Chapter 23

Building Healthy Cities

A Focus on Interventions

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1.0. INTRODUCTION

Healthy cities do not exist, rather they must be created. As a result, healthy cities are characterized by a constant stream of interventions that strive to improve the social, environmental, occupational and economic conditions of their residents. These interventions augment city health and should never cease.

Cities of the 19th century were plagued by pollution, pathogens, and over-population and suffered from smells, dirt and noise. These living conditions were dangerous to peoples' health. A review of historic public health regulations and interventions in cities and towns illustrates the process of progressive improvements in urbanites' health. The design and layout of urban sewage lines and trash incineration, public water collection, and distribution systems extended longevity and reduced morbidity. Besides sanitration and hygiene, housing occupancy restrictions helped to prevent the spread of infectious diseases such as tuberculosis, building and fire codes, and workplace regulations helped to improve environmental and occupational health. Public health is a far reaching discipline that not only aims to meet basic human needs such as safe water, food, shelter, work and safety but also to create environments that support a healthy way of life. For example, single land use zoning laws were designed to create physical environments that separated industrial emissions from residential areas to prevent toxic exposures. Segregated land use created the modern American cities with remote suburban subdivisions separated from commercial and industrial areas connected by a vast expansion of highway networks. The rise of the suburbs is also linked to the decline of the inner cities, with resources being diverted to support the construction of a costly dispersed infrastructure. In turn, some urban centers have become desolate, unappealing, and anonymous. The rectangular grid layout of American cities with long monotonous city blocks is not conducive to community life which is torn apart by speeding traffic. This development has resulted in a number of public health problems that need to be addressed with targeted interventions for healthier cities.

The extent of decline of the urban core, varies from city to city and while not ubiquitous is nevertheless sufficiently widespread to be of concern; it manifests itself in abandoned downtowns that lack vitality, as well as degraded infrastructure, damaged homes, trash accumulation, and graffiti, which negatively affects mental and physical health over and above personal risk factors. Dilapidated physical environments of inner cities have been associated with poor vaccine coverage and high infectious disease rates, including measles and AIDS (CDC, 1998; Wallace, *et al.*, 1990; Kenyon, *et al.*, 1998). Inner city neighborhoods have also been associated with chronic diseases such as cardiovascular diseases, diabetes and asthma (Shewry, *et al.*, 1992; Rosenstreich, *et al.*, 1997; Diez-Roux, *et al.*, 1999). An epidemic of obesity that cuts across all demographic groups is sweeping the U.S and has been increasing over time nationwide (Mokdad, *et al.*, 2001; Ogden, *et al.*, 2002; Flegal, *et al.*, 2002; Wolf-Maier, *et al.*, 2003). Obesity is a serious health hazard also responsible for sleep apnea, hypertension, low self-esteem, and depression. Neighborhood of residence is associated with elevated body mass index, even after adjusting for age, sex, class, smoking, and material deprivation (Ellaway, *et al.*, 1997), and it is proposed that the built environment affects physical activity (Poston and Foreyt, 1999; King, *et al.*, 2000; Handy, *et al.*, 2002). While the obesity epidemic has disproportionally affected low density sprawl developments it is also associated with multiethnic, low income, inner city neighborhoods (O'Louhlin, *et al.*, 1998). Thus, neighborhoods that encourage physical activity may help to control the obesity epidemic (Goran, *et al.*, 2000).

Neighborhood stressors can trigger depression and decrease physical functioning in the elderly (Aneshensel and Sucoff, 1996; Balfour and Kaplan, 2002; Latkin and Curry, 2003; Kingsley, 2003). The diagnosis of depressive disorders increased across ethnic groups in the U.S. with prescription for antidepressants escalating three-fold between 1988 and 1998 (Skaer, 2000). Urban blight has been associated with negative emotions and a sense of hopelessness (Greenberg and Schneider, 1996; Fitzpatrick and LaGory, 2000). A direct link between the environment and mental health has been established in a variety of urban settings (Stiffman, *et al.*, 1999; Black and Krishnakumar 1998; Marsella, 1998; Dalgard and Tambs, 1997; Frumkin, 2002). Environmental features such as public gathering places and worthwhile destinations for pedestrians that facilitate social contacts and support can improve mental health (Halpern, 1995; Dalgard and Tambs, 1997). More recently, an experimental study that randomized subjects to different living environments found neighborhood effects on mental health both in adults and children (Leventhal and Brooks-Gunn, 2003). Social disorder such as crime, public drinking and drug use, also negatively affect well-being and neighborhood satisfaction (Dembo, *et al.*, 1985; Wallace 1990; Sampson, *et al.*, 1997).

The most prevalent risk factor for chronic diseases such as obesity, hypertension, cardiovascular disease and depression is physical inactivity and even moderate physical activity has a beneficial health benefit (Pate, *et al.*, 1995). What urban features encourage active living? Some neighborhood designs are more conducive to walking, social interactions and social networks and community involvement have distinct mental and physical health benefits (House, *et al.*, 1988; Berkman and Kawachi, 2000; Kawachi and Berkman, 2001). Moreover, cities are engines of art, civic life, and economic activity and enrich the human experience with religious, cultural, and racial/ethnic diversity. Urbanicity has the quality to generate collective amenities such as libraries, theaters, and hospitals that serve the common good. These characteristics of certain urban settings can be health promoting and thus be beneficial to public health. This chapter describes an urban intervention to

enhance these characteristics by retrofitting the urban setting. The approach was developed by a non-profit organization entitled "The City Repair Project" in Portland, Oregon. City Repair works with hundreds of volunteers and activists committed to making urban communities better places to live. The intervention described here aims to revive the existing urban city layout with novel urban features and amenities that help to create healthy urban environments that foster healthy social environments. The following section describes the problem at hand of building healthy cities and the implications for urban community organizing. The next section explains the specific steps of the "intersection repair" strategy, followed by a case study. This intervention strategy has been applied to a number of settings in different cities with the original prototype "intersection repair" projects in Portland.

2.0. FRAMING THE PROBLEM

2.1. Life in the Grid City

Most American towns and cities have been laid out with a grid pattern comprised of streets and side streets crossing at right angles (Figure 1). Such a simple network of orthogonal streets that intersect in a regular manner creates rectangular or square city blocks. The rationale of city planning to shape the urban environment with this pattern of vertical and horizontal streets lies in increased connectivity: the possible routes between any given two points is maximized. Short of diagonal connections (which are missing in a rigid grid layout) the distance between the starting point and the destination is minimized, diversifying the transportation options and

Figure 1. The Grid City with a Predetermined Rectilinear Layout, Portland OR. (Reproduced with permission, City of Portland)

improving the transportation system. In contrast, with the hierarchical traffic pattern found in more recent development such as urban sprawl, trip lengths increase because the residential streets with few connections feed into arterial streets that move traffic out of the neighborhood. In this model, a trip across the neighborhood is very difficult, while a trip around the neighborhood is very easy and fast. Thus, the grid is the geometric form of choice for a planned network with high connectivity for efficient movement of goods and services.

The origin of the gridiron has its roots in ancient settlements since biblical times. Modular grid patterns were used 3000 B.C. in Assyria and Babylonia for military camps and city designs and the temple complex of Zoser at Sakkara in Egypt was laid out orthogonally in 2650 B.C. (Kostof, 1985). The discipline of rational city planning has been attributed to the architect Hippodamus of Miletus (498-408 BC). He is credited with designing orthogonal towns including Olynthus, Priene, and Miletus; for example, he designed the Mediterranean harbor town Miletus in such a way that the sea and mountain winds could freely breeze through the city blocks and bring relief during the hot summer months. The orthogonal design was used by the Greeks for solar architecture to fully capture the sun rays during the winter but to escape the full solar impact during the summer, when the angle of the sun has shifted. These ancient methods to fight the urban heat island effect are remarkable in light of persistently high heat-related mortality and morbidity in urban centers today, that are entirely preventable. (Semenza, *et al.*, 1996; Semenza, *et al.*, 1999). The Greeks also invented the Phalanx, a rectangular arrangement of soldiers, and exported the grid city to their colonies as a tool of military control.

The Romans imposed a rigid quadrilateral structure over the conquered land and allocated square subdivisions to war veterans; they introduced the castrum to urban planning in their colonies, a fortified legionary camp with a predetermined grid pattern. At the heart of the ancient Roman city planning is the crossing of the two main streets, the east-west oriented decumanus and the perpendicular north-south cardus. At the center of the castrum was an institutional building or temple with the two mayor perpendicular crossroads extending through the fortification into the landscape. The forum in the center was thus able to control the traffic passing through the gates of the walled rectangular castrum.

European settlement of North America was characterized by towns with a concentric layout with a common meeting house in the center and public squares. Population growth and immigration necessitated more land acquisitions and the rectangular grid plan was adapted as the organizing theme. For example, New Haven, Connecticut or Savannah, Georgia, were laid out on the grid with a central public square for the church or a public square for the community. The National Land Ordinance of 1785 dictated that the westward expansion from the existing colonies be divided by a rectangular grid pattern, which was also applied to the planning of cities and towns (Kostof, 1985). Such a subdivision assured an efficient way to effectively plan and sell new acquisitions (Maholy-Nagy, 1968). Furthermore, the uniform distance between sections and blocks facilitated transport of people and goods. Inherent in the principle of the classic grid design applied to the city is the uniform distribution of traffic circulation: there are no major arterial roads that are at the top of the hierarchy of high volume traffic and conversely there are no residential streets that are spared the high volume travel of cars. Residential neighborhoods can therefore fall victim to a constant stream of through traffic which negatively impact the quality of urban life (APHA, 1948). Unlike the cities in the east such as, New Haven and Savannah, the National Land

Ordinance did not provide for public centers, parks, or open landscapes since it carved the land into squares of private property and virtually omitted the public realm, except streets. The monotony of the rectangular pattern did not consider topography or the natural curvilinear layout of the land and was imposed over the undeveloped landscape to neutralize the environment. The lack of open space deprived the urban population of recreational sites with fresh air and abundant light, and fostered monotonous housing standards. Furthermore, the omission of public squares, ceremonial places, and public structures as nodes of community life was a serious limitation of the relentless grid design; it could potentially be the source of social isolation and alienation in urban centers. The grid layout fulfilled a number of technocratic goals, but fell short to take into account a number of human qualities. Aristotle criticized the Hippodamian approach to city planning stating that every city core should have a haphazard arrangement and he stressed the importance of tradition and habit in making city residents orderly and law-abiding. Indeed, cultural identity may be stronger in an organically evolved city plan with historic and artistic landmarks.

The intervention described here aims to retrofit the layout of the grid city by integrating public gathering places into the public realm. These gathering places aim to reinstate the town commons that historically had been the geographic glue of community stewardship. These restorative public places with interactive art installations are intended to inspire a sense of belonging and identity, trigger conversations among strangers, spark creativity, cultivate civic capacity, and even stimulate local economic vitality. These commons are essential parts of the democratic process to facilitate collective responsibility and tolerance. The approach has been implemented by the local non-profit organization The City Repair Project, and has been field-tested and evaluated at numerous sites.

3.0. COMMUNITY ORGANIZING IN URBAN NEIGHBORHOODS

This particular intervention has been designed to enhance the urban core of American grid cities which tend to have been planned without any provisions of significant public gathering places. Community organizing in urban neighborhoods can reverse alienation and foster a sense of responsibility that counteracts urban blight; it encourages residents to take initiative against social disorder and physical deterioration (Wilson, 1996). Neighborhood stewardship manifested in physical improvements of the urban environment is a direct consequence of the community organizing capacity; this capacity that can directly be translated into concrete action such as physical improvements to solve local problems (Perkins, *et al.*, 1990). Often residents have little control over the demographic composition of their neighborhood nor over transient populations that may be involved in drug trafficking and crime; however, residents can revitalize their built urban environment. Factors that determine participation in such community efforts to reverse urban decay are sense of social connectedness and sense of community (Crenson, 1978; Florin and Wandersman, 1984; McMillan and Chavis, 1986; Taylor, 1988). Once a more inviting place has been created that is aesthetically pleasing, friendly and safe, such as the public squares described here, social interactions are facilitated which in turn increases the sense of community and participation in community efforts.

Community organizing relies on social capital which refers to the potential and resources inherent in social networks or social cohesion (Putnam, *et al.*, 1995)

and comprises a web of social relationships and their characteristics (Berkman and Glass, 2000). Social network ties have been associated with decreased rates of mortality among adults and increased sense of well-being (Seeman, *et al.*, 1988; Oxman, *et al.*, 1992). Social capital relies on such networks for cooperation between residents of dilapidated urban environments to initiate collective problem solving. Social capital can be seen as a by-product of social relations that promote trust and mutual cooperation and is therefore not a characteristic of one particular individual, but rather a collective characteristic. As such, social capital can facilitate remedial action in an urban setting and promote specific steps necessary for local problem solving.

There are two components to social capital: localized and bridging capital. Localized capital, inherent in existing social or religious groups, is necessary but not sufficient for community problem solving, because it may produce redundant information not pertinent to improving inner-city neighborhoods (Granovetter, 1973). In contrast, bridging social capital connects various groups and can reveal new information for local problem solving and create new opportunities. Therefore, a public health intervention that sequentially builds social networks to augment localized social capital and facilitates bridging capital should result in collective efficacy that would engage residents in direct social action (Sampson, *et al.*, 1999). This intervention aims to realize community projects in the grid city that build community capacity and governance skills for consensus decision-making and community stewardship.

Although building social networks and social capital to solve community problems has merit on its own, it can also indirectly promote public health: social support and friendship ties reduce mortality and morbidity (House, *et al.*, 1988; Semenza, *et al.*, 1996, Semenza, *et al.*, 1999); lack of trust between neighborhood residents is associated with increased risk of death from cardiovascular diseases (Kawachi, *et al.*, 1997) and in U.S. states with lower levels of social capital, self-reported health is poorer, controlling for individual risk factors (Lochner, *et al.*, 1999; Kawachi, *et al.*, 1999). Social capital has also been related to mental health in adolescents (Aneshensel and Sucoff, 1996), adolescent birth rates (Denner, *et al.*, 2001), and firearm deaths (Kennedy, *et al.*, 1998).

It has been recognized that voluntary involvement in organizations and institutions is crucial for local problem solving (Bellah, *et al.*, 1996), disease prevention (Green, 1990) and mental health (Naparstek, *et al.*, 1982); however, it has proven challenging to realize such programs (Sieler-Wells , 1989). The procedure described here has been institutionalized and builds both localized and bridging social capital, through an ecologic intervention. The intervention encourages residents to improve the urban "grid-scape" physically (streets and public squares) in order to stimulate walking; it supports neighbors to build worthwhile destinations for pedestrians in the public realm that are inviting socially in order to improve social networks and cohesion and it engages participants to beautify the neighborhood symbolically thereby to creating a sense of belonging and pride.

4.0. THE STRATEGY: INTERSECTION REPAIR

4.1. An Urban Intervention

The process of creating healthy cities involves the political support of a wide range of governmental agencies that are willing to engage in trans-disciplinary integration

and community involvement. The success of such interventions depends on the political commitment and leadership that can lead to institutional change. While these strategies are important for the long-term planning process of new urban developments, the question remains how current urban features can be retrofitted to improve public health.

A successful intervention within the city limits of Portland, Oregon has been conceived by The City Repair Project, initiated by community members and supported by City officials. The intervention aims to retrofit the urban orthogonal grid to create public gathering places for human interactions. This approach illustrates both the importance of public participation in neighborhood design but also the relevance of urban amenities and art to improve the qualities of urbanity.

The objective of this health-promoting neighborhood intervention is to engage residents in neighborhood stewardship in the interest of public health. It is an urban revitalization strategy that directly engages communities in urban design, a field that has traditionally been dominated by professional planners, architects, and developers. The community-initiated neighborhood-enhancement project is intended to dynamically connect individuals by involving them in the planning and implementation of creative and attractive urban places. These interactive communities intentionally design vibrant places that are restorative to mental and physical health. This health-promoting neighborhood intervention creates sustainable communities by creating gathering places with environmentally conscious construction that benefit both the livability of the neighborhood and the well-being of its residents. Improvements in the physical environment have positive ripple effects across social indicators, such as changes in the social fabric of the community and expansion of social networks after the intervention. Working together on ecological construction, particularly working with cob (a natural building material), which relies on collective physical labor, stimulates social interactions and increases physical activity. Other activities, such as community organizing and design workshops contribute to expanding social ties as well.

4.2. Community Outreach

A step by step description of the health-promoting neighborhood intervention is described here. Community organizers are hired who are responsible for outreach to neighborhoods with significant urban problems (Figure 2; step 1). Particular attention is placed on involving underrepresented populations such as groups of different socioeconomic status, race, ethnicity, age, sexual-orientation, etc. To begin the process of site selection the organizers communicate with a wide range of residents and collect information about potential sites (Figure 2; step 2). Informal meetings are held at a residence close to any site where an intervention project is anticipated to be implemented (Figure 2; step 3). At the initial meeting, residents socialize with each other and social networks are initiated in a process of building localized social capital. In subsequent meetings, information is provided about mechanisms for improving the built urban environment and staff from City Repair holds a slide presentation about projects that have been created in the past. This step sparks discussions and questions and an open forum is held to allow different points of views to be expressed. The community organizers track these discussions and create contact sheets, including names, addresses, phone, and e-mail contact information of engaged residents. The community organizing staff assures that all residents within a two block radius are included (or informed) in this process, since these individuals need to sign off on the final project (see below). Thus it is important to canvass systematically from door to

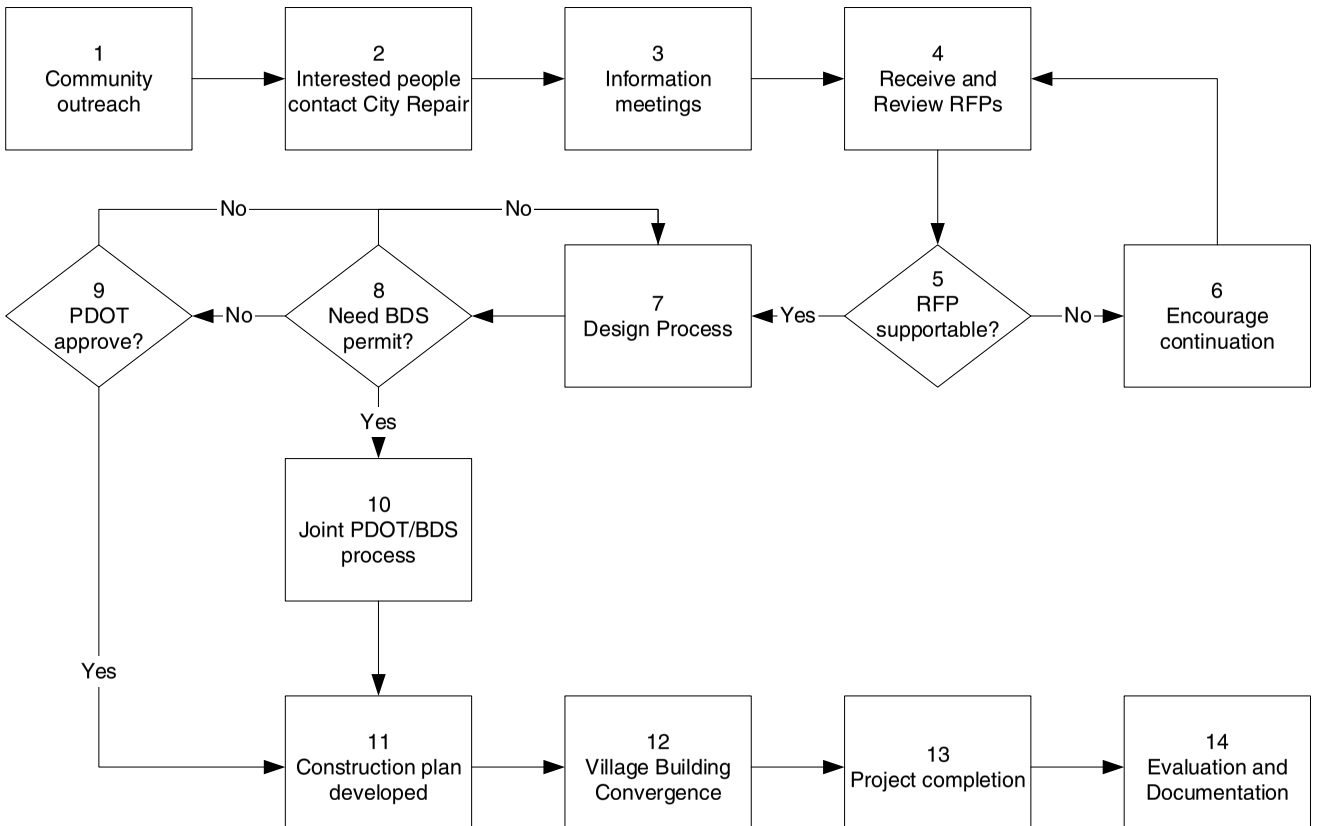

Figure 2. Flow-diagram: A Health Promoting Neighborhood Intervention. See text for details; PDOT: Portland Department of Transportation; BDS: Bureau of Development Services; RFP: Request for Proposals. (*Source:* Adapted with permission from Cowan, S., Lakeman, M., Leis, J., Lerch, D., and Semenza, J.C. The City Repair Project. Belltown Paradise/Making Their Own Plans. Bloom, B., and Broomberg, A. [eds.] White Walls, Inc., Chicago, Il).

door to inform interested residents beyond the two block radius. Beyond personal outreach, flyers, phone banks, email listservs, and information bulletin boards are used to disseminate information about meeting time and location. Representatives from Neighborhood Associations also participate in this process since they are local advocates for neighborhood issues and represent a voice to the larger City government. Representatives from City Bureaus are also informed about the process and community members are encouraged to work with the City to discuss different project ideas; this step builds bridging social capital.

4.3. Design Process

Following these meetings, interested neighborhood groups receive a "request for proposals" (Figure 2; RFP; step 4) and are asked to provide information about their motivation to initiate such a project, the depth of neighborhood participation, and their vision. From the pool of these applications, sites are selected (Figure 2; step 5) for formal development. As a result of the community outreach, a core group of residents is formed in these neighborhoods. The neighborhood core group serves as leaders that organize planning meetings and encourage participation in the design process from residents within a two block radius. The neighborhood core group also determines the schedule for community involvement, organizational structure, design workshops, installation dates, and plans for maintenance and future development of the project. The group ensures that all voices are heard, that the decision-making process is accessible, and that there is a process to address concerns, such as consensus decision making. The neighborhood core group is also responsible for regularly communicating with their neighborhood associations and with affected neighbors. Neighbors are provided with information about the project, results of recent meetings, next steps, how to get involved and/or respond. This process involves: door to door outreach, flyers, listservs or websites, activating neighborhood phone trees, posting information either in a temporary "communication station" at the intersection or in someone's front yard, hosting small gatherings, etc.

In collaboration with trained facilitators and design professionals, a base map of each of these sites is developed with critical landscape features and architectural structures. Suggestions for worthwhile destinations for pedestrians and other improvements is discussed and incorporated into preliminary drawings. Designs for the public place reflects the local culture and public art and may incorporate features such as seating areas, lighting, signage, paths, landmarks, water fountains, and information centers/information kiosks. These design workshops involves a series of steps with feedback loops, where ideas are turned into designs, moving from the general to the specific (Figure 2; step 7). Neighborhood skills are assessed and supported by architects and design professionals. Design concepts are disseminated by the core group as part of the outreach activities, and feedback is incorporated into technical drawings for permitting and building. At least two design workshops per neighborhood are held to develop artistic destinations for pedestrians and other features and structures. The design workshops are the focus of the public participation process. In these workshops neighbors share ideas and concerns and together produce both the design and process for creating the project. Workshops are as accessible as possible, including choice of time and location, and providing translation, childcare, food, etc. A workshop design team assists in the development of technical drawings. The team is composed of

design professionals, trained facilitators, and providers of technical assistance in the areas of natural building, permaculture design, and relevant forms of public art. The workshop design team is charged with guiding the design process. The final plan is presented at an informal community gathering and routed for signature within a two block radius of the project, as required by City Ordinance (see below) prior to obtaining permits and approval. The Neighborhood Core Group and volunteers from the City Repair Project present the proposal to City traffic engineers for evaluation and authorization, in a process of building bridging social capital.

This design process is the basis for the development of plans for structures that foster walking activity, social interactions and cultural development. Furthermore, the actual process of collectively constructing a feature in the public right of way empowers communities and builds social networks.

4.4. Permitting Process

The City of Portland allows street painting and construction in the right of way, according to City Ordinance #172207 (September 19, 2001), which regulates the implementation of such activities. The Portland Department of Transportation (PDOT) has established a precedent for these projects by granting revocable permits (Figure 2; step 10) for ongoing intersection modifications, if the two streets can be classified as Local Service Streets and carry less than 2,500 vehicles on an average day. A petition of support is required by the city; the petition has signatures from each of the adjacent residents and at least 80% of the residents on the project street frontage(s) within two standard city blocks of the proposed project. The City Traffic Engineer has the authority to modify the petition boundaries when considered appropriate. The residents provide a written description of the proposed changes, including diagrams depicting how the intersection will look when completed. The residents have to demonstrate how the project will improve, or at least maintain, traffic safety and the safety of individuals at or in the vicinity of the intersection. Issues of concern may be as follows.

4.4.1. Pedestrian, Bicyclist and Automobile Safety

Concerns for safety are incorporated into all designs, as outlined by PDOT requirements and the technical expertise of the design professionals involved. Concerns may also be addressed by reviewing statistics for car-to-person collisions at the sites, inviting representatives of existing sites to speak at neighborhood meetings to discuss pedestrian safety issues.

4.4.2. Vandalism and Crime

Social disorder tends to be a problem at the intersection repair sites prior to the intervention. Reported offenses within a two block radius of one site have decreased statistically compared to two unimproved sites.

4.4.3. Disability Accommodation

Concerns for disability accommodation is incorporated into all designs, as outlined by PDOT and ADA requirements and technical expertise of design professionals

involved. Concerns may also be addressed by inviting a representative from Independent Living Resources to the neighborhood organization to discuss disability issues and how to develop a space that is safe and inclusive for people with disabilities.

4.4.5. Maintenance

The Neighborhood Core Group at each site is committed to overseeing the long-term responsibility, maintenance and development of the intersection repair project.

The City of Portland, OR has provided political support to institutionalize the intersection repair process and has collaborated with neighborhood associations, non-profit organizations and residents to implement the projects.

4.5. Construction Workshop

An organizing committee is formed of volunteers, neighbors, students, professionals, builders, designers, activists and artists for project implementation and coordination of all project aspects (Figure 2; step 11). Implementation of projects provides many opportunities for individuals and organizations to contribute their resources, expertise and vision. The media are used to alert the public to the upcoming event and how to get involved; information is disseminated through web sites, neighborhood newsletters and newspapers, Community Radio, and nonprofit organization networks. The organizing committee helps the neighborhoods to mobilize and to build the community public places that they have envisioned, designed, and funded (at least in part) for themselves. These physical places will be created by the communities in order to facilitate public gatherings. While all of these projects build community in similar ways, they vary according to each neighborhood's expression of their local culture. Most projects are located in or adjacent to the public right of way in prominent locations.

In order to assist communities with the implementation of their construction plans, a building workshop (Village Building Convergence) is held (Figure 2; step 12). Through a synchronized effort multiple projects in a range of different neighborhoods are realized simultaneously. This approach allows for more efficiency by sharing resources. The workshop is coordinated by a spokecouncil that is comprised of representatives of committee members in charge of different tasks, such as publicity, fund raising, design, etc.

This process is called "Intersection Repair", and is outlined in City Ordinance # 172207 (see above). It, has been implemented in the past in response to the high level of interest among Neighborhood Associations to increase communication between neighbors, actively involve new people in the neighborhood association, host successful community events, build relationships with local organizations, and activate public spaces; these findings are reported by the Healthy Neighborhood Project Neighborhood Association Questionnaires, Neighbor Surveys and various neighborhood meetings. Natural and ecologic builders assist in the construction of artistic destinations for pedestrians, developed by the communities (for examples, see Table 1). Proactive neighborhood groups revitalize their own streets by working together over a time span of several months to create a common vision for their neighborhood. In the past several thousand neighbors, volunteers, and visitors have participated in the building of physical elements in the public realm as a showcase of neighborhood improvement.

Table 1. Examples of Work Completed at Nine Sites during the Village Building Convergence 2003, Portland, OR

1. Two neighborhood kiosks, benches and garden, in conjunction with local day laborers, Citybikes Cooperative, KBOO Community Radio and many local businesses and volunteers.
2. A neighborhood kiosk, herb spiral, two benches and a painted mural in the intersection.
3. Three trellises arching over the sidewalk, a mosaic garden wall, re-painted sunflower street mural and a gigantic sunflower-shaped dome over the sidewalk and fountain.
4. A poetry garden including lantern and make-a-poem/take-a-poem station.
5. An earthen floor and earth plaster on an existing straw bale studio.
6. Two benches (with Portland Parks and Recreation), and six planter boxes in the street.
7. Two benches, a 24-hour chalk station, re-painted mural on the street intersection.
8. Two benches at a community store.
9. A community sanctuary at a school.

5.0. A CASE STUDY: THE SUNNYSIDE PIAZZA

5.1. The Setting

In 2000, the Sunnyside Neighborhood in Portland, OR was plagued by a variety of problems, including a large transient population, social disorder, street litter, noise, and parking violations. The neighborhood, laid out on the grid network (Figure 1), was composed of 65% renters, low to moderate income, and predominantly white residents. A local church offered free dinners on Wednesdays and Fridays to the homeless population of Portland. The neighborhood was exposed to an onslaught of individuals seeking these services. Unfortunately, the Wednesday and Friday events were accompanied by an escalation of undesirable public behaviors such as excessive public alcohol drinking, and drug use that had a detrimental effect on the community living in close proximity to the church. Numerous storefronts were vandalized, continuing a history of graffiti incidents in the neighborhood.

Automobile traffic was unduly heavy and often exceeded the residential speed limit, creating numerous safety problems in this neighborhood. Another problem arouse late at night when the local taverns and liquor store closed and the customers drove home. The speed limits and traffic regulations were rarely respected, and many drivers were clearly under the influence of alcohol as evidenced by numerous DUI arrests. Families with children were particularly concerned about safety issues, although all pedestrians and drivers were at risk from these conditions.

This neighborhood had an unusually high frequency of pedestrians due to the vicinity of grocery stores and cafes and restaurants within two blocks of the intersection. While a litter-fighting organization supplied and serviced small trash cans at a few locations, these often overflowed into the street. There were no means of disposing of litter in the public realm. As a result there was a considerable amount of littering in this neighborhood, and since the presence of trash on the street invited more trash, the situation tended to spiral out of control. Many neighbors experienced and complained about the detrimental effects of excess noise from reckless driving, individuals under the influence of alcohol, and street fights. On several occasions, the police were involved in resolving such conflicts.

5.2. Placemaking

As a result of these neighborhood problems, a group of residents around a prominent intersection started to organize ways to improve the livability and sense of community in this grid neighborhood. Informal meetings began in January 2001, and the group quickly grew to consist of 20 to 30 neighbors who met regularly to discuss strategies to build neighborhood cohesion. The goal was to create a sense of place, and constructively address the local problems in the neighborhood by building a sense of community and providing an urban model for integrating art, neighborhood gathering spaces, and improving the quality of life in a mixed-use neighborhood.

During nine months of meetings, discussions, workshops, designs plans, outreach and block parties the community conceived and implemented a neighborhood enhancement project in collaboration with The City Repair Project, City officials, and the Neighborhood Association. Plans were drawn up for a three-phase implementation of various design features that would convert a regular street intersection into a pedestrian-friendly public square (Figure 3). The plan called for a large street mural, trellises in the four corners, planter boxes in the street, an art wall and an information kiosk to exchange local news. Over 100 households within two square blocks of the intersection signed a petition in support of the project in 2001, including residents of the immediately adjacent houses.

In September 2001, traffic was blocked off during a block party, and in a joint effort residents painted a giant sunflower motif (the symbol of the neighborhood; Figure 4) in the middle of the intersection that symbolizes the organization of the seeds of a mature sunflower. With the intention to incorporate educational opportunities in urban design, the natural geometry of the sunflower was used: the pattern resembles two opposing spirals, and mathematically represents a Fibonacci series. Irrespective of size of the seed head the numbers of the two spirals are always a pair in the series: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, etc (the sum of the two previous numbers add up to the next number). For example in a small sunflower 34 spirals can be counted in one direction and 55 in the other direction, while in a bigger one there may be 89 spirals in one direction and 149 in the other. The sunflower mural spans 40 feet across and extends up onto the sidewalk with 12 foot long petals. By connecting the sidewalks and drawing people into the center, the "piazza" creates a focal point for community events. While automobile traffic still crosses the intersection the mural draws attention to pedestrians and circuitously slows traffic speed. With the sunflower being the unifying theme all houses in close proximity displayed a colorful sunflower on their porch.

In May 2002, during a natural building workshop organized by the City Repair Project hundreds of residents, workshop participants and ecological builders constructed a new neighborhood information kiosk on-site with cob, a building material similar to adobe. The kiosk featured a living roof, and a solar-powered battery light for nighttime illumination. Residents created a colorful stained class mosaic art wall with a solar powered fountain with rain water catchments.

The next year, as part of the Village Building Convergence the community erected a metal dome, towering 13 feet over the Sunnyside Piazza. A local artist created the artwork for the dome sculpture and trellises and coordinated the construction. The dome sculpture was designed according to the scheme of a sunflower: iron rods spiral out from the center with 5 spirals in one direction and 8 in the other, according to the Fibonacci Series. The structure was welded together in a nearby driveway and carried to the Piazza. As part of a dome raising ceremony

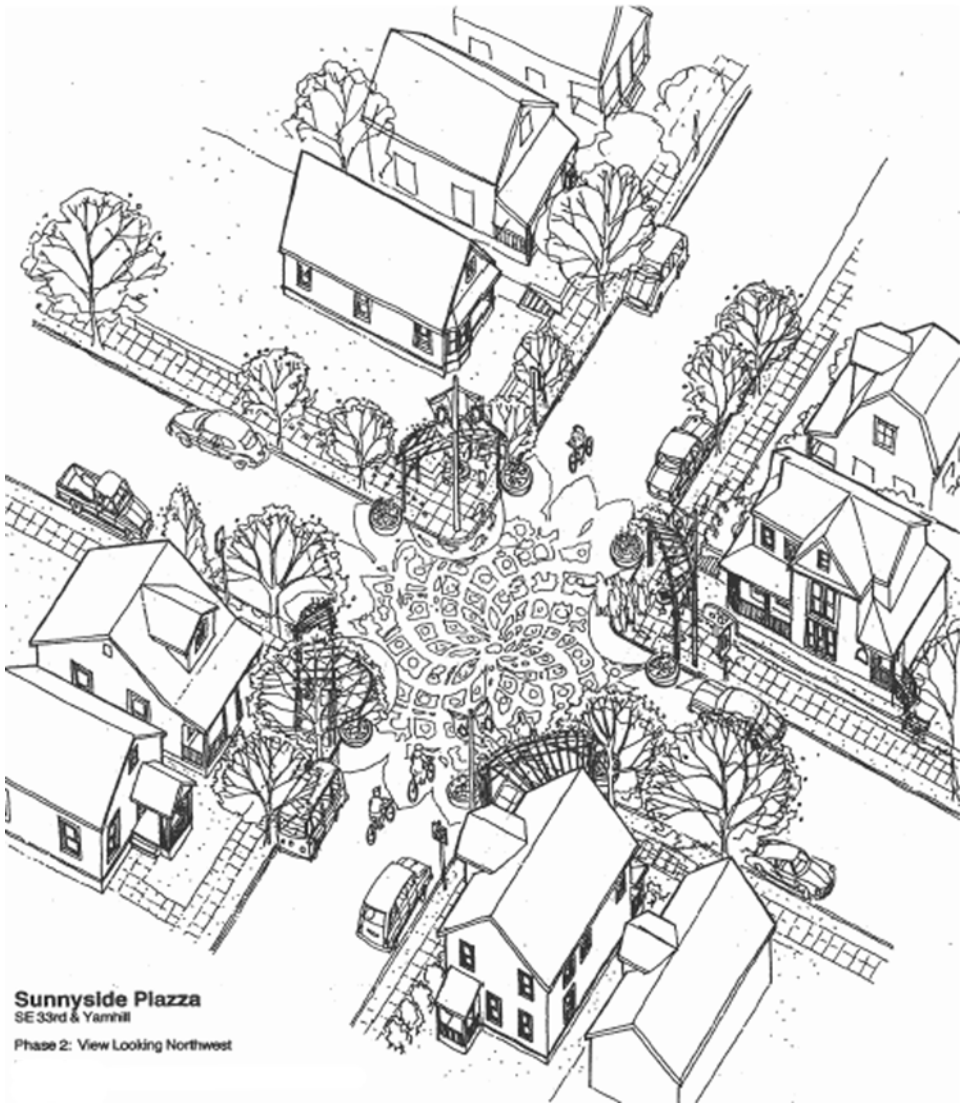

Figure 3. Plan for an Intersection Repair Project, Sunnyside Piazza, Portland, OR. (*Source*: Reproduced with permission. Semenza, J.C. (2003). The Intersection of Urban Planning, Art, and Public Health: The Sunnyside Piazza. *Am. J. Public Health* 93(9): 1439-1441.)

(analogous to an Amish barn raising ceremony) the 300-pound dome that mimics the sunflower design painted in the middle of the intersection, was raised onto wooden pillars over one of the corners; three wooden trellises were installed in the other corners of the intersection. Over 100 residents, friends of the Sunnyside Piazza and workshop participants of the Village Building Convergence joined forces to lift the structure onto its new home. In this metaphorical act, the large dome was raised onto ladders and installed over the sidewalk, secured to the hatches and bolted to the footings. Written comments were collected from participants: "I have never seen so many active, creative, awesome people from one community gathering together and having so much fun making their home such a wonderful place."

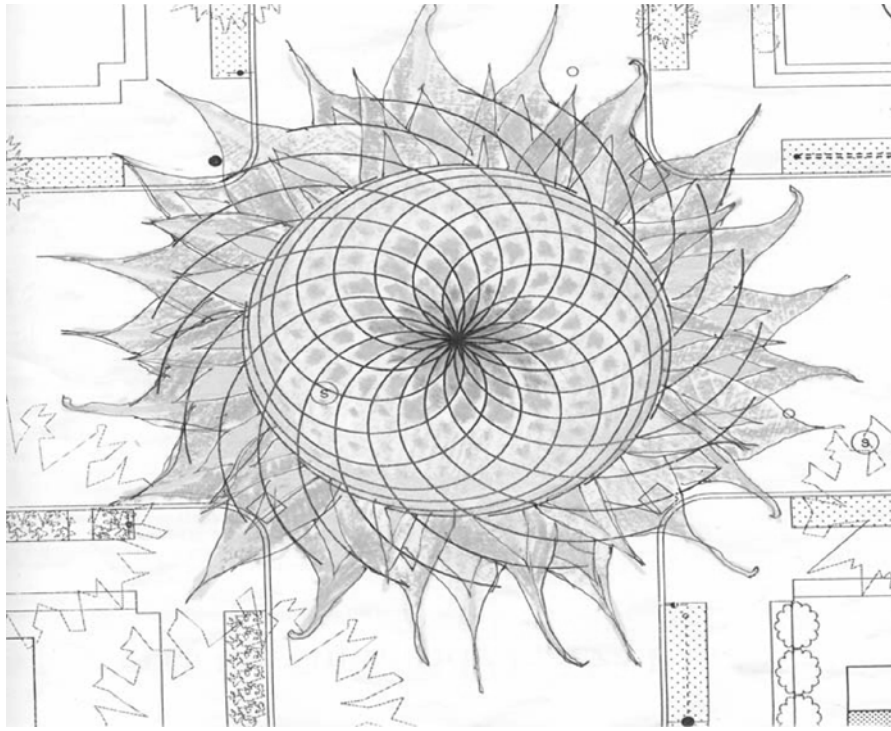

Figure 4. Sunflower Motif of Large Street Mural.

"It is not only aesthetically pleasing but it clearly demonstrates the community involvement and dedication to a united and sustainable future." "I love seeing so many of my neighbors getting together, taking pride in their community. The intersection is a place of beauty, and I am glad to have it in my neighborhood."

During block parties, the neighbors got together to plant and maintain hanging gardens on trellises on the other three corners and installed eight planters in the parking lanes within 15 feet of the intersection in order to enforce no-parking zone that will prevent parked cars from blocking vision clearance for on-coming traffic. In response to a community need, the neighbors helped to beautify the neighborhood with flowers and other plants in these planters. Recently, several benches were placed in the right of way next to the intersection, inviting by-passers to interact with each other and enjoy the giant sunflower, newly constructed cob structures and solar-powered fountain.

These activities allowed the neighbors to build social capital and to create a public square where neighbors and by-passers can interact to get to know each other. By building social relationships and mutual cooperation around collective problem solving, they embarked on an urban experiment to modify the physical design of an intersection in the grid city, as a manifestation of reclaiming the neighborhood. These new features were designed for everybody to enjoy the richness of the urban experience at the Sunnyside Piazza. The community art projects sparked conversations among strangers and pedestrians were observed to interact with the new urban features (see below).

However, support of the modification of the built urban environment was not unanimous; objections by a number or residents were addressed by accommodating their concerns and incorporating their suggestions into the design. Initially, the petition for the intersection repair project had been rejected on the grounds that the traffic frequency was too high at the particular intersection. This hurdle was eventually overcome by taking the initiative to City Council.

The homeless participated in all community activities such as the street painting and as a result took pride and ownership in the neighborhood; the homeless helped to clean up litter and waste and have donated materials that were incorporated into the structures. Burglary, assault, vehicle theft, robbery, etc have declined significantly ($P<0.001$), and call for service has diminished as well, compared to two unimproved control sites. Drug abuse and trafficking has been reduced, based on subjective assessments, but no official data exist to verify this trend. Similarly, traffic speed has been reduced but official measurements have not been conducted. Furthermore, many of the low/moderate income neighbors have been strong participants of these activities and have built previously non-existing relationships. University students and high school students have been brought to the intersection on field trips to learn the concept of mathematical relationships in nature (e.g. Fibonacci series, golden mean, etc). The site has become a destination for community residents, as well as visitors from within Portland and beyond. On a regular basis, residents hold potluck parties with outdoor movie screenings and groups of tourists and conference attendees come to the site and enjoy the Sunnyside Piazza.

5.3. Evaluation

Pedestrians passing by the Sunnyside Piazza were compared to pedestrians at an unimproved, adjacent intersection and it was observed that 32% interacted in some way with the art projects by either addressing a stranger about the mural, reading the signs, taking photographs, playing with the water fountain, etc while only 7% ($P<0.01$) of pedestrians at the adjacent control intersection interacted in any way with the urban environment or another pedestrian (Semenza, 2003). Residents at the intervention site were compared to residents at two unimproved, nearby intersections; of 97 Sunnyside Piazza residents surveyed within a two block radius of the intersection the majority (65%, n=63) of respondents classified their neighborhood as an excellent place to live, compared to 35% at the control sites. Residents at the Sunnyside Piazza scored better with other social indicators as well and indicated better general health compared to the two unimproved control sites ($P<0.01$). The administration of a detailed 11-point depression scale indicated also better mental health among residents of the Sunnyside Piazza ($P<0.01$).

However, these data are limited by their ability to differentiate between the contribution of the demographic composition of the population at the comparison sites and the environmental context. It is possible that the observed differences between the Sunnyside Piazza, compared to the two control intersections can be attributed to demographic discrepancies between the sites rather than physical improvements of the urban landscape. This distinction between contextual and compositional sources of variation is essential in the examination of neighborhood effects on health. In order to address this potential limitation of the above evaluation we have recently conducted a number of prospective longitudinal studies before and after intersection repair interventions at different sites. By doing so, the study population is maintained the same, while the built urban environment is modified. Each study subject is

Table 2. Outcome Measures of Evaluation Tool: Numbers of Questions per Category and One Sample Question

• Neighborhood (4): How would you rate your *present* neighborhood as a place to live?
• Sense of community (6): My neighborhood is a good place for kids to grow up.
• Neighborhood social interaction (4): Have you asked one of your neighbors for help?
• Perceived control at the neighborhood level (5): I can influence decisions that affect my neighborhood.
• Neighborhood participation (4): Most people in the neighborhood are active in groups outside of the local area.
• Mental health (11) I felt that everything I did was an effort.
• General health (1) In general, would you say your health is:

his or her own control and within subject variation is recorded. Two consecutive cross-sectional surveys were conducted to evaluate the impact of intersection repair interventions. Residents within a two-block radius of the sites were systematically sampled by going from door to door and survey data were collected before and after the intervention from the same study subjects. Subjects were blinded to the purpose of the study and no reference was made to the upcoming workshop in order to prevent the Hawthorne effect. Demographic and general health information, as well as personal identifiers for the follow-up survey, was recorded.

The subjects' perception of their own general health on a five point rating scale was collected as well as mental health with 11 survey items pertaining to depression (Table 2). Four other variables were assessed from multiple questions on the survey, sense of community, neighborhood social interaction, perceived control at the neighborhood level, and neighborhood participation. Preliminary analysis of the data indicated a beneficial effect of these community activities on public health (Semenza, March, and Bontempo, unpublished observations): a correlation matrix revealed that these four variables displayed a positive direct bivariate relationship with each other, indicating that these four variables are all related to each other and are a measure of social capital. The strongest relationships were between perceived control, neighborhood participation and sense of community. All three correlations exceeded 0.4 indicating that these three aspects are at the heart of social capital. Depression was negatively correlated with these social measures, and general health was positively correlated, suggesting a beneficial effect of the social fabric on mental health and well-being. Statistically significant improvements were documented for sense of community, social interactions, mental health and social capital while the improvements in the other variables were positive but not statistically significant. This ecologic intervention demonstrates the benefit to health promotion through community participation in local neighborhood projects.

6.0. CONCLUSION

Through community organizing this approach has proven to build both localized and bridging social capital that has manifested itself through physical

improvements of urban environments. Over its eight years of existence The City Repair Project has created over 30 public gathering places and events in Portland, OR that engage people to connect with the community and place around them. Intersection Repair projects outside the Portland area have been implemented or are in the process of being implemented in Olympia, WA, Ottawa, Ontario, Ashland, NC, Minneapolis, MN, and Ithaca, NY. They all have a core group of people committed to making their neighborhoods better places to live and have strategically organized their community. The goal is to help people physically change their neighborhoods to be more community-oriented, ecologically sustainable, and simply more beautiful. This work is inspired by the idea that localization of decision-making, culture, and economy is a necessary foundation for healthy cities.

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