

A Toolbox for Improving Health in Cities: A Discussion Paper

Understanding Health in Cities

The health of city dwellers is a domain that has proven to be particularly difficult for the development of effective interventions. Urban environments have large concentrations of populations with particular health concerns, such as drug users, unemployed youth, homeless people, refugees, people with mental illness, and the physically disabled, as well as individuals with HIV/AIDS, asthma, and tuberculosis. These and other groups are generally only found in large numbers in cities, and their presence produces unique problems.

In addition, cities present challenges and opportunities related to greater ethnic diversity, the influence of the built environment, concerns about transportation and mobility, and urban violence. However, in the past, the unique nature of cities and their impact on the health of their residents have not been addressed with appropriate intervention strategies. What is needed is an approach that recognizes the complex nature of health in a complex urban context.

This paper is based on research conducted by Health and Everything and the Canadian Urban Institute for Wellesley Central Health Corporation (WCHC). The consultants were asked to develop a framework that would guide an urban health initiative by WCHC in Southeast Toronto. The research results can be used by other organizations with a mandate to promote health in cities and, it is hoped, will lead to a new understanding of health in cities.

A complex question

We have approached health in cities from the perspective of complex adaptive systems. This approach has a number of important implications for intervention that do not emerge in traditional, mechanistic accounts of cities and health. We believe that our approach can serve as a basis for innovative and effective promotion of the health of urban residents at a variety of levels and in many different forms.

Complex adaptive systems are systems made up of many individual, self-organizing elements capable of responding to others and to their environment. The entire system can be seen as a network of relationships and interactions, in which the whole is very much more than the

sum of the parts. A change in any part of the system, even in a single element, produces reactions and changes in associated elements and the environment. Therefore, the effects of any one intervention in the system cannot be predicted with complete accuracy, because the system is always responding and adapting to changes and to the actions of individuals. Nevertheless, by making many small-scale changes and selecting those that produce the desired effects, individuals and groups may succeed in bringing about improvements in the system as a whole. At the same time, the tendency of elements within the system to organize themselves offers opportunities to bring about changes that benefit the system.

Distinguishing complexity and complication

In understanding complex adaptive systems, it is important to distinguish them from large systems that are not formally complex. Complex adaptive systems are not merely “complicated,” as in having a lot of parts. Crucial to the notion of complexity is the fact that the parts of the system interact and change in the face of changing circumstances, often in ways that could not be deduced from the characteristics of the individual elements in isolation.

Thus, for example, an individual automobile is complicated, but it is not complex in this formal sense. A car possesses thousands of individual parts, but in general these parts have very limited interactions. One can, for example, change the oil without worrying about altering the behaviour of the headlights, or defrost the windows without affecting tire pressure. Most of the parts are independent of the others.

By contrast, the rise of the automobile as a popular mode of transportation produced massive and unforeseen changes in society and human settlements. Not only did mobility increase, but other changes occurred as well: huge resources had to be devoted to road construction; suburban living was made practical, with all its positive and negative effects; pollution from cars affected health; a new source of traumatic injury – auto accidents – appeared; teenagers were given a new freedom, with a huge impact on youth culture; and so on. The physical function of an individual automobile is relatively simple to describe and understand, but the way in which millions of automobiles interacted with society produced effects that were not easily predictable.

Complicated systems are amenable to simplification, to reduction to smaller parts. Complex systems are heavily interconnected, and cannot be analyzed in the same fashion. This does not mean that it is impossible to intervene in complex systems. However, the approach to intervention is very different from that used in systems that are merely complicated.

We will now consider cities and health as complex adaptive systems.

Cities Are Complex

Most traditional approaches to understanding the urban environment have been useful within narrow limits, but almost invariably have failed to capture the full range of city dynamics. However, recent developments in the science of complex adaptive systems offer a better explanation of how cities work, and how to intervene in them.

In trying to explain what cities are and how they work, many people have resorted to metaphors. The city has been likened to a marketplace, a fortress, a garden, a theatre, a machine. Each metaphor says something about the city, but none adequately captures the many different ways in which the city functions and how it is perceived. Nor is it possible to create a better representation of what the city is simply by “adding up” or combining various metaphors. The different perspectives offer views that are competing, not complementary. Although these various metaphors may all be “true,” they are not necessarily compatible.

Metaphors for city life affect the way we believe that cities can be changed. It is arguable that the use of narrow perspectives on what cities are and how they work has been responsible for the failures of so-called “rational” city planning. Exponents of the rational approach tend to assume that planning outcomes are *predictable* and that if the system is manipulated in the appropriate way, predetermined results will ensue. This view of cities as static, predictable entities that respond in calculable ways to interventions, or as the passive recipients of interventions, rather than dynamic systems that actively respond to change, has time and again been shown wanting.

Jane Jacobs, one of the most influential recent thinkers on cities and their development, proposes a view of cities as organic entities, which differs markedly from the vision of cities as static entities of narrow purpose. For Jacobs, cities are *self-organizing* entities – structures and functions arise without the need for external controls. This organization occurs at both the macro and micro levels. At the macro level, cities develop as economic drivers, playing a fundamental role in the national economy. At the micro level, streetscapes and communities are defined by local forces, and well-functioning neighbourhoods will spontaneously arise if the conditions are right.

Furthermore, Jacobs believes that interventions in urban development must respond to local circumstances. Successful strategies for change in cities will not succeed unless the context of

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the local area is understood. “One-size-fits-all” interventions, delivered in a top-down fashion, are doomed to failure.

When we view cities as complex adaptive systems, we can appreciate more of their particular characteristics. For example:

Self-organization: City structures may develop without the need for official intervention. Faced with difficulties or failures in the urban environment, individuals may not wait to have the problem addressed by formal authorities, but will instead gather like-minded citizens to develop solutions outside the formal political system. Such organization is especially true in urban health. Despite the existence of a central planning capacity, non-predictable gaps in services will always occur. Fortunately, if allowed to do so, individuals and groups will come forward to fill these gaps.

Dynamic interactions: Cities are not static and passive, but are constantly changing and responding to change. Individuals within cities are in constant contact with the natural, built, and social environments. These environments influence the individual, but in addition, individuals influence their environments. The relationship is not one of determinants acting on people, but rather of people and their environments *interacting*.

Multiple viewpoints: A single view of cities has limited use. Cities can legitimately be described in a variety of ways, many of which may conflict with each other. In addition, people within a city take on a wide variety of roles, as citizens, members of various communities, users of services, consumers of products, and so on. Each city inhabitant leads both an individual and a communal life.

Emergent characteristics: A city is not just a very large village, or even a large collection of villages. The scale of a city produces phenomena and institutions that are not present in smaller population groupings (few villages, for examples, have symphony orchestras, mass transit, or homeless people). Influences on a city may therefore produce different effects, depending upon their scale. The effects of interventions do not just “scale up,” and small-scale interventions may not work in larger contexts (as can be seen, for example, in urban transit). In addition, the elements of a city come together to produce something more than the component parts. The characteristics of a neighbourhood are different from, and not just the sum of, the individual elements of houses, streets, parks, and shops. What makes a neighbourhood work, or not, is not the result of its particular parts, but rather, of the complex interactions of the individual elements.

Critical nature of local conditions: The local context can make a huge difference in the effect of any intervention. As has been frequently demonstrated, importing programmes or policy initiatives from other cities or areas within a city without adapting them to the local context is a recipe for failure.

Non-predictability of interventions: Because cities are dynamic, interactive, and self-organizing, they change in ways that seem at times to be unpredictable. This unpredictability also applies to the effects of policy initiatives and interventions, which often do not seem to generate the results that “rational” planning would anticipate.

These characteristics of cities fit well with the theory of complex adaptive systems. By understanding how such systems work in general, one can begin to formulate effective interventions. Health, too, shares some of these abstract features.

Health is Complex

Just as it takes sophisticated conceptual tools to fully understand cities, it takes careful analysis to appreciate the domain of health. Most concepts of health fall into one of three categories: (1) biomedical concepts that focus on the body as an organism; (2) epidemiological concepts that stress the environment; or (3) sociological concepts that recognize the importance of complex interactions between the two.

The third category has been underemphasized so far, but in fact leads to a more dynamic picture of health in which *the quality of the interaction between an individual and his or her social context is a major contributor to health*. Positive interactions, such as those in good husband-wife relationships, improve health, while negative interactions such as those between certain workers and excessively controlling workplaces, harm health. Health is a function of the non-linear interaction of many forces.

Our changing understanding of health affects the entire health field. Much of medical science is struggling to transform itself from a deterministic, mechanistic, organic focus on the state of the individual body to a more interactive, less deterministic practice that recognizes the importance of a broad range of influences on health. Hospitals and other health care organizations are trying to define their role beyond repairing the organism.

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Recently, more and more determinants of health have been identified and health care researchers have come to appreciate their complex interactions with each other and with health status. They include:

- **Physiological factors:** the cardiovascular, immune, muscular, and endocrine systems, as well as body weight and height.
- **Psychological and behavioural factors:** stress, personality, as well as health-promoting and health-damaging behaviours.
- **Sociodemographic factors:** age, ethnicity, gender, location.
- **Socioeconomic status:** education, income, occupation, family wealth, economic mobility, perceived status, childhood status, material possessions, national income distribution.
- **Social, environmental and medical factors:** residential characteristics, occupational environment, social support, social and professional hierarchy, access to health care.

These factors are not mutually exclusive. A person's lifestyle, for example, is not independent of his or her socioeconomic environment, which is why the impact of health education about tobacco varies in different social settings. An individual who is surrounded by family members, friends, and coworkers who smoke may continue to smoke even though he or she knows that it is unhealthy. Such interactions between the determinants suggest that the outcome of interventions cannot always be predicted accurately. Moreover, unforeseeable events can affect the health not only of individuals but of entire populations. These observations suggest the value of approaching health through the lens of complexity.

Health in Cities: Three Approaches

Since both cities and health are complex, it should not be surprising that health *in* cities shares their complexity. Two perspectives on this domain, the populations-and-problems-centred “urban health” approach, and the environmentally focused “Healthy Cities” approach, have tried to capture the complexity inherent in cities, but fall short of fully describing the implications of this complexity. We have proposed a “Health in Cities” model, which takes the strengths of these other perspectives, and grounds them in the theory of complex adaptive systems.

The “Urban Health” Approach

A traditional way to view health in cities is to target particular problems or groups for intervention. Homeless people, refugees, HIV/AIDS sufferers, people with chronic mental health

problems, and elderly people living in poverty, while not unique to cities, are more concentrated there.

The focus of this approach to health within the urban context is primarily on identifying and understanding vulnerable communities (for example, the socially disadvantaged or drug users), or particular diseases or syndromes that are of concern primarily in cities (such as AIDS, tuberculosis, or asthma). This approach recognizes that many factors are involved in the health of urban residents, but, in general, focuses on specific problems. However, communities and groups with health concerns compete for limited money and services, so interventions directed at certain groups may inadvertently lead to reduced attention to other communities.

The "Healthy Cities" Approach

The influential "healthy cities" approach emphasizes the way that the city environment (conceived very broadly) influences the health of residents. This approach explicitly acknowledges the diversity and interconnectedness of the many elements of urban living. It is a holistic approach that assumes that everything within a community is connected, and therefore cities need to get many sectors involved in developing public health policies. The Healthy Cities Project of the World Health Organization specifies the following features of a healthy city:

1. A clean, safe, high-quality physical environment (including housing quality).
2. An ecosystem which is stable now and sustainable in the long term.
3. A strong, mutually supportive, and non-exploitative community.
4. A high degree of public participation in and control over the decisions affecting one's life, health, and well being.
5. The meeting of basic needs (food, water, shelter, income, safety, and work) for all the city's people.
6. Access to a wide variety of experiences and resources within the possibility of multiple contacts, interaction, and communication.
7. A diverse, vital, and innovative city economy.
8. Encouragement of connectedness with the past, with the cultural and biological heritage, and with other groups and individuals.
9. A city form that is compatible with and enhances the above parameters and behaviours.
10. An optimum level of appropriate public health and sick care services accessible to all.
11. High health status (both high positive health status and low disease status).

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One of the key features of the healthy cities approach is its recognition of the importance of interactions between individuals and the natural, built, and social environment. Individuals are not just passive, narrowly defined entities, but interact with the city in many ways. By optimizing these interactions, both individual and community health can be improved. This emphasis on the interactive nature of health, and its determination through multiple factors, is an important feature of this approach.

Although cities that participate in Healthy Cities initiatives work to improve general environmental factors that potentially affect all city residents, they tend to downplay the importance of particular problems and vulnerable groups. What is needed is a model that captures both the urban health and healthy cities approaches, and that in addition provides a strong theoretical basis for intervention.

Health in Cities: An example of a complex adaptive system

Health in cities involves multiple groups, with multiple health needs, and potentially competing interests, connected in a non-linear fashion to multiple urban environments, each of which interacts with the groups and individuals within those groups. In order to develop effective health interventions within this complex web, what is needed is an approach that recognizes both the particular vulnerabilities and problems faced by certain specific populations within the urban environment, but also addresses the effects that the urban environment has on all city residents.

The Urban Health and Healthy Cities approaches focus almost exclusively on the problems typical of urban settings. This narrow focus on *problems* ignores the *strengths* and *assets* of an area, population, or situation. The potential exists to improve urban dwellers' health using the positive features of cities (such as relatively easy communication among residents, the existence of large groups with similar interests, the ability to organize and mobilize concentrated populations, or the strong regulatory context of cities). These advantages are not found in other environments (such as rural settings), and when used correctly, can maximize the success of interventions.

Looking at cities, at human health, and at health in cities as examples of complex adaptive systems offers the opportunity to bring together the useful insights of the Urban Health and Healthy Cities perspectives, while avoiding some of the drawbacks of these approaches.

All complex systems are made up of multiple individual elements, each of which interacts dynamically over time with other individual elements and with the environment. These

interactions can change the behaviour of the individual elements, as their actions are not static and fixed, but shift or adapt in the face of changing circumstance. As collections of individual elements interact, their behaviours can organize spontaneously, as they work together to achieve some desired state or to solve some particular problem.

Because so many elements are dynamically interacting and separately responding to changes in their immediate conditions, the global behaviour of such systems is unpredictable – they are much more than the “sum of their parts.” Small changes in a local context can produce changes in behaviour of numerous elements, that in turn will influence other, more distant parts of the system, at times generating widespread changes from small, local perturbations.

The Health in Cities Toolbox

We believe that viewing cities and health as complex adaptive systems has important practical implications for intervening in the health of urban residents. We have begun to identify tools for such intervention and are continuing to develop them.

1. Gather information: Because understanding local conditions is vital to intervening in complex systems, accurate and complete information about the context of a problem is the first step toward developing a strategy to remedy it. Acting without this understanding in complex systems can often make a situation much worse. Also, identifying and understanding positive, as well as negative, features is necessary for full comprehension of a given problem. Understanding the local strengths and assets that can be brought to bear on a problem can be of enormous assistance in developing truly local solutions to the problem.

2. Respect history: Unlike traditional mechanistic systems, adaptive systems are shaped by their past, and a knowledge of this history may suggest constraints on or opportunities for what can be done in the future. Understanding the history of the people or communities who are involved in any intervention will provide a clearer picture of what interventions are possible or have some likelihood of success.

3. Consider interaction: Health is not just a function of the individual’s biological characteristics, but is profoundly affected by interactions with the natural, built, and social environments. These factors must be considered when developing approaches to health in cities. However, these elements do not just have an “impact” on individual health, but *interact* with the individual and with each other in complex and often unpredictable ways, and change over time

as the entire system adapts. Thus, the language of “determinants” of health, with its suggestion of mechanistic, linear, one-way relationships, constant over time, may be misleading.

4. Promote variation: Introducing many different, small-scale interventions for the same problem offers a greater hope of finding an appropriate and effective solution (or solutions) than a single, top-down, “rationally-planned” approach. Promoting a variety of possible interventions may sound inefficient, but this approach is highly effective when a system is unpredictable, as health in cities often is. However, it is also important to understand and accept that many interventions will “fail.” Such failures should not be viewed as failures of the overall way of understanding the system – this is simply a feature of how one develops successful interventions in complex adaptive systems.

5. Conduct selection: Although most complex systems produce a variety of solutions to particular problems, these possible solutions undergo selection by the system (for example, natural selection in species, or consumer preference in the market). Over time, as the experience is repeated, more and more effective solutions are identified. Likewise, for interventions in health in cities, a beneficial strategy would include evaluating performance of potential solutions, and selecting the best candidates for further support and development.

6. Fine-tune processes: In complex systems, which change over time and respond dynamically to outside forces, it is necessary to constantly refine interventions through a continual process of variation and selection. As various solutions are tried and evaluated, issues are gradually clarified and solutions are refined. Thus, the process of intervening in complex adaptive systems in any meaningful way will always be an iterative one. There is no one final best approach that can be permanently adopted, no one more efficient or effective way of intervening that will always work. Because the system is constantly changing, it is necessary to continue adjusting and adapting the interventions to keep them current and useful.

7. Encourage self-organization: Complex adaptive systems often spontaneously generate solutions to problems without external input or formally organized interventions. This feature is evident in health in cities, where grassroots, self-funded groups often arise to address what they see as pressing health issues through service delivery or advocacy. This self-organizing quality is a “free good” that can be very valuable in producing innovative and novel approaches to problems.

A Case Study in Applying the Toolbox

How do these tools work in practice? To demonstrate the way in which our suggested approach differs from more conventional approaches to intervening in health in cities, we applied the tools in the toolbox to a real initiative undertaken by Wellesley Central Health Corporation but have fictionalized the results to preserve some areas of confidentiality.

WCHC was concerned about Toronto's underfunded educational system and the dramatic reduction of resources for youth. The WCHC board decided to sponsor a Youth Project to respond to the impact of these problems on a particularly vulnerable group – young undereducated men, some of whom have serious psychosocial and other illnesses. The WCHC board began by recommending a study to identify the most critical health issues, particularly those related to mental health and addictions. It suggested that the project members talk to key informants and organize focus groups.

Findings of research on youth

Two researchers carried out more than 30 in-depth interviews with experts, community institutions, and residents of the area under consideration in Toronto. The interviews focused on poverty, poor nutrition, unsafe schools, and the lack of recreational opportunities for youth, and highlighted the need to “break the cycle” of poverty, violence, and unemployment and the importance of keeping youth in school. The study concluded by pointing out that each geographic area or school district has its own specific needs. The report identified two distinct groups in need of support:

1. Those between the ages of 11 and 13 were said to be especially vulnerable, with low self-esteem, and facing a difficult transition into adolescence. These young people were felt to be at risk of turning to cigarettes, drugs, or alcohol, or of being victims of bullying. This group often had minimal parental support and few services were available to help them.
2. Those between the ages of 14 and 17 needed support to keep them in school. They were at risk of depression, drug abuse, teen pregnancy, homelessness, and involvement in criminal activity or gangs. In their case, parental support was often absent and few services were available to help them.

The study suggested establishing a community drop-in centre that would be open before and after school and on weekends. It would offer wide-ranging programmes, be staffed by skilled

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workers, and be connected to school boards, parental groups, local organizations, and the resources of the City of Toronto.

The WCHC's Urban Health Committee also held focus groups with young people about their concerns to determine useful modes of intervention. These focus groups confirmed the earlier findings and supported the proposal for a drop-in centre. The participants added that the centre should not be located in a school.

The study also recommended a focus on the a particular area of Toronto tat we will call "Jackson Heights". This is an area largely made up of high-rise apartment buildings in central Toronto that is home to more than 30,000 people and includes one of the most densely populated square blocks in North America. Many of the households in the area have very low incomes or rely on social assistance. The study noted the following characteristics of the area:

- 49% of population is made up of immigrants.
- 40% of population speaks a language that is neither English nor French.
- There is a large refugee population from Sri Lanka and other countries.
- Many refugees and their children have direct experience of violence in their home country.
- There are fewer services in Jackson Heights than in other predominantly low-income areas of Toronto.

Finally, the report identified an existing organization, the Jackson Heights Youth Centre, which provides some support to the youth of the area and could provide an operational base for further programming, including research and evaluation, but was seriously in need of financial and research support.

Using the information from this report, we decided to apply the toolbox to get a slightly different perspective on the area and to identify potential interventions that might benefit the youth of the area.

Applying the Toolbox to the Case Study

1. Gather information

a. Gather data about local conditions:

- Who lives here?
- What are the demographic characteristics of the population?

b. Capture local *strengths* as well as *weaknesses*:

- What are the local problems and issues?
- Which populations are most at risk?
- What are local assets that might be used to help?

This stage of the inquiry has been largely completed. All that remains is to identify the local assets that can be used to help address local problems (this is a type of research known as “appreciative enquiry”). Communities like St Jamestown are not merely a collection of problems needing a solution. They also have valuable assets. To focus only on problems means that important parts of the community are overlooked. Ignoring the assets of a complex environment can also mean that an intervention may inadvertently harm those assets. **Most members of complex social environments want to make things better. This asset should be identified as interventions are considered.**

2. Respect History

a. Work hard at understanding local history and culture:

- What particular values are important to this community?
- Are there any taboos that should be considered?

b. Interpret possible interventions in the light of specific local circumstances:

- What would people really like to do?
- What issues would galvanize this community?

The work done so far has already identified some of this information, such as the high incidence of refugees, many with direct personal experience of violence. Their attitudes to violence may have a strong bearing on how violence in the community is dealt with. Less obvious issues are also worth exploring. For example **it is probably worth finding out how people in the area, especially children, have adapted to the high density of the neighbourhood.** This might have implications for a number of interventions, including those related to violence.

3. Consider Interactions

a. Recognize interactions that already exist:

- How do people help each other in the community?

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- What are the vicious cycles that make things worse?
- Are there virtuous cycles that might make things better?

b. Consider how possible interventions might interact:

- How might they affect the identified issues?
- How might they affect other issues in the community?
- Are they feasible?

The identification of issues and needs among youth in the community is a strong basis for developing a more complex view of the interactions that occur. This immediately suggests other questions about interventions. For example, **when families *do* provide support for youth, how do they do so in this community? How would one go about strengthening families' capacity to provide such support? How could older youth help those younger than themselves?**

4. Promote Variation

a. Identify previous interventions:

- Which have succeeded in the past? Why?
- Can we build on previous successes?
- Which failed? Why?
- Can we learn from and correct previous failures?

b. Identify many different potential *small* interventions:

- What interventions could be “seeded” in the current situation?
- How can they be tried out at a small scale?

The analysis so far considers major interventions, such as the services and support provided by the Jackson Heights Youth Centre. The particular interventions in that context as well as in the community could easily be broadened by suggesting programmes to allow the older youth to support and help younger ones. **Programmes that enlist older youth to help increase the safety of younger children, or act as coaches, trainers, or mentors would do this. Similarly, programmes might be suggested that provide opportunities for youth to help others in the community while developing useful skills. A good example is training adolescents to volunteer in daycares or help care for older people.**

5. Conduct Selection

a. Consider which interventions should be seeded:

- Which interventions have multiple consequences?
- Which interventions have been suggested by youth themselves?

b. Allow interventions time to demonstrate success or failure:

- Which interventions are taking off?
- Which are dying on the vine?

c. Develop evaluation procedures that include the participants:

- How do youth think they benefited from the interventions?
- How do they think others benefited from them?

d. Gather data that is independent and considers outcomes:

- What are some independent measures of success?

There has already been an initial process of selection. The identification of an existing successful programme that can be nurtured is an excellent example of how to intervene. Ongoing selection of options will continue, although keeping an observant eye on interventions without meddling is a difficult role for funders to play. **Allowing programmes and interventions the space and resources to succeed or fail on their own is an option: if people stop coming, then the programme has failed. If it is always full, it has succeeded.** Natural selection in species, or consumer preference in the market, are examples of this kind of selection. A beneficial strategy includes evaluating the performance of potential solutions, and selecting the best candidates for further support and development.

6. Fine-Tune Processes and Interventions

a. Improve interventions with members of the community:

- What ideas do youth have to improve interventions?
- What ideas do their families have?

b. Adjust interventions as circumstances change:

- How can programmes adjust to changing circumstances?
- What are the opportunities for new programmes in these changed circumstances?

Since complex systems change over time and respond to outside forces, it is necessary to constantly refine interventions. As solutions are tried and evaluated, they are modified so that they remain current and appropriate to their context. Thus, intervening in complex adaptive systems in any meaningful way will always involve constant fine-tuning. **There is no one final best approach that can be permanently adopted and no single most efficient or effective way of intervening that will always work. Because the system is constantly changing, it is necessary to continue adjusting and adapting the interventions to keep them current and useful.**

7. Encourage Self-Organization

a. Identify the areas in which self-organization has occurred:

- Have there been spontaneous and unplanned responses to issues?
- What are they?
- Have they been encouraged or discouraged? How?

b. Identify obstacles to self-organization:

- How these obstacles be eliminated or reduced?

Complex adaptive systems often spontaneously generate solutions to problems without external input or formally organized interventions. This feature is evident in urban health, where grassroots self-funded groups often form to address what they see as pressing health issues. This self-organizing quality can be valuable in developing innovative and novel approaches to problems. In finding ways to intervene in urban health, it is important to recognize the benefit of such self-organization, and to facilitate it rather than block it. **The development of the Jackson Heights Youth Centre seems to have been at least partly self-organized. A decision to support it would reduce obstacles to its continued existence.**

This very brief case study shows how the toolbox for health in cities can be applied to specific situations. Other urban issues could be approached in this way, using the toolbox as a guide and a spur to more comprehensive thinking about health in cities.

Conclusion

Cities are enormously complex and changes in one part of a city may produce unforeseen consequences in another. Human health, too, is a product of many factors, each of which interacts with the others, and each of which is subject to change that may affect the overall health of an individual. The web of interactions whereby individuals within cities respond to each other and to the urban environment can be viewed as a complex adaptive system. Therefore improving health in cities is a matter of making numerous small-scale interventions, selecting those that prove to be effective, encouraging self-organization among city dwellers, and constantly modifying approaches as the system continually changes and adapts.

The model we propose, based on the theory of complex adaptive systems, is being considered by several health care providers and organizations, who have found it a useful way to look at health in cities. We hope that other organizations will find it helpful in their efforts to improve health.

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