in CBPR and CER.

Recent reviews demonstrate a growth in CBPR and CER efforts in recent years, reflecting the increasing recognition by communities, researchers, and funding agencies that research with communities has a better chance of influencing local decision-makers, designing culturally relevant interventions, and creating policy (Wallerstein et al., 2008; O'Brien et al., 2011). For example, a special issue on youth violence highlighted approaches using CBPR and CER in different capacities, ranging from conflict in schools to gang activity in neighborhoods. In one community-based project, school staff used CBPR to engage youth in addressing racial bias and conflict (Bradshaw et al., 2010).

Another area that has received much attention is the role of CBPR in informing local health policies. Addressing social determinants of health through

effective data translation using local knowledge to influence land use could potentially impact equitable design of neighborhoods. CBPR helps lift of health assets and barriers in community settings. Combining the expertise of researchers knowledge of effective methods together with the expertise of community members lived experience and knowledge of perceptions of health helps to create a more comprehensive understanding of the multiple factors that impact the health of people living in a community. Participation of community members has been shown to be critical for the adoption of community driven initiatives, such as improved food systems or physical activity standards (Dennis et al., 2009). In cases where people are involved in the process of decision-making, policies have a higher likelihood of success and sustainability (O'Brien et al., 2010).

Despite the growth in CBPR and CER initiatives, and evidence of much strength of these approaches, there are still improvements that need to be made to make these efforts more successful at building knowledge and creating change to improve health and health disparities. Academic and community teams are known to be effective in producing empirical knowledge (O'Brien et al., 2010). Yet, producing that knowledge is complex and new tools are needed to help elicit knowledge from the experts – the community members. Researchers can facilitate the generation of new methods that help community members work together to recognize, create, and document that knowledge.

Conversely, it is not enough to simply document new knowledge in the form of research findings. That knowledge needs to be translated into some type of action to address the community-documented issue. Translation of empirical knowledge into something meaningful, like a policy, an intervention, or a

community action or decision should consider community characteristics and readiness for change (Weiner et al., 2009). Methods like the Community Readiness Model could be combined with CBPR/CER processes to help understanding where a community is at in terms of readiness to mobilize for change. The Community Readiness Model is one way to engage top stakeholders in order to impact the success of a policy, program or plan. It can be used to assess the level of readiness of a community to develop and implement prevention strategies around specific issues by identifying the community's readiness to address changes to neighborhood supports and barriers through interventions, programs and community development strategies by revealing supports and barriers in the community in addition to key stakeholders (Plested et al., 2006). Attention to readiness for change may be helpful in designing interventions that are sustainable.

There is increasing awareness that integrated health and place research, particularly in disadvantaged communities (i.e. geographies), is improved when community members, public health professionals, urban planners and researchers all work together. Working across sectors helps identify and address the multiple factors that affect health in places (Stokols et al., 2003). However, addressing these multiple factors and initiating and sustaining such collaborations have often proven difficult. In fact, when Kurt Lewin was writing about the new laws of development in social science as a call for action research, he was targeting a specific discipline, psychiatry, and the complexities of collaboration across professions and disciplines were not explicitly addressed (Stokols, 2006). Blending disciplines is a key process in building a 'conceptual template' that contributes to the fields of both public health end environmental

health. As Newell writes, "Natural and social sciences need to develop approaches that focus on the use of clashes between worldviews to catalyze new insights." (Newell et al., 2005). As such, CBPR and CER approaches may work best with coordination and collaboration between and within researcher disciplines and across professional sectors (Stokols, 2006).

While CBPR projects often happen in particular geographic communities, they often do not actually fully address aspects of place as part of the process. Yet this integration seems crucial in conducting CBPR projects related to health. Indeed, the integration of health and place is evident in geography discourse regarding the effects of place on health and inequities. Place in this context is where social and physical attributes exist in a specific location (Curtis, et al., 1998). These locations are places where people spend their time working, playing, or recreating. Additionally, location refers to "various social and economic process com[ing] together in combinations which may be specific to the place…" and in turn influence environmental attributes that affect variations in health (Curtis et al., 1998).

There is a steadily growing literature focused on health implications of where a person lives, works, goes to school or plays (Frank 2006, Frumkin 2003, Dannenberg et al. 2011). It is well documented that poor communities face a greater burden of disparity and adverse health outcomes (Patz et al., 2007). Alternatively, healthy places can foster social connectedness, potentially increasing physical activity and healthy eating. By becoming engaged in one's community and social landscape, individuals are far more likely to take the next step into involvement (Aboelata, et al. 2011). As such, CBPR projects that explicitly address place as a determinant of health, can help broaden preventive

health opportunities for that community.

Although there are many examples of successful CBPR projects in the literature, there are very few articles that document actual outcomes and impacts that can be attributed to CBPR research (Wallerstein et al., 2008). What we know is that the process of CBPR creates a common ground between researchers and communities and creates mutual benefit, such as providing evidence to support healthy policies, if done with skill (Srinivasan et. al., 2003). However, because the literature does not report evaluation of outcomes regularly, less is known about the actual outcomes of CBPR projects in terms of how successful they were in producing a range of outcomes. As such, it is difficult for practitioners to know what might work best in what situation and with what populations.

In sum, despite the growth in CBPR and CER initiatives to improve health and health disparities in specific geographies, practitioners of these methods recognize that multiple tools and approaches need to be used and tested in order to "build healthy places with people and for people" (Aboelata et al., 2011; Srinivasan et al., 2003; Trickett et al., 2011).

Participatory Photo Mapping: A promising new approach

Participatory Photo Mapping (PPM) is a new participatory research method that combines photography, narratives and maps, and is designed to address place-based changes, such as walkability, or improved food systems in a neighborhood (Dennis, et. al. 2008). This method aims to address some of the challenges in prior CBPR and CER research. It builds on the strengths of previous CBPR initiatives by engaging community members fully in the process,

and considering community members as the experts on the processes that are affecting their health in their neighborhood. PPM is also an interdisciplinary research tool, pulling from multiple disciplines, including anthropology/ethnography, public health, geography and environmental design fields in order to produce knowledge using different approaches and methods. The PPM method is couched within a social justice framework, allowing research teams to address issues of inequity in neighborhoods through identifying, targeting, and creating change initiatives. Finally, this approach is meant to specifically address health in the context of place, emphasizing neighborhood context as an important context within which individuals, families, and groups experience aspects of life that affect health.

In PPM, participants are given cameras and asked to take pictures of the places in their community that stand out in terms of a specific issue, for instance, safety or food/physical activity environments. Researchers and practitioners walk along with the participants, allowing for observation and relationship building (Carpiano 2009). After the picture-taking session, participants view the photos on the wall or on a computer and talk about each image. Researchers map the participants travel routes and photographs so that the locations of the photographs are recorded. The maps and photographs document a direct observation to places in the neighborhood (John et al., 2012). Both the photos and the narrative are linked to a geographic information system so that the qualitative data are attached to a place. This bundle of data is then analyzed in order to identify themes; the photos, narratives and places are never separated. Recommendations are compiled, vetted and delivered to the community, and an action plan is put in place.

The revealed knowledge is used in an action plan for social change. In order to put an action plan in place, all partners develop it together. Questions such as: Who needs to hear this information? and Who is the best person to deliver these recommendations? and What is the best strategy for delivering these recommendations? are asked of the team. The target audience is identified and goals are set. For example, a partner may want to Identify facilities and assess barriers in rural townships that could be opened up for shared recreational use. Their goal could provide information and evidence for advocating for joint use agreements in rural townships. Together, the team could decide to bring suggestions to the school board by a certain date. The outcome could raise awareness of the limitations that living in a rural area has on an individuals, in order to pass policies that meet the needs of the community, in this case, increasing recreational opportunities for people in the community. This example demonstrates the way PPM works with community members to capture attitudes about a specific place, develops products, communicates findings and has the ability to mobilize and engage community members in a plan that leads to social action.

PPM was developed through a series of community-based projects in which the components were used in combination. It stemmed from an increasing interested from decision makers, stakeholders, public health professionals, clinicians and community members to better understand 'people's experience of health and place' (Dennis, et. al. 2008).

In my work with PPM, I use a mixture of qualitative and quantitative data. Quantitative data are in the form of surveys, satellite images, census data, demographics, school statistics (such as # of free and reduced lunch youth), and

public health data (such as number of households enrolled in medical assistance or WIC). These data are necessary to determine and measure the prevalence and incidence of disease, while qualitative data are needed to determine how individuals and populations "experience and act on these problems" (Brown 2003). Cope and Elwood (2009), in their recent book called "Qualitative GIS," refer to a 'hybrid relational database' consisting of spatial data in the form of satellite imagery and qualitative data such as photographs, narratives or video. The PPM process brings together community members and researchers adhering to the principles of Community Based Participatory Research (CBPR) and Community Engagement in Research (CER). The mechanisms of PPM include pictures and narratives being linked to a GIS using software or open-source maps. This 'hybrid relational database' mixes qualitative and quantitative data that can be analyzed and assessed. It is through this assessment of human behavior in a particular place that peoples' experiences of how environments influence health are revealed.

In sum, PPM is a method that aims to contribute to community-based participatory research studies in four major ways:

1) Contribute a tool that captures attitudes and perceptions of people as they navigate an environment
2) Develop products used to communicate with policy and decision makers
3) Communicate findings to a broad audience
4) Create actionable processes in which community members take a part in mobilizing and engaging calls to action

Dissertation aims

My dissertation research aims to examine the PPM method to determine whether and how PPM shows promise as a method for initiating and facilitating community collaborations to improve health in specific geographies. Additionally, I ask: what additional approach or approaches is/are needed to improve community health outcomes at the local level? I will answer these questions by addressing two specific aims in two separate papers:

Aim 1:

To evaluate Participatory Photo Mapping as a practical tool in helping communities identify factors that impact their health

The Participatory Photo Mapping Method combines photographs, narratives and maps, along with participant observation. Participants include community members, local organizations, youth centers, neighborhood associations, coalitions, public health practitioners and local decision makers. PPM has been used as an engagement tool intended to advance meaningful place-based community health strategies. Through this research I aim to (1) understand whether and how PPM has helped communities identify factors that impact their health, and (2) identify to what extent PPM has contributed to the achievement of PPM project goals and informed future work in the communities using PPM.

In order to address this larger aim and the sub-aims, Paper 1 presents data using a multi-method approach, including conducting informant interviews and developing and fielding a survey. The survey was conducted in 2009 with 22 users of the PPM method across approximately 30 projects. Users included government officials, public health professionals and researchers.

Aim 2:

To use Participatory Photo Mapping to explore food choices and physical activity opportunities for Latino youth in Milwaukee

Latino children in the U.S. are more likely to be overweight or obese than their non-Latino, White counterparts (Lutfiyya et. al., 2008). Reasons for this disparity are complex, with explanations and potential solutions likely varying from community to community. This project collaboratively engaged Latino community youth using Participatory Photo Mapping (PPM). We gathered data on the eating and recreational experiences of 30 Latino youth in grades 5-8 in one school in Milwaukee, Wisconsin. In Paper 2, I summarize the findings of the project and its implications for how to improve the food choice and physical activity opportunities for Latino youth in this particular school.

Significance:

The ultimate goal of my work is to identify, create, or use tools that will help *people* transform *places* to improve health and reduce health disparities. The results of this dissertation will contribute knowledge that will improve our ability to use and improve PPM specifically, and to consider other processes to better work with communities to improve health.

Why is it important that we design, evaluate, and improve such methods, tools, and processes when working with communities? Literature shows that poor communities face a greater burden of health inequity and adverse health outcomes broadly defined (Clark 2008, Story et al. 2010). It is also well known that health inequities are widening due to unequal distribution of resources and decision-making power (World Health Organization accessed June 4, 2012). The

systems of inequity are products of current policies, physical environments, social norms and practices (World Health Organization accessed June 4, 2012). The World Health Organizations asserts that inequity is deeply rooted in social and environmental structures. The inequity is systematic and therefore the approach needed to work toward health equity should be systematic.

Reducing inequity requires improving conditions in people's daily lives, shifting power and decision making to those who do not have a voice and finally, researching the factors that keep perpetuating inequity. Social and behavioral change interventions that are grounded in local knowledge and build on existing community assets are more affordable and sustainable (Marsh et al. 2004, Walker et al. 2007). Accordingly, working *with* a community to reveal local solutions and existing resources is more likely to foster positive change in resident's behavior (Corburn 2003). A community that is engaged in revealing assets is more likely to be a stakeholder in the change process (Walker et al., 2007).

O'brien writes, "Health services research has paid less attention to research translation at local levels. Therefore, CBPR offers researchers an opportunity to address local health policy questions." (O'brien et al. 2011). Mechanisms for CBPR include working together with communities, tapping into local data, using partnership to inform and interpret findings and finally, building an infrastructure for impacting local policy (O'Brien et al., 2011). These mechanisms build social connections that are required in order to improve sustainable community interventions and environments (Aboelata et al., 2011). For example, participation of community members has been shown to be critical

for adoption of new school food or physical activity standards, and creation of community gardens, both of which can improve health (Ashley et. al., 2008; Sallis et. al., 2006).

In sum, in order to address health inequities, more attention needs to be paid to developing CBPR processes that can best engage communities in processes that will help them identify and address the factors that affect their health. PPM is a particular approach that shows great promise. The results of my dissertation will inform whether PPM is a successful new approach, and will suggest ways to improve the PPM approach and suggest other ideas for developing or augmenting new approaches.

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Evaluating Participatory Photo Mapping: A Promising Practice to Advance Strategies in Community Health

Suzanne Gaulocher

Evaluating Participatory Photo Mapping: A Promising Practice to Advance Strategies in Community Health

Abstract:

Background: In recent years, researchers, professionals and community partners have engaged in many projects in various states using a novel method called Participatory Photo Mapping (PPM). This method combines photography, maps and narratives, and has been used as a tool to advance meaningful place-based community health strategies.

Objective: We aim to understand (1) whether and how PPM helped communities identify factors that impact their health, and (2) to what extent PPM contributed to the achievement of project goals and influenced future work.

Methods: We conducted a mail survey of 22 people who had completed PPM projects between 2003 and 2009. The survey included both closed- and open-ended questions.

Results: We found that PPM could assist in: (1) gaining and assessing information; (2) increasing awareness of the issues; (3) identifying and documenting these issues; and (4) enabling community change and empowerment. Respondents also reported that PPM helps facilitate collaboration between community members, professionals and researchers. Mapping was described as difficult in terms of resources, time and the need for technological skill.

Conclusion: PPM may be useful in advancing strategies in community health as a stand-alone method or as a complement to other methods. This method may contribute to place-based decision-making that could inform community interventions to improve health.

Introduction

It is well known that inequities in health outcomes are widening due to unequal distribution of resources and decision-making power.[1] These inequities are the products of policies, social norms and systematic practices that are deeply rooted in social and environmental structures.[6-7] Poor communities bear an increasing burden of negative health outcomes that are affected by the lasting effects of inequity.[2,3] (See Table 1 for a list of key definitions for this paper).

Public health is in need of new strategic approaches to better understand the underlying determinants of health and the complexities that lead to poor health outcomes, such as chronic disease.[4,5] In particular, the interaction between behavior and the built environment is not well understood, and public health has not advanced rapidly enough to understand this relationship.[6] As a result, there has been an increase in community participation in public health studies with researchers and community members alike.[7] However, the perspectives of community partners have not been the focus of recent publications.[8] Prior research has documented processes in community collaboration that work, yet suggest that there are still areas in which continued innovation is needed.[9]

Table 1 Main concepts and definitions

Concept	Definitions
Empowerment	The continued momentum of individuals and groups to gain and maintain control over their own lives by participating more effectively in shaping their communities.[10]

Place-Based Policies	Mechanisms that address social and environmental issues over time and in a specific places.[11]
Built Environment	Buildings, (such as schools, homes and workplaces), streets, alleyways, highways and parks that are created by and for people.[12]
Health Equity	Active efforts to eliminate health disparity and inequity.[13]
Health Inequity	When minority groups experience systematic social disadvantages that lead to health outcomes that are worse than groups with greater social advantages.[14]
Community Capacity	Knowledge, skills, ability and resources that go beyond those that community members already bring to a particular problem.[8]

Participatory Photo Mapping (PPM) is a relatively new method of community-based research. It was designed to build upon the best practices of community engagement in research to improve understanding of the impacts of place on health. PPM combines photography, narratives and maps, and is designed to address place-based changes, such as walkability or improved food distribution in a neighborhood. PPM allows researchers to work more closely with communities.[14] It is a method that honors the role of community members as equal participants in designing and implementing projects in order to explore these issues. Increasingly, PPM has been used as one approach to understanding means to increase community capacity, address inequity, and raise awareness of issues.[8] PPM has been used to engage with community members, to build trust between them and researchers. Research with communities has encountered

many problems in the past through lack of trust, when research was conducted on, rather than with, community members. Participatory methods like PPM address these issues and help gain understanding of the role the environment plays on health, and how increased awareness could build community assets rather than perpetuate inequity.[8,15]

Participatory design approaches, such as PPM, may offer the potential to better understand lived experience in order to address health as it is broadly defined.[8] PPM is based on principles of community engagement, which have been shown to be important in initiating and creating change.[16] For example, participation of community members has been shown to be critical for the adoption of new school food and physical activity standards and it has led to creation of community gardens, all of which may maintain or improve health.[17,18]

PPM has been conducted in multiple states in multiple countries, such as Ukraine, Sri Lanka, Honduras, Canada and Costa Rica. PPM has been implemented for multiple reasons, ranging from assessing health and safety, understanding nutrition environments, measuring physical activity, understanding livelihood, assessing recreational use agreements, documenting safe routes to school, understanding perceptions of economic development, and improving neighborhood design. PPM has been done with multiple populations ranging from children, youth, and elderly, rural, urban, suburban, and homeless populations. PPM has been carried out on foot, in cars, on bikes and even in a tractor. This growth in its use led us to want to evaluate PPM as an effective method for assessing to what extent PPM contributed to the achievement of these project goals and influenced future work.

 As PPM was designed to enhance our understanding of the effects of place on health, it is important to evaluate whether or to what degree the method actually has worked to achieve project goals. We conducted a survey of 22 users of the PPM method across approximately 30 projects. In this paper, we present analysis of survey results, addressing two aims. First, we aim to understand whether and how PPM helped communities identify factors that impact their health. Second, we aim to identify to what extent PPM contributed to the achievement of project goals and guided future work.

Methods

This evaluation targeted principle organizers of PPM projects— individuals who often provided the leadership for moving PPM projects forward. These principle organizers are people who had used PPM between 2003 and 2009. They were identified because they had conducted at least one PPM project, and in some cases, several. They were point people during projects and workshops or they were people to whom we provided technical assistance. Human subject approval was secured before conducting this evaluation.

In order to develop a survey instrument to use with all PPM participants, we first conducted a pilot study to develop our survey questions. First, we developed an initial set of key questions and conducted semi-structured pilot interviews with 5 informants. The pilot interview (see appendix) covered eight questions. These interviews each took approximately 60 minutes. Special attention was given to the importance of the PPM process, to break down the

method so as to identify strengths and weaknesses of each component, and to compare components against one another.

Qualitative data allow for the potential to explore issues in deep ways by asking "what, how, and why" rather than "how much". The data seek understanding of meaning and experience focusing on "thick" description (not prediction), processes (not outcomes), and context (not generalizability).[16] All qualitative data were analyzed using NVivo8 software to reveal the main themes. In order to address our research questions, we separated our analysis into two categories: identification of factors that influence health and achievement of project goals. Our team members each coded the data and then verified these codes by testing them against one another using intercoder agreement. We provided a list of main codes to a second set of 3 coders and asked them to code the same narrative. Then, we compared the codes against each other for reliability and discussed areas where there was inconsistency in the coding. Next, the research team agreed upon the most accurate code to be used for the assessment. The second round of coding had high reliability, but in areas where codes were not consistent, we had a conversation about code meaning and decided together upon the main code. Through an iterative process, the codes were collapsed into themes, which became the main headings for sets of questions in the survey (See Appendix for the entire survey).
Survey Development and Measures

The resulting survey we developed was a four page mail-in document that examined the four primary components of the PPM method. It included questions about the use of photos, focus groups, maps and presentations. We

provided the University of Wisconsin Survey Center (UWSC) a census sample of the 27 users of the PPM method; that is, every identified user/coordinator of a PPM project was sent a survey via mail. Of the 27 users invited to participate, 23 responded, and one self-selected as ineligible, yielding a total response rate of 82%. The survey was fielded between February 2010 and February 2011. The respondents self-identified the sector they represented, which included: government, academia or community (see Table 2).

Organization Type	Percent Response	Total Number
Government	27%	6
Community	32%	7
Academic	41%	9
Total	100%	22

Table 2. The respondents' self-identified sectors

The survey included 16 main questions with 43 sub questions (See Appendix). Six questions were open-ended. The open-ended questions were analyzed using the same qualitative thematic analysis process described above. We divided our analysis into two categories: identification of factors that influence health and achievement of project goals.

The development and analysis of the survey data we collected focused on four critical components of PPM: photographs, narratives, maps and

communication (see Figure 1). We developed the survey to test the effectiveness of each of these four main components of PPM. The goal of the survey was to get feedback from PPM users about the effectiveness of each component, and then to test the relationship between the components and the intended project outcome. The following are some of the closed-ended questions asked in the survey specific to the four main components. Respondents were asked to choose "not at all", "very little", "some", "quite a bit", or "a great deal."

- To what extent did photographs or the process of taking photographs generate new information?
- To what extent did the focus groups, interviews and narratives actively engage participants?
- To what extent did the maps generate new information?
- To what extent did your presentation actively engage participants?

Participants were also asked a series of open-ended questions about their own experiences and perceptions, and overall about their feedback about what worked best and what needed improvement specific to the four main components. Examples of open-ended questions asked in the survey include:

- What were the project goals of your last PPM project?
- How else have you shared your information and results with decision makers?
- What were the greatest weaknesses of the PPM method?
- What were the greatest strengths of the PPM method?

Outcome data were collected over a 12-month timeframe; we asked participants to document outcomes immediately after the was completed, after six months and again after 12 months of completing the PPM process. We asked:

- Initially, what was changed as a result of your project?

- Twelve months after the project completion, what changes persisted?

Respondents were asked if they would use the method again or refer the method to others.
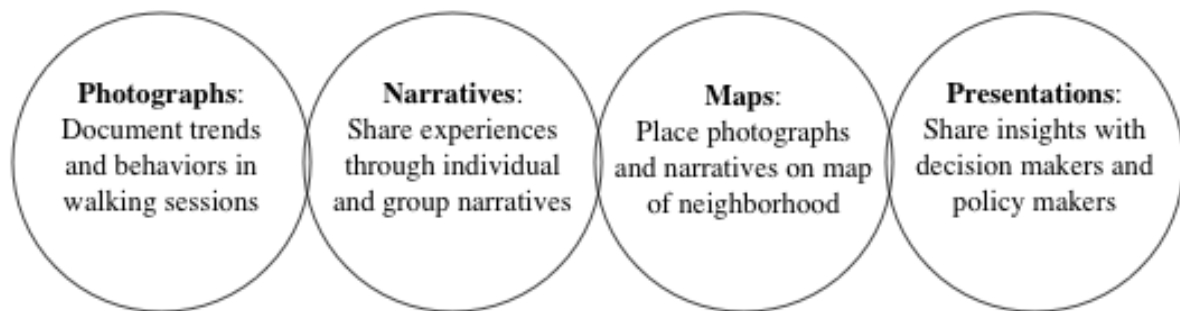

Figure 1. This evaluation explores the four primary components of PPM: photographs, narratives, maps and communication

Results

Participatory Photo Mapping integrates four primary components – photographs, narratives, maps, and presentation -- which we carefully examined separately.

Photographs: Participants scored the photographs component high compared to mapping and presentations in particular. All but one participant reported that the photographs actively engaged the participants and prompted conversations with both community members and decision-makers. Photos were more likely than any other component to be used to generate new knowledge in order to increase the awareness of issues with decision-makers.

Narratives: According to participants, the focus groups and interviews that were conducted using the collected photographs actively engaged participants and generated new information. Eighty-two percent of participants reported that the focus groups, interviews and narratives actively engaged participants. The narratives ranked lower in these categories than photographs, yet higher than maps and presentations.

Maps: Almost eighty percent of the participants reported that the maps revealed new information, yet sixty percent of participants reported that mapping, in particular, proved to be technically challenging. Thirty-two percent felt that maps shape the views of decision-makers. Mapping was also described in the open-ended survey questions as difficult in terms of resources, time and the need for technological skill.

Presentations: All but four of the participants presented their project results to an audience at least once (in many instances, the findings were used in multiple presentations). Audiences included: youth center director, grant proposals, community retreats, conferences and one-on-one conversations. One participant reported that PPM fostered community tours led by participating youth. Conversely, another participant reported that they did not present the PPM data because the youth they were working with were not prepared. In a similar instance, the participant felt that the youth that worked on the project did not represent the community at large and that all perspectives were not heard.

In order to evaluate the degree to which respondents believed that PPM helped communities identify factors that impact their health and the extent to

which the method contributed to the achievement of project goals, we first analyzed the open-ended questions to organize our analysis into four themes that emerged from the data: assessing and gaining information, increasing awareness of the issues, identifying and documenting the issues, and finally, community change and empowerment (See Figure 2). These themes were identified using constant comparative qualitative analysis and inductive reasoning. Even though these categories overlap, for the most part the first two involve identifying factors that impact the health of people in a community, and the other two elucidate the extent to which PPM helped achieve the goals of a project.
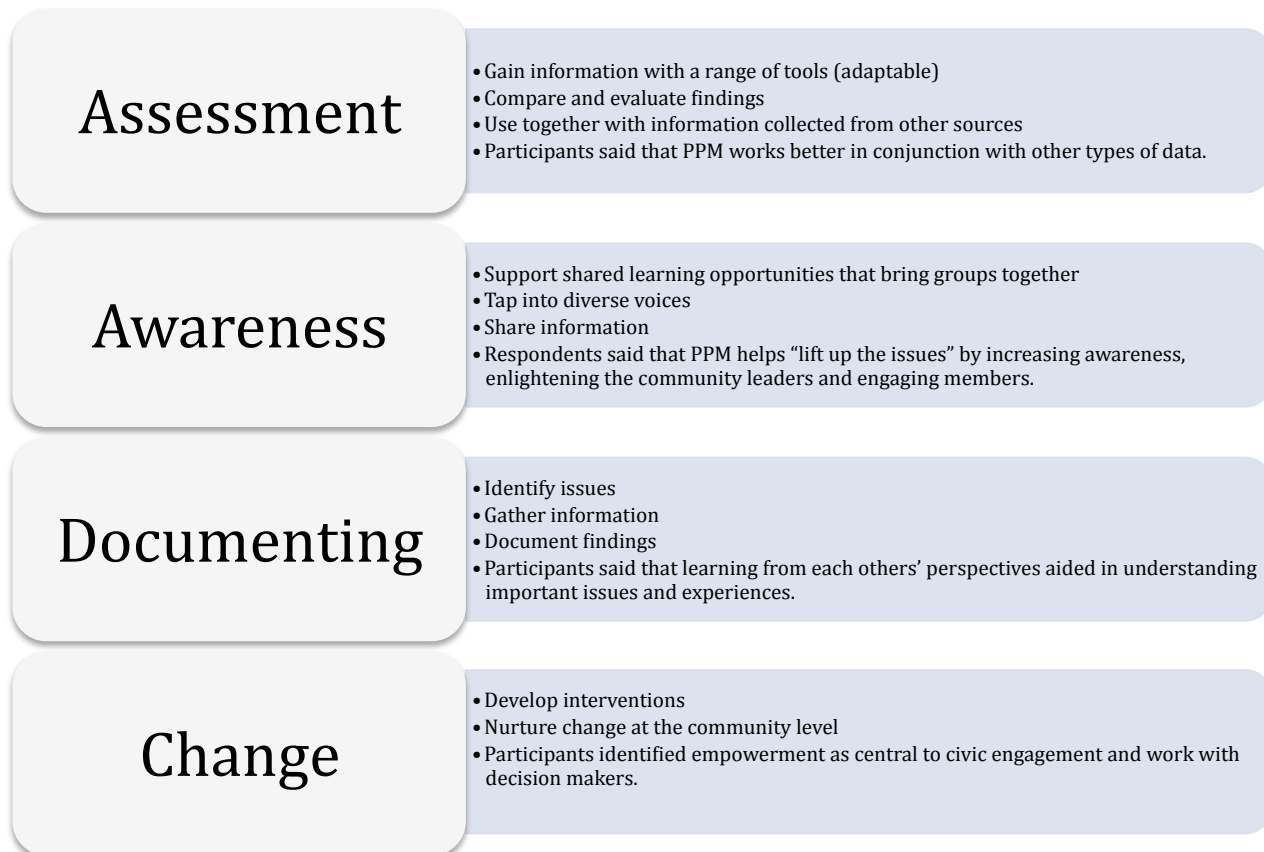
Assessment
- Gain information with a range of tools (adaptable)
- Compare and evaluate findings
- Use together with information collected from other sources
- Participants said that PPM works better in conjunction with other types of data.

Awareness
- Support shared learning opportunities that bring groups together
- Tap into diverse voices
- Share information
- Respondents said that PPM helps "lift up the issues" by increasing awareness, enlightening the community leaders and engaging members.

Documenting
- Identify issues
- Gather information
- Document findings
- Participants said that learning from each others' perspectives aided in understanding important issues and experiences.

Change
- Develop interventions
- Nurture change at the community level
- Participants identified empowerment as central to civic engagement and work with decision makers.

Figure 2. Four categories and main points that emerged from the data: (1) assessment, (2) awareness, (3) documentation and (4) change.

Assessing and Gaining Information. Results revealed that respondents felt that taking photographs was very engaging. Participants reported that they had had a need for assessment tools, and through their PPM project had discovered that photographs and focus groups together worked well to assess and uncover the factors and issues communities cared about and helped community members communicate their ideas. In the words of some participants:

> The photographs were an excellent way to uncover concerns of community members and strengthened arguments for changes. The focus group forums allowed the communities to gather and discuss their concerns, which proved very meaningful.

> PPM is great for engaging youth and gaining their perspectives on health issues as they relate to the areas where they live. It also helps children express their ideas to adults and help make changes in their communities.

> Eighty-eight percent of respondents reported that the PPM method was adaptable to their project needs, and 78 percent reported that the four components of the method were well integrated. Adaptability is a feature of PPM that is important to community-based studies. Strategically, communities need adaptable tools.

Increasing Awareness of the Issues. A majority of respondents reported that they presented their findings in a public forum or to decision makers. Presentations were used to increase awareness and also to engage community members as well as decision-makers. This study reported that 84% of participants reported that PPM was most useful in helping people gain a greater understanding of issues in

the community. Participants reported that PPM enhanced awareness of the issues by working with the community to incorporate culturally sensitive processes in community-engaged decision making. For example, three participants reported that PPM uncovered concerns youth had about their neighborhood, such as safety after school, and allowed a way for youth to talk about their own concerns in their own voice. One participant said that PPM was a very respectful way to engage a "quiet demographic." It fostered active participation and was community-based.

Eighty-two percent reported that PPM aided in development of new partnerships and achieving project goals, but only 66 percent of respondents reported that PPM actually helped prioritize issues. Prioritization of issues is a strategy that could be added to PPM projects. However, researchers will have to learn more about the importance of prioritization to different types of participants.

Engagement was a major factor why PPM was identified as a practical tool for participants' uses. It allowed people to "hear the voice of youth" and share creation of equitable contributions and solutions. Some of the participants that worked with youth believe that PPM promoted self-confidence by building curiosity and trust. This in turn allowed youth to express their ideas in a safe environment. In addition, PPM was often identified as enjoyable and fun. It provided a creative outlet and was exciting and visually appealing. It inspired community members and was an active way to gather information. People were looking around in their community rather than sitting at a computer to find data.

However, one respondent reported that youth who participated were not fully representative of the community. Because the participants in PPM projects

volunteer their time and self select into the project, there was concern that all the issues were not heard, increasing the potential for bias.

Identifying and Documenting the Issues: Overall, seventy two percent of participants reported that PPM is very helpful in engaging participants to generate new information about issues that affect health in their neighborhood. Seventy-seven percent of participants reported that PPM helped them gain a greater understanding of the issues in the community. Examples provided by respondents of identifying and documenting the issues include: identifying rural people's perceptions of barriers to physical activity in their community; documenting the daily life of homeless people in an urban setting; assessing neighborhood youth's sense of safety in their community and identifying risks to youth as they walk home from school.

However, the data also show that the actual act of documenting, mapping and presentations are often too technical for both public health practitioners and community members. When asked to rate the four components of PPM, mapping ranked last. Participant feedback helped us realize areas to strengthen PPM, such as increasing the usability of equipment, such as GPS units and projectors. In the words of one participant:

> There were some technical difficulties with the equipment occasionally. There is a lot of room for human error when using the equipment, which can really affect results.

Community Change. According to participants, PPM findings helped enabled knowledge to be put into practice by aiding decision making at multiple levels that led to change. PPM projects had a principle organizer (survey respondents) that often provided the leadership for moving research findings to action. Actions taken would often affect one part of one neighborhood, for example by working with city planners to build a section of sidewalk, or had the potential to influence an entire school district or program at a county health department (See Table 3). PPM led to many other initiatives and created an environment where policy and decision makers continued to listen. One-third of survey respondents said that the PPM process helped their community partners' voices be heard: "There remains a greater sense among participants [of a] continuing trust that their stories are being heard and they are worth being heard." This in turn provided building blocks for future initiatives. About one-third of participants worked with the media and engaged in word-of-mouth conversations as a way of sharing information.

The majority of participants reported that PPM helped develop new partnerships. This may have contributed to community change. All but five participants reported that PPM facilitated communication and dissemination, and prioritized issues and achieved project goals.

Actors in the change strategy	*Social Ecological Level*	*The changes that occurred*
Neighborhood (Social dynamics)	Community	PPM helped create new community gathering opportunities, such as suppers, forums and positive actions in parks. This included neighborhood clean-up days and community meals.
Individual community leaders	Individual, Interpersonal (such as social networks)	Findings revealed by a PPM project improved attitudes of community members. In addition, it increased comfort when speaking and raising awareness in public settings. It was also reported that PPM permitted an increase in commitment and energy by community leaders, improved leadership capacity, enhanced creativity, and led to adoption of new skills.
Built environment and public health professionals	Government, Environment, Community	Traffic control and engineering: painting crosswalks, and sidewalk installation and repair, were ways PPM helped guide urban planning. Physical improvements included neighborhood clean-up, visual enhancements such as planting flowers, and increased safety measures such as hiring an additional crossing guard for after school hours.
Policy and decision makers	Public Policy, Community, Environment and individual	Policy and decisions contributed to school wellness plans; youth safety plans and increased commitment and support. It was reported that PPM made decision makers listen and pay attention to the issues. It was emphasized that it was important that children's voices be included in policy and decision-making.

Table 3. Interventions resulting from PPM show that change occurred at multiple levels and was influenced by community members, such as youth, or by professionals, such as public health nurses.

The study findings showed that 77% of respondents reported that information/data generated through PPM not only strengthened the argument for social and environmental change, but also built momentum for pursuing that change. Examples include: the installation of a playground, sidewalk installation and repair, creation of quarterly community suppers in the neighborhood, and positive activities introduced in the park. Results indicated that PPM projects created a shared vision and stimulated discussions. In addition, a majority of these projects worked with young people and were specifically interested in engaging youth in their work. Many participants who worked directly with young people perceived that youth saw themselves as community experts and had a high level of self- and collective-confidence.

Finally, when considering PPM as a whole, 86% of all participants reported that they were likely to use PPM again, while 92% would recommend PPM to another person.

Lessons Learned

Results of this evaluation suggest that PPM can be improved in the following ways:

(1) Address technical proficiency (the GPS didn't work, it was difficult to integrate maps, and people simply did not know how to use the software); (2) improve follow-through (connecting with decision makers was not happening enough in community settings) by addressing logistical difficulties, such as scheduling meetings and participation; and 3) focus on bias, and the fact that PPM targets only specific populations and so it is subjective.

Technical Proficiency:

PPM is resource intensive. Participants reported that engaging partners and decision makers involves additional coordination, funding, technical assistance, software, cameras, GPS units and a projector.

The research team utilized the maps to track walking routes and geolocate the photographs in order to compile recommendations and reports. The reports with recommendations, maps and key photographs were returned to the community members and other stakeholders and decision makers. These data were used in presentations, which participants reported were successful in influencing decision-makers. Upon reflection, it may be that the maps were most useful to the research team rather than to the participants in identifying issues and trends in a specific geography. For example, maps helped the researchers identify behavior patters that revealed use of the specific environment. In the map below, the red circle depicts an area in a neighborhood where youth in one Madison neighborhood did <u>not</u> spend time. In order to understand this behavior pattern, researchers asked the youth why they did not go to that particular part of their neighborhood. The youth unanimously answered that they did not feel welcome in that part of the neighborhood because that was where the rich people lived. The participants had this knowledge already, but the mapping helped the researchers elicit and document this information.

Mapping, more so than the other three components of PPM, proved to be technically challenging. The problem was that community members usually relied on researchers to take care of technological matters. That said, it is incumbent upon the research team to create a user-friendly PPM application so that it can be used without a researcher being present. As a result of this evaluation, our research team has committed itself to find ways to improve the utility of PPM in community settings. Because communities are at different levels of technical abilities, it is imperative that PPM be simple and user friendly. We adapted to this limitation by using open source or paper maps versus GIS software in some projects. Because the spatial aspect of this method is so important, we are committed to master the difficulty of using technology in this work.

On the other hand, PPM aided engagement and learning, including shared learning. PPM helped community members gain perspective of the issues and generated new knowledge. One respondent reported specifically that the mapping portion revealed spatial patterns and behavior trends that led to increased awareness and a more comprehensive view of data and information that described what was really happening in neighborhoods.

Improve Follow Through and Logistical Difficulties

We have learned from this evaluation that PPM works best if teams can touch in with researchers for technical assistance and to do some of the work toward the end of the project. One participant said that follow through and applying findings in conversations with decision makers was one weakness of PPM. Our team has adapted to this weakness by encouraging and expecting community partners to utilize the expertise of researchers toward the end of the project, including proving improved and long term technical assistance and addressing logistical difficulties by being more strategic about scheduling meetings and engaging community participation.

Respondents appreciated that PPM projects produced products and outcomes. For example, results from these projects included deliverables such as maps, photographs, reports and presentations for use in community forums. Participants compiled recommendations and shared the information gained through PPM with community members and policy makers through media and press releases. Other places where PPM findings were shared included: community retreats, academic conferences, youth centers and schools.

PPM is resource intensive technologically and works best if the entire project is brought to fruition. Participants reported that follow through in some projects did not happen, which wasted and depleted resources and potentially jeopardized relationships with community members.

Bias

One respondent wrote that youth who participated in that project were not fully representative of the community, increasing the potential for bias. While only one participant mentioned this, we recognize that this is a potential weakness of any PPM or other CBPR project. By placing emphasis on producing thick descriptions of peoples' perceptions of place, it is difficult to engage large numbers of people and hear all voices in one project. Additionally, participants in PPM and CBPR projects are not randomly selected. Researchers make every effort to include as many representatives in one study, but this rarely happens. One way of addressing this issue may be through the vetting process during or after data analysis. By engaging other stakeholders and participants in discussing the preliminary results of the PPM project, other people, voices, and perceptions could be integrated and examined further.

Discussion

The use of health data specific to a geographic area to demonstrate health inequity, while producing geographically specific knowledge through community participants, is not a common practice.[21] We view these findings as supportive of PPM as an effective method to investigate community health outcomes *with* the communities themselves.[15, 22] To be clear, however, users

should refrain from selecting PPM when another tool may be more appropriate. Picking a tool that best fits the need is important, and PPM works with community groups interested in assessing health and place. This new methodology is unique because it integrates both community and environmental contributions to health, safety and other issues of relevance to a community in a comprehensive way.[19] The National Expert Panel on Community Health Promotion recommends that ensuring that community and researcher partnerships are equipped with a diverse set of tools broaden the traditional scope of research methods that address community health. We believe the findings from this evaluation will be useful in improving community health efforts. Strengths of the PPM approach include:

- PPM creates a systematic way to involve people in participatory processes that are grounded in their lived experiences of place.
- PPM emphasizes community/university partnerships.
- PPM connects community members with decision makers.
- PPM facilitates the transfer of knowledge about how attributes of people interact with attributes of place to inform behavioral change.
- PPM provides products like images, presentations, and maps that are able to engage people in dialogue and extract knowledge from the perspectives of people who are often unheard.
- PPM grounds findings to personal, social and geographical realities in order to shape place-based interventions.

Many community groups have had great success in harnessing the power

of mapping technologies like GIS. [11] It is only in the last two decades that qualitative data have been combined with spatial/mapping procedures.[20] Although professionals typically have used maps, participatory mapping has the potential to become a powerful tool in the hands of citizen groups.[11] Further, participatory mapping adds value to the intervention process by engaging community partners to shape their communities effectively in the ways they feel is important.[11] For example, this evaluation revealed that PPM increased the level of youth involvement in the issues.

People's behavior is personally, socially, and *geographically* grounded. PPM identifies a communal process by focusing more on group dynamics than on the individual. People are socialized through interactions and participation in community settings and relationships with each other and with the environment.[21,21] Interactions with the environment can either empower or weaken community members individually and collectively.[22] Through this evaluation we learned that PPM enhanced the work both *in* and *with* communities in understanding how people interact with place, and this in turn guides behavior and has the potential to create community change.

If we understand how people experience health, we can better understand how to intervene in a meaningful way within the socioecological context.[7] PPM may be helpful in addressing change at multiple tiers of the social- ecological framework, including micro- and macro-level environments, such as at the individual and community level. PPM is a vehicle by which a community can talk about and act upon the things its people care about.

Appendix

Key Informant Questions:

1. Tell me what you thought about the PPM process?
2. Tell me about your experience with each of the following PPM components:
   a. Photographs:
   b. Narratives:
   c. Maps:
3. How would you compare the three components?
4. Was one component more useful than the others? Explain.
5. Tell me about your PPM project outcomes.
6. What surprised you? Tell me more about that.
7. What do you think about using this tool in another project?
8. What else would you like to add?

Follow Up (prompts):
1. Tell me more about that.
2. What did you think about that at the time?
3. Tell me how the PPM project changed your thinking about the issue you identified?

Notes:
- The idea is to let the subjects speak generally about PPM so that we can discern common themes among all the respondents.
- We should avoid injecting any particular idea into the conversation.
- The survey should get at the details, especially if you include open ended questions in addition to likert-scale questions.

Tasks:
1. Code interviews (Sam/Suzanne) independently and then compare our coding.

2. Develop a concise set of themes/codes to give to others to use when coding the same transcripts.
3. Compare inter-coder reliability. Presuming it is high, develop the survey based on those themes.

**The Participatory Photo Mapping (PPM) method has four steps: 1) taking photographs,
2) conducting interviews, 3) integrating maps and 4) sharing information. In answering the questions that follow, please reflect on your last project that used the PPM method.**

1. What were the project goals of your last PPM project?

The <u>first</u> step of the PPM method involves participants taking photographs while traveling by foot, bike or automobile with GPS units.

2. To what extent did the photographs or the process of taking photographs…	Not at all	Very little	Some	Quite a bit	A great deal
a. …actively engage <u>participants</u>?	○	○	○	○	○
b. …prompt participant conversation?	○	○	○	○	○
c. …shape participants' views?	○	○	○	○	○
d. …increase participants' familiarity with the community?	○	○	○	○	○

e. …increase participants' knowledge of

the issue?

	Not at all	Very little	Some	Quite a bit	A great deal
f. …prompt <u>project coordinator</u> conversation?	○	○	○	○	○
g. …shape project coordinators' views?	○	○	○	○	○
h. …increase project coordinators' familiarity with the community?	○	○	○	○	○
i. …increase project coordinators' knowledge of the issue?	○	○	○	○	○
j. …prompt <u>decision maker</u> conversation?	○	○	○	○	○
k. …shape decision makers' views?	○	○	○	○	○
l. …increase decision makers' familiarity with the community?	○	○	○	○	○
m. …increase decision makers' knowledge of the issue?	○	○	○	○	○
n. …generate new information?	○	○	○	○	○

The <u>second</u> step of the PPM method involves focus groups and interviews during which participants discuss issues while viewing the collected photographs; the discussions generate narratives.

3. **To what extent did the focus groups, interviews and narratives…**	Not at all	Very little	Some	Quite a bit	A great deal
a. …actively engage participants?	○	○	○	○	○
b. …prompt decision maker conversation?	○	○	○	○	○
c. …shape decision makers' views?	○	○	○	○	○
d. …represent community perceptions					

	of the issue?					
e.	…generate new information?	○	○	○	○	○

The <u>third</u> step of the PPM method involves mapping travel routes, photographs, and narrative.

4. To what extent did the maps…	Not at all	Very little	Some	Quite a bit	A great deal
a. …actively engage participants?	○	○	○	○	○
b. …prompt decision maker conversation?	○	○	○	○	○
c. …shape decision makers' views?	○	○	○	○	○
d. …reveal previously unrecognized spatial relationships?	○	○	○	○	○
e. …prove to be technically challenging?	○	○	○	○	○
f. …generate new information?	○	○	○	○	○

The <u>fourth</u> step involves sharing information generated through the PPM method with policymakers and decision makers. Please reflect upon all the ways you may have shared the results of this project.

5. Did you present your results?

⤵ ○ Yes

○ No ➔ **Go to question 7**

6. To what extent did your presentation…	Not at all	Very little	Some	Quite a bit	A great deal

a. …actively engage participants?	○	○	○	○	○
b. …shape decision makers' views?	○	○	○	○	○

7. How else have you shared information and results with decision makers?

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In this section, please reflect on your <u>overall</u> experience with the PPM method.

8. To what extent did the…	Not at all	Very little	Some	Quite a bit	A great deal
a. …<u>photographs</u> contribute to the achievement of project goals?	○	○	○	○	○
b. …<u>focus groups, interviews and narratives</u> contribute to the achievement of project goals?	○	○	○	○	○
c. … <u>maps</u> contribute to the achievement of project goals?	○	○	○	○	○
d. …<u>sharing of results </u>with policymakers and decision makers contribute to the achievement of project goals?	○	○	○	○	○

9. Please rank the steps of PPM in order of usefulness, from one to four, with one being the <u>most</u> useful, through four being the <u>least</u> useful:

	Photographs
	Narratives

☐ **Maps**
☐ **Presentation**

10. To what extent did using the PPM method…	Not at all	Very little	Some	Quite a bit	A great deal
a. …increase participants' sense of being taken seriously?	○	○	○	○	○
b. …increase participants' self-esteem?	○	○	○	○	○
c. …increase trust between you and participants?	○	○	○	○	○
d. …help you gain a greater understanding of issues in the community?	○	○	○	○	○
e. …help you develop new partnerships?	○	○	○	○	○
f. …help you communicate effectively?	○	○	○	○	○
g. …help community members prioritize issues?	○	○	○	○	○
h. …help you achieve your project goals?	○	○	○	○	○

11. To what extent..	Not at all	Very little	Some	Quite a bit	A great deal
a. …was the PPM method adaptable to your project needs?	○	○	○	○	○

b. …were the four steps of the PPM
   method integrated?

    ◯   ◯   ◯   ◯   ◯

12a. Please think about any changes that occurred in the community at least partly as
a result of your project.
Initially, what was changed as a result of your project?

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12b. Twelve months after project completion, what changes persisted?

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13. What were the greatest weaknesses of the PPM method?

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14. What were the greatest strengths of the PPM method?

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15. How likely are you to…	Not at all likely	A little likely	Somew hat likely	Very likely	Extremel y likely
a. …use the PPM method again?	○	○	○	○	○
b. …recommend the PPM method to others?	○	○	○	○	○

16. With what type of organization are you affiliated?

○ Community-based; name of organization [　　　　　　　　　　　]

○ Academic

○ Government:

○ Other, please specify [　　　　　　　　　]

Thank you for your participation in this
study of the Participatory Photo Mapping Method.

Please return your completed survey in the envelope provided to:

University of Wisconsin Survey Center
630 West Mifflin Street, B174
Madison, WI 53703

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Using Participatory Photo Mapping to explore food choices and physical activity opportunities for a Latino population in Milwaukee

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Abstract: Latino children in the U.S. are more likely to be overweight or obese than their non-Latino, White counterparts. Reasons for this disparity are complex, with explanations and potential solutions likely varying from community to community. This project collaboratively engaged Latino community youth using Participatory Photo Mapping (PPM), which is a community-based participatory research approach that incorporates digital photography, narratives and maps. We gathered data on the eating and recreational experiences of 30 Latino youth in grades 5-8 in one school in Milwaukee, Wisconsin. Specifically, we used photographic records, GPS travel data, and interviews to collect data on participants' eating and recreational behavior in the social and built environment, and their perceptions of these experiences. We aimed to understand how youths' perceptions and attitudes of environmental factors affected their behaviors around physical activity and eating habits. Results suggest that: (1) this school environment excels in physical activity opportunities, yet was lacking for a healthy nutrition environment, (2) the food consumed at home and during non-school hours were sometimes nutritious, yet often included fast food and processed, high calorie "junk" food, (3) meal time at the home environment is a social event where social networks are enhanced within the immediate and extended family, and (4) the neighborhoods around the home provide easy

access to junk food, but also provide rich opportunities to be physically active. Interventions to improve obesity among children need to take these specific school and family environments into account.

Latino children in the U.S. are more likely to be overweight or obese than their non-Latino, White counterparts.[1] Children's weight is a function of genetic heritage, social and physical environments, nutrition and physical activity. [1] Reasons for ethnic disparities in childhood obesity are complex, with both explanations and potential effective solutions likely varying from community to community.[2]

Evidence shows that people's environments, both social and physical, strongly affect their physical and mental health.[3,4] The "healthfulness" of a school or community environment is a function of several interacting factors, including the built environment (e.g., its suitability for physical activity and outdoor recreation), the food environment (e.g., access to grocery stores and fast food), the policy environment (e.g., school policy on physical education and food quality), and the social environment (e.g., social networks or cultural norms and trends). This complex milieu influences the attitudes and behaviors of children, affecting their weight and their health. Given the complexities of these factors, it has become clear that research looking at one potential determinant of obesity at a time provides a limited understanding of the full context that affects childhood obesity.

For example, a recent study on energy expenditures by youth at parks reported that park access has only a weak association with increased physical activity, and that little is known about proximity to parks and utilization of parks for physical activity.[5] Another study reported that neighborhood demographics impact fast food density in poor, African American communities, increasing

consumption of fast food. This is primarily caused not only by density of fast food restaurants, but also because of lack of proximity to diverse food choices.[6] Research also shows that physical activity among youth varies widely by age, gender and race.[7] Moreover, even in the same objective environment, cultural norms, attitudes, and behaviors may differ between individuals and families, making their experiences of the environment different. As such, studies on childhood obesity need to examine how culture affects children's attitudes, experiences, and behaviors.[8] Given the complex factors that contribute to the health and weight of children, studies that focus on many aspects of children's particular contexts may be better at identifying major determinants of local child obesity and health, and at providing specific pathways to improve child obesity rates and overall health.

This study uses a community-based participatory approach to gain a deeper understanding of the physical and social environment of a group of Latino children in one elementary school. Community-based participatory research (CBPR) is particularly useful in identifying how people engage with each other and with a place under specific conditions.[5] We use Participatory Photo Mapping (PPM), a CBPR method that engages community members in a research process that integrates photography, maps (Geographic Information System technology), and narratives.[9] The process produces a rich set of qualitative and spatial data related to community members' experience of health and place, and thus can reveal relationships that purely quantitative methods often miss. For example, PPM might uncover that despite the availability of a neighborhood playground, children may not play there as a result of perceived discrimination or safety issues rather than a lack of interest in outdoor activity.

This type of qualitative finding complements quantitative data, and can help community members and policy makers create more effective community-, school-, and home-based interventions.

The purpose of this PPM project was to engage youth in a process to understand how their environments and perceptions of their environments affect their behaviors around physical activity and eating habits. In public health research and practice, the built environment refers to buildings, (such as schools, homes and workplaces), streets, alleyways, highways and parks that are created by and for people.[2] While there are aspects of the built environment that can affect people's health directly, how people *perceive* their built and social environment usually has a more direct effect on their behavior. Therefore, an important concept to highlight is that of *affective appraisal*, which states that, as people move through an environment, they judge more than the physical attributes of a place, they judge how it makes them feel.[10] Culture, peer groups, and families affect how youth interact with their social and built environments. This study was designed to try to understand the complexities of how a specific group of youth in one middle school perceive and experience their environment in ways that likely affect their weight and health.

Methods:

As part of a larger project funded through the School of Medicine and Public Health at the University of Wisconsin-Madison, a sub-set of the research team used participatory photo mapping (PPM) to collect data generated by Latino children in one middle school in Milwaukee, Wisconsin. The study began

in August 2010 and lasted two years. The PPM data collection spanned one summer in that two year timeframe in 2010.

Participants

Thirty Latino children (11 boys and 19 girls) in grades 5-8 living in Milwaukee, Wisconsin and attending the Bruce Guadalupe Community School (BCGS) chose to participate in this project (See Table 1). Youth were recruited by asking for volunteers from the pool of the 180 consented and assented participants from the larger study. Thirty children volunteered, and were assented for the PPM project. At the time of the study, BGCS enrolled 860 students in grades Kindergarten through 8th, 98% of whom were Hispanic, 80% of who received free/reduced-price lunch, and 39% of whom had an elevated body mass index (BMI). The research team chose to work with BGCS to build and strengthen an existing partnership the school had with one of the research partners, and in order to improve health equity in this underserved Wisconsin community. Human subject approval was secured in order to conduct this project.

Table 1 Distribution of participants by grade and gender

Grade	Boys	Girls	Total
5	3	6	9
6	3	7	10

7	4	3	7
8	1	3	4
Totals	11	19	30

PPM method**:**

The first step was to present all 30 students with a 45-minute instructional session that included three learning modules focused on the ethics of photography, the risks and responsibilities of photography, and information about the project and guidance on how to take pictures. Together, the research team and participating students created a list of the important aspects of the social and built environments to be explored, such as outdoor recreation, hanging out with friends or playing outside in winter. Students were given cameras and Global Positioning System (GPS) units to take home for one week and instructions for taking pictures as 'homework'. The instructions included how to use the GPS unit and camera, how to turn units on and off, how to mark a location.

The researchers and students jointly formulated three goals for the data collection: (1) to describe students' food and recreation environment, (2) to assess their emotions about and appraisals of their food and recreation environment, and (3) to document how children describe and assess their emotions about their food and recreation environment.

We talked about etiquette and responsibilities of photography by leading a discussion on what ethical photography means. We stated that

ethical photography is being aware of how photographs portray people, including capturing images that may embarrass, ridicule or stereotype people. We asked them to take about 10 – 20 photographs each day and to make sure to document both the food and the recreation environment to tell a story about how they experience the food and outdoor recreation environments. (See Appendix for the complete set of instructions).

Next the youth were instructed take pictures focused on the food and outdoor recreation environment in their neighborhood, and to make a plan to photograph these places. We told them to focus on the social environment, including: (1) interactions with family/friends that included physical activity and nutrition opportunities, (2) interactions with people at school, and 3) interactions with people in the community. We also asked them to focus on the built environment, including: (1) routes to school, stores, parks, and other destinations; (2) any outdoor spaces in which the youth spent time or about which they had an opinion (e.g., regarding safety); and (3) any public source of food/snacks (e.g., corner stores).

During the five days of participation, students wore a GPS unit secured to their arm with an elastic, Velcro band. The GPS unit tracked their movement throughout the day, and youth were asked to turn off their unit at night to conserve battery power. The photographers were asked to explain the intentions of the images.

Finally, after the data were collected by students, researchers conducted group sessions with youth in which we used the photographs as prompts and asked for descriptions of the meaning of each photograph. Researchers were careful to differentiate between the picture taker and anyone else who

commented on the photo. Kids presented to each other and we recorded their explanations of their photographs. At the completion of each after-school session, students returned the equipment to study personnel.

Researchers kept the discussion focused on physical activity and eating habits within their neighborhood to stay in line with the research focus. Youth perceptions included supports/barriers to healthy eating, access to fresh foods, perceptions of neighborhood food outlets, neighborhood supports/barriers to active living, access to opportunities for physical activity, perception of local recreation environments (parks, etc.), and perceptions of the local outdoor environment in general (streets, sidewalks, etc.).

Qualitative Assessment of Field Results:

Analyzing Qualitative Data:

All personally identifiable information was edited or removed from the photographs and accompanying interview transcripts. Collected data were then coded, geo-coded, and mapped together with a coordinated set of photographs, narratives, and focus group transcripts. Photographs and narratives were mapped using ArcGIS software. This process was inductive; the interview and focus group data were analyzed using a Microsoft Word table like Table 2 below:

Table 2. This is a Microsoft Word table that includes the photograph and the corresponding narrative for that photograph. The columns include a place for the

	Narrative	Narrative Code	Parent Code
	This a taco. I was hungry so my mom made me some tacos (they were good). DELICIOUS. It's a Latina thing.	Latina Thing Mom Familial - food	Family Food Attributes
	I ate a paleta and that is why I have a popsicle. This came from my house. Paleta man sells bigger ones. It's cold and juicy and delicious. It tastes juicy. Eat only in summer because Latina's are very hot. Latinas need their coldness.	Summer Need coldness	Food

researchers to record their codes.

In order to connect participants' perceptions to a place, photographs, narratives, and places were linked using a time stamp and latitude and longitude coordinates in order to place the photograph into a geographic information system during the analysis. This is referred to as a hybrid relational database and consists of spatial data in the form of satellite imagery and qualitative data such as photographs and narratives.[11] This project links pictures and narratives to a

GIS using ArcGIS. Together the data incorporate qualitative and quantitative analysis that are assessed.[10] In this way the lived experience of the participants and the places are never separated.

After PPM was used to identify participants' experiences and views of community factors that promote or impede health, researchers compared this information with objective measures of the built and nutrition environment. This allowed researchers to determine (1) availability of and access to healthy food and its actual consumption, and (2) proximity to environments supportive of physical activity and actual participation in physical activity.

We then used constant comparative analysis to generate themes and subthemes. Constant comparative analysis generates empirical knowledge by building themes through the process of data analysis and coding.[10,12] Researchers also tested the reliability of the coding process by comparing the themes across coders, creating a reliability score and analyzing the data until no new themes emerge. Using this intensive qualitative analysis process, deep descriptions of participant perceptions of nutrition and physical activity from photographs, GPS routes and narratives were coded. Data were collapsed into codes within specific categories and then into themes.[13] These themes were then examined within the framework of the research aims.[10,14]

This process enabled researchers to group narrative by code, category and finally by theme. The findings were then vetted with participants in order to test accuracy of original findings. Feedback from the community was then integrated and changes were made to reflect the vetting process. We also vetted our preliminary findings with our community partners and others who were not part

of the original study. The results section discusses our findings within the main categories derived from our analysis: place, activity, food and transportation.

Results:

Place

This research shows that the family unit, not the urban landscape, defines physical boundaries where youth are and are not permitted to spend their time. These physical boundaries include not only parks and food outlets, but also houses of friends and family members. Figure 1 shows that the PPM participants are spread across a large geography. Many of the kids reported being limited to cousins' houses and places near their home. It became clear that families define their spatial boundaries differently from each other, and that this has consequences for how the children perceive interactions with their environment. We found that youth had boundaries summarized best by referring to them as "near my home" but that this meant different things to different children. If a park or healthy food outlet was located outside of the bounded spaces, they would not be used. Parents had clear limits to where their kids were and were not permitted to play, walk, etc., yet proximity had little to do with it.

Near home environments are where kids play (see Figure 2); kids spend most of their time at home in yards, streets and alleyways near the home (see Photos 1 & 2). One youth said, "In the sidewalk I mostly play catch and bike ride. This is the safest place I play in my whole neighborhood." Kids also play in the street:

"I play soccer and football in the street because no cars pass mostly. There's a large amount of space and it's not so bumpy and for me it's better then an alley. It's easier to move away from the cars. Easier to play with everyone in my street and have fun."
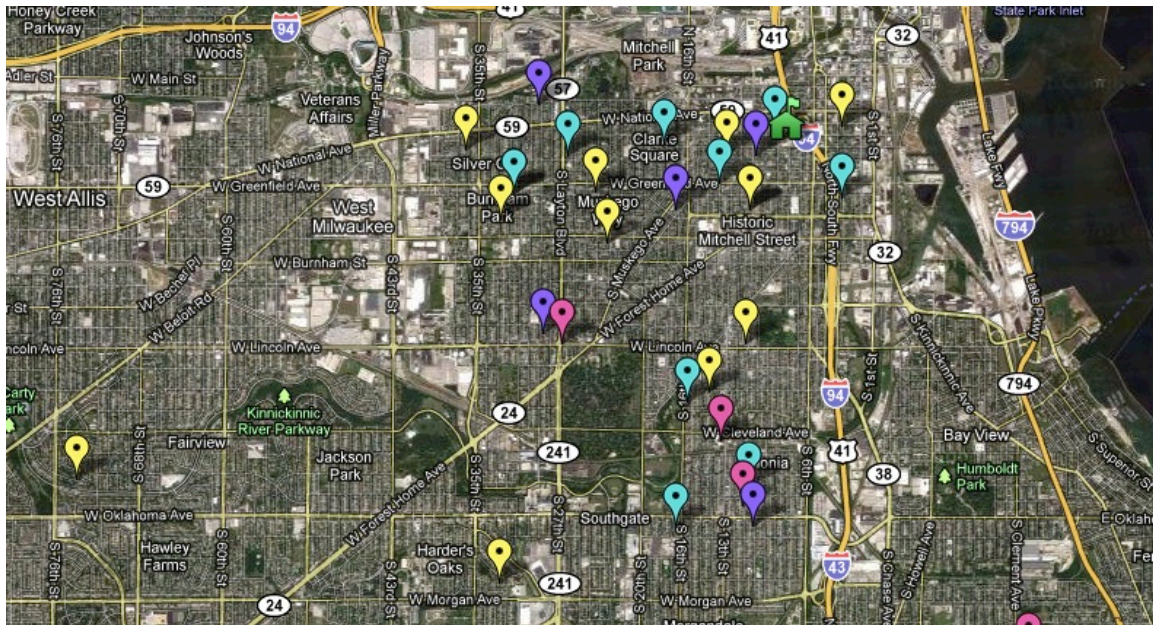

Figure 1: The Spatial Distribution of PPM Participants. The school is depicted as the green schoolhouse symbol in the upper right and the colors reflect the different grades. Yellow is grade 6, blue grade 5, purple grade 7, and crimson grade 8.
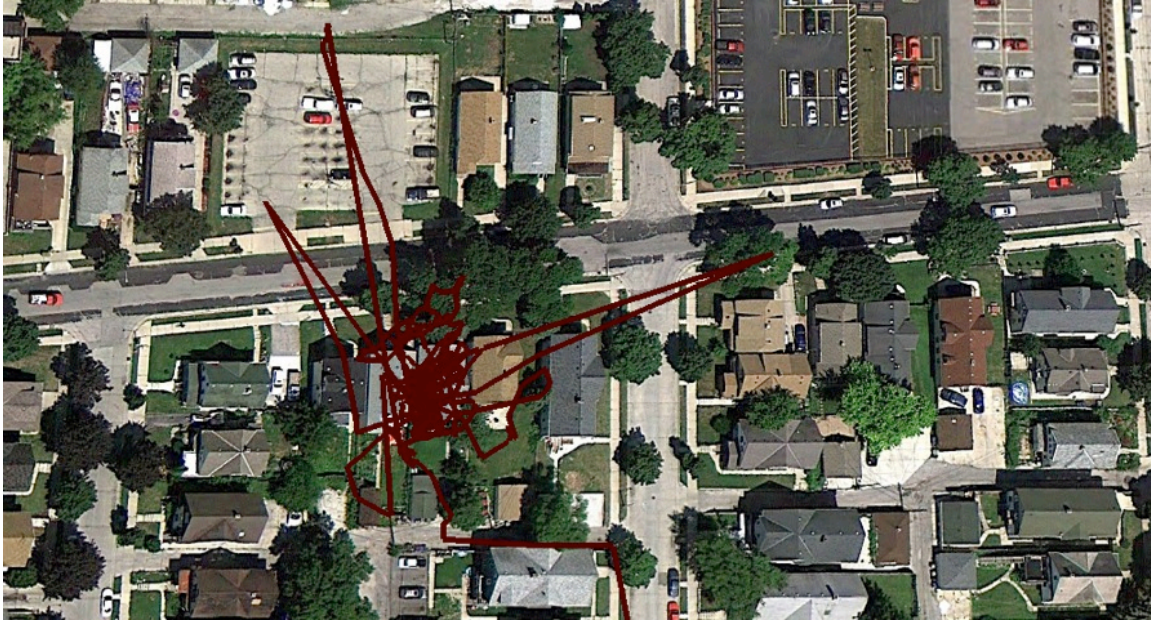
Figure 2: This map depicts one youth's activity around his home, where he plays mostly in streets and alleyways.

In this project we learned that families tend to drive to parks no matter how close they live so that they can eat as a family there. Youth reported that they did not go to parks alone. One youth said, "It depends if it is a popular park. We don't stop if it is popular; we want to be alone with our family. It's important to have fewer people around." Another youth said, regarding popular parks, "I don't fit in there." And another reported, "I really love this park because my family and I get together and we play in the park. I like it better than the park by the school because there is more space and it's less crowded."

Activity

We identified this theme because most of the kids reported that they were regularly physically active at school or near their homes (see Figures 2 & 3). Major themes regarding physical activity include: (a) physical activity took place

at either the BGCS gym or in the near-home environment (yard, sidewalk, street, and alley), and took place throughout the entire day; (b) larger parks that could accommodate extended families for long periods were mentioned and small neighborhood parks, although rarely mentioned, were considered "too small," "too crowded" or "for younger kids only"; (c) physical activities involved free play with friends, siblings or cousins, rather than sports, or other organized activities; and (d) some mention of exercising in the home.
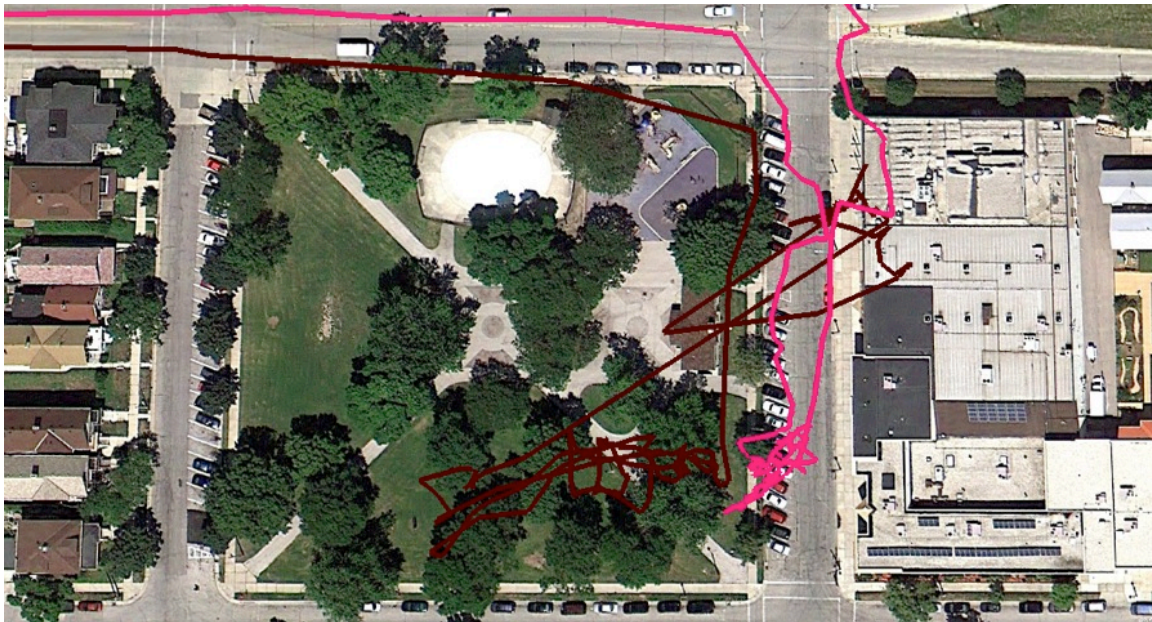
Figure 3: Youth would spend time at the park after school and take care of younger siblings or other young children and later be picked up by a caregiver in a car. This map depicts two youth spending time in a park prior to being picked up.

Photo 1: Here is a picture of kids playing in an alleyway, described as safe.

Photo 3: A participant's yard where she plays with her friends and siblings.

Study participants reported being physically active in formal and informal ways. An example of a formal physical activity is playing sports at school during physical education classes (see Photo 4 & 5) or engaging in dance classes after

school. An example of an informal physical activity is walking to a destination. In the words of one youth:

> "I usually walk to this gas station with my cousins, my mom, and my brother. On the way there, I can talk to my cousins and get to know them better, since I barely talk to them. We usually bring a wad of cash to spend on lots of junk food. It is not a very far walk but I enjoy the time I get to spend with my family."

Photo 4: The youth took pictures of their peers playing volleyball at school. Formal types of physical activity such as physical education classes were described by youth as one way to be active during or after school.

Photo 5: A frequented gas station where youth walk to get snacks. They walk in groups and pool their money in order to buy snacks to share collectively.

Physical activity is very common at the school every day. Many youth reported playing sports and moving a lot in a day, but also through the entire year due to mandatory programming throughout the summer. One youth's photo elicited this description: "This is Sophie playing volleyball in school. The people who play volleyball are from Summer Recreation. We always play many cool things and go swimming and other fun activities."

Food

We identified this theme because youth had much more to say about foods and snacks than they did about physical activity. We found that eating habits and social lives are tightly bound together. Major themes regarding food choice include: (a) strong influence of adult family members' diets in determining the type of foods consumed in the home (e.g. snacks and fast food

restaurants versus home-cooked meals and fresh fruit); (b) the role of social networks involving "cousins" and, to a lesser extent, classmates, in consumption of snack foods and sugary beverages; (c) the role of culture in meals, what is eaten and where; (d) travel modes to food sources (driven in cars to fast food; walking to convenience stores for snacks); and (e) snack foods associated with social "bonding" and family togetherness. Growing food is seen as a physical activity, a source of social connections to family members, and a source of nutritious food. In the words of one youth:

> "This garden is a special part of myself. My grandfather loves to plant food such as cilantro or onions. We had another garden before this, and I would help my grandpa pick the vegetables. I got a chance to bond with my grandpa and get to know him even more. Besides getting bond time with my grandpa, I can also get a chance to learn how to grow my own food when I'm older. Most of the stuff we pick from the garden we use to cook. It's cheaper."

Researchers observed that almost all youth eat school lunches. Although the school excels in rich recreation environments, it has a poor food environment from a nutritional standpoint. One youth described the photo of his lunch: "This is our delicious lunch from school" (see Photo 6). The youth nearly unanimously favored school lunches over homemade lunches. The youth were protective of their school lunches and wanted to be clear that we (the research team) would not change their lunches at all (through this project) by changing the menu.

Photo 6: Here is a photograph of a typical school lunch, which participating youth described positively.

Most youth drink chocolate milk, of which there are two types: regular and Swiss (22 vs. 26 g of sugar) and the higher calorie milk is "more like candy". The following quotes reflect the youth perceptions of school food:

"This is what I ate yesterday in school. This is really good. I really like the Salisbury steak and the corn."

"This lunch is one of my favorites. This lunch contains a beef patty with rice and gravy. We have corn, mixed fruit, and milk on the side. Whenever the school serves us this lunch, we always fight over it. We fight because we are always hungry so we try to steal other people's food."

The youth talked about food as sometimes cheap, such as fast food and snacks purchased in grocery stores, and expensive food, such as groceries. Youth

would pool their money to by cheap snacks, such as chips and candy, and share them. One youth said:

> Who doesn't love candy? Well, in my house, candy is eaten almost every other day. These prove [showing candy] that yesterday, when I was in the mood for candy, I went and brought some. We don't usually get monster sizes such as these, but they were on sale for $3.00. I love eating candy and eat it when I can. When I do want candy or I'm in the mood for it, I can go to the Walgreen's by my house.

Another youth talks about McDonalds (See Photo 7), "Mmmm! McDonald's is my favorite fast food restaurant. My mom would take us to get food about once every two weeks. We don't really go there much, but when we do, we get sandwiches and pies, snack-like things or breakfast." A Mexican market was frequented by most youth and their families and one young person said, "I love my culture's food".

Near home environments are where most meals are eaten (See Photo 7). Generally, parent dietary choices were strong predictors of children's diets. Youth report that their parents cook meals and families eat together. A youth describes, "My mom cooks every other day at home. She makes the best dinners. This here is a pot of rice with chunks of meat in there. Being a Puerto Rican and having a mom who cooks Puerto Rican food, we eat this type of food about three times a week! I just love my culture's food! My family and I have this for dinner."

Photo 7: A typical home cooked meal. Youth's parents are cooking traditional meals from their home country, in this case, Puerto Rico.

Transportation

The built environment is mostly experienced in cars and on foot (See Figure 3). However, bike riding and walking are not a part of the school commute because the school uses parent drop off as a way to get parents to the school so as to engage them. Youth talked about walking to a destination as a form of physical activity, but the primary destination was often a gas station where kids would buy candy and other snacks. One youth describes these walks as a way of passing time, "We walk here. It's a block away. That is where I go with my cousins on a Friday night when we have nothing to do and we walk here and get a bunch of junk food."

Figure 3: This map portrays travel by car from the school to a youth's house, and each route shows additional stops made during the trip home. An example would be, leaving school, visiting the gas station, stopping at McDonalds and then going home.

Understanding travel patterns and eliciting feedback from young people about the trends of walking and biking better informed us about automobile use. In this study, it was clear that there were social benefits of using automobiles. Families spend time together and bonded while in cars (See Photo 3). One youth said, "When it gets really hot outside, my mom would start the car and take my sister and me to get some custard. When we get our custard, we don't usually head home right away. We would sit in the car and just talk about random things. This is one of my favorite things to do with my family."

Proximity to fast food restaurants or parks matters in that youth are allowed to seek out only certain places no matter how close or far away they are.

Parents have a lot of say in where kids go and who with. Almost all park visitation is done with family members and many places are frequented, either for eating, recreation or errands as a family. For example, almost all kids identify Wal-Mart as a food environment, and even though they go there for grocery shopping, they can also shop for other things at the same time, so it is a favorite destination. Further, proximity to a park does not equal accessibility because although parks are accessible to kids, they don't always exercise when they use them.

Discussion

The results of this study suggest that both the school environment and family factors affect the physical activity and food consumption of the participating youth. Regarding physical activity, this school was rich in recreation opportunities, and provided the bulk of the physical activity outlets for the participating children. Youth reported sports and physical education classes, as well as dance classes and other after school activities. Though walking and biking can potentially increase physical activity among youth, our GPS tracking found that youth in this study were mostly transported using cars. Youth did not ride their bikes to school, but relied upon parents or other family members to get a ride. However, time in cars was reported as important to family bonding. Time in parks was mixed between play and social bonding; youth did not play in parks much, but instead spent more time in parks with family sharing a meal or hanging out with friends.

The results suggest that the nutrition environment at the school is not ideal, yet at home, youth have home cooked meals several times a week. Youth

report that they are eating traditional meals from their parents' native Mexico and Puerto Rico, and sometimes eat convenience dinners such as corn dogs and French fries. Desserts tend to be fruit and sweets such as cookies, pie, sugary cereal and candy, with an occasional visit to fast food restaurants, such as McDonalds, for ice cream. Snacks are usually foods purchased in convenience stores and gas stations, such as Cheetos and candy. In addition, GPS tracking showed that youth visited fruit markets and other places where healthy food can be purchased. Youth also pooled their money to purchase unhealthy snacks. This is an example of the complicated nature of the social environment and food choices. Youth are purchasing unhealthy snacks to share, which is both social bonding and consumption of unhealthy foods. They are also driving in cars to places they could walk in order to purchase both healthy and non-healthy items.

This study has several limitations. Because we chose to understand one group of children's experiences in depth, the results are not generalizeable. The group of youth reflects a subset of youth from a very high performing school in a Latino area in one American city. Conversely, a strength of this study is that it highlights information that may be useful in reducing obesity for these children in this location.

With increasing awareness of childhood obesity on the rise, much debate is occurring about the role of schools in increasing physical activity in youth.[15,16] Our study suggests that the school plays an important role in the physical activity of the participating children in our project, as almost all of their physical activity occurs in or at the school. This PPM project indicates that youth participants regard parks primarily as community-gathering places rather than physical activity opportunities. Results of this study suggest that increasing

access to parks may not, therefore, improve the physical activity of children in this study. Conversely, policies that reduce the required physical activity during school time could harm the physical activity levels of these children. Additionally, there are barriers to options of active transport to school. Youth are being driven to school in cars by caregivers. As mentioned above, riding a bike to school is not encouraged so that school officials can make use of parent drop off as a way to get parents to the school so as to engage them.

Alternately, results of this study suggest that there are many opportunities to improve the eating habits of these youth, both in and out of school. However, as we will discuss below, there is a difference between identifying opportunities for improvement and developing strategies that will succeed.

The PPM method aims to allow researchers, health care providers, policy makers, and community members a way to assess health in a community. Accordingly, this project involved the youth in this community, their lived experience and their connections to the environment. This is the most important principle of community engagement in research, that the examination and understanding of issues are embedded within the participants' culture, community dynamics and interactions.[5] Research supports that participating with communities in the data gathering process yields thorough, comprehensive identification of issues that foster local and culturally appropriate problem solving.[17] PPM enhances this process by working with the community to thoroughly observe the role of society and culture and create new knowledge by:

1. Developing culturally sensitive study design
2. Building trust between researchers and community members and

3. Evaluating/measuring to what extent the preferred outcomes were achieved

4. Communicating the results to people who can advocate for change[18]

Translating these research findings into potential community action steps requires communication among school staff, academic researchers, families, schools, and community members with the goals of: (1) identifying and discussing strategies for encouraging healthy nutrition and physical activity choices, (2) exchanging information with community leaders about existing environmental barriers to health and recommendations for change, and (3) discussing potential future steps for improving community health.

This study helped advance our understanding of physical activity and nutrition among a group of middle school students in this school by using PPM. However, collaboration between the research team and our community partners was complicated when it came to translating that knowledge into action steps.[18] In many ways, the PPM portion of the study was well received. Participants felt good about the knowledge produced about the importance of their culture, non-physical boundaries within a built environment, and youth perceptions about the school and their near-home places. Yet, youth did not want this research to change their school meals, which they found delicious; this aspect is not surprising based on industry intentionality to include fats and sugars in many foods for profit motives.[19] In addition, community partners at the school were resistant to any policy implication that would change their food menu because of lack of funding (partners held the belief that healthier food costs more), yet were

open to changes in the already rich physical activities at the school.

Conclusion

In our study, we learned that this school environment excels in physical activity opportunities, yet needs to rethink the nutrition environment.[20] On the flip side, the home environment is where youth are exposed to their cultural heritage through home cooked meals and social networks within their immediate and extended family. Socializing with friends and family is linked to food, both healthy (home cooked meals with family) and unhealthy (e.g., purchasing snacks with friends). Changing the food and nutrition environment outside of school could be more difficult than changing the food and nutrition environment in schools, as food outside of school is integrally tied with culture and social interactions among family and friends. Further research should focus on how school policies could influence physical activity and nutrition among youth.

Appendix:

How to use the GPS unit and camera:

The GPS unit only has one button. To turn the unit on, press the button for a count of 3-Mississippi (one Mississippi, two Mississippi, three Mississippi) and release. The unit needs to be outside when it is turned on so that it can connect to the satellites. The yellow/orange light will begin to blink once the connection has been made. You may wear the armband or put the GPS unit in your shirt or pants pocket. When marking the location of a photograph, simply press the button for the count of one-Mississippi and release.

The cameras have been set up with the correct time and photograph mode. **Please don't change any settings!** For example, do not use the video setting or change the date/time.

It is important to carry the GPS unit while taking photographs.

Please also remember to bring the camera and the gps unit to school every day. You must turn in the camera and gps unit to the office when you first arrive to school. We will return them to you at lunchtime.

Day 1:

After you have thought about the food and outdoor recreation environment in your neighborhood, make a plan to photograph these places. Once you are outside, press the gps button for 3 seconds and release. Wait until the yellow/orange light begins to

blink before you begin your walk. Take a walk and take your photographs!

Try to take about 10 – 20 photographs each day. Make sure to document both the food and the recreation environment.

Remember that you are trying to tell a story about how you experience the food and outdoor recreation environments.

NOTES:

Day 2:

Think about the photographs you took yesterday and make a plan to photograph different places today. Again, once you are outside, press the gps button for 3 seconds and release. Wait until the yellow/orange light begins to blink before you begin your walk. Take a walk and take your photographs!

Try to take about 10 – 20 photographs each day. Make sure to document both the food and the recreation environment.

Remember that you are trying to tell a story about how you experience the food and outdoor recreation environments.

Notes:

Day 3:

Today you will work on telling the story of your photographs. We'll work on adding text to the photographs using Powerpoint. It's important to explain your photographs, so people will know what they mean to you. What is most important for other people to understand about your experience of the food and outdoor recreation environment? Try to write a short paragraph about each photograph.

Next, you will break into small teams and share your slideshow. What themes do you all have in common? What is unique about each set of photographs?

As a group, talk about what is important for people to know about the food and outdoor recreation environment as you experience it. What do you think might surprise them?

Notes:

Day 4:

On this last day, you will work in teams to produce a slideshow presentation that highlights the most important themes for your group. Remember that you are the experts! This is your chance to tell decision-makers what you think they need to know about your experience of the food and outdoor recreation environment in order to make better decisions.

Some questions to ask:

1. What do you like and what do you not like?

2. What do you think should change? What should remain the same?

3. What are the three most important things people should know about the food and outdoor recreation environment?

FINAL PRESENTATION:

Select 4 photographs from the food environment and 4 photographs from the outdoor recreation environment. Make sure that each member of the group has at least one photograph in the slideshow. The slideshow should answer the questions above. Remember that your audience includes the people who make decisions about the food and outdoor recreation environments and they need to hear from you because you are the EXPERTS!

We will make an interactive computer map showing the photographs you select and the stories you write about each photograph.

Notes:

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Conclusion

This paper underscores the timely reappearance of research that is driven to understand place effects on health. This dissertation work is a conceptualization of a framework to infuse CBPR into health and place thinking. This framework is meant to explain and redirect research and practice. Population health outcomes have been compromised by a lack of rigorous and scholarly interdisciplinary collaboration, lack of understanding linking the relationship between human health and place or communities, as well as community participation in decision-making. The scope of this framework is limited in that it does no (as of yet) follow this integration through to system, environment, policy or behavior change. What it is meant to do is provide the beginnings of a roadmap and redirection in a time in which it is necessary to understanding how place affects health. This dissertation highlights the ways in which health and place research has been successful, outlines gaps and provides recommendations for future studies.

I did this by first outlining the assets and gaps in literature, followed up with a research project that explores place effects on health in the field and end with an evaluation of one tool, Participatory Photo Mapping (PPM). Together these findings show how attitudes and perceptions of place can inform people's health behaviors. Using a method like PPM can help us understand behavior trends so that policies and programs are meaningful and can be implemented for greatest impact. Finally, these papers culminate with the evaluation of the PPM methodology for increasing the evidence base. This chapter gets at the grit of PPM and provides one example of a tool that integrates place effects on health.

Ideally, PPM would be one tool in a broad range of tools that can be fitted to the needs of researchers and community members.

I presented three methods to conducting this research, each building upon the next: (1) evaluate current research studies and community initiatives that merge these fields, (2) conducted a community based participatory research project that fused health and place into the design and, (3) implement a process evaluation of PPM for increased rigor and scholarship in application.

First, the research is reflective of two things, (1) a trend I've seen in science to work across health and place disciplines in order to introduce diverse concepts into research and practice and, (2) a breakdown in health and place research to effectively contribute to the evidence through evaluating empirical studies and community based interventions. Current research on the relationship between human health and environmental influences has been steadily increasing; we recognize this as important work. However, we are not allowing the evidence to strategically influence future study in the systematic way; effort to evaluate current interventions that bridge health and place is lacking. This reappearance of research with this focus is timely, as the number of research studies that combine health and place are increasing, which allowed me to review over 30 scientific papers for common themes and outline gaps.

I begin with a critical review and redirection of the current evidence. My dissertation revealed current areas in which researchers and practitioners could address complications of integrating health and place research and redirect their research goals and strategies. These findings assert that a call for a redirection is one way to explore the infusion and integration of health and place more systematically.

Second, building upon this understanding, I present a case example of how a study design works to infuse place into perceptions of health with youth in Milwaukee. This study used Participatory Photo Mapping to work with young people between 5-8th grades to assess perceptions and attitudes of nutrition and physical activity environments. We learned that this school environment excels in physical activity opportunities, yet needs to rethink the nutrition environment. On the flip side, the home environment is where youth are exposed to their cultural heritage through home cooked meals and social networks within their immediate and extended family. The neighborhoods around their homes also provide rich opportunities to be physically active. This study revealed specific findings that are relevant to this geography, but are not generalizable to the greater population. This in-and-of-itself is a poignant finding, as meaningful, impactful recommendations and policies work best within a local context and a small geography. Marrying findings from a larger, more generalized study, together with local contexts, brings together evidence and a tailored approach to public health interventions that increase the likelihood of success.

Finally, I end with process evaluation of a new tool, Participatory Photo Mapping, and explore how combining maps, narrative and photographs help capture peoples attitudes and perceptions. This method intends to assess the relationship between people and their environment together. Health and place are almost always studied in isolation of the other, especially when it comes to community interventions. There is movement toward integrating health and place research, yet little is known as to the how/what and even the why of this approach. I designed this process evaluation to unwrap the components of

Participatory Photo Mapping, explore the strengths and weaknesses of those components and then put the components back together in a more efficient and rigorous way. PPM contributes one approach to the need for a broad range of approaches to understanding community level public health and designing meaningful interventions that impact health sustainably.

Overall, my research presents a discussion on the areas of science in which research integrates health and place, and areas where there is a continued need. Because of the trends in science, more and more researchers are using interdisciplinary approaches. Because of this critical mass of integrated studies, I was able to decipher gaps and strengths in current, peer-reviewed literature. This is important because little evidence exists to understand attitudes and behaviors of people in communities in terms of specific public health problems, such as nutrition habits and physical activity choices.

In addition, this research explores, not only the process and methodology of integrated health and place research, but delves deeply in gaps in understanding attitudes and behaviors around health issues. Processes like PPM are useful tools in realizing how the attributes of place influence the attributes of health to inform behavior. We found that perceptions and attitudes were not what we expected. We were also reminded that culture influences youth choices in terms of diet and activity. The Milwaukee study is an example that shows that a prescriptive appraisal will not be effective as a stand-alone assessment because culture, social and physical environments influence choices. To really dive deep in our awareness of how to impact health in our culture, we need to infuse mixed methods and community participation into our research.

Following are recommendations from my dissertation, collapsed within three main categories: integration of human environment research, community engagement, and evidence.

Integration of human environment research:

- Strengthening the bridge between health and place studies through building and enhancing new and existing conceptual models
- Improve upon existing development and planning processes that provide new insights on how to apply current paradigms to new knowledge
- Infuse public health thinking into non-health fields, such as urban planning, education, and environmental studies
- Increased collaboration between interdisciplinary research teams and communities to provide comprehensive insights to community health interventions
- Diffuse ideas through course curriculum and training an interdisciplinary workforce

Community:

- Combine community engagement together with health and place science
- Build upon methodologies, such as PPM, that are intended to work interdisciplinarily and with in a community setting
- Focus on outcomes that lead to social action

- Apply an asset based approach so that what may currently exist as deficits turn into assets

- Get community members to the table and integrate their voice into decision-making

Evidence:

- Level the playing field by enhancing systems of equitable decision making between professionals, researchers and community members

- Explore innovative and meaningful ways to improve public health through policy initiatives targeted specifically at places

- Research findings inform policies that shape the built environment and inform public health programs

- Through evaluating current programs and interventions, best practices will be employed in producing geographically specific knowledge with community participants

The links across chapters includes a presentation of a conceptual redirection of an approach to science that aims to impact health outcomes in communities. This dissertation really focused on local decision making, community involvement and participation for a diverse audience as a way to (1) reframing scientific thinking and practice to a more integrated and participatory approach and (2) provide direction for that reframe.

Further community-based studies, like the one done in Milwaukee, should focus on how policies and decisions could influence health behaviors at the

community level. Because such studies are embedded in CBPR principles, it is important to point out that findings are often not generalizable, but specific to a particular school and people living in a particular geography. This work is complicated, and studies like the one done in Milwaukee point out that blending disciplinary thought together with CBPR using methods such as PPM can create tangible, meaningful, local impact. Additionally, these papers show how this work can be culturally relevant and comprehensively beneficial. In order to affect change, it is important to understand behavior and why people make the choices they make; how people interact with the environment around them has a lot to do with their health outcomes.

Combining health and place research efforts together with CBPR provides a necessary pathway for influencing population health outcomes. Infusing different disciplines into health research and practice allows for comprehensive and integrative approaches to thinking about public health and environmental problems simultaneously. Recommendations presented in this dissertation have the potential to affect essential community and research outcomes and make available key contributions from diverse stakeholders. Community participation is a huge emphasis in the integration of health and place research. Researchers, professionals and community members working together to better understand the relationship between health and place, and to create impactful policies, decisions, programs and action steps will contribute to building equitable and healthy communities.