

7 Local Environmental Health Initiatives: The Impacts of Collaboration

Each of the local environmental health initiatives described in this book used different resources, structures, and approaches to change diverse systems that managed environmental and public health in its community. This chapter uses the Local Environmental Health Initiative Framework to analyze how these collaborative efforts promoted environmental health equity. This framework emphasizes the process of issue framing and problem definition, the resources for collaboration (human, knowledge, and financial), the initiatives' structures and decision-making processes, and the impacts of the collaborative efforts. These impacts include outputs (products), social outcomes (capacity and relationships), and impacts on policies, systems, and environments (PSE).

Issue Framing and Problem Definition

Each local initiative redefined a longstanding health issue as a problem of environmental health inequity, emphasizing that lower-income communities and people of color were disproportionately affected. This reframing introduced new stakeholders into existing decision-making arenas. These initiatives also identified gaps in existing environmental management systems that contributed to the problem. These new problem definitions shaped the scope, scale, and approach of the initiatives.

In many ways, the portrayal of lead as a “health issue with a housing solution” was a straightforward reframing of a problem by the Rochester Coalition to Prevent Lead Poisoning (CPLP). However, there were actually several elements of this problem definition. First, lead poisoning was highlighted by an elementary school principal, Ralph Spezio, as an issue

of children's overall well-being, particularly with respect to their success in school. Thus, the initiative's definition of "health" was very broad. Second, CPLP emphasized how lead's impacts on children contributed to the city's social problems. The coalition presented a long-term vision for a lead-free city with better-educated citizens, less criminality, higher earning potential, and fewer long-term medical issues—all problems that were central concerns to the larger community. Third, CPLP advocated that changing local lead policy was an "achievable win" that would give the community hope and confidence to make progress in other issues. Solving the lead problem, they argued, would yield improvements in community morale. Identifying housing—particularly low-income rental housing—as the driver of childhood lead poisoning put the focus squarely on the city rental housing inspection process, but it also necessitated public education, landlord training, county health department funding, and coordination with public housing programs. CPLP acknowledged the economic challenges of Rochester's housing market and accordingly emphasized the potential for cost-effective solutions. Because it promoted less-costly lead hazard controls rather than permanent lead removal, CPLP stressed the need to sustain efforts over time.

The effort in Duluth to connect decisions about the built environment to health equity required framing a complex problem in a clear and consistent way. Decisions affecting the built environment occur in many sectors of local government, including transportation, land use planning, economic development, and parks and recreation. Private-sector development decisions, multiple state and federal agencies, community preferences, and economic forces also shape land use. Healthy Duluth leveraged the emerging national consensus that improving food access and active transportation opportunities can advance health equity. The partners reframed Duluth's vision for sustainable growth around a green economy as an opportunity to create healthy built environments for all residents. Healthy Duluth focused on low-income neighborhoods but recognized that long-term sustainability would depend on a citywide commitment to "Health in All Policies." This problem definition required engaging multiple policy actors and targets for action.

THE Impact Project arose from community concerns about the health impacts associated with shipping, railyards, trucking, and warehousing around the ports of Southern California. The project argued that the

multiple existing policies regulating goods movement activities did not sufficiently protect the health of people living closest to intermodal transportation hubs from cumulative harms. This problem definition encompassed several related insights. First, it broadened the consideration of health concerns from a focus on air quality alone to include multiple impacts (e.g., noise, traffic, and light pollution) on community health. Second, it highlighted how existing regulatory systems, with their focus on regional environmental quality, did not effectively protect fenceline communities from concentrated hazards close to highways and transportation facilities. Third, it emphasized that the heaviest burdens fell on children, low-income residents, and communities of color. Finally, it framed goods movement as a regional phenomenon in which decisions made in one locality were likely to have unanticipated, unassessed, and unregulated effects on other communities in the region. THE Impact Project encompassed the largest scale and scope of the cases. Because it implied such broad targets for action, the project's strategy was to help affected communities better advocate for their own health protection, engage in multiple decision-making arenas, call attention to the regional environmental justice implications of decisions on specific local projects, and shape how community health concerns are integrated into future decision processes.

All three initiatives reframed long-standing environmental issues in terms of health equity. Their diverse problem definitions inspired new approaches to old issues. The way each initiative reframed the problem had important implications for who it involved, what resources it could access, how it was structured, and what it accomplished.

Leveraging Resources for Collaboration

By definition, these collaborative initiatives operated outside the scope of existing programs, agencies, and organizations. This situation required marshaling new resources and redirecting existing resources to support their efforts. It is typically more difficult to obtain support for convening, strategic planning, and analysis than for programs, products, and activities. Therefore, resources are often a limiting factor for collaboration. As noted in chapter 3, collaborative resources may be categorized as “human,” “knowledge,” and “financial,” although there is significant overlap. Table 7.1 recaps the types of resources leveraged by each initiative.

Table 7.1

Summary of resources for collaboration

	Coalition to Prevent Lead Poisoning	Healthy Duluth	THE Impact Project
Human	1–3 paid CPLP staff; 15–70 volunteer committee members (health care, education, community, legal, city/county government, housing agencies).	1–3 staff; health impact assessment (HIA) consultants; staff from local health department, city, community group partners.	Project partners (staff and members of 2 academic and 4 community groups) shared convening tasks (organizing meetings, notes, etc.); USC staff administered grants.
Knowledge	Expertise, data access, analytic capacity of committee members; experience of community partners; public relations partners' skills; federal agencies and national lead groups' input.	Health department and city data, maps, and analyses; transportation planners' technical knowledge; Bridges to Health survey; community surveys.	Academics' expertise in environmental health research, policy analysis, and communications; community partners' experience with organizing and understanding of community concerns.
Financial	Grants from insurers, local government, United Way, private foundations, donation of services by public relations partners.	State health department funding (SHIP); HIA grants; brown-field planning grants; private foundation grants.	Private foundation grants (Kresge, California Endowment); NIEHS funding for USC core functions supported staff time.

Human Resources

These local environmental health initiatives involved diverse stakeholders who brought skills and perspectives needed to address complex problems in new ways. However, collaborative efforts take energy, time, and resources, and so many potential participants—particularly those engaged in programs targeted by the initiative for change—may have strong disincentives to participate. It can therefore be challenging to sustain involvement by all key stakeholders. As summarized in table 7.2, the three initiatives accessed and leveraged human resources from different constellations of community, academic, government, and private-sector organizations to support their respective efforts.

Table 7.2

Contributions of human resources from different sectors

	Coalition to Prevent Lead Poisoning	Healthy Duluth	THE Impact Project
Community	Series of community agencies hosted CPLP; community groups served on committees, educated and organized residents to support lead law.	Community organization (Zeitgeist Center) hosted Health Duluth Area Coalition; community groups/service agencies served on campaigns and participated in projects to engage residents.	4 local community groups were key partners; they educated, organized, and involved their members and residents of impacted communities in policy processes.
Government	Local, state, and national agencies participated as (non-decision-making) members of CPLP committees.	City of Duluth led 2 HIAs and brown-field plans; local health department and transportation agency staff participated in HDAC.	No direct participation in THE Impact Project structure.
Academia	UR environmental health sciences researchers, outreach program, and clinicians served on committees, reviewed materials, conducted analyses, gave community talks.	Limited involvement: UMD faculty wrote food access report; provided interns.	USC environmental health sciences researchers provided technical knowledge, testimony, review; USC hosted project; Occidental College partners provided environmental policy expertise.
Private sector	Health care professionals, risk assessors, lead trainers joined CPLP. Early involvement by property owners declined over time.	Health care sector provided data and staff analysis capacity.	No direct participation in THE Impact Project structure.

Coalition to Prevent Lead Poisoning The human resources mobilized by the Rochester Coalition to Prevent Lead Poisoning were primarily the individuals who contributed time to the working committees. At the height of activities, this included around seventy people. These committees involved diverse organizations that saw the goal of reducing childhood lead poisoning as closely aligned with their missions. Coalition committee members included staff from a public interest law firm, the local community action agency, the county health department, various city departments, neighborhood group leaders, and many others. The health sector—including researchers, clinicians, public health professionals, and health insurers—was well represented, adding to the credibility of the organization. Most committee members attended meetings as part of their jobs, but several volunteers participated as interested community members.

There was limited involvement from the private sector whose business was most likely to be affected by CPLP's efforts: landlords and rental property managers. Several property owners and real estate professionals participated early in CPLP's history but dropped off over time. However, a number of individuals involved in lead hazard control work, including risk assessors and trainers, remained involved for many years. In addition to the time contributed by committee members, CPLP had staff members who supported the work of the committees, developed public communications, and conducted community outreach.

Healthy Duluth Local government agencies contributed significant, sustained staff resources to the efforts to advance health equity in Duluth's built environment. City staff involvement included the parks department staff who initiated the original Fit City designation, city planners who participated in the health impact assessments (HIAs), and the economic development officials who integrated health equity into brownfield redevelopment projects. Regional and county health department staff helped launch the Pioneering Healthy Communities project, supported active living and food access projects, and participated in the HIAs. Transportation planning agency employees engaged in active and public transportation projects. Community groups contributed staff time to attend meetings, hosted AmeriCorps volunteers, and dedicated existing resources to related projects. Staff at health care organizations also contributed time to collaborative efforts. Academic institutions were not extensively involved, with

the exception of University of Minnesota-Duluth (UMD) providing several applied analyses and a regular stream of student interns. Many but not all of these stakeholders participated in the Healthy Duluth Area Coalition, which also hired staff to support convening the coalition and managing related projects.

THE Impact Project Although its core membership was small, THE Impact Project coordinated closely with a many organizations, agencies, and coalitions, which in turn leveraged additional human resources. The University of Southern California (USC) Environmental Health Sciences Center provided staff support through its Community Outreach and Engagement Core (COEC). The COEC dedicated significant staff time to goods movement issues, writing grants to support the project, conducting related outreach, and summarizing research findings related to the health impacts of goods movement activities. Staff and faculty from the Urban Environmental Policy Institute at Occidental College contributed environmental policy expertise. THE Impact Project community partners facilitated the engagement of additional staff, members, and residents in their organizations' related activities, programs, and events. Government agencies and the private sector were not directly involved in the partnership.

Human Resources Summary One measure of success is whether the collaborative efforts involved people who had not been previously engaged in addressing the identified environmental health problem. Before the CPLP formed, health professionals were the core actors involved in childhood lead poisoning efforts in Rochester. CPLP engaged a wider range of community, education, housing, and other interest groups in the issue. Before the formation of Fit City Duluth, the primary effort to promote healthy environments was the work being done by public health professionals on smoke-free indoor air. Healthy Duluth engaged many other agencies and community stakeholders. THE Impact Project, which had the broadest range of targets for change, directly involved the narrowest range of stakeholders—academics and community leaders. Although many of these partners were already focused on specific aspects of goods movement, THE Impact Project broadened their engagement. It also leveraged additional human resources through the staff and membership of its partner groups. The Moving Forward conferences brought in hundreds of attendees from across the country. Thus, all three initiatives mobilized a wide range of new

human resources to address an existing problem of environmental health equity.

Each initiative drew on human resources from many groups that had not previously been involved in addressing the identified environmental health problem. However, it is also important to note which stakeholders were *not* involved in each collaborative. Notably, none of the initiatives depended on human resources from groups that were targets for systems changes. For example, rental property owners had a minor role in the Rochester CPLP and goods movement industries were not partners in THE Impact Project. Many “target” organizations—particularly government agencies—provided information and technical resources but were not responsible for convening, strategic direction, or decision-making functions.

Knowledge Resources

Each initiative leveraged knowledge through its members, who provided access to data, analysis capacity, community experience, and professional expertise. This makes it difficult to distinguish human resources from knowledge resources. In fact, some argue that human resources *are* knowledge resources, since all participants contribute based on their training, skills, and experiences (Ascher, Steelman, and Healy 2010). Diverse members provided different types of knowledge—for example, health data, environmental science, community values, and insight into systems-change approaches. As well, all of the initiatives procured technical services using their financial resources.

The main knowledge function of the initiatives was to synthesize multiple kinds of information. They relied primarily on existing data, but strategically generated new data to fill identified gaps. They complemented national research with local information and worked to translate this knowledge in policy-relevant ways. All three initiatives emphasized that their positions were science-based, bolstering their credibility. They all leveraged knowledge about public health, environment, and community experiences to advance systems change.

Public Health Expertise Each effort accessed public health expertise in different ways. CPLP had such extensive involvement by clinicians, public health professionals, and researchers that the coalition’s co-chair, Bryan Hetherington, quipped: “No one could afford to buy the expertise that we

got for free” (Hetherington 2016). In Duluth, clinicians helped establish Fit City Duluth, local health department staff played sustaining roles throughout Healthy Duluth efforts, and health system staff developed the Bridges to Health survey, conducted data analysis, and convened the community health needs assessment. THE Impact Project partners included clinicians and USC’s environmental health scientists.

The availability of health data varied from case to case. Predictably, more health surveillance data were available in the larger cities. For example, THE Impact Project could draw on local studies of near-road pollution and community-level health effects. Childhood lead poisoning data were available at the zip-code level in Rochester, but most health outcomes data were available only at the city or county level in Duluth. Lack of fine-scale local health data made it difficult to connect environmental determinants with health disparities at scales meaningful to communities.¹

Thus, each initiative tapped health expertise that informed its understanding of the problem, helped develop effective solutions, and bolstered credibility. CPLP and THE Impact Project directly accessed nationally known researchers whose work suggested that the environmental exposures were of greater health concern than previously thought. Health professionals in all three cases expressed enthusiasm about the opportunity to inform local solutions by collaborating with environmental and community stakeholders. As USC Professor Ed Avol said about his involvement in THE Impact Project, “We all had a commitment to improving the public health and reducing the environmental exposures, and THE Impact Project provided opportunities to do so” (Avol 2018). Similarly, community physician Dr. Richard Kennedy noted that working with CPLP gave him “a sense of empowerment because we had so many bases covered. We had so many smart people coming together, I felt like we could do this, and was willing to put the time into it” (Kennedy 2018). Former Monroe County health director Dr. Andrew Doniger agreed, saying that “it was clearly the beginning of a community movement, and our staff were thrilled to be part of that. They felt like they were being listened to after all of the frustration they had felt; now there was a chance that things were going to change. ... I don’t think we felt threatened. I think that we felt appreciated” (Doniger 2017).

Environmental Knowledge All three initiatives also had the capacity to access, analyze, and create knowledge about environmental conditions.

CPLP members included housing agencies and lead inspectors who educated the group on how to prevent, identify, and address residential lead hazards. The 2002 Needs Assessment produced models and maps identifying high-risk neighborhoods. The Get the Lead Out (GLO) project generated information about hazards in high-risk neighborhoods. Healthy Duluth included transportation and land use planners, brownfield experts, and parks and recreation staff with expertise in managing the built environment. Healthy Duluth also generated new environmental knowledge through HIA consultants, community surveys, and the University of Minnesota-Duluth food access report. All partners in THE Impact Project started with a baseline understanding of environmental health, which was enhanced by interacting with USC air quality researchers. As well, the A-Teams generated knowledge about air quality, truck traffic, and other environmental conditions in their communities. Thus, in all cases, environmental knowledge came from the participation of technical experts who recognized that collaborating with new stakeholders could elevate solutions to environmental problems they had been working on for years. As Duluth transportation planner James Gittemeier said, “Urban planners have espoused livable communities for decades ... but when we tried to talk about this, it wasn’t as powerful as when public health convened everybody, then the community realized it was a public health issue” (Gittemeier 2018).

Community Experiences, Values, and Preferences Each initiative integrated residents’ experiences, values, and preferences. CPLP’s bylaws required 30 percent of the members of its board to be from or represent affected communities; these members brought community knowledge into the coalition’s work. In addition, the GLO project documented the challenges facing low-income families, such as the widespread fear that complaining about lead hazards could lead to eviction. This input from community members informed CPLP’s support of policy approaches that did not rely on tenant complaints about lead hazards. Although Healthy Duluth efforts did not directly involve residents, community service agencies represented their clients’ needs. In addition, Healthy Duluth projects elicited community input through development of neighborhood coalitions, conducting food access surveys, and public meetings on HIAs and brownfield planning efforts. THE Impact Project had a strong structure for accessing community knowledge through its four community-based partner groups. Community members’ experiences were documented through the short video

storytelling projects, A-Teams, and testimony at public meetings. While all three initiatives accessed community knowledge, their different contexts resulted in varying strategies for doing so. In CPLP and Healthy Duluth, professional members of the coalitions elicited community input because environmental health equity was not initially at the forefront of local community groups' agendas. THE Impact Project, by contrast, was driven by community groups' concerns about the environmental health implications of goods movement; these groups initiated and directly informed all its efforts.

All three initiatives harnessed members' knowledge about systems change and advocacy approaches. Some made focused efforts to further develop these skills. CPLP's board included many professionals with extensive experience in policy engagement as community organizers, public interest lawyers, and civil servants. It established a Leadership Development subcommittee to build the skills and roles of affected community members. The Healthy Duluth efforts were inspired by members' experiences passing tobacco control policies. Watching *Unnatural Causes* and attending national conferences enhanced their policy advocacy skills. Healthy Duluth grew to include members from community organizations with advocacy experience, government agency staff, and former elected officials. THE Impact Project community partner members were steeped in community organizing experience. The academic members included individuals with strong policy backgrounds. The project also worked with others such as the Natural Resources Defense Council (NRDC) with extensive knowledge of California's air regulatory system. All three groups built on their core members' past experience in systems change.

Generation, Transmission, and Use of Knowledge As social scientists who study the role of science in environmental policy have found (Ascher, Steelman, and Healy 2010), three "knowledge functions" are necessary for producing well-informed decisions: generation, transmission, and use. Each initiative was able to access multidisciplinary knowledge, data, and experience in different ways. As modestly resourced collaborations, their ability to generate new knowledge was limited. Each initiative filled gaps in local environmental health data by collecting community-based information (e.g., CPLP's Get the Lead Out project, community surveys in Duluth, and THE Impact Project A-Teams) and analyzing existing information in new ways. Although these knowledge-generating tasks were important, they

did not take a significant portion of the groups' resources. Rather, the initiatives' goal was to use existing information more effectively to advance solutions to environmental health equity problems. In order to use such multidisciplinary data, the initiatives needed the capacity to access and analyze it. For example, a public interest lawyer combined existing health department data on lead poisoning by zip code with U.S. Census data to analyze the distribution of lead risk in Rochester by race and ethnicity. This simple geographic analysis fundamentally recast the issue of lead as one of environmental justice.

Information on health and the environment often resides in separate agencies and at different scales. For example, housing data were available to CPLP by address, but information on children with elevated blood lead levels was aggregated to the zip code to protect privacy. Conversely, air quality in California is monitored regionally, but research showed that health effects varied over very small distances from transportation hubs. Thus, a major early effort in each case was to produce an overview synthesizing relevant health and environmental information at similar scales (Matsuoka et al. 2011; Gilley, Gangl, and Skoog 2011; Boyce and Hood 2002).

Each initiative also used external information from government reports, academic research, and case studies of other communities. This information helped build a common understanding of the environmental health problem, but local data was also essential to building credible arguments for local decision makers. The initiatives faced challenges in trying to connect environmental health determinants to local health outcomes because of the multifactorial relationships involved. Environmental contributions to health are difficult to demonstrate at a local level. This complicated the initiatives' efforts to develop a community consensus that addressing environmental factors would be a productive, ethical, and effective step toward reducing health disparities. Nonetheless, each group was successful in combining national research findings with available local data to support their systems change agendas.

All three initiatives devoted significant resources to synthesizing and sharing information in policy-relevant, audience-appropriate ways. Materials translating environmental health knowledge to varied audiences were key products of all three initiatives. These included policy briefs, storytelling videos, public service announcements, and researchers' testimony at public hearings.

Although each of the initiatives accessed, generated, and integrated multiple kinds of information in different ways, they all prioritized accessing and sharing credible information. This may reflect the fact that, as Wondolleck and Yaffee (2000, 244) point out, “Participants in these processes are investing considerable time and energy in trying to solve problems and resolve disputes. They can achieve their own ends and receive benefits from the effort they have invested only if the process is ultimately deemed acceptable to other participants and agency decision makers, as well as to those who would challenge the process’s agreements. Hence, each participant has a considerable incentive to make sure that the group’s decisions are credible and legitimate.” Despite their limited resources, each initiative recognized that scientific credibility was a key source of their power to affect change.

Another common theme was that the process of building knowledge was a core part of the effort. As Ascher, Steelman, and Healy (2010, 210) note, “Knowledge generation, transmission, and use (can be) socially integrative.” In other words, the very process of collaboratively developing a better understanding of the problem can strengthen partnerships. Each initiative’s focus on knowledge sharing suggests this was a key unifying function of the partnership. Thus, leveraging credible multidisciplinary knowledge was both a key strategy of and important contributor to the effectiveness of the groups.

Financial Resources

All three initiatives began with members who had flexibility in their jobs or the capacity to volunteer that allowed them to convene partners, but did not have core funding to support an environmental health initiative. Each initiative eventually obtained financial resources from a variety of sources over time for staff, communications, and projects. The way each effort obtained financial resources, who controlled them, and how the resources were used to support collaboration differed greatly.

The Rochester CPLP started as an all-volunteer effort in 1999. Small private donations allowed it to hire a part-time staff to write grants to sustain the organization’s capacity. Over time, CPLP received additional funding to coordinate the work of the committees, produce outreach materials, and support communications campaigns. These grants came from a variety of sources, including local foundations, government agencies, health insurers, in-kind donations of communications services, and the United Way.

Tracking Healthy Duluth's financial support is more complicated. The initiative was started as an unfunded effort by city parks and recreation staff. When Fit City Duluth was established as an independent not-for-profit group, it had no financial support and was staffed by an AmeriCorps volunteer. Fit City soon received the Pioneering Healthy Communities grant for core staff and activities. The Healthy Duluth Area Coalition (HDAC) obtained private foundation and government grant funding to hire an executive director. HDAC staff were supported through funding from the State Health Improvement Partnership (SHIP) and private foundations. Other projects like HIAs and brownfield plans were funded by grants.

THE Impact Project was primarily financed by private foundation grants that supported joint activities, member organizations' staff time, and administrative costs related to the project. These resources allowed the group to develop communications materials, produce reports, support community-based science, participate in policy processes, and translate scientific information to the news media. Even after dedicated funding ended, the project's members continued to meet monthly. Ongoing support from the National Institute for Environmental Health Sciences (NIEHS) and from the Moving Forward Network helped sustain THE Impact Project.

Thus, all three initiatives began as voluntary efforts but eventually leveraged financial resources to support core staff and activities. Obtaining funds to sustain collaboration was challenging. One strategy was to seek funding for projects related to their goals (i.e., producing materials, hosting meetings, providing training, conducting surveys, outreach initiatives) that in effect subsidized their convening functions. Another commonality was diversified financial support: none of them relied on one single sustained source of funding over time.

The initiatives' control of financial resources varied. CPLP's funds were managed by core staff in accordance with grant work plans and under the direction of its executive board. With the exception of foundation grants that provided support for HDAC, most of the funding for Healthy Duluth efforts was project-based and controlled by the organization that initiated the specific project. THE Impact Project developed grant proposals jointly and divided funds equally among the partners to implement the work plans. Thus, each initiative obtained financial resources to support convening functions that in turn leveraged human and knowledge resources.

Organizing Collaboration: Group Structuring and Decision-Making Processes

Collaborative initiatives' structures and decision-making processes contribute to the stability, sustainability, and success of the efforts. The three local environmental health initiatives had diverse organizational structures, but each collaborative had an element of consensus decision-making, information sharing, and coordination of related decisions made by individual partners. Their structures and processes evolved over time.

The Coalition to Prevent Lead Poisoning relied on the fiscal and physical infrastructure of several different nongovernmental organizations at different times. The organization also changed its structure significantly over the years. After the lead law passed in 2005, active membership dwindled, the number of working committees was reduced to two, and CPLP relaxed its bylaws to allow for more informal decision-making. As of 2017, it had no dedicated staff, but the group continued to be active through regular meetings, communications services subsidized by a local public relations firm, and staff support contributed by long-standing members.

In Duluth, there was not a single convening body, but rather an increasingly well-connected network of professionals who collaborated on projects to promote healthy built environments. The HDAC did not have formal membership or decision-making rules, but rather served as a coordinating forum and provided input on the plans, projects, and funding proposals developed by staff and partners. Stakeholders asserted that because of the community's small size this informal network allowed them to identify opportunities to work together in pursuit of common goals.

THE Impact Project operated on a model of equal decision-making and resource sharing. The University of Southern California administered grants, meeting sites rotated between the partner groups' offices, and decisions were made by consensus. THE Impact Project had just six organizational members: four community partner organizations and two academic institutions, although the members worked regularly with additional groups involved in goods movement.

Every collaborative effort must balance between including diverse perspectives to inform consensus solutions and limiting partners to those with common interests. These initiatives were formed to advocate for

environmental health equity by changing the actions of government and private-sector actors. They tried to build broad support but did not expect to develop a universal consensus around their solutions. Instead, they supported their members' advocacy for systems change. Each made efforts to understand and integrate the perspectives, knowledge, and constraints of the government or private-sector actors that their solutions targeted, but these affected organizations were not part of their decision-making structures.

All three initiatives had rather informal, loosely structured organizations. Much of the literature on collaborative organizations focuses on the importance of clear leadership, decision rules, and committed participation (Collective Impact Forum 2018). However, these three cases showed that progress is possible even when these conditions are not met. Only the CPLP had formal bylaws, and these were only in place during several years at its height of activity leading up to passage of the lead law. Healthy Duluth was comprised of loosely coordinated efforts of a number of separate agencies and organizations convened by different groups over time. THE Impact Project partners agreed to develop work plans by consensus to support their collaborative efforts and continued meeting after their funded work ended. Each group adapted its organizational and decision-making structures for collaboration as problem definitions, resources, and community needs shifted over time.

All three collaborative structures were able to balance their roles as partners with decision makers and as advocates for policy change. As noted, Healthy Duluth and CPLP engaged government agency staff as partners in non-decision-making roles, but they also advocated for changes in the policies and practices of these agencies. THE Impact Project members served as appointed members of government advisory committees, educated elected officials and agency staff about the health effects of goods movement, and testified as advocates at public hearings. This "inside-outside strategy" was evidenced in all three cases (Matsuoka 2014).

Impacts of Collaboration

These initiatives focused on changing local policies, systems, and environments to further health equity. Their strategies for impacting local decision processes were very different, however. Therefore, it is not surprising that

their outputs and impacts varied as well. Nonetheless, participants and outsiders widely viewed each of these cases as a success.

As noted in chapter 3, defining “success” of a collaborative effort is complicated. On first blush, indicators that the initiative was successful might include answers to questions like: Did the initiative accomplish its initial goal? Did participants as well as outsiders view it as successful? Was there a concrete outcome—a new policy, process, or improvements in the environment—that can be traced to these efforts? The answers to these questions may not reflect the full value of the effort. For example, changed external conditions, unanticipated barriers, or new information may have altered the effort’s goals over time. Different stakeholders may have different views about its success. Any assessment of accomplishments must consider what is likely to have happened absent the initiative. Finally, the initiative may have had unintended consequences that should also be considered in evaluating impacts. The conceptual framework presented in chapter 3 captures some of the complexities of assessing the impacts of collaborative efforts and provides a starting point for describing the impacts of these efforts in terms of their outputs, social outcomes, and systems-change impacts. Each initiative generated a wide range of products that supported its systems-change efforts. These initiatives also had social impacts that magnified their policies, systems, and environments influence. In each case, stakeholders noted unanticipated positive outcomes or “ripple effects” of their work, including sparking similar local efforts in other sectors and serving as a model for other communities.

Outputs

Each initiative produced a wide range of outputs in support of its overall goal. These outputs helped to develop, promote, and implement solutions to the identified health inequities.

The CPLP developed, promoted, and campaigned for the passage of a local lead law targeting rental housing. Its outreach work built support for the legislation. Once the law was passed, CPLP refocused on maintaining inter-governmental coordination, monitoring implementation of the law, and community education about lead poisoning. CPLP’s outputs contributed to other primary prevention activities in the community, like the school district’s lead policy, enhanced county inspections, and neighborhood-based outreach efforts.

Healthy Duluth's promotion of health equity in the built environment employed a variety of strategies and approaches. Most of the early projects involved conducting assessments, supporting neighborhood coalitions, and creating development plans. Partners later engaged in more direct actions, including commenting on street redesign projects, implementing community gardens, and organizing community events.

THE Impact Project engaged in decisions on a range of issues throughout the region. Its outputs supported the goal of ensuring that all decisions related to goods movement consider community environmental health impacts. A first step was to raise awareness of the comprehensive, cumulative, and inequitable impacts on vulnerable populations. Accordingly, project staff worked closely with the media and developed their own communication tools. The outputs included an array of storytelling videos, "Ports 101" training sessions, education materials, and policy briefs related to topics including trucking, railyards, warehouses, and port expansion. Because of the large geographic area, it was essential to build the capacity of local communities to advocate for themselves. This was the rationale for outputs such as the A-Teams, workshops, and trainings for community partners.

The varied outputs of the three initiatives all aimed to create the conditions for change in systems to promote environmental health. These outputs also reflected the initiatives' recognition of the two-way relationship between environmental and economic equity. For example, CPLP aimed to find an approach to primary prevention that would not damage the low-income rental housing market or cause major rent increases. It also produced a workforce development guide to advance training of unemployed community members in lead hazard control work. Healthy Duluth shifted its focus from "active living" to "transportation equity" with a focus on improving low-income residents' ability to access employment and nutritious food. The efforts supported job creation through the Deep Winter Greenhouse project and emphasized the cost savings of growing food in community gardens. THE Impact Project's "Driving Harm" policy brief addressed the challenges facing independent contractors who had to pay for pollution controls on their own trucks and recommended that trucking companies instead hire drivers as employees (THE Impact Project, 2012b). Later efforts emphasized creation of green jobs in neighborhoods affected by transportation industries. Thus, these initiatives' outputs focused on

reducing environmental health inequities in ways that also improved (or at least did not detract from) other social determinants of health, particularly poverty.

Social Outcomes

The Local Environmental Health Initiative Framework delineates social outcomes as a distinct type of impact. Researchers and participants in coalitions frequently note that the trust, relationships, skills, and networks developed through the course of collaboration have positive impacts beyond the observable “outputs” of these efforts. These social outcomes can result in ripple effects in other sectors, decision forums, or time periods. Strong social outcomes were evidenced in all three initiatives. CPLP developed a network of lead-savvy community leaders and government staff who continued to collaborate, anticipate challenges, and take advantage of opportunities to further lead poisoning prevention efforts. In addition to continuing the lead work, many of the partners who worked together on CPLP later partnered on healthy homes, childhood obesity, and built environment collaborations. Healthy Duluth cultivated a tightly networked group of professionals in a range of organizations who “speak the language” of health equity. This network continued to focus on promoting health equity as new opportunities arose.

THE Impact Project increased the skills and knowledge of all its partners. Community partners learned about environmental health research, which bolstered their ability to participate in future goods movement decisions and enhanced their credibility. Academic partners gained experience in partnering with community organizations, interacting with the media, and engaging in a policy processes. The partners continued to interact on ongoing goods movement issues and through the national Moving Forward Network.

Participants in all three cases stated that the experience of collaboration had indirect effects on their ongoing work in the community. In all three cases, partners went on to work together on other community issues. However, participants also acknowledged that since the majority of these social outcomes were based on individual rather than institutional relationships, these impacts may attenuate with staff turnover over time. Although the initiatives did not aim to create permanent organizations, each made efforts to sustain convening functions that may refresh social outcomes over time.

Impacts on Policies, Systems, and Environments

It is difficult to comprehensively capture the impacts of collaborative initiatives on policies, systems, and environments. Uptake of outputs (e.g., participation in events, website hits, materials distributed) and stakeholders' reflections on social outcomes are intermediate indicators that the initiative's contributions will foster changes in policies, systems, and environments over time. To capture the potential for longer-term impacts, it is also important to document changes in policy, environmental health conditions, or external systems that may be attributed to the initiative's work. Impacts on decision processes and policies may be direct or indirect, long term and multilevel. In some cases, it may be possible identify trends in environmental determinants and health outcomes that can be attributed to the initiative's impacts on local systems change. Finally, many of the initiatives had effects outside of their local areas. Capturing such "external" impacts reflects the two-way interactions between local initiatives and broader efforts to improve environmental health. Table 7.3 provides an overview of some of the PSE impacts.

Decision Processes and Policies CPLP's efforts contributed to several policy changes. The City of Rochester's 2006 lead law was the flagship outcome, but there were also changes in the practices of county health and human services departments, Rochester Housing Authority inspections, and the maintenance of school buildings. As well, CPLP established new processes for coordination that continue to affect how local governments plan, implement, and adapt their lead poisoning prevention efforts. Healthy Duluth's efforts supporting active living and better access to healthy food contributed to land use and brownfield redevelopment plans that reflected environmental health equity concerns. Adoption of health and fairness as aims for the comprehensive plan and discussions about passing a city resolution for a "Health in All Policies" approach suggest that decision processes in Duluth have been changed in durable ways. THE Impact Project concentrated on elevating health considerations in all decisions related to goods movement. To do so, the project partners first needed to increase the transparency of public decisions and expand opportunities for participation. In addition to promoting these procedural changes, partners and other stakeholders participated in multiple policy processes, including an environmental review of the I-710 and the Southern California International Gateway railyard proposed by Burlington Northern Santa Fe Railway. While

Table 7.3

Impacts on policies, systems and environments

	Coalition to Prevent Lead Poisoning	Healthy Duluth	THE Impact Project
Decision Processes and Policies	Passed local lead law; supported RCSD school lead policy; enhanced Rochester Housing Authority inspections.	Complete streets policy recommendation; health and fairness integrated into comprehensive plan.	Increased transparency and participation in goods movement decisions; enhanced consideration of health in EIR process; supported local “green” ordinances.
Environmental Health	City inspections show reduction in lead hazards in rental housing; rate of childhood lead poisoning declining faster than elsewhere.	New trails, gardens, and parks; Grocery Bus; complete streets; healthier brownfield developments; designing data system to capture health impacts.	Contributed to diesel emissions reductions through CAP; other impacts on health and environmental conditions difficult to measure due to scope and scale of issue.
External Impacts	Served as model for lead policy efforts in other cities; informed statewide lead policy network.	Highlighted as model for HIA and brownfields work; informed MN Brownfields health indicator tool.	Engaged in state and national EJ and policy analyses; initiated Moving Forward Network.

it is not yet clear to what extent the partners influenced the final decisions, their efforts increased the awareness of community health considerations and influenced decision processes. THE Impact Project partners also contributed to policy changes like local land use plans and truck-routing agreements to better protect communities’ environmental health.

Indicators of Environmental Health Equity Each of the initiatives used data on health disparities to motivate, focus, and argue for the significance of its efforts. However, health outcomes are influenced by so many factors that it is difficult to attribute them to any single policy, educational effort, or funding stream aimed at improving the environment. Even the prevalence of childhood lead poisoning, which is directly caused by lead

exposure, can be influenced by changes in housing markets, individual behaviors, consumer products, and population shifts (e.g., the increase in immigrant children from countries with high lead risk). For this reason, the efforts focused on impacting environmental determinants as well as measuring health outcomes.

For example, Rochester inspected more than 140,000 units in the first ten years of implementing the lead law. The unexpectedly high passing rate indicated that property owners were proactively making rental units lead safe. These efforts certainly contributed to the 82 percent decline in cases of children with elevated blood lead (EBL) levels from 2002 to 2012 (Kennedy et al. 2014). Although EBL cases are declining everywhere, the reduction in Rochester happened at a rate 2.4 times that in other upstate areas that lacked community lead coalitions. It is impossible to say whether CPLP's overall efforts—or the lead law in particular—caused these outcomes, but the data from other communities and reflections of a broad range of observers suggest that it made a significant contribution. Healthy Duluth influenced plans that have already resulted in a number of projects to improve environmental health equity in Duluth, including new trail segments, bike-friendly road improvements, community gardens, and the “Grocery Bus.” Bridging Health Duluth is designing a community health tracking system that hopes to capture the cumulative effects of such efforts on health disparities over time. As already noted, THE Impact Project influenced a range of decision processes, policies, and plans that in turn have affected environmental conditions. For example, the Clean Air Action Plan significantly decreased diesel emissions from trucks at the ports. However, because of the complexity of goods movement decisions and multiple drivers of air quality, it is difficult to directly attribute any specific improvements in environmental conditions to THE Impact Project's efforts. Tracking any associated health effects is even more complex, because of the many non-air quality contributors to asthma, heart disease, and cancer. Thus, although in each of these cases there is some evidence of environmental improvement, it is important to remember that issues like air quality, housing markets, and economic development are significantly impacted by forces outside of local control, so lack of observed short-term improvements in environmental conditions does not necessarily mean the initiative failed to make a positive contribution. This is even more true of observed health effects, which often have multiple causes and long latency.

External Impacts All three initiatives interacted with and were informed by efforts in other communities, national interest groups, and state or federal government agencies. These connections helped disseminate their experiences to other communities. The Rochester lead law has been widely recognized as a cost-effective approach to reduce hazards in high-risk private rental housing. Since it passed, over two dozen cities have reached out to Rochester to learn from its experiences, and some have passed their own lead laws. There is much to be learned from the CPLP experience in terms of building a coalition of diverse stakeholders, characterizing the local challenges and resources for reducing lead hazards in housing, designing an appropriate system of prevention, and coordinating efforts to monitor and adapt the program over time. CPLP and city staff frequently interact with other cities about how to adapt Rochester's approach to their local context. However, they always caution that while the coalition-building process is widely applicable, Rochester's specific policy solution may not be appropriate for other cities.

Several of Duluth's innovative efforts have been shared with wider audiences. For example, Minnesota Brownfields piloted a brownfield health indicator tool in Duluth that was published for statewide use in 2017. Former funders including the Pew Charitable Trusts and the Center for Prevention at Blue Cross Blue Shield of Minnesota have highlighted Duluth-based environmental health equity projects on their websites. Healthy Duluth stakeholders have also been invited to speak at numerous state and national conferences.

THE Impact Project discovered there was national interest in its efforts among attendees at the first Moving Forward conference. Recognizing the need to share lessons learned between groups in different regions led to formation of the Moving Forward Network (MFN). Additionally, the Moving Forward conferences showed the potential for local groups to come together to pursue a national policy agenda that would benefit all port-adjacent communities, giving rise to MFN's "zero campaign" on emissions. This unanticipated outcome of THE Impact Project may help to significantly reduce the future health impacts of ports around the country. Over the years, THE Impact Project members have been recognized by national awards, news articles, and academic publications praising it as a model community-university partnership.

Each of the initiatives learned from and informed other communities. Although it is not possible to attribute specific changes in other cities, state

agencies, or federal policy to these interactions, there is clearly potential for these local initiatives to inform environmental health equity efforts in other communities.

Summary of Impacts While it is difficult to prove that these initiatives directly reduced health disparities in the short term, there are many indicators that they influenced systems in ways that will reduce environmental health inequities over time. Rochester is the only case in which there is public health data that strongly suggest the community's efforts to reduce housing-based lead hazards have contributed directly to positive health outcomes. Both CPLP and Healthy Duluth can point to environmental changes attributed to their efforts. Because of the scope, scale, and timeline of goods movement decisions, it is difficult to connect specific environmental health impacts to THE Impact Project's activities, but the policies and processes the partners affected are likely to contribute to wide-ranging long-term improvements in the long term.

All the initiatives influenced processes and systems in ways that are likely to reduce environmental health inequities over time. In Duluth, the integration of health considerations into planning processes has already shaped the flow of resources into low-income neighborhoods. Adoption of health and fairness as goals for city decisions and the network of professionals committed to furthering health equity bodes well for implementation of these plans. THE Impact Project's success in increasing opportunities for participation by a broad range of stakeholders, enhancing the engagement capacity of community partners, and elevating attention to health in decisions related to goods movement is likely to strengthen environmental health protections. However, it may never be possible to directly connect improvements in environmental health equity to the partnership. Acknowledging such challenges of evaluating collaborative efforts can help set appropriate expectations, develop intermediate indicators of progress, and help participants and funders appreciate the indirect, long-term, and often invisible nature of these initiatives' contributions toward environmental health equity.

Summary

These three cases differ by issue area, geography, demographics, scope, and scale—yet their collaborative approaches had several common features. First, each initiative addressed a problem in which the environmental

determinant was managed by a well-established set of rules and regulations. Despite this existing management system, in each case the community identified a disproportionate health burden on a local population. Framing these problems as unacceptable inequities was necessary for launching a collaborative search for new solutions. The groups' ability to make systems changes supports the observation that "information, resources, and political support are often more readily available when multiple parties work together to collaboratively solve complex problems" (Wondolleck and Yaffee 2000, 245). Thus, their successes both depended on and contributed to boundary spanning, partnering, and collaboration.

In each case, the collaborative effort involved multiple sectors, but each had a unique constellation of government, health care, community, environmental, and academic partners. At least one member of each initiative had a directive to collaborate with community partners around environmental health issues. In Rochester and Southern California, these included NIEHS-funded Community Outreach and Engagement Cores; in Duluth, the guidelines for the local health department's State Health Improvement Partnership (SHIP) and the city's brownfield planning grants from the U.S. Environmental Protection Agency encouraged community collaboration. These organizations helped convene others who had the incentive, flexibility, and resources to participate and then leveraged these resources to expand community engagement.

Because these were informal collaboratives initiated by the community, there was no mandate for specific organizations or individuals to partner. Therefore, understanding the partners' barriers, incentives, and goals for their voluntary participation is essential to understanding the success of these initiatives. In each case, stakeholders perceived the initiative as an opportunity to make progress on an issue of concern by partnering with new groups. Each collaborative found ways to work around participants' professional constraints—for example, by focusing on building capacity, analysis, and sharing knowledge. This allowed professionals and academics to participate in the initiative, while also supporting the advocacy efforts of community partners, volunteers, and nongovernmental groups. Enabling participation from diverse sectors helped the initiatives access multidisciplinary knowledge and perspectives.

The organizational diversity of each initiative suggests that there is no one "right" structure for a successful local environmental health initiative.

Rather, the structure must be appropriate to the goals, needs, and capacity of members, and it may change over time. Each initiative used a different strategy to achieve systems change. CPLP focused on promoting a new local policy. Healthy Duluth developed a common vision among partners who then proceeded to integrate health into the practices of non-health agencies. THE Impact Project increased its members' environmental health literacy and capacity to advocate for awareness of health in public decisions. Many of their impacts were indirect, process-based, long-term, and even invisible to outsiders. Specific goals and approaches were not clear at the outset but rather emerged from the collaborative over time. This suggests that a developmental approach to evaluating these types of initiatives is most appropriate (Patton 2010).

These initiatives produced a wide range of outputs, social outcomes, and changes in policies, systems, or environments. In each case, the local environmental health initiative secured funding streams and influenced decision processes. There may be future shifts in the environmental, legal, technical, or economic context that require the collaborative energy of a local environmental health initiative adapt to these changes. Fortunately, the social impacts of these initiatives have increased the capacity of communities to address future needs. Finally, each contributed to change beyond the local community in unanticipated ways. This suggests an underappreciated potential for local-to-local learning to promote environmental health equity beyond the community scale.

Given this diversity of these collaborative efforts, it is clear that there are many paths to success. It also suggests that one initiative's approach is unlikely to have the same impact in another community. Although these initiatives' specific strategies, structures, and approaches may not be readily replicable, there is still much to learn from them about supporting progress toward environmental health equity in other communities. Certain community conditions may facilitate collaboration to address local environmental health and justice issues. These conditions—and how to foster them—are further discussed in chapter 8.

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