

## **J. Corburn and S. Swanston: Case Study**

### **Mapping and CBPR**

In the Greenpoint/Williamsburg (G/W) neighborhood of Brooklyn, New York, community groups have engaged in partnerships to map their research findings in order to address environmental health disparities. Mapping is increasingly understood as a central component of epidemiologic research and moving from research to policy, particularly for those interested in contextual and neighborhood effects on health.<sup>1-7</sup> <sup>1 2 3 4</sup> <sup>5 6 7</sup> Two Brooklyn community-based organizations, the *Watchperson Project* and *El Puente de Williamsburg*, have used a range of mapping strategies, including artist rendering, street murals and geographic information systems (GIS), to move from research to action. Three vignettes of the work of these two groups highlight the power maps have to make scientific data more universally accessible and understood as well as the limitations inherent in map-making, such as how they can over-simplify and wash-out contextual complexity of neighborhood health phenomenon.

### **Mapping Environmental Health in Brooklyn**

The G/W neighborhood is a low-income community where a number of ethnic groups and polluting industries coexist. Latino, Hasidic Jewish, Polish immigrant, and African-American families, along with young whites, live in a community where over thirty-five percent of residents live below the poverty line. In less than five square miles, the neighborhood houses over thirty waste transfer stations, the city's largest sewage treatment facility, and seventeen Toxic Release Inventory (TRI) sites listed by the U.S. Environmental Protection Agency.<sup>8</sup> A 2000 neighborhood health survey by the New York City Department of Health and Mental Hygiene found that over 12 persons per

1000 were living with HIV/AIDS (almost double the 6.4% rate for Brooklyn as a whole), almost 70% of residents are overweight (compared with 53% across NYC generally), 12% have been diagnosed with diabetes (compared with 8% for NYC), and almost 104 persons per 10,000 are hospitalized each year for mental illnesses, compared to approximately 67/10,000 across NYC.<sup>9</sup>

### **Mapping for Coalition Building**

A community mapping project began after residents learned that the New York State Department of Environmental Conservation had scheduled a public hearing to review the operating permit of a neighborhood business, Radiac, the city's only low-level radioactive waste transfer and storage facility. Students at *El Puente Academy*, a high school run by the community-based organization, organized a group called the *Toxic Avengers* to research and document the existing environmental health burdens in preparation for the public hearing. The data gathering and mapping project was led by Dr. Jose Morales, a public health scientist, and technical assistance was provided by the Queens College, Center for Biologic Systems. After walking the neighborhood, reviewing environmental pollution, and existing public health data, the young people produced a map depicting how they viewed their community and the potential environmental health threats from the Radiac facility (Figure 1).

**<<Insert Figure 1 About Here >>**

The student map shows skulls 'describing' numerous local hazards with a background map that was made to look like an x-ray, all aimed at portraying a sense of

urgency that local pollution is compromising residents' health. Pictures of local facilities are used on the map to ensure viewers recognize polluters by sight, not just name, and some brief text about the facilities' environmental performance accompanies each image. To further portray the sense of urgency, the images of each facility are slightly "whited-out" to look almost ghost-like. According to Luis Garden Acosta, El Puente's founder and Executive Director, the Toxic Avenger's map convinced him that everyone in the community breathed the same air and it would take a neighborhood-wide coalition to stop existing polluters.<sup>10</sup> The maps were placed around the community to alert residents about the upcoming hearing. Acosta sent one map to the leader of the Hasidic Jewish community, Rabbi David Niederman, along with a personal invitation asking for his group to join El Puente on a march through the streets to the Radiac public hearing. Rabbi Neiderman was so impressed by the map and the severity of the potential health hazards in the neighborhood, that he asked to lead the march himself. Holding the Toxic Avengers maps in hand, over 200 Latino and Jewish environmental health activists marched together to the hearing.<sup>11</sup>

While Radiac's operating permit was eventually renewed, the public outcry at the meeting forced the state to attach more stringent environmental safety and monitoring procedures to their permit. Perhaps more importantly, the Toxic Avengers map helped organize a multi-ethnic environmental health coalition in the neighborhood that eventually came to be known as the Community Alliance for the Environment (CAFE). While the neighborhood's different ethnic groups could not come together around other social justice issues such as affordable housing, the CAFE held together and would continue to play an instrumental role in future environmental health research and action,

including gathering evidence that stopped an incinerator from siting in the neighborhood, improved the performance of a local sewage treatment plant, and encouraged the EPA to pilot a cumulative exposure assessment study in the neighborhood.

### **Mapping for Asthma Awareness and Action**

Mapping has also played an important role in helping to address asthma afflicting the neighborhood's Latino population. Using a CBPR approach, El Puente partnered with Community Information and Epidemiologic Technologies (CIET), a non-governmental organization that provides technical assistance, to perform a series of door-to-door surveys and community focus groups aimed at generating evidence of local health disparities and environmental injustices.<sup>12</sup> Over the past decade, a series of community health surveys and tens of focus groups organized by community health workers from El Puente have reached over 6,000 Latinos living in the Southside of Williamsburg.<sup>13</sup> Some key survey findings were that over three-quarter of residents believed air pollution was a source of poor health, 12% of the Latino population reported being diagnosed with asthma within the past year, close to half the population did not have health insurance, and over 40% used herbal and other home remedies to treat their asthma.<sup>13</sup> According to Cecilia Iglesias-Garden, the leader of El Puente's community health worker team, the survey findings were the first "scientific" validation of what many in the community had known for a long time; namely that asthma was disrupting lives and leading many families back to familiar and trusted practices such as culturally-rooted home remedies.<sup>14</sup>

In an effort to share their survey and focus group findings with the wider community, El Puente members designed a street mural. The mural helped translate

findings and validate the local knowledge of residents. Painted on a prominent building in the heart of the Latino community, the mural depicts some of the know triggers of the disease, the physiology of an asthma attack, the importance of collective action to address the disease, and treatment options (Figure 2).

<<Insert Figure 2 About Here >>

Street murals are a type of mapping that can allow CBPR participants, especially historically marginalized and voiceless populations, to tell stories of anguish, injustice and disease. El Puente used its street mural to draw attention to the disease, attract residents to community health events, and to assist the street-level and in-home health outreach being performed by their community health worker team.

### **Air Toxics and GIS Mapping**

A third example suggests how community-driven research can employ advanced technologies such as GIS, to better understand hazardous exposures and drive interventions. After selecting G/W for its first community-based cumulative exposure assessment, the Environmental Protection Agency (EPA) presented its methodology for modeling air toxics at the neighborhood-scale during a series of public meetings. This would be one of the first attempts by EPA to use modeled estimates of air toxics concentrations at the census tract level in a community-wide exposure assessment.<sup>15</sup> At one meeting, the Watchperson Project questioned whether the EPA air toxic model should be based primarily on emissions from Toxic Release Inventory (TRI) sites. The EPA responded that they were using TRI sites because air toxics monitoring data did not exist in the community. Members of the Watchperson Project noted that the decision to

limit model inputs to TRI sites would miss emissions from the hundreds of small area source polluters in the neighborhood, such as auto-body shops, printers, and dry cleaners.

To document the potential limitations of the EPA model, the Watchperson Project performed street-level visual surveys and combined these with their in-house GIS to map both the TRI sites and the location of area sources found in their street-surveys and an air permit database obtained from the New York City Department of Environmental Protection.<sup>16</sup> The result was a series of block-by-block maps revealing that the EPA model was going to miss approximately 3,000 facilities that were emitting or likely to emit air toxics. The Watchperson Project also used the findings from the street survey to develop another map depicting the location of dry cleaners located in residential buildings, and the number of families living in those buildings derived from US Census data (Figure 3).<sup>17</sup> According to Samara Swanston, Director of the Watchperson Project, the maps were intended to emphasize to the EPA that the neighborhood had a unique set of hazardous exposures that would be washed-out with standard air dispersion modeling assumptions. Ultimately, the community maps did not alter the EPA model, but they were used to encourage the New York City Department of Environmental Protection to issue new, more stringent operating and venting rules for dry cleaners operating in residential buildings across the city.<sup>18</sup>

**<<Insert Figure 3 About Here >>**

### **From Mapping to policy in CBPR**

As the three vignettes reveal, the mapping of community data may not immediately influence policy, but the mapping process can help legitimize community knowledge, translate and share findings, and building neighborhood coalitions, all of

which are elements of successful interventions and policy-change. The mapping process can also influence the policy discourse by questioning what information should matter and who can offer credible data. As the Watchperson Project example highlighted, successful community mapping efforts can reveal power imbalances that may be built into professional models, techniques and analytic methods. By using a method that is widely accepted by professionals, namely GIS, the Watchperson Project was able to shift the policy discourse around air toxics from ‘what is a safe exposure’ to ‘which neighborhood residents may be disproportionately burdened?’

The three vignettes also reveal that making maps is more than visually displaying information. The El Puente asthma mural expressed values within local Latino tradition and culture. The Toxic Avenger’s ‘skulls’ map resonated with residents because it depicted both hazards and the subjective meanings young people associated with them. Since community map making always requires selectively including some data from a complex reality, the process is as much about expressing and shaping local identity as it is about displaying information. Finally, the vignettes suggest that CBPR practitioners should use maps with caution, since the necessary data aggregation process can obscure the complex interactions between neighborhood social and physical characteristics, and understanding these interactions may be critical for designing effective health promoting policies.

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