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Community Health Needs Assessment in a Rural Setting: Foundation for a Community–Academic Partnership

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Abstract

The Community-based Cooperative for Studies Across GEnerations (CoSAGE) is a rural community–academic partnership with the long-term goal of developing community- and individual-level interventions to promote community well-being. The purpose of this study was to conduct a community needs assessment to solicit perceptions of the characteristics of the community, health-related resources, health-related barriers, and high-impact health problems and environmental factors. Key informant interviews (N = 30) were conducted with community leaders representing schools, businesses, churches, health care providers, and government. Thematic analysis was used to identify common themes across respondents. Church, family, and schools emerged as central community resources. Age-related hearing impairment was endorsed as the highest impact health condition, and lack of jobs was the highest impact environmental factor. These results provide insights into the health-related resources and needs of rural communities. Findings will be utilized to develop and prioritize a community-driven research agenda.

Introduction

The health of rural-dwelling people is an important area of concern in today's health care system. Nearly 20% of the U.S. population, or roughly 60 million people, reside in rural settings. Rural settings are defined as territories, populations, and housing units located outside urbanized areas, as well as urban clusters with fewer than 2,500 residents *(United States Census Bureau, 2010)*. Rural settings differ from urban settings with regard to both demographic and economic indicators. For example, rural populations tend to be older than urban populations *(Meit et al., 2014)*. Rural settings tend to be characterized by lower income and increased levels of poverty compared to urban settings *(Meit et al., 2014)*. For the first time, rural areas experienced a small decline in population between 2010 and 2012 *(USDA, 2013)*. This population

decline has the potential to exacerbate rural–urban disparities in economic indicators, such as employment rates and poverty levels *(USDA, 2013)*.

Disparities between rural and urban settings are also critical in the area of health. Rural health disparities have long been observed and are widening. For example, Singh and Siahpush *(2013)* recently reported that age-adjusted all-cause mortality rates increased with levels of rurality, increased mortality rates persisted after adjustment for poverty level, and the degree of disparity has increased over time. Four causes of death accounted for 70% of these disparities: heart disease, unintentional injuries, chronic obstructive pulmonary disease (COPD), and lung cancer. Attention to and elimination of these rural–urban health disparities are important goals within Healthy People 2010 and Healthy People 2020 *(U.S. Department of Health and Human Services, 2013)*.

Health-related research and evidence-based health innovations in rural settings are needed in order to achieve these Healthy People goals. However, evidence suggests that rural populations are currently underrepresented in research overall *(Baquet, Commiskey, Mullins, & Mishra, 2006)*, potentially limiting the generalizability of research findings. Recent examples of research designed to identify rural health disparities and their predictors, as a foundation for tailoring interventions, exist in the area of colorectal cancer screening *(Hughes, Watanabe-Galloway, Schnell, & Soliman, 2015)* and prescription opioid misuse *(Rigg & Monnat, 2015)*. Recent examples of interventions tailored to rural settings also exist in the areas of cardiovascular health in rural women *(Hageman, Pullen, Hertzog, & Boeckner, 2014)* and physical activity *(Mitchell et al., 2014)*. A lack of lay voice and community perspective from rural populations in the development and implementation of intervention or other types of research, however, may hamper the ultimate effectiveness and sustainability of community- and individual-level health interventions. Other barriers to dissemination that are particularly relevant to the adoption of health innovations in rural community settings include lack of acceptability of interventions, lack of tailoring programs to individual or community needs, and the imposition of interventions from the outside *(Glasgow & Emmons, 2007)*.

Engaged scholarship through community–academic partnerships provides a venue for meeting this critical need for rural-based health research in a manner that fosters meaningful and mutually beneficial outcomes for communities and institutions of higher education *(Kellogg Commission, 1999)*. The Community-based Cooperative for Studies Across GEnerations (CoSAGE) was

established in 2009 as a research partnership between an academic institution and a rural community. As a broad goal, CoSAGE aims to examine genetic, lifestyle, and environmental factors involved in complex health conditions. The long-term goal of CoSAGE is to develop interventions that are tailored at the community and individual level to decrease the negative impact of chronic health problems and promote both individual and community well-being. The CoSAGE project employs a community-based participatory research (CBPR) approach *(Minkler & Wallerstein, 2008)*. The rationale supporting the CBPR approach includes the desire to identify and prioritize a community-driven research agenda and the intention to link discovery with more rapid translation of knowledge into clinically useful information, taking into account the relationship between the individual and/or community and the surrounding physical and social environment. We contend that this innovative approach to the design, implementation, and translation of health research will yield sustained benefits for the community and academic partners.

The purpose of this article is to report findings from the first phase of the CoSAGE project, a mixed-methods community health needs assessment. The primary goal of the community health needs assessment was to gain insights into the characteristics of the community, as well as the perceived health resources and needs of persons residing in rural settings. Another goal of the community health needs assessment was to engage more broadly with community leaders about the CoSAGE project and plan. We employed four specific research questions: (1) How do community members describe their community? (2) What does the community identify as health-related resources? (3) What does the community identify as barriers to accessing health care? (4) What health conditions and environmental factors are perceived as high impact by the community?

Materials and Methods

Design

A cross-sectional, descriptive study design using qualitative and quantitative measures was used to address the research questions among a rural community engaged in a newly formed community-based health research project. The study was approved by the academic partner's Institutional Review Board; procedures to protect human subjects were followed throughout the study.

CBPR Strategies

Several strategies and processes were developed and utilized to support the overall CBPR approach of this project. A research advisory committee (RAC), made up of 16 community members who reside in the partner community, was established. RAC members were recruited primarily based on their shared interests in health research within their community. Secondary goals included involving partners from all three villages that make up the partner community, partners of both sexes, and as broad an age range as possible. To that end, RAC members were nearly evenly distributed across the three villages. Fifty-three percent of RAC members were female; 50% were retired. Employment sectors represented by RAC members included primary and secondary education, school administration, farming, health care (nurses, analyst for a commission on disability concerns), clergy, telecommunications, public utilities, and engineering. Monthly meetings are held with the RAC in a project space located within the partner community. RAC members were full partners in establishing the vision, mission, and broad goals of CoSAGE. In addition, members participated in all phases of this study, including the identification of key informants, development of the semistructured interview guide, pilot testing of the Community Impact Inventory, interpretation of study results, and dissemination of findings.

Sample and Setting

The CoSAGE partner community consists of individuals who live in a 90-square-mile area that includes three villages in the Great Lakes region of the U.S. Upper Midwest. The populations of the three villages themselves are small, ranging form 470 to 1,209 residents, and the landscape is characterized by farmland and flat, open countryside. The partner community is designated as a nonmetropolitan area, given that urban communities of 2,100–49,999 people are located within 30–40 miles of the three villages in each direction *(U.S. Department of Agriculture, 2013)*. Primary care providers and small hospitals are located 20-30 miles in any direction from each of the villages. The history of the original settlement of the three villages by German Catholic immigrants and evidence for subsequent high kinship was previously described *(Bonner et al., 2014)*.

Community leaders were recruited from the three villages, representing the school, business, church, health care, and government sectors. Consistent with a needs assessment approach

(DiCicco-Bloom & Crabtree, 2006), purposive sampling and snowball/network sampling were used to identify leaders from each sector from all three villages and to achieve balance by gender and across age groups. The RAC contributed to building the pool of potential participants. In addition, community leaders were asked at the conclusion of the interview if there was anyone else they felt it would be important for the research team to contact.

Instruments

Demographics. Brief demographic data were collected as part of the semistructured interview guide to describe the sample and to help monitor the representativeness of community leaders across the three villages.

Semistructured interview guide and the Community Impact Inventory. A semistructured interview guide was developed by the researchers in partnership with the RAC. The interviews began by asking informants to rate the overall quality of life in their community on a 4-level descriptive scale (*excellent, good, fair*, or *poor*) and about how they would describe their community. Follow-up probes were used to elicit the informants' perceptions of the community's health-related strengths and needs, health resources and barriers, and high-impact health problems and environmental factors.

A paper-and-pencil questionnaire, the Community Impact Inventory, was modeled after other rural community health needs assessment surveys *(Beverly, Mcatee, Costello, Chernoff, & Casteel, 2005)* and modified by the investigators in collaboration with the RAC, to measure community leader perceptions of the extent to which a set of 39 health problems and 26 environmental factors had impact on the community. For the purposes of this study, *impact* was not defined as the frequency of a given health problem or exposure. Rather, impact was operationalized by asking participants to consider the extent to which the health problems and environmental factors influenced the overall wellness, quality of life, and resources of their community. The questionnaire was designed using a 4-point Likert scale, with 1 indicating *no perceived impact on the community* and 4 indicating *major perceived impact on the community*. The draft survey was pilot tested by the RAC members, who completed the survey and were asked to provide feedback on the clarity and completeness of the questions, as well as the perceived relevance of the questions to their community.

Procedures

Recruitment. An initial pool of 40 potential participants was mailed an introductory letter describing the parent study and community assessment phase of the project. The letter indicated that potential participants would receive a follow-up phone call inviting them to participate. If potential participants were interested, a face-to-face interview was also scheduled at that time. Some additional follow-up contact also occurred via e-mail communication.

Data collection. Data collection occurred at a time and place convenient to the community leader, and interviews were conducted by research team members. Participant responses were recorded through note-taking during the interview. Notes were recorded as completely as possible, using the actual words of the informant. A note-taking strategy is consistent with key informant interview techniques *(Kumar, 1989)*. Note-taking was also selected over audiotaping due to the outsider status of the investigators in the broader community and concerns that audiotaping might negatively influence participants' willingness to freely share responses. Interviews ranged from 60 to 90 minutes in length and were completed over a 12-month period.

Data analysis. Data from the semistructured interviews and the Community Impact Inventory were entered through a campus data-entry interface into a secure database. Data were downloaded into an Excel spreadsheet for further analysis.

For the qualitative data, interview transcripts were coded by the authors using thematic analysis as described by Braun and Clarke *(2006)*. The overall analysis involved identifying descriptive categories of the data and common themes within and across these coding categories and was previously described by Goris, Schutte, Rivard, and Schutte *(2015)*. The themes and subthemes generated through this method of analysis were presented to the RAC as a strategy for evaluating the content validity of the analysis. RAC members were asked to consider the following questions in their review of the findings: (1) Do these themes seem accurate, based upon your understanding of the community? (2) Is anything missing; did we leave anything out? (3) Is anything there that does not belong? (4) Are the words we used to label the themes sensitive to the values and feelings of your community? No major concerns were identified by the RAC members. However, they did think it was important to include additional denominations (e.g., Lutheran and Baptist) in the discussion of the role of the church within this predominantly Catholic community.

Data from the Community Impact Inventory were analyzed using SPSS Statistics software, Version 19.0. Descriptive statistics were used to describe the sample and to rank the health and environmental factors by perceived impact.

Results

Sample demographics. Thirty community leaders completed the key informant interviews. Participants exhibited a mean age of 57.5 (*SD* = 12.8) years, ranging from 35 to 86 years of age. Seventy-one percent of the sample was less than 65 years of age. Females made up 57% of the sample. Participants were distributed across the community sectors: church (19%), education (19%), government (10%), health care providers (13%), business (26%), and other (6%). All three villages within the partner community were represented in the interviews, with approximately 27% of the total participants from each village. Six participants (20%) worked or provided services in the partner community but lived elsewhere.

Community characteristics and resources. Most informants reported the overall quality of life in their community as good (*n* = 14; 50%) or excellent (*n* = 13; 48%). A single informant (4%) reported overall quality of life as poor. Considerable overlap occurred in themes emerging in response to the questions "How would you describe your community?" and "What are the community strengths and resources?" Four essential themes emerged in response to these questions and reflect characteristics of the people and their relationships with each other: *close-knit, church is central, family is central, and school is central*.

Close-knit. Close-knit, defined as being held tightly together through social and cultural ties, emerged as a prominent descriptor of the partner community. Examples of this theme included "Community closeness, not just related, binds [together] to draw off strength"; "Cohesiveness"; and "Close-knit, keep eye out [for each other]." Two subthemes in this category illustrated the community manifestations of their close-knit nature: *everyone helps* and *everyone knows*.

Everyone helps. Descriptions of the closeness of the community coincided with descriptions of help, support, and working together to assist other community members in need. Informants noted, "Community is where to be if you need help. You are not alone" and "When you need someone, they are there for you."

Everyone knows. Similarly, the closeness of the community manifested in a heightened awareness of other peoples' lives, as

reflected in such statements as "Everyone knows what is going on" and "People are aware of each other's well-being." Community leaders also recognized that this characteristic of the community could be considered both a strength and a challenge. On one hand, other people readily know when another individual needs help. On the other hand, people may hesitate to seek help for fear of a lack of privacy, as illustrated in the following response to a question about barriers to health care: "Possibly the tight knit community because you don't want everyone to know you have a problem. If you go to the doctor, it is public knowledge."

Church is central. The church emerged as another prominent characteristic of the partner community, playing an integral role in community life. Responses that illustrate this major theme include "Church is at the heart of the community" and "The church is a very strong backbone [of the community]." Three subthemes further describe the nature of the church's centrality in the community: church as relating point, church as community resource, and faith.

Church as relating point. The church provided a central organizing social connection for community members. Members of the community defined their relationships with each other through the church. As one participant described, "The church is the social network." Another participant described the church as "the hub of the community; the common relating point."

Church as community resource. In addition to providing a social connection for community members, the church also provided tangible health-related resources that are central to community life. Participants described a variety of resources provided by the church, including meals, organization of volunteers to assist with transportation needs, and a location for social and physical activities.

Faith. Faith, defined as strong religious beliefs, emerged as an important strength of the community within the *church is central* theme. Catholicism was identified as the primary, but not exclusive, faith tradition within the partner community, with Baptist and Lutheran churches also present in the villages. The descriptions "faith-based," "Christian," "good values," and "good Christian ethics" further illustrate the subtheme.

Family is central. The central nature of the family emerged as a third prominent characteristic of the partner community, also playing a critical role in the life of the community as a whole. Examples of this theme included the following descriptions: "family

oriented," "sense of family," "family bond and family values," and "family tradition." The central role of family was particularly evident in relationship to the needs of older adults within the community as previously described by Goris et al. *(2015)*. The following three subthemes, however, illustrate the specific aspects of family identified as central to the overall community: intergenerational relationships, family responsibility, and relatedness.

Intergenerational relationships. An important aspect of the central nature of family in the community was the high value placed on intergenerational ties. Many participant responses referred to the crossing of generations or age groups, for example: "Big supporters of extended families," "Grandparents [are] involved with grandchildren and great grandchildren and community activities," and "There is no generation division as in urban areas." Although this subtheme emerged as a clear strength, other responses suggested that the intergenerational ties can also have less positive outcomes in relation to some behaviors. One participant highlighted this point regarding drinking: "Grandpa drank, dad drinks, considered normal for kids to drink."

Family responsibility. The family also provided a variety of health-related resources that were central to the community. Further, this support is considered an important responsibility of the family as illustrated by the following data: "Family's commitment to children"; "It is the family's job to help take relatives to doctors though"; "If they are from [the] area, there is a big family, they care for you or hire help. Always taken care of by family, otherwise [there are] not resources"; and "Family takes care of relatives."

Relatedness. The third subtheme related to the centrality of family was identified by a subset of participants and was labeled *relatedness*, or the recognition of the biological connection between families within the partner community. Because many of these individuals are descended from the original community founders, participants recognized that "a lot of families are related to each other," contributing to the close-knit characteristic of the community.

School is central. *School is central* is the final prominent theme that emerged as a descriptor and resource of the partner community. This theme relates to the integral role that school plays in community life. Like church and family, the schools also provide important tangible community resources, many of which are directly related to health. For example: "The school's doors are open for community members to walk. Community members walk track at school; it is available to the community"; "Towns support school

activities and utilize rural schools for activities"; and "Schools are the focal point of two communities."

Strong church, family, and school ties were identified as important characteristics of the partner community. These strong interrelationships provided multiple tangible and intangible resources that supported the health and well-being of community members.

Community barriers to access. Community leaders were also asked to identify barriers to accessing health care in their communities. Two themes, *rural economy* and *distance to resources*, emerged in response to this question. These factors reflect characteristics of the physical environment and relationships between the partner community and surrounding communities. These two themes were identified as barriers to access for older adults in particular *(Goris et al., 2015)* and as themes relevant to the community at large.

Rural economy. The nature of the rural community and economy emerged as a barrier to health care. On one hand, the community was perceived as being "solid, middle class" with "many families doing well." On the other hand, participants recognized that "big industry pieces are lacking," and the "town [is] too small to support a doctor." Lack of local health care providers, especially specialist services, was a recurrent need identified by community leaders.

Distance to resources. Distance to resources, a theme reflecting the proximity of the partner community to resources, emerged in relation to access to health care providers and services. Regional health care providers are located 20-30 miles away from the three rural villages. Some community leaders perceived these resources as being in close proximity. Other community leaders, however, saw the physical distance and limited transportation options as a barrier to health care, as shown in the following quotes: "Travel and distance [for] those who don't drive"; "No transportation for older people"; and "[If you are] disabled, such as breaking a hip; [you] have to go out of town for rehab." All themes and subthemes are summarized by relevant research question in Table 1.

Table 1. ***Summary of Themes According to Research Question***

Research Question	Theme	Subtheme	Definition
How would you describe your community? What are the community strengths and resources?	Close-knit		Members of the community are held tightly together through social and cultural ties, reflecting community cohesiveness.
		Everyone helps	Members of the community support and care for each other.
		Everyone knows	Closeness of the community is manifested in a heightened awareness of other peoples' lives.
	Church is central		The church plays an integral role in community life.
		Church as relating point	The church provides health-related resources that are central to the community.
		Faith	Strong religious beliefs are an important strength of the community.
	Family is central		Families play an integral role in community life.
		Intergenerational relationships	Families place a high value on crossing generations or age groups.
		Family responsibility	The family provides health-related resources that are central to the community.
		Relatedness	Families recognize the biological connection between families in the community.
	School is central		Schools play an integral role in community life.
What are barriers to accessing health care in your community?	Rural economy		The rural nature of the community affects the economy and access to health care.
	Distance to resources		The relative proximity to resources affects access to health care.

Table 2. ***Health Problems Ranked According to Mean Impact Score***

Health Problem	*N*	No Impact *N* (%)	Minor Impact *N* (%)	Some Impact *N* (%)	Major Impact *N* (%)	*M* Impact (*SD*)	Min	Max
Age-related hearing impairment	23	2 (8.70)	1 (4.35)	16 (69.6)	4 (17.4)	2.96 (.77)	1	4
Congestive heart failure	23	0	7 (30.4)	11 (47.8)	5 (21.7)	2.91 (.73)	2	4
Hypertension	22	2 (9.1)	3 (13.6)	12 (54.5)	5 (22.7)	2.91 (.87)	1	4
Arthritis	24	0	6 (25.0)	15 (62.5)	3 (12.5)	2.88 (.61)	2	4
Heart attack	25	2 (8.0)	5 (20.0)	13 (52.0)	5 (20.0)	2.84 (.85)	1	4
Cancer (other)	25	1 (4.0)	6 (24.0)	15 (60.0	3 (12.0)	2.80 (.71)	1	4
Stroke	23	2 (8.7)	6 (26.1)	10 (43.5)	5 (21.7)	2.78 (.90)	1	4
Alzehiemer's disease	27	1 (3.7)	9 (33.3)	12 (44.4)	5 (18.5)	2.78 (.80)	1	4
Cancer (breast)	26	1 (3.8)	7 (26.9)	16 (61.5)	2 (7.7)	2.73 (.67)	1	4
Cancer (prostate)	25	2 (8.0)	7 (28.0)	13 (52.0)	3 (12.0)	2.68 (.80)	1	4
Diabetes	24	1 (4.2)	10 (41.7)	9 (37.5)	4 (16.7)	2.67 (.82)	1	4
Memory Loss	23	3 (13.0)	7 (30.4)	9 (39.1)	4 (17.4)	2.61 (.94)	1	4
Depression	24	3 (12.5)	8 (33.3)	10 (41.7)	3 (12.5)	2.54 (.88)	1	4
Mental health	23	3 (13.0)	7 (30.4)	11 (47.8)	2 (8.7)	2.52 (.85)	1	4
Cancer (lung)	25	2 (8.0)	10 (40.0)	11 (44.0)	2 (8.0)	2.52 (.77)	1	4
ADHD	23	4 (17.4)	7 (30.4)	10 (43.5)	2 (8.7)	2.43 (.90)	1	4
Cancer (colon)	26	3 (11.5)	11 (42.3)	10 (38.5)	2 (7.7)	2.42 (.81)	1	4
Osteoporosis	24	4 (16.7)	7 (29.2)	12 (50.0)	1 (4.2)	2.42 (.83)	1	4

Dental problems	23	5 (21.7)	6 (26.1)	10 (43.5)	2 (8.7)	2.39 (.94)	1	4
Cataracts	23	4 (17.4)	7 (30.4)	11 (47.8)	1 (4.3)	2.39 (.84)	1	4
Emphysema	23	3 (13.0)	11 (47.8)	8 (34.8)	1 (4.3)	2.30 (.77)	1	4
Glaucoma	23	5 (21.7)	9 (39.1)	7 (30.4)	2 (8.7)	2.26 (.92)	1	4
Autism	26	3 (11.5)	15 (57.7)	7 (26.9)	1 (3.8)	2.23 (.71)	1	4
Melanoma	23	7 (30.4)	5 (21.7)	10 (43.5)	1 (4.3)	2.22 (.95)	1	4
Asthma	22	4 (18.2)	11 (50.0)	7 (31.8)	0	2.14 (.71)	1	3
Congenital deafness	23	7 (30.4)	9 (39.1)	6 (26.1)	1 (4.3)	2.04 (.88)	1	4
Birth defects	23	4 (17.4)	14 (60.9)	5 (21.7)	0	2.04 (.64)	1	3
Macular degeneration	21	7 (33.3)	7 (33.3)	7 (33.3)	0	2.00 (.84)	1	3
Pregnancy loss	24	6 (25.0)	14 (58.3)	4 (16.7)	0	1.92 (.65)	1	4
Irritable bowel syndrome	22	7 (31.8)	11 (50.0)	3 (13.6)	1 (4.5)	1.91 (.81)	1	4
Diverticulosis	16	6 (37.5)	6 (37.5)	4 (25.0)	0	1.88 (.81)	1	3
Multiple sclerosis	25	9 (36.0)	11 (44.0)	5 (20.0)	0	1.84 (.75)	1	3
Prematurity	23	7 (30.4)	13 (56.5)	3 (13.0)	0	1.83 (.65)	1	3
Cerebral palsy	23	10 (43.5)	10 (43.5)	3 (13.0)	0	1.70 (.70)	1	3
Celiac disease	23	10 (43.5)	11 (47.8)	2 (8.7)	0	1.65 (.65)	1	3
Epilepsy	23	11 (47.8)	10 (43.5)	2 (8.7)	0	1.61 (.66)	1	3
Cleft lip and palate	23	12 (52.2	10 (43.5)	1 (4.3)	0	1.52 (.59)	1	3
Crohn's disease	22	12 (54.5)	9 (40.9)	1 (4.5)	0	1.60 (.60)	1	3
Hemochromatitis	22	17 (77.3)	4 (18.2)	1 (4.5)	0	1.27 (.55)	1	3

Note. Some percentages total more or less than 100 due to rounding.

High-Impact Health Problems and Environmental Factors

Health problems were ranked according to mean impact score; they are summarized in Table 2. Age-related hearing impairment attained the highest mean impact score (M = 2.96, SD = 0.77), and hemochromatosis yielded the lowest mean impact score (M = 1.272, SD = 0.55). Health problems that were endorsed as having some or major impact by more than 60% of the community leaders included age-related hearing impairment (87%), hypertension (77%), arthritis (75%), heart attack (72%), cancer (other) (72%), congestive heart failure (70%), breast cancer (69%), stroke (65%), Alzheimer's disease (63%), and prostate cancer (64%). Community leader perceptions of impact were largely congruent with county vital statistics (see Table 3), with notable exceptions. For example, age-related hearing impairment emerged as the highest impact problem as perceived by community leaders but, as expected, was not evident in the leading causes of death or hospitalizations in the partner community according to county vital statistics.

Table 3. ***Comparison of Top 10 Health Problems According to Community Leaders (Ranked by Mean Impact Score) and County Health Indices (Ranked by Number of Deaths)***

Rank	Community Leader Rating by Mean Impact Score	State Health Department County Health Profile, Leading Causes of Death (# deaths, 2010)
1	Age-related hearing impairment	Heart disease (112)
2	Congestive heart failure	Cancer (109)
3	Hypertension	Chronic lower respiratory diseases (39)
4	Arthritis	Unintentional injuries (24)
5	Heart attack	Alzheimer's disease (23)
6	Cancer (other)	Stroke (20)
7	Stroke	Diabetes (15)
8	Alzheimer's disease	Kidney disease (13)
9	Cancer (breast)	Intentional self-harm (8)
10	Cancer (prostate)	Pneumonia/influenza (6)*

Note. * Not included in Community Impact Inventory.

Environmental factors were also rated by key informants and ranked according to mean impact score (Table 4). Lack of jobs attained the highest mean impact score (M = 2.62, SD = 1.02), and unsafe school environment yielded the lowest impact score (M = 1.20, SD = 0.41). Only five environmental factors were endorsed

as having some or major impact by at least 50% of the community leaders, including lack of jobs (54%), exposure to herbicides (54%), unemployment (50%), exposure to fertilizers (50%), and underemployment (50%).

Table 4. ***Environmental Factors Ranked According to Mean Impact Score***

Environmental Factor	*N*	No Impact *N* (%)	Minor Impact *N* (%)	Some Impact *N* (%)	Major Impact *N* (%)	*M* Impact (*SD*)	Min	Max
Lack of jobs	23	13 (15.4)	8 (30.8)	8 (30.8)	6 (23.1)	2.62 (1.0)	1	4
Unemployment	26	3 (11.5)	10 (38.5)	9 (34.6)	4 (15.4)	2.54 (.91)	1	4
Herbicide exposure	26	4 (15.4)	8 (30.8)	11 (42.3)	3 (11.5)	2.50 (.91)	1	4
Fertilizer exposure	26	6 (23.1)	7 (26.9)	9 (34.6)	4 (15.4)	2.42 (1.0)	1	4
Underemployment	26	6 (23.0)	7 (26.9)	10 (38.5)	3 (11.5)	2.38 (.98)	1	4
Lack of respite care for persons with dementia	22	5 (22.7)	7 (31.8)	7 (31.8)	3 (13.6)	2.36 (1.0)	1	4
Insecticide exposure	26	5 (19.2)	11 (42.3)	7 (26.9)	3 (11.5)	2.31 (.93)	1	4
Shortage of recreational facilities	24	7 (29.2)	9 (37.5)	5 (20.8)	3 (12.5)	2.17 (1.0)	1	4
Poor road conditions	25	8 (32.0)	9 (36.0)	5 (20.0)	3 (12.0)	2.12 (1.0)	1	4
Lack of affordable health care	25	8 (32.0)	7 (28.0)	9 (36.0)	1 (4.0)	2.12 (.93)	1	4
Poverty	24	6 (25.0)	11 (45.8)	6 (25.0)	1 (4.2)	2.08 (.83)	1	4
Lack of community information sources	24	9 (37.5)	7 (29.2)	6 (25.0)	2 (8.3)	2.04 (1.0)	1	4
Lack of cultural activities	24	9 (37.5)	8 (33.3)	5 (20.8)	2 (8.3)	2.00 (.98)	1	4
Aerial crop spraying exposure	23	9 (39.1)	10 (43.5)	4 (17.4)	0	1.78 (.74)	1	3
Odor pollution	23	10 (43.5)	10 (43.5)	2 (8.7)	1 (4.3)	1.74 (.81)	1	4
Lack of affordable child care	23	12 (52.2)	7 (30.4)	4 (17.4)	0	1.65 (.78)	1	3

Lack of affordable housing	24	14 (58.3)	6 (25.0)	4 (16.7)	0	1.58 (.78)	1	3
Crime	25	12 (48.0)	12 (48.0)	1 (4.0)	0	1.56 (.58)	1	3
Illiteracy	25	13 (52.0)	11 (44.0)	1 (4.0)	0	1.52 (.59)	1	3
Water pollution	23	16 (69.6)	3 (13.0	4 (17.4)	0	1.48 (.79)	1	3
Noise pollution	24	15 (62.5)	8 (33.3)	1 (4.2)	0	1.42 (.58)	1	3
Poor traffic conditions	23	16 (69.6)	5 (21.7)	2 (8.7)	0	1.39 (.66)	1	3
Air pollution	25	17 (68.0)	7 (28.0)	1 (4.0)	0	1.36 (.57)	1	3
Lack of community green space	23	17 (73.9)	4 (17.4)	2 (8.7)	0	1.35 (.65)	1	3
Gang activity	24	19 (79.2)	5 (20.8)	0	0	1.21 (.42)	1	2
Unsafe school environment	25	20 (80.0)	5 (20.0)	0	0	1.20 (.41)	1	2

Note. Some percentages total more or less than 100 due to rounding.

Discussion

A mixed-methods approach to a community health needs assessment, as part of a community–academic partnership, provided important insights into the strengths supporting and challenges facing small rural U.S. communities today, especially in relationship to accessibility of health-related resources. Despite residing relatively close to larger cities, community leaders perceived distance from formal providers as a barrier to obtaining health care services for community members. Further, the small economic base within the partner community made it difficult to attract and sustain a formal network of health care providers and services. These findings are consistent with prior research demonstrating disparities in access to health care providers and services in rural areas compared to urban areas *(Bennett, Olatosi, & Probst, 2008)*. These findings also suggest additional opportunities for engaged scholarship at institutions of higher education to develop and deliver innovative care strategies in rural settings, such as student-led health clinics *(Stuhlmiller & Tolchard, 2015)* or lay health educators *(Krukowski et al., 2013)*, with a critical emphasis on community engagement, partnership, and capacity building.

Study findings also provide insights into the social structures that small rural communities use to support the health of their community members in the absence of formal, local health care resources. In this case, community members draw upon their close family, church, and school ties to monitor needs and to provide care, support, and resources, such as transportation and food. Interestingly, findings from this study are consistent with earlier research within this community that examined acculturation as well as the spatial orientation of community resources more than 40 years ago *(Deforth, 1970)* and more than 60 years ago *(Norris, 1950)*. In both cases, church was identified as holding a central position in the community. These prior findings lend validity to the results of this study; further, they suggest that these small villages are characterized by a remarkable social stability over time. The central role of the church in community life is also similar to the prominent role of faith-based organizations as sources of spiritual and social support described for African American communities in both urban and rural settings *(Ford, 2013; Lumpkins, Greiner, Daley, Mabachi, & Neuhaus, 2011)*.

In addition to providing important community-based perceptions of health-related strengths and needs in the rural United States, this community needs assessment provides a foundation for the broad goals of this community–academic partnership that is focused on the role of genes, lifestyle, and environment in common complex diseases. Community leader interviews afforded an important opportunity for trust building and colearning between community and academic partners as it allowed conversation about the project to extend beyond the immediate RAC members to the broader community. The key strengths of the study process were threefold.

First, the health assessment included questions to help build an understanding of the nature of the community, a critical component of engaged scholarship. Specifically, the focus of the community assessment provided an important description of the surface structure of the community; that is, the observable social and behavioral characteristics of the community as well as the community's deep structure such as community perceptions of the social, cultural, psychological, historical, and environmental influences on health behaviors *(Campbell et al., 2007)*. According to Campbell et al., knowledge of a community's surface and deep structure will increase the sensitivity (that is, the effectiveness and sustainability) of eventual health interventions by increasing both the feasibility of implementing the intervention and its overall impact. By inte-

grating qualitative data collection and analysis methods in the assessment strategy for this project, investigators obtained a particularly rich contextual description of the community that will undergird the development, prioritization, and implementation of a community-driven research agenda.

Second, both community assets and needs in relation to health were explored in order to inform subsequent capacity-building activities that leverage existing resources. Third, community leader ratings of the impact of health problems and environmental factors yielded findings that would not have been detected from county-level health statistics alone. For example, community ratings of the impact of health problems were congruent with the top 10 causes of mortality in the partner community, with the exception of age-related hearing impairment and arthritis. Although one would not expect to see these two conditions as causes of mortality, they were nonetheless perceived as relatively high-impact health concerns in the partner community.

CBPR approaches, in particular, have been increasingly used to guide research aimed at examining the interaction between genes, environment (exposures), and human health *(McCarty et al., 2008; O'Fallon & Dearry, 2001, 2002)*, especially in rural settings. Rural settings provide an advantageous platform for the study of complex diseases due to relative environmental homogeneity and a tendency for individuals in rural settings to live in the same environment over extended periods of time *(Igl, Johansson, & Gyllensten, 2010)*. In some cases, studies set in rural settings were initiated with a focus on a particular health problem or selected problems, such as obesity *(Mohatt et al., 2007)* and obesity-related phenotypes *(Bopp et al., 2012)*. In this case and others *(Igl et al., 2010)*, a broad assessment to determine high-impact and high-priority health problems was used, within a CBPR framework, to build subsequent research efforts toward the goal of a community-driven and engaged research agenda *(Wallerstein & Duran, 2006, 2010)*.

The process and findings of the CoSAGE project also hold important implications for community engagement and outreach in higher education in general. This project models the successful initiation of community engagement and scholarship at the investigator level partnered with a community at the grassroots level. The combination of grassroots engagement, a CBPR approach, and a needs assessment strategy was particularly powerful and effective in achieving the Kellogg Commission *(1999)* guiding characteristics of engagement, including responsiveness (i.e., listening to communities) and respect for partners (i.e., jointly defining problems and

solutions). The efforts reported here occurred early in the establishment of this community–academic partnership and provided an important trust-building and community-outreach activity. These early activities support our ongoing objective of achieving another guiding characteristic of engaged scholarship: the integration of discovery research, translation, teaching, and service (*Kellogg Commission, 1999)*. Selected examples of this integration through the CoSAGE platform include supporting dissertation research, facilitating on-campus research experiences for high school students, partnering in the provision of health fairs within the community, and distributing health promotion messages and resources related to hearing health.

In the area of discovery research, the community-level health assessment findings are being used to inform the next steps of the CoSAGE community–academic research partnership. Specifically, data are being used to guide the development of culturally-informed community engagement and recruitment strategies in order to build a research participant biorepository within the partner community. These findings are also playing an integral role in the prioritization of a locally relevant community research agenda focused on promoting hearing wellness and quality of life for persons with dementia and their families.

This study used a mixed-methods approach to a community-level health needs assessment that was designed to solicit perceptions of the characteristics of a rural community, health-related resources, health-related barriers, and high-impact health and environmental factors. Limitations, however, are acknowledged. First, although saturation of themes was reached in qualitative data analysis, the sample size was relatively small ($N = 30$) for the analysis of quantitative data. Therefore, the perceptions of community leaders regarding the high-impact health problems and environmental factors may not reflect the actual health status of the community at large and may not reflect the perceptions of less-integrated community members. To address this limitation, an individual-level needs assessment is under way. Specifically, community members are invited to contribute health data and a biologic sample to a community biorepository, which will provide for an examination of the presence of health problems, exposures, and relevant lifestyle behaviors in order to supplement our community-level assessment. A second limitation of this study is that community leader interviews were documented by hand in the field rather than audiotaped. Although investigators believe this was the best approach for building trust and soliciting information, relevant data units and

themes may have been lost during the handwritten transcriptions. To address this potential limitation, several strategies were used to verify study findings with the RAC (i.e., review of major themes, subthemes, and illustrative quotes; review of manuscripts) in order to establish the credibility of the results. Although this community health needs assessment process was itself conceptualized as a community engagement strategy, several other activities to engage with the partner community were implemented subsequent to this assessment. Strategies included establishing a project office within the partner community, participating in local community events, meeting with local governmental bodies, and establishing relationships with clergy within the partner community.

Conclusions

Findings from this research suggest that rural communities leverage church, family, and school resources to provide essential and tangible sources of support for community members with health-related needs. In addition, community leaders acknowledged the ongoing barriers to health services that result from physical distance from providers and are exacerbated by challenging economic conditions. Further, community leaders identified a number of high-impact health conditions and environmental factors that extended information available through county-level vital statistics.

This community needs assessment was a critical step in establishing a long-term relationship between community and academic partners. The community assessment represented an opportunity to discuss the CoSAGE project and goals beyond the previously established RAC. As a result, the information gained through this process is contributing to the development of acceptable and feasible strategies for community engagement and participant recruitment in subsequent phases of the project. The determination of high-impact health problems is being used to prioritize the planning and implementation of a community-driven health research agenda. Finally, the development and implementation of future discovery and translational efforts will be built on and will support family, intergenerational, and church connections. The CoSAGE approach, grounded in a community health and engaged scholarship philosophy and process, provides a model for academic–community partnership that our team anticipates will yield valuable outcomes for both partners.

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