



HEALTHCARE SYSTEMS AROUND THE WORLD

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ABSTRACT

Academic, secular, and religious organizations have shown an increasing interest in improving “Global Health” through international medical brigades. One major challenge is to convert resources and good intentions into tangible results that are culturally acceptable, empowering, and sustainable. Another challenge is to disseminate assessment tools to share as replicable resources. We shared a replicable Community Health Needs Assessment, designed by a chronic disease epidemiologist and undergraduate students with participation by a community health committee, under the auspices of the University of Arizona and the nongovernment organization (NGO) Salud Juntos in La Guacamaya, Yoro, Honduras, and to discuss the barriers to implementation. The door-to-door survey was conducted during the summer of 2008 by a team of trained bilingual undergraduate volunteers and contained a mixture of categorical and free response questions representing 17 public health domains, ranging from nutrition to perceived public health needs. Results are available elsewhere; this paper will discuss the design and implementation process. Following University of Arizona institutional review board approval and during the implementation of the survey, additional domains of interest were identified, and linguistic and cultural challenges were encountered. Surveys should be tailored to the specific community and, although logistically challenging, participatory action research methods are ideally incorporated in full partnership. Sound research methodology, community participation, and thorough training and piloting of surveyors can decrease cultural and linguistic barriers, assuring meaningful assessment that will truly benefit the community.

Background

Rapid growth in medical volunteerism in resource-poor countries

presents an opportunity for improving global health; however, this must be done responsibly. A major challenge is to direct the good intentions of volunteers into “endeavours that generate locally acceptable, sustainable changes in health” (Heck, Bazemore, & Diller, 2007). A large number of nongovernmental organizations (NGOs) and religious organizations participate in medical volunteerism in the developing world. They are dedicated to improving the health and quality of life of residents either in the short term through medical brigades or in the long term through public health programs and policies. However, organizational resources, for example, time and money are limited, so it is important that they be utilized in an effective manner, benefiting both volunteers and those that need help. Crucial to this process is gathering information to determine the best way to “portion out the available resources (money, time, and organizational efforts) to best meet the demands” (Witkin, 1994, p. xv). An initial and important step (one of many) in co-creating acceptable and sustainable change within a given community is to design and perform a Comprehensive Needs Assessment. Consistent with Witkin (1994), this is best done: a) by focusing on the needs of the group rather than individuals, b) by engaging a wide-cross section of service providers and recipients in democratic involvement, c) by prioritizing needs (and ultimately the actions to address these needs), and d) by triangulating methods informing this process. This article will specifically address the identification of needs portion of this process.

When it was first sought to design a Comprehensive Epidemiological Community and Health Needs Assessment Survey in Honduras, a succinct “how to” primer for NGOs did not exist. Although a thorough review of the literature revealed a wide variety of articles and books on needs assessment (Levy et al., 1994; Pepall, et al., 2006; Witkin, 1994), and some targeted assessments and other surveys inclusive of risk factors and diseases (Boss Toole, & Yip, 1994; Duffield & Taylor, 2004; Prudhon & Spiegel 2007; Salama, Maloney, & van der Veen, 2001; Spiegel et al., 2004;) a clear and practical synthesis was not located. In order to assist NGOs in design of Community Needs Assessments in other Latin American communities, this article attempts to fill this void. Although not included in this paper, the survey and its results are readily available in English and Spanish, free of charge, at: <http://www.aging.medicine.arizona.edu/GlobalHealth.html>. In addition, inquiries are welcome and can be addressed to jmohler@aging.arizona.edu.

Several methods of community assessment data collection are available to identify and understand the underlying environment of community needs (Prudhon & Spiegel, 2007). Strict classical epidemiological surveys can capture health risks and



disease states, but may neglect other important community components, such as perceived strengths and weaknesses, social networks, and informal power structures. Community Based Participatory Action Research (CBPR) methods may be used to better incorporate community intangibles. CBPR combines the local knowledge of community participants with the research team's expertise in methods and processes (Minkler, 2003). Williams (1999) commented that CBPR is a more valid way to gather people's experiences and knowledge than traditional top-down research, in which planning, decision making and implementation are predetermined. CBPR is not a method of conducting research; rather, it is an orientation to research (Minkler & Wallerstein, 2003). It can involve quantitative, qualitative, or combined data-gathering methods, depending on the issue under investigation. By implementing CBPR, epidemiologists can better study and understand complex community health problems. This ensures the relevance of findings and aids in the application of said findings to promote structural changes that can improve health outcomes and prevent disease. (Leung, Yen, & Minkler, 2004) However, because there are many physical and communication barriers among nongovernmental organizations (NGOs) and their target populations, especially when preparatory work is being done away from the community of interest, CBPR is often difficult to implement in its purest form.

The Genesis for this Project

Based in Seattle, Washington, Salud Juntos is a nonsectarian, not-for-profit volunteer group of students, donors, healthcare professionals, and other individuals, dedicated to "improving the general health and well-being of those living under less fortunate circumstances in Latin American by way of collaborative, sustainable, and minimally invasive development" (www.saludjuntos.org). The goal of Salud Juntos is to develop a sustainable system of clinical care in Yoro, Honduras, in collaboration with existing local, regional, and national health services. The objective of this Community Needs Assessment was to better understand the public health milieu of a small peri-urban community in Yoro, Honduras.

La Guacamaya, Honduras, a small community of approximately 6,500 persons (Latitude: 15° 15' 0 N, Longitude: 87° 47' 60 W), is located approximately 20 minutes by car from the nearest city, El Progreso, Yoro, and 45 minutes by car from San Pedro Sula. La Guacamaya had a preexisting Community Health Committee and a 2,000-square foot clinic that was constructed in the wake of Hurricane Mitch. At the time of this effort, this clinic operated only one to two weeks per year, when staffed by U.S. medical brigades, and the community was not affiliated with the Honduran National Health Care System.

Context

Honduras is the third poorest country in Central America (SIDA, 2008), with a GDP per capita of \$1212, or under three and one-half dollars per day (IMF, 2007). Income inequality is also significantly high in Honduras (UN Gini index: 53.8) (UNDP, 2006) as is its unemployment rate of 27.9%. The result is a nation with 60% of its population officially below the poverty level (CIA 2007). On top of this, it is estimated that the average Honduran has only 4.3 years of schooling (ENDESA, 2006). Not surprisingly, such an economy and infrastructure does not bode well for the health of its people.

The Honduran healthcare system is largely a state-run, socialized network of hospitals, clinics, and centros de salud (health centres) that are operated by government-contracted doctors, specialists, and nurses who have received from one to more than five years of training (ENDESA 2006). In addition to these health resources various private and religiously affiliated hospitals and clinics are found in major cities. Despite this "socialized" system, quality healthcare is mainly reserved for the upper classes who can afford private care. Those using the public sector can expect long waiting times, unavailability of drugs, and the lack of quality diagnostic and intervention techniques/equipment. For example, a large clinic with an average of 300 consults daily has only two functioning sphygmomanometers. This is a clear illustration of the dire state of the public health system.

According to the WHO, Honduras has the 5th worst healthy life expectancy of all nations in the western hemisphere, at 56 years for men and 60 years for women (WHO 2002). Infant mortality rates in Honduras are also relatively poor, with 25.21 deaths for every 1000 live-births, which is approximately 4 times the U.S. rate. The maternal mortality ratio, of 110/100,000 live births, is similarly poor (WHO 2005). In 2005, USAID found that over 24% of children under five years of age suffered from chronic malnutrition (ENDESA 2006).

Like many tropical developing nations, the severity and variety of pathologies in Honduras are significant. Among the most prevalent conditions is infectious diarrhea, with USAID finding that 55.7% of children under age five had at least one incidence of needing oral rehydration salts for treatment during their lifetime. The same survey also found that 15.5% of children under age 5 had experienced diarrhea in the two weeks before questioning. Such enteric diseases are largely the result of poor sanitation as well as a lack of potable water. Basic sanitation is lacking in the rural areas. It is estimated that 55% of people in Honduras drink untreated water. In regards to sewage disposal, 31% are connected to a sewage system, 14% have a septic tank,



19% have a hydraulic latrine, 17% have a pit latrine, and 16% have no waste disposal system. In addition, acute respiratory infections, including pneumonia, account for the 23% of under age5 deaths (ENDESA 2006). Higher profile diseases such as tuberculosis, dengue, Chagas, malaria, syphilis, and, increasingly, AIDS are also present in Honduras.

Methods

The primary investigator (PI), an academic epidemiologist at the University of Arizona, members of Salud Juntos, and several undergraduates travelled to La Guacamaya in the winter of 2007-2008 to hold a two-week medical brigade and to inspect the community at its request. In collaboration, the 10-member Community Health Committee (CHC), a volunteer group previously formed by the community, and the PI proposed that a community needs assessment be conducted the following summer in order to prioritize money, time, and organizational efforts to best meet public health and clinical demands, as well as to aid in the acquisition of future grant funding. The survey was designed specifically to inform future community health interventions by Salud Juntos and other NGOs in La Guacamaya, as dictated by the Community Health Committee.

Domains of Interest
Family Membership
Occupational Exposures
Shelter
Water
Education
Sanitation
Garbage Disposal
Nutrition
Food Obtainment/Preparation
Vector Borne Disease Risk
Pulmonary Risk Factors
Infectious and Chronic Disease Period Prevalence
Utilization of Existing Care
General Public Health Concerns
Interest in Community Involvement
Family Resources
Community Strengths

Community Needs Assessment (CNA) Design

The CNA was developed by a PhD epidemiologist project director, on faculty at the University at Arizona College of Medicine, in collaboration with seven undergraduate students from Cornell and the Community Health Committee. Domains of interest (see Table 1) were identified and discussed by the working group using expert advice, a search of the evidence-based, extant data on Honduran epidemiology, and CHC input. Questions were developed through an iterative process ending in refinement by content experts. Both free-response and multiple-choice questions were utilized. The survey was translated into Spanish, and back-translated for comprehension, and then reviewed by a local Honduran speaker familiar with local idioms. The survey was then generated using the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention Epi Info™ Version 3.5 survey and mapping program. Prior to implementation, the survey was approved by both the University at Arizona and Cornell University Human Subjects Committees. Table 2 specifies the development process.

Community Needs Assessment Development Process	
Process	Performed By
Review of evidence base	PI
Expert interviews of stakeholders, providers and community health committee (CHC)members	PI and students
Identification of domains based upon evidence and CHC	PI and students
Programmed into Epi Info™ Version 3.5 survey and mapping program English version and public health experts	CHC
Generation of questions based on methods of Aday (Aday XX)	PI and students
Review of questions by public health experts, with incorporation of changes	PI
Programmed into Epi Info™ Version 3.5 survey and mapping program English version and edited	PI and volunteer data manager
Translated into Spanish, and back-translated for comprehension	Students
Reviewed by a local Honduran speaker familiar with local idioms	CHC member
Programmed into Epi Info™ Version 3.5 survey and mapping program Spanish version	PI and volunteer data manager
Reviewed	CHC

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Process	Performed By
IRB approval obtained University of Arizona and Cornell University	PI (University of Arizona) Students (Cornell)
Students and Data Manager trained in survey methodology, data entry and community safety	PI
Piloted by CHC members in Honduras	Students overseen by PI
Community survey performed	Students overseen by PI
Data entry with error checking and 10% data for data entry error rate (< 10%)	PI
Data cleaning and analysis	PI with volunteer epidemiology graduate student
Data discussion with graduate students and CHC	Team
Report generation	PI with volunteer epidemiology graduate student
Review of questions by public health experts, with incorporation of changes	PI with volunteer epidemiology graduate student

Piloting the CNA

Upon the teams' arrival to La Guacamaya, Honduras, the survey was presented to the health committee for final linguistic, subject matter, and cultural approval. Several dry-run surveys were conducted with trusted community members. Key informants (Health Committee members and service providers) were interviewed using open-ended questions, in addition to taking the survey themselves, prior to community implementation.

Implementation

In order to enhance the ease of gathering data, the community was initially divided into four quadrants, and GPS coordinates of the borders of the town and coordinates of each surveyed house were recorded (a map was later generated of the area). Teams of bilingual, trained student interviewers travelled from house to house conducting the survey in Spanish. Initially, the teams were instructed to sample every third house. On several occasions, teams partnered with a community member while implementing surveys.

Data Management and Analysis

Missing or uncertain field responses were checked by the data coordinator and clarified, where necessary, in discussion with the survey teams. Data were hand-entered by the data coordinator and trained survey team members into an Epi Info™ survey database, transferred using Stat/Transfer Version 9, and analyzed using STATA Version 9.0 using descriptive and associative statistics. GPS coordinates were entered into the Epi Info™ mapping database, and

a map of the community and surveyed households was generated and underlain by a GOOGLE geographic topographic image.

Results

Design of Survey

Survey results are not reported here, but these are available at: <http://www.aging.medicine.arizona.edu/GlobalHealth.html>. Barriers to successful implementation are incorporated in the Results Section, and suggested changes are in the Findings and Conclusion Sections.

We were unable to incorporate ideal CBPR methods. The first trip to the community during winter 2007-2008 lasted 17 days, and the team did not return to conduct the survey until May of 2008. The physical distance and communication difficulties (poor telephone and email availability) between the survey team and the community made it difficult to involve the community in the survey design process. Therefore, the majority of the survey planning and design was done with minimal community involvement. Open-ended community human resource and desired goals questions were included in the survey to elicit more community input.

Pilot Survey

Upon review by the health committee, several words were changed on the survey they could be better understood by members of the community. The dry-run pilot surveys proved to be invaluable to the survey teams; from these they learned how to approach homes and request involvement in the survey, which resulted in nearly 100% participation.

Implementation

Conducting the survey in respondent's homes had several benefits. Respondents were able to answer questions comfortably and did not need to walk in the heat to participate. Also, while conducting surveys, the teams were able to inform families about the clinic in La Guacamaya, including information the hours, the location, and the type of specialists available. Furthermore, in-home surveys also allowed for personal interaction and a more intimate understanding of the resources and deficits of the community members. Another advantage of conducting the door-to-door survey was the ability to make field notes about the environment and building space, for example, the status of sewage removal and cleanliness. This allowed for a more thorough understanding of the issues faced in the community.

Survey Teams

Conducting the survey in teams of two allowed surveys to be conducted efficiently and safely; one surveyor asked the



questions while the other recorded responses. It also served as a language check to ensure proper execution of the questions and comprehension of responses. Although anticipated before the survey, the language barrier between Spanish and English still posed difficulties in the communication of questions' content and the understanding of responses due to dialectic and idiomatic issues.

Sampling

The planned sampling method was to interview every third house, and if that specific home was not available, then to move on to the next household. This was not what happened, however, because the desired sample size increased once surveys commenced. Instead, every inhabited household was approached for a survey.

Response Bias

As with all subjective surveys, survey responses were subject to response bias. Conducting the survey with a community member, although beneficial for community relations and language comprehension, could have given rise to biased responses because of fear of social repercussions and stigma. In addition, the presence of foreign researchers may have elucidated further response bias. For example, when surveyors asked about the presence of pets in the household, many times they would receive a definitive "No," contradicting visual evidence. This was evident in other questions as well, including the prevalence of obesity, sanitation/garbage disposal, and age. This could have been because of either a desire to please or seek approval, or due to the differences in cultural nuances in the conceptual understanding of specific survey questions.

Safety Protocols

One final consideration was the safety of the surveyors. The Community Health Committee announced the CNA ahead of time. Teams walked through the community unsupervised. Although no safety problems occurred during the implementation of the survey, in hindsight, safety protocols could have been tighter and more concrete.

Length of Survey

The survey took 20 to 45 minutes to complete, and therefore was a draining experience for both respondents and surveyors. Occasionally, the respondents would appear to lose interest toward the end of the survey. Some of the most important questions, such as self-reported problems in the community

and desired changes, were located at the end, and frequently participants would fail to provide adequate detail.

IRB Regulations

A drawback of the survey format was that, due to IRB standards, questions could not be edited during the implementation process while on the ground because the survey required advanced approval. Exact phrasings of the questions were modified by surveyors in the execution of the survey in accordance with comprehension and previous responses. Despite these variations on the wording of the questions, the teams could not edit written questions or add new questions based on experience in the community. As a result, problems that were discovered after IRB approval could not be addressed. For instance, in many houses it was reported that there were no working members of the family. A question regarding the source of familial income would have been pertinent, but it could not be added because of IRB regulations. This point is especially relevant because recent World Bank data regarding Honduras reported that 24.5% of Honduran GDP is in remittances (Ratha 2009). Moreover, sensitive questions, such as those dealing with sexually transmitted diseases, domestic violence, and mortality rates were not addressed in the survey. The successful completion of the first survey, however, set a strong basis for later surveys to address these additional issues.

Analysis

Overall, 301 surveys were conducted during six weeks in the summer of 2008, representing over one-third of the households in the La Guacamaya community (98% of the 301 at-home community members who were approached agreed to participate). The data were analyzed along with clinical data, and GPS coordinates, and results were presented to the Community Health Committee in January 2009, to inform future community interventions and assist in development of grant proposals.

Discussion

Despite Salud Juntos' good relationship with the Community Health Committee and the invitation to perform this survey, difficulties were encountered in the design and implementation of this survey primarily for reasons of language, culture, communication, and rigidity of IRB regulations. The following were recommended:

1. Include a wide array of questions in the IRB approval request that are wholly inclusive of elements, including those that may not be known or acknowledged by the



community, so that the survey team may determine which questions are most applicable to the community after IRB approval. This will allow on-the-ground editing.

2. Improve local communication capability to increase contact with community members during design process. This could include on-the-ground collaborators to allow for face-to-face communication, an essential aspect of true CBRP methods.
3. Provide international phone cards, Skype, or a webcam. This has been done at the La Guacamaya site, where the communication has been improved.
4. Hold representative focus groups to check comprehension and content prior to large-scale implementation.
5. Incorporate a community member into every survey team, and give respondents the choice of who is present during the survey.
6. Organize a comprehensive training process to ensure the survey is executed optimally. Practice the survey beforehand (especially if language is an issue), offer cultural sensitivity training, and hold safety briefings.

Conclusions and Recommendations

Baseline epidemiological CNAs are key to gathering information to determine the appropriate way to portion out the available resources to best meet public health and clinical demands in developing nations. An initial and important step (one of many) in co-creating, empowering, and sustainable change within a given community is to design and perform a comprehensive needs assessment. However, even though ideal, using a full community participatory research model may not always be possible. There are many challenges, but incorporating sound research methodology, being sensitive to community values and stated needs, and offering careful on-site training and operation of survey collection and processing can increase the validity of the survey; it also can build and maintain the trust of the community. Once data are analyzed the next important step is to assessing and to make a community action plan a priority.

Competing interests

The authors claim no competing interests.

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References

- Boss, L. P., Toole, M. J., & Yip, R. (1994). Assessments of mortality, morbidity, and nutritional status in Somalia during the 1991-1992 famine. *JAMA*, 272, 371-376
- CIA. (2007). *CIA World Fact Book: Honduras* [online]. CIA.gov. Available from: <https://www.cia.gov/library/publications/the-world-factbook/geos/ho.htm>. [Accessed 29 October 2008].
- Duffield, A., & Taylor, A. (2004). *Emergency nutrition assessment: Guidelines for field workers*. London: Save the Children.
- ENDESA. (2006). Honduran Presidential Institute of National Statistics. *Encuesta Nacional de Demografía y Salud 2005-2006*. Available from: http://www.measuredhs.com/pubs/pub_details.cfm?ID=625. [Accessed 29 October 2008].
- Heck, J. E., Bazemore, A., & Diller, P. (2007). The shoulder to shoulder model—Channeling medical volunteerism toward sustainable health change. *Family Medicine Journal*, 39, 9, 644-650.
- IMF. (2007). International Monetary Fund. *World Economic Outlook Database*. Available from: <http://www.imf.org/external/pubs/ft/weo/2007/01/data/index.aspx>. [Accessed 29 October 2008].
- Leung, M. W., Yen, I. H., & Minkler, M. (2004). Community based participatory research: a promising approach for increasing epidemiology's relevance in the 21st century. *International Journal of Epidemiology*, (3), 499-506.
- Minkler, M., & Wallerstein, N. (Eds.) (2003). *Community-based participatory research for health*. San Francisco, CA: Jossey-Bass.
- Mohler, M. J., D'Huyvetter, K., Bigelow, R., Heier, J., MacKenzie, D., Mann, S., Moyer, D., et al., (2008, November). La Guacamaya Community Health Needs Assessment. Arizona Center on Aging, Division of Global Health, University of Arizona.



- Prudhon, C., & Spiegel, P. (2007). A review of methodology and analysis of nutrition and mortality surveys conducted in humanitarian emergencies from October 1993 to April 2004. *Emerging Themes in Epidemiology*, 4 (1), 10.
- Ratha, D. (2009). *Remittance flows to developing countries to exceed \$300 Billion in 2008, 2009*. Available from: <http://blogs.worldbank.org.proxy.library.cornell.edu/peoplemove/remittance-flows-to-developing-countries>. [Accessed 7 July 2009]
- Salama, P., Assefa, F., Talley, L., Spiegel, P., Van Der Veen, A., & Gotway, C. (2001). Malnutrition, measles, mortality, and the humanitarian response during a famine in Ethiopia *JAMA*, 286 (5), 563-571
- SIDA, (2007). *Country report 2007; Honduras*. Available from <http://www.sida.se/publications>. [Accessed on 15 January 2008].
- Spiegel, P. B., Salama, P., Maloney, S., &van der Veen, A. 2004. Quality of malnutrition assessment surveys conducted during famine in Ethiopia *JAMA*, 292, 613-618
- UNDP (United Nations Development Programme), (2006). *Human development report 2006. Table 15: Inequality in income or expenditure*. Available from: <http://hdr.undp.org/en/reports/global/hdr2006/>. [Accessed on 29 October 2008].
- Vastag, B. (2002). Volunteers see the world and help its people. *JAMA*, 288, 5, 559
- WHO (World Health Organisation), 2005. *Make every mother and child count*. Available from: http://www.who.int/whr/2005/annex/indicators_country_g-o.pdf. [Accessed 31 October 2007].
- WHO (World Health Organisation), (2006). *Core health indicators: Honduras*. Available from: <http://www.who.int/whosis/database/country/compare.cfm?country=HND&indicator=HALE0Male,HALE0Female&language=english>. [Accessed 30 October 2008].