Collaborating for Systems Change: A Social Science-based Framework for Academic Roles in Community Partnerships

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Introduction

Community-academic partnerships have been increasingly promoted to support science-based actions that improve environmental public health. These actions may include changes in public policies, community groups, local organizations, and residents' awareness, knowledge, and behaviors. However, the complexity of these processes can limit academics' ability to contribute effectively. Restrictions placed by funders, narrow technical expertise, need for long planning time, incentives to generate knew knowledge over applying existing data, and barriers to changing approaches may constrain academic partners' ability to respond to communities' needs. We present a social science-based framework to help plan, communicate, and evaluate academic roles in complex systems changes efforts in the area of environmental public health. We explore the framework's utility by applying it to three long-term partnerships within the National Institute of Environmental Health's Community Outreach and Engagement Core network. We conclude by discussing the framework's relevance to other types of academic-community partnerships and implications for promoting more effective academic engagement in community problem-solving.

It is widely accepted that research can and should support solving community problem solving. However, effectively improving the use of science in all types of decisions has long frustrated researchers, policy makers, and the public. Environmental public health, funders, agencies, and academics have promoted various types of community-academic partnerships to enhance the problem-solving process.[1,2,3,4,5] Community-based participatory research, translational science efforts, citizen science, and multi-directional outreach and communication programs have expanded in recent years.[1,6] Academics can play different roles in these partnerships including generating, using, and transmitting knowledge. Communities' needs for these different types of knowledge functions evolve as the process of systems change unfolds. Therefore, a clear understanding of the systems change process can help identify appropriate contributions by academic partners. Conversely, lack of

attention to the community context and stage of systems change can lead academics to conduct studies, outreach efforts, public education, or data analyses that are irrelevant or even counterproductive.

Our goal is to characterize, clarify, and distinguish the diversity of roles that academic partners can play in supporting their community partners' efforts within systems change processes.[7] To do so, we present a framework that applies social science concepts about the policy process to the diverse types of systems changes pursued by environmental health partnerships. The framework clarifies the contributions academic partners can make at different stages of the systems change process. The framework may help translational institutions plan, communicate, and evaluate their contributions to systems change processes. It may also help community partners better define expectations for their academic partners as their needs evolve over time. This clarification can strengthen partnerships' processes and outcomes.

This framework also provides a tool to address several unique challenges of evaluating academic-community partnerships.[8] First, a wide range of strategies are available to bring about systems change, including organizing, education, and policy. Partners may need to take on different roles, approaches, and activities as the context of the change process evolves. This often results in evaluation challenges, including issues of contribution versus attribution and clarifying the contributions of specific partners.[1,9,10,11] The evolving nature of academic partners' roles can complicate efforts to assess the effectiveness of these engagement efforts. Second, building relationships to address issues of environmental public health is time intensive. Change can also take a long time to achieve, and assessing the impact of these changes can take even longer.[1,9,10,11,12] Having interim normative goals for partners' roles may provide opportunities for formative evaluation. Third, partners may invest resources through a long-term partnership, but still may not succeed in bringing about systems change.

Systems change efforts are also subject to variations in community support, political circumstances, and other contextual factors related to sustainability such as funding and budget environments.[6,9,10,11,12,13,14,15] The proposed framework can help academic partners identify and document progress, even when partnerships do not produce the intended results. Finally, because these partnerships typically engage in a wide range of activities, no single metric or evaluation approach fully captures their impact. Thus, the framework may help identify which of the many evaluation approaches available are appropriate for a particular situation, and how evaluation approaches may need to change over time.

One mechanism for supporting academic-community partnerships is the Community Outreach and Engagement Core (COEC) program within the NIEHS-funded Environmental Health Sciences Core Centers.[1] COECs support multidirectional communication between environmental health researchers and partners, including community groups, public health professionals, and government agencies. In so doing, COECs increase awareness of

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[1]Other programs with similar goals for supporting sustained community-academic partnerships and research translation include other programs within the NIEHS Partnerships for Public Health network. Similarly, many institutions support their own outreach programs. For the purposes of this analysis, we focus specifically on the NIEHS COEC model.

environmental health and help researchers understand which environmental health issues are important to their identified audiences. COECs carry out this key function through diverse strategies that include developing partnerships to enhance dialogue, raising awareness of environmental health issues and environmental health research findings, collaborating with communities to identifying and solve environmental health problems, and evaluating and disseminating outreach models. The ultimate goal of these activities is to promote environmental health in the community – including changes in behavioral norms; changes in private, industry or organizational practices; and local, state, and federal policy change.[2] Evaluation approaches informed by diverse social science disciplines help maximize the COECs' contributions to improvements in community health. Many COECs leverage the approaches, methods, and perspectives of social scientists from fields including sociology, geography, political science, education and communications. Social sciences are often essential to their efforts to translate environmental health research to community problem solving, institutional change, and policy processes.

Below, we describe the framework and how it details the potential roles of academic partners at different stages of a cycle of systems change. We use the framework to analyze long-term community partnerships with COECs at the University of Rochester, Columbia University, and the University of North Carolina at Chapel Hill and explore the utility of this framework for evaluating such efforts. Next, we discuss the framework's implications for other types of partnerships that aim to bring technical information, data, or other kinds of knowledge into systems change processes. We conclude with recommendations for funding, supporting, and expanding academics' contributions to community partnerships.

Framework for academic roles in partnerships for systems change

Academics, public health professionals, and community groups recognize the importance of integrating science and community input into public health planning, programs, and policy decisions. A wide range of approaches to enhance this integration have been developed, including citizen science, community based participatory research, and community engagement programs. Our framework highlights how these academic roles in these efforts may evolve throughout the process of systems change.

We use the term "systems change" to refer to changes in institutions, behavioral norms, organizational practices, or policies affecting a community. As identified by social scientists who study policy processes, all types of systems change involve multiple stages.[16,17,18] The process of change typically begins with identifying a problem, formulating alternative solutions, developing support for a proposed solution, and finally implementing the change. Evaluation of impacts may inform efforts to sustain the change or may highlight new problems, initiating a new cycle of systems change. Our framework incorporates the growing understanding of how to promote the translation of research into these the social science concept of the policy process.[2,3,4]

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[2]We use the phrase "systems change" to describe this broad range of potential outcomes promoted by different COEC efforts to support improved environmental public health.

The framework depicted in Figure 1 highlights the different stages of systems change. The circular structure is meant to communicate the iterative nature of systems change. The components of the framework need not be followed in the order in which they are described; partnerships may suddenly find themselves in a new stage due to environmental, political, or economic factors, such as when budgets are reduced or new political leaders are elected. However, academic and community partners experience challenges in the community change process, they may find it helpful to revisit the framework to see if there are components or activities that they missed.

The framework is divided into four quadrants, each representing a phase in the cycle of systems change: Initiation, Developing Solutions, Implementing Change, and Sustainability. The outer ring describes activities that may be undertaken by the partnership during that phase of the cycle. Below, we describe the academic-community partnership interactions common to each of these stages, specifically highlighting how academic partners may contribute to the process.

The Core: Academic-Community Engagement

In the center of the framework is the academic-community engagement. This engagement or partnership may be initiated by community groups, government agencies, or academics. Social science informs the process, methods, and evaluation of these partnerships. Some partnerships exist for a short time to address a specific problem; others evolve into long-term collaborations that work to address ongoing issues in the community. The activities described as academic activities in the framework below can be conducted by other types of organizations with access to technical expertise (e.g. technical research institutes, government agencies, etc.); however, for simplicity they are referred to as "academic partners" here.

Initiation

In the "Initiation" phase, the problem or issue is identified, framed, and characterized. Problems may be identified by community partners, professionals, or academics. The function of defining the nature of the problem in terms of outcomes, values, interests, and scope sets the stage for how communities will begin to address the problem.

Identify and Frame Problems—In this component, partners work together to identify the problem. Community partners may bring a concern forward, or academic partners may identify the problem before community partners are aware of it. At this stage, an important goal is to describe the problem using concepts and language that help communicate the issue to relevant audiences. This stage also involves identifying the source of the problem and who has the capacity to address the problem. Academic partners may be in a position to ensure that community members have access to resources to help them understand the problem.

Ask Questions to Inform Solutions—As part of this stage, community partners can ask questions that help them better understand the source or sources of the problem, the factors that promote or constrain the problem, and potential solutions that address the problem.

Academic partners may contribute at this stage by refining questions to ensure that the scientific answers inform potential solutions.

Collect and Analyze Information—Academics can work in this phase to collect the information they need to answers questions identified earlier. The information may take many forms, from counts or measures of exposures, to numbers of people at events, to health outcome data. Other data may be more narrative in nature, and may take the form of stories, observations, meeting minutes or other qualitative data. In many cases, collecting reports, analyses, or experiences from other communities may help inform potential solutions. At this stage, academic partners may take on the role of training community members in data collection and analysis techniques, or in identifying researchers who have the tools they might need to collect data and stories themselves. This function also includes reporting research findings, data analyses, summaries of qualitative data, and literature or case reviews in ways appropriate and meaningful to the community.

Developing Solutions

This quadrant includes the processes involved in developing potential solutions to the identified problem.

Develop Framework for Change—Partners can develop a strategy to address the problem using the findings from any analyses that are conducted that are in line with the problem identified. At this point, academic partners may serve as facilitators during discussions about the best approach to address the problem.

Raise Awareness and Build Support—The partners' goal in this stage is to raise awareness of the problem, the proposed solution, and the actions needed to promote the solution. Raising awareness may include working with the media, meeting with community groups to communicate the issue, educating affected communities about the impact of the problem, and reaching out to others involved in or affected by the problem. Academic partners can contribute to this effort by introducing community members to media contacts, ensuring that community members have access to research that communicates impacts on the community, or by providing technical expertise on the problem. Participation by academic partners in community initiatives may also lend credibility to these efforts.

Identify Alternate Solutions—Partners can work to identify and explore potential solutions. Key academic partner roles at this stage may include benchmarking (identifying solutions used by other communities), analysis (developing understanding of how the solution might work in this community), or collecting additional information to inform new solutions. At this stage, academic partners may once again find themselves in a position to help community partners collect data and understand and interpret the findings.

Implementing Change

The process of implementation involves changes at the systems level to enact or apply solutions. Developments in this quadrant may be more susceptible to or influenced by contextual factors, such as changes in elected leadership, budget reductions and public

opinion. For example, an academic-community partnership may have spent years working with a particular elected official, only to have that official voted out of office just before the launch of an initiative. This means that academic partners must be particularly attentive to external factors and flexible in their response.

Assess Alternatives and Select Solution—Based on the analysis and alternatives generated in the previous quadrant, partners can work together to select and promote a preferred strategy or solution. Selection may be informed by analyses of alternate solutions that have been successfully implemented elsewhere, or projections of impacts within the local context. The initial proposal or position may change as other stakeholders weigh in, decision makers make choices, or details of implementation are analyzed. Academic partners can provide the scientific evidence on which potential solutions were based.

Promote solution—At this stage in the systems change process, partners may use information to educate decision makers on the problem and offer potential solutions. Academic partners can ensure that comprehensive and accurate information is available in a credible, timely, and appropriate form. Educating decision makers and promoting solutions may involve preparing and disseminating materials, attending meetings, making presentations, writing letters to the local newspaper, and providing data and evidence to decision makers as requested.

Implement Change—This component of the framework involves implementation of the selected strategy. Academic-community partnerships can support implementation in a variety of ways. For example, academic partners may help raise awareness of any change that been made, train those responsible for implementing change, and provide information about how to adopt or comply with the change.

Sustainability

This stage involves ensuring that the strategies for addressing the initial problem are sustained over time. It is important to recognize that change can take a long time, and that there may be interim measures to show that change is taking shape. Academic partners contributions to evaluation efforts can help ensure that systems change efforts are tracked and monitored over time to demonstrate continue success or areas for potential improvement.

Sustain Change—Communities working to sustain change often face challenges including shifts in leadership, budgets, and resources. Partnerships may continue to contribute at this stage by working with decision makers to ensure that the change is adequately funded, enforced and monitored over time. Academic partners can support these efforts by informing, tracking, or evaluating implementation. Sustaining change can also require continuing to raise awareness about the issue and about the impact the change has on the community.

Evaluate, Amend, Terminate, Replace—Ideally, a sustainable change includes a review process that allows for adaptation based on lessons learned. Sometimes, this may

result in identification of new problems or opportunities for improvement, which may start the systems change cycle again. Within such a process, academic partners can assist in evaluating the impact of the change on the community. Understanding and communicating potential impacts of the change can help inform decisions related to sustaining, terminating, or amending the change.

Disseminate and Replicate Change—Once evaluation efforts have collected information about how to structure and implement a specific solution that partnerships may play an important role in disseminating this information to other communities. These communities can adapt the change to their needs and can replicate those aspects that will address their community needs. While community, government, or interest groups may be most effective in dissemination through their own networks, academic partners may have unique abilities and academic credibility that allows them to conduct comparative analyses, present at national conferences, publish in journals, or report to government agencies.

Using the Framework to Analyze Academic Roles in Community Partnerships

As noted above, this framework can be used to identify potential roles for academic partners at different stages in the community change process, to identify what has been done, and what may be productive new approaches. The framework can also be used as an evaluation tool, to help understand and assess the contributions of academic partners. To facilitate the use of the framework as evaluation tool, we used information from the CDC on developing process evaluation questions to identify questions that partners can ask to understand and document the academic role in each stage of the cycle (see Table 1).[19] Partners may find these questions useful at the beginning stages of a partnership as members of the partnership are trying to understand their role in the collaboration.

To demonstrate the framework's utility for clarifying the role of academics partners in the complex cycle of systems change, we applied it retrospectively to three longstanding academic-community partnerships supported by COECs at the University of Rochester, Columbia University, and the University of North Carolina at Chapel Hill. The case studies present the perspectives of two academic partners and one community partner with a long history of partnering with an academic institution. For each case, we describe the role of the partner, and how the partnership worked through the various components of the framework to address a specific environmental health problem. In the subsequent discussion, we highlight challenges and opportunities for using the framework to evaluate these efforts.

The three case studies represent a range of different issue areas, community settings, decision-making arenas, and types of academic-community partnerships related to environmental health. First, we examine the role the University of Rochester COEC played in supporting lead prevention efforts in Rochester, NY. The COEC at the University of North Carolina at Chapel Hill provides a case study that describes efforts to improve maternal and child environmental health throughout the state. Finally, we explore Columbia University COEC's partnership with West Harlem for Environmental Action (WE ACT) addressing a variety of environmental health concerns in New York City. In each case, we highlight the

role of social science and social scientists in brining knowledge into the process of systems change. We conclude by discussing how the application of the framework to these cases contributes to our understanding, evaluation, and future planning for academic-community partnerships in EH.

Local Lead Policy in Rochester, NY

Background

The University of Rochester COEC has focused on local lead (Pb) poisoning prevention efforts since 2000. At that time, a community coalition was forming to fight childhood lead poisoning, which was occurring in certain neighborhoods at more than 10 times the national rate. The COEC's contributions to the community effort to address lead poisoning evolved naturally from the University's decades of research on lead and health. This research included the Rochester Lead in Dust study, which conclusively linked children's blood lead levels to concentrations of lead dust in their homes and also showed that lead has an impact on children's development at lower levels than had previously been considered.[20,21] The COEC's participation in the Rochester Coalition to Prevent Lead Poisoning (CPLP) evolved over time, with different contributions at various stages of the process.[22] This community's efforts to combat lead poisoning at the local level have been reported elsewhere.[23,24] After briefly summarizing these early stages, we focus below on academic-community interactions in the sustainability phase of the process.

Social science concepts, approaches, and methods were foundations of the COEC's contributions, including comparative policy analysis, economic projections, survey design, interviewing, and informing community-appropriate communications strategies. The COEC accessed social science expertise in several ways. The COEC director was a doctorally trained social scientist with expertise in policy analysis and mixed-method evaluation. COEC staff had professional training and experience in science education, communications, survey design and administration, and evaluation. In addition, the COEC sought additional social science expertise through faculty and staff in the Department of Public Health Sciences for focus group analysis, survey research, and qualitative methods.

Initiation

Early in the CPLP's efforts, the COEC played an important role in helping to define the issue as "a health problem with a housing solution." Previously, childhood lead poisoning had been viewed as primarily the jurisdiction of the health department. By sharing the Lead in Dust study and other research through short summaries, media reports, and community presentations, the COEC helped to show that addressing lead as a housing problem was essential. This laid the foundation for bringing housing agencies, community groups, and inspectors to the table to help search for solutions.

Developing Solutions

At this stage, the COEC role included conducting analyses and interpreting existing data to inform local solutions. In additional to incorporating research from environmental health studies, the COEC reviewed applied economic literature for information on societal costs

related to lead poisoning. For example, COEC staff integrated findings from national studies on the medical, educational, criminal justice, and economic costs of lead poisoning and calculated how these costs accrued in the Rochester community. Results of this analysis helped the Coalition gain the support of new partners, especially those concerned about poor educational attainment in Rochester city schools, local Medicaid costs, and juvenile crime rates.

Systems change

The COEC supported development of local policy solutions in numerous ways. At the time this issue was being debated, there were few relevant models for local lead laws, and none in New York outside New York City. The COEC reached out to researchers, state and federal agencies, and national non-governmental groups to identify potential tools, strategies, and policy options. This comparative policy analysis informed the Coalition's policy approach, design of a model lead law, and projections of its impacts. For example, the COEC worked with the National Center for Healthy Housing to analyze unpublished studies that showed that visual-only inspections for lead were not as effective as dust wipes for identifying lead hazards, then translated these findings in short summaries appropriate for community audiences and policy makers.[23] The COEC applied these findings to local inspection projections to predict both the costs and benefits (identifying additional hazards) of using dust wipes. The COEC also identified options to focus inspections in high-risk areas to further improve efficiency. These timely analyses helped inform a cost-effective local lead ordinance that was unanimously adopted by the Rochester City Council in December 2005.

Sustainability

Throughout this process, the COEC emphasized the value of collecting, sharing, and analyzing data that would allow stakeholders to evaluate and, if needed, revise the ordinance in the future. As a result of these research findings, the lead legislation included a requirement that the city inspections department publicly report the numbers inspections results annually. Since 2006, the COEC has worked to evaluate the effectiveness of the law. The COEC tapped academic statisticians to develop analytic approaches that compensated for some of the gaps in data collected through inspections. The COEC also combined health department data on elevated blood lead levels and city data on inspections to determine whether the law was making rental housing safer relative to unregulated owner-occupied housing. These analyses were discussed by the CPLP's Government Relations committee and used to support collaboration between the City inspectors and County health department. The COEC also helped obtain grant funding to conduct random surveys with landlords, interviews, and focus groups at the beginning of the collaboration and three years into implementation of the legislation. The results of this multidisciplinary evaluation helped CPLP refute claims that the law was ineffective, unnecessary, and excessively costly. Based in part on these evaluation efforts, the law has been amended several times to more efficiently target resources and address gaps in implementation. COEC staff continue to serve on CPLP committees and boards, contribute to media/public messaging, and provide technical assistance.

Dissemination

Another aspect of the COEC's contribution was dissemination of lessons learned from the process, structure, and evaluation of the lead law. COEC staff's expertise in communications contributed to these efforts. The COEC has worked with CPLP to respond to other communities interested in replicating Rochester's lead law. The COEC also received funding to partner with a local public interest lawyer to research, compare, and evaluate local lead laws in eight cities across the U.S. Significantly, Rochester was both the only city in this qualitative comparative evaluation study in which university partners had had an active role throughout the process and a sustainable process for ongoing evaluation. Lessons learned from this comparative case analysis have been shared through professional and academic publications and presentations.[25]

Evaluating Impacts

CPLP took great pride in having promoted a "science-based" approach to addressing this problem, and social science skills, tools, and approaches were a critical component for integrating science into the policy process. This example showcases how the function of translating knowledge can be important at all stages of systems change, but that the type of information and how it is translated may change over time. The COEC's ability to respond rapidly and flexibly to urgent information needs, to tap local and national clinical, housing, and medical researchers for credible expert input, and to leverage additional financial resources enabled them to respond to these shifting needs over time. The COEC's multidisciplinary social science approaches contributed to science-based problem solving throughout the evolving community context.

Promoting Guidelines for Maternal Environmental Health in North Carolina

Background

From 2006–2013, the UNC-Chapel Hill COEC coordinated the outreach efforts of the statewide Childhood Lead Poisoning Prevention Program (NCCLPPP), under contract first to the North Carolina Department of Environment and Natural Resources (NCDENR) and later to the North Carolina Department of Health and Human Services (NCDHHS). (In 2011, NCCLPPP moved within NCDHHS.) Recently, the COEC partnered with the Women's Health Branch (WHB) in NCDHHS to assist the agency in implementing an optional federal policy focused on addressing lead exposure during pregnancy.[26] Other key stakeholders in this initiative included the state's Women, Infants and Children Program, the State Laboratory of Public Health, and local health departments in Craven, Guilford and Hoke Counties. This example focuses primarily on initiation, developing solutions and implementing change, because key elements of sustainability are still being defined.

Throughout the process, the COEC leveraged skills, training, and experience in social science approaches including survey design, administration, and analysis, educational practices (including materials design, communication, and evaluation) for training public health professionals, policy analysis, and evaluation research. The COEC director had training in environmental policy and science education and expertise in community education and evaluation. Additional COEC staff had professional training and experience in

education, communications and evaluation. In addition to this "in-house" social science expertise, the COEC worked closely with the UNC Howard W. Odum Institute for Research in Social Science to design surveys and analyze data.

Initiation

As early as 2008, local health departments in North Carolina expressed concerns about pregnant women and lead exposure, but the NCCLPPP did not have the resources to provide guidance for testing and follow-up with this population. The COEC and NCCLPP developed and conducted informal email poll that solicited information on how local health departments were responding to these concerns. The poll yielded mixed results: some health departments were doing nothing, some were sending blood samples to private laboratories, and others were sending them to the State Lab when they were associated with a child elevated blood lead (EBL) case. Although no local health department was systematically assessing risk of lead exposure among pregnant women, all who participated in the poll suspected it was a problem.

In 2010, the CDC issued guidelines for addressing lead exposure during pregnancy, but at the same time emphasized that implementation was optional; prior to these guidelines, no such protocol existed. Stakeholders in NC wanted to see the CDC guidelines effectively implemented to meet the need for risk assessment, education, testing and follow-up.

Working with the Women's Health Branch (WHB), COEC staff tested a risk questionnaire and associated educational materials in Craven and Guilford Counties in February 2011. Collectively, 83 women took the risk questionnaire. Eighteen women identified at least one risk factor, which would have prompted a blood sample under the CDC 2010 guidelines[26]; however, no blood samples were taken as part of the pilot study. In addition, educational materials were rated by participants as easy to use and understandable.

Developing Solutions

Following the pilot test, WHB and COEC staff jointly convened a Lead and Pregnancy Work Group—comprised of key stakeholders from community-based organizations, local health departments, and state health and environmental agencies—which determined that the best course of action would be to incorporate required lead exposure risk assessments and education in the 2011–12 Maternal Health Agreement Addenda. Subsequently, the WHB in NCDHHS took the lead in making changes to the Agreement Addenda. Maternal Health Nurse Consultants working for WHB were identified as the first point of contact for local health departments needing assistance with implementation. The WHB leadership and UNC COEC staff then conducted outreach on the CDC 2010 guidelines, raising awareness among maternal health professionals and environmental public health professionals.

Systems change

Working together, WHB and COEC staff members created an implementation plan with stakeholder input and refined the risk assessment tools and educational materials. As a result of this plan, WHB and COEC staff trained 250 nurses and environmental health specialists

in the guidelines and use of the educational tools. Subsequently, local health departments began implementing the guidelines.

Since 2012, risk assessment and education have been required through Maternal Health Agreement Addenda between NCDHHS and local health departments. These Addenda guide clinical and support services through the best practices of care as well as the legal requirements of staffing and quality and quantity of services. They are static documents, effective for one year, meaning each year the decision to include the lead and pregnancy requirements will be considered anew.

Sustainability

With leadership from the health department in Hoke County, WHB and COEC staff members, created a local policy template to enable health departments to adopt risk assessment and education as local rules, making them more permanent than the agreement addenda. Future activities that would promote sustainable change could include: incorporating risk assessment, education and testing into state law, which would avoid the need for piecemeal efforts in each county; finding funds for testing and follow-up for undocumented or uninsured women; and finding resources to enable the State Lab to accept and process blood samples from pregnant women.

Dissemination

In addition to training public health professionals in use of the tools, COEC staff shared this approach to protecting pregnant women and their unborn children with health departments across North Carolina and also nationally, through presentations at the American Public Health Association annual meeting, the National Healthy Homes Conference, and the Birth Matters Annual Conference. Communications expertise was crucial in this phase of the effort, to design clear and convincing materials and to develop trainings and presentations to ensure that this approach can easily be replicated.

Evaluating Impacts

The COEC used a variety of qualitative measures to assess the impact of this effort. The COEC solicited information from Work Group members on the effectiveness of the partnerships, their desire to maintain them, improvements needed, and the ability to jointly implement the plan as outlined. Over time, the COEC plans to track whether these provisions remain in state Agreement Addenda and whether (and how many) health departments adopt local rules. Quantitative measures will include the number of health professionals trained and measures of knowledge gained from training; they could also include the number of pregnant women who are tested. The COEC continues to support NCDHHS' statewide lead poisoning prevention outreach. Recently, COEC staff assisted NCDHHS in revising the pregnancy screening questionnaire and focused its educational efforts on informing medical providers about the CDC guidelines.

Addressing Garbage, Pests and Pesticides in New York, NY

Background

The structure of the Columbia University COEC differs from those at the University of Rochester and the University of North Carolina-Chapel Hill. WE ACT has been the primary community partner for Columbia University's NIEHS Center for Environmental Health in Northern Manhattan (Columbia University) COEC for more than 20 years. They are integrated into the COEC as full partners. WE ACT staff salaries are partially paid by the COEC. WE ACT staff co-direct the COEC, co-teach courses at the University, and have ready access to the technical expertise of Columbia University researchers. WE ACT and Columbia's COEC collaborate closely to implement programs and provide translation of Columbia University researchers' findings. This case illustrates the fact that individual staff may be employed by academic or non-academic partners yet play similar roles in the translation of science to support systems change.

These staff utilized a wide range of social science approaches to advance community problem-solving, including survey development and implementation, communication and education, PhotoVoice, and evaluation. The Columbia co-director was a faculty member with a doctorate in Sociology. WE ACT staff had extensive training and experience in survey design, focus groups, and interviewing through prior COEC projects and research partnerships. Additionally, the WE ACT and Columbia co-directors had acquired expertise in policy processes through prior campaigns to translate research findings into policy and practice change.

This case study describes implementation of a demonstration project to improve community environmental health in apartment buildings in four Northern Manhattan neighborhoods (Central Harlem, East Harlem, West Harlem and Washington Heights/Inwood). Densely populated and poorly maintained housing in these neighborhoods provide abundant sources of food waste and water, creating a perfect haven for pests like rats, mice, and cockroaches to flourish. The demonstration project consisted of several activities to address these issues in multiple venues. This case study focuses on the initiation, developing solutions, implementing change and sustainability. Funding for the project was obtained by WEACT, with COEC participation and support, from the United States Environmental Protection Agency's Community Action for a Renewed Environment (CARE) program. With the award, WEACT initiated a partnership of more than 50 organizations in Northern Manhattan that had a stake in improving community environmental health. Members included tenant and housing groups, environmental organizations, city agencies, Columbia's NIEHS center and other universities. The Northern Manhattan Care Collaborative (CARE) undertook the task of assessing community environmental health concerns and developing initiatives to address them.

Initiation

The first stage of the demonstration project was to conduct a community-based environmental health assessment using funding provided by the United States Environmental Protection Agency's Community Action for a Renewed Environment (CARE) program that

involved over 500 Northern Manhattan residents. Experts from the COEC developed the survey and implementation plan, and interns funded through the CARE program and the COEC assisted WEACT staff members with implementation of the survey. The survey results identified garbage, pests and pesticide issues as a primary concern for residents of Northern Manhattan.

Developing Solutions

Once the issues were identified, the CARE partnership worked collaboratively to identify innovative solutions to address the garbage, pests and pesticide issues, including local businesses, community residents, local organizations, COEC staff, and other Columbia University researchers. Findings from researchers were used to educate community residents on risks related to environmental health issues identified through the community-based environmental health assessment. In addition to developing the survey assessment tool, researchers participated in collaborative meetings, supported the development of environmental health research reports, helped design the project evaluation, and provided funding for interns to implement programs identified as part of the collaborative process. The group decided to focus on raising awareness and building political will to support residents to use integrated pest management strategies by establishing the Green Apartment Building project.

Systems change and Sustainability

As part of the process to engage stakeholders who previously had not been involved in the demonstration project, WE ACT and students from Columbia University conducted a series of PhotoVoice projects that captured the views of community members, local business owners and building maintenance staff. PhotoVoice is a participatory process that engages marginalized populations in storytelling by taking and discussing photographic images of their community. The use of this participatory process allowed partners from local businesses, building maintenance staff, and residents to tell their side of the garbage story in a space that allowed for constructive criticism and development of solutions. Through this process the partners helped identify options for solving garbage, pests and pesticide problems in residential circumstances and were able to identify champions and leaders who could help raise awareness of the problem and potential solutions. WEACT coordinated the trainings for more than 200 local residents, 12 building maintenance staff, and 8 businesses in the four selected neighborhoods on managing garbage, pests and pesticides. The training was delivered by skilled facilitators from the 50+ organizations that worked together to complete the community-based environmental health assessment. These skilled facilitators included individuals from non-profit organizations, local government agencies that specialize in sustainability for communities of color and low income. The trainings covered mold, water efficiency, recycling, composting and integrated pest management. Finally, WEACT, Columbia University interns and COEC staff trained residents, local businesses and building maintenance staff to recognize problem areas, implement solutions and understand the impact of managing garbage, pests and pesticides.

Dissemination

WE ACT and the COEC continue to work together to identify ways to disseminate information about the Northern Manhattan CARE Collaborative's Green Apartment Building and Green Business projects as well as other garbage, pests and pesticide issues. WE ACT includes these collaborative models in their on-going programs and presents them as best practices in publications and presentations.[27]

Evaluating Impacts

According to the results from the pre and post-tests, administered at the beginning and end of each training, participants had a 20% increase in knowledge about causes and solutions for garbage, pest and pesticide issues. In addition, using a pest-management assessment tool developed by the NYC Department of Health, Columbia University interns and WE ACT staff found that buildings kept up by maintenance staff who participated in the trainings remained in good to very good condition. These assessments were done approximately 6 months after the completion of the trainings for building maintenance professionals. In some cases, informal interviews with business owners revealed increased cleanliness in front of stores, awareness of policies related to waste, and opportunities for people to place garbage new cans in the business corridor covered that were placed by the Department of Sanitation, a CARE partner. As a result of this work in conjunction with the broader community-based environmental health assessment, a "Northern Manhattan Environmental Health Report Card" was developed and distributed to over 1000 people in Northern Manhattan. WE ACT staff wrote the report cards with the support of collaborative partners and COEC researchers and Columbia University interns.

Currently activities related to the Green Apartment Building project have concluded, however the partnership between the COEC and WE ACT continues through the WE ACT for Healthy Homes campaign and an expansion of the CARE work into schools.

Discussion

These three case studies differ in terms of type of environmental health issue, range of COECs' roles, and scope of systems change. Nonetheless, in each case the framework helped to identify, describe and evaluate the academic-community partnerships' contributions at different stages in the cycle of systems change. Table 2 highlights some of the COECs' contributions at different stages in the three cases. Problem identification and framing was an interactive process between COECs and community partners. In all three cases, an early-stage contribution by the COEC was to help communities understand what had been done in other communities with similar problems and which strategies had worked best elsewhere. Each COEC also played a role in translating or adapting these best practices to the local situation, based on local data and input from partners. The COECs leveraged data from other communities and worked collaboratively with partners to collect local data and communicate findings. This process often involved comparative policy analysis, interviews, and communication skills. Each COEC also played a role in translating or adapting these best practices to the local situation, based on local data and input from partners. In each case, the academic partner leveraged data from many sources, tapped

multiple social science disciplines for expertise, and worked collaboratively with the communities to collect local data and to provide information to affected community audiences.

The COECs worked with communities to evaluate the impact of the change on the community and to share this progress with other stakeholders using social science approaches. Social science frameworks informed evaluation efforts in each case. The COECs designed and implemented diverse evaluation approaches, using data from quantitative, qualitative or formative evaluations to inform possible solutions. For example, each COEC conducted qualitative formative evaluation by interviewing partners. In addition, the COECs played a key role in sustaining the collection, analysis, and communication of information about the impacts of the systems change. Each COEC worked with communities to evaluate the impact of their partnership and to share this progress with other stakeholders, although different approaches were used in each situation.

Conclusions

Academics can play multiple roles to promote science-based systems change through community partnerships. In the three examples presented here, the COECs helped community groups frame issues, identify information needs, conduct literature reviews, understand and apply the experiences of other communities to their context, develop and conduct surveys, present at national conferences, and publish in academic journals, among other activities. Social science approaches, tools, and concepts served as the foundation for many of these translational functions. The COECs were able to access multiple social science disciplines at different times through the skills, training, and experience of COEC staff. In many cases, they also leveraged the expertise of social science faculty in their institutions. This range of contributions is broader and more diverse than that typically envisioned in project-specific funding for partnerships.

Although each of the COEC efforts described above obtained additional funding or resources for specific activities, their core resource base and mandate from the NIEHS to respond to community needs allowed them to flexibly respond in different ways as the process of systems change unfolded. In other words, the COECs' sustained and flexible core support helped them sustain and adapt their efforts over time. The successful long-term partnerships, adaptability, and impacts of these COECs suggest that funders, agencies, and academic institutions should expand support for such sustained, broad, and flexible involvement by academic partners. These partnerships' would not likely have accomplished as much were they supported solely by project-specific grant funding. The COECs were able to adapt and diversify their roles largely because of their core funding and mandate to promote multidirectional knowledge transfer in response to evolving community needs.

Applying our framework to these three COEC cases makes it clear that the social sciences are a fundamental part of this translational process. First, social scientists with expertise in processes of social change can use the framework to help partners better understand and influence systems change processes. Second, the framework highlights how leveraging approaches from multiple social science disciplines can help academic-community

collaborations contribute to solving critical problems of environmental health through systems change.

This application of the framework to the COECs' experiences also provides lessons for shorter-term and more focused partnerships. When flexible, sustained core funding is not available, academics can use the framework to characterize the community context to guide them in making a meaningful impact with their limited resources. It may also be useful in grant applications to predict and justify likely future needs for academic contributions.

The framework provides a useful tool for describing the evolution of academic-community partnerships and clarifying the varied roles that academic partners can play throughout the process. It clarifies the many stages in which social science can make key contributions to environmental public health problem-solving. Future research is needed to explore how the framework can be used in different types of partnerships, its utility for planning multidisciplinary partnerships to address complex problems, and its effectiveness as an evaluation tool for systems change efforts.

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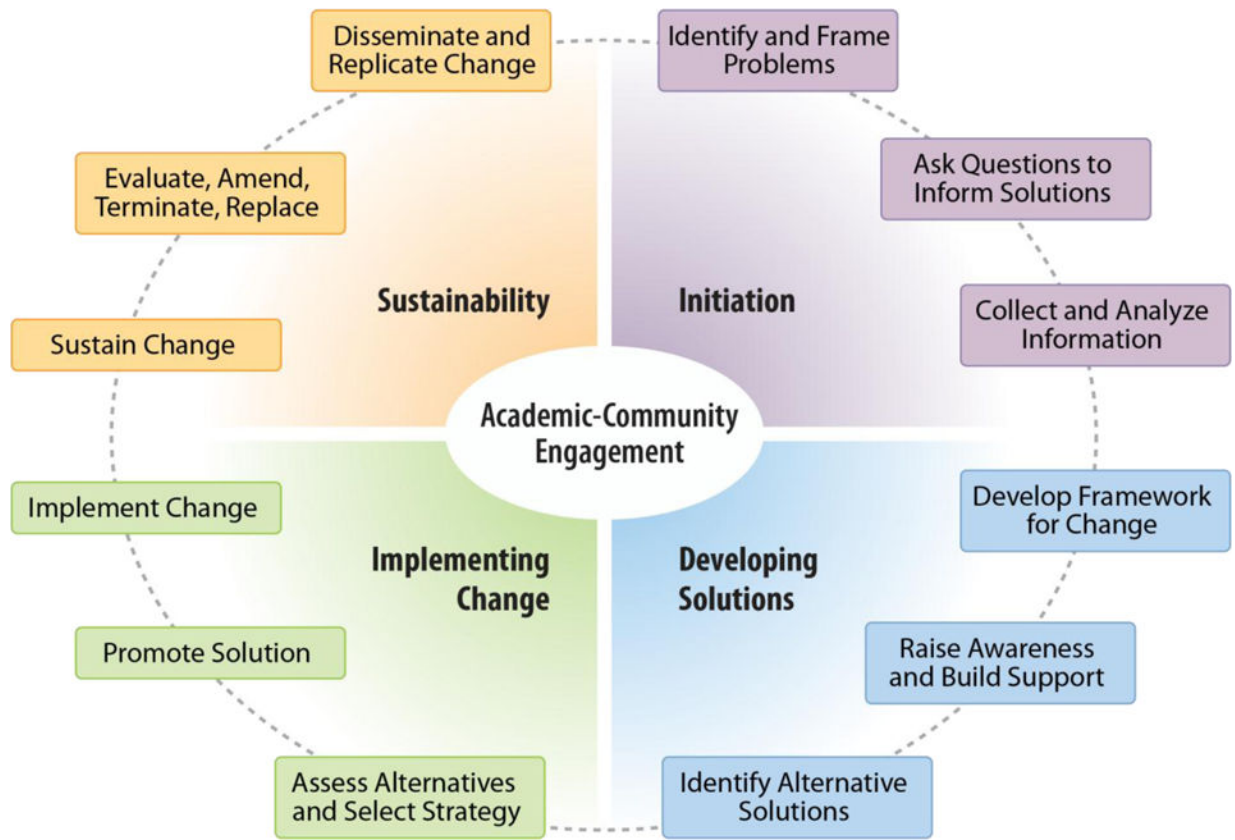
Figure 1.
A Framework for Academic Partners Supporting Community Change

Table 1

Questions to assess academic role in partnerships for community change

Initiation	Identify and Frame Problems	What role did the academic partner play in identifying and framing the problem? How did the academic partner help bring scientific evidence to bear on the community's understanding of the problem?
	Ask Questions that Inform Solutions	How did academic partner help identify key information needs and critical uncertainties?
	Collect and Analyze Information	How did the academic partner contribute to data collection and analysis?
Developing Solutions	Develop Framework for Change	How did the academic partner contribute to developing or selecting an approach, strategy, or policy recommendation?
	Raise Awareness and Build Support	How did the academic partner contribute to raising awareness? What role did the academic partner play in identifying key messages to communicate? How did the academic partner contribute to building coalitions, public will?
	Identify Alternate Solutions	How did the academic partner help the community explore multiple solutions to the problem?
Implementing Change	Assess Alternatives and Select Strategy	What role did the academic partner play in identifying a solution?
	Promote Solution	What role did the academic partner play in connecting decision makers and the community? What information was provided to decision makers, and what was the academic partner's role in this process?
	Implement Change	How did the academic partner support implementation, compliance or enforcement efforts?
Sustainability	Sustain Change	How did the academic partner contribute to sustaining change?
	Evaluate, Amend, Terminate, Replace	How did the academic partner contribute to evaluation efforts? What role did the academic partner play in evaluation and adaptation efforts?
	Disseminate and Replicate Change	What role did the academic partner play in disseminating lessons learned to other communities? How did academic partner resources (academic access, funding, credibility) contribute to dissemination?

Table 2

Highlighting Academic Partner Roles in and Contributions to Community Change

Framework Component	University of Rochester	University of North Carolina-Chapel Hill	Columbia University & WEACT
Identify and Frame Problems	Leveraged research and national experience to frame lead as a housing problem	Local health departments identified concerns about pregnant women and lead exposure in the same time frame as CDC guidelines were being developed	Participated in and supported issue identification process driven by residents of Northern Manhattan, Columbia University researchers and WE ACT.
Ask Questions to Inform Solutions	Compiled "Frequently Asked Questions" and summaries of medical literature	State agency conducted informal survey of local health depts.; COEC assisted in developing and disseminating survey	Compiled research from Columbia University and other publicly available sources and translated it into plain language through summaries and environmental health stories.
Collect and Analyze Information	Projected local costs of lead poisoning; estimated prevalence of and cost to assess and repair lead hazards;	COEC, Women's Health Branch and two local health depts. developed and piloted risk assessment tool and educational materials	Developed, implemented and analyzed survey data through the support of interns, Columbia University researchers and WE ACT staff. Supported tracking of health education intervention.
Develop Framework for Change	Identified models in other states and sought input from national nonprofits	Convened statewide workgroup	Built community partners' capacity to evaluate, monitor, and gather qualitative input.
Raise Awareness and Build Support	Contributed to media releases, arranged for expert speakers, and fact-checked CPLP materials	Conducted outreach on CDC lead and pregnancy guidelines	Contributed and provided feedback on outreach materials, press releases and environmental health report card.
Identify Alternative Solutions	COEC staff participated in Government Relations and Science committees of CPLP, which drafted law	COEC facilitated workgroup discussions of ways to implement CDC guidelines	Provided research support on other models in urban environments that address similar issues.
Assess Alternatives and Select Solution	Summarized unpublished evaluation data from other states' lead programs; analyzed implementation costs of policy options	Workgroup suggested changes to local health dept. Maternal Health Agreement Addenda	Developed and supported monitoring and evaluation tools that told the story of the impact of the projects.
Promote Solution	Solicited letters of support, policy memos, and talks by national and local experts	COEC and WHB jointly trained 250 local health dept. staff in CDC guidelines and use of risk assessment tools	Provided statistics, information and support for grant writing to sustain partnership.
Implement Change	Contributed to educational materials for property owners and tenants; reviewed annual implementation reports	WHB took the lead in incorporating changes to Maternal Health Agreement Addenda	Met with local businesses, managers and other stakeholder. Participated in all portions of process from planning to evaluation.
Sustain Change	Contributed to efforts to secure continued funding by presenting evaluation findings	Need continued training of local health dept. staff to encourage adherence to voluntary guidelines	Continued support of staff through capacity development and funding.

Framework Component	University of Rochester	University of North Carolina-Chapel Hill	Columbia University & WEACT
Evaluate, Amend, Terminate, Replace	Analyzed, presented, and published evaluation data; analyzed potential impact of policy amendments	Creation of local policy templates by individual counties, providing a longer-term commitment than annual Agreement Addenda	Analyzed, presented and disseminated data. Encouraged continued participation of Columbia University staff and researchers.
Disseminate and Replicate Change	Summarized CPLP experience and lead law in national conferences, publications, and consultation with other cities	Ongoing efforts to inform local health detartments of the value of incorporating guidelines into Agreement Addenda or developing local rules	Spoke at press events, continued to support through funding and identified key ways to turn results into other models. Participated in development of other materials to talk about the work.