

USING SOCIAL THEORY TO GUIDE RURAL PUBLIC HEALTH POLICY AND
ENVIRONMENTAL CHANGE INITIATIVES

by

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DEDICATION

This dissertation is dedicated to Steve, Emerson, and Zora for all of their support, encouragement, sacrifices and love. Every day you bring me great joy and enrich my existence. I love you and am thankful for every moment we are together.

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ABSTRACT

The study of health disparities and the social determinants of health has resulted in the call for public health researchers to investigate the mid- and upstream factors that influence the incidence of chronic diseases (Adler & Rehkopf, 2008; Berkman, 2009; Braveman P. , 2006; Braveman & Gottlieb, 2014; Krieger, 2011; Rose, 1985). Social ecological models (SEMs) provide important conceptual tools to inform this research and practice (Krieger, 2011; Golden & Earp, 2012; Story, Kaphingst, Robinson O'Brien, & Glanz, 2008; Glanz, Rimer, & Lewis, 2002). These models can help us look at the social and physical environments in rural Arizona communities and consider how health policies and environmental interventions address mediating factors, such as disparities in access to fresh food, that contribute to ill health in marginalized, rural, populations. Rural residents are at greater risk for obesity than their urban counterparts (Jackson, Doescher, Jerant, & Hart, 2006; Story, Kaphingst, Robinson O'Brien, & Glanz, 2008). And while human life expectancy has steadily increased over the past thousand years, current projections indicate that the rise in obesity-related illnesses will soon result in its decline (Olshansky, et al., 2005). One reason for this decline, may be the reduced availability of healthy food - an important predictor of positive health outcomes including reduced obesity and chronic disease - in many parts of the United States (Brownson, Haire-Joshu, & Luke, 2006; Ahen, Brown, & Dukas, 2011; Braveman & Gottlieb, 2014; Braveman, Egerter, & Williams, 2011). The United States Department of Agriculture (USDA) defines food deserts as geographic areas in which there is limited access to grocery stores and whose populations

have a high rate of poverty. In Arizona, 24% of the rural census tracts are considered food deserts; compared to an average of eight percent of rural census tracts across the nation (United States Department of Agriculture, 2013). Food deserts are one example of the upstream factors influencing the health of rural populations.

Local health departments have been encouraged through the National Association for City and County Health Officials (NACCHO) and through the Public Health Accreditation Board (PHAB) to conduct community health assessments (CHAs) in order to identify unique contexts and community resources, health disparities, and the social determinants of health as well as potential areas for advocacy, policy change, environmental interventions, and health promotion interventions. Public health challenges like chronic diseases, which have multiple causes, can be explored in-depth through CHAs. CHAs often contain recommendations for action and/or are followed by community health improvement plans (CHIPs) which help local health departments prioritize resources and set measurable goals. In Florence, AZ recommendations made in a CHA are being acted upon by a non-profit agency, the Future Forward Foundation (3F). This investigation explores two interrelated issues regarding the use of CHAs and CHIPs as practical tools to set public health priorities. First, what makes a CHA useful to rural public health practitioners? What methods of conducting a CHA and subsequently analyzing the data results in actionable policy recommendations and/or environmental level interventions? Second, to what extent can public health agencies engage nontraditional partners to work in partnership to address the social determinants of health? As an

example, I will look at the impact of a volunteer-based non-profit agency, located in a rural food desert on improving the social and physical nutrition environment as recommended by a local CHA. This inquiry will provide insights to public health practitioners seeking to identify and implement policy and environmental change addressing complex, multi-causal, public health issues, and provide insights regarding engaging nontraditional partners who may not self-identify as public health agencies.

Chapter 1: Introduction & Background

Situating the author

I enrolled in doctoral studies in public health after a winding path including a diverse academic and professional career. After receiving an undergraduate degree in Sociology, I worked as an adult probation officer for Maricopa County, AZ. I was afforded the opportunity to obtain a Master of Science in Criminal Justice; and I completed that degree in the same month as my five year employment anniversary. Passionate as I was to make a difference, I was experiencing burnout and I felt that the criminal justice system was, in public health terms, focusing too downstream and too late in the lives of those we served to be effective. I resigned my position as a badged law enforcement officer.

At the same time, my family decided to move to rural Arizona from the Phoenix metro area. Growing up in Michigan, I enjoyed living in a rural community close to nature. Though I fondly remember my late adolescent years as being characterized by university life, love and marriage; we lived in the city and I missed the peaceful appeal of nature's open spaces.

We found ourselves in Saint Johns in 2006, the county seat of Apache County. Having just obtained my graduate degree in Criminal Justice, I applied and interviewed for related positions but ultimately pursued a career outside of my comfort zone. I was hired initially by Apache County as the Public Fiduciary, a position that reported to the Public Health Director. After six months the County Manager recruited me for the position of Public Health Director, where I remained for nearly three years. My appointment to that position was remarkable. I had no experience or education in public

health, which I pointed out to the County Manager when he asked me to take the job. His response was that there were few candidates in possession of a master's degree and that fact illuminates a common dilemma across many rural Local Health Departments (LHDs). My immersion into the world of public health significantly altered both my personal and professional trajectories as I internalized the values and ethics of the field.

Though I entered public health practice as an outsider I almost immediately recognized that public health interventions could potentially mitigate social issues that lead to involvement with the criminal justice system. At that time the Arizona Department of Health Services employed Carol Vack in a position titled "County Liaison." I can only imagine what Carol thought when she read my resume! She quickly took steps to pair me with another rural county health director who would be my mentor. She also stressed the importance of my participating in the monthly Arizona Local Health Officer Association (ALHOA) meetings held in Phoenix. I owe a great deal to Carol, as she was a superb professional resource and exceedingly helpful. Some significant experiences during my on-the-job training as county health officer included the:

- 2007 statewide implementation of the Smoke-Free Arizona Act.
- 2008 American Public Health Association Annual Meeting in San Diego where I learned about community organizing, strategic planning, and the Mobilizing for Action through Planning and Partnership (MAPP) process in preparation for initiating it in Apache County.

- 2009 coordination and deployment of the Strategic National Stockpile of antiviral medications to county health departments and their subsequent distribution to the community during the H1N1 influenza outbreak.

My years with Apache County were professionally satisfying. The community was welcoming and close-knit. The bureaucracy was so vastly different from Maricopa County's it was virtually unrecognizable as the same level of government. Things that took months in Maricopa County would take minutes in Apache County (like borrowing a county car). While there are many pros and cons when comparing large versus small county governments, the rural working environment was very enjoyable. However, like many young professionals that move to rural communities, we missed the amenities of the city. Ultimately we moved to a different rural community, Florence, AZ in Pinal County, which is approximately equidistant from Phoenix and Tucson. Living in Florence, only a little more than an hour from Tucson, allowed me to attend the University of Arizona and transfer the few MPH credits I had obtained online while in Apache County. My goal has been to ensure that my formal education catches up with my on-the-job public health training as a rural county health director and that I am well prepared for my career in public health.

Review of the Literature: Social Determinants of Health

Although the importance of social factors and community-based approaches has been recognized since the 1960s and early 1970s in the global health literature (Irwin & Scali, 2007), many of the more recent and preeminent researchers in this area reference a 1985, article by Geoffrey

Rose called *Sick Individuals and Sick Populations* (Rose, 1985) in their writings on health disparities and social determinants of health. Rose formalized an academic conversation about the etiology of disease and advocated 'The Population Perspective' (The Scope of Public Health as Ethics, 1999) over the traditional, individualistic, medical model of disease prevention. The premise of Rose's work is that the mean of the distribution of risk influences the tail of the distribution (Berkman, 2009, p. 36) or, put another way, that the average amount of exposure a population has to some risk factor influences how many people get sick. Rose argued that public health prevention efforts should be aimed at reducing the risk of the entire population to reduce the incidence of disease. Other researchers have expanded on Rose's work and developed a body of work on social epidemiological theory (Krieger & Zierler, 1999; Link, 2008; Krieger, 2011; Kaplan, 2004; Phelan, Link, & Tehranifar, 2010) and research strategy (Schwartz & Diez-Roux, 2001). Basic premises articulated by these researchers include:

- individuals are inextricably part of their environments.
- individuals' contexts have profound health effects and can result in health disparities.
- to understand the cause of incidence researchers should study population characteristics, not individual ones.

Further, researchers have noted that the magnitude of various health disparities has changed over time - thus illustrating the changeable and preventable nature of health disparities (Adler & Rehkopf, 2008). The 'risks' that populations are exposed to - especially the unequal distribution of those

risks - are considered 'social determinants of health' (SDH) (Raphael, 2011). Put another way, health disparities and health inequity among populations are a result of the SDH.

The concept of minimizing health disparities to pursue health equity, has its origin in both public health ethics and the field of international human rights. Public health ethics encompasses a foundation of legal rulings to help us define and take action on behalf the "common good" while simultaneously minimizing paternalistic policies (Beauchamp, *Community: The neglected tradition of public health*, 1999). The field of international human rights encompasses "economic, social and cultural rights, such as the right to a decent standard of living, which in turn encompasses rights to adequate food, water, shelter, and clothing requisite for health, as well as the right to health itself" (Braveman P. , 2006, p. 183; Braveman & Gruskin, 2003). Additionally, public health efforts aim to increase social justice in a context dominated by a market justice model of rights and obligations. While market justice emphasizes the centrality of individual agency in disease and injury, social justice focuses on structural risks and barriers to wellbeing. Social justice stresses prevention, minimizing risk, collective action, and an equal distribution of any burdens required to promote health equity (Beauchamp, *Public health as social justice*, 1999; *New Ethics for the Public's Health*, 1999). This ethical framework led to the development of the following definition of health inequalities or disparities, "health differences that are avoidable, unnecessary, and unjust" (Braveman P. , 2014, p. 7) and the development of the principle of health equity which aims to "reduce—

and, ultimately, eliminate—disparities in health and in its determinants, including social determinants” (Braveman P. , 2014, p. 6).

There is not agreement in the literature about which conceptual approach to take in the study and elimination of health disparities. A more nuanced consideration of the population perspective on health disparities argues interventions should aim to decrease disparities between vulnerable socially defined groups instead of trying to lower the mean risk exposure for the entire population due to the concern that the population perspective may have the unanticipated and inadvertent effect of worsening social inequalities (Frohlich & Potvin, 2008). Others argue that radical population interventions (such as fluoridation of drinking water) are preferable to superficial interventions that rely on individual behavior change to ensure that social inequities are not worsened (McLaren, McIntyre, & Kirkpatrick, 2010; McCormick, 2001). The complex interplay between individual agency and structural forces, or life choices and life chances, is explored in more depth in the Health Lifestyle Theory. This view argues “structural variables...provide the context for socialization and experience that influences life choices... Choices and chances interact and commission the formation of dispositions to act (habitus), leading to practices (action)...whose reenactment results in reproduction (or modification) through feedback to the habitus” (Cockerham, 2005, p. 64). Because all public health solutions do not necessarily lend themselves easily or obviously to a radical structural intervention such as fluoridation of the water supply, it is incumbent upon public health practitioners to investigate the choices and chances that contribute to health disparities. One

recommended method is for researchers to strive to understand this complex interplay in a reflexive way (taking into account their own social/historical/material location) with participation from the community to enable the local production of health (Frohlich & Potvin, 2010; Minkler & Wallerstein, 2008).

It has been noted that the distribution of risk should be considered when designing strategies to prevent disease. The paradox of prevention is that small groups at very high risk may have less cases of a disease than a large population at moderate risk (Berkman, 2009; Rose, 1985; Frohlich & Potvin, 2008). Also, if the distribution of risk is not normally distributed in a population and is skewed or concentrated, then high-risk interventions may be more effective. The caveat is that if relative inequality itself is the disparity, moving the entire curve to the left will not result in improvements to population health (Berkman, 2009).

The opposing arguments listed above either come from the “fundamental causes” line of thought stressing the need to alter the most distal determinants by policy or structural change or the “pathways model” way of thinking which focuses on more proximal determinants and seeks to understand the intervening pathway and how humans embody and adapt to their contexts (Diez Roux, 2012). Social ecological models, which have roots in these theoretical approaches and are discussed in greater detail below, place greater emphasis on multi-level approach and focus on altering the more distal or environmental determinants (Stokols, 1992; Glanz, Rimer, & Lewis, 2002; Glanz & Mullis, 1988).

In 1998 the World Health Organization published their report entitled *Social Determinants of Health: The Solid Facts*. A Second Edition was published in 2003. The report outlined the global scale of health disparities and illustrated the social gradient of health (with data from England and Wales) which showed that people near the bottom of the social ladder were twice as likely to suffer from premature death and illness as those near the top (Wilkinson & Marmont, 2003). These findings have been reproduced and a more general finding that the societal inequality itself is a SDH has also been explored in some depth (Wilkinson & Pickett, 2009). In addition to socioeconomic factors, some of the other social determinants in the report included stress, social exclusion, early life, unemployment, food, and transportation. Suggested policy recommendations for each were also included (Wilkinson & Marmont, 2003). Health disparity researchers further articulated and explored the research and policy implications of shifting to a broad focus on the social determinants of health (SDH) (Braveman, Egerter, & Mockenhaupt, 2011) and noted that recognition of the importance of SDH in the literature in the United States became more normative and frequent during the 2000s (Braveman, Egerter, & Williams, 2011). Other notable SDH not specifically mentioned in the WHO report include education, epigenetic processes, sanitation, and clean water (Braveman & Gottlieb, 2014).

The WHO report describes social exclusion as a disparity resulting from poverty, racism, discrimination, and unemployment (Wilkinson & Marmont, 2003). This is much in the same vein as researchers studying marginalization (Lynam & Cowley, 2007). In fact this disparity could be

considered alongside, or as a part of a measure of social capital. Social capital can be defined by psychological characteristics such as measurements of social participation, interpersonal and political trust (Ahnquist, Wamala, & Lindstrom, 2012) or by psychosocial measures which include looking at social networks, social consciousness, neighborhood characteristics, perceptions, poverty and social exclusion (Cattell, 2001). However, these definitions of social capital, which examine individual and social factors, fail to consider another more structural definition of social capital as a SDH. A structural view of social capital is understood through network analysis (such as contrasting the networks of professionals versus non-professionals) and an examination of the role of institutions and the state. The structural view of social capital seeks to gauge “the community’s social capital –its internal cohesion, ties and networks—as well as the type of relationship that the state has with communities” to evaluate institutional support for civil rights, economic development, and coalitions or partnerships between public and private partners (Muntaner, Lynch, & D., 2000, p. 112). A shift in the public health literature to define social exclusion as a disparity produced by the determinant of weak structural social capital would better address the population perspective advocated by Rose (Rose, 1985) and could help combat an overly individualistic study of population health (Muntaner, Lynch, & D., 2000, p. 110).

The McKinlay Model to Eliminate Health Disparities (Satcher, 2006; McKinlay, 1995; McKinlay & Marceau, 2000) is the most well-known metaphor and conceptual tool used to classify the social determinants of health disparities, although it was used by McKinlay to describe levels of

intervention and epidemiologic research methods (McKinlay, 1995). Determinants along a causal pathway can be described as occurring upstream, mid-stream or downstream. Health knowledge and behavior are examples of the most downstream determinants of health while economic conditions and social opportunities are seen as upstream (Braveman, Egerter, & Williams, 2011). Likewise, individual medical care with a curative focus is a downstream intervention, while policy development to affect social and/or economic conditions is seen as an upstream intervention. McKinlay (1995) presented a 2x2 table presenting a typology of health interventions which is reproduced in Figure 1.

Conceptions of Health

		Natural Science	Holistic View
Social Philosophies	Individualistic	1 Downstream curative focus	3
	Collectivistic	2	4 Upstream health promotion policies

Figure 1. Typology: Social philosophies and conceptions of health (McKinlay, The new public health approach to improving physical activity and autonomy in older populations, 1995)

McKinlay further explains that the natural science view is one that is mechanistic and pathogenic and comes from allopathic medicine as opposed to the holistic view which has its roots in classic Greek thought and encompasses the salutogenic, or health-promoting factors. The salutogenic model, which envisions health/illness as a continuum instead of a

dichotomous variable, de-emphasizes risk factors and instead seeks ways to move people in the direction of health (Antonovski, 1996; McKinlay, 1995).

Raphael (2011), finds seven types of discourse in his analysis of the SDH literature which can be seen on a continuum from identifying individuals at risk of disparities to a discussion of power, privilege, influence and an examination of who benefits from health disparities. The following table is partially a reproduction of one that appears in Raphael’s article (2011).

Table 1. SDH Discourses partially reproduced from (Raphael, 2011):

	SDH Discourse - subject of discourse	Research & Practice paradigm	Practical implication
1	Those in need of health and social services	Develop and evaluate services	Improve service provision
2	Those with modifiable medical and behavioral risk factors	Develop and evaluate lifestyle programming	Health behavior change programs
3	Those with poor material living conditions	Identify processes by which adverse living conditions determine health	Identify pathways, reinforce the discourse/concept, strengthen evidence
4	Those who belong to a group (class, disability, race, gender...) with disparities in their material living conditions	Conduct race-, class-, gender-based analysis of living conditions and health effects	Provide evidence of systematic differences in life experiences for groups and form the basis for anti-discrimination efforts
5	Public policy decisions made by governments and other societal jurisdictions	Investigate how public policy decisions are carried out and how they affect health	Affect government policymaking and politics to reduce disparities
6	Economic and political structures and justifying ideologies	Investigate how national political economy fosters particular approaches to addressing SDH	Modify political and economic structures
7	Those who create and benefit from health and social inequalities	Investigate the effects of power and influence and how it can be confronted and deflated	Identify class interests who benefit from inequality and mobilize for change

The current study includes elements of Rapheal's fourth and fifth identified discourses as I am focusing on the rural communities of Arizona and how local public health departments make decisions about how to allocate resources. Additionally, through a case study, I examine a program that affects the material living conditions for rural residents.

Review of the Literature: Social Theory and Social Ecological Models

My minor course of study is multidisciplinary with an emphasis on medical anthropology and sociological theory. At first glance, social ecological models (SEMs) can be considered rather simple practical conceptual tools. However these models contain premises and understandings developed in great depth in the theoretical literature. It is important to provide an overview of a small fraction of the theory that either directly or indirectly informs SEMs to highlight some of the underlying assumptions that inform the models.

Epistemology or 'how we know what we know' is fundamental to theoretical discussions. Social 'truths' result from a fluid historical process; today's certainty may very well be tomorrow's absurdity. Social scientists question not only knowledge itself, but also how knowledge came to be. This is important when considering how individuals or groups of individuals came to "know" things about their health or their health choices and whether what people "know" can be influenced or changed to promote optimal health outcomes.

Pierre Bourdieu proposed the conception of *habitus*, or individual dispositions, as "a product of history" (1992, p. 34) or "embodied history" (Bourdieu, 1992, p. 35). *Habitus* describes an individual's reflexive reactions and ways of perceiving and understanding. He argued individual dispositions are developed over the life course and "are acquired through social experience" (Jenkins, 1992, p. 79). However *habitus*, like knowledge, is not static. Rather, it is transformative and "operates in relation to a social field...[and] can be transformed by changed circumstances, and expectations

or aspirations will change with it” (Jenkins, 1992, p. 82). The social field is comprised of institutions, organizational arrangements, and places – otherwise considered ‘social structures.’ Humans inhabit, and social interactions take place, in the social field. Social structures such as institutions, hierarchical arrangements, and the system of customs that accompany the structures are considered objective because they can be observed and described. *Habitus* describes the subjective internalization or embodiment of objective social structures in the social field. A social field is defined in the literature as “a social arena within which struggles or manoeuvres take place over specific resources or stakes and access to them” (Jenkins, 1992, p. 84). “The structures characterizing a determinate class of conditions of existence produce the structures of the *habitus*, which in turn are the basis of the perception and appreciation of all subsequent experiences” (Bourdieu, 1992, p. 34). Social fields are “structured system[s] of social positions – occupied either by individuals or institutions – the nature of which defines the situation for their occupants” (Jenkins, 1992, p. 85). One might consider SEMs as visual models of the social field under consideration.

Social positions are characterized by the resources, or capital, that are available or at stake in the field. There are four types of capital: economic, social (valued relations with others), cultural (knowledge), and symbolic (prestige and honor). (Jenkins, 1992). These theoretical constructs lead us to understand how *habitus* might be modifiable as long as the social field, or the resources therein, are transformed. The preceding statement is made with knowledge of what Foucault calls “disciplines” (Foucault, 1979).

'Disciplines' are contrasted with liberties by Foucault. Disciplines are all of the "systems of micro-power...[or] infra-law..[which] seem to extend...law to the infinitesimal level of individual lives" (Foucault, 1979, p. 65). Foucault calls the mechanism by which these disciplines occur 'bio-power.' "Bio-power, or power over life, constitutes power employed to control individual bodies and population[s]." The two basic forms of bio-power are "bio-politics of the population" such as regulatory control and "anatomo-politics of the human body" which "focus on the body as a machine" (Gastaldo, 1999, pp. 115-116). "The process of promoting knowledge and norms occurs within a web of micro-powers of forms of control and resistance" (Gastaldo, 1999, p. 123). "[P]ower is rather like a colour dye diffused through the entire social structure and is embedded in daily practices" (Turner, 1997, p. xii). This foundational social 'Theory of Practice' as developed by Bourdieu certainly informs ecosocial theories, especially through the concept of embodiment, which "offers an integrated approach to analyzing the multilevel process, from societal and ecological to subcellular, that co-produce population distributions of health, disease, and well-being" (Krieger, 2011, p. 222).

Some public health researchers believe there is a lack of theoretical foundations guiding programming and evaluation. They recommend returning to Bourdieu's theories to gain practical knowledge to guide improved programming and evaluation methods. Such "practical knowledge can only result from the confrontation between the objective systems of relationships that structure practice and the subjective experiences of social actors whose practices reproduce and transform the structure". This

“reflexive approach to knowledge” (Potvin, Gendron, Bilodau, & Chabot, 2005, p. 594) incorporates objective and subjective knowledge to transform the social field.

Sallis and Owen present a history of social thought related to SEMs stating the roots can be found in public health thought in the host-agent-environment model and in psychology dating back to the idea of ecological psychology, a term used in 1936 by Kurt Lewin. Later psychologists seeking to account for the environmental influences on behavior included Skinner who sought to understand antecedent events in relation to consequent behavior; Barker who thought behavior was more easily extrapolated from situations rather than individual factors; Bronfenbrenner who devised a theory of microsystems and macrosystems to account for behavior; Bandura whose Social Cognitive Theory posits environmental factors affect behavior; and Moos who developed a SEM. (Sallis & Owen, 2002)

According to Krieger (Ecosocial theory of disease distribution, 2011) integrative, multilevel ecologically-oriented theories and frameworks began to appear in the literature in the 1990s that sought to illustrate the myriad SDH and their influence on health disparities over time and in various contexts. These social epidemiological theories originate and build upon the “social ecological model,” a product of “ecological systems theory” as proposed by Bronfenbrenner in the 1970s (Bronfenbrenner, 1977).

Krieger discusses three premises that are shared by the ecological disciplines. First, understanding the context of people in their place requires analysis of “level, time, and space” including geographical and historical milieu. Second, understanding that individuals are part of

populations and both are affected by their environment. Third, that ecological context matters because one can view the various determinants for that time and place and observe the unique pattern (Krieger, 2011, p. 208). These premises outline where there is agreement between the various iterations of ecological models, and for the purposes of this study, it is not necessary to delve into the intricacies of disagreements that exist in the literature. It is interesting to note that illustrations of SEMs generally show the individuals (and their dispositions) as being influenced by multiple factors (in the social field) as Bourdieu's had theorized (Jenkins, 1992). One could also view a SEM as picturing the individual being influenced by the various disciplines and bio-power within the web of micro-power as theorized by Foucault (Foucault, 1979). Below are some figures from the literature and web illustrating various ecological models.

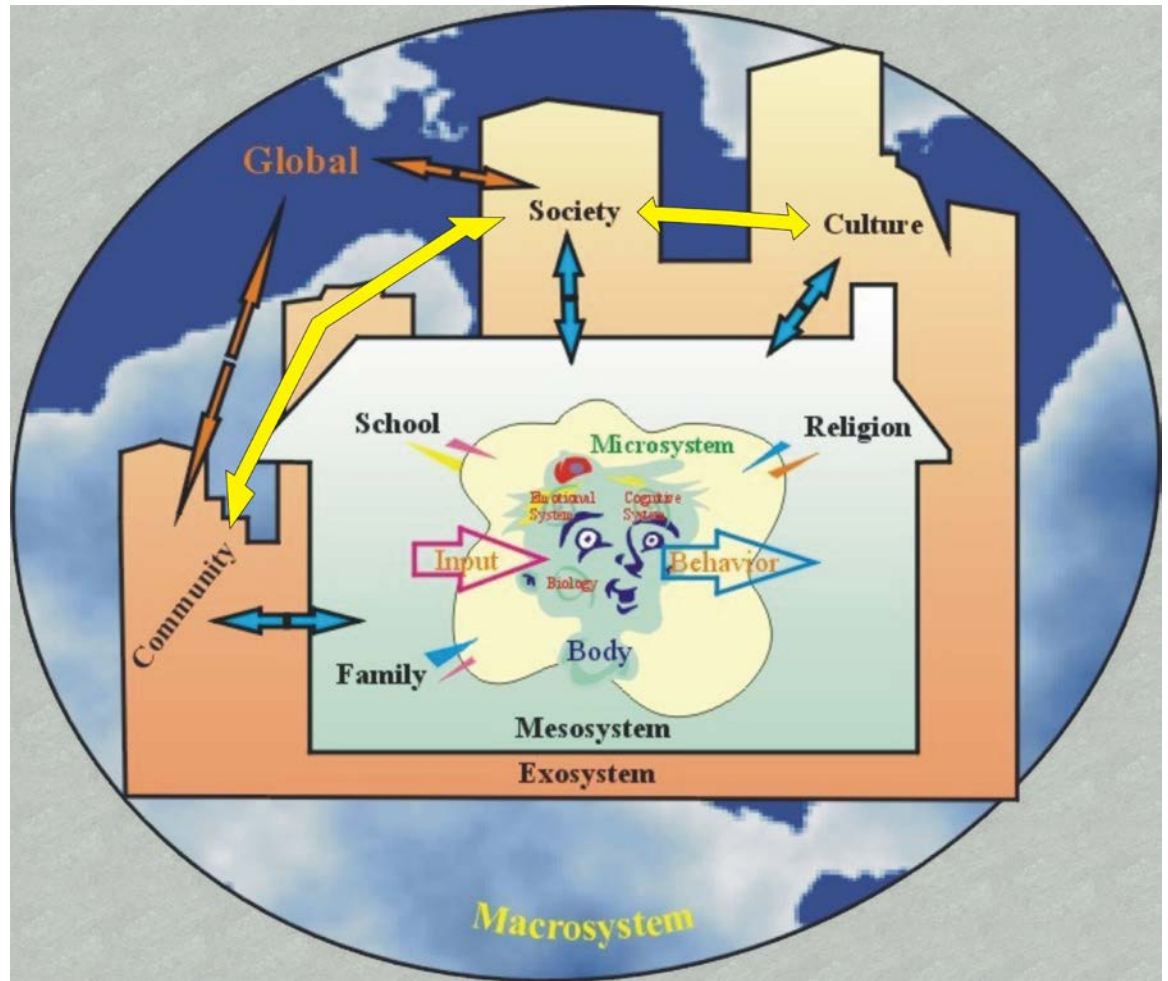
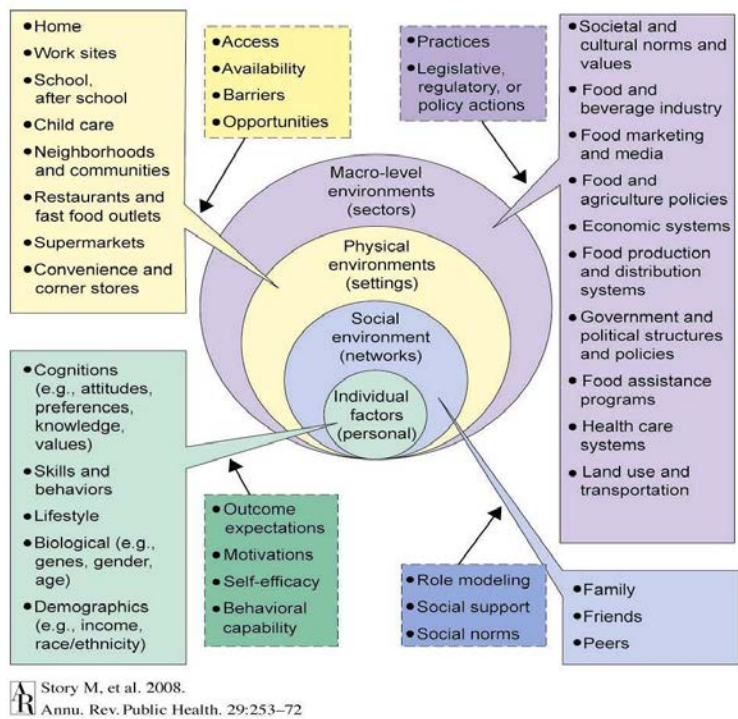


Figure 2. A diagram illustrating Bronfenbrenner's Ecological Systems Theory (Paquette & Ryan, 2001)



Annual Reviews

Figure 3. An ecological model showing the multiple influences on what people eat (Story, Kaphingst, Robinson O'Brien, & Glanz, 2008)

In 1988, an issue of *Health Education & Behavior* focused on exploring the use of ecological models for health promotion (Golden & Earp, 2012). The authors in one article stated the “purpose of an ecological model is to focus attention on the environmental causes of behavior and to identify environmental interventions” (McLeroy, Bibeau, Steckler, & Glanz, 1988). In other words, researchers recognized the importance of altering the social field (Jenkins, 1992). The authors of another article reviewed a number of environmental change initiatives and argued that researchers must continue to refine program evaluation methodologies to include individual and population outcomes (Glanz & Mullis, 1988, p. 411). Other researchers have emphasized that the social environment is multilayered and interventions

should have ecological depth, or target multiple levels of the SEM over an extended period (Stokols, 1996; Golden & Earp, 2012).

Over twenty years after the 1988 issue of *Health Education & Behavior* focused on evidence-based uses of the SEM, Golden and Earp reviewed 236 articles in the same publication to look at whether articles published about health intervention activities were targeting higher levels of the SEM. “Whereas 95% of all articles described individual-level activities and 67% described interpersonal activities, only a little more than a third (39%) described institutional-level activities. Community- and policy-level activities, by contrast, were much less common, found only in 20% and 6% of articles, respectively....63% described interventions that focused on only one or two social ecological levels” (Golden & Earp, 2012, p. 367). These results led them to state that “calls for multilevel interventions that better incorporate social, institutional, and policy approaches to health promotion have gone largely unheeded” (Golden & Earp, 2012, p. 368)

In another review of the literature, Richard, Gauvin & Raine focused only on physical activity and nutrition interventions and analyzed articles by time period and number of levels of the SEM targeted. They concluded that “a very substantial amount of research dealing only with one determinant at the individual level of influence...suggests limited integration of the principles of an ecological approach” while also acknowledging that the proportion of these types of studies has decreased over time (Richard, Gauvin, & Raine, 2011, p. 316). They also noted that few of the fruit and vegetable intake studies reviewed targeted higher levels of intervention or

tried to affect the community or political level (Richard, Gauvin, & Raine, 2011, p. 319).

A number of researchers have agreed that participation and collaboration are important for planning public health interventions (Richard, Gauvin, & Raine, 2011; Mantoura & Potvin, 2012; Potvin, Gendron, Bilodau, & Chabot, 2005; Israel, Schulz, Parker, & Becker, 2001; Marent, Forster, & Nowak, 2012). Community-based collaborative research “focuses on social, structural, and physical environment inequities” (Israel, Schulz, Parker, & Beckler, 1998, p. 173) and is complimented by analyses that utilize SEMs. Further, community-based research is not solely grounded in the positivist etiology (Israel, Schulz, Parker, & Beckler, 1998) it relies on multiple ways of knowing and can incorporate various methods of data collection and indicators to, ultimately, triangulate what is known and develop approaches for intervention.

Review of the Literature: Rural versus Urban disparities

It has been shown that life expectancy is inversely related to levels of rurality, and that this trend has worsened over time. The prevalence of obesity is higher in rural areas as is unemployment, poverty, and poor access to healthcare services. Rural residents have who have fewer protective factors including lower levels of educational attainment and physical activity, suffer more often from unintentional injury and lack of transportation, and suffer greater mortality from chronic disease and suicide (Singh & Siahpush, 2014; Befort, Nazir, & Perri, 2012; Jackson, Doescher, Jerant, & Hart, 2006; Eberhardt & Pamuk, 2004; Hartley, 2004; Patterson, Moore, Probst, & Shinogle, 2004; Bolin, et al., 2015). Studies find that

mental health services are in greater demand, per capita, in rural communities than in urban settings. Additionally, per capita, psychotropic prescription medication is used more frequently (Ziller, Anderson, & Cobern, 2010). One researcher has highlighted the negative effects of dislocation, or inadequate psychosocial integration, in free market societies and how addiction results (Alexander, 2000). Perhaps dislocation provides an explanation for the increased demand for mental health services in rural areas. In terms of the built environment, rural residents generally have less access to recreational facilities, are more likely to live in food deserts, and may have to travel greater distances to access services (Lovasi, Hutson, Guerra, & Neckerman, 2009; Larson, Story, & Nelson, 2009; Sharkey, 2009; Whelan, Wrigley, Warm, & Cannings, 2002). Shifting food systems, less local production of food, and the disappearance of the family farm have resulted in rural communities becoming increasingly reliant on lengthened food chains. The shift from self-sufficiency and local production on family farms to dependence on long food chains results in disempowered communities (Flannery & Mincyte, 2010).

Researchers proposing solutions to reduce disparities for rural communities focus on multi-level strategies that include: policy and environmental changes to increase physical activity and availability/consumption of nutritious foods; developing broad-based partnerships and coalitions; interpersonal and cultural shifts; institutional changes; and implementing smart growth strategies to community design (Barnidge, et al., 2013; Schoenberg, Howell, Swanson, Grosh, & Bardach, 2013; Dalbey, 2008; Sharpe & Staelin, 2010). To shorten the links in the

food chain researchers are recognizing a social movement towards “local food” (Starr, 2012). Researchers considering the built environment determined the increased density of fast food outlets contributes to obesity and they call for better land use regulations to limit the growth of obesogenic environments (Fuzhong, Harmer, Cardinal, Bosworth, & Johnson-Shelton, 2009; Inagami, Cohen, Brown, & Asch, 2009). Some researchers have proposed approaching addictive foods much like tobacco or alcohol, i.e. by restricting marketing to children, increasing taxes or regulating availability (Gearhardt, Grilo, DiLeon, Brownell, & Potenza, 2011).

To address the need to retain professionals in rural areas, an article exploring “lessons learned” from rural health providers asked what they wished someone would have told them prior to their career in rural service. This article provides some salient messages for public health professionals seeking to develop programs for retention of rural providers. It reports that providers considering rural service need to have good self-care practices to prevent burnout; recognize the importance of personal/professional boundaries; be aware that rural providers may have expanded roles and responsibilities beyond the provision of care including the role of administrator, receptionist, pharmacist, social worker, etc.; be satisfied with few amenities; and appreciate the abundance of natural beauty and peace (Chipp, et al., 2010).

Preliminary research

Between December of 2012 and August of 2013 I conducted a comprehensive assessment of the food environment in a rural community to gain practical experience collecting population-level data (Schwartz & Diez-Roux, 2001) and look at various determinants at multiple levels of the SEM to measure the complex and multifaceted determinants that affect downstream factors like obesity. My goals were to document local access to healthy foods and identify potential policy or environmental-level changes that could be the focus of an intervention and community-based participatory research project. I drew upon the work of other researcher who sought to measure population factors such as the food environment (Story, Kaphingst, Robinson O'Brien, & Glanz, 2008; Cummins & Macintyre, 2006; Sobal & Bisogni, 2009; Sallis & Glanz, 2009; Sallis & Glanz, 2006; United States Department of Agriculture; Glanz, Sallis, Saelens, & Frank, Healthy nutrition environments: Concepts and measures, 2005).

I focused on the town of Florence, AZ where I have resided since 2010. Florence has a population of 7,836 living in households (and a population of 17,700 living in state and private prisons). Keeping with prior training in conducting community health assessments I developed a plan to analyze secondary data as well as collect primary data. Below is a summary of the secondary and primary data I collected:

Secondary Data:

- Census (demographic)
- Behavioral Risk Factor Surveillance System (ADHS)
- County health department (number of families who qualify for nutrition services)
- Pulte Homes (current demographics of Anthem community as well as projected growth)
- Local food bank (number of families who rely on services)
- Town of Florence documents (General Plan, Economic Development Plan, etc.)

Primary data collection:

- Created a coalition of concerned residents, held meetings and discussions about the nutrition environment seeking to understand the problem and potential solutions from the community perspective.
- Administered a coalition member opinion survey. This was a paper and pencil survey administered at a coalition meeting.
- Created a community survey, with the input of the coalition, to examine community perceptions of assets and needs of the nutrition environment. The coalition helped design the distribution plan and determined the desired number of respondents.
- Using a photo-voice-type project performed by high school students, documented nutrition environment assets and needs.
- Conducted key informant interviews with community leaders.

- Conducted an audit of the physical nutrition environment with input and assistance from the coalition using the NEMS-S and NEMS-R tools.

The SEM below was developed following this preliminary research, and provides a visual tool that aids in synthesizing the primary and secondary data collection described above.

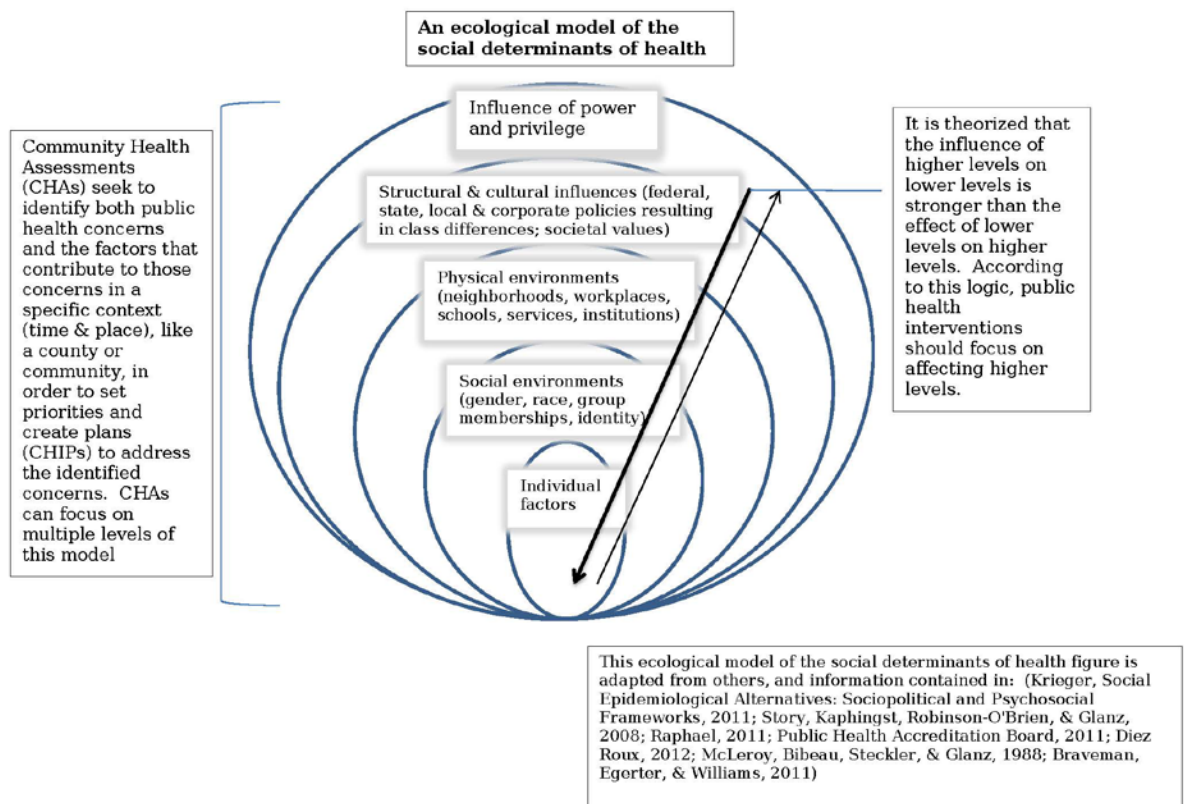


Figure 4: Social ecological model of SDH

The data collected during the community health assessment is presented below in a table which is based upon, and sorted by, the SEM level of the social determinant of health (SDH) presented in figure 4.

Table 2. Results of a CHA of the nutrition environment in Florence

Primary or secondary data	Source of data	SEM level	Highlighted SDH data:
Secondary	USDA - Food Access Research Atlas	Environment	5/5 Florence census tracts have one or more measures (out of six) indicative of a food desert. 3/5 Florence census tracts have 3 or more measures indicative of a food desert (most definitions of food desert require three or more measures)
Secondary	County Health Rankings	Environment	Pinal County has the second highest rate (out of 15 AZ counties) in having the highest proportion of fast food establishments
Primary	Coalition	Environment	Limited access to fresh foods, the expense of fresh foods, and the high proportion of fast foods were mentioned as barriers to healthy eating (especially in the downtown area)
Primary	Coalition	Environment	Suggestions to address the concerns included expanding existing programs, creating a farmer's market, attracting a grocery store for downtown, work with restaurants to increase healthy options, increase local production of food
Primary	Community survey	Environment	Downtown residents and seniors who live in the food desert census tracts favored solutions to increase grocery options and fresh food options downtown
Primary	Key informant interviews	Environment	Some decision-makers were reluctant to consider the perspective that their decisions impact the food environment
Primary	Key informant interviews	Environment	Local non-profit is engaged in putting in backyard gardens as a strategy to increase locally available produce
Primary	Key informant interview	Environment	Economic development plans include improving the corner store, which currently is more of a liquor store
Primary	Key informant interview	Environment	The senior center is very supportive of healthy eating and gives fresh produce as prizes for Bingo
Primary	Coalition	Environment	Bountiful baskets is a program designed to bring fresh produce into communities and could be expanded to serve downtown Florence
Primary	NEMS survey	Environment	Confirmation that fresh foods from stores or healthy prepared foods at restaurants are not available in Florence, especially in the downtown area
Primary	Key informant interviews	Environment & Social	Many families in Florence are reliant on food boxes and food boxes from food bank do not regularly have fresh foods in them

Primary	Coalition	Environment & Social	16 community programs or facilities that serve Florence were identified as being supportive of healthy eating
Primary	Photovoice	Environment & Social	Only 10% of the pictures received had any fruits or vegetables in them, there were a lot of processed and sugar-sweetened food items, school lunches that were pictured were not healthy but made up of processed high-fat foods such a hot dogs
Secondary	Town of Florence	Social	20% of residents absent in the summer (elderly population)
Secondary	Census	Social	Pinal County and all areas contained therein (included Florence) are considered rural
Primary	Coalition	Social	Barriers may include the fluctuating number of residents - consumer numbers fall in the summer (winter visitors)
Secondary	ADHS - BRFSS	Individual	90% of individuals in Florence do not consume recommended amount of fruits and vegetables each day
Primary	Key informant interviews	Individual education & social	UA Cooperative Extension provided nutrition education to food bank participants and helps to raise awareness of healthy cooking

The findings from the CHA were used to make the following recommendations:

Table 3. Recommendations based on CHA of Florence nutrition environment

Recommendation based upon data found:	Type of action:	SEM level targeted:	Recommendation:
NEMS - S/R; photo voice	Research	Environment	Continue photo voice research with restaurant staff, patrons and owners to raise awareness and create more visual evidence of the problem in the community; continue photo voice project in the high school and refine process
NEMS - S/R	Disseminate data	Environment	Present NEMS data to owners and stakeholders of restaurants
NEMS - R	Community action	Environment	Encourage restaurants to provide nutrition information to customers and create health choices on menus
NEMS - R	Organizational action	Environment	Create a health choices eating guide for Florence residents

NEMS - S	Community action	Environment	Encourage stores to increase the percentage of their shelf space devoted to healthy food items
NEMS - S/R	Organizational action	Environment	Work with existing stores and restaurants and existing supply chains to increase the availability of healthy foods at a reasonable price
Coalition	Community action	Environment	Expand Bountiful Baskets to include a site in downtown Florence
Key informant interview	Organizational action	Environment	Work with the Town of Florence to create incentives or small, low-cost loans for local businesses who are working to increase the availability of healthy foods
Photo voice & coalition	Community action	Environment	Work with food service administration at Florence Unified School District
Key informant interview	Organizational action	Environment	Work with the Town of Florence to create incentives, such as water bill rebates for citizens/businesses working to increase the local production of food
Coalition	Community action	Environment, Social, & Individual education	Promote efforts to increase the local production of food, gardening classes, and education
Coalition	Research	Environment, social & individual education	Survey back yard gardening program participants to assist in evaluation efforts of the program
Coalition	Community action	Environment, social	Support the development of a CSA with committed growers
All	Disseminate data	Individual education	Present findings from CHA to community and Town of Florence city counsel

During the months of September through November of 2013, I presented a summary of data collected and the resulting recommendations during two publically announced community meetings. I also made a presentation to the Florence City Council. The coalition decided by consensus that the most feasible action to take immediately was to support and promote the local production of food. Many coalition members volunteered with the Future Forward Foundation (3F). I, as a participant

observer of 3F, reached out to its garden recipients to study the impact the program had on the rural and frontier communities in Pinal County. I have also made my final electronic CHA report available to stakeholders via email and I am aware that its information was used in grant writing.

Genesis of the Study

During and upon completion of my preliminary research I made some observations that informed my thesis. For instance, I noted that the difference in approach between a grassroots CHA and an institutionally initiated CHA resulted in the identification of different public health partners. As a student and resident of Florence, the CHA we conducted was completed with grassroots participation from the community. While in Apache County I had attended formal training on the Mobilizing for Action through Planning and Partnership (MAPP) model for conducting a CHA and we had started the four assessments (Corso, 2005), but I resigned my position before the process was completed. However, the approach and plan we developed in Apache County varied significantly from the one I developed as a student and resident with no institutional support. As a student I circulated flyers and spoke to a reporter for the local paper to publicize my efforts. I also networked with community agencies such as the senior center, library, school administration, and others. As an individual I could not count on organizations to participate. This differed from my experience in Apache County where I would have expected the support of other organizations. I had a difficult time setting up meetings with key stakeholders, in part, because of my “student” status. As the county health director, I would not have had barriers to accessing key stakeholders, and I

would have assumed their participation. Health department staff would have reached out to all of the traditional partners in the area and ensured their attendance at large meetings. Because I was a student, I was in a better position to network with community members rather than community leaders. I was also approached by non-traditional partners, such as the Future Forward Foundation Executive Director, who was interested in healthy eating and was seeking grants to continue the back-yard gardening program they had started. I wondered if, in my former role as the public health director, I would have included a non-traditional partner like 3F in an institutional CHA.

Other insights I gained from my preliminary work was that SEMs could be helpful in planning CHA data collection and community engagement was valuable. A deliberate difference in my approach to the Florence CHA as opposed to the CHA we performed in Apache County was the use of the SEM as well as a more qualitative, ethnographic, participant-observer perspective. I was keenly aware, after many public health classes at the University of Arizona that it was more important to gather population data rather than individual data. I also realized that my status as a student gave me the opportunity to listen to the stories of the community and search for the unifying themes. I therefore chose to look at limited secondary data that focused on individual measures of health and instead sought out measures of population health.

My preliminary investigation raised the question of whether there was evidence for what made CHAs effective to public health practitioners. In my understanding an effective CHA is one that identifies upstream or high-level

determinants and prioritizes them over individual determinants to develop actionable and measurable recommendations. I found a tool in the literature, developed by the RAND Corporation that had been used to survey CHA users about the usefulness of CHA reports (Myers & Stoto, 2006). The tool was developed after a review of the literature and had been applied in New York State (Stoto, Straus, Bohn, & Irani, A web-based tool for assessing and improving the usefulness of community health assessments, 2009) and Kane County, IL (Kuehnert, Graber, & Stone, 2014). Other researchers identified factors that were important as part of the process of conducting a CHA to ensure the generated CHA data were useful in contributing to public health program and policy decisions (Spice & Snyder, 2009; Solet, et al., 2009).

Because I personally and professionally valued the partnership I developed with the Future Forward Foundation (3F) I wanted to continue to research how their program was affecting the nutrition environment. Through our many conversations and my final CHA report I provided a new perspective to them; namely, that their efforts to increase the local production of fresh food were “public health” activities. Thinking about their program in terms of working to bring fresh food to a food desert, and using data from the CHA to write for grants to continue their work certainly altered their approach to fundraising. An admitted area of weakness for their program was evaluation. The director once said to me, “We are doers!” in response to my request for data showing the impact of their program. I realized that a partnership such as the one I formed with 3F would likely not have happened from inside the public health system. I was

compelled to look to the other rural counties in Arizona to see who they partner with and how they leverage those relationships to improve the public's health. While these intentions were present at the genesis of this study, I was unable to explore the questions in much depth. The need for local stakeholder input ended up being one criterion that was added to the usefulness tool found in the literature. In this way engaging local partners was prioritized, but the quality and extent of that engagement or partnership was not explored.

The literature review above that includes social theories and ethics, SEMs, SDH, and rural vs. urban disparities provides the abstract concepts which informed the development of the SEM in Figure 4, but also the new criteria that define a useful CHA below. The concepts also inform my understanding of broad public health values (chiefly the need for a focus on high level interventions) which helped me craft a hypothesis which has real-world implications. Because of my experience as a rural health officer and current rural resident I kept the focus of the study on rural communities in Arizona. Researchers have laid out a path by which public health practitioners can affect individual health outcome. Significant success with policy change such as with the Smoke-Free Arizona law has given us practical evidence that this path is fruitful. I sought a method by which rural public health practitioners could have a similar positive impact on the health of their local jurisdictions. Defining the criteria which make CHAs most useful to practitioners and linking those CHAs to CHIP recommendations seemed to be a most immediate way for research to inform practice.

Public Health Accreditation Board (PHAB)

In 2003 the Institute of Medicine called for a national steering committee to examine the benefits of accrediting local health departments. In 2005 the *Exploring Accreditation* project was launched by the Robert Wood Johnson Foundation and in 2007 the Public Health Accreditation Board (PHAB) was formed as a non-profit entity. PHAB developed the standards and measures with input from many stakeholders and conducted a field test with a small number of agencies in 2008. In 2009 the first draft standards and measure were made available for public comment and they were field tested through 2010 with 30 agencies. The first set of standards and measures were launched on September 14, 2011 (Public Health Accreditation Board, 2016). The newest version of the standards and measures is 1.5 and was effective from June 2, 2014. The standards require that state and county local health departments conduct community health assessments.

To date accreditation is a voluntary process. However, the Arizona Department of Health Services (ADHS) is committed to achieving accreditation. To further this goal, in 2012, ADHS combined block grant funding and National Public Health Improvement Initiative grant funds to establish intergovernmental agreements with its counties so that each could conduct a Community Health Assessment (Arizona Department of Health Services, 2016). The taxonomy in use for the structural framework of the PHAB domains is:

- Domain (example Domain 1)
 - Standard (example Standard 1.1)

- Measure (example Measure 1.1.1)
 - Tribal/State/Local/All (example 1.1.1.S for state health departments, 1.1.1.L for local health departments, 1.1.1.T for tribal health departments, 1.1.1.A for all health departments)

PHAB Domain 1 states, “conduct and disseminate assessments focused on population health status and public health issues facing the community” (Public Health Accreditation Board, 2016, p. 13). Standard 1.1 is “participate in or lead a collaborative process resulting in a comprehensive community health assessment”. In the description of Standard 1.1 it states CHAs “are conducted in partnership with other organizations and members of the community and include data and information on demographics; socioeconomic characteristics; quality of life; community resources; behavioral factors; the environment (including the built environment); morbidity and mortality; and other social, Tribal, community, or state determinants of health status” (Public Health Accreditation Board, 2016, p. 14). There is no reference or illustration of a social ecological model in the PHAB standards, though the description certainly describes determinants at multiple levels.

Arizona counties all published their CHAs in 2013 (Arizona Department of Health Services, 2016). Some of the Arizona counties are also seeking county-level accreditation through PHAB.

Community Health Assessment (CHA)

According to the CDC, CHAs identify the key health needs of a community through systematic data collection and analysis utilizing a set of principles that include specific definitions about the community being studied, multisector collaboration, community engagement, transparency, evidence-based practices, evaluation for continuous quality improvement, and dissemination of results. The benefits of conducting CHAs include strengthening partnerships in the public health system, increasing knowledge, increasing collaboration and coordination of activities, identifying community strengths and weaknesses, preparing for accreditation, and improving public health practice (Centers for Disease Control, 2017). The goal of a CHA is to identify key health concerns and assets within the community and to develop strategies to address the needs (Public Health Accreditation Board, 2017).

Mobilizing for Action through Planning and Partnership (MAPP)

The National Association of City and County Health Officials (NACCHO) was founded in the 1960s and is a non-profit agency which brings together over 2,800 local health departments (LHDs) to improve public health, give voice to LHD concerns, and provide resources to LHDs focused on best practices (NACCHO, 2016). One such resource that NACCHO has made available to LHDs is the Mobilizing for Action through Planning and Partnership (MAPP) process, which is a community-oriented strategic planning process to improve community health (NACCHO, 2016; Corso, 2005). Many LHDs consider MAPP the gold-standard method by which to conduct a CHA and CHIP.

NACCHO provides technical assistance to state and local health departments by conducting regular conference calls for departments engaged in the MAPP process, providing training to state and local health departments on various aspects of the MAPP process, and collecting and making available stories, forms, and other documents from jurisdictions across the county.

In brief the MAPP process has six phases, and each phase has a number of steps. The phases are: organize for success & partnership development, visioning, the four assessments, identify strategic issues, formulate goals and strategies, action cycle. It is recommended that the process be cyclical: collecting data, formulating goals, taking actions, evaluating, and then starting over, approximately every five years.

From the perspective of rural health departments, the four assessments are the most onerous and time consuming. NACCHO recommends that a core support team be assigned to the project to ensure that the process continues to move forward. Most LHDs find that, without funding for a full-time or part-time MAPP coordinator, identifying the staff time to perform the project is difficult. The Arizona Department of Health Services recognized this as a barrier provided funds to facilitate the MAPP process in all fifteen counties.

Community Health Improvement Plan (CHIP)

The Public Health Accreditation Board defines a CHIP as a sustained and systematic process of addressing community needs identified in the CHA (Public Health Accreditation Board, 2017). CHIPs are typically renewed every three to five years and set forth the vision of health for the

community as defined through a collaborative process with public health system stakeholders.

Local Health Departments (LHDs)

The public health system in the United States is comprised of a tapestry of local, tribal, state and national public health agencies. The Centers for Disease Control and Prevention describes itself as the “nation’s health protection agency” (Centers for Disease Control, 2017). However much of the work of public health is accomplished by LHDs whose funding includes local taxes and fees, state funding, and federal funding from the CDC or other federal agencies that flows through state health departments. For instance the Arizona Department of Health Services receives federal funding for the Women, Infants, and Children (WIC) program and in turn distributes that funding to 15 LHDs and a number of tribal departments that administer the program on a local level. The provision and funding of local public health varies considerably within and among states. A common observation, or jest, made by local public health officials is, “If you’ve seen one LHD you’ve seen one LHD.”

In Arizona there are fifteen counties and fourteen of them administer public health services. In one instance a community health center serves as the LHD for the county. There are also a number of tribal health departments in Arizona, most notably the Navajo Department of Health, which spans three counties in Arizona as well as counties in Utah and New Mexico. When both a county and tribal health department exist within a geographic boundary there is collaboration. In some cases there is an overlap of some services and others are clearly defined as being the

responsibility of one agency or the other. CHAs conducted by Arizona's fifteen local health departments generally include data about the tribal communities residing within their boundaries. The Navajo Department of Health CHA includes data for the whole tribal community residing both within and outside of Arizona. In this study I reviewed the CHAs and CHIPs of the thirteen rural local health departments in Arizona. I did not review tribal CHAs or the CHAs from Arizona's two urban local health departments (Maricopa and Pima).

Research Purpose and Aims

Addressing the SDH that contribute to chronic diseases is a complex task. Researchers rooted in social ecological theory recommend that interventions should be focused on at least two levels of the SEM (Golden & Earp, 2012). Many past and present public health interventions for obesity and chronic disease have focused on health education and behavior change in at-risk populations; such approaches can lead to victim-blaming and, often, do not address the underlying social and physical environmental factors that maintain and reinforce unhealthy behaviors (McLeroy, Bibeau, Steckler, & Glanz, 1988). A renewed focus on the SDH provides public health professionals with a strengthened mandate to search for underlying (or root) causes and seek mid- and upstream solutions at the policy and environmental levels (World Health Organization, 2003; Baum & Fisher, 2010; Phelan, Link, & Tehranifar, 2010). Social ecological models posit that changes in the physical and social environments have an impact on individual behavior (Story, Kaphingst, Robinson-O'Brien, & Glanz, 2008; Krieger, 2011). Public health researchers have identified promising areas

for alterations in the physical environment (Brownson, Haire-Joshu, & Luke, 2006). Despite these insights, strategies to improve the public's health through environmental change have been relatively neglected by local public and environmental health departments (Kuiper, Jackson, Barna, & Satariano, 2012). Because rural populations face unique health disparities and rural LHDs have limited resources, I focused my research on rural CHAs.

My two broad research aims consider integrated activities: the conduct of CHAs and CHIPs in rural Arizona and the implementation of a multi-level intervention. Both share the common goal of multi-level change.

The specific aims of this study were originally proposed as follows:

- Specific Aim #1a: Adapt a “usefulness” tool – informed by the literature, the Arizona Local Health Officers’ Association (ALHOA), the Arizona Department of Health Services (ADHS), relevant social theory, and my preliminary research – to assess the extent to which rural CHAs can provide a practical pathway for local policy, physical and social environmental change (Stoto, Straus, Bohn, & Irani, 2009; Myers & Stoto, 2006; Kuehnert, Graber, & Stone, 2014).
- Specific Aim #1b: Quantitatively and qualitatively compare and contrast the CHAs completed by Arizona’s thirteen rural LHDs with each other with a grassroots, theory-driven community health assessment in Florence, AZ, with other grassroots efforts highlighted in the literature, and with relevant theories based upon measures developed in Specific Aim #1a.

- Specific Aim #1c: Quantitatively and qualitatively, evaluate the relationship between CHA score and CHIP content in relation to proposed initiatives. Based upon relevant social theory that should guide public health practice (Potvin, Gendron, Bilodau, & Chabot, 2005) and, by extension, rural community health assessments, I will explore the following hypotheses:

Hypothesis: More useful CHAs will result in CHIP recommendations that propose interventions at higher levels of the social ecological model such as policy, physical environment, or social environment change.

- Specific Aim #1d: Develop a community engaged, multi-method, theory-driven rural CHA framework that outlines metrics for conducting CHAs, measuring health indicators of interest, and producing actionable policy and environmental change recommendations informed by the outcomes in Specific Aims #1b & #1c.
- Specific Aim #2a: Using a case study, conduct an ethnography of community change in Florence, AZ related to the physical nutrition environment - as related to the impact of the Future Forward Foundation (3F) initiatives.
- Specific Aim #2b: Using a case study, assess the impact of the 3F initiatives on participants' social environments (Story, Kaphingst, Robinson-O'Brien, & Glanz, 2008) and individual dispositions, understandings, and practices.

- Specific Aim #2c: Develop multi-level (family, community, city/town, county) policy and environmental-level strategies to support similar initiatives in rural communities.

Amendments were made to the proposed specific aims (listed above) as the study progressed. In specific aim #1b, I only compared and contrasted the CHAs and CHIPs from the thirteen rural counties to each other and did not include my grassroots CHA or others from the literature. The thirteen rural Arizona CHAs were completed in the same time period, with the same training and expectations from the ADHS, and with funding from the ADHS. The usefulness tool was developed with assistance from Arizona local health officials and reflected their experience and values. CHAs from the literature completed in other jurisdictions were not particularly relevant to the present study. The grassroots CHA that I facilitated was also not relevant since it was not completed by a LHD and it focused exclusively on the food environment in a town as opposed to broad SDH in a county.

Specific aim #1d was also altered as I came to fully appreciate the how ubiquitous the MAPP process had become. In proposing the present study I assumed LHDs would use different CHA processes, but in reviewing the CHAs I realized the thirteen rural counties in Arizona all used MAPP as a template and modified it for their local use. Specific aim #1d evolved into a review and critique of the MAPP process in practice after it became apparent that Arizona LHDs used different processes for synthesizing the data obtained. Further research to determine if this issue has been previously addressed in the literature revealed one article (Erwin, 2013). I then then developed a new method to assist practitioners with data

synthesis, or triangulation, using SEMs. This method, which also addresses specific aim #2c, is fully presented in the manuscript prepared in Appendix B.

The results of specific aims #1a-1c are reported in the manuscript prepared in Appendix A, though many details that were not included can be found in Chapter 2 under the heading *Specific Aim 1: CHAs and CHIPs*. The results of specific aims #2a-2b are reported in the manuscript prepared in Appendix C. Details that were not included in the manuscript can be found in Chapter 2 under the heading *Specific Aim 2: Grassroots multi-level food environment initiative*.

Figure 5 illustrates the areas of intersection between the three main components of this study: the preliminary study (grassroots CHA), specific aims #1(CHAs/CHIP investigation) and specific aims #2 (food environment ethnography). The unifying aspects among all components of this study include consideration of the differences between grassroots and institutional CHAs; the usefulness of SEMs during CHA planning and data analysis; and a focus on upstream or higher-level interventions (using SEMs). Specific aims #1 and #2 explore related concepts in the following ways:

- both utilized mixed-methods approaches to the collection and/or analyses of data;
- both explore various methods of public health data collection in rural settings - specific aim #1 by considering how rural LHDs approached CHA data collection and specific aim #2 through ethnography and related methodologies;

- both utilize SEMs for coding during directed content analyses and thematic analyses.

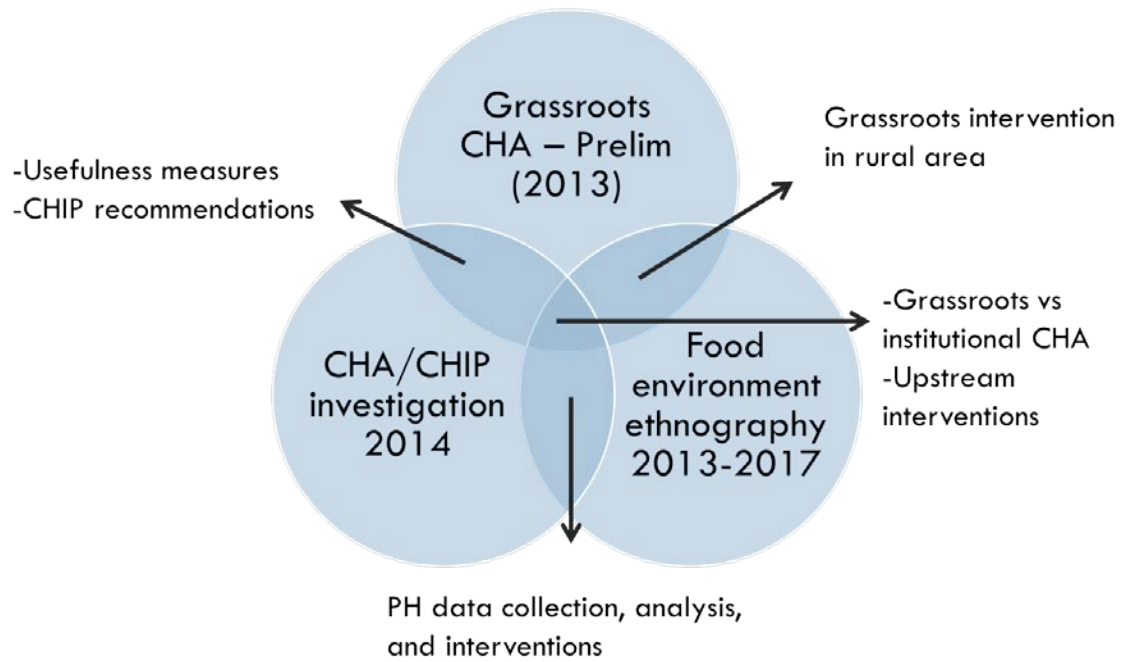


Figure 5: Intersection of Dissertation Study Components

CHAPTER 2: PRESENT STUDY

Specific Aim 1: CHAs and CHIPs

Method

The present study utilized a mixed-method approach to explore the hypothesis that more useful CHAs will result in CHIP recommendations that propose interventions at higher levels of the social ecological model such as policy, physical environment, or social environment change. A over view of the methods used is presented in Figure 6.

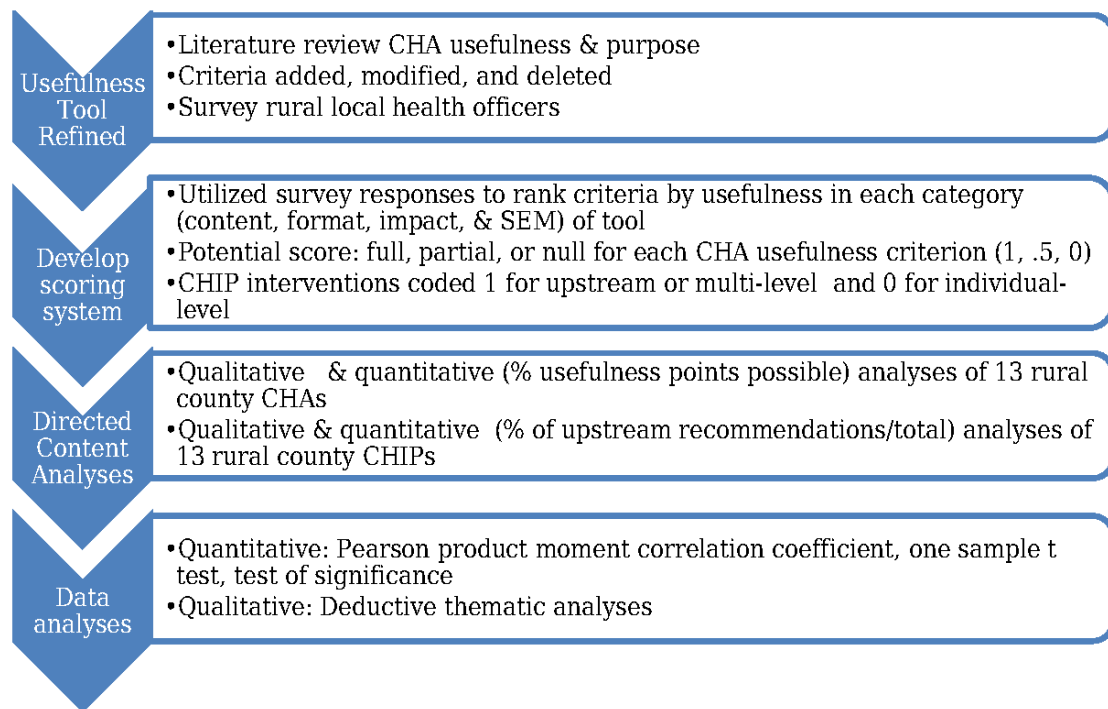


Figure 6: Overview of methods

To accomplish specific aim #1a a descriptive study was undertaken to determine what criteria define useful CHAs. Subsequently, local public health practitioners were surveyed in order to determine which criteria defined useful CHAs in their experience. Using the survey data a usefulness tool and scoring system was developed.

Specific aim #1b required a directed content analysis (Hsiu-Fang & Shannon, 2005) be conducted on thirteen CHAs from the rural counties in Arizona using the coding and scoring system developed in specific aim #1a. A directed content analysis was also conducted on the thirteen corresponding CHIPs, coded in accordance with the SEM developed for this study. The CHA and CHIP scores were quantitatively compared using a one sample t test, the Pearson product moment correlation coefficient and a test of significance.

Existing usefulness tool

Researchers have developed a tool to assess the “usefulness” of CHAs (Myers & Stoto, 2006; Stoto, Straus, Bohn, & Irani, 2009; Kuehnert, Graber, & Stone, 2014). They characterize “usefulness” is as a subjective concept that is defined by stakeholders. Three domains of usefulness have been identified: content, format and impact (Kuehnert, Graber, & Stone, 2014). I revisited the definition of “usefulness” to ensure its relevance for Arizona rural public health practitioners and researchers. In the domains of content and impact I found the absence of concepts that are significant in the literature. For instance, in the domain of content, there was no mention of SDH. Additionally though highly recommended by PHAB, there was no emphasis on collecting local data or engaging the local community. Finally, because CHAs are a form of community-based research and best practices indicate that there should be a balance of power between the local community partners and agencies (Becker, Israel, Gustat, Reyes, & Allen III, 2013) one strategy to promote the balance of power is to present proposed

solutions from the community equally and distinctly from the solutions proposed by public health professionals.

In the domain of impact there was no discussion of creating actionable or measurable recommendations or strategies for change, though this is the stated goal of a CHA by the PHAB (Public Health Accreditation Board, 2017). Additionally, there was no emphasis on collecting or grouping health indicators together to explore population health concerns in greater depth. Related to the community-based research best practices listed above, in order to ensure equitable participation and trust the CHA should present the perspectives of community members or representatives affected by health disparities.

As mentioned above SEMs can be used to evaluate whether interventions are upstream versus downstream, but they can also be used to synthesize data collected in a CHA to triangulate findings (see Appendix B). In addition to the domains of format, content and impact a useful CHA will use a conceptual tool, such as a SEM to classify, organize, and synthesize data to make upstream or multi-level recommendations for action. A table summarizing the usefulness criteria found in the literature compared to the usefulness criteria proposed in this study is found in Appendix A, Table 1. The final usefulness tool used in this study is presented in Table 4 below.

Revised usefulness tool

A survey was prepared for local stakeholders in Arizona. The revised usefulness criteria were presented by domain and participants were asked to rank the criteria within each domain (format, content, and impact) in

terms of creating a useful CHA. Open-ended questions as well as three rated items about SEMs were also included in the survey.

The ALHOA meets monthly in Phoenix. In March of 2014 I attended an ALHOA meeting and presented a summary of my research and asked for assistance in completing a survey via Survey Monkey. I asked that both the rural local health officer and key staff members from the rural counties who were involved in the CHA complete the survey. I also asked a very few ADHS staff who work closely with ALHOA to participate. Survey responses were collected in April and May of 2014. A total of 16 surveys were completed representing 10 rural counties and the ADHS. Three rural counties did not participate. One survey was incompletely filled out and the ranking questions were blank. As a result there were 15 responses for the ranking questions.

Each criterion within a domain was given a weighted score based on responses. For example, in terms of format there are eight possible criteria. Criteria ranked 1st received 8 points while those ranked 8th received only one point. To clarify, Figure 7 provides the survey responses regarding ranking the CHA format criteria.

Weighted score		Rank1	Rank2	Rank3	Rank4	Rank5	Rank6	Rank7	Rank8
	Usefulness of CHA format:								
80	Is easy to understand	4	2	3	1	0	2	2	1
77	Includes both summary and detailed versions to be used with different audiences	3	2	1	5	0	1	2	1
76	Is well organized; it is easy to find content (includes table of contents)	2	4	2	1	2	0	3	1
76	Clearly indicates the relationship among related health indicators	2	2	1	4	2	4	0	0
75	Includes narrative and graphic representations of key findings to meet the needs of varying audiences	1	3	3	1	4	1	2	0
63	Clearly identifies data sources (includes citations for graphs and/or tables)	1	1	2	2	3	3	2	1
47	Uses a consistent format to present information on different topics in the report	1	0	3	0	2	2	0	7
46	Is available online and includes appropriate links	1	1	0	1	2	2	4	4

Figure 7: ALHOA survey responses (CHA format)

The shaded cells represent the majority of responses (at least 8/15) for each criterion in order to illustrate the concentration of like responses and to determine which criterion would be ranked as more useful in the case of a tie in the weighted score. The weighted score for “Is easy to understand” was determined by the following formula:

$(4*8)+(2*7)+(3*6)+(1*5)+(0*4)+(2*3)+(2*2)+(1*1)=80$. Respondents in the survey did not offer any additional criteria in the open-ended questions that were substantially different than those listed in the three categories.

Using this methodology, the criteria in each category (format, content, and impact) were ranked according to the usefulness rankings placed upon them by Arizona rural health officials and ADHS staff. The final revised CHA usefulness tool listed the criteria in descending order of usefulness as illustrated in Table 3 of Appendix A and assigned a weight opposite to the rank, with the most highly rated criteria receiving the highest weight.

All respondents stated they had “some familiarity” had “seen/heard of limited experience with” or “use regularly in professional life” social ecological models. Respondents were split evenly on rating the statement, “A useful CHA gives consideration to which level of the social ecological model the public health agency is seeking to influence” (50% answering disagree or strongly disagree and 50% answering agree or strongly agree). However, in response to the question, “Complex public health concerns are best represented in a CHA through a combination of multiple indicators at different levels of the social ecological model” 75% answered they agreed or strongly agreed. As a result four additional criteria were added, in no

particular order or rank, and each criterion was assigned the score of 1.

These criteria are found below.

- There is a recognition and/or discussion of any dynamic of social ecological model (illustrations, explanation, etc).
- Multiple indicators at different levels of SEM are used to describe complex health concerns.
- There is clear attention on which level of the SEM is being influenced.
- All recommendations focus on upstream SDH as opposed to individual education.

The end result of the ALHOA survey was the revised usefulness tool and scoring system found below in Table 4. The rater definitions were added during the directed content analysis to ensure consistency in coding. Item numbers 9, 13, 17, 19, 21, 24- 25 & 27-32 were the new criteria added to the usefulness tool in this study.

Table 4: Usefulness tool to evaluate a CHA

Item	Usefulness of CHA format:	Rater Definitions:	Score
1	Is easy to understand		8
2	Includes both summary and detailed versions to be used with different audiences	Includes an Executive Summary/Summary, may be included in CHIP	7
3	Is well organized; it is easy to find content (includes table of contents)		6
4	Clearly indicates the relationship among related health indicators (format)	Similar indicators grouped together in report (.5 if data presented by method of data collection instead of by indicator)	5
5	Includes narrative and graphic representations of key findings to meet the needs of varying audiences	Presents data in charts and graphs as well as in paragraphs	4
6	Clearly identifies data sources (includes citations for graphs and/or tables)		3
7	Uses a consistent format to present information on different topics in the report		2
8	Is available online and includes appropriate links	Includes available through ADHS	1
		<i>Maximum possible weighted score:</i>	<i>36</i>
	Usefulness of CHA content:	Rater Definitions:	Rank
9	Includes local, primary data which provides insights into the specific health concerns of the rural community	Community survey acceptable	12
10	Allows comparisons over time	On many measures = 1, on few or one measure = .5, on no measures = 0	11
11	Includes most important aspects of the community's health	Labeled as "priority" or "top issues" or other similar wording	10
12	Clearly indicates the relationship among related health indicators (content)	Similar indicators (i.e. leading causes of death and top health concerns of local pop OR data about diabetes, food deserts and obesity) are connected via a written explanation	9

13	Collects and presents data about the social determinants of health	Uses SDH language and provides definition and/or explanation; and/or explicitly gives attention to upstream environmental, economic and educational factors	8
14	Goals and purpose of the CHA are clearly stated		7
15	Allows comparisons with data from other communities or other appropriate benchmarks	Comparison with state-level data acceptable	6
16	Provides sufficient focus on positive community characteristics (community assets/strengths), as well as negative characteristics (community weaknesses)	Highlights protective factors for health and explains them as such, history/facts of area insufficient without explanation of how it affects public health	5
17	Includes the opinions, beliefs, and public health solutions proposed by populations directly affected by health disparities	Reports results of open-ended questions on community survey acceptable	4
18	Presents meaningful subgroups of population (to assess health disparities)	Can be that geographically isolated community data presented separately	3
19	Includes the opinions, beliefs, and public health solutions proposed by public health system professionals	Solutions proposed in "recommendations" section of CHA acceptable	2
20	Sufficiently documents the process and methods used to create a CHA	Methodology of local data collection/ community survey acceptable	1
		<i>Maximum possible weighted score:</i>	78
	Usefulness of CHA potential impact	Rater Definitions:	Rank
21	Generates actionable & measurable recommendations for amending or creating local programs or policies	Measures do not have to be defined if easily implied - Can include recommendation to conduct CHIP process	8
22	Serves as a resource to prioritize and plan services		7
23	Serves as a resource to guide a comprehensive health promotion strategy		6

24	Serves as a resource to explore significant population health concerns in greater depth by grouping related health indicators together		5
25	Can be used to meet Arizona Department of Health Services requirements/expectations		4
26	Serves as a resource for grant writing applications		3
27	Can be used for Public Health Accreditation Board (PHAB) documentation		2
28	Serves as a resource to distinguish solutions proposed by populations affected by health disparities from solutions proposed by public health system professionals	Can include a plan to collect solutions proposed by community	1
		<i>Maximum possible weighted score:</i>	36
	Other - SEM	Rater Definitions:	Value
29	There is a recognition and/or discussion of any dynamic of social ecological model (illustrations, explanation, etc)	Discussion of levels of influence, upstream/downstream? "Built Environment, Social Environment"	1
30	Multiple indicators at different levels of SEM are used to describe complex health concerns		1
31	Clear attention on which level of the SEM they are trying to influence		1
32	All recommendations focus on upstream SDH as opposed to individual education	Health concerns identified and classified on subsequent tab of spreadsheet and red items are included in CHA recommendations	1
		<i>Maximum possible score:</i>	4
	Total CHA usefulness score		154

Method for analysis of Arizona CHAs

I conducted a directed content analysis (Hsiu-Fang & Shannon, 2005) of the thirteen rural county CHAs using the coding outlined in the usefulness tool in Figure 4. For each criterion the CHA received a score of 0, .5 or 1 depending on whether the CHA did not meet, partially met, or fully met the criterion. In many cases rater definitions were developed to ensure consistency in coding and scoring the CHA. While engaged in this content analysis text in each CHA was highlighted and notes were added to each electronic document so that a comparison on specific criterion could be made between the thirteen CHAs. The content analysis was conducted using a full version of Adobe Acrobat to view, highlight, mark, and comment in electronic, pdf documents. An Excel spreadsheet was used to make notes about each CHA, create a SEM for the SDH data reported in each CHA, and to record the scores for each criterion. Looking back it would have been more effective and efficient to have used NVivo for coding the text in the CHAs as was done for the directed content analysis conducted for specific aims #2a and #2b. However, at the time when this content analysis was conducted I did not appreciate the functionality of NVivo.

I considered the advantages and disadvantages of scoring dichotomously (0 and 1) as opposed to including a third score (.5). There were many cases where a criterion was partially met in a CHA by one jurisdiction in comparison to a different CHA where the criterion was fully met. Giving full credit to a jurisdiction that had taken some steps towards meeting a criterion seemed unfair to the jurisdictions that had fully met the criterion. The reverse was also true, giving no credit when a jurisdiction

had taken some steps to meet a criterion seemed overly harsh and did not distinguish between those who completely omitted or did not meet a criterion. Including a “partially met” score of .5 allowed for a more nuanced view of the range of scores among the thirteen rural county CHAs. Additionally, when similarly scored CHAs in the 60-70% range were compared to each other and then compared to the highest scoring and then lowest scoring CHAs, the scoring system did, subjectively, capture a broad gradation of useful CHAs based upon the tool.

The SEM measures were each weighted with a score of one because those questions were not ranked in the survey with the other criteria in the format, content and impact domains. The total points possible for the SEM measures was 4 out of a total possible of 154 (or less than 3%). In other words, those measures were not weighted as heavily as many of the other criteria ranked highly by public health stakeholders.

The scores for each CHA’s criterion were then weighted by multiplying them by the score for each item on the usefulness tool and then added together. A total of 154 points were possible. Each CHA score was then displayed as a percentage of total points possible. The distribution of CHA scores is displayed in Figure 8.

CHA score	30.8	47.4	63.6	69.2	69.5	69.5	71.5	74.5	77.2	87.7	91.1	93.0	97.7
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Figure 8: Distribution of CHA scores

It was an unanticipated finding that the MAPP process was lacking in a formal method for synthesizing data. While this finding and recommendations are discussed fully in Appendix B, it is worth noting that

such a finding may have been missed if certain factors had not worked together to highlight this issue. Factors that contributed to this finding include the fact that the thirteen reviewed CHAs were conducted during the same time period, local public health officials in charge of the CHAs attended the same training, all of the counties utilized the MAPP process to some extent, and they conducted their work under the same expectations in terms of funding from the ADHS. More than anything it was the pattern of disjointed reporting occurring across most of the thirteen CHAs that made the lack of a process for data synthesis stand out. Additionally, having a personal history of working in and with rural counties, and recognizing many dedicated professionals learned their skills on-the-job, it is not surprising that rural counties do not have staff with formal skills in organizing, interpreting, and presenting data from multiple sources. Data triangulation (Patton, 2002) is a concept discussed in graduate-level methods classes, but is not necessarily common knowledge.

Method of analysis of Arizona CHIPs

While a more meaningful evaluation of CHIP recommendation would include a long-term follow-up on outcomes, this study was only able to evaluate the CHIP documents themselves. To ascertain whether CHIP recommendations were focused upstream versus downstream a directed content analysis (Hsiu-Fang & Shannon, 2005) was conducted using the SEM presented in Figure 4 above. Strategies, proposed interventions, and actions were coded 1 if they targeted a level other than behavior change and 0 if they were focused solely on individual education or behavior change. Multi-level interventions were coded 1.

To arrive at a percentage score for each CHIP the total number of multi-level or higher level recommendations were divided by the total number of recommendations. The distribution of CHIP scores is presented in Figure 9.

11	54	68	69	72	73	83	83	85	90	97	97	100
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Figure 9: Distribution of CHIP scores

Results

There is a highly statistically significant association between high scoring (useful) CHAs and CHIP recommendations focused at higher levels of the social ecological model. The (Pearson) correlation coefficient $r=.85$ indicates the variables are positively correlated. The one sample t test result of .3999595 indicated the null hypothesis should be rejected and the p value of .000225 indicates the results are highly significant. Statistical results were obtained by using Excel. A discussion about these results is presented in Appendix A. Figure 10 displays the matched CHA and CHIP scores by county.

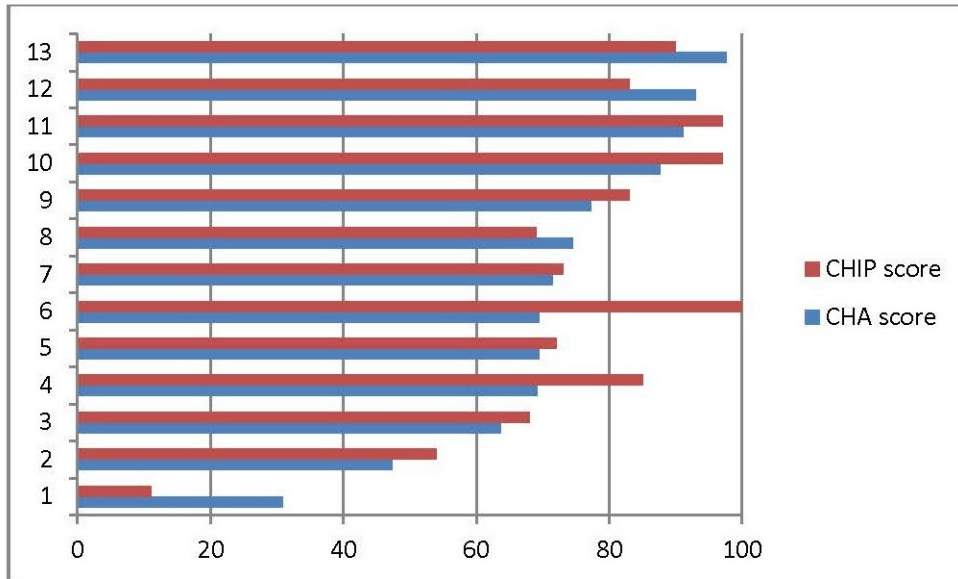


Figure 10: Matched CHA and CHIP scores by county

Limitations

There are several limitations to this study. First, restriction of the sample to rural Arizona LHD CHAs and CHIPs resulted in a geographic focus with a small sample size limiting the amount the findings can be generalized beyond the current study. Second, there is the possibility of bias in scoring the CHAs and CHIPs as there were no secondary or tertiary raters to assess reliability. Third, though the additional criteria added to the usefulness tool were somewhat validated by the ALHOA survey, there may have been better ways to ensure internal validity and ensure the new criteria were measuring what they were intended to measure. Finally, the method of operationalizing the CHIP recommendations and scoring the documents was less than ideal and provided only a preliminary view of whether upstream recommendations resulted from the CHA processes.

Specific Aim 2: Grassroots multi-level food environment initiative

Future Forward Foundation (3F)

The Executive Director of the 3F was introduced herself to me at one of the community meetings I held when conducting preliminary research for this study in January of 2013. She and her husband, a University of Arizona Certified Master Gardener and 3F volunteer, are excellent resources to the community in terms of their knowledge about the history of the area and their positive experiences with the local production of food. Since 2013 the 3F has continued their *Seed the Future* backyard gardening program and have also provided other services to the community through partnerships. Together with the University of Arizona's College of Agriculture and Life Sciences, the 3F brought a series of classes aimed at backyard growers, beginning farmers and ranchers entitled, "Financing, Marketing, and Production of Specialty Crops" to Florence. Additionally, the University of Arizona was able to partner with the 3F to build two hoop houses (Cowling, Groups partner to grow food for the hungry, 2016). The 3F also installed a community garden in Randolph, AZ with other partners (Cowling, Growing a health community: Power company makes 3-year grant to help Randolph garden, 2016), and oversee a large garden in Florence on donated land called the Future Forward Foundation Farm (4F) which donates a great deal of produce to local agencies. The 3F continues to look for opportunities to increase the local production of food.

Seed the Future

The 3F backyard gardening program known as Seed the Future, was started in the spring of 2013 and installed, or helped to install, 55 gardens through October of 2016 (Cowling, Groups partner to grow food for the hungry, 2016). In late spring of 2015, when I met with the Executive Director to obtain the contact information for the gardeners, 32 gardens had been completed. I was able to schedule semi-structured interviews with 74%. A full description of the program is included in Appendix C.

In April of 2014 I received a Seed the Future garden in my backyard and became a participant observer of the program. In the late spring of 2015 I met with 3F staff and obtained the names and contact information for the 31 gardeners (excluding myself) who had received gardens at that time. The majority of gardeners were available to meet with me (n=23).

Methods

As a participant observer of the 3F *Seed the Future* program utilizing CPBR principals (Israel, et al., 2008) I conducted a focused ethnography of the rural Pinal County food environment. Field notes detailing data collected from the following sources were kept:

- scheduled and spontaneous face-to-face encounters with 3F members, partners and volunteers in Florence, AZ;
- social connections on Facebook with 3F staff, volunteers, and gardeners;
- personal correspondence via email and mail;
- the 3F webpage (Future Forward Foundation, 2017);

- community events;
- semi-structured interviews with other gardeners;
- the local newspapers.

As outlined in specific aims #2a and #2b I was interested in understanding how the backyard gardens had affected various levels of the SEM (individual, social environment and physical environment). A semi-structured interview guide was developed to ensure questions were asked in an open-ended manner and consistently to each participant. I scheduled times to meet the majority of them at their homes so that I could tour their gardens; in three cases we met at a public space. After providing each participant with a brief overview of my work, I presented them with an informed consent form to review and sign and asked if they minded if I recorded the interview with my cell phone. All of the participants agreed to the conversations being recorded. The conversations were recorded using a smart phone application called Smart Voice Recorder. The ubiquitous nature of cell phones was advantageous as it was unobtrusive and seemed to be forgotten quickly by participants allowing the conversations to proceed freely and comfortably.

By meeting most gardeners on their property and viewing the gardens I was able to observe their lived experiences. After each interview, I took notes about details I observed pertaining to the care they took in keeping up their yards and gardens, their facial expressions and body language when talking about the impact the garden has had on their family and personal health and other comments that might have been made when the recording device was not active. In some cases I was invited into their homes, in other

cases we conversed outside near the garden or on a patio. Most gardeners were proud of their gardens and were happy to show it. In a couple of cases where the garden had fallen into neglect and/or the weeds were very tall, the gardeners were more reserved about showing it. In these few cases the gardeners clearly felt badly about the state of the garden and made many apologies about the weeds.

To promote a positive exchange of knowledge between the community and the researcher in the process of data collection (Minkler & Wallerstein, 2008) I often shared that I too had a garden and that I was a member of a Facebook group called Arizona Gardening. I offered up the social network group as a resource in response to some gardener concerns that they felt isolated and/or did always know how to get answers to their questions. As a fellow gardener I had had success in posting questions and receiving responses from the group and I shared this experience with some of the gardeners when applicable. I also offered to “friend” some of the gardeners who were active on Facebook as a means for them to share pictures of their garden with me and vice versa. In this manner I was able to stay connected with a number of the gardeners. In cases where the gardeners were not on Facebook, I collected their email addresses and offered to send them information (e.g. recipes for produce they had little experience preparing, the 3F planting guide, or other resources from the University of Arizona Cooperative Extension) that they had mentioned they were lacking during our conversations. I generally followed up within days of the interview to provide the information promised. In a number of cases I was offered, and accepted, produce or seeds from the gardens. One participant mailed seeds

to me a couple months after the interview in response to positive comments I had made regarding on some of their plants. Many gardeners sent pictures of their gardens or produce to me via email, text, or Facebook as I had requested during the interviews. In many cases I was able to stay connected with the gardeners long after the interviews.

Data Analysis

I contracted with a third-party under a confidentiality agreement to transcribe the recorded interviews. The transcriptions were prepared in Microsoft Word and uploaded into NVivo 11. Coding was based upon the SEM and then by topic in accordance with the scheme outlined below.

- Physical environment coding included statements made about
 - food banks,
 - landfills,
 - senior centers,
 - tribal lands,
 - and other institutions.
- Social environment coding included statements made about
 - the community,
 - the 3F,
 - sharing with family and friends,
 - new friends,
 - history of garden acquisition,
 - community events,
 - and future 3F support.

Individual factors were broken into short and long-term factors.

- Short-term factors included statements about
 - present experience,
 - past experiences,
 - changes to diet,
 - crops, composting,
 - and information seeking.
- Long-term individual factors included statements made regarding
 - future intentions,
 - health impacts,
 - and knowledge gained.

The text of each interview was reviewed multiple times to ensure all applicable statements were coded according to the scheme outlines above. The results of the directed content analysis are reported in Appendix C.

Limitations

While ethnography of a specific rural environment may provide insights to future practitioners, the results are difficult to generalize. Likewise, the Seed the Future program may provide a model intervention for other rural communities, but the findings in this study are contextualized to rural Pinal County desert communities. In terms of the interviews conducted, I was only able to interview 33% of participants who dropped out of the program. Speaking to others who decided not to continue gardening would have provided greater insight into the challenges faced by these participants and may have led to additional ways 3F could improve the program.

CHAPTER 3: CONCLUSIONS

Implications for Public Health Policy and Practice

Public Health Practice

Taken as a whole this study provides valuable insights into how SEMs can inform and assist public health research, practice, and evaluation. Not only can SEMs provide a visual representation of the ecological environment under consideration, they can be used to collate and triangulate SDH data collected in the course of a CHA. One use of SEMs that was not explored in great depth in this study is how they might be used to plan data collection, for instance focusing on one or more levels of the SEM and collecting data at that level. During preliminary research I utilized the Nutrition Environment Measurement Survey (Glanz, Sallis, Saelens, & Frank, 2007; Honeycutt, Davis, Clawson, & Glanz, 2010; University of Pennsylvania) for restaurants and stores to collect data at the level of the physical environment. I also utilized the United States Department of Agriculture food desert locator (United States Department of Agriculture, 2013). SEMs could aid public health practitioners in targeting aspects of the physical or social environment to measure. Partnerships with researchers or exploration of the literature might then be undertaken to find measurement tools or strategies for data collection at that level.

SHD data presented using a SEM can be advantageous. Complicated and/or multiple sources of data can be summarized and triangulated rendering complexity more understandable by lay partners. Potential interventions at multiple levels can be reviewed in the context of a SEM

while presenting upstream or multi-level strategies as best-practices and recommended by researchers (Golden & Earp, 2012). SEMs can be valuable during the CHIP process when CHA data are presented to community stakeholders and policy-makers are deciding where to focus resources. The value of upstream interventions is illustrated by SEM diagrams. SEMs are a useful tool to use in presenting to policy makers as their use may help in shifting the dialog from a focus on individual accountability and towards policy and environmental-level interventions.

SEMs are also useful in evaluating the impact of multi-level community programs (McKinlay, 1996). In this study primary data was collected from semi-structured interviews with participants of a rural backyard gardening program. The coding for a directed content analysis was based on a SEM. Because SEMs are based on generations of social thought and theory there is a depth to the complexity of potential models; yet there is also the potential for simple, pragmatic, and meaningful models that convey fundamental concepts clearly and efficiently.

There is an important lesson learned in understanding the differences between top-down bureaucratic CHA conducted by a rural LHD and the grass-roots CHA and subsequent ethnography of the food environment I conducted in Pinal County, AZ. Most significantly the 3F was absent from the LHD CHA. The absence of any mention of this potential partner could be explained in many reasonable ways (i.e. 3F may not have responded to calls or invitations for public comment or public meetings that were published in local media), but it is the absence of a reflexive approach to knowledge that is most significant in LHD CHAs. While the thirteen rural CHAs all included

some local data collection, there were many counties that used utilized multiple-choice community surveys to prioritize various individual SDH as opposed to a more meaningful engagement with the community to pursue the local production of health. In some cases focus groups were used somewhat effectively to understand the SDH facing frontier communities or particular social groups; but these efforts may have been hindered by an inability to fully practice the principals of community-based participatory research because the public health staff were not necessarily local residents or participant observers of the lived experiences. There was no indication of a reflexive approach to knowledge in the CHAs. Ethnographic research often occurs over a period of time and requires training uncommon to practitioners. This may be an area where researchers could partner with practitioners to provide training in both theory and methods to enhance the quality and depth of future community engagement.

Public Health Policy

LHDs, especially rural agencies engaged in CHAs, will benefit from considering the criteria listed in the revised usefulness tool developed in this study. Because the tool was developed with input from rural health officials it includes many criteria deemed essential by researchers and public health practitioners alike. Use of the tool also promotes calls for public health researchers to consider a constructivist paradigm (Israel, Schulz, Parker, & Beckler, 1998) and for public health practitioners to be reflexive and engage local partners to promote the local production of health (Frohlich & Potvin, 2010; Frohlich & Potvin, 2008).

While correlation does not indicate causation, there are many reasons that higher scoring CHAs may produce CHIP recommendations that are focused upstream and more likely to affect policy. Most significantly, when rural counties discuss the SDH in CHA reports, they are also likely to include data measuring the strengths and weaknesses of the physical and social environments in addition to downstream individual risk factors such as rates of chronic disease and obesity. When a discussion of the SDH is absent, there is a greater focus on individual risk factors in the CHA reports and subsequently on individual education and behavioral change in the CHIP recommendations. Secondly, rural counties with populations affected by health disparities that included both recommendations made by both the affected populations and public health professionals were more likely to propose creative approaches to addressing public health concerns - e.g., partnerships with agencies not typically seen as part of the public health system (road authorities), activities like community gardening and Farms to Schools programs, and targeted plans for frontier or isolated communities to address unique challenges like transportation or road maintenance. Third, when counties used multiple measures, or indicators, of the SDH relating to specific public health concerns like chronic disease and included community strengths and weaknesses regarding policies and the physical and social environments; they were best equipped to build upon community assets and form partnerships to address community needs. Counties that relied heavily on secondary data related to chronic disease (morbidity and mortality) or that collected primary data via surveys and asked respondents to prioritize various chronic diseases were less able to consider data related to the

effects of policies and the physical and social environments during in the CHIP process. Fourth, when local perspectives were absent or featured less prominently than those of public health professionals CHIP recommendations were more likely to place more emphasis on individual accountability, knowledge, and behavior as opposed to upstream determinants.

Future Research Directions

Additional research is necessary to further explore the relationship between useful CHAs and CHIP strategies that are actionable, measurable, and upstream or at multiple levels of the SEM. A suggested approach for quantifying progress on CHIP strategies is using a longitudinal or retrospective approach to make observations over time. The present study was limited in that it only reviewed what was written in the CHIP at one point in time instead of evaluating real-world progress.

Because CHAs and CHIPs are required by PHAB for accreditation, and because more and more LHDs are seeking accreditation it is prudent to endeavor to produce the CHAs and CHIPs that are meaningful, useful, and have a positive impact on the public's health. Because CHAs are labor intensive and short-lived (PHAB recommends updating them every 3-5 years) there is a need to focus on SDH measures that can reasonably be altered during the intervening years if the LHD wishes to show progress in various outcomes and value for the time invested in the process. Downstream determinants (individual risk factors, morbidity or mortality rates) may not be the best indicators for highlighting actionable public health policy or environmental change initiatives (McKinlay & Marceau,

2000). Research into identifying SDHs that have the potential for alteration over the span of three to five years may help inform the data collection efforts of LHDs.

Non-traditional partners, such as non-profit agencies like the 3F, have the potential to introduce valuable new ways of thinking about public health problems and solutions. The definition of “public health system” as presented by the MAPP process is broad enough to include these agencies, but it takes creativity and initiative for LHDs to identify and engage these partners. Research into how to best identify and engage non-traditional partners in CHAs could inform future collaborative efforts. Further, once engaged, there is the question of how LHDs can support and enhance community projects like *Seed the Future*.

Finally, after LHDs implement the use of SEMs to triangulate data in CHAs it would be prudent to study the effectiveness of the method. Because the method is currently theoretical it is difficult to anticipate all of the real-world implications. There are a number of research questions that could be investigated relating to using SEMs for data synthesis. If SEMs are used are the data in CHAs presented in a significantly different matter (e.g. not presented by the method of data collection)? Does the SEM or multiple SEM help to distill and highlight common findings across multiple data collection strategies? How are conflicting data handled using SEMs? Are SEM models as useful in CHIP processes as initially anticipated? There are many questions that would arise in a real world application of this method and further study could help to refine and enhance the method and produce a

model report for use by other counties (National Association for County and City Health Officials, 2013).

Perhaps the most valuable insight I have gained is that the reflexive approach to knowledge - which incorporates objective models (such as SEMs), subjective insights from lived experiences, and local context - yields meaningful data with more depth than any objective measure of individual SDH. While analyzing the LHD CHAs I found myself seeking those narrative sections of the reports that provided glimpses into living in that particular rural place. The tables presenting data on morbidity and mortality have a use, but it is a very limited one when considering how best to direct limited public health resources. A future direction for research may consider the MAPP process and how it might be enhanced to promote a reflexive approach to knowledge or to create a new CHA process which focuses, as researchers suggest, on promoting “the confrontation between objective systems of relationships that structure practice and the subjective experience of social actors whose practices reproduce and transform the structure” (Potvin, Gendron, Bilodau, & Chabot, 2005, p. 594).

REFERENCES

- Adler, N. E., & Rehkopf, D. H. (2008). U.S. Disparities in Health: Descriptions, causes, and mechanisms. *Annual Review of Public Health, 29*, 235-52.
- Ahen, M., Brown, C., & Dukas, S. (2011). A national study of the association between food environments and county-level outcomes. *The Journal of Rural Health, 27*, 367-379.
- Ahnquist, J., Wamala, S. P., & Lindstrom, M. (2012). Social determinants of health - A question of social or economic capital? Interaction effects of socioeconomic factors on health outcomes. *Social Science & Medicine, 74*, 930-939.
- Alexander, B. K. (2000). The globalization of addiction. *Addiction Research, 8*(6), 501-526.
- Antonovski, A. (1996). The salutogenic model as a theory to guide health promotion. *Health Promotion International, 11*(1), 11-18.
- Arizona Department of Health Services. (2013, 11 12). *Managing for Excellence: Community Health Assessments*. Retrieved 12 16, 2013, from <http://www.azdhs.gov/diro/excellence/assessment/index.htm>
- Arizona Department of Health Services. (2016, September 28). *Accreditation*. Retrieved from ADHS Managing for Excellence: <http://azdhs.gov/operations/managing-excellence/index.php#accreditation>

- Arizona Department of Health Services. (2016, October 24). *Managing for Excellence - State Health Assessment & Improvement Plan - Community Information*. Retrieved from Arizona Department of Health Services: <http://azdhs.gov/operations/managing-excellence/index.php#ship-sha-community>
- Barnidge, E. K., Radvanyi, C., Duggan, K., Motton, F., Wiggs, I., Baker, E. A., & Brownson, R. C. (2013). Understanding and addressing barriers to implementation of environmental and policy interventions to support physical activity and health eating in rural communities. *The Journal of Rural Health, 29*, 97-105.
- Baum, F., & Fisher, M. (2010, September). Health equity and sustainability: Extending the work of the Commission on Social Determinants of Health. *Critical Public Health, 20*(3), pp. 311-322.
- Beauchamp, D. E. (1999). Community: The neglected tradition of public health. In D. E. Beauchamp, & B. Steinbock (Eds.), *New Ethics for the Public's Health* (pp. 57-67). New York: Oxford University Press.
- Beauchamp, D. E. (1999). Public health as social justice. In D. E. Beauchamp, & B. Steinbock (Eds.), *New Ethics for the Public's Health* (pp. 101-109). New York: Oxford University Press.
- Becker, A. B., Israel, B. A., Gustat, J., Reyes, A. G., & Allen III, A. J. (2013). Strategies and techniques for effective group process in CBPR partnerships. In B. A. Israel, E. Eng, A. J. Schulz, & E. A. Parker (Eds.), *Methods for Community-Based Participatory Research for Health* (pp. 69-96). San Francisco, CA: Jossey-Bass.

- Befort, C. A., Nazir, N., & Perri, M. G. (2012). Prevalence of obesity among adults from rural and urban areas of the United States: Findings from NHANES (2005-2008). *The Journal of Rural Health, 28*, 392-297.
- Berkman, L. F. (2009). Social epidemiology: Social determinants of health in the United States: Are we losing ground? *Annual Review of Public Health, 30*, 27-41.
- Bolin, J. N., Bellamy, G. R., Ferdinand, A. O., Vuong, A. M., Kash, B. A., Schulze, A., & Helduser, J. W. (2015). Rural health people 2020: New decade, same challenges. *The Journal of Rural Health, 31*, 326-333.
- Bourdieu, P. (1992). Structures, Habitus, Practices. In P. Bourdieu, *The Logic of Practice*. Stanford: Stanford University Press.
- Braveman, P. (2006). Health disparities and health equity: Concepts and measurements. *Annual Review of Public Health, 27*, 167-194.
- Braveman, P. (2014). What are health disparities and health equity? We need to be clear. *Public Health Reports, 129*(S2), 5-8.
- Braveman, P. A., Egerter, S. A., & Mockenhaupt, R. (2011). Broadening the focus: The need to address social determinants of health. *American Journal of Preventive Medicine, 40*(1S1), S4-18.
- Braveman, P., & Gottlieb, L. (2014). The social determinants of health: It's time to consider the causes of causes. *Public Health Reports, 129*(S2), 19-31.
- Braveman, P., & Gruskin, S. (2003). Poverty, equity, human rights and health. *Bulletin of the World Health Organization, 81*(7), pp. 539-545.

- Braveman, P., Egerter, S., & Williams, D. R. (2011). The social determinants of health: Coming of age. *Annual Review of Public Health, 32*, 381-398.
- Bronfenbrenner, U. (1977, July). Toward an experimental ecology of human development. *American Psychologist, 32*, 513-531.
- Brownson, R. C., Haire-Joshu, D., & Luke, D. A. (2006). Shaping the context of health: A review of environmental and policy approaches in the prevention of chronic disease. *Annual Review of Public Health, 27*, 341-370.
- Cattell, V. (2001). Poor people, poor places, and poor health: the mediating role of social networks and social capital. *Social Science & Medicine, 52*(10), 1501-1516.
- Centers for Disease Control. (2017, March 24). *CDC Organization*. Retrieved from CDC: <https://www.cdc.gov/about/organization/cio.htm>
- Centers for Disease Control. (2017, February 18). *Community Health Assessments & Improvement Plans*. Retrieved from Centers for Disease Control: <https://www.cdc.gov/stltpublichealth/cha/plan.html>
- Chipp, C., Dewane, S., Brems, C., Johnson, M. E., Warner, T. D., & Roberts, L. W. (2010). "If only someone had told me...": Lessons from rural providers. *The Journal of Rural Health, 27*, 122-130.
- Cockerham, W. C. (2005). Health lifestyle theory and the convergence of agency and structure. *Journal of Social Behavior, 46*, 51-67.

- Corso, L. C. (2005). Developing the MAPP community health improvement tool. *Journal of Public Health Management Practice, 11*(5), 387-392.
- Cowling, M. (2016, October 11). *Groups partner to grow food for the hungry*. Retrieved February 20, 2017, from Casa Grande Dispatch:
http://www.pinalcentral.com/casa_grande_dispatch/area_news/groups-partner-to-grow-food-for-hungry/article_2cae2c2e-8fd5-11e6-9023-ff6c5ca042cf.html
- Cowling, M. (2016, July 7). *Growing a health community: Power company makes 3-year grant to help Randolph garden*. Retrieved February 20, 2016, from Florence Reminder Blade-Tribune:
http://www.pinalcentral.com/florence_reminder_blade_tribune/news/growing-a-healthy-community/article_2024797c-43c2-11e6-be75-af0850863a57.html
- Cummins, S., & Macintyre, S. (2006). Food environments and obesity - neighborhood or nation? *International Journal of Epidemiology, 35*, 100-104.
- Dalbey, M. (2008). Implementing smart growth strategies in rural America: Development patterns that support public health goals. *Journal of Public Health Management Practice, 14*(3), 238-243.
- Diez Roux, A. V. (2012). Conceptual approaches to the study of health disparities. *Annual Review of Public Health, 33*, 41-58.
- Eberhardt, M. S., & Pamuk, E. R. (2004). The importance of place of residence: Examining health in rural and nonrural areas. *American Journal of Public Health, 94*(10), 1682-1686.

- Erwin, P. C. (2013). Data synthesis in community health assessment: Practical examples from the field. *Journal of Public Health Management and Practice, 19*(5), 468-474.
- Flannery, E., & Mincyte, D. (2010). Food as power. *Cultural Studies Critical Methodologies, 10*(6), 423-427.
- Foucault, M. (1979). Discipline. In M. Foucault, *Discipline and Punishment* (pp. 215-228). New York: Vintage Press.
- Frohlich, K. L., & Potvin, L. (2008, February). The inequality paradox: The population approach and vulnerable populations. *American Journal of Public Health, 98*(2), 216-221.
- Frohlich, K. L., & Potvin, L. (2010). Commentary: Structure or agency? The importance of both for addressing social inequalities in health. *International Journal of Epidemiology, 39*, 378-379.
- Future Forward Foundation. (2017, January 29). *Home*. Retrieved from Future Forward Foundation: <http://www.futureforwardfoundation.com/>
- Fuzhong, L., Harmer, P., Cardinal, B. J., Bosworth, M., & Johnson-Shelton, D. (2009). Obesity and the built environment: Does the density of neighborhood fast-food outlets matter? *American Journal of Health Promotion, 23*(3), pp. 203-209.
- Gastaldo, D. (1999). Is health education good for you? Rethinking health education through the concept of bio-power. In A. B. Peterson (Ed.), *Foucault, Health and Medicine*. London: Routledge.

- Gearhardt, A. N., Grilo, C. M., DiLeon, R. J., Brownell, K. D., & Potenza, M. N. (2011). Can food be addictive? Public health and policy implications. *Addiction*, 1-5.
- Glanz, K., & Mullis, R. M. (1988). Environmental interventions to promote healthy eating: A review of models, programs, and evidence. *Health Education Quarterly*, 15(4), 395-415. Retrieved September 17, 2016, from heb.sagepub.com
- Glanz, K., Rimer, B. K., & Lewis, F. M. (Eds.). (2002). *Health Behavior and Health Education Theory, Research and Practice* (3rd ed.). San Francisco, CA: Jossey-Bass.
- Glanz, K., Sallis, J. F., Saelens, B. E., & Frank, L. D. (2005). Healthy nutrition environments: Concepts and measures. *American Journal of Health Promotion*, 19(5), 330-333.
- Glanz, K., Sallis, J. F., Saelens, B. E., & Frank, L. D. (2007). Nutrition environment measurement survey in stores (NEMS-S) Development and evaluation. *American Journal of Preventive Medicine*, 32(4), 282-289.
- Golden, S. D., & Earp, J. L. (2012, January 20). Social ecological approaches to individuals and their contexts: Twenty years of Health Education & Behavior health promotion interventions. *Health Education and Behavior*, 39(3), 364-372. Retrieved February 4, 2014, from heb.sagepub.com
- Hartley, D. (2004). Rural health disparities, population health, and rural culture. *American Journal of Public Health*, 94(10), 1675-1678.

- Honeycutt, S., Davis, E., Clawson, M., & Glanz, K. (2010). Training for and dissemination of the nutrition environment measurement surveys (NEMS). *Preventing Chronic Disease: Public Health Research, Practice and Policy*, 7(6), 1-10.
- Hsiu-Fang, H., & Shannon, S. E. (2005). Three approaches to content analysis. *Qualitative Health Research*, 15, 1277-88.
- Inagami, S., Cohen, D. A., Brown, A. F., & Asch, S. M. (2009). Body mass index, neighborhood fast food and restaurant concentration, and car ownership. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 86(5).
- Irwin, A., & Scali, E. (2007). Action on the social determinants of health: A historical perspective. *Global Public Health*, 2(3), 235-356.
- Israel, B. A., Schulz, A. J., Parker, E. A., & Becker, A. B. (2001). Community-based participatory research: Policy recommendations for promoting a partnership approach in health research. *Education for Health*, 14(2), 182-197.
- Israel, B. A., Schulz, A. J., Parker, E. A., & Beckler, A. B. (1998). Review of community-based research: Assessing partnership approaches to improve public health. *Annual Review of Public Health*, 19, 173-202. Retrieved January 14, 2014, from www.annualreviews.org
- Israel, B. A., Schulz, A. J., Parker, E. A., Becker, A. B., Allen III, A. J., & Guzman, R. (2008). Critical issues in developing and following CBPR principals. In M. Minkler, & N. Wallerstein (Eds.), *Community-Based*

- Participatory Research for Health From process to Outcomes* (pp. 47-66). San Francisco: Jossey-Bass.
- Jackson, J. E., Doescher, M. P., Jerant, A. F., & Hart, L. G. (2006). A national study of obesity prevalence and trends by type of rural county. *The Journal of Rural Health, 21*(2), 140-148.
- Jenkins, R. (1992). Practice, Habitus and Field. In R. Jenkins, *Pierre Bourdieu* (pp. 74-84). New York: Routledge Press.
- Kaplan, G. A. (2004). What's wrong with social epidemiology, and how can we make it better? *Epidemiologic Reviews, 26*, 124-135.
- Krieger, N. (2011). Ecosocial theory of disease distribution. In N. Krieger, *Epidemiology and the People's Health: Theory and Context* (pp. 202-235). Oxford: Oxford University Press.
- Krieger, N. (2011). Social Epidemiological Alternatives: Sociopolitical and Psychosocial Frameworks. In N. Krieger, *Epidemiology and the People's Health: Theory and Context* (pp. 163-201). Oxford: Oxford University Press.
- Krieger, N., & Zierler, S. (1999). What explains the public's health - A call for epidemiologic theory. In D. E. Beauchamp (Ed.), *New Ethics for the Public's Health* (pp. 45-49). New York: Oxford University Press.
- Kuehnert, P., Graber, J., & Stone, D. (2014). Using a web-based tool to evaluate a collaborative community health needs assessment. *Journal of Public Health Management Practice, 20*(2), 175-187.

- Kuiper, H., Jackson, R. J., Barna, S., & Satariano, W. A. (2012). Local health department leadership strategies for healthy built environments. *Journal of Public Health Management Practice, 18*(2), pp. E11-23.
- Larson, N. I., Story, M. T., & Nelson, M. C. (2009). Neighborhood environments: Disparities in access to health foods in the U.S. *American Journal of Preventive Medicine, 36*(1), 74-81.
- Link, B. G. (2008, December). Epidemiological sociology and the social shaping of population health. *Journal of Health and Social Behavior, 49*, 367-384.
- Lovasi, G. S., Hutson, M. A., Guerra, M., & Neckerman, K. M. (2009). Built environments and obesity in disadvantaged populations. *Epidemiologic Reviews, 31*, 7-20.
- Lynam, M. J., & Cowley, S. (2007, June). Understanding marginalization as a social determinant of health. *Critical Public Health, 17*(2), 137-149. Retrieved January 14, 2014, from <http://dx.doi.org/10.1080/09581590601045907>
- Mantoura, P., & Potvin, L. (2012). A realist--constructionist perspective on participatory research in health promotion. *Health Promotion International, 28*(1), 61-72. Retrieved February 15, 2014, from <http://heapro.oxfordjournals.org/>
- Marent, B., Forster, F., & Nowak, P. (2012). Theorizing participation in health promotion: A literature review. *Social Theory and Health, 10*(2), pp. 188-207.

- McCormick, J. (2001). Commentary: Reflections on sick individuals and sick populations. *International Journal of Epidemiology*, 30, 434-435.
- McKinlay, J. B. (1995). The new public health approach to improving physical activity and autonomy in older populations. In E. Heikkinen, J. Kuusinen, & I. Ruoppila (Eds.), *Preparing for aging* (pp. 87-103). New York: Plenum Press.
- McKinlay, J. B. (1996). More appropriate evaluation methods for community-level health interventions. *Evaluation Review*, 20(3), 237-243.
- McKinlay, J. B., & Marceau, L. D. (2000). To boldly go... *American Journal of Public Health*, 90(1), 25-33.
- McLaren, L., McIntyre, L., & Kirkpatrick, S. (2010). Rose's population strategy of prevention need not increase social inequalities in health. *39*, 372-377.
- McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education & Behavior*, 15(4), 351-377. Retrieved December 16, 2013, from heb.sagepub.com
- Minkler, M., & Wallerstein, N. (Eds.). (2008). *Community-Based Participatory Research for Health From Process to Outcomes* (2nd ed.). San Francisco, CA: Jossey-Bass.
- Muntaner, C., Lynch, J., & D., S. G. (2000). Social capital and a third way in public health. *Critical Public Health*, 10(2), 107-124.

- Myers, S., & Stoto, M. A. (2006). *Criteria for assessing the usefulness of community health assessments: A literature review*. Santa Monica: RAND Corporation. Retrieved October 19, 2013, from http://www.rand.org/content/dam/rand/pubs/technical_reports/2006/RAND_TR314.pdf
- NACCHO. (2016, October 24). *NACCHO - About*. Retrieved from NACCHO - About: <http://www.naccho.org/about>
- NACCHO. (2016, October 24). *NACCHO - MAPP*. Retrieved from NACCHO: <http://www.naccho.org/programs/public-health-infrastructure/mapp>
- National Association for County and City Health Officials. (2013, February). *NACCHO Model Practices Database*. Retrieved February 8, 2013, from NACCHO: <https://eweb.naccho.org/eweb/DynamicPage.aspx?site=naccho&webcode=mpsearch>
- (1999). *New Ethics for the Public's Health*. In D. E. Beauchamp, & B. Steinbock (Eds.). New York: Oxford University Press.
- Olshansky, S. J., Passaro, D. J., Hershow, R. C., Layden, J., Carnes, B. A., Brody, J., . . . Ludwig, D. S. (2005, March 17). A potential decline in life expectancy in the United States in the 21st century. *The New England Journal of Medicine*, 352(11), 1138-1145. Retrieved November 15, 2013, from www.nejm.org
- Paquette, D., & Ryan, J. (2001, July). *Bronfenbrenner's Ecological Systems Theory*. Retrieved September 16, 2016, from Florida Health: [95](http://www.floridahealth.gov/AlternateSites/CMS-</p></div><div data-bbox=)

Kids/providers/early_steps/training/documents/bronfenbrenners_ecological.pdf

Patterson, P. D., Moore, C. G., Probst, J. C., & Shinogle, J. A. (2004). Obesity and physical inactivity in rural America. *The Journal of Rural Health, 20*(2), 151-159.

Patton, M. Q. (2002). *Qualitative Research & Evaluation Methods* (3rd ed.). London: Sage Publications.

Phelan, J. C., Link, B. G., & Tehranifar, P. (2010). Social conditions as fundamental causes of health inequalities: Theory, evidence and policy implications. *Journal of Health and Social Behavior, 51*(S), S28-S40.

Potvin, L., Gendron, S., Bilodau, A., & Chabot, P. (2005). Integrating social theory into public health practice. *American Journal of Public Health, 95*(4), 591-595.

Public Health Accreditation Board. (2016, September 28). *Public Health Department Accreditation Background*. Retrieved from Public Health Accreditation Board: <http://www.phaboard.org/about-phab/public-health-accreditation-background/>

Public Health Accreditation Board. (2016, September 28). *Standards & Measures*. Retrieved from http://www.phaboard.org/wp-content/uploads/PHABSM_WEB_LR1.pdf

Public Health Accreditation Board. (2017, February 18). *Acronyms and Glossary of Terms, 1.0*. Retrieved from Public Health Accreditation

Board: <http://www.phaboard.org/wp-content/uploads/PHAB-Acronyms-and-Glossary-of-Terms-Version-1.02.pdf>

Raphael, D. (2011). A discourse analysis of the social determinants of health. *Critical Public Health, 21*(2), 221-236.

Richard, L., Gauvin, L., & Raine, K. (2011). Ecological models revisited: Their uses and evolution in health promotion over two decades. *Annual Review of Public Health, 32*, 307-326. Retrieved April 24, 2012, from www.annualreviews.org

Rose, G. (1985). Sick individuals and sick populations. *International Journal of Epidemiology, 14*(1), 32-38.

Sallis, J. F., & Glanz, K. (2006). The role of built environments in physical activity, eating, and obesity in childhood. *The Future of Children, 16*(1), 89-108.

Sallis, J. F., & Glanz, K. (2009). Physical activity and food environments: Solutions to the obesity epidemic. *The Milbank Quarterly, 87*(1), 123-154.

Sallis, J. F., & Owen, N. (2002). Ecological models of health behavior. In K. Glanz, B. K. Rimer, & F. M. Lewis (Eds.), *Health Behavior and Health Education Theory, Research, and Practice* (pp. 462-484). San Francisco: Jossey-Bass.

Satcher, D. (2006, October). Ethnic disparities in health: The public's role in working for equality. *PLoS Medicine, 3*(10), 1683-1685. Retrieved September 14, 2016, from www.plosmedicine.org

- Schoenberg, N. E., Howell, B. M., Swanson, M., Grosh, C., & Bardach, S. (2013). Perspectives on healthy eating among Appalachian residents. *The Journal of Rural Health, 29*, s25-s34.
- Schwartz, S., & Diez-Roux, R. (2001). Commentary: Causes of incidence and causes of cases-A Durkheimian perspective on Rose. *International Journal of Epidemiology, 30*, 435-239.
- Sharkey, J. R. (2009). Measuring potential access to food stores and food-service places in rural areas in the U.S. *American Journal of Preventive Medicine, 36*, S151-155.
- Sharpe, K. M., & Staelin, R. (2010). Consumption effects of bundling: Consumer perceptions, firm actions, and public policy. *Journal of Public Policy and Marketing, 29*(2), 170-188.
- Singh, G. K., & Siahpush, M. (2014). Widening rural-urban disparities in life expectancy, U.S., 1969-2009. *American Journal of Preventative Medicine, 46*(2), e19-e29.
- Sobal, J., & Bisogni, C. A. (2009). Constructing food choice decisions. *Annals of Behavioral Medicine, 38*(S1), S37-S46.
- Solet, D., Ciske, S., Gaonkar, R., Horsley, K., McNees, M., Nandi, P., & Krieger, J. W. (2009). Effective community health assessments in King County, Washington. *Journal of Public Health Management Practice, 15*(1), 33-40.
- Spice, C., & Snyder, K. (2009). Reviewing self-reported impacts of community health assessment in local health jurisdictions. *Journal of Public Health Management Practice, 15*(1), 18-23.

- Starr, A. (2012). Local food: A social movement? *Cultural Studies Critical Methodologies*, 10(6), 479-490.
- Stokols, D. (1992). Establishing and maintaining healthy environments: Towards a social ecology of health promotion. *American Psychologist*, 47, 6-22.
- Stokols, D. (1996, March/April). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion*, 10(4), 282-298.
- Story, M., Kaphingst, K. M., Robinson O'Brien, R., & Glanz, K. (2008). Creating healthy food environments: Policy and environmental approaches. *Annual Review of Public Health*, 253-272.
- Story, M., Kaphingst, K. M., Robinson-O'Brien, R., & Glanz, K. (2008). Creating healthy food and eating environments: Policy and environmental approaches. *Annual Review of Public Health*, 29, 253-272.
- Stoto, M. A., Straus, S. G., Bohn, C., & Irani, P. (2009). A web-based tool for assessing and improving the usefulness of community health assessments. *Journal of Public Health Management Practice*, 15(1), 10-17.
- Stoto, M. A., Straus, S. G., Bohn, C., & Irani, P. (2009). A web-based tool for assessing and improving the usefulness of community health assessments. *Journal of Public Health Management Practice*, 15(1), pp. 10-17.

- (1999). The Scope of Public Health as Ethics. In D. E. Beauchamp, & B. Steinbock (Eds.), *New Ethics for the Public's Health* (pp. 3-49). New York: Oxford University Press.
- Turner, B. S. (1997). From governmentality to risk: Some reflections on Foucault's contribution to medical sociology. In A. B. Petersen (Ed.), *Foucault, Health and Medicine* (pp. ix-xxi). New York: Routledge.
- United States Department of Agriculture. (2013, 12 5). *Food Access Research Atlas*. Retrieved 12 16, 2013, from <http://www.ers.usda.gov/data-products/food-access-research-atlas.aspx#.Uq9ek9JDsg0>
- United States Department of Agriculture. (n.d.). *Definitions*. Retrieved 07 25, 2013, from <http://www.ers.usda.gov/data-products/food-access-research-atlas/documentation.aspx#definitions>
- University of Pennsylvania. (n.d.). *Nutrition Environment Measurement Survey*. Retrieved 05 01, 2013, from <http://www.med.upenn.edu/nems/>
- Whelan, A., Wrigley, N., Warm, D., & Cannings, E. (2002). Life in a 'food desert'. *Urban Studies*, 39(11), 2083-2100.
- Wilkinson, R., & Marmont, M. (Eds.). (2003). *Social Determinants of Health: The Solid Facts*. Copenhagen, Denmark: World Health Organization.
- Wilkinson, R., & Pickett, K. (2009). *The Spirit Level*. New York: Bloomsbury Press.

World Health Organization. (2003). *The Solid Facts (2nd ed.)*. Denmark:
World Health Organization.

Ziller, E. C., Anderson, N. J., & Cobern, A. F. (2010). Access to rural mental health services: Service use and out-of-pocket costs. *The Journal of Rural Health, 26*, 214-224.

APPENDIX A: Measuring and Enhancing the Usefulness of Community Health Assessments in Producing Upstream Focused Community Health Assessments (Submitted for consideration to the *Journal of Public Health Management and Practice*)

Abstract

Context: Public health practitioners who want to produce meaningful community health assessments (CHAs) that lead to community health improvement plans (CHIPs) focused on upstream (i.e. social, physical or policy environment) interventions may seek a tool to assess the usefulness of a CHA.

Objective: To determine if higher scoring (or useful) CHAs are correlated with CHIPs recommending an increased ratio of upstream to downstream (i.e. individual-level) interventions.

Design: An existing tool developed to measure the usefulness of community health assessments (CHAs) for public health practitioners is revisited and revised with a focus on making CHAs useful to the public health practitioners in rural communities. New literature-based criteria focused on social determinants of health (SDH), social ecological models, public health accreditation and other impact questions were added to the tool. Public health stakeholders in Arizona were surveyed to determine the perceived usefulness of old and new measures. Survey results were used to develop a scoring system for the revised usefulness tool.

Setting: A review of thirteen rural Arizona CHAs and CHIPs

Main outcome measures: Score of thirteen rural Arizona CHAs on a usefulness tool compared with the ratio of (interventions designed to affect

levels above 'individual' in the social ecological model) to downstream interventions (individual-level interventions) in the corresponding CHIPs.

Result: There is a correlation between useful CHAs and upstream CHIP recommendations. The Pearson product moment correlation coefficient $r=.85$, the one sample t test is .3999595 and the p value is .000225.

Conclusion: The revised usefulness tool may be used by public health practitioners in rural settings to enhance the content, format, and impact of future CHAs and provide greater alignment of CHA data with CHIP recommendations.

Keywords: community health assessment, usefulness tool, evaluation; CHA; CHIP

Introduction

A still unresolved question in the public health literature is what makes a Community Health Assessment (CHA) “useful” to public health practitioners. In 2006, researchers exploring this issue developed a tool to measure the usefulness of CHAs based upon published findings from practitioners and CHA users (Myers & Stoto, 2006). Subsequent researchers used this tool to measure CHA users’ perceptions of usefulness (Kuehnert, Graber, & Stone, 2014). The tool includes 20 criteria focused on CHA content, format and impact (Stoto, Straus, Bohn, & Irani, 2009). The present study expanded this tool with local stakeholder input from public health practitioners in rural Arizona to include 13 additional criteria and developed a scoring system for the expanded tool. Both innovations are intended to explore whether or not CHAs that best address the indicators in the expanded tool are correlated with community health improvement plans (CHIPs) that target upstream interventions as opposed to downstream ones. Or, put another way, can CHAs that score high on the expanded usefulness tool help practitioners plan interventions that target higher levels of the social ecological model that focus on social, environmental, or policy change - as recommended in the public health literature (Golden & Earp, 2012; McLeroy, Bibeau, Steckler, & Glanz, 1988; Bronfenbrenner, 1977; Story, Kaphingst, Robinson O'Brien, & Glanz, 2008; Richard, 2011; Glanz & Mullis, 1988)? The SEM utilized in this study is shown in Figure 1.

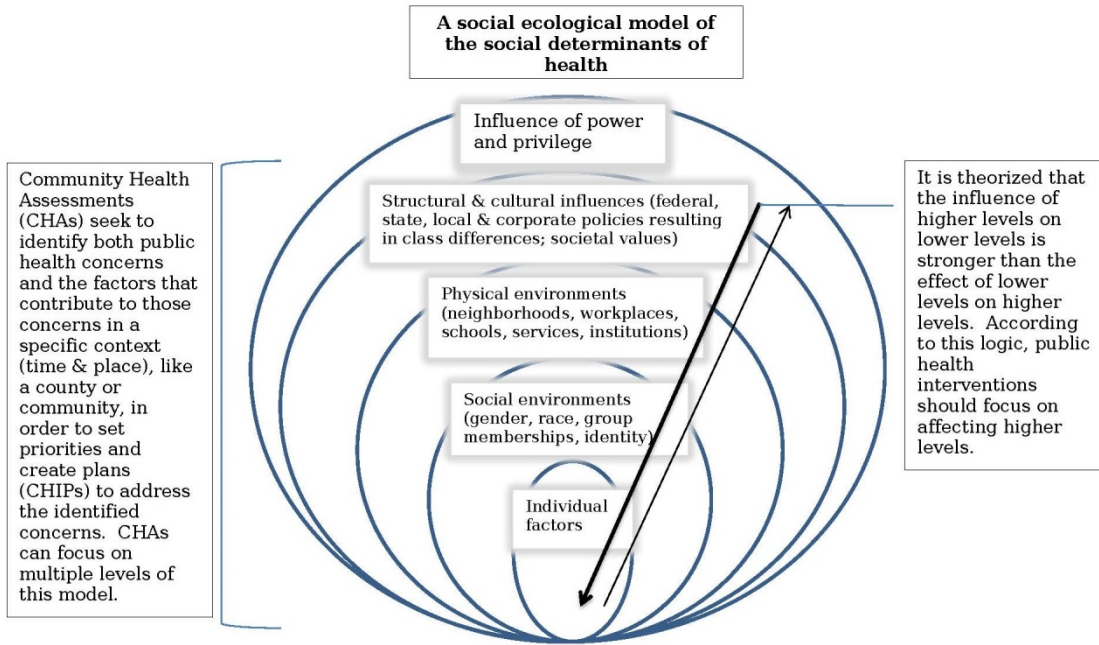


Figure 1: Social Ecological Model of the Social Determinants of Health

Method

A series of methods were utilized for this study. The methods are outlined below in Figure 2 and subsequently explained in the text.

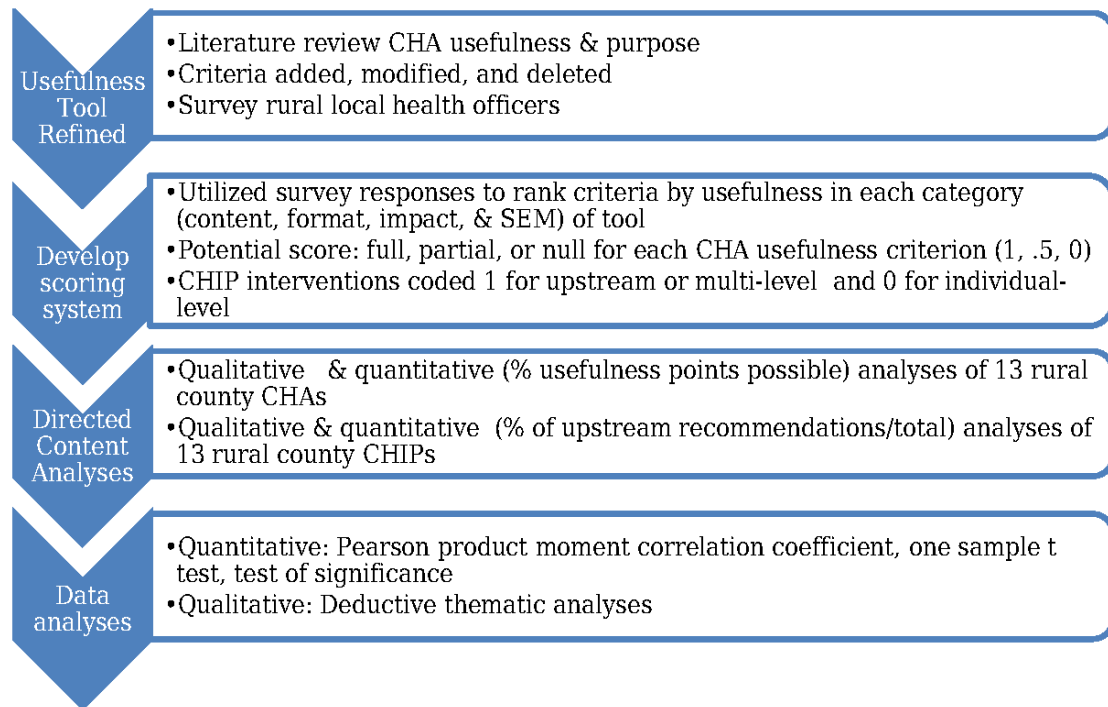


Figure 2: Overview of Methods

The existing “web-based tool to determine and enhance the usefulness of Community Health Assessments” was developed in 2006 by the RAND Corporation in cooperation with the New York State Health Department and the CDC Assessment Initiative (Myers & Stoto, 2006, p. iii). The determination of “usefulness” in the RAND study was defined first by a literature review to identify factors and criteria that previous users of CHAs described as useful. Using this information, an extensive list of criteria was developed and then reduced by a technical advisory panel. The final determination of “usefulness” was made by end users of CHA products in New York via an email survey. The resulting 20 “usefulness” criteria fell

into three categories, CHA content, format, and impact. The first author of this article further enhanced these criteria by reviewing the recent literature regarding: salient public health issues on the social determinants of health (Rose, 1985; Berkman, 2009; Adler & Rehkopf, 2008; Ahnquist, Wamala, & Lindstrom, 2012; Diez Roux, 2012; Braveman, Egerter, & Williams, 2011; Braveman & Gottlieb, 2014; Raphael, 2011) (Wilkinson & Marmont, 2003); the use of social ecological models as a tool to design multilevel public health interventions (Golden & Earp, 2012; Krieger, 2011; Story, Kaphingst, Robinson O'Brien, & Glanz, 2008; Bronfenbrenner, 1977; Richard, 2011); current trends in public health practice such as the move toward local health department accreditation (Public Health Accreditation Board, 2016); current local trends in Arizona toward accreditation (Arizona Department of Health Services, 2016); the unique contexts and challenges in rural public health practice (Ahen, Brown, & Dukas, 2011; Barnidge, et al., 2013; Befort, Nazir, & Perri, 2012; Singh & Siahpush, 2014); public health theory and ethics (Antonovski, 1996; *New Ethics for the Public's Health*, 1999; Braveman & Gruskin, 2003; Cockerham, 2005; McKinlay, 1995; Paquette & Ryan, 2001; Potvin, Gendron, Bilodau, & Chabot, 2005; Krieger & Zierler, 1999) (Stokols, 1996); and the recommendation to promote the local production of health (Frohlich & Potvin, 2010; McLeroy, Bibeau, Steckler, & Glanz, 1988; Israel, Schulz, Parker, & Becker, 2001). Table 1 compares the original tool developed by RAND to the revised tool developed in this study below.

Table 1: A comparison of the closed-ended criteria for CHA usefulness as presented in the literature versus current study modifications

	Reproduced from Table 1 (Stoto, Straus, Bohn, & Irani, 2009):		Modified usefulness criteria used in this study:	
CHA Content. The CHA document	1	Clearly states the goals and purpose of the CHA	1	Clearly states the goals and purpose of the CHA
	2	Includes the most important aspects of the community's health	2	Includes the most important aspects of the community's health
	3	Allows comparisons with data from other communities or other appropriate benchmarks	3	Allows comparisons with data from other communities or other appropriate benchmarks
	4	Allows comparisons over time	4	Allows comparisons over time
	5	Presents data in meaningful subgroups of population (eg, to assess health disparities)	5	Presents data in meaningful subgroups of population (eg, to assess health disparities)
	6	Provides sufficient focus on positive characteristics, for example, community assets as well as negative characteristics, for example death rates	6	Provides sufficient focus on positive characteristics, for example, community assets as well as negative characteristics, for example death rates
	7	Sufficiently documents the process and methods that are used to create the CHA	7	Sufficiently documents the process and methods that are used to create the CHA
(Criteria added & modified to content from format Q #12)			8	Clearly indicates the relationships among related health indicators (eg, similar indicators are connected via a written explanation)
(New criteria)			9	Includes local, primary data which provides insights into the specific health concerns of the rural community
(New criteria)			10	Includes the opinions, beliefs and public health solutions proposed by populations directly affected by health disparities
(New criteria)			11	Includes the opinions, beliefs and public health solutions proposed by public health system professionals
(New criteria)			12	Collects and presents data about the social determinants of health
CHA Format. The CHA document	8	Uses a consistent format to present information on different topics in the report	13	Uses a consistent format to present information on different topics in the report
	9	Includes both summary and detailed versions to be useful for a variety of audiences	14	Includes both summary and detailed versions to be useful for a variety of audiences
	10	Is well organized: it is easy to find content (eg includes a table of contents)	15	Is well organized: it is easy to find content (eg includes a table of contents)
	11	Is easy to understand	16	Is easy to understand

(modified criteria)	12	Clearly indicates the relationships among related health indicators	17	Clearly indicates the relationships among related health indicators (similar indicators grouped together in report)
	13	Included narrative and graphic representation of key findings to meet the needs of varying audiences	18	Included narrative and graphic representation of key findings to meet the needs of varying audiences
(Deleted criteria)	14	Uses a similar structure or data elements as other community planning tools that we use		
(modified criteria)	15	Is available online	19	Is available online, and has appropriate links
(Added to question 19)	16	If yes to 15, Document includes appropriate links		
(Deleted criteria)	17	Can be reproduced easily by photocopy		
	18	Clearly identifies data sources (eg, citations to graphs or tables)	20	Clearly identifies data sources (eg, citations to graphs or tables)
CHA Impact. The CHA document:	19	Serves as a resource to prioritize and plan services	21	Serves as a resource to prioritize and plan services
	20	Serves as a resource for writing grant applications	22	Serves as a resource for writing grant applications
	21	Serves as a resource to guide a comprehensive health promotion strategy	23	Serves as a resource to guide a comprehensive health promotion strategy
(New criteria)			24	Generates actionable & measurable recommendations for amending or creating local programs or policies
(New criteria)			25	Serves as a resource to explore significant population health concerns in greater depth by grouping related health indicators together
(New criteria)			26	Can be used to meet Arizona Department of Health Services requirements/expectations
(New criteria)			27	Can be used for Public Health Accreditation Board (PHAB) documentation
(New criteria)			28	Serves as a resource to distinguish solutions proposed by populations affected by health disparities from solutions proposed by public health system professionals
Other criteria - Social Ecological Models. The CHA document:				
(New criteria)			29	Provides a recognition and/or discussion of any dynamic of social ecological model (illustrations, explanation, etc)

(New criteria)			30	Uses multiple indicators at different levels of SEM to describe complex health concerns
(New criteria)			31	Focuses clear attention on which level of the SEM the agency is seeking to influence
(New criteria)			32	Makes recommendations focused on upstream SDH as opposed to downstream individual education

State and local public health officials in Arizona were surveyed to gain stakeholder input on the expanded tool. The survey asked respondents to rank the criteria for each category (format, content, and impact) and to answer an open-ended question for each category soliciting any other criteria not listed. The survey also queried respondents' knowledge about social ecological models and solicited feedback on two statements – “A useful CHA gives consideration to which level of the social-ecological model the public health agency is seeking to influence,” and “Complex public health concerns are best represented in a CHA through a combination of multiple indicators at different levels of the social ecological model” – using a Likert scale (strongly agree, agree, disagree, strongly disagree). Finally respondents were asked a series of open-ended questions to capture any additional thoughts about criteria for measuring the usefulness of CHAs. The survey was administered by Survey Monkey and sent to the thirteen rural local health department directors and key Arizona Department of Health Services (ADHS) staff in March of 2014. Local Health Department directors were encouraged to fill out the survey themselves as well as forward the survey link to their CHA coordinators. A total of 16 surveys were completed representing 10 rural counties and the ADHS. Three rural counties did not participate. One survey was incompletely filled out and the

ranking questions were blank. As a result there were 15 responses for the ranking questions.

Table 2: Respondent characteristics

Rural Local Health Officer/Director	10
Rural LHD CHA coordinators	5
ADHS staff	1
N=	16

The survey data was used to develop a scoring system for CHAs to better quantify their usefulness and to compare them to the actionable recommendations made either in the CHA or in a subsequent community health improvement plan (CHIP). The final revised CHA usefulness tool listed the criteria in descending order of usefulness as illustrated in Table 3 and assigned a weight opposite to the rank, with the most highly rated criteria receiving the highest weight.

Table 3: Final revised usefulness tool with rankings by category

Rank	Usefulness of CHA Format	Weight
1	Is easy to understand	8
2	Includes both summary and detailed versions to be used with different audiences	7
3	Is well organized; it is easy to find content (includes table of contents)	6
4	Clearly indicates the relationship among related health indicators (format)	5
5	Includes narrative and graphic representations of key findings to meet the needs of varying audiences	4
6	Clearly identifies data sources (includes citations for graphs and/or tables)	3
7	Uses a consistent format to present information on different topics in the report	2
8	Is available online and includes appropriate links	1
Rank	Usefulness of CHA Content	
1	Includes local, primary data which provides insights into the specific health concerns of the rural community	12
2	Allows comparisons over time	11
3	Includes most important aspects of the community's health	10
4	Clearly indicates the relationship among related health indicators (content)	9
5	Collects and presents data about the social determinants of health	8
6	Goals and purpose of the CHA are clearly stated	7
7	Allows comparisons with data from other communities or other appropriate benchmarks	6
8	Provides sufficient focus on positive community characteristics (community assets/strengths), as well as negative characteristics (community weaknesses)	5
9	Includes the opinions, beliefs, and public health solutions proposed by populations directly affected by health disparities	4
10	Presents meaningful subgroups of population (to assess health disparities)	3
11	Includes the opinions, beliefs, and public health solutions proposed by public health system professionals	2
12	Sufficiently documents the process and methods used to create a CHA	1
Rank	Usefulness of CHA potential impact	
1	Generates actionable & measurable recommendations for amending or creating local programs or policies	8
2	Serves as a resource to prioritize and plan services	7
3	Serves as a resource to guide a comprehensive health promotion strategy	6
4	Serves as a resource to explore significant population health concerns in greater depth by grouping related health indicators together	5
5	Can be used to meet Arizona Department of Health Services requirements/expectations	4
6	Serves as a resource for grant writing applications	3

7	Can be used for Public Health Accreditation Board (PHAB) documentation	2
8	Serves as a resource to distinguish solutions proposed by populations affected by health disparities from solutions proposed by public health system professionals	1
	Total Score Possible	150

The scoring system was developed to reflect the average rankings assigned by the rural local health officers and staff who participated in the survey. For each category (format, content, impact), criteria were assigned a weighted score based on responses. For example, in terms of format there are eight possible criteria. Criteria ranked 1st received 8 points while those ranked 8th received only one point. The weighted score for “Is easy to understand” was determined by the following formula based on survey data: $(4*8)+(2*7)+(3*6)+(1*5)+(0*4)+(2*3)+(2*2)+(1*1)=80$. Respondents in the survey did not offer any additional criteria in the open-ended questions that were substantially different than those listed in the three categories.

Using this methodology, the criteria for each category (format, content, and impact) were ranked in accordance with the usefulness rankings placed upon them by Arizona rural health officials and ADHS staff. The final revised CHA usefulness tool listed the criteria in descending order of usefulness as illustrated in Table 3 and assigned a weight opposite to the rank, with the most highly rated criteria receiving the highest weight.

About social ecological models, all respondents stated they had “some familiarity,” had “seen/heard of, limited experience with,” or “use regularly in professional life”. Respondents were split evenly on rating the statement, “A useful CHA gives consideration to which level of the social ecological model the public health agency is seeking to influence” (50% answering

disagree or strongly disagree and 50% answering agree or strongly agree). However, in response to the question, “Complex public health concerns are best represented in a CHA through a combination of multiple indicators at different levels of the social ecological model” 75% answered they agreed or strongly agreed. As a result four additional criteria were added, in no particular order or rank, and each criteria was assigned the score of 1, bringing the total points possible to 154. These criteria are found below.

- There is a recognition and/or discussion of any dynamic of social ecological model (illustrations, explanation, etc).
- Multiple indicators at different levels of SEM are used to describe complex health concerns.
- There is clear attention on which level of the SEM is being influenced.
- All recommendations focus on upstream SDH as opposed to individual education.

Results

Utilizing the expanded usefulness tool, the first author conducted a directed content analysis (Hsiu-Fang & Shannon, 2005) of the CHAs of the thirteen rural counties in Arizona (which were completed in 2012 and retrieved from the ADHS website in October of 2013) (Arizona Department of Health Services, 2013). Each CHA received either 0, .5, or 1 point for each criterion in the usefulness tool. The points were then multiplied by the weight for each criterion. A maximum of 154 points were possible from all four categories (format:36; content:78; impact:36; and other:4).

The content analysis served to determine whether higher scoring CHAs correlated with CHIP recommendations for interventions aimed at

higher levels of the social ecological model. The thirteen rural county CHIPs were obtained from the ADHS website in February of 2014 (Arizona Department of Health Services, 2013). In one county, the CHA and CHIP documents were one and the same. The 12 other counties had separate documents. The total number of recommendations for action were counted in each CHIP and each was then coded 1 if it targeted a level other than individual behavior change or education, and 0 if it focused only on individual behavior change or education. Multilevel approaches were coded as 1. Each CHIP then received a percentage score based on the number of multilevel/higher level interventions divided by the total number of interventions. The CHA and CHIP scores matched by county are displayed in Figure 3.

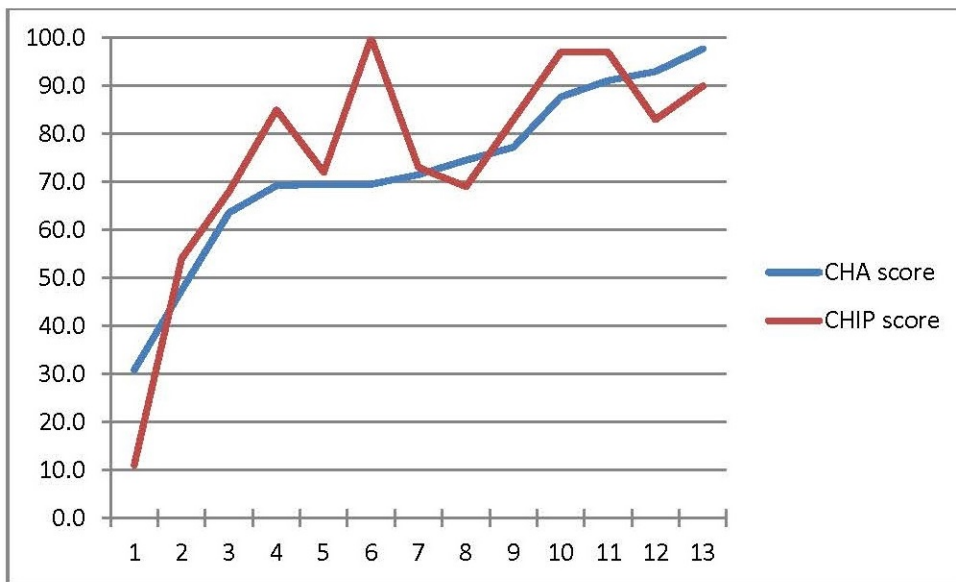


Figure 3: Arizona rural county CHA and CHIP scores matched by county

There is a highly statistically significant association between high scoring (useful) CHAs and CHIP recommendations focused at higher levels of the social ecological model. The Pearson product moment correlation

coefficient $r=.85$, the one sample t test is .3999595 and the p value is .000225.

Discussion

Our work builds on previous methods for evaluating CHA usefulness and is innovative in comparing CHA usefulness to CHIP recommendations. Importantly the current efforts focused on rural areas and the application of social theory place a greater emphasis on:

- engagement of local stakeholders to identify and propose solutions to specific health concerns;
- presentation of the community voice and ideas as distinct from recommendations made by public health professionals;
- the collection and presentation of related social determinants of health data;
- and the generation of actionable and measurable upstream (i.e. social environment, physical environment, or policy change) interventions as opposed to downstream (i.e. individual health education/behavior change) interventions.

The SEM used in this study is a synthesis of social theory and previous SEMs found in literature (Story, Kaphingst, Robinson O'Brien, & Glanz, 2008; Rose, 1985; Braveman, Egerter, & Williams, 2011; Braveman & Gottlieb, 2014; Raphael, 2011; Krieger, 2011; Antonovski, 1996; New Ethics for the Public's Health, 1999) (Krieger & Zierler, 1999; Stokols, 1996). SEMs are important because they represent complex social theoretical principals in a simple visual image. SEMs are useful for targeting higher level or upstream interventions when conducting planning processes. Researchers

have found that multi-level interventions are most effective, especially those that target one or more higher levels of the SEM (Golden & Earp, 2012). In this study the SEM was used to classify the myriad interventions proposed in the 13 rural CHIPs.

It is important to note that the reason all thirteen rural Arizona counties conducted CHAs and CHIPs during this time period was due to a funding initiative by the ADHS as a precursor to the agency pursuing state accreditation through the Public Health Accreditation Board (PHAB). As part of the initiative, public health officials in Arizona were offered training through the National Association of City and County Health Officials (NACCHO) on the Mobilizing for Action through Planning and Partnerships (MAPP) process for conducting Community Health Assessments (Corso, 2005). Most counties used a modified version of MAPP in their local jurisdictions. The initiation of this study took place after counties completed their CHAs and CHIPs. None of the counties used an illustration of a social ecological model to show the multi-level causes of disease or their proposed initiatives - and social ecological models are not currently promoted by NACCHO in their training for the MAPP process. In other words, the CHAs were evaluated on criteria that health officials had not been specifically trained to include in their CHA and CHIP process. However, many jurisdictions focused on the SDH in the CHAs and scored highly despite the absence of an illustration of a social ecological model.

Implications for Policy & Practice

The expanded “usefulness” tool used in this study, created with the input of state and local rural health officials in Arizona includes many criteria deemed essential by researchers and public health practitioners

alike, considers the call for public health researchers to consider a constructivist paradigm (Israel, Schulz, Parker, & Beckler, 1998), and for public health practitioners to be reflexive and engage local partners to promote the local production of health (Frohlich & Potvin, 2008; Frohlich & Potvin, 2010). It can be used to provide practitioners with a guide to both conducting and evaluating their CHA process and final reports. Though the data set was limited to thirteen rural Arizona county CHAs and CHIPs there was a correlation between higher scoring (useful) CHAs and CHIP recommendations that target upstream SDH. Although correlation does not prove causation, there are several reasons to believe that useful CHAs could produce upstream CHIP recommendations. Most significantly, the first author noted the following trends during the directed content analyses:

- When rural counties discuss the SDH in CHA reports, they are also likely to include data measuring the strengths and weaknesses of the physical and social environments in addition to downstream individual risk factors such as rates of chronic disease and obesity. When a discussion of the SDH is absent, there is a greater focus on individual risk factors in the CHA reports and subsequently on individual education and behavioral change in the CHIP recommendations.
- Secondly, rural counties with populations affected by health disparities that included recommendations made by both the affected populations and public health professionals were more likely to propose creative approaches to addressing public health concerns - e.g., partnerships with agencies not typically seen as part of the public health system (road authorities), activities like

community gardening and Farms to Schools programs, and targeted plans for frontier or isolated communities to address unique challenges like transportation or road maintenance.

- Third, when counties used multiple measures, or indicators, of the SDH relating to specific public health concerns like chronic disease and included community strengths and weaknesses regarding policies and the physical and social environments; they were best equipped to build on community assets and form partnerships to address community needs. Counties that relied heavily on secondary data related to chronic disease (morbidity and mortality) or that collected primary data via surveys and asked respondents to prioritize various chronic diseases were less able to consider data related to the effects of policies and the physical and social environments during in the CHIP process.
- Fourth, when local perspectives were absent or featured less prominently than those of public health professionals CHIP recommendations were more likely to place more emphasis on individual accountability, knowledge, and behavior as opposed to upstream determinants.

While the trends noted above seem to best explain the correlation between CHA and CHIP scores, it is also possible, for example, that a county wanted to take steps toward affecting policies or environmental factors and therefore sought, and reported, data that supported that intention.

The expanded tool should lead to further exploration of how the use of social ecological models could influence the collection, organization, and evaluation (McKinlay, 1996) of data in CHAs and CHIPs. Previous

researchers have noted the lack of tools to conduct data synthesis during the MAPP process (Erwin, et al., 2013). In the CHAs reviewed for this study, it was common to see data presented by the method of collection instead of by public health concern. For instance, a county may have initiated a photo voice project to assess community strengths, a community survey to determine top health priorities, a focus group around a particular health concern, and secondary data collection to review morbidity and mortality, and then report about each method and results in a separate section. An alternative format of reporting data would be to consider a public health concern, such as obesity or chronic disease, and then triangulate secondary data, community survey data, focus group data, and photo voice data relevant to that public health concern.

There are limitations to this study in that the sample of CHAs was small and exclusive to rural counties in Arizona. Additionally, recommendations are not outcomes. Future studies may include greater follow-up with public health officials regarding progress made on the implementation of CHIP recommendations. These additional data would better assess the impact of CHAs as opposed to simply evaluating CHIP recommendations themselves as was done in this study.

This study attempted to bridge a gap between research and practice by building on existing criteria in the literature used to define useful CHAs. Local health officials in Arizona were engaged to ensure the definition was relevant to their practice. The resulting product provides both researchers and practitioners with a new vantage point from which to consider the usefulness of CHAs and implications for CHIP recommendations.

Works Cited

- Adler, N. E., & Rehkopf, D. H. (2008). U.S. Disparities in Health: Descriptions, causes, and mechanisms. *Annual Review of Public Health, 29*, 235-52. Retrieved January 14, 2014, from www.annualreviews.org
- Ahen, M., Brown, C., & Dukas, S. (2011). A national study of the association between food environments and county-level outcomes. *The Journal of Rural Health, 27*, 367-379.
- Ahnquist, J., Wamala, S. P., & Lindstrom, M. (2012). Social determinants of health - A question of social or economic capital? Interaction effects of socioeconomic factors on health outcomes. *Social Science & Medicine, 74*, 930-939. Retrieved from www.elsevier.com/locate/socscimed
- Antonovski, A. (1996). The salutogenic model as a theory to guide health promotion. *Health Promotion International, 11*(1), 11-18.
- Arizona Department of Health Services. (2013, November 12). *Managing for Excellence: Community Health Assessments*. Retrieved 12 16, 2013, from <http://www.azdhs.gov/diro/excellence/assessment/index.htm>
- Arizona Department of Health Services. (2016, September 28). *Accreditation*. Retrieved from ADHS Managing for Excellence: <http://azdhs.gov/operations/managing-excellence/index.php#accreditation>

- Barnidge, E. K., Radvanyi, C., Duggan, K., Motton, F., Wiggs, I., Baker, E. A., & Brownson, R. C. (2013). Understanding and addressing barriers to implementation of environmental and policy interventions to support physical activity and health eating in rural communities. *The Journal of Rural Health, 29*, 97-105.
- Befort, C. A., Nazir, N., & Perri, M. G. (2012). Prevalence of obesity among adults from rural and urban areas of the United States: Findings from NHANES (2005-2008). *The Journal of Rural Health, 28*, 392-297.
- Berkman, L. F. (2009). Social epidemiology: Social determinants of health in the United States: Are we losing ground? *Annual Review of Public Health, 30*, 27-41. Retrieved January 14, 2014, from www.annualreviews.org
- Braveman, P., & Gottlieb, L. (2014). The social determinants of health: It's time to consider the causes of causes. *Public Health Reports, 129*(S2), 19-31.
- Braveman, P., & Gruskin, S. (2003). Poverty, equity, human rights and health. *Bulletin of the World Health Organization, 81*(7), pp. 539-545.
- Braveman, P., Egerter, S., & Williams, D. (2011). The social determinants of health: Coming of age. *Annual Review of Public Health, 32*, 381-398.
- Bronfenbrenner, U. (1977, July). Toward an experimental ecology of human development. *American Psychologist, 513-531*.
- Cockerham, W. C. (2005). Health lifestyle theory and the convergence of agency and structure. *Journal of Social Behavior, 46*, 51-67.

- Corso, L. C. (2005). Developing the MAPP community health improvement tool. *Journal of Public Health Management Practice, 11*(5), 387-392.
- Diez Roux, A. V. (2012). Conceptual approaches to the study of health disparities. *Annual Review of Public Health, 33*, 41-58. Retrieved January 14, 2014, from www.annualreviews.org
- Erwin, P. C. (2013). Data synthesis in community health assessment: Practical examples from the field. *Journal of Public Health Management and Practice, 19*(5), 468-474.
- Frohlich, K. L., & Potvin, L. (2008, February). The inequality paradox: The population approach and vulnerable populations. *American Journal of Public Health, 98*(2), 216-221.
- Frohlich, K. L., & Potvin, L. (2010). Commentary: Structure or agency? The importance of both for addressing social inequalities in health. *International Journal of Epidemiology, 39*, pp. 378-379.
- Glanz, K., & Mullis, R. M. (1988). Environmental interventions to promote healthy eating: A review of models, programs, and evidence. *Health Education Quarterly, 15*(4), 395-415. Retrieved September 17, 2016, from heb.sagepub.com
- Golden, S. D., & Earp, J. L. (2012, January 20). Social ecological approaches to individuals and their contexts: Twenty years of Health Education & Behavior health promotion interventions. *Health Education and Behavior, 39*(3), 364-372. Retrieved February 4, 2014, from heb.sagepub.com

- Hsiu-Fang, H., & Shannon, S. E. (2005). Three approaches to content analysis. *Qualitative Health Research, 15*, 1277-88.
- Israel, B. A., Schulz, A. J., Parker, E. A., & Becker, A. B. (2001). Community-based participatory research: Policy recommendations for promoting a partnership approach in health research. *Education for Health, 14*(2), 182-197.
- Israel, B. A., Schulz, A. J., Parker, E. A., & Beckler, A. B. (1998). Review of community-based research: Assessing partnership approaches to improve public health. *Annual Review of Public Health, 19*, 173-202. Retrieved January 14, 2014, from www.annualreviews.org
- Krieger, N. (2011). Ecosocial theory of disease distribution. In N. Krieger, *Epidemiology and the People's Health: Theory and Context* (pp. 202-235). Oxford: Oxford University Press.
- Krieger, N., & Zierler, S. (1999). What explains the public's health - A call for epidemiologic theory. In D. E. Beauchamp (Ed.), *New Ethics for the Public's Health* (pp. 45-49). New York: Oxford University Press.
- Kuehnert, P., Graber, J., & Stone, D. (2014). Using a web-based tool to evaluate a collaborative community health needs assessment. *Journal of Public Health Management Practice, 20*(2), 175-187.
- McKinlay, J. B. (1995). The new public health approach to improving physical activity and autonomy in older populations. In E. Heikkinen, J. Kuusinen, & I. Ruoppila (Eds.), *Preparing for aging* (pp. 87-103). New York: Plenum Press.

- McKinlay, J. B. (1996). More appropriate evaluation methods for community-level health interventions. *Evaluation Review*, 20(3), 237-243.
- McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education & Behavior*, 15(4), 351-377. Retrieved December 16, 2013, from heb.sagepub.com
- Myers, S., & Stoto, M. A. (2006). *Criteria for assessing the usefulness of community health assessments: A literature review*. Santa Monica: RAND Corporation. Retrieved October 19, 2013, from http://www.rand.org/content/dam/rand/pubs/technical_reports/2006/RAND_TR314.pdf
- (1999). *New Ethics for the Public's Health*. In D. E. Beauchamp, & B. Steinbock (Eds.). New York: Oxford University Press.
- Paquette, D., & Ryan, J. (2001, July). *Bronfenbrenner's Ecological Systems Theory*. Retrieved September 16, 2016, from Florida Health: http://www.floridahealth.gov/AlternateSites/CMS-Kids/providers/early_steps/training/documents/bronfenbrenners_ecological.pdf
- Potvin, L., Gendron, S., Bilodau, A., & Chabot, P. (2005). Integrating social theory into public health practice. *American Journal of Public Health*, 95(4), 591-595.
- Public Health Accreditation Board. (2016, September 28). *Public Health Department Accreditation Background*. Retrieved from Public Health

Accreditation Board: <http://www.phaboard.org/about-phab/public-health-accreditation-background/>

Raphael, D. (2011). A discourse analysis of the social determinants of health. *Critical Public Health, 21*(2), 221-236.

Richard, L. G. (2011). Ecological models revisited: Their uses and evolution in health promotion over two decades. *Annual Review of Public Health, 32*, 307-326. Retrieved 04 24, 2012, from www.annualreviews.org

Rose, G. (1985). Sick individuals and sick populations. *International Journal of Epidemiology, 14*(1), 32-38.

Singh, G. K., & Siahpush, M. (2014). Widening rural-urban disparities in life expectancy, U.S., 1969-2009. *American Journal of Preventive Medicine, 46*(2), e19-29.

Stokols, D. (1996, March/April). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion, 10*(4), 282-298.

Story, M., Kaphingst, K. M., Robinson O'Brien, R., & Glanz, K. (2008). Creating healthy food environments: Policy and environmental approaches. *Annual Review of Public Health, 29*, 253-272.

Stoto, M. A., Straus, S. G., Bohn, C., & Irani, P. (2009). A web-based tool for assessing and improving the usefulness of community health assessments. *Journal of Public Health Management Practice, 15*(1), 10-17.

Wilkinson, R., & Marmont, M. (Eds.). (2003). *Social Determinants of Health: The Solid Facts*. Copenhagen, Denmark: World Health Organization.

APPENDIX B: Integrating and interpreting MAPP data: How social ecological models can enhance the community health assessment and improvement planning process.

Abstract

Local health departments often use a tool, Mobilizing for Action through Planning and Partnerships (MAPP), to conduct community health assessments. However, MAPP does not provide practical guidance for synthesizing the data collected from its four assessments (Erwin, 2013). Social ecological models (SEM) are designed to focus attention on the upstream determinants of health disparities and to help develop interventions focused on those upstream determinants (McLeroy, Bibeau, Steckler, & Glanz, 1988; Golden & Earp, 2012; Glanz & Mullis, 1988; Richard, Gauvin, & Raine, 2011). During the community health improvement plan (CHIP) process, this paper proposes using SEMs to triangulate CHA data from the four MAPP assessments and to prioritize and strategically plan interventions with firm theoretical foundations and well-researched conceptual models (Stokols, 1996) focused on upstream determinants (McKinlay, 1996). Practical examples and guidance on using SEMs to synthesize CHA data from rural Arizona counties as well as on developing CHIPs focused on upstream interventions follow.

Introduction

One of the many standards required for state health departments applying for accreditation from the Public Health Accreditation Board is the development of a comprehensive state community health assessment in

collaboration with local partners, including local health departments. In 2012, the Arizona Department of Health Services (ADHS) funded the state's fifteen local health departments to conduct community health assessments (CHAs) and develop subsequent community health improvement plans (CHIPs). All local health departments in Arizona used the Mobilizing for Action through Planning and Partnerships (MAPP) (Corso, 2005) process in whole or in part to conduct their community health assessments. The first author conducted a directed content analysis (Hsiu-Fang & Shannon, 2005) on the thirteen CHAs and CHIPs from rural counties to determine if there was a correlation between higher scoring CHAs and CHIP recommendations proposing upstream interventions - i.e., interventions at higher levels of the social ecological model, as recommended by researchers (McKinlay & Marceau, 2000). These findings - reported elsewhere (Kizer, Reinschmidt, Thomson, Schachter, TBD) and supported by previous findings (Erwin, 2013) - demonstrated wide variation in how local health departments (LHDs) synthesized and presented their multisource data. In this article, we argue that the multisource data in CHAs could be more effectively triangulated (Patton, 2002) using a series of social ecological models to identify and visually illustrate the social determinants of health (SDH) for a variety of public health concerns. We further argue that social ecological models depicting the SDH provide an ideal starting point for the CHIP process through its integration of social theory into public health practice (Potvin, Gendron, Bilodau, & Chabot, 2005).

Theoretical Background

Social ecological models (SEMs) are grounded in social theory and provide an illustration, “conceived topologically as a nested arrangement of structures, each contained within the next” (Bronfenbrenner, 1977, p. 514). In order to conduct directed content analyses (Hsiu-Fang & Shannon, 2005) of thirteen rural CHA reports, the first author developed a SEM that was based upon various existing SEM models, social theories, public health practice standards, and a SDH discourse analysis in the literature (Krieger, 2011; Story, Kaphingst, Robinson O'Brien, & Glanz, 2008; Raphael, 2011; Public Health Accreditation Board, 2016; Diez Roux, 2012; McLeroy, Bibeau, Steckler, & Glanz, 1988; Braveman, Egerter, & Williams, 2011; Richard, Gauvin, & Raine, 2011) (Antonovski, 1996; Stokols, 1996; McLaren, McIntyre, & Kirkpatrick, 2010; Paquette & Ryan, 2001; Rose, 1985; Wilkinson & Marmont, 2003; *New Ethics for the Public's Health*, 1999; Berkman, 2009; Braveman, 2006). The resulting hybrid SEM is presented in Figure 1.

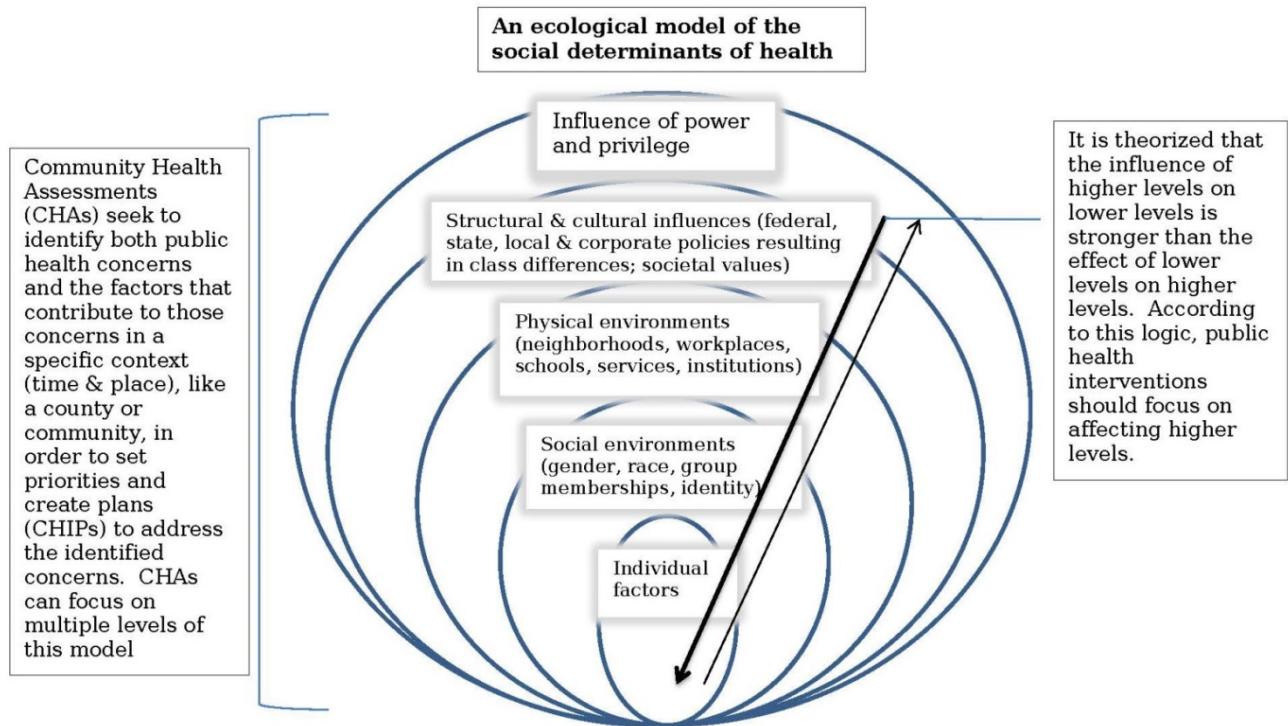


Figure 1: Social Ecological Model of the Social Determinants of Health

Findings

The MAPP process as presented by the National Association of City and County Health Officials (NACCHO) recommends that CHAs include four major assessments (National Association of City and County Health Officials, 2017), each collecting data on different aspects of the community's health.

The assessments are:

- **Community Themes and Strengths Assessment** - Asks community residents what is important to their quality of life and whether their assets can be used to improve the community's health.
- **Local Public Health System Assessment** - Asks public health system staff about activities, competencies and capacities to provide essential public health services.

- Community Health Status Assessment - Uses secondary data and local surveys to determine the priority of various community health concerns and quality of life issues.
- Forces of Change Assessment - Considers forces such as legislation, technology and others to determine what changes are affecting the public health and whether any threats or opportunities are generated by those forces.

A directed content analysis (Hsiu-Fang & Shannon, 2005) of the CHA reports from the thirteen rural counties in Arizona revealed the following trends:

- While the thirteen rural counties in Arizona all used the MAPP process to some extent, many adapted the process for their local use and either did not conduct all four assessments or combined various aspects of the assessments into one community survey or used another method.
- All thirteen counties presented some secondary SDH data obtained from the ADHS and other sources as well as primary data such as community survey results and focus groups.
- The most common format of presenting data was by the method of data collection. In these CHA reports, section headings indicated how the data was collected (i.e. survey results, focus group, or secondary data) and then report the data.
- In a few cases, counties presented the SDH data by geographic subdivision.

Adapting the MAPP process for local use is a normative practice as NACCHO recognizes that the structure and functions of public health departments vary significantly. Reporting the SDH by the method of data collection is also an accepted practice among LHDs. In reviewing the MAPP guidance and model reports provided by NACCHO on their website, it is also common to see data presented under the headings of the four assessments. It is unclear if NACCHO provides written guidance, or discusses this in trainings, but the model reports featured on the website do follow this pattern. (National Association of City and County Health Officials, 2017). Suffice it to say that the rural counties in Arizona followed the prevailing reporting norms. While it is advantageous to document methods and findings after each primary data collection project for historical accuracy, we argue that this information could be analyzed, organized, and reported in a more meaningful way.

There are several disadvantages of reporting SDH by the method of data collection in a CHA report. Most significantly, the focus becomes the method instead of the findings. Additionally this style of presentation leads to a considerable amount of repetition about significant health concerns. It is also difficult to identify the priority health issues without multiple reviews of the various sections of the report. In some cases, reporting SDH by the method of data collection results in conflicting data being presented without context. For example, one county CHA reported in one section that recreational opportunities were an asset to the community, specifically noting fitness centers, walking paths, and parks. In another section, the same CHA reported a lack of sidewalks, parks, safe walking paths, and other

facilities. While one might infer that the conflicting input was from community members living in rural versus frontier communities, CHAs are more meaningful when conflicting data are given proper context. Finally, although the CHA report is intended to inform the CHIP process; in many cases, CHIP recommendations did not appear to be based on the CHA data reported.

When SDH data were presented by geographic subdivision, there was significant repetition of some social determinants of health - for example the SDH based on access to health care services is something many rural and frontier communities have in common. Presentation of data by geographic subdivision was effective when the CHIP recommendations were both geographically focused and unique.

Synthesizing and presenting SDH data in a social ecological model could help reduce redundancy and clarify priorities for intervention. The steps for this method are summarized in Table 2 below. The first step involves identifying a SEM that is representative of the ecological environment (Bronfenbrenner, 1977) as well as easy to understand and use. The levels of the SEM should include descriptions that allow SDH data to naturally fit into their appropriate levels (Raphael, 2011). Each level should be broad enough to include a variety of findings, or indicators, and offer public health practitioners opportunities to create programs and/or interventions that address the SDH at that level. If a level of the SEM is outside of the scope of the local health department to affect change, it is doubtful data will be collected at that level. Some researchers have specifically sought to measure environmental SDH, and perhaps practitioners may, in the future,

focus more on collecting upstream data as part of the CHA process (Ahen, Brown, & Dukas, 2011; Story, Kaphingst, Robinson O'Brien, & Glanz, 2008; Kelly, Flood, & Yeatman, 2011; Barnidge, et al., 2013; McKinlay & Marceau, 2000). Table 1 offers examples of interventions that target various levels of the SEM.

Table 1: Examples of programs or interventions designed to address SDH at various levels of a SEM

SEM Levels:	Influence of power & privilege	Structural & cultural influences (federal, state, local & corporate policies resulting in class differences; societal values)	Physical environments (neighborhoods, workplaces, schools, services, institutions)	Social environments (gender, race, group memberships, identity)	Individual factors SDH (knowledge, habits, practices, morbidity & mortality rates)
<i>Example of a SDH finding in a CHA</i>	N/A	Norms and laws regarding tobacco use are very permissive in rural communities	Much of the county is a food desert with limited access to fresh foods	Little social support for healthy eating initiatives in a tribal community	High rates of chronic disease and obesity
<i>Example of a public health program/intervention to address SDH</i>	Outside of the scope of local health departments	Smoke-Free AZ law passed to restrict use of tobacco in public spaces across the state; implemented and enforced by LHDs	Work with existing agencies (schools and restaurants) to improve availability of fresh, healthy options	Provide school-based education about local indigenous foods coupled with cafeteria cooperation to prepare and serve said foods (multi-level intervention)	Behavior change and lifestyle modification education

The second step in using SEMs to depict SDH is to create a system for recording the information. While spreadsheets are useful tools, the first author has seen examples of poster pages and post-it notes used effectively for similar activities. It does not matter which system is used as long as the

end result can be captured (by saving a file or photographing work done by hand). An example spreadsheet is provided in Table 3.

Third, starting with secondary data relevant to the entire jurisdiction, brief statements summarizing the SDH can be inserted into the appropriate level of the SEM. Reading the definitions or description of the SEM levels will assist in making determinations about where the SDH should be placed in the model. Once secondary data is inserted into the model, primary data can be inserted, including surveys, focus groups, photo voice, and key stakeholder interviews. It is important to include SDH relevant to both community strengths and weaknesses.

Fourth, many of the SDH may be related to a particular public health concern, such as chronic disease or youth health. In these cases, a new row in the spreadsheet, or a new SEM drawing, can be added to capture all the SDH related to that concern. New rows can be added to capture geographic-specific concerns; though it is best to add additional SEMs (or rows) sparingly. The advantage of this system is that it allows the synthesis of data from multiple sources into a condensed overview of the SDH contributing to specific public health concerns. The SDH that are more narrowly focused can still be included in the model for the entire jurisdiction. Or, a geographic-specific model can be used to list only those more narrowly focused concerns generating interventions different than those for the entire jurisdiction. For example, if the improper use of car seats is causing increased mortality from motor vehicle accidents in children and the planned intervention would be the same for the entire jurisdiction, this SDH would not be listed in the geographic-specific model. It is also

important to report each SDH only once in the proper SEM or row of the spreadsheet in order to generate an overview that is useful to stakeholders in the CHIP process.

Finally, if a specific SDH is raised multiple times during primary data collection (for example, in both survey results and focus groups), it is important to use a consistent method of highlighting these findings. One suggestion is to use *italics* if the concern was raised twice and **bold** if the concern was raised three or more times. In a paper-based system, slash marks can be added to a post-it note to indicate that a SDH was raised // (two) or /// (three or more) times.

Table 2: Steps necessary for using SEMs to triangulate SDH data from multiple sources

1	Identify a social ecological model	Use an existing one from the literature or adapt one. For each level of the model ensure clear definitions regarding the SDH that would fit in that category. Figure 1 provides the SEM used in this article.
2	Create a system to classify findings (spreadsheet - see Table 3, or on paper/poster by hand)	If using a spreadsheet create columns for the levels of the SEM, by hand create posters or drawings of the various levels
3	Starting with secondary data applicable to the entire jurisdiction, insert SDH findings into the SEM in the proper level in a row labeled to represent the entire jurisdiction (type into a cell spreadsheet; add post-it notes to poster)	Looking at a chart or table showing County A has unemployment greater than the state average, record this SDH in the row labeled "county wide" and under the column labeled structural/cultural influences. Findings should be kept together in a cell and separated by punctuation (semi-colons used in the example below).
4	Create multiple SEMs sparingly labeled with broad public health concerns or geographic subdivisions.	The number of rows should be kept to a minimum. Rows are only added to capture SDH for a unique geographic subdivision or broad public health concern like chronic disease. SDH should not be listed more than once except in rare circumstances where interventions would be geographically distinct.

5	When the same SDH is raised in multiple settings (survey, focus group, photo voice project, etc.) use a consistent system to highlight these findings.	Example: If using a spreadsheet and the SDH is mentioned twice add <i>italics</i> , mentioned three or more times add bold . If using a paper method, add slash marks (II or III for three or more) next to the SDH.
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The example model in Table 3 uses italics and bold for common SDH findings across the rural counties in Arizona and is generally representative of the rural counties but not of any specific county or jurisdiction. However this fictional model is presented to consider the usefulness of this method of synthesizing data, especially in terms of how CHA data can be used to inform the CHIP process. Once all of the SDH are inserted into the SEMs, the models can be used to create diagrams highlighting the positive and negative SDH such as in Figure 2.

Table 3: Examples of selected SDH from multiple rural AZ county CHA reports recorded in a SEM

	Structural & cultural influences (federal, state, local & corporate policies resulting in class differences; societal values)	Physical environments (neighborhoods, workplaces, schools, services, institutions)	Social environments (gender, race, group memberships, identity)	Individual factors SDH (knowledge, habits, practices, morbidity & mortality rates)
County wide	Unemployment greater than state average (x% vs y%); schools lack funding; Rural residents value small community, knowing neighbors, feeling safe, and open spaces; Immigration;	High prev of fast food restaurants and a <i>lack of fresh food in many areas of the county;</i> <i>Areas of blight in various communities;</i> Outdoor activities are available year-round; Strong faith-based community	81% of pop has HS education; 13.4% with bachelor's or higher; 20% of families in poverty; Additional seasonal residents (winter); Large immigrant population; Tight-knit comm	Leading causes of death are cancer and CVD; Lack of knowledge about how to manage chronic disease; Death by unintentional injury rate is high compared to state average
Geographic subdivision X tribal community	Chronic underfunding of schools; Very tight knit community with unique local customs, language, and traditions;	<i>food desert;</i> poor roads; no public transit; closest health services 30+ miles; Chapter Houses serve as valued community spaces;	98% of pop is Native American; little social support for health eating initiatives;	High rates of chronic disease;

Chronic Disease	<i>High rates of medication noncompliance due to cost; food insecurity is high according to SNAP enrollment; high rate of uninsured;</i>	<i>Most of the county is a food desert with no local source of fresh food; assets include walking paths/parks/ and fitness centers; Lack of workplace wellness programs;</i>	15% of pop are seniors, 15% pop are native American, 30% pop are Hispanic, 20% of families in poverty;	Highest rate of diabetes in AZ; 41% of hospital discharges related to respiratory illnesses; lack of knowledge about community recreation facilities; high prevalence of obesity;
Youth Health	High incarceration rates take parents out of the home; Drug, tobacco and alcohol use is seen as normal;	Lack of after school & weekend activities for teens; Poor community involvement in organized community activities by the towns; Drugs, tobacco and alcohol are readily available in the environment	32% of births are to teens; 20% of families in poverty; Many single parent families; Youth are initiating drug, tobacco, and alcohol use at higher rates than the state average	High prevalence of youth obesity; Youth are using and abusing tobacco, drugs and alcohol

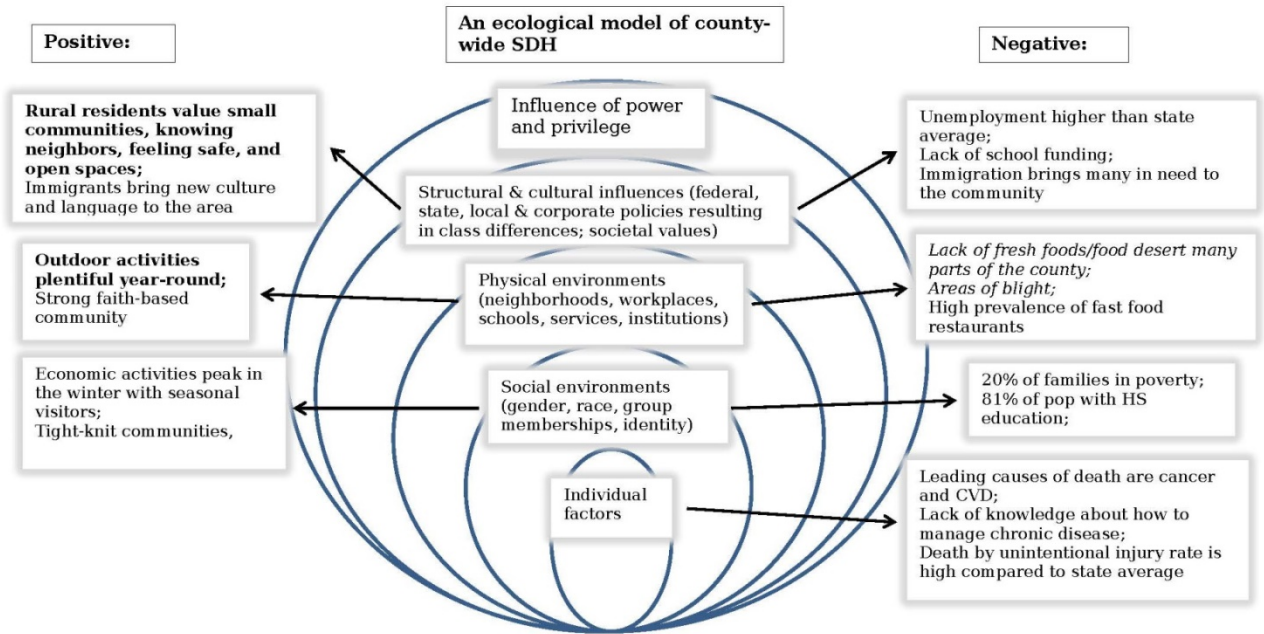


Figure 2: EXAMPLE: County-wide SDH based upon Table 3 (bold items were findings in 3 or more data collection efforts, italic items were findings in 2 or more data collection efforts)

Ideally, appropriate models like Figure 2 above, representing geographic boundaries and public health concerns would be developed for ease of presentation to community partners. Then, when community partners and public health professionals meet as part of the CHIP process, the upstream SDH (both positive and negative) will provide guidance on both assets to build upon and concerns to address. A discussion on the rationale of focusing upstream could be included in the introductory remarks (Golden & Earp, 2012; McKinlay & Marceau, 2000; Braveman & Gottlieb, 2014). Figure 2 also carries over the bold and italics used in the spreadsheet. SEM diagrams provide an excellent starting point for strategizing about future interventions, coalitions, and programs and could naturally steer a conversation to upstream interventions and building upon assets.

In the first author's review, the 13 rural county CHIPs did not always seem to follow the CHA data. Because data from surveys, focus groups and secondary sources were not used to triangulate findings, some counties appear to have prioritized one dataset over another. For instance, some counties appear to have relied upon community surveys to set priorities even when secondary data may have been inconsistent or contradictory. In a different example, the SDH discussed in some depth in the CHA were not the target of any proposed interventions in the CHIP. Taken together, the 13 rural counties used a variety of classification schemes to group priority health issues, but none presented the layered approach encouraged by SEMs to address public health concerns. In the best cases, rural counties presented a public health concern, such as chronic disease, and then proposed interventions that targeted both upstream and downstream SDH.

Discussion

This paper describes a method, using social ecological models, to triangulate data from multiple sources during the course of a comprehensive CHA. The advantages of this method are:

- SEMs offer a simple and practical method of synthesizing data;
- SDH data from secondary and primary sources are both integrated into SEMs as opposed to being reported in separate sections of a CHA report;
- SDH noted in multiple data sources (secondary data, surveys, focus groups, interviews) are highlighted to raise awareness of their significance as local concerns;

- Highlighted SDH data are used in conjunction with less common SDH data to triangulate meaningful findings;
- Models can be displayed as illustrations or diagrams for ease of community presentation;
- CHA reports using SEM models will present consolidated information and provide a context for conflicting information rendering the CHA report more useful to community partners and policy makers;
- All SDH are given consideration during a CHIP process as opposed to privileging data from one source (such as community surveys);
- SEMs provide a starting point for CHIP process discussions with community stakeholders;
- SEMs presented as diagrams showing the nested relationships between SDH implicitly communicate findings from the public health literature that upstream interventions present greater promise of improved public health than downstream interventions.

Community Health Assessments are the currency of public health practice. Data generated during CHAs are used to solicit funding and create strategic plans. Documentation of the CHA process is used to seek accreditation (Arizona Department of Health Services, 2016) and measure progress toward improved public health. NACCHO provides significant support to local health departments, many of them rural and representing frontier communities, about how to assess the public health. However, there is currently a gap in practice on how to synthesize the data generated to triangulate meaningful findings. The proposed model is offered as a method of filling that gap and aiding local health departments, especially rural and

under-resourced health departments, in their mission to improve public health.

Works Cited

- Ahen, M., Brown, C., & Dukas, S. (2011). A national study of the association between food environments and county-level outcomes. *The Journal of Rural Health, 27*, 367-379.
- Antonovski, A. (1996). The salutogenic model as a theory to guide health promotion. *Health Promotion International, 11*(1), 11-18.
- Arizona Department of Health Services. (2016, September 28). *Accreditation*. Retrieved from ADHS Managing for Excellence: <http://azdhs.gov/operations/managing-excellence/index.php#accreditation>
- Barnidge, E. K., Radvanyi, C., Duggan, K., Motton, F., Wiggs, I., Baker, E. A., & Brownson, R. C. (2013). Understanding and addressing barriers to implementation of environmental and policy interventions to support physical activity and health eating in rural communities. *The Journal of Rural Health, 29*, 97-105.
- Berkman, L. F. (2009). Social epidemiology: Social determinants of health in the United States: Are we losing ground? *Annual Review of Public Health, 30*, 27-41.
- Braveman, P. (2006). Health disparities and health equity: Concepts and measurements. *Annual Review of Public Health, 27*, 167-194.
- Braveman, P., & Gottlieb, L. (2014). The social determinants of health: It's time to consider the causes of causes. *Public Health Reports, 129*(S2), 19-31.

- Braveman, P., Egerter, S., & Williams, D. (2011). The social determinants of health: Coming of age. *Annual Review of Public Health, 32*, 381-398.
- Bronfenbrenner, U. (1977, July). Toward an experimental ecology of human development. *American Psychologist, 513-531*.
- Corso, L. C. (2005). Developing the MAPP community health improvement tool. *Journal of Public Health Management Practice, 11(5)*, 387-392.
- Diez Roux, A. V. (2012). Conceptual approaches to the study of health disparities. *Annual Review of Public Health, 33*, 41-58. Retrieved January 14, 2014, from www.annualreviews.org
- Erwin, P. C. (2013). Data synthesis in community health assessment: Practical examples from the field. *Journal of Public Health Management and Practice, 19(5)*, 468-474.
- Glanz, K., & Mullis, R. M. (1988). Environmental interventions to promote healthy eating: A review of models, programs, and evidence. *Health Education Quarterly, 15(4)*, 395-415. Retrieved September 17, 2016, from heb.sagepub.com
- Golden, S. D., & Earp, J. L. (2012). Social ecological approaches to individuals and their contexts: Twenty years of Health Education & Behavior health promotion interventions. *Health Education & Behavior, 39(3)*, 364-372.
- Hsiu-Fang, H., & Shannon, S. E. (2005). Three approaches to content analysis. *Qualitative Health Research, 15*, 1277-88.

- Kelly, B., Flood, V. M., & Yeatman, H. (2011). Measuring local food environments: An overview of available methods and measures. *Health and Place, 17*, 1284-1293.
- Krieger, N. (2011). Ecosocial theory of disease distribution. In N. Krieger, *Epidemiology and the People's Health: Theory and Context* (pp. 202-235). Oxford: Oxford University Press.
- McKinlay, J. B. (1996). More appropriate evaluation methods for community-level health interventions. *Evaluation Review, 20*(3), 237-243.
- McKinlay, J. B., & Marceau, L. D. (2000). Public health matters: To boldly go... *American Journal of Public Health, 90*(1), 25-33.
- McLaren, L., McIntyre, L., & Kirkpatrick, S. (2010). Rose's population strategy of prevention need not increase social inequalities in health. *International Journal of Epidemiology, 39*, 372-377.
- McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education & Behavior, 15*(4), 351-377. Retrieved December 16, 2013, from heb.sagepub.com
- National Association of City and County Health Officials. (2017, January 18). *MAPP Phase 3: The Four Assessments*. Retrieved from NACCHO: <http://www.naccho.org/programs/public-health-infrastructure/mapp/phase-3-the-four-assessments>
- (1999). New Ethics for the Public's Health. In D. E. Beauchamp, & B. Steinbock (Eds.). New York: Oxford University Press.

- Paquette, D., & Ryan, J. (2001, July). *Bronfenbrenner's Ecological Systems Theory*. Retrieved September 16, 2016, from Florida Health: http://www.floridahealth.gov/AlternateSites/CMS-Kids/providers/early_steps/training/documents/bronfenbrenners_ecological.pdf
- Patton, M. Q. (2002). *Qualitative Research & Evaluation Methods* (3rd ed.). London: Sage Publications.
- Potvin, L., Gendron, S., Bilodau, A., & Chabot, P. (2005). Integrating social theory into public health practice. *American Journal of Public Health, 95*(4), 591-595.
- Public Health Accreditation Board. (2016, September 28). *Standards & Measures*. Retrieved from http://www.phaboard.org/wp-content/uploads/PHABSM_WEB_LR1.pdf
- Raphael, D. (2011). A discourse analysis of the social determinants of health. *Critical Public Health, 21*(2), 221-236.
- Richard, L., Gauvin, L., & Raine, K. (2011). Ecological models revisited: Their uses and evolution in health promotion over two decades. *Annual Review of Public Health, 32*, 307-326. Retrieved 04 24, 2012, from www.annualreviews.org
- Rose, G. (1985). Sick individuals and sick populations. *International Journal of Epidemiology, 14*(1), 32-38.
- Stokols, D. (1996, March/April). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion, 10*(4), 282-298.

Story, M., Kaphingst, K. M., Robinson O'Brien, R., & Glanz, K. (2008).

Creating healthy food environments: Policy and environmental approaches. *Annual Review of Public Health*, 253-272.

Wilkinson, R., & Marmont, M. (Eds.). (2003). *Social Determinants of Health:*

The Solid Facts. Copenhagen, Denmark: World Health Organization.

APPENDIX C: Targeting multiple levels of the socioecological model with a backyard gardening program in rural food desert communities

Abstract

Purpose: As a participant observer using a community-based mixed-method approach, the first author conducted a focused ethnography of the food environment in rural Pinal County, AZ to evaluate the impact of a backyard gardening program on the rural food environment.

Findings: A non-profit community agency that did not identify itself as a public health agency developed an intervention that increased the amount of fresh food available in rural food desert areas and targeted multiple levels of a social ecological model.

Introduction

Researchers have encouraged public health professionals to design interventions that target multiple levels of the social ecological model with an emphasis on upstream interventions (Golden & Earp, 2012; McLeroy, Bibeau, Steckler, & Glanz, 1988; Richard, Gauvin, & Raine, 2011; McKinlay & Marceau, 1999; McKinlay & Marceau, 2000), especially in the area of interventions designed to enhance nutrition and/or physical activity (Glanz & Mullis, 1988; Story, Kaphingst, Robinson O'Brien, & Glanz, 2008; Barnidge, et al., 2013). In the rural communities of Pinal County, AZ a non-profit agency has implemented a gardening program that is having a positive impact at multiple levels (individual, social, and physical environment) of the social ecological model. Through a focused ethnography, participant

observation, and semi-structured interviews I explored the impact of this program; findings are reported in this paper.

Theoretical Framework

Researchers have argued that a reflexive approach to knowledge is necessary in order to evaluate social-change programs. A reflexive approach to knowledge must balance subjective ways of knowing, objective models of the social world, and the context – including salient local issues – where knowledge is gained (Potvin, Gendron, Bilodau, & Chabot, 2005). Participant observation and ethnography are methods by which the researcher can confront subjective experiences and practices within objective systems of relationships. As a resident of Florence, AZ (one of the rural communities of Pinal County, AZ), a participant observer of the program under study, and as an ethnographer of the rural food environment in Pinal County, AZ I am using a first-person reflexive narrative approach to disseminate findings.

Social ecological models (SEMs) are tools that can be used to understand objective systems of relationships. SEMs can help practitioners to identify the social determinants of health (SDH) in a particular setting as well as plan interventions to address determinants (Kizer, Reinschmidt, & Schachter, TBD). The social ecological model used to diagram the impact of the 3F program on the rural ecological environment in Pinal County, AZ, displayed in Figure 1, is based upon existing models and discussions of social determinants of health found in the literature (Bronfenbrenner, 1977; Krieger, 2011; Story, Kaphingst, Robinson O'Brien, & Glanz, 2008; Raphael, 2011; Diez Roux, 2012; McLeroy, Bibeau, Steckler, & Glanz, 1988;

Braveman, Egerter, & Mockenhaupt, 2011; Richard, Gauvin, & Raine, 2011)
(Stokols, 1996; Antonovski, 1996).

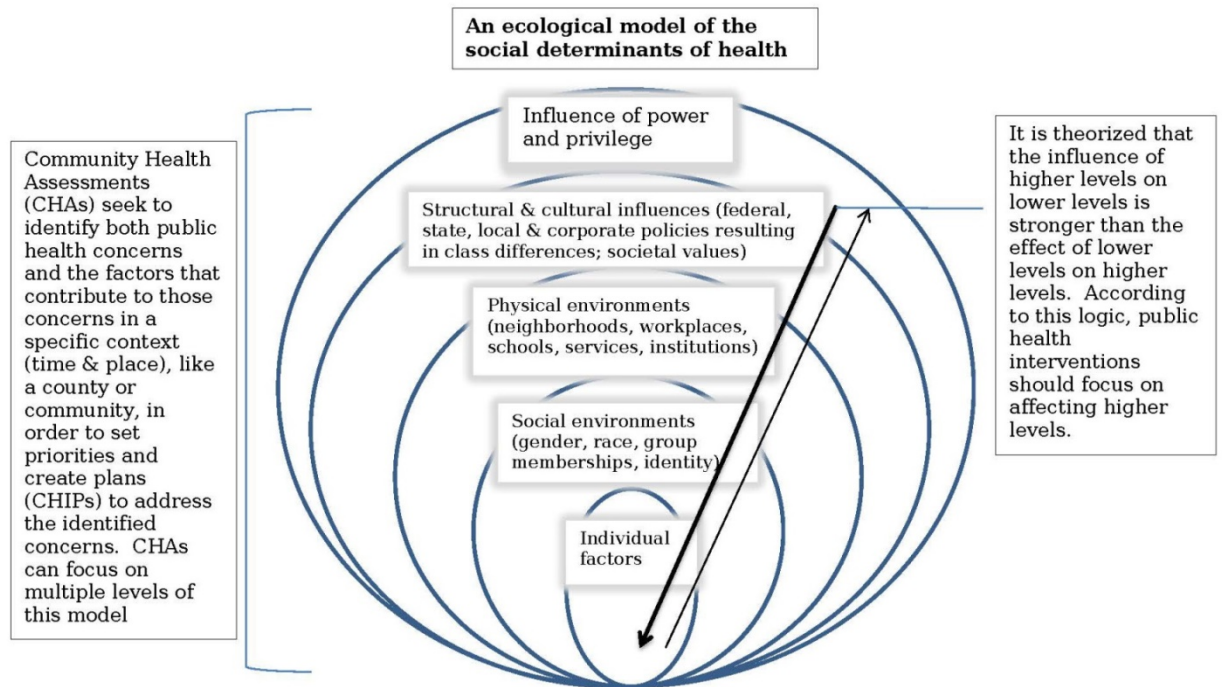


Figure 1: Social ecological model of the social determinants of health

Approach: Methods

I utilized community-based participatory research principles (Israel, Schulz, Parker, & Beckler, 1998; Israel, et al., 2008) to conduct a focused ethnography of the food environment in rural Pinal County, AZ to evaluate the impact of the 3F backyard gardening program. From the fall of 2013 through the summer of 2015 I collected data through semi-structured interviews with gardeners, participant observation, local media reviews, and key stakeholder interviews. The semi-structured interviews with gardeners were recorded and transcribed. The transcriptions were uploaded to NVivo 11 for a directed content analysis (Hsiu-Fang & Shannon, 2005) and coded

to include multiple areas of investigation, but most specifically to highlight how the gardens affected gardeners' habits and practices, their social environments and the physical environments in their rural communities.

Approach: Initial Work

In early 2013, as preliminary research for a potential dissertation project, I facilitated a grass-roots community health assessment (CHA) of the rural food environment in Florence, AZ. Both secondary and primary data (community/coalition meetings and surveys, focus groups, photo voice, key stakeholder interviews, and use of the Nutrition Environment Measurement Survey [NEMS]) were collected between December of 2012 and the summer of 2013 (Cowling, Group hopes to show local demand for healthier foods, 2013; Cowling, Group checking local healthy food options, 2013). The results of the assessment were reported to the community in public meetings in October and November of 2013 (Cowling, Group searches for a way out of the (food) desert, 2013). During the data gathering phase, a community coalition of approximately 50 community members were active in meetings, received periodic updates via email, and volunteered to help with various aspects of the CHA. When the assessment results were made public, the community coalition voted to continue their efforts by volunteering with a local non-profit called the Future Forward Foundation (also known as 3F) – an agency that had started a backyard gardening project during the same year and had been identified in the CHA as an agency working toward making fresh foods available in our rural food desert. My role then shifted from the facilitator of the CHA to that of an ethnographer.

As another part of my dissertation research I explored the hypothesis that more useful CHAs result in CHIP recommendations that are focused upstream. I revisited and revised a usefulness tool from the literature (Kuehnert, Graber, & Stone, 2014) with input from the rural local health officers in Arizona. The criteria identified in the revised usefulness tool were utilized to conduct directed content analyses (Hsiu-Fang & Shannon, 2005) on Arizona's thirteen rural county CHAs. The institutional CHAs provided a contrast to the grass-roots CHA I facilitated during my preliminary research.

Approach: Ethnography & Participant Observation

The Future Forward Foundation was founded in 2011. In August of 2012 a local newspaper article reported that the chairman of the board and founder of 3F stated that, "The mission of 3F is to alleviate poverty, improve the standard of living and promote the betterment of the communities of Pinal County, the state of Arizona and the southwestern United States" (Cowling, 2012). The article noted that the foundation would be working on "cultural performances, community gardens, affordable housing, economic development and more" (Cowling, 2012). In January of 2013 a local newspaper reported 3F was seeking to attract businesses and jobs through their 'Repaint the Town,' project (Cowling, Repaint the Town: Volunteers believe a new coat of paint will work wonders for Florence, 2013).

I first met 3F staff in January of 2013 at a community meeting discussing the local food environment. Though not specifically familiar with public health values, they shared a desire for social justice. 3F's focus on increasing the local production of fresh foods was partly based on the area's

rich agricultural history which was lost and mostly forgotten after local farms switched to growing cotton. Volunteers of 3F included individuals whose families had been in the area for generations and had personal knowledge of the lost agricultural history of the area. These informants discussed the lost potential of the land, the rich soil produced by the Gila River, and their personal experiences with bountiful harvests from their own gardens. In addition, one 3F member knowledgeable about the produce of the native peoples of the area was successfully partnering with Native Seed Search, a Tucson-based seed bank, to produce ancient varieties of locally produced crops. 3F staff and other community members discussed the need for a vibrant Farmer's Market in the area, but recognized there was a lack of growers. The concepts of public health and "food environments" were not initially familiar to many community members or 3F staff. In my role as a participant researcher focused on measuring "food environments," I introduced a different way of framing 3F's work and in their search for practical solutions to the concerns of rural populations there was an exchange of knowledge (Minkler & Wallerstein, 2008). As a result, the solutions and activities proposed by 3F came to be framed more in terms increasing the amount of fresh foods available to alleviate the food desert and less focused on economic development.

In April of 2013 a local newspaper article mentioned both the CHA of the local food environment and 3F's backyard gardening program, called 'Seed the Future.' It aptly described the purpose of this program as increasing the local production of food, assisting families in need, and building the foundation for a future Farmer's Market (Cowling, Foundation

promoting healthy foods: Backyard gardens are 3F way of encouraging more fruit and vegetable consumption locally, 2013). At that time, the program offered the installation of free backyard gardens complete with drip irrigation systems on timers and random selections of planted seeds and seedlings to community members who were willing to attend gardening classes and agree to a monthly visit by 3F staff.

In April of 2013, 3F hosted a garden tour of their initial, or founding, gardens - all located in Florence, AZ. Along with many other community members, I caravanned to these eight homes to see gardens in various stages of growth. A great deal of information was presented by 3F about their preferred method of in-ground gardening (as opposed to raised bed gardening), drip irrigation (as opposed to flood irrigation), and intensive gardening (spacing plants very close to each other). At that time, 3F was looking for funding to expand their program and build more gardens. They were also struggling with less than optimal results - some gardens had failed because of altered drip irrigation systems or other problems. In one-on-one discussions, 3F staff referred to the gardens as their "eight babies" and expressed sadness regarding gardens that were not thriving.

Already experienced as a raised-bed gardener, I applied for a 3F garden in the spring of 2014. By that time, 3F had added to the requirements for gardeners. Gardeners were asked to agree to: give 30% of their produce to 3F for distribution to local agencies (senior center, food bank, etc.), not to tamper with their 3F installed irrigation systems, allow tours of their gardens, post signs in their front yards promoting 3F, and take photos and/or be interviewed about their gardens (this added to facilitate my

research). My 3F garden was installed in my backyard in April of 2014. My garden and another installed in my neighborhood and both failed due to poor, rocky soil conditions from construction debris. 3F staff were concerned about the quality of the soil in our subdivision. However, they wanted to make their in-ground gardens available to all residents and used our two gardens as test cases. At the same time they planted my new in-ground garden, they planted seedlings in my existing raised bed garden. The plants in the raised bed garden thrived and, as a result, I was able to give some of my fresh produce to the agency. I delivered my produce to another 3F volunteer gardener readying a large supply of fresh produce for the local food bank. I can echo the sentiments I later heard expressed by other gardeners that it felt very good to be able to donate fresh produce to the community.

3F has used information from the aforementioned, grassroots CHA (distributed to 3F in September of 2013), in their grant applications. Their current description of 'Seed the Future' says it is an initiative intended to target food insecurity, poor diets, and sustainable vegetable production in food deserts (Future Forward Foundation, 2017). My thinking about food environments was also altered by my work with 3F. Initially, I thought of their backyard gardening program as a downstream intervention targeting individuals, but I soon came to identify with the larger vision held by 3F staff of a vibrant gardening community that would affect not only the lives of gardening families, but the larger community, as well. As is common with action research, both the researcher and the community engaged in a process of "coming to know" (Minkler & Wallerstein, 2008, p. 230). It is

interesting to note that 3F was not included in the formal CHA conducted by the local health department in 2012-2013.

In the late spring of 2015, I met with 3F to obtain the names and contact information of all gardeners who had participated in their program in order to conduct interviews. By that time, the program had expanded beyond Florence to other food desert areas in Pinal County including those in Coolidge, Kearny, San Tan Valley, Winkleman, Mammoth, San Manuel, Oracle, and Superior. 3F provided the names of thirty-one participant gardeners (excluding myself). I was able to conduct semi-structured interviews with 74% of those participants (n=23). Whenever possible, I met them at their homes and toured their gardens. (I did meet three gardeners away from their homes due to scheduling considerations.) Table one summarizes some descriptive information about the gardeners.

Year garden received	Respondents	Non-respondents	Total	Primary gardener female	Primary gardener male	Garden maintained by couple	Total
2013	7	3	10	3	4	3	10
2014	9	1	10	5	3	2	10
2015	7	0	7	6	1	0	7
Unknown	0	4	4	4	0	0	4
TOTAL	23	8	31	18	8	5	31

Table 1: Descriptive statistics about Seed the Future participants

Results: Individual impacts

There were a number of ways individual habits and practices were affected by their gardens. Participants had varied backgrounds and experience with gardening. Seventeen stated they grew up with or around gardens, but only twelve had extensive gardening experience in their adult lives. Four individuals said this was their first experience gardening as adults and seven said they had had limited experiences with gardening, had

gardened in different climates or states, and felt that gardening in Arizona was very different from their previous experiences.

Most participants (n=19) reported that their eating habits had changed; they had tried new foods, and/or would make long-term changes to their eating habits as a result of their gardening experiences. The following quotes represent these sentiments.

"It's given me the chance to [try], like the chard and cauliflower, that I normally wouldn't put in my diet - to eat those. I've been able to prepare them pretty well. And so yes, it's affected my diet."

"Yeah, [I've tried]the stuff I wasn't really familiar with, like honestly I had never, that I know of, eaten Swiss chard let alone cooked with it so that was a whole new experience."

"Yes, [the garden has affected my eating habits] very much so. I tried to start eating well."

"Oh yeah, [the garden affected the eating habits of myself and my family] tomatoes for everyone, broccoli, cauliflower, more fresh vegetables. In fact today I was just thinking that I want to plant just what we eat [as opposed to vegetables that were foreign to the family]."

Nineteen participants stated they would continue gardening and planned to plant in the next growing season. Many participants expressed pride and satisfaction in having grown their own food. These sentiments are represented in the following two quotes.

“It makes it a lot easier when you just come outside and you need something that you’re cooking and it’s in your garden.”

“It was amazing when I pulled the first carrot out. When I see a carrot I see it in the store, you know. So when I see it and pull it out of the ground myself, that’s an experience in itself. Whether it be radishes, carrots, onions or whatever. When we were doing the beets, we sometimes get beets that big around {Holding up hands} and then the cauliflower -I was like wow, look at that cauliflower! All this stuff I see at the store, you know? It’s quite an experience to see that we participated in growing this stuff ourselves.....Yeah, to me, just being able to grow something that comes out of the earth instead of going to the store and buying it, to me that’s an experience in itself.”

Those who said they would not continue gardening discussed not having adequate time or resources to care for their gardens, not staying in their Arizona homes enough of the time to successfully garden, or struggling with a troubling aspect of the garden such as keeping pests out.

Though I did not specifically ask about health, a number of participants volunteered that changing their diet as a result of their garden was positively affecting their health. Individuals mentioned that their 3F garden was helping them control hypertension, cholesterol (following a stroke), and thyroid concerns. Two individuals mentioned their desire to eat fresh foods in response to a cancer diagnosis, two others discussed improvements in managing their weight by eating a healthier diet, and three individuals volunteered information about improvements they had made in managing their diabetes including the statements below.

“I’m diabetic and my A1C was 7.8. I just recently had an appointment and it’s 6.8 [after changing my diet because of the garden].”

“And I’m diabetic so vegetables have to be at least 50% of my diet and it’s just so nice to have them right there [in the backyard] and have it be pretty much year round. There’s a little gap between the summer, end of the summer garden and the production of the winter garden, but last year I started freezing some of my winter vegetables and that worked out well. My A1C, which is your blood sugar levels, has gone down quite a bit by just having the diet with all the vegetables... The last time I had it checked it was 7.4 and I’ve never have a 7 point anything. The lowest I think I ever had was 8.2! ...We’re still trying to get it down to 7 but that’s the closest I’ve ever been.”

When asked if their knowledge of gardening had changed, many participants gave specific examples of how they had gained new knowledge about gardening as a result of their experiences. Most expressed positive sentiments regarding the drip irrigation system on the timer; though a small subset of participants reported watering by hand after their timer systems malfunctioned. Many participants expressed surprise at the diversity of crops that they could grow in Arizona through the summer. Some shared information that they had gained regarding controlling weeds and pests. Overall, seventeen participants reported an entirely positive experience. Others reported positive and negative aspects. The negative aspects included being disappointed about their gardens’ total yield, the expense of fencing and other measures to combat pests, and the lack of ongoing communication from 3F (such as a newsletter or email group and/or

direction on where/when to deliver their excess produce). Other infrequent complaints included that 3F would not replant their gardens in subsequent seasons, and that gardening was too much work.

Results: Social environment impacts

Backyard gardens were found to impact the social environments' of the participants. Some stories were shared regarding how gardening had affected the mental health of participants and their families and friends. These quotes capture sentiments about how the gardens positively affected mental health.

“Oh it’s very therapeutic; I mean just giving back to nature...just getting your hands in the dirt and seeing something from the beginning through to the end it’s just so satisfying...The trouble we have more than anything else is that it becomes, it is SO therapeutic I often times don’t notice that my hands are dirty or that I have stuff under my fingernails and I’ll go out and then be like..oh, my!”

“Sometimes a friend of mine, she likes to pull weeds, and so she’ll come and pull weeds as her therapy.”

One family had recently suffered a significant tragedy and a good deal of our discussion centered on how the garden was serving a therapeutic purpose. Here is an excerpt from that conversation.

“It’s everything we can do to keep our head above water sometimes. With counseling and the trauma alone is enough to polish off most families....So this garden is more of a godsend then I think most people could possibly understand because it keeps a family together,

it keeps us doing things and it keeps us moving forward, you know?.... The landscape here has completely changed compared to what it was...if you have to stay in the house where a great tragedy occurred, you have to change the look of it or you can't survive...You won't make it, there's no way. Change the landscape, the purpose - change it all."

Another garden was installed in the yard of a single-family transitional housing unit belonging to an outreach program serving veterans. A key staff member reported on the garden's effects.

"They just got into it. The veterans just got into it and it became not just a garden but a therapy garden -really, a therapy garden. It was a life-changer for a couple of them. One of the residents, this young man here [pointing at a picture], had done landscaping and just made some poor choices and ended up, he and his daughter, they were residents for a while until he could get his life back together. He would go out and work the garden and it helped transition - transform - I guess we should probably call it a transformational housing because with the garden there and the other things that they can do through the camaraderie in the...house. It can move them along to wherever they are. Some of them are so, in such poor health, that they would never be transformed into workers again but they can have self-esteem built back up and self-reliance and be able to become independent again with support ... Oh they love [the garden]. [One individual who moved out of the house because of anger issues but loved the garden] said, 'can I work the garden?' Knock yourself out. It

became his passion, it did, it became his passion. We would pull up at the house there and he would be smiling and would want to take anybody who came by out to the garden, show them the produce, let me pull you some produce, let me get you some produce.”

Nine of the gardeners mentioned volunteering their time with 3F to install other gardens, attending educational classes hosted by 3F, or networking with new people as a result of their gardening experiences.

“It’s [new community activities] all 3F related. Like when we did the, when we partnered with the Elks Club and we went to build a garden over at one of the veterans in Coolidge...and the Catholic Church garden, I was always over there. I think I planted that twice with them and I also helped them pull the produce from it. I have met people that I would have never met just by doing that too.”

“I think the first day of that class was awesome when everybody stood up and talked about what their backgrounds were and what they were interested in. It was like, WOW, this is so cool to have all that diversity of those people; because you have all those people to listen to and fall back on also.”

A number of people lamented that the social connections between gardeners was not stronger and made recommendations to strengthen that aspect of the program. Here are the thoughts of three gardeners addressing this concern.

“Yes, yeah we have a list of each other and we have the email and everything and I think at first we did a little bit, but that just kind of faded away and everybody’s got their busy lives.”

“That’s one thing I wanted to address, I think it would have been really good if um, if each of the gardeners were able to speak with the others or have their information if they were willing to provide it. That way, you know I was like “well how’s your garden?” Questions among other gardeners, “how is it growing?” “what are you doing?” “what are you not doing?” ... where I was a little disappointed in the program but because I don’t really know a lot of people in town and I don’t know how they are, but just by passing by I saw a garden down here by the dip and it looked like it was full and I was like why didn’t he harvest or was he waiting? You know, I would have liked to ask him but I don’t know who he is.”

“Maybe we should all have each other’s phone numbers so if we need help we know who to call. Help each other weed or if you have questions.”

The majority of participants shared their gardening experience with family, friends and neighbors. Some took and sent garden pictures while others invited neighbors or family members to come and help. Many participants gave tours of their gardens to neighbors and family. In that spirit a number of people expressed the sentiment that they were not only growing the garden for themselves, but also for their social network including the children in their lives. This resonated with me as I have gardened with my two young children during this experience and found

many benefits including their willingness to try new produce and their joy in routinely eating their favorite vegetables from the garden. The following quotes capture sentiments regarding sharing the gardening experience.

"I'm not just growing it for me; I'm growing it for the people I can give it to."

"Well I'm all about food for the masses so I want to grow high yielding food source, you know what I'm saying?"

"Yes...I was really trying to do this for the community"

"So this has been huge, I often wonder how many people went home and gardened as a result of seeing what's here. I bet there's a few. I'm really glad for people. They need to be able to; there's a freedom in being able to be self-sustaining."

"One thing that I really did enjoy about the garden was that we could help a few people. If we didn't get it to [3F], at least we got it to people who needed it. We got it to friends that were in trouble who needed some help, we got it to another couple families that didn't have a lot of money and so we did that... They saved groceries and ate fresh food."

"But I pick families that could appreciate having the free vegetables and usually I pick families that have the kids and when I have extra I'll give it to them."

"We do share with family. We have family in Globe, we have family in Tucson, family in Apache Junction and we have shared our bounty with them."

“My niece was here, I couldn’t keep enough yellow tomatoes, so thank goodness they produced every day because she would eat them like...she is 7 and she would just walk around with a bag of them. That’s what she ate...At first she was like, ‘What is a yellow tomato?’ But once she ate them she was like, ‘Do you have any more yellow tomatoes?’”

Results: Physical environment impacts

Produce from backyard gardens found its way into many institutions in the physical nutrition environment. Various churches, restaurants, chamber of commerce events, veterans groups, senior centers and homebound seniors, tribal lands, and food banks were mentioned as places produce was distributed in the local rural communities.

“Yeah, so we had rainbow carrots all up and down right there and some over here [pointing to rows in the garden]. We had radishes and we gave a bunch of them to the food bank, that’s our contribution...We also bagged up a bunch of stuff to take down [to the food bank], we didn’t want to take it loose. But they’re real appreciative you know. Everything that we gave them, they just enjoyed it, you know?”

One gardener decided that in addition to giving produce to the food bank, he would raise seedlings to give away.

“I give plants like these to the food bank. Oh man, people love them there. They disappear...This one here [pointing to a variety of seeding] I’ve taken them over 500 plants. What I call is a “plant” like

this [pointing] they'll be from 3 to 4 to 5 [seedlings in a small container]. ... No, that was [a] new [experience of taking things to the food bank]. That's where [3F] got me started because I think it's a wonderful thing. Everybody should grow something, you know. Especially if you live like I did, my father did - you had to grow something - you couldn't buy every damn thing. If you had to buy everything, you couldn't have it."

Additionally, one gardener pointed out that gardening provided an opportunity to reuse packaging for container gardens or seedling beds that would otherwise end up in the landfill. Fifteen gardeners reported maintaining active compost piles - recycling yard, kitchen, and garden trimmings and ultimately enhancing the soil instead of sending organic waste to the landfill.

Discussion

The key findings from this focused ethnography of rural nutrition environments in Arizona are:

- SEMs are a useful tool to illustrate multi-level SDH and to evaluate whether interventions target SDH at multiple levels.
- SEMs provide a theoretical framework for use in evaluating social-change programs and analyzing subjective data.
- Because I engaged in a reflexive approach to knowledge as opposed to a top-down bureaucratic process of gathering data (Potvin, Gendron, Bilodau, & Chabot, 2005) I identified and partnered with a non-traditional agency implementing a multi-level nutrition

intervention that was not included in a formal CHA conducted by the local health department during the same time.

- I was able to apply community-based participatory principals effectively because of my status as a local resident and participant observer of the program instead of a researcher from outside.
- Non-traditional agencies have the potential to address significant public health challenges in innovative and novel ways.

The 3F backyard gardening program in rural Pinal County, AZ increased the availability of fresh foods in a number of food desert areas. The majority of participants reported positive experiences with gardening, and sharing their gardens and produce with their communities. Though administered by a non-profit agency not connected to any formal public health institutions the program targets multiple levels of the SEM. Non-traditional agencies, such as 3F, performing public health functions should be included in CHAs as they can bring new ideas, expertise and resources to public health problems. The lessons from this focused ethnography reinforce the recommendation formal public health agencies be inclusive and draw on all community assets, including non-traditional partners, for the benefit of the communities served.

Additional areas of inquiry and future research into programs seeking to alleviate the disparity in access to fresh foods in rural areas might explore how existing institutions such as churches, food banks, senior centers and restaurants can affect the food environment. In this study gardeners reported giving produce to existing agencies, but it was unclear what quantity of produce was made available to the community. From the stories

that were shared it seemed that more produce was given away to family, friends and neighbors; but there was no way to quantify the amount that was given to social networks versus the amount given to institutions for distribution. What was clear is that backyard gardens are an intervention that have a measurable effect beyond the immediate impact to the household owning the garden. Further, in very small communities that lack a grocery store, gardens offer a practical solution for introducing a variety of produce that would otherwise only be obtained by driving great distances. The 3F program could potentially enhance its impact by doing more to foster comradery and networking among participating gardeners. Email and online groups could build upon the altruistic motives shared by many gardeners and bring them together around the cause of helping others. Additionally, in the case of new gardeners, such a group would assist them in obtaining information and showcasing their successes. Many gardeners highlighted the social aspect of their gardening. I too have shared my garden with my neighbors and family and take pride in growing produce to share with others. The social aspect of the garden is more appealing to many than the solitary work required day in and day out. Keeping the focus on the social aspects of the garden may encourage more people to persist over time.

One limitation of this study is that I was only able to interview three participants who dropped out (n=3). Interviewees and 3F staff advised me that six of eight non-respondents had not continued with their gardens. Understanding the factors that led to their decisions to stop gardening could provide additional insight in how the program could be improved.

In addition to Seed the Future, 3F has partnered with other agencies to increase the local production of food through community gardens (Cowling, Growing a health community: Power company makes 3-year grant to help Randolph garden, 2016), and their own farm called Future Forward Foundation Farm, or 4F (Cowling, Groups partner to grow food for the hungry, 2016). They have also received a grant to provide a large garden and classes (including cooking classes) to a local apartment complex (Austin, 2017). Their goal to plant 60 backyard gardens by the end of 2017 is dependent on continued donations, volunteers, and grant funding. Since 2012, 3F has been successful in writing for grants and finding partners to scale up their local production of food in rural food deserts.

Works Cited

- Antonovski, A. (1996). The salutogenic model as a theory to guide health promotion. *Health Promotion International, 11*(1), 11-18.
- Austin, L. (2017, February 5). Personal correspondence: Thanks! Florence, AZ.
- Barnidge, E. K., Radvanyi, C., Duggan, K., Motton, F., Wiggs, I., Baker, E. A., & Brownson, R. C. (2013). Understanding and addressing barriers to implementation of environmental and policy interventions to support physical activity and health eating in rural communities. *The Journal of Rural Health, 29*, 97-105.
- Braveman, P. A., Egerter, S. A., & Mockenhaupt, R. (2011). Broadening the focus: The need to address social determinants of health. *American Journal of Preventive Medicine, 40*(1S1), S4-18.
- Bronfenbrenner, U. (1977, July). Toward an experimental ecology of human development. *American Psychologist, 5*13-531.
- Cowling, M. (2012, August 12). *3F Working to help communities*. Retrieved February 22, 2017, from Florence Reminder Blade-Tribune: http://www.pinalcentral.com/florence_reminder_blade_tribune/news/f-working-to-help-communities/article_1862d636-a2eb-51f2-8580-4b16e073b900.html
- Cowling, M. (2013, April 3). *Foundation promoting healthy foods: Backyard gardens are 3F way of encouraging more fruit and vegetable consumption locally*. Retrieved February 22, 2017, from Tri-Valley

Dispatch:

http://www.pinalcentral.com/trivalley_dispatch/news/foundation-promoting-healthy-foods/article_82368f5c-9bc2-11e2-8247-001a4bcf887a.html

Cowling, M. (2013, July 25). *Group checking local healthy food options.*

Retrieved February 22, 2017, from Florence Reminder Blade-Tribune:
http://www.pinalcentral.com/florence_reminder_blade_tribune/news/group-checking-local-healthy-food-options/article_3a8d1644-f49b-11e2-8fb5-0019bb2963f4.html

Cowling, M. (2013, February 28). *Group hopes to show local demand for healthier foods.* Retrieved February 22, 2017, from Florence

Reminder Blade-Tribune:

http://www.pinalcentral.com/florence_reminder_blade_tribune/news/group-hopes-to-show-local-demand-for-healthier-foods/article_49d39a32-811f-11e2-8597-001a4bcf887a.html

Cowling, M. (2013, September 19). *Group searches for a way out of the (food) desert.* Retrieved February 22, 2017, from Florence Reminder

Blade-Tribune:

http://www.pinalcentral.com/florence_reminder_blade_tribune/news/group-searches-for-a-way-out-of-the-food-desert/article_7aae9d82-20ac-11e3-9ba6-001a4bcf887a.html

Cowling, M. (2013, January 3). *Repaint the Town: Volunteers believe a new coat of paint will work wonders for Florence.* Retrieved February 22,

2017, from Florence Reminder Blade-Tribune:

http://www.pinalcentral.com/florence_reminder_blade_tribune/news/repaint-the-town/article_ddb43162-551e-11e2-81eb-0019bb2963f4.html

Cowling, M. (2016, October 11). *Groups partner to grow food for the hungry*. Retrieved February 20, 2017, from Casa Grande Dispatch:

http://www.pinalcentral.com/casa_grande_dispatch/area_news/groups-partner-to-grow-food-for-hungry/article_2cae2c2e-8fd5-11e6-9023-ff6c5ca042cf.html

Cowling, M. (2016, July 7). *Growing a health community: Power company makes 3-year grant to help Randolph garden*. Retrieved February 20, 2016, from Florence Reminder Blade-Tribune:

http://www.pinalcentral.com/florence_reminder_blade_tribune/news/growing-a-healthy-community/article_2024797c-43c2-11e6-be75-af0850863a57.html

Diez Roux, A. V. (2012). Conceptual approaches to the study of health disparities. *Annual Review of Public Health, 33*, 41-58. Retrieved January 14, 2014, from www.annualreviews.org

Future Forward Foundation. (2017, January 29). *Seed the Future*. Retrieved from Future Forward Foundation:

<http://www.futureforwardfoundation.com/seed-the-future>

Glanz, K., & Mullis, R. M. (1988). Environmental interventions to promote healthy eating: A review of models, programs, and evidence. *Health*

Education Quarterly, 15(4), 395-415. Retrieved September 17, 2016, from heb.sagepub.com

Golden, S. D., & Earp, J. L. (2012, January 20). Social ecological approaches to individuals and their contexts: Twenty years of Health Education & Behavior health promotion interventions. *Health Education and Behavior*, 39(3), 364-372. Retrieved February 4, 2014, from heb.sagepub.com

Hsiu-Fang, H., & Shannon, S. E. (2005). Three approaches to content analysis. *Qualitative Health Research*, 15, 1277-88.

Israel, B. A., Schulz, A. J., Parker, E. A., & Beckler, A. B. (1998). Review of community-based research: Assessing partnership approaches to improve public health. *Annual Review of Public Health*, 19, 173-202. Retrieved January 14, 2014, from www.annualreviews.org

Israel, B. A., Schulz, A. J., Parker, E. A., Becker, A. B., Allen III, A. J., & Guzman, R. (2008). Critical issues in developing and following CBPR principles. In M. Minkler, & N. Wallerstein (Eds.), *Community-Based Participatory Research for Health From process to Outcomes* (pp. 47-66). San Francisco: Jossey-Bass.

Krieger, N. (2011). Ecosocial theory of disease distribution. In N. Krieger, *Epidemiology and the People's Health: Theory and Context* (pp. 202-235). Oxford: Oxford University Press.

- Kuehnert, P., Graber, J., & Stone, D. (2014). Using a web-based tool to evaluate a collaborative community health needs assessment. *Journal of Public Health Management Practice, 20*(2), 175-187.
- McKinlay, J. B., & Marceau, L. D. (1999). A tale of 3 tails. *American Journal of Public Health, 89*(3), 295-298.
- McKinlay, J. B., & Marceau, L. D. (2000). Public health matters: To boldly go... *American Journal of Public Health, 90*(1), 25-33.
- McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education & Behavior, 15*(4), 351-377. Retrieved December 16, 2013, from heb.sagepub.com
- Minkler, M., & Wallerstein, N. (Eds.). (2008). *Community-Based Participatory Research for Health From Process to Outcomes* (2nd ed.). San Francisco, CA: Jossey-Bass.
- Potvin, L., Gendron, S., Bilodau, A., & Chabot, P. (2005). Integrating social theory into public health practice. *American Journal of Public Health, 95*(4), 591-595.
- Raphael, D. (2011). A discourse analysis of the social determinants of health. *Critical Public Health, 21*(2), 221-236.
- Richard, L., Gauvin, L., & Raine, K. (2011). Ecological models revisited: Their uses and evolution in health promotion over two decades. *Annual Review of Public Health, 32*, 307-326. Retrieved 04 24, 2012, from www.annualreviews.org

Stokols, D. (1996, March/April). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion, 10*(4), 282-298.

Story, M., Kaphingst, K. M., Robinson O'Brien, R., & Glanz, K. (2008). Creating healthy food environments: Policy and environmental approaches. *Annual Review of Public Health, 29*, 253-272.

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