



Flint resident perceptions about the causes, consequences, and solutions to the Flint Water Crisis

Executive Summary

Through a partnership between the Community Foundation of Greater Flint (CFGF) and Michigan State University (MSU), a team of community partners and researchers: (a) conducted a series of community-based modeling workshops with residents throughout the City of Flint; and (b) administered a follow-up online survey with Flint Water Crisis (FWC) responders and residents to better understand beliefs about the causes and consequences of, and solutions to, the FWC. The purpose of this work in spring and summer of 2016 was to capture the perspectives of Flint community members in order to outline public concerns and identify community-driven policy recommendations going forward. This summary report presents resident, community, and FWC responder perceptions about the FWC as part of a process to inform future planning and policy development. Results of the five community workshops as well as the analysis of the survey responses highlight the following issues:

Trust and Power in Decision Making

- Flint residents do not trust government officials or government scientists. Flint residents do not believe these institutions have the best interest of Flint residents in mind.
- Residents and FWC responders believe that residents and NGOs in Flint have the least amount of power in decision-making regarding the recovery effort, while government officials have the most power.
- The lack of trust in government coupled with feelings of powerlessness and lack of appropriate ways to communicate their concerns and experiences will complicate recovery efforts and should be addressed in future planning.

Beliefs about Causes and Consequences of the FWC

- Residents believe that the FWC resulted from long-term economic and social problems in Flint, including a decreased tax-base, a history of marginalization, and a loss of decision-making control by the City.
- Residents believe that *short-term consequences* of the FWC include increases in: emotional stress/fear, daily household labor, adverse effects of pre-existing health conditions, uncertainty, and community stigmatization.

- Residents believe that *long-term consequences* of the FWC include decreases in: community health (especially children's health), trust in officials, educational outcomes/attainment, and real estate/economic (re)development.

Community Policy Recommendations

- Participants suggested short-term solutions to the FWC, including the replacement of pipes in the City and whole-house filters, which were both widely supported.
- Participants suggested long term solutions to the FWC including keeping the recovery money in the City of Flint and, specifically, not outsourcing work, labor, and other recovery funds to outside (non-Flint) contractors.
- The participants offered a salient and powerful perspective on viewing the FWC as an opportunity for development/rebuilding in the City and as a means for addressing systemic problems faced by the City.
- By focusing on the use of Flint-based solutions (including training and skill development of Flint residents) to the FWC, the participants suggest a way forward that would help break the 'vicious cycle' that has faced the City for several decades (i.e., a decreased tax-base, marginalization, and loss of decision-making control).
- Recognizing and responding to the community's concerns regarding systemic failures (rather than the symptomatic problems of lead exposure) is critical not only to address the trust issue, but also because the community itself provides expertise borne of its collective experiences.

Introduction

The FWC prompted community leaders and academic researchers to explore the perspectives and voices of Flint residents about the disaster. Discussions at an initial meeting between MSU and Flint community partners indicated that almost all communication regarding the recovery efforts was limited to government agencies and it was unclear how to best engage communities impacted by the event. Given the high degree of uncertainty and the severity of the event, the voices of Flint residents and other community groups were not being heard, and it was clear that trust in government officials had deteriorated. This lack

of communication and trust between those impacted by the FWC and those responding to the FWC made incorporating community perspectives into recovery planning difficult. Community leaders and CFGF identified the need for an efficient and systematic approach to capturing and communicating resident concerns to officials engaged in response planning. The team developed and implemented a multi-stage engagement project to learn about resident, community, and FWC responder perceptions about the complex dynamics of FWC.

Approach

The MSU team, in consultation with CFGF, developed the Voices of Flint (VOF) project. The VOF used a two phase participatory data collection process.

First, in spring of 2016, the team divided the City of Flint into four quadrants to ensure fair representation across multiple communities within the city and convened one workshop in each quadrant. Participants were recruited through the community partners. Each workshop hosted between 4 and 14 participants, and consisted of a brief survey and a participatory modeling exercise. During the workshops, participants discussed their understanding of the complex dynamics of the FWC and developed a semi-quantitative concept map representing their collective understanding of the causes, consequences, and solutions to the FWC (see example of concept map created during workshop in Supplementary Information). The MSU team aggregated the four workshop models into a single model. This aggregate model was returned to the community partners and reviewed in a final “all hands” workshop with 36 community members to ensure it reflected the diverse perspectives and viewpoints heard throughout the four workshops. This model helped to identify major themes regarding the causes, consequences, and possible solutions to the water crisis. The survey results from the workshops were analyzed to determine how information was provided to and spread throughout the community, and to identify trusted organizations within and outside of the City. During the final workshop potential solutions were discussed and model-based scenarios were developed in order to provide clear policy recommendations for government decision-makers engaged in recovery planning.

Second, following the workshops, an online questionnaire was developed based on the reoccurring themes that were identified during workshops. The purpose of the survey was to determine the degree of consensus regarding beliefs about the FWC so that areas of agreement and disagreement could be communicated to city, state, and federal officials. The survey included basic demographic info and a series of True/False questions and was administered to a listserv of 355 individuals representing various community and government

organizations involved in the recovery effort (hereafter referred to as ‘FWC responders’). Participation in the workshops and in the survey can be found in Table 1.

Table 1. Participation profile for the Voices of Flint Modeling (a) workshops and (b) FWC responder survey

Community Voices of Flint	Number of Individual Participants N = 42
Modeling Workshops	N
Workshop 1	14
Workshop 2	7
Workshop 3	11
Workshop 4	4
“All hands” City wide Workshop	36
FWC Responder Online Survey divided by group	Number of Respondents N=137
Survey Respondents by Race	110
White	69
Non-white	41
Survey Respondents by Residency	111
Flint Resident	32
Non-resident	83
Survey Respondents by Job/Responder Role	106
Flint Community Organization	57
Religious Organization	9
School	12
Government	11
Emergency Responder	17

Trust

Workshop participants were asked from whom they received information about the lead crisis, how useful the information was, which groups had resident interests in mind, and their level of trust in organizations and community groups. Information sources included several government organizations, community groups, NGOs, and scientists. Survey results indicate that the State of Michigan’s Government is the least helpful and least trusted source of information. This is consistent with other workshop survey results indicating that the State is not perceived to have Flint residents’ best interests in mind. The most helpful and trusted sources were from individuals’ personal social networks (i.e., work, church, friends, and neighbors) and university scientists. These results offer insights for how organizations (including governmental and non-governmental) could improve their communications with the residents of Flint, specifically by providing information through churches and local NGOs (Figure 1).

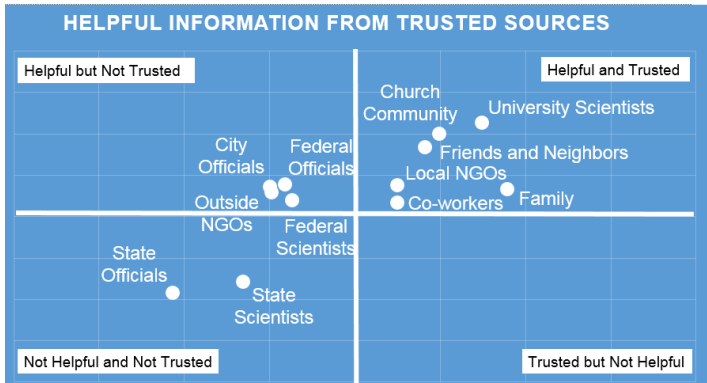


Figure 1. Mean survey responses collected during 4 community workshops in Flint (N=36) indicate a bifurcation between community-based sources and governmental sources based on the dimensions of (a) how trusted information sources are about the FWC (x axis), and (b) how helpful these sources of information are (y axis).

Causes of the FWC

While the direct physical causes of the water crisis include the City's deteriorated infrastructure and the change in water source to the Flint River and water treatment, the community-created models of the FWC collected during workshops revealed additional underlying causes that include:

- exploitative practices by industry;
- Flint's depressed economy and tax base;
- a history of marginalization by race and socio-economic status;
- loss of decision-making control among residents; and
- austerity measures put in place by state government.

These long-standing issues were perceived to create an environment for the infrastructure deterioration and for the decisions that led to the water crisis. Residents identified these as persistent issues that have plagued Flint for decades.

During the modeling workshops, residents were encouraged to view the Flint community and the FWC as a system of interacting components and events. The discussion that followed outlined a narrative that the city has been locked into a vicious cycle of a depressed economy, marginalization by government officials and industry, and a loss of decision-making control. These interacting events resulted in widespread lead exposure which residents believe will lead to additional economic depression (e.g., declining real estate values, decreased economic developed and investment, and decreased educational attainment among residents), leading to further marginalization and additional loss of decision-making control. Recurring terms used by participants across all workshops related to the causes of the FWC are found in Figure 2.



Figure 2. Word Cloud based on reoccurring concepts related to the causes of the FWC mentioned across all 4 workshops.

Consequences of the FWC

Exposure to lead in the water has had several consequences from the community's perspective, ranging from physical health effects and crisis-induced trauma to further economic decline. The immediate effects include decreases in:

- overall community health (particularly children's health);
- real estate values;
- trust in officials;
- educational outcomes/attainment; and
- the local economy.

Immediate effects also include increases in:

- emotional stress and fear;
- daily household labor;
- exacerbation of pre-existing health conditions;
- uncertainty;
- opportunities for outside businesses to take advantage of recovery efforts; and
- the negative consequences from the stigma of poverty and social failures associated with Flint.

The serious health issues resulting from the lead exposure were the most immediate concern of the residents, particularly for those who take care of children and the elderly. It is important to note that uncertainty about the health effects is pervasive in the community due to a lack of consistent, reliable, and trusted information regarding how to assess their personal risks, lack of scientific data on personal and community exposure, and how this information is changing over time. This uncertainty adds to significant long-term psychological stress. Residents believe that dealing with these impacts will create significant barriers to recovery even after infrastructure



Figure 3. Word Cloud based on reoccurring concepts related to the consequences of the FWC mentioned across all 4 workshops.

improvements have been made in the City. Reoccurring terms used by participants across all workshops related to the short and long term consequences of the FWC are found in Figure 3.

Policy Solutions to address the FWC

During workshops, participants discussed and modeled both short-term and long-term solutions to the crisis. The immediate solutions to the water crisis recommended across all workshops included installation of whole-house filters and replacing city pipes. However, these physical improvements were largely seen as immediate and necessary, but considered ineffective in addressing systemic issues such as economic depression. While a need for reparations and real estate buy-outs were certainly identified, residents also seek more sustainable solutions to some of the systemic issues that allowed the lead issue to develop and escalate. Residents were aware of recent steps that have already been taken to restore power to the mayor and city council, but several workshop participants stressed the importance of ensuring that local decision-makers should have a predominant voice in how recovery funds were used.

In general, residents were concerned about the lack of 'inside-the-community' policy solutions. To this end, participants suggested the establishment of a local workforce training program that could address the filter installation, pipe replacement, and social/monitoring programs needed within Flint in the short term. Additionally, in the long term, a trained labor force could also be exported to other communities and municipalities who, due to the national publicity of the FWC, are now reminded of the public health crises that can result from public infrastructure neglect. Residents spoke about Flint being the "canary in the coal mine" for other communities that will likely face similar issues. The community expressed a concern that current government officials may not see the FWC as opportunity for long-term investment in Flint, and therefore, may be reluctant to provide funding for anything beyond immediate issues related to acute lead exposure.

Residents suggested a long-term healthcare plan as a way to deal with some of the anticipated future health issues expected to result from lead exposure. They also expressed concerns about how the crisis would affect youth in the community in years to come, particularly in terms of educational attainment and delinquency. This concern for the next generation presents residents with considerable uncertainty about the future well-being of their community. Policy suggestions include the development of a long term monitoring plan for the children exposed to lead in order to track child development issues and the development of family support programs in schools. Reoccurring terms used

by participants across all workshops related to solutions to the FWC are found in Figure 4.



Figure 4. Word Cloud based on reoccurring concepts related to the solutions of the FWC mentioned across all 4 workshops.

Breaking free of the Vicious Cycle

A dominant theme identified across workshops and analysis of community models was the concern that the recovery money now entering Flint would be contracted to businesses based outside the Flint community. While these contracts may have short-term benefits, such as reducing immediate and extreme lead exposure, such policies were perceived to perpetuate the social and environmental problems that Flint has faced for many decades (Figure 5).

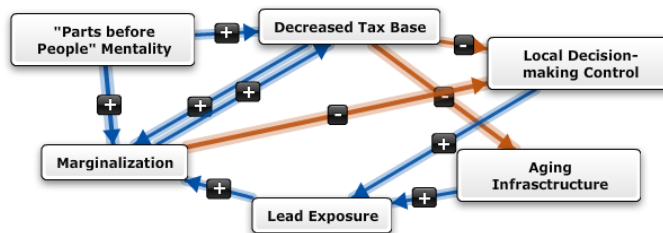


Figure 5. Example of subgraph of the concept map collected during workshop 3 indicated that residents felt that the City of Flint was locked into a "vicious cycle" and that an economic atmosphere of "parts before people" and loss of manufacturing jobs in the Flint lead to 'marginalization" and a "decreased tax base" that led to a decrease in "local decision-making control" and facilitated a lack of investment in "aging infrastructure." These two factors in particular increased lead exposure through the FWC which in turn increase further marginalination.

To address this, several workshop participants recommended that this disaster could be viewed as an opportunity to rebuild the economic tax-base of the City as a way to address systemic problems that led to the disaster. Rather than viewing the FWC as a series of tragic consequences resulting from a handful of bad decisions, several residents of Flint view it as the result of the complex interplay among numerous factors that include (but are not limited to) a decreased tax-base, a history of marginalization, and the inability of the municipality to make decisions based on local knowledge because of the emergency manager program. Therefore, their policy recommendations included local-scale solutions such as providing opportunities for workforce training in Flint to

rebuild infrastructure and developing entrepreneurial opportunities whereby the Flint community might design and engage in rebuilding. Alternatively, outsourcing solutions to the FWC would maintain problems associated with the economically depressed community and not provide them with a way contribute to replacement of their infrastructure, manage the social and health impacts of the disaster and ultimately allow them to rebuild their community and ensure that problems similar to the FWC can be avoided in the future.

Power in Decision-making and Agreement among Residents and FWC Responders

An online survey was developed based on the major themes that emerged from the resident workshops. The purpose of the survey was to identify areas of consensus and disagreement about the FWC among residents and FWC responders. The survey included a series of True/False questions about the causes, consequences and solutions to the FWC and was administered to 355 individuals who represented various community (NGOs, schools, churches) and government organizations involved in the recovery. The FWC responder contact list used for the survey was obtained through a local emergency response organization who had collected this information in the first 5 months of 2016. Therefore the survey data presented here represents a convenience sample and is not a randomized sample of FWC responders or residents. However, these data do reflect perspectives of those actively involved in the months following public acknowledgement of the FWC. Of the 355 individuals that were contacted to take the survey, 101 individuals participated in the larger study. The survey was also administered in-person during the ‘all hands’ modeling workshop with residents for a total of 137 respondents.

Perceived Power in Decision-making

Analysis of the survey data indicate that there is agreement among residents and FWC responders regarding what institutions and groups were perceived to have decision-making power in the wake of the FWC. When asked to rank their level of agreement about organizations or groups holding decision-making power from Strongly Agree (1) to Strongly Disagree (5), with 3 being neutral, survey responses indicated that State, Federal, and City officials and Federal scientists currently hold the most decision-making power, while national NGOs, university scientists, and Flint residents hold the least decision-making power (Table 2).

Table 2. Survey responses from the FWC responder and resident survey regarding level of agreement about which organizations and institutions have decision-making power based on scale (1) strongly agree to (5) strongly disagree with (3) being neutral.

Institutions or Groups with Decision-making Power (in rank order)	Mean (SD) (N=137)
State Officials	1.6(.70)
Federal Officials	2.1(1.0)
City Officials	2.7(1.1)
Federal Scientists	2.9(1.1)
Institutions or Groups with Unclear Decision-making Power (in rank order)	Mean (SD) (N=137)
State Scientists	3.0(1.1)
Local NGOs	3.0(1.5)
Religious Organizations	3.0(1.6)
Institutions or Groups without Decision-making Power (in rank order)	Mean (SD) (N=137)
National NGOs	3.2 (1.5)
University Scientists	3.3(1.0)
Flint Residents	3.8(1.1)

Consensus about Causes, Consequences and Solutions to the FWC

To understand the degree of consensus about causes, consequences and solutions to the FWC, survey participants were separated by basic demographic information (e.g., race and residential status) and cultural consensus analysis was used to determine whether cultural views about the FWC were shared or distinct along racial or residential lines (Table 3).

Based on proportion of true/false statements and patterns of agreement, survey results indicate that there is general consensus about the consequences and solutions among those surveyed independent of racial or residential lines. However, survey results also indicate that there was variation both within and across respondent groups in terms of what caused the event to occur. Some differences along racial or residential lines were found. For example, whites and non-residents were less likely than residents and non-whites to agree that recovery money was primarily benefiting businesses outside of Flint. Additionally, Flint residents were more likely to agree than other groups that the FWC happened because of austerity measures taken by state. Lastly, there was general agreement among all respondents that removing the pipes would not solve the problem and agreement that recovery funds should be used to re-energize the tax base in Flint.

Conclusions

The purpose of the Voices of Flint project was to capture the perspectives of the Flint community members in order to inform future planning and policy development in Flint. Participatory modeling workshops and surveys identified some systemic causes of the water crisis that replacing the lead pipes will not be able to address. When considered together, the data we collected from community members present a troubling finding: that there is widespread agreement that Flint residents do not have power in the decision-making process, that residents do not trust those that have the power in the recovery process, and that some of the risks they perceive are not shared by those engaged in the FWC recovery effort who live outside their communities. If care is not taken to increase community voice and discuss the concerns identified by residents, it is unlikely that social conditions in Flint will be improved in the near future due to a lack of coordination between those impacted by the crisis and those in charge of disaster response.

While the Flint community participants expect to deal with negative impacts of the FWC in the years to come, many of those we spoke with shared their view that this disaster may serve as an opportunity to create a more cohesive and resilient community through entrepreneurship and local, long-term recovery efforts.

Therefore, as recovery planning efforts continue and increase, care should be taken to clearly communicate (through trusted sources) and engage with Flint residents. Furthermore, efforts should be undertaken to ‘insource’ FWC responses, including hiring Flint-based contractors as well as training and organizing Flint residents so that they can provide skilled labor and management for FWC solutions.

Although there appeared to be some disagreement about definitive and exact reasons why the FWC occurred, it is encouraging that the Voices of Flint project revealed there to be a consensus about some of the major problems Flint residents now face, as well as some short- and long-term solutions to these problems.

Contributors to this Report

This research summary is the result of a partnership between the Community Foundation of Greater Flint, MSU Department of Community Sustainability, MSU’s Office of Outreach and Engagement, MSU Department of Media and Information, and Food Plus Detroit who all participated, funded and otherwise supported this report.

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Table 3. Survey responses from the FWC responder and resident survey regarding level of agreement about the causes, consequences and solutions to the Flint Water Crisis (FWC). Participants were asked to provide true/false responses to a series of statements. Responses were grouped by race and residential status to assess agreement within and between different cultures of the community. The table shows the proportion of respondents who answered "true" to specific statements. The Eigenvalue ratio indicates whether or not there is consensus within the group (> 3.0 indicates consensus).

Causes of the FWC	White N=69	Non-white N=41	Across Group Consensus	Flint Resident N=32	Non-resident N=83	Across Group Consensus
The FWC happened because of a breakdown of the democratic process	.70	.73		.78	.66	
The FWC happened because of the appointment of an emergency manager	.70	.73		.88	.64	
The FWC happened because of a poor tax base	.65	.71		.69	.65	
The FWC happened because of austerity measures taken by state	.78	.78		.94	.72	
Eigenvalue Ratio	1.4	1.4	1.3	2.4	1.0	1.2
Consensus	No	No	No	No	No	No
Consequences of the FWC	White	Non-white	Across Group Consensus	Flint Resident	Non- resident	Across Group Consensus
Children were disproportionately affected by the FWC	.85	.91		.89	.87	
Lead is the only contaminant in the water that Flint residents are worried about	.04	.02		.05	.02	
Residents of color experienced the crisis differently than white residents	.63	.57		.65	.59	
The water crisis brought the community together	.71	.72		.76	.68	
The water crisis creates an opportunity for Flint to rebuild itself	.89	.91		.81	.91	
Flint residents will continue to feel impacts of the water crisis for the next 10 years	.89	.98		.95	.89	
Recovery funds are primarily benefitting contractors outside of Flint	.34	.70		.73	.37	
Eigenvalue Ratio	5.7	8.7	5.6	4.6	5.2	5.2
Consensus	Yes	Yes	Yes	Yes	Yes	Yes
Solutions to the FWC	White	Non-white	Across Group Consensus	Flint Resident	Non- resident	Across Group Consensus
Removing the pipes solves the problem	.16	.26		.25	.18	
After lead pipes are removed, increased household labor caused by inability to use household water will be reduced	.78	.59		.67	.70	
Recovery funds should be used to re-energize the tax base in Flint	.76	.85		.78	.83	
The resignation of Governor Snyder will solve the FWC	.05	.13		.22	.03	
Eigenvalue Ratio	4.9	2.8	3.6	3.1	3.5	3.4
Consensus	Yes	No	Yes	Yes	Yes	Yes

Supplementary Materials

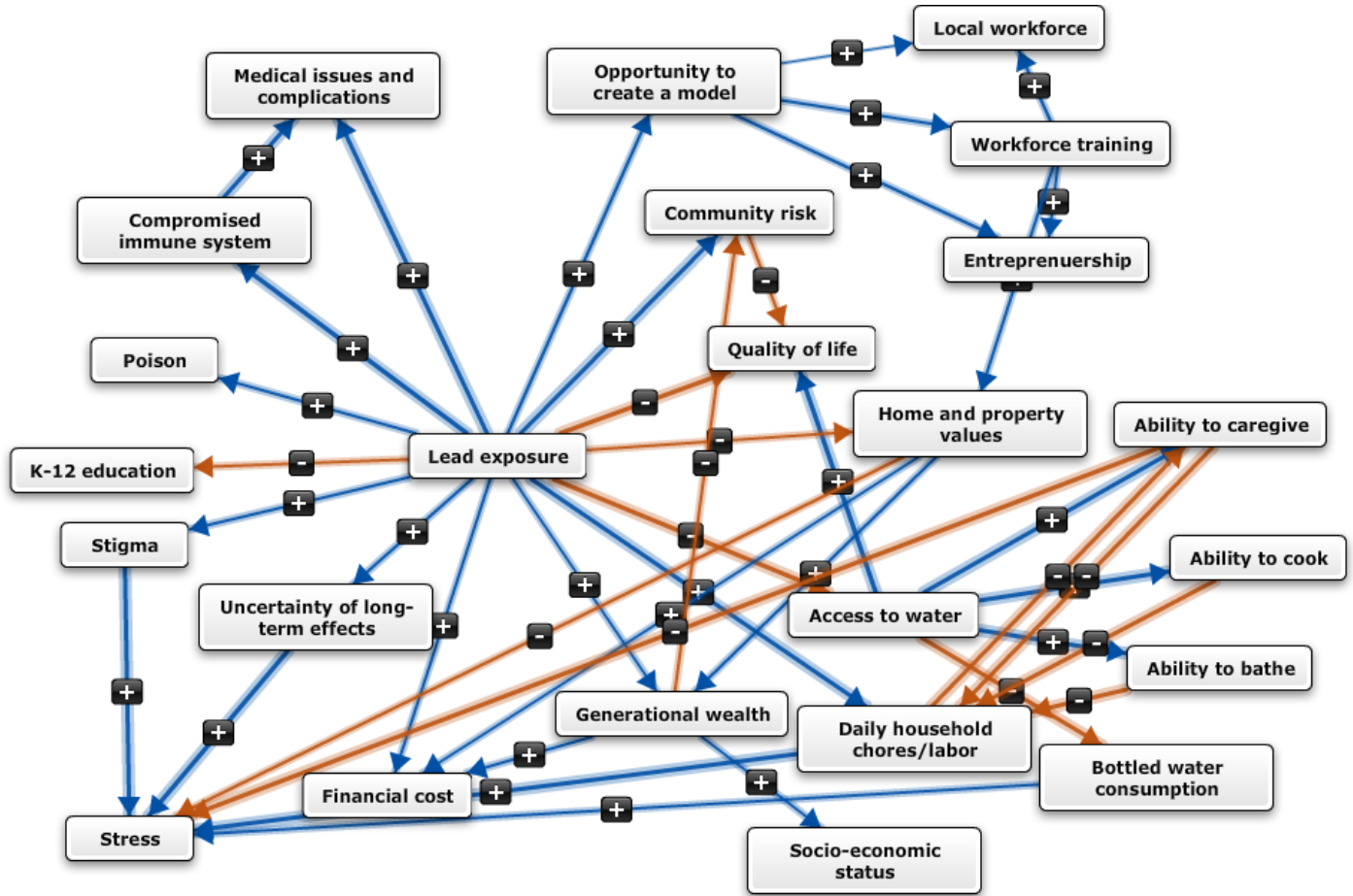


Figure S1: Example of sub-model developed with 11 residents during Workshop 3 shows the direct and indirect effects of “lead exposure” and its impact on the Flint community when represented as a system of interacting components. Red lines indicate decreasing influence and blue lines indicate increasing influence. For example, when “lead exposure” increases, it decreases “K-12 education” quality and increases both “stigma” and “uncertainty of long-term effects” which, in turn, increase “stress”. Similar models were collected during all individual workshops held throughout the city and reviewed during the “all hands” workshops to generate clear policy recommendations from the community. Models were developed using Mental Modeler software (www.mentalmodeler.org).