

Sociological Modeling of Emergence

A Case Study of Homelessness and Best Practices in Single Room Accommodation
in the Downtown Eastside of Vancouver, Canada

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Abstract

Homelessness in Vancouver's Downtown Eastside (DTES) is a complex social problem that has been exacerbated in the last four decades by an influx of persons with mental health issues and drug traffickers that have exploited the psychological vulnerabilities of the community's most at risk residents. The existence of over 100 single room occupancy rooming houses and hotels (SROs) in the DTES have the potential to ameliorate homelessness because of a unique supply of low cost transitional beds in close proximity to community services. However, in many instances "for profit" and "deregulated" SROs accelerate homelessness by the exploitation of tenants through the behaviour of unscrupulous SRO owners and managers. In the worst cases this exploitation involves the establishment of a sex trade business in the SRO and a co-dependent drug trafficking ring that props up the illicit enterprise.

In the 20th century proponents of open societal systems from interdisciplinary fields (Gasset, Alexander, Brueggemann, Jacobs, et al) argued that intimacy is integral to community and personal wellness in urbanized and industrialized societies where marginalized persons are disconnected from meaningful relationships.

As open societal theories were developing in the philosophical and intellectual schools, a group of non linear thinking scientist (Bertalanffy, Wolframs, Lorentz, et al) began to develop "open" scientific theories that were useful to predict the way that any group of agents with a "free will" will exhibit collective intelligence and adapt to adverse conditions without the input of globally structured information. This approach to the study of dynamic systems came to be known as chaos theory, complexity and emergence.

In the latter decades of the 20th century social entrepreneurs began to apply the rudiments of emergence theory to benevolent business ventures and provided effective environments for open sociological systems to develop (see Senge, Bornstein, Barabasi, et al). Two such benevolent investors have established an opportunity for emergence specialists, relationally focused tenant support personnel and a cooperative indigenous tenant population to demonstrate a sociological modeling of emergence in the DTES of Vancouver.

This research report utilizes emergence-based research tools to determine if an increase in intimacy in an open sociological system is decreasing risks of homelessness and increasing wellness for tenants in two market SROs in the DTES. The two rooming houses feature best practices (i.e., safe, clean, affordable and supportive housing) and a relationally-based staff of indigenous and intentional personnel that are sensitive to the principles and practices of emergence.

To facilitate this initiative a survey was conducted with 140 residents of the DTES that have been exposed to best practices, for profit housing, deregulated housing and absolute homelessness. A linear analysis of the survey results revealed that length of stay in a best practice market SRO reduces the probability of homelessness for hard to house and not housing ready tenants in a twelve month period by more than 90%. In addition, the

research determined that the “usage rate” of sex trade linkages, substance abuse and untreated mental illness days was reduced by 40-60% for tenants that were exposed to best practices in an SRO for a minimum of ten weeks.

Non linear research results are illustrated in this report via a computer generated modeling of emergence in the DTES. These results demonstrate the interplay of common interest groups in a given SRO and can predict the effects of small changes in their population base and influence. Emergence modeling also provides a way to see how a small increase in the total number of best practice SROs in the DTES will affect the entire neighborhood and contribute to the development of a plausible tipping point for overall community wellness.

Research findings have been applied in the attached *Guide to Best Practices for Self Organizing Communities*. This guide includes a definition of terms and core values related to best practices and self organizing communities, an outline of the salient features of best practices and a description of the way that emergence theory is applied in an SRO setting.

2. Introduction

Purpose

Homelessness in Vancouver's DTES is a complex social problem that has been exacerbated in the last four decades by an influx of persons with mental health issues and drug traffickers that have exploited the psychological vulnerabilities of the community's most at risk residents. The existence of over 100 SROs in the DTES have the potential to ameliorate homelessness because of a unique supply of low cost transitional beds in close proximity to community services. However, in many instances "for profit" and "deregulated" SROs accelerate homelessness by the exploitation of tenants through the behaviour of unscrupulous SRO owners and managers. In the worst cases this exploitation involves the establishment of a sex trade business in the SRO and a co-dependent drug trafficking ring that props up the illicit enterprise.

In Vancouver's total core area 6,257 residents (46% of the total SRO population) live in 147 privately owned SROs. Significant risks to this population include homelessness, untreated drug addiction, untreated mental illness and the issues associated with sexual exploitation. Despite the severity of these risks, only two of the privately owned SROs employ tenant support workers (TSW) and only five of the aforementioned facilities have management staff that provide "advocacy and extra supports" for the tenants. As a result, some hard to house and not-housing-ready tenants can become homeless after short stays in market SROs.

In light of the above observations, the primary purpose of this research initiative is to determine if SROs that adopt best practices can reduce homelessness and increase wellness in low income, hard to house and not-housing-ready tenants. Further, the outcome of this project is intended to form a foundation that will enable future best practice development in the 147 market SROs in the Vancouver core area by establishing a gold standard definition of market SRO management. Outcomes are also intended to create awareness that best practices produce "length of stay" in transitional housing and thereby reduce the risks of drug use, mental illness and sex trade linkages.

Research Questions

This research report will address the following questions:

- 1) What is a reliable gold standard definition of best practice for market SROs?
- 2) Do best practices reduce risks of homelessness and increase wellness in low income, hard to house and not housing ready SRO tenants?
- 3) How can a sociological modeling of emergence assist low income housing initiatives in Canada?
- 4) What is the lever point at which the total number and spatial distribution of best practice SROs in the DTES will significantly ameliorate homelessness in the entire community?

- 5) How can information about best practices in privately owned SROs reduce the knowledge gap that exists between potential SRO benevolent investors and the methods and means of establishing profitable and supportive housing for low income and hard to house tenants?

Research Methods

To establish a definition of best practices for market SROs a “gold standard” method was utilized. These standards were developed following a literature review and consultations with SRO tenants, SRO management, TSWs, SRO owners, social service workers and health care providers.

Data was gathered from low income, hard to house and not housing ready tenants in existing best practice, for profit and deregulated SROs, and from homeless persons. The data focused on the housing history of the project participants and examined the relationship between SRO management styles and homelessness (with a concentrated focus on the underlying factors of untreated drug and alcohol addiction, untreated mental illness and sexual exploitation).

The gathered data was analyzed and documented under the guidance of the project’s advisory committee. The data was then extrapolated to provide an emergent model. This model illustrates how a best practice management team can impact the “length of stay” in a typical market SRO. A second emergence model, which is still in development, will predict the lever point at which an optimum number of best practice market SROs in the DTES can reduce the total number of homeless in the area.

Confidentiality of the project participants was protected to ensure that the participants’ names would not be published in project documents and that no information would be accessible to non project staff. Participants in the documentary video signed a release allowing their identity to be revealed.

Literature Review

Understanding a Sociological Modeling of Emergence

Why is an understanding of emergence import to this research?

As open societal theories were developing in the philosophical and intellectual schools in the last century, a group of non linear thinking scientist (Bertalanffy, Wolframs, Lorentz, et al) began to develop “open” scientific theories that were useful to predict the way that any group of agents with a “free will” will exhibit collective intelligence and adapt to adverse conditions without the input of globally structured information. This approach to the study of dynamic systems came to be known as chaos theory, complexity and emergence.

Thus, emergence is a useful illustration and learning tool that can help social service providers, social entrepreneurs and governing bodies to imagine a new reality in marginalized communities such as the DTES. Emergence modeling can be performed on desk top computers and allow non technical users opportunities to experiment by altering agents numbers and distributions in a given environment. The user can then watch virtual changes in outcomes as they occur in “real time” from the bottom up. This is important because it provides an illustration on the effect of TSWs and relationally-based desk personnel on increased wellbeing in an SRO simply by an incarnated presence and increased wellness ideation in the environment.

Conversely, emergence modeling can also illustrate how an increase of predators in an SRO can tip the population toward illness and abuse. Finally, emergence models can illustrate virtual changes in the total number of best practices SROs in the DTES and watch how a tipping point occurs after a relatively small number of best practice conversions.

The visual nature of the emergence tool helps users to formulate conclusions that are intuitive.

Introduction to Emergence

Emergence is the name given to the phenomenon of collective intelligence exhibited by a population of individuals. The meaning of intelligence in this sense defines a resilience to adverse conditions, adaptation to a changing environment, a sense of communal values and an overall beneficial cooperation. Populations useful to emergence research consist of diverse members that interact locally but adapt as a whole to global conditions.

This research initiative draws emergent analogies from ants, bees and other social insects, individuals, groups, business (companies, monopolies, and cartels), cities, regions, and nations. The principles gleaned from the study of these emergent communities are then generalized for more abstract populations, such as the DTES.

Recent developments in scientific study, computing performance and inter-disciplinary study have produced a novel framework to re-examine the intricacies and complexities of

social sciences, especially the most effective means to deal with endemic, systemic or recurring social illness. Homelessness, drug and alcohol addiction, untreated mental illness, sex trade linkages and organized crime are some examples in this category.

The social illness and wellness of the population examined in this study are states of being that can be framed as problems of mass behavior. Emergence research asks the question, “How do different groups with equal resources gravitate towards stable population dynamics where individuals have radically different degrees of wellness?” The tools available to emergence researchers are then used to replicate sociological phenomenon and suggest analogous mechanisms for the observed behavior.

The Interdisciplinary Nature of Emergence

The theory of emergence is known by many names. This is the result of its interdisciplinary foundations. As such, the theory of emergence enjoys a wide variety of examples, terminology and approaches. A table of different fields of study contributing to the field of emergence and a typical population model follow.

<i>Field</i>	<i>Model</i>
Biology	ants, slime molds, social insects
Urban planning	the development of Manchester, England
Management	game theory, negotiation strategies
Resource management	predator-prey models
Epidemiology	disease spread
Chaos theory	fractals
Dynamical systems	

Understanding Emergent Principles

Emergent principles are inferred from characteristics exhibited by specific populations. A common example of these principles is the army ant, which, if in a population of less than about 100 members, will march in a circle until exhausted. At some higher population threshold, the swarm acquires the sense to map out raiding trails and demonstrates properties of a stable population such as providing nutrients for and genetic propagation of the swarm. Hence swarm intelligence.

Slime molds also manifest similar properties. Defining characteristics of emergence can be observed in the growth and structure of cities, marketing relations, inter-national economics and police-protester dynamics.

The following is list of principles that define emergence:

More is different: the properties exhibited by a population are dependent on the size of the population. Critical values associated with population size relate to fundamental increases in capability. This non-linear relationship has a counterpart in the chaos theory phenomenon of bifurcation (the sudden change in steady or stable states of a dynamical system).

- **Ignorance is useful:** coarse grained information is readily accessible and processable. [Information approximation is ignorance of details.] Yet, groups of individuals using these approximations, who lack true (global) knowledge, can persist resiliently in changing environments. Local knowledge, coupled with massive local information exchange, is sufficient for optimal-tending behaviour by the entire population.
- **Encourage random encounters:** random exchange of information allows the pursuit of multiple goals. This practice is most famous for its use in genetic algorithms, where codings for problem solutions are randomly permuted and mutated, and then propagated based on their fitness. The pursuit of multiple goals increases the population ability to adapt to a changing environment. Random encounters are often critical components of population models.
- **Signs exhibit patterns:** the modes and content of communication between individuals and groups of individuals provide insight into global population states. How and what individuals are communicating corresponds to how the environment is affecting the entire population.
- **Neighbours are information:** primary sources of new information are an agent's current neighbours. Face-to-face interactions are a high-bandwidth mode of communication (for humans) due to body-language, tone and tenor. While individuals may be restricted to a specific locality, information can be quickly communicated via local mobility and varied partner information exchange.

The principles may be expanded into heuristics for specific situations and may be used as part of emergence simulations.

Emergence and General Systems Theory

An early contributor to the theory of emergence was Ludvig von Bertalanffy, who used the term *general system theory* to describe the study on inter-related parts. "General system theory is a logico-mathematical science of wholeness; its rigorous development is technical (mathematicized) where verbal descriptions are not expendable. Problems are *seen* and recognized before they can be formalized mathematically."

Bertalanffy notes that the success of general systems theory is due to the following:

- There are a limited number of simple mathematical expressions which will be preferably applied to describe natural phenomenon. [Laws with identical structure will thus occur in different fields.] Conceptualization schemes are also limited
- Order exists in reality itself and admits the application of our conceptual constructs

- A general definition of a system allows one to show correspondences from one field to another. Meta-principles apply across the more specific fields.

While systems can be viewed as collections of agents, it is important to examine characteristics of the agents and the environment requisite for emergence.

- Agents must exhibit differing abilities to react to each other and the environment (e.g., agents have different tendencies in similar situations).
- Agents should obtain local information regularly, and from many sources. No information about the population as a whole (that is, global statistics) is required to make decisions toward optimization.
- The environment must not change [with respect to population self-preservation factors] faster than a sub-population can adopt an alternate [self-preserving] mode of behaviour. For example, the depletion of resources in one area should be balanced by the time required to move to a new region. [Cataclysmic events are generally not helpful in discussing alternate possible modes of existence for the population.]

Emergence and Collective Intelligence

The presence of collective intelligence is usually conditioned upon certain criteria, namely critical values for population diversity and density, interaction levels and environmental rate of change. Collective intelligence can be seen to operate when the following conditions exist:

- The population is a collection of unique individuals. Agents must vary in their ability to react, their propensity for different responses, and their individual information channels.
- Agents receive regular local information from a variety of sources. No information about the population as a whole (that is, global statistics) is required to make decisions ultimately leading to optimization of the group.
- The environment must not change factors relating to self-preservation of the population significantly faster than the population can adopt an alternate mode of behavior. That is, as the environment undergoes global changes that affect how the agents act separately and as groups, most agents must be able to adapt appropriately given the information channels and individual/group abilities. For example, the depletion of resources in one area should be balanced by the time required to move to a new region.
- Cataclysmic events are generally not helpful in discussing alternate possible modes of existence for the population.

Emergent behaviour in nature demonstrates collective intelligence through non-coerced individual cooperation and bottom-up organization. This suggests a bifurcation in the system state of the population; the population has reacted to changed environmental conditions to maximize wellness. Such an example would implicitly contain the criteria regarding population diversity and density, interaction levels and other emergent principles are met.

Emergence and the Open System Concept

The Laws of Thermodynamics dictate the fate of closed systems. Energy classes degrade into heat and the heat itself disperses into a state of equilibrium. At this point, no work can be done since there is no differential of latent energy to harness. This is the point of maximum entropy, or, more fatally, the heat death of the universe.

Bertalanffy points out that "Living systems are basically open systems. An open system is defined as a system in exchange of matter with its environment, presenting import and export, building up and breaking down of its material components. Under certain conditions, open systems approach a time-independent state (the steady state). The steady state is maintained at a distance from equilibrium and is therefore capable of doing work. The system remains constant in spite of continuous, irreversible processes taking place."

Consider as an example the closed system consisting of a marble (agent) and a glass (environment). It is closed because no energy is being input to the system. If the glass is open end up and the marble undergoes a small movement, it will settle to the bottom of the glass, minimizing the latent energy. This a stable state where small inputs do not change the final state of the system. If the glass is inverted and the marble placed on the now exposed base, a small change in position can lead to large system changes as the marble rolls off the base. This is an unstable state. However, when the system is open, many more stable states exist in the system. Let the system allow the cup to undergo circular motion. Depending on the frequency of the rotation, the marble can exist in different circular loci along the inside of the glass.

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Emergence and the Need for Intimacy in Open Societies

Why is the connection between emergence and discussions on intimacy in open societies important to this research?

The closed patterns that perpetuate illness perceptions in some inner city communities in Western societies have been challenged and “opened” through the thinking of influential philosophers, intellectuals and theologians in the last century. These proponents of open societal systems come from interdisciplinary fields (Gasset, Alexander, Brueggemann, Jacobs, et al) and have argued that intimacy is integral to community and personal wellness in urbanized and industrialized societies where marginalized persons are disconnected from meaningful relationships.

Thus, a juxtaposition of emergence and the social sciences provides an opportunity to view communities as organic systems that have a mind of their own and the ability to create their own pathways to wellness. This awareness is important because it will encourage society to view the antitheses to intimacy in inner cities as anathema (e.g., empty lots, abandoned buildings, market SROs operated by organized crime, the trend to over build non market housing that can potentially cause communities to become imbalanced in a program ideation, etc.).

The built form of communities that see intimacy as integral to mental wellbeing will reflect the vision of their planners and provide places that persons can interface with regular dialogue and meaningful activities.

The Standing Wave Phenomenon and Closed Societal Thinking

Homelessness, sex-trade linkages, mental illness, drug and alcohol addiction, and crime can often be seen as perpetual social problems that reside in certain communities. Despite large-scale top-down programs and local community initiatives, these problems persist and characterize people groups, cultures and geographic regions.

The characterization of a neighborhood such as the DTES as a community with perpetual social problems is known in emergence studies as the standing wave phenomenon. The phenomenon is illustrated in any stream of water whenever a rock or other obstacle causes a standing wave to form. The individual rivulets and water molecules change with time, yet the pattern persists.

Although the population base of communities that are negatively labeled as “the slums” or “skid row” are constantly changing, the perception of its social ills stays the same. Thus, individual residents with varying degrees of wellness may come and go from the community, but group dynamics are perpetuated. If the community is seen as a “closed” in that it is internally programmed toward illness.

The obstacle that causes negative attitudes to perpetuate both in and out of some inner city communities is often the built form of the community. Abandonment leads to neglect

and a collection of boarded up buildings, empty lots, and influx of crime and an over abundance of housing facilities that are program-based and reduce opportunities for intimacy in tenants. The standing wave phenomenon can be altered through built form changes in the community. Best practice marker SROs are one example of such changes.

The Function of the City in Creating/Limiting Wellness

Architect Christopher Alexander has pondered the function of the city as it relates to the individual and the forming of communities. He presents four theses:

- the most basic and urgently needed kind of contact is intimate contact
- social pathologies (neg. delinquency and mental disorder) follow inevitably from lack of intimate contact
- urbanization inevitably produces the so-called autonomy-withdrawal syndrome; society must overcome this syndrome to recreate intimacy
- to create urban spaces that allow intimacy, a specific set of rules for city housing must be followed.

These theses can be expanded as follows:

The Need for Intimate Contact

- People in modern society have more contacts and communication, than say people in pre-industrial societies. However, as the number of contacts/communications increases, the quality decreases. Contacts with any one individual become shorter, less frequent, less deep
- intimate contact may be defined as close contact between two individuals in which they reveal themselves in all their weakness, without fear
- intimate contact has two pre-conditions. 1) Persons must see each other very often, almost every day, though not always for long (discussion must plow through the headlines and the happenings of mutual friends to self-revealing statements). 2) Persons must meet under informal conditions without wearing any assigned roles or functions. In intimate relations, people talk about the ultimate meaning of their lives.
- Pre-industrial society had primary groups to sustain intimate human contact. A primary group may be defined as a small group characterized by intimate face to face association and cooperation (e.g., the family, neighborhood elders, children's playgroup). These groups form the social nature and ideals of individuals
- Membership in a group sustains persons. The open society is no longer centered around place-based groups, such as the village green or commons.
- Modern society is structured as secondary contacts where people are related by single role relationships (e.g., buyer : seller)
- Social organization is a phenomenon produced by the participation of people who have penetrated (the tough exteriors) of each other
- An individual can only be healthy and happy when his life contains three or four intimate contacts. A society can only be a healthy one if each of its individual members has three or four intimate contacts at every stage of his existence.

Evidence for Need for Intimate Contact

- No metrics exist to study the wellness of individuals. Therefore, it is suggested that extreme cases of lack of intimate contact are studied where metrics are easily definable and measurable
- A study on the Chicago distribution of mental illness shows that those most alone (hotel residents and lodgers) suffer most. Whites in black neighborhoods and blacks in white neighborhoods suffered more than their neighbors sharing the skin color of the majority
- A disintegrated society may be defined as a collection of individuals (Leighton). These individuals share the same geographic location but have non-patterned encounters
- Poorer people have fewer meaningful friendships
- Both age and marital status correlate to mental health
- Studies suggest that child-child relationships are sine-qua-non (something absolutely indispensable or essential) to future mental wellness.

The Autonomy-Withdrawal Syndrome

- People can only reach the true intimacy and mutual trust required for self-revelation when they are in private
- It follows that they must meet casually in homes and drop in on each other frequently. Note that proximity is a condition to dropping in and that 10 minutes travel seems an upper bound for travel time to drop in on someone
- A stressful life encourages people to withdraw at home and to not welcome unexpected visitors. This and other exhibitions of individualism can be considered a pathological response to stress. Note that the extreme differentiation/specialization of society realizable in urban centers means that any good or service can be bought. Money as the medium of exchange does not remind people of their interdependence but provides feelings of independence and self-sufficiency. The retreat to the suburbs is a stress induced withdrawal from life
- The popular response to urban stress may be called the autonomy-withdrawal syndrome
- Since child-child interactions are so key, how does suburban space affect children? It isolates them and keeps them safe; in their back yards and not mixed on the street and sidewalk.

Solutions

Approach A: Suppose that intimate contact can only be sustained by primary groups. We must then work to create new kinds of primary groups that might work in society.

Approach B: Suppose that adult primary groups are no longer feasible. We must then create a social mechanism that is able to sustain informal, daily contact between people without the support of primary groups. Approach B continues with some architectural suggestions regarding homes and green space.

In summary, “urban concentrations create stress. However, if people do not expose

themselves, if they do not make themselves vulnerable, life will become more and more intolerable and we shall see more and more signs of dissociation which are already far too evident.”

The Use of Imagination to Create Open Societies

Walter Brueggemann is a proponent of social action based on theological principles. One salient feature of his philosophy is the open-endedness of the solution to social problems, a feature of emergent systems. This is especially seen in his conception of prophetic ministry. “The task of prophetic ministry is to nurture, nourish, and evoke a consciousness and perception alternative to the consciousness and perception of the dominant (to serve in criticism the dismantling of the dominant consciousness and in energizing the marginalized)”.

Thus, the imagination of wellness in a community such as the DTES is a metaphysical concept that can have physical effects if influential community agents (indigenous community leaders, TSWs, benevolent investors) alter the built form of the neighborhood to accommodate wellness activities. The prevailing perception of the DTES as a “war zone,” “slum,” or community of drug addicts and criminals matches a community that is, in fact, underdeveloped, black listed by commercial lending institutions and dominated by the sights and sounds of police sirens and emergency vehicles.

Just as affluent communities presume that wellness focused members will utilize parks, recreational facilities, social clubs, corner stores and restaurants, so also the DTES as perceived with wellness images will adopt a radically different built form.

It is important to remember that when viewing the specific details in a mass behaviour case study, it is often not fruitful to immediately search for series of rational causes and affects because the population doesn't act as does an individual in isolation. Nor does it act as a simple function of its composite members. Thus, the population as a whole does not act as the most powerful individual, nor rationalize at the level of some informed subgroup. Strengths don't sum; weaknesses are future possibilities.

The effect, by which groups of individuals act not as a single larger individual but exhibit behavior at variance with such a concept, can be seen as a synergism where the whole is greater than the parts.

Defining Wellness in Urban Settings

Defining wellness in urban settings, especially in a holistic sense, is problematic. One measure of individual wholeness is sensitivity to deviations from normalcy. Conversely, lack of wholeness can be construed as insensitivity. Some symptoms of desensitization are: propensity for violence, decline of the respect for life, casualness to human hurt, and craving for heightened experience. Thus, participation in small groups or communities is indicative of individual wellness. The state is the will to do something in common.

When dealing with studies and simulations, it is important to use an appropriate

yardstick. The choice of features for observation may limit or confuse the problem. Metrics used for comparison, while appropriate in one domain of study, may not be appropriate elsewhere. Also, when considering the wellness of an individual, general statistics relating to demographics may or may not be useful for relating the study to regional and nation-wide statistics for people groups.

One measure of individual wholeness is sensitivity to deviations from normalcy. Conversely, a lack of wholeness can be construed as insensitivity. According to Walter Brueggemann, some symptoms of desensitization are:

- propensity for violence
- the decline of the respect for life
- the casualness to human hurt
- the craving for heightened experience

Participation in small groups or communities is often an indication of individual wellness. When defining groups we ultimately mean a collection of individuals who share a common value. "The state comes into being when naturally divided groups are obliged to live together - implying a common purpose. The state is not consanguinity, nor linguistic unity, nor is it contiguity of habitation. It is the will to do something in common."

A common value in the definitions of individual and group wellness is the presence and effectiveness of a community where the individual can act as participant and recipient (participation with others in sharing and pursuing common values; recipient of care and support at critical times when only personal confidantes are effective).

It is important to realize that lack of or limited resources do not prohibit either the formation or continuation of a community. "Tears are a way of solidarity in pain when no other form of solidarity remains." What is important in the search for community wellness is the communication of belonging and identity.

The Iron Laws of Systems for Populations

Specific populations under given constraints exhibit rules or laws. These rules or laws describe how a given quantity is optimized. Optimization (minimization or maximization of a variable) does not imply fairness or justice, simply a description of how things actually work; it is a functional definition. Thus, the rule "might is right" applies to a population under a despot. The effect of the despot's will is maximized. Rules are often given as hypotheses for complex situations and then initially validated in a simpler environment. If an analogous behavior is not observed, either the rule or the implementation is suspect. If it is observed, more realistic models can be implemented.

Bertalanffy lists The Iron Laws of Systems from Boulding's "The Organizational Revolution":

Law1: Malthusian Growth

The increase in a population is, in general, greater than that of its resources.

Law2: Optimum Organization Size

The larger an organization grows, the longer is the way of its communication and this, depending on the nature of the organization, acts as a limiting factor and does not allow an organization to grow beyond a certain critical size.

Law3: Law of Instability

Many organizations exist not in a stable equilibrium but show cyclic fluctuations which result from interacting sub-systems.

Law4: Law of Oligopoly

If there are competing organizations, the instability of their relations and hence the danger of friction and conflicts increases with the decrease in the number of these organizations.

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Emergence and Social Entrepreneurs

Why is the connection between emergence and social entrepreneurs important to this research?

In the middle of the 20th century the human relations school of business management began to see the need to foster the innate desire of all persons to find meaning and purpose in their work. By the latter decades of the century the idea surfaced that businesses could become learning organizations that could allow a bottom up orientation to business solutions through systems thinking and a team approach to the workplace. At the same time social entrepreneurs were using open thinking approaches to solve some of their most difficult social problems. Where governments, church organizations and NGOs were finding difficulties overcoming funding issues and the inertia that is often associated with long term social initiatives, social entrepreneurs were using their determination and orientation to self-sufficiency to deliver community services without a reliance on the public purse.

Two such benevolent investors, Hart Molthagen and David Ash have established an opportunity in the DTES of Vancouver for emergence specialists, relationally focused tenant support personnel and a cooperative indigenous tenant population to demonstrate a sociological modeling of emergence.

Emergent Principles and Social Entrepreneurship

Social entrepreneurs function well within the principles of emergence. The following are unique features that enable social entrepreneurs to function in open systems:

- Exposure to the concept of an open market that finds its own level in an open society has helped pave the way for social entrepreneurs to operate from the bottom up in community settings.
- There is a degree of reality in the business world that is not always existence in governments, churches and NGO groups. The concepts of bankruptcy and market success, based on the inherent worth of things, help social entrepreneurs to create solutions to community problems that are both self sustainable and endure without perpetual subsidies and grants.
- Social entrepreneurs tend to mistrust bureaucracy and therefore are reluctant to seek public funding. Their independent spirit makes them reluctant to seek support from charitable sources. In this sense social entrepreneurs cannot be forced into the mold of the present models of PPP (private, public, partnerships). Social entrepreneurs are more likely willing to work with informal connections to governmental and NGO organizations.
- Public perception is important to social entrepreneurs but only in the sense that they need to be aware that the community requires the service they are providing and the manner in which it is being provided is socially acceptable.
- Social entrepreneurs are inclined to see a need and respond in pragmatic ways. Societal statues and guidelines are seen as a means to order and not as obstacles to the care and well being of marginalized persons.

David Bornstein profiles notable social entrepreneurs that have solved social problems on a large scale by innovation, determination and the ability to implement their ideas in concrete ways. Bornstein defines social entrepreneurs as transformative forces: people with new ideas to address major problems who are relentless in the pursuit of their visions, people who simply do not take no for an answer, who will not give up until they have spread their ideas as far as they possibly can.

Bornstein also notes that social entrepreneurs are independent initiators that develop a small community of like-minded persons and function well outside the presence of top-down organizations. According to Bornstein, independence from established structures not only helps the social entrepreneurs wrest free from prevailing assumptions, it gives them latitude to combine resources in new ways to gather together people's ideas, experiences, skills and resources in configurations that society is not naturally aligned to produce.

Finally, Bornstein notes the common themes that social entrepreneurial ventures contain when developing communities: namely:

- Independent income
- Individual reward
- Cooperative venture.

Benevolent Business

Benevolent business uses capital for investment in projects which address basic human needs for those marginalized by our society or live in a state of distress. The terms “capital” and “investment” are hints that this resource, while addressed in a humanitarian spirit, is based on sound business practices and a long term view of socially responsible investing. Principles of benevolent business practice may be summarized as follows:

- a benevolent business does business for the sake of goodness itself. Profits are a means to an end, not the end itself
- a benevolent business seeks to work for the good of the community, not to provide a good image to counter the negative impacts of irresponsible cooperative actions
- a benevolent business uses its skills and knowledge both directly and indirectly to better the community in which it serves
- a benevolent business is accountable not to only to shareholders and stakeholders, but also to those in the community at large that have an intuitive sense of the moral integrity of business ventures
- the success of the benevolent business is not measured by increasing profit margins. Benevolent business measures success by the wellness of its employers, customers, the community in which it operates and the global community that is impacted by its practices
- benevolent business sees itself as a part of an interrelated organic whole that concerns itself not only with the interests of its own affairs, but also the interests of its competitors, the interests of the environment, and the interests of the people in its community

- a benevolent business is the extension of the person and personage of its owners, employees and consumers. As an authentic embodiment of real persons, a benevolent business assumes liability for all its harmful actions, and accepts responsibility for the equitable distribution of its rightfully earned profits
- a benevolent business is a learning organization that seeks to understand how to surrender the power and control of its owners and offer it to its employees and consumers, without endangering the sustainability of its benevolent undertakings
- a benevolent business is subject to the principles of bottom up development and thus endeavors to optimize feed back loops in consumers, employees and suppliers
- a benevolent business has an ear to the ground and can recognize and encourage the wellness patterns that develop in the rich conduits of its enterprise.

Salient Works on Emergence and Social Entrepreneurs

Bornstein, D. *How to Change the World: Social Entrepreneurs and the Power of New Ideas*. Oxford University Press, New York, 2004.

Gladwell, Malcolm. *The Tipping Point: How Little Things Can Make a Big Difference*. Little, Brown & Company: New York, 2000.

_____. *Blink: The Power of Thinking Without Thinking*. Little, Brown & Company: New York, 2000.

Senge, Peter M. *The Fifth Discipline: The Art and Practice of the Learning Organization*. Doubleday: New York, 1990.

Surowiecki, James. *The Wisdom of Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business, Economies, Societies and Nations*. Doubleday: New York, 2004.

Research Data

Introduction: Benevolent Investments and Market Housing in the DTES

In the DTES of Vancouver social entrepreneurs have established a lean and effective benevolent business approach to SRO development through the efforts of both indigenous and intentional tenants and staff. This initiative has proved useful to a sociological modeling of emergence. As a result, sustainable safe and supportive housing is being provided for hard to house tenants at risk to homelessness, sex trade linkages, addictions and untreated mental health issues at the Jubilee Rooms on Main and the Dodson Rooms on Hastings. These self organizing housing efforts are operating without financial support from senior levels of government.

The entrepreneurial vision of safe and supportive, privately funded rooming houses began when Hart Molthagen (a Vancouver based property developer and entrepreneur) purchased the Jubilee Rooms on Main in 2000. Four years later, Hart Molthagen and David Ash (a Langley based venture capitalists), purchased the Dodson Rooms on Hastings. The Jubilee Rooms, an 80 room structure once known in the community as a crack house and a brothel, was transformed into a best practice rooming house after a renovation of the premises. The new site now features 24 hour onsite managers trained in best practices, a closed circuit security system to protect tenant safety, two kitchens and onsite tenant support workers. A similar initiative is now underway at the Dodson Rooms—a building with 67 spacious rooms and a pub.

Observations from community service providers and members of the National Housing Initiative (NHI) indicated that many observable changes have occurred in these two buildings that exceed the actual physical renovations; changes that have produced a significant positive impact on the wellness of the residents without a reliance on the public purse. A question was posed by personnel from the NHI as to what the “magic” was that was making the Jubilee Rooms and Dodson Rooms work. In a socio-scientific attempt to describe this “magic” the following research data was gathered and analyzed.

Research Criteria

In order to construct an empirically based model of the organizations observed in the SROs, surveys were taken at several SRO hotels to quantify and qualify the demographics and individual wellness of the participants. Some surveys were repeated six months later to examine trends although all the surveys include a three year housing history and a three year survey of risks to homelessness. The survey included questions as outlined below (see the Appendix A for a sample of the survey form). The format lists each field in terms of possible categories and provides category descriptions (fields with only one category are binary).

2.2.1 Institutionalized in Childhood – Juvenile centre, military reform school, orphanage, hospital, residential school (for any period of time)

- 2.2.2 Lower Income – below poverty line
- 2.2.3 Possible Prenatal Trauma – suspected significant use of drugs, alcohol during mother’s pregnancy
Possible “Neonatal” Trauma – emotional, physical or social neglect of a child under 2 years of age
Cognitive of Early Childhood Trauma or Possible Early Childhood Trauma – as above, age 2-13
Adolescent Trauma – as above, age 13-18
Adult Trauma – as above, over age 18
- 2.2.4 Level of Childhood Trauma – 0-18 years
Normal Experiences – nurturing, supportive, stable parents
Some Trauma – 1-5 experiences of mild to moderate abuse
Significant Trauma – any experience of significant trauma
- 2.2.6 Family Interactions – Regular – 1 supportive visit or conversation with 1 or more family member per month
Significant Occasions - 2-10 connections during holidays or special occasion
Rare – less than one family interaction per year
No family connections – has had no family interaction in over two years
Court restricted – restraining order in place preventing family contact
- 2.3.1 No Significant Health Issues – No medical condition that interferes with work or ability to participate in recreational or social activities
Infectious Disease – e.g. HIV, Hepatitis, Tuberculosis, Sexually Transmitted Disease (STD)
Malnutrition – food deficiencies, anorexia
Limb deterioration – amputations, partial paralysis
Other illness – any other physical ailment that affects activities of daily living
- 2.3.2 No Significant Mental Health Issues – no mental health condition (see above)
Mood Disorder – Depression, Anxiety, Bi-Polar, OCD
Reality Disorder (Psychosis) – Schizophrenia
Personality Disorder – Anti-Social, Schizoid, Histrionic, Narcissistic
Organic Brain Disorder – FAE, FAS, stroke, brain tumour, brain injury
- 2.3.3 Healthy Regular Social Interaction – Daily interaction with 1 or more friends, family members or colleagues
Occasional Healthy Regular Social Interaction – weekly (see above)
Rare Healthy Regular Social Interaction – monthly (see above)
- 2.3.4 Regular Spiritual Expression – weekly worship or meditative spiritual activity alone or in a group
- 3.1.2 Low Income – can live independently without support

- Hard to House – requires support and advocacy to maintain safe and supportive housing
- Not Housing Ready – cannot avoid eviction despite tenant support worker or advocacy supports
- 3.1.3 Market – Housing without program or criteria for entry
Non-Market – Social Housing or housing with program or criteria for entry
- 3.1.4 Best Practice – see below
For Profit – see below
Deregulated – see below
- 4.1.1 Social Assistance 1 - \$780/month (disability benefit)
Social Assistance 2 - \$500 (regular social assistance)
Deregulated - any income earned through illegal means
- 4.2.1 Mental 1 – see 2.3.2
Mental 2 – mental disability but no treatment needed (can self-regulate)
Mental 3 – treatment compliant (has clear diagnosis and functions well)
Mental 4 – sometimes treatment compliant (functions and is hard to house or not housing ready)
Mental 5 – undiagnosed or not treatment compliant (hard to house or not housing ready)
- 4.3.1 Addictions 1 – responsible use of legal substance or abstinence
Addictions 2 – marijuana, alcohol or prescription drug use in a way that does not impair functioning
Addictions 3 – marijuana, alcohol, prescription drug use in a way that impairs functioning
Addictions 4 – any drug or alcohol use that puts tenants at risk for eviction
Addictions 5 – drug use (including heroin and cocaine), alcohol use that causes person to be non-housing ready and forced to steal, engage in prostitution or organized crime to facilitate drug use
- 4.4.1 No Sex-Trade Linkage – no sex trade activity
Sex Trade 2 – 1 or more interaction per week in controlled environment outside person’s home
Sex Trade 3 – 1 or more interactions per week in home or controlled environment
Sex Trade 4 – 1 or more interactions per week in home only
Sex Trade 5 – 1 or more interactions per week in back alleys or cars
- 4.5.1 Predator/Prey 1 – 1 or more incidents per week that indicate that the individual is stolen from, taken advantage of or forced to do something against their will
Predator/Prey 2 – 1 or more incidents per month (see 1)
Predator/Prey 3 – no predator/prey tendencies

Predator/Prey 4 – 1 or more incidents per month where the person steals, takes advantage or forces someone to do something against their will
Predator/Prey 5 – 1 or more incidents per week (see above)

Survey Results

Surveys were conducted from March to November of 2004. In total, 140 interviews were done with residents of the DTES. The total number of complete and usable interviews was 92. Participants in the study came from environments of absolute homelessness, deregulated, for profit and best practice SROs.

Most of the interviews were conducted in neutral locations in a relational, conversational style. The participants were asked a series of question involving demographic information, housing history, daily habits, and interaction with building staff and tenants. As well, they were asked questions relating to their drug use, sex trade linkages and mental health status. The participants were allowed to refuse to answer any questions that they didn't feel comfortable with, and were assured of the confidential nature of the survey, and their names were never used.

Surveys were conducted using the Code of Ethics as supplied by SCPI. Participants were asked to sign a release of information document that outlined the protocols of the survey.

A summary of the linear data with analysis follows (see the Appendix B for a table of the complete numeric data).

Demographic Results

The basic demographic information revealed that 80% of the interviewees were male and 20% female. Their average age was 40 years old, with 15% less than 30, 73 % between 30 and 50, and 12% over 50. 24% were aboriginal, 60% of European descent. 90% had been born in Canada. 23% defined their religion as traditional, 40% Christian, and 30% indicated that they had no religious affiliation. 48% had no picture ID which is significant in that it restricts there ability to obtaining banking services, deal with government agencies or find employment. The average length of stay in the DTES was 9.4 years, with 27% living there for less than 1 year, 52% had lived there for 1-20 years and 21% had been there over 20 years.

Family history reveals that only 29% were raised by both parents and 37 % had been in foster care or institutionalized. 69% of the responds were raised in poverty. Only 10% indicated no history of trauma, while 34% indicated prenatal trauma, 23% neonatal trauma, 55% early childhood trauma, 50% adolescent trauma and 19% trauma in adulthood. Many indicated that they had experienced trauma in all the age categories. 61% indicated that the trauma was severe. Only 12% had attended any post secondary training and another 25% had completed secondary school. Over 75% did not have regular family interaction (defined as at least once/month).

The present wellness status indicated that 65% have some significant physical health problem, 76% had some form of mental health issue, 25% had regular socialization and 19% regular spiritual expression.

Housing History Results

The present housing status section indicated that 22% of the interviewees were homeless. 19% meet the criteria for low income, 70% were hard to house and 11% not housing ready. None of the interviewees were in non market housing. 55% lived in a best practice SRO, while 28% were in deregulated accommodation.

The housing history sections asked the interviewees to retrospectively report on their housing history over the previous three years and revealed a number of emerging patterns. Within the sample population homelessness had doubled from 11% 3 years ago to 22% currently. Transitional housing had grown to 78% from 52%, while low income housing and institutional housing had gone from a combined total of 30% to 0%.

The SRO history section showed the number in best practice had grown from 1% to 50%. This marked increase is more a reflection of the number of persons interviewed at the Jubilee rather than an indication of the population in general. Simultaneously the number of people in the for-profit or deregulated categories dropped from a total of 57% down to 28%.

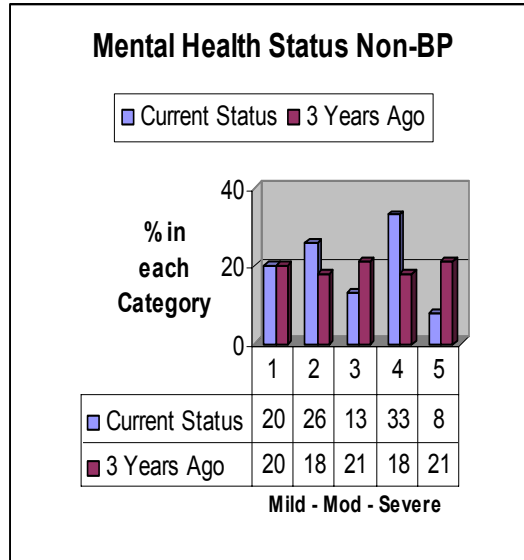
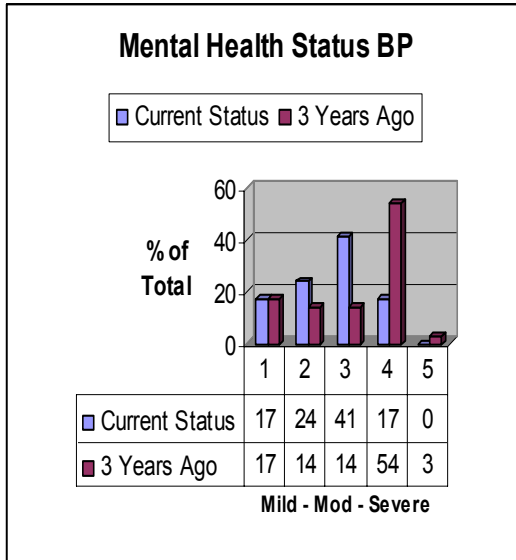
During the three year period the population stabilized somewhat with a drop in the number of housing changes from 52% 3 years ago to 39% currently. The reason for the movement also improved with 20% currently moving to better housing, as opposed to only 9% 3 years ago. There was also a pattern of reduced evictions for non payment and rule breaking.

The statistics demonstrate a clear change in the interviewees' perception of the housing characteristics over the three year period. Reports of guest fees and prostitution dropped from 31% to 11% and public drug dealing from 31% to 11%. On the positive side the number reporting the building as safe and clean jumped from 7% to 25%, food programs increased from 0% to 25% and advocacy from 0% to 5%.

Risk Factors to Homelessness

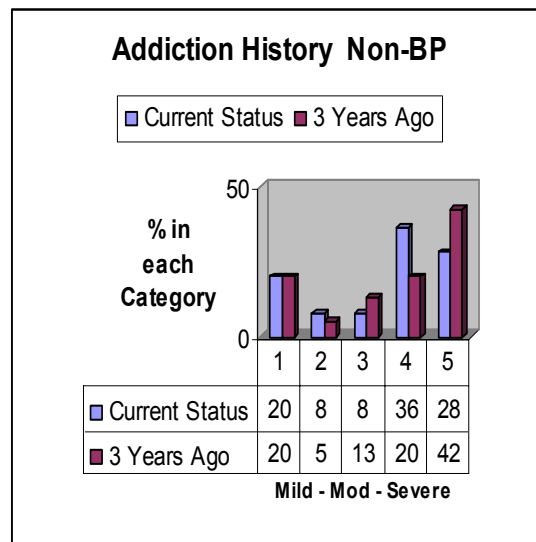
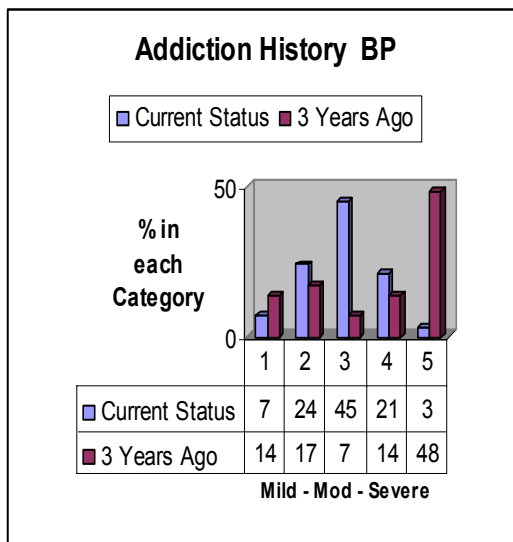
Analyzing the interviewees' income source over the last 3 years reveals some surprising changes. The number of people with employment income had dropped from 13% three years ago to 1% presently and the number on social assistance had growth from 61% to 82%. Deregulated income, panhandling and no income all were down with the total 3 years ago being 26% and presently only 17%.

Changes noted in the mental health history section show a reduction in the number of people in categories 4 and 5 (more severe MH issues). Drawing out the statistics for those that report that they are in a Best Practice (BP) environment as compared to those in Non-BP demonstrates even more improvement as is displayed in the following charts:



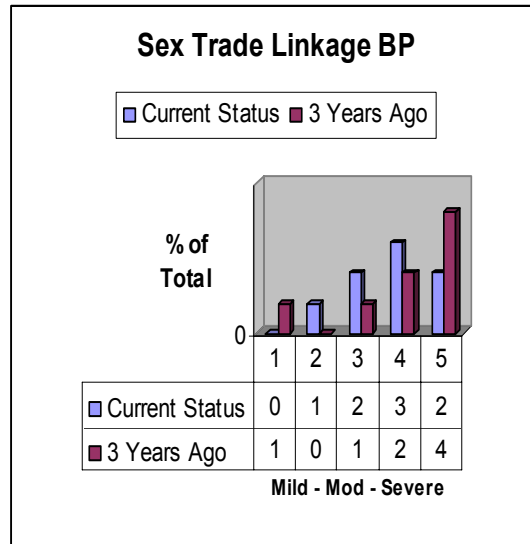
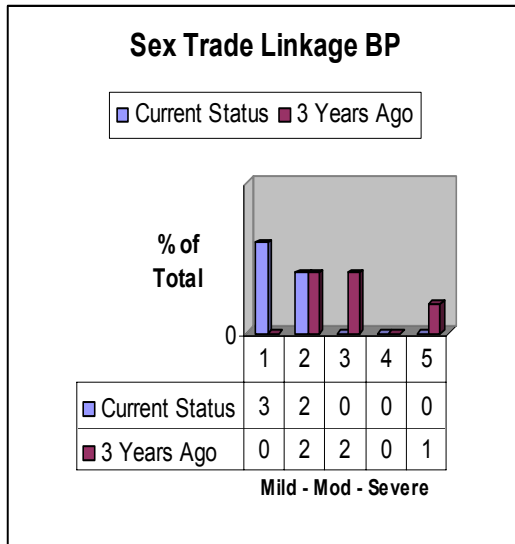
Currently in the BP tenants only 17% are at level 4 and none at level 5, while those in non-BP are 33% and 8% respectively (41% of the total). What makes these results even more significant is when you examine where the population was 3 years ago; i.e., those in BP were in worse shape with 55% over level 3 as opposed to non-BP having only 39% at these levels. In short, the level of severity in the non-BP stayed relatively stable (39-41%), while the level in BP dropped from 55% to 17%.

Comparing the addiction usage of tenants in BP with those in non-BP reveals a similar trend as the following charts demonstrate:

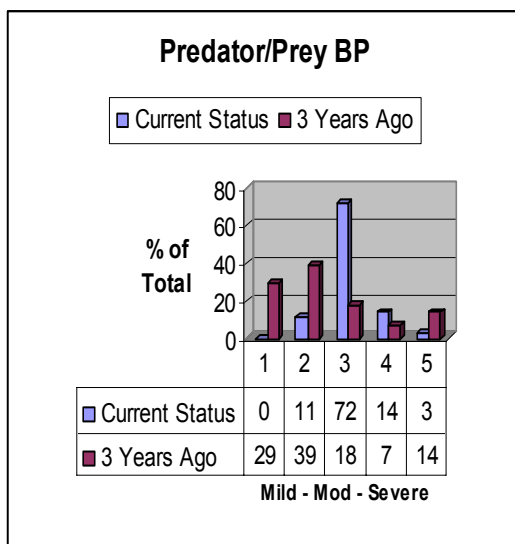


In the BP environment addiction usage at level 4 & 5 (high usage) dropped from 62% down to 24%. In non-BP level 4 & 5 usage remained relatively stable at 62% & 64%.

Tracking the change in the Sex Trade Linkages was more difficult because very few of the interviewees stated that they were or had ever been involved (all the males interviewed indicated no sex trade activity, while 13 females reported involvement). Removing the people who denied involvement reveals that in BP 5 tenants were involved 3 years ago but currently only 2 are and they are at level 1. In the non-BP 7 were active 3 years ago, currently 8 are and 5 of those are at level 4 or 5.



In the Predator/Prey category for BP there is clustering appearing in the middle, indicating that less people are subject to predatory activity or acting as predators themselves.



Subjective Questions

The subjective question section asked the interviewee about their daily habits and interactions with tenants, building managers and community workers both currently and over the last 3 years (the analysis is based on all the interviewees).

Under daily habits, 16% of tenants indicate they spend their time alone in their rooms (down from 25%). 23% indicate they socialize in the hotel (up from 8%). The number of people utilizing food lines or hanging out on the street is basically unchanged. There is a decline in people involved in clubs/work/treatment from 21% to 16%.

Tenant and building manager interactions showed a marked improvement. Conversations regarding personal wellness went from 0% 3 years ago to 12% presently. Friendly and affirming dialogue was up from 13% to 52%. Interviewees indicating they had limited or no dialogue with building managers went from 53% 3 years ago to 19% currently. Interactions based on the rules dropped from 16% down to 11% currently. Controlling or threatening conversation decreased from 16% to 6%. Aggressive or violence interactions went from 2% to 0%.

Tenant to tenant interactions followed the same pattern displayed above.

Tenant to community workers interactions also saw improvement in personal wellness, friendly and affirming, and limited or none. Rule based, controlling or aggressive interactions were minimal throughout the three year period.

A Gold Standard Definition of Best Practices for SROs

Professional Contributions to Gold Standard Definitions for Best Practices

After a consultation process that included advocates for the homeless, low income housing experts, community development professionals and social entrepreneurs, the four primary components of best practices for SROs were established. As a result, the concepts **safe, clean, affordable and supportive** were put into practice at the Jubilee Rooms on Main and the Dodson Rooms on Hastings. The slogan, *safe and supportive housing for community minded people* was posted on the entrance to the rooming houses and included on rooming house related literature. Indigenous and intentional desk personnel were trained in these concepts and tenants were reminded regularly of their importance.

Tenant Contributions to Gold Standard Definitions for Best Practice

After the tenant surveys were tabulated a different view of best practices surfaced. It was commonly believed that tenants primarily wanted a safe and clean building, but the supportive and affordable components were essential as well. The outcome of the interviews revealed a different perception.

The open ended questions at the end of the tenant interviews gave the interviewees an opportunity to comment on positive and negative features of SRO's. The results of this

section were used to aid in the development of a gold standard definition for best practice. Overwhelmingly the feature that was listed most often as valuable was supportive. Words like caring staff, love, support, encouragement, helpful, and listening were given 37 times to describe a good SRO by the interviewees. The second most popular response involved safety concerns 16 responses. The third most popular response involved cleanliness issues with 10 responses. And surprisingly, not a single response either negative or positive was given for affordable. Other comments regarding a good SRO included breakfast program, free phone, kitchen, work opportunities, showers, quiet, location, etc.

Negative features that indicated an SRO was harmful were unsafe (11 responses), unclean (7 responses), unsupportive (1 response) and then a variety of other responses (e.g., mice, small rooms, no private bathrooms, too hot, too cold, people using drugs, etc). See Appendix B for a complete list of tenant descriptions of SRO best practices.

The following is a description of the four primary components of market SRO best practices as outlined in the document *Best Practice Housing for Self Organizing Communities*.

Safe

The primary component in best practice housing is a safe environment for all tenants. SRO safety can be achieved through the provision of the following:

- 24 hour staffing that monitors tenant activity in public areas (hallways, kitchens and common rooms) and guest access (day and evening hours only).
- Security cameras and rear door alarms that provide a practical means of monitoring activity in the SRO. Most tenants welcome security cameras as a safety tool and not as “big brother” intruding into their living space.
- A front door that is locked at all times and only accessible to tenants and their guests. Guests can gain access during day and evening hours through a “buzzer” system that is operated by front desk personnel.
- Rear door restricted access that prevents exposure to vulnerable back lane areas. These doors must be configured to allow tenants a quick exit capability in the event of a fire, but also to prevent persons from entering the building from the hidden lane entrance for illegal purposes.
- Properly locking bathrooms and tenant room doors and windows. These provisions not only provide a sense of home and security in an SRO, but also prevent theft and assault.

In most instances, a major function of SRO desk personnel and concerned rooming house and hotel occupants is to keep vulnerable tenants safe from outside predators, guests and organizations that reduce tenant rights and freedoms. Less often, but even more importantly, desk personnel need to keep the entire SRO tenant population safe from those tenants that threaten the safety of others by the following activities:

- Level two drug dealing (i.e., selling drugs not only for their personal use but as a means of achieving income and control over others)
- Theft of tenant and SRO property

- Violence and disruptive behavior

If a tenant will not cease the activities listed above, even with the best efforts of a relationally based staff, it may be necessary to protect the whole from the few. On these occasions it will be helpful for best practice desk personnel to have already nurtured a good relationship with police offices and provincial tenancy regulators. Once criminal activity takes root in a building it is difficult to remove it without making major changes and thus prevention or outside assistance is the key to keeping tenants safe.

Clean

In common usage the word “clean” can mean either physically clean, as in clean rooms, bathrooms, etc., or clean, as in clean and sober persons that do not use drugs or alcohol. Although this guide respects best practice efforts that require tenants to be clean and sober, in this context clean refers to the condition of the building’s physical structure. A clean SRO can be achieved by the following activities:

- Daily cleaning all hallways, stairs, common rooms, offices and front sidewalks. Although cleaning can be outsourced or done by desk personnel, a tenant cleaning program that remunerates a half dozen or so tenants for daily chores will develop independent living skills and an overall sense of ownership.
- The building envelop should also be checked daily for graffiti. Immediate action should be taken to remove unwanted street messages.
- Monthly room checks will not only ensure that tenants do not collect combustible materials in a small space but will also provide an opportunity for desk personnel and tenant support workers to check for conditions that will attract rodents and bug infestations.
- Quarterly “bin days” will allow for regular cleaning of basement areas, closets and tenant rooms that are especially dirty or have become fire hazards.

Affordable

Deregulated SROs and in some cases for-profit SROs can receive income through a “cut” of drug sales and “drug holding” activities in the building, guest fees charged to johns for the use of rooms on an hourly or nightly basis and the purchase of MHR rent and allowance cheques at reduced rates. It is possible that an SRO owner can make up to \$1000 per day through these deregulated activities (i.e., income from drug trafficking, sex trade linkages and the illegal purchase of income security cheques).

Although it may seem difficult and even impossible to make a market SRO financially viable if deregulated income is removed from the operation, keeping an SRO “in the black” can be achieved if the following provisions are in place:

- An economy of scale that allows expenses of 24 hours staff and other best practice components to be offset by sufficient income. Most SROs with 70 rooms or more will provide the necessary economy of scale.
- A lean business plan that stays focused on best practice housing and resists the urge to spend SRO income on supportive activities (see below for more information on how to provide support on a limited budget)

- A modest remuneration plan for indigenous employees that are willing to trade a short term (i.e., three to twenty-four months) semi-sheltered job training experience for entry level wages (i.e., \$8 per hour at 2005 cost of living standards).

Because between 70 and 90% of SRO tenants are on social assistance, affordability in market hotels and rooming houses can be maintained by keeping rents at levels that match rent payments by the Ministry of Human Resources. Currently, tenants with regular benefits are allowed \$325 per month for rent. The remaining portion of their monthly benefit is \$175. Tenants with regular benefits can pay more for their rent if there is added value (e.g., “outside” window exposure, larger rooms or private kitchens and bathrooms) but this will greatly reduce their ability to purchase other necessities of life.

Tenants with disability benefits receive \$600 – \$900 per month and can afford rooms that rent for up to \$425 if they so choose. Rooms renting for these amounts should at the very least be of a large size (150 - 200 square feet or more) and have an “outside” window exposure. Self contained units that are at least 350 square feet and equipped with a small kitchen and/or private bathroom can be rented to single persons for \$450, or \$625 for a couple (\$625 is the maximum rent allowable for two persons that are married or living in a common law relationship).

Supportive

The fourth component of best practice market housing involves tenant support. In a general sense this component of best practice SRO living can be achieved by helping to create a corporate memory that upholds the core values of this guide. Core value training is not a costly exercise and can be facilitated through regular staff, tenant, guest and volunteer training days. The process will take some time as old values die hard. In the end, an SRO that commits itself to best practice values and demonstrates consistency in the interactions of the owners, staff and tenant leadership team, will eventually be transformed into a supportive environment. Tenants will treat other tenants with respect. Staff will validate tenants and their guest. Owners will see people issues as their bottom line. Recovery, healing and an increased quality of life will flow naturally from the newly established best practice corporate memory.

From an organized perspective, the supportive component is much more difficult to achieve in that professional tenant support can be costly, labor intensive and illusive in the chaotic world of the DTES. Although the paragraph above and the discussion on emergent development below will provide some insight into how SRO developers can create bottom up environments that allow tenants, staff and guests to support one another, the present reality of life in the DTES requires some type of formal tenant support structure.

Because this guide is built around financially viable SRO operations that use income to pay for primary best practice housing costs and not expensive tenant support programs, the following discussion will assist developers in their ability to provide organized tenant supports without cost, or with limited costs, in a best practice rooming house or hotel:

- *Direct NGO involvement* will provide tenant supports at limited costs to the SRO owner and tenants. The provincial government is motivated to pay for tenant supports in an SRO via capable NGOs with experience in addictions and mental health issues because it is an inexpensive way to get a high level of tenant care and treatment into the DTES (a typical tenant support program that supplies a minimally training support worker eight hours a day, seven days a week costs \$70,000). Direct NGO tenant support often is focused on the distribution of medication to persons with dual diagnoses. Typically, participants will receive anti-psychotic drugs to treat reality based disorders, and other relevant medications to treat mood based disorders. These medications are usually controlled by tenant support workers with little or no medical training. A qualified nurse is often placed in a supervisory role somewhere in the background of the outreach organization to “legitimize” the distribution of medication by non qualified personnel. This inexpensive method of chemical restraint on med compliant persons in the DTES is possible because the medications are prescribed directly to the tenants by cooperating pharmacists in easy to manage blister packs. The up and down sides of direct NGO involvement are as follows:

 - From an owner’s perspective, the upside of direct NGO involvement in organized tenant support is that a lot of in-house tenant support can be obtained for very little costs. Normally, participating tenant support organizations will only require a small office to carry out operations. The loss of revenue from one room is approximately \$5,000 per year. NGOs will also assume liability for all medication issues and are a direct link to community services. In short, a great deal of tenant support is supplied at almost no cost and without liability.
 - The downside of direct NGO involvement is that the owner loses some input into the affairs of his or her building. Community support agencies are normally closely connected to social science theories which are notoriously top down in their methodologies. Thus, organized tenant support with direct NGO involvement can complicate operations in an SRO and create a controlling bureaucracy. A caretaker mentality usually replaces the hope of increased quality of life for tenants and guests.

- *Indirect NGO involvement* will provide tenant supports at no cost to the SRO owner and tenants. An increasing number of tenant support services are available in the DTES on a case by case basis from support centers located outside the SRO. In the DTES organizations are currently providing home visits by community health care and psychiatric nurses, community doctors, infectious disease support workers, community police officers, clergy persons and relationally based advocates at no charge to SRO owners and tenants. Indirect NGO involvement also has an upside and a downside:

 - The upside of indirect tenant support involvement is that tenants, staff and owners have greater ownership of care and treatment programs. With this approach there is a noticeable absence of a centralized control office with tenants waiting for medications and attention by tired tenant support workers. Tenants and staff are free to pursue tenant support from the best

possible sources and remain in the driver's seat at all times. Thus tenant support services obtained on the open market so to speak support the bottom up development of the SRO and tend to minimize the caretaking mentality of social science organizations. Further, organizations offering support in SROs and their own outreach centers will still assume some liability for the outcomes of their actions.

- The downside of indirect tenant support involvement is that much can be missed by an ad hoc approach to tenant support. Multi-level, indirect tenant support programs do not have a centralized authority and the more introverted tenants tend to get overlooked with this approach. Further, organizations offering support in SROs and their own outreach centers leave gaps on the liability side of things.

Case Studies

The following four case studies have been included to provide a feel for the interviewees and their unique stories (all the names have been changed to protect the identities of the interviewees).

Case Study #1

Brad moved into the Jubilee after being homeless and living in Bear Creek Park in Surrey for three years. He became homeless through circumstances in his life caused by depression that regularly spiralled out of control. Brad had been a business and home owner in Delta for many years, but after the ending of his engagement and the death of his mother and grandmother, his life began to go down hill. As a result Brad lost his business, then his home, and eventually the majority of his personal belongings.

Eventually, Brad became so depressed that he couldn't work, and didn't want to be around people. He gathered the few possessions that he had left and moved into Bear Creek Park, where he ended up staying for a few years. He survived on his savings by taking trips to a nearby mall to wash up and use the bathroom. Brad would watch people go by and wished his life was different. He found peace in the park and says that he saw a few other people staying there over the years, but that he kept his distance and kept to himself.

After three years Brad had exhausted his resources and realized that needed to be around people again in order to survive. He started to stay in shelters in the DTES, and although he never thought that he would live in the community, he gradually accepted support from the Downtown Eastside Residence Association, the Strathcona Mental Health Clinic and doctors in the area. Brad moved into the Jubilee Rooms on Main in 2000 and began to feel at home for the first time in years.

Brad says that he likes the friendly and supportive staff that always take the time to talk to him and who care about him as a person. He used to love to cook and thinks that one of the best parts about being at the Jubilee is the shared kitchens. Brad also says that there are things he wishes that could be different. He likes his home to be cleaner than the Jubilee is sometimes, and is also not used to the mice that seasonally appear in the building. However the longer that he is in the Jubilee the he feels his depression easing, and has started to enjoy being part of a community again.

Case Study #2

Keith was sent to Vancouver after serving time in a federal penitentiary. When he arrived in Vancouver he lived in an SRO where the tenants and staff took advantage of him and robbed him. One day he decided to leave that rooming house and hitchhiked to Portage la Prairie, where he grew up, to find some friends that he hadn't seen in more than 30 years.

When he was quite young Keith was placed into a series of foster homes. His biological mother was very young when she had him and Keith experienced abuse and trauma from his earliest memories. When he was a teenager he ran away from his foster home and began hanging out with a group of street kids in Winnipeg. He stole with them to survive and formed a bond. This would be the only family that Keith would ever know.

Keith and his friends began by robbing banks with toy guns, and when he was 19 years old Keith was caught and convicted of three counts of robbery. In total, He received a sentence of 27 years for the robberies and one year for having a toy gun.

In jail, Keith found out that he had schizophrenia. He learned everything he could about it, and took every course the prison offered him, including his GED. He was much loved by the staff there for his gentle spirit and caring attitude. When he was released from jail he found that life was very different than he remembered and he didn't have the life skills to protect himself. After a short time in he went to Portage la Prairie to see if he could find the boys that had been his family. But after 28 years, none of them were still around and he ended up in a shelter in Winnipeg where a doctor helped him get onto the right medication. After spending some time in transitional housing in Winnipeg, he came back to Vancouver.

In 2004 Keith found his way to the Jubilee, where he felt safe. He made friends in the building and spent a lot of time with the hotel staff, who loved him for his positive attitude and friendly spirit. Keith has helped many people he talks to understand more about schizophrenia.

Case Study #3

Mary moved into the DTES a month after her 19th birthday. She had been in foster care since she was 13 years old. Both of her parents are alcoholic that lived in the DTES. Mary was in foster care for six years, but when she was 19, she had to move out of the house she was in, and since she had no where to go, she moved into the Dodson Rooms on Hastings, the rooming house that her mother lived in.

When she moved into the building, it was operating in a deregulated manner. She felt very unsafe in her room, as her door wouldn't shut or lock properly. Her room faced the alley on the first floor and her window didn't lock, so she constantly feared that someone would be able to come into her room while she slept. She was unused to the shared bathrooms that didn't lock and found it hard to survive with no where to cook or even store food. Mary was soon lured into drug use and eventually some sex trade work to pay for her use. She felt like her life was getting out of control.

After the building was converted to best practice, Mary door her door replaced and she felt safe in her room. She began to open up to the staff about her struggles, and they gave her support with her desire to stop using drugs. Mary stopped her sex trade work and started to attend a local school for adults with learning difficulties. She spent her

evenings doing her homework with the staff members, and in time started to use fewer drugs.

Eventually, Mary decided that she wanted to leave the building to go and stay with an aunt that lived in a remote part of British Columbia. Some of the staff got together and paid for her plane ticket to get there. Mary still calls the rooming house weekly to talk to the staff and let them know how she is doing.

Case Study #4

Matthew came to the Jubilee after living in many other rooming houses in the DTES. He immediately felt that there was something different about the Jubilee, as he was used to hotels that had staff that were either controlling or aggressive toward the tenants, or just completely ignored him. At the Jubilee, with the unconditional support of the staff, Matthew thought for the first time in his 18 year addiction that maybe he could stay off drugs.

Matthew grew up in a nice home in White Rock. He was angry as teenager for his dad being absent from his life, and got into trouble with drugs at an early age. He had his own child, and found himself following the same absent path as his own father had, and hated himself for not being in her life. Matthew tried many attempts at recovery and treatment centres, but always found himself back on drugs.

After his mother died, Matthew hit his lowest point. He moved from rooming house to rooming house in the DTES, using more drugs than ever before. He felt that no one cared whether his life continued, and his experiences with the welfare system and rooming house staff left him feeling devoid of any human intimacy and completely dehumanized.

After being in the Jubilee for a period of time, Matthew began to realize that he needed to change the direction his life was heading. He became friends with some of the staff, and started to work for the SRO in a tenant cleaning program established to help employee tenants. He was quickly one of their best cleaners and was asked to do work in other areas of the hotel. He knew his addiction was harming himself when he was diagnosed with HIV, but he was happy that after years of going to programs that required certain criteria to remain there, that he had found a place that he was accepted and validated despite his drug use.

Recently, Matthew entered a recovery program out of the area, and was successful in remaining clean and sober. He is living independently for the first time in a long time, and has re-established contact with his teenage daughter.

Sociological Emergence Analysis

Introduction to Techniques and Methods of Swarm Simulations

Open source software for many types of swarm simulations is available from www.swarm.org. The swarm model for the SRO follows a common pattern in the swarm community. A world is defined in which the agents can interact. Interaction rules are defined, and a population of agents is introduced. Interactions are recorded for a given number of iterations and statistics are collected on agent-agent and agent-world interactions.

In order to abstract from the many factors for ability, interaction modes, and definitions of wellness evident in the survey, each agent defines wellness in a single resource value. This value quantifies both wellness (health) and resources. The world of the agents contains sinks (which decrease the wellness of the agent) and sources (which increase agent wellness).

Each agent also has a propensity to share resources with others. When agents encounter each other, a probabilistic exchange occurs. Each agent can share with the other. An agent can also unilaterally refuse (or offer) resources to the other agent. By defining different modes (always share, sometimes share, never share) and rates of sharing, the dispersion (and rate of dispersion) of resources in the world can be monitored.

A typical simulation consists of the following: a 10 x 10 map contains 20 sources and 30 sinks. 500 agents are randomly distributed and interactions recorded for 100 iterations. For a probability of sharing equal to 0.5 for each agent, 27000 agent-agent resource exchanges take place (compared to 10000 source/sink exchanges). For this simple model, the net flow of resources f may be determined as

$$f = n_{sink} r_{sink} - n_{source} r_{source}$$

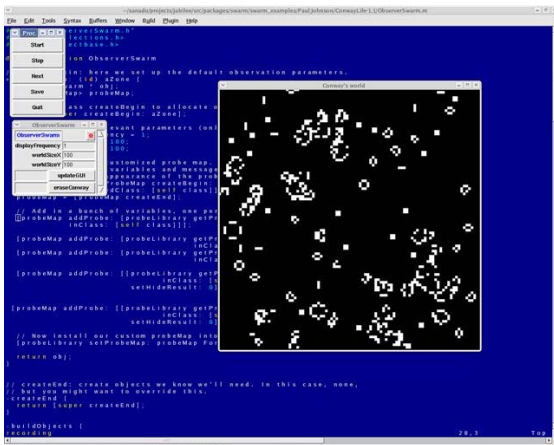
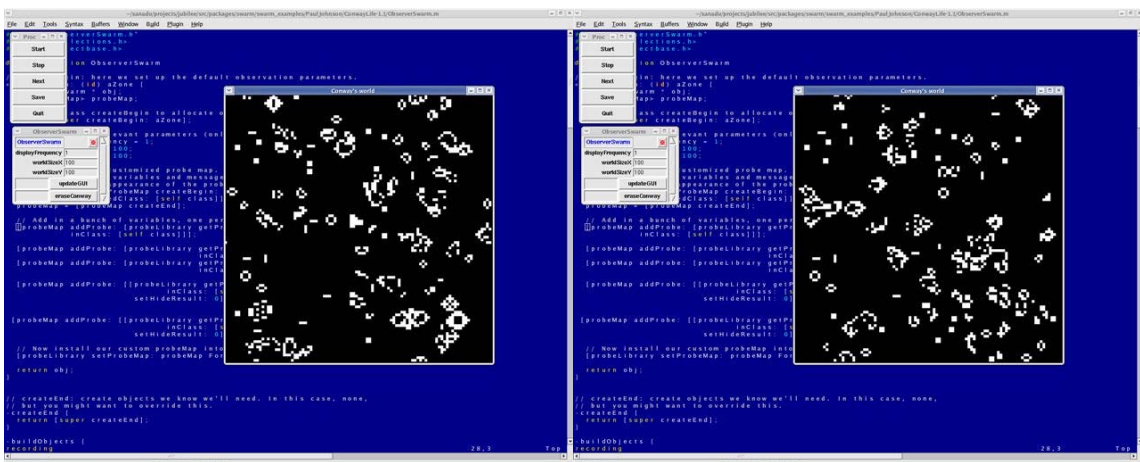
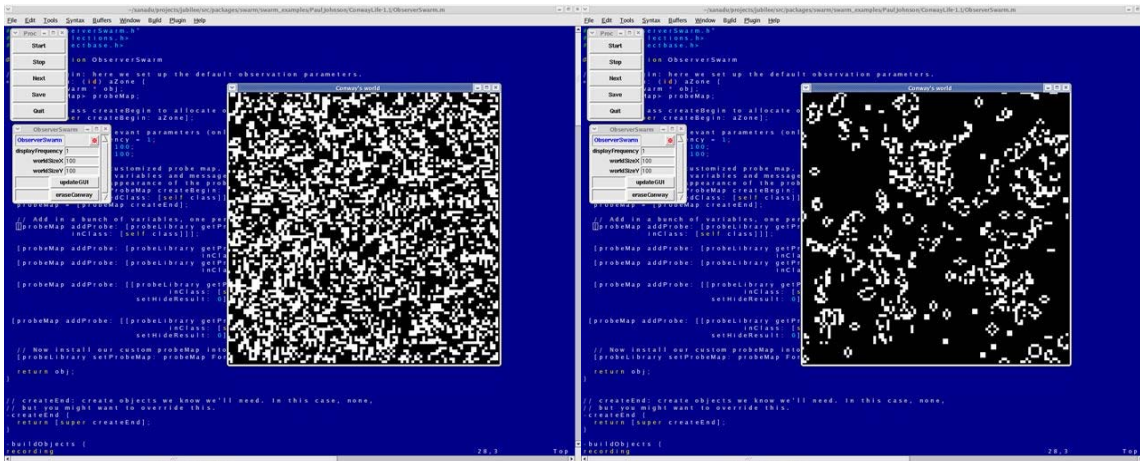
where n_{sink} (n_{source}) is the number of sinks (sources) in the map and r_{sink} (r_{source}) is the average exchange rate of the sinks (sources). The above example demonstrates an overall decrease in average agent resources with a variance that decreases dramatically (at epoch 10) and then slowly increases for the rest of the simulation.

Implementation

Simulations were written in C++ for use with Scopira®, a visual programming language algorithm development (www.scopira.org).

Illustrating Emergence in SROs and the DTES

The emergence based illustrations for this research report are still in progress. The following page offers an example of five screens (out of a total of 235) of a single simulation where competing and/or complimentary agents have been programmed to interact in a given environment.



Research Conclusions

This research has answered the following questions and reached the following conclusions:

What is a reliable gold standard definition of best practice for market SROs?

The research has concluded that the **safe, clean, affordable and supportive** concepts as suggested by community professionals have proved to be accurate descriptors of best practices for market SROs.

The **supportive, safety and cleanliness** focused components of best practices (in that order) reflect the views of the SRO tenants and homeless persons.

Do best practices reduce risks of homelessness and increase wellness in low income, hard to house and not-housing-ready SRO tenants?

Survey results reveal that none of the tenants surveyed were homeless after a ten week exposure to best practices. A global survey of all tenants that have lived in the Jubilee Rooms on Main and the Dodson Rooms on Hastings revealed that less than 2% of the total tenant population became homeless after a minimum 10 week stay.

Wellness improvement rates over a three year period are as follows:

- A comparison of mental illness classifications in best practice/non best practice environments revealed that rates remained stable in non best practice interviewees (39-41%), while the level for tenants exposed to best practices was reduced from 55% to 17%.
- A comparison of addiction usage classifications in best practice/non best practice environments revealed that non best practice interviewees remained relatively stable (62-64%) for those tenants with level four and five drug usage (high usage levels of drugs and alcohol), while the usage rate for the same user types dropped from 62% to 24% for tenants exposed to best practices.
- A comparison of sex trade linkages in best practice/non best practice environments revealed that of the eight tenants that were not exposed to best practices five were still linked at the higher levels of exposure after three years, while only two of five tenants exposed to best practices were still linked to the sex trade during the same period (at reduced exposure levels).

What is the lever point at which the total number and spatial distribution of best practice SROs in the DTES will significantly ameliorate homelessness in the entire community?

In process

Appendix A Sample Questionnaire

1.1.1 Date dd/mm/yyyy	_____		Interview location	_____		
1.1.2 Interviewer	_____					
1.1.3 Interviewee's Initials	_____					
1.1.4 Interviewee type	Homeless person	Tenant	SRO Manager	DTES Community Work.	SRO Owner	
2.1 Who are You? Questions						
<u>Basic Demographic Information</u>						
2.1.1 Gender	Male	Female				
2.1.2 Age	_____					
2.1.3 Birth Country	_____					
2.1.4 Per Capita Income of Birth Country	0-1000	1000-5000	5000-10000	10000+		
2.1.5 Ethnicity of Origin	Aboriginal to Canada (50%+)	European	Hispanic	Western Asian	Eastern Asian	African
2.1.6 Religious Orientation	Animist/Traditio nal	Christian	Buddhist	Islam	None	Other (state)
2.1.7 Has Picture ID?	Yes	No				
2.1.8 Years spent in the DTES	_____					
<u>Wellness/Illness History</u>						
2.2.1 Family History	Institutionalized in Childhood	Foster Housing History	Raised by Single Parent	Raised by Both Parents		
2.2.2 Family Economic History	Social Assistance	Lower Income	Middle Income	Upper Income		
2.2.3 History of Trauma Experiences	Possible Prenatal Trauma	Possible Neonatal Trauma	Cognitive of Early Childhood Trauma	Adolescent Trauma	Adult Trauma	No Lifetime Trauma
2.2.4 Early Childhood Trauma	Normal Experiences	Some Trauma	Significant Trauma			
2.2.5 Educational Achievements	Non Completion Primary ED	Completed Primary Ed	Attended Secondary	Completed Secondary	Attended Post Secondary	

2.2.6 Family Interactions as an Adult	Regular	Significant Occasions	Rare Family Connections	No Family Connections	Court Restricted		
<u>Present Wellness/Illness Status</u>							
2.3.1 Physical Health Issues (HI)	No Significant Health Issues	Infectious Disease Issues	Malnutrition	Limb Deterioration	Other Illness		
2.3.2 Mental Health Issues (MHI)	No Significant (MHI)	Mood Based Disorder	Reality Based Disorder	Organic Brain Disorder	Personality Based Disorder		
2.3.3 Socialization	Regular and Healthy SI	Occasional Healthy SI	Rare Healthy SI	No Significant Healthy SI			
2.3.4 Spiritual Expression (SP)	Regular SP	Occasional SP	Rare SP	No SP			
3.1 Where Do You Live? Questions							
<u>Present Housing Status</u>							
3.1.1 Housing Status	Homeless	Housed					
3.1.2 Housing Orientation	Low Income	Hard to House	Not Housing Ready				
3.1.3 Present Housing Type	Market	Non Market	None				
3.1.4 Present Market Housing Status		1	2	3	4	5	None
<u>General Housing History (GHH)</u>							
3.2.1 Present	Homeless	Shelter	Transitional	Low Income	Treatment / Institution	Friends/Family	
3.2.2 1-12 Month GHH (50%+)	Homeless	Shelter	Transitional	Low Income	Treatment / Institution	Friends/Family	
3.2.3 13-24 Month GHH (50%+)	Homeless	Shelter	Transitional	Low Income	Treatment / Institution	Friends/Family	
3.2.4 25-36 Month GHH (50%+)	Homeless	Shelter	Transitional	Low Income	Treatment / Institution	Friends/Family	
<u>SRO Housing History (MHH)</u>							
3.3.1 Present		1	2	3	4	5	None
3.3.2 1-12 Month MHH (50%+)		1	2	3	4	5	None
3.3.3 13-24 Month MHH (50%+)		1	2	3	4	5	None

3.3.4 25-36 Month MHH (50%+)	1	2	3	4	5	None
	1	2	3	4	5	None

Reason for Housing Change(s) (RHC)

3.4.1 Present	No Changes	Moved to Better Housing	Evicted for Non Payment	Evicted / Breaking Rules	Evicted No Reason	Moved Other
3.4.2 1-12 Month RHC (50%+)	No Changes	Moved to Better Housing	Evicted for Non Payment	Evicted / Breaking Rules	Evicted No Reason	Moved Other
3.4.3 13-24 Month RHC (50%+)	No Changes	Moved to Better Housing	Evicted for Non Payment	Evicted / Breaking Rules	Evicted No Reason	Moved Other
3.4.4 25-36 Month RHC (50%+)	No Changes	Moved to Better Housing	Evicted for Non Payment	Evicted / Breaking Rules	Evicted No Reason	Moved Other

Marking House Characteristics

3.5.1 Present Features	Guest Fees / Prostitution	Public Drug Dealing	Minimum standards	Safe and Clean Building	Food Programs/Act iv.	Advocacy
3.5.2 1-12 Month Features	Guest Fees / Prostitution	Public Drug Dealing	Minimum standards	Safe and Clean Building	Food Programs/Act iv.	Advocacy
3.5.3 13-24 Month Features	Guest Fees / Prostitution	Public Drug Dealing	Minimum standards	Safe and Clean Building	Food Programs/Act iv.	Advocacy
3.5.4 25-36 Month Features	Guest Fees / Prostitution	Public Drug Dealing	Minimum standards	Safe and Clean Building	Food Programs/Act iv.	Advocacy

4.1 What are Your Risk Factors to Homelessness? Questions

Income History

4.1.1 Present	Employed	Social Assistance 1	Social Assistance 2	Deregulated Income	Panhandling	No Income
4.1.2 1-12 Month Income History (50%+)	Employed	Social Assistance 1	Social Assistance 2	Deregulated Income	Panhandling	No Income
4.1.3 13-24 Month Income History (50%+)	Employed	Social Assistance 1	Social Assistance 2	Deregulated Income	Panhandling	No Income
4.1.4 25-36 Month Income History (50%+)	Employed	Social Assistance 1	Social Assistance 2	Deregulated Income	Panhandling	No Income

Mental Illness History

4.2.1 Present Status	1	2	3	4	5
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4.2.2 1-12 Month Mental Illness History	1	2	3	4	5
4.2.3 13-24 Month Mental Illness History	1	2	3	4	5
4.2.4 25-36 Month Mental Illness History	1	2	3	4	5
<u>Addiction History</u>					
4.3.1 Present Status	1	2	3	4	5
4.3.2 1-12 Month Addiction History	1	2	3	4	5
4.3.3 13-24 Month Addiction History	1	2	3	4	5
4.3.4 25-36 Month Addiction History	1	2	3	4	5
<u>Sex Trade Linkage History (STL)</u>					
4.4.1 Present Status	1	2	3	4	5
4.4.2 1-12 Month STL History	1	2	3	4	5
4.4.3 13-24 Month STL History	1	2	3	4	5
4.4.4 25-36 Month STL History	1	2	3	4	5
<u>Predator/Prey Tendencies (PT)</u>					
4.5.1 Present Status	1	2	3	4	5
4.5.2 1-12 Month Predator/P History	1	2	3	4	5
4.5.3 13-24 Month Predator/P History	1	2	3	4	5
4.5.4 25-36 Month Predator/P History	1	2	3	4	5

5.1 How Does SRO Market Housing Affect You? Questions

Daily Habits

5.1.1 Present Daily Routine	Alone in Room	Hotel Socializing	Food Lines	Hanging Out / Street	Clubs/Work/Treatment
5.1.2 1-12 Daily Routine	Alone in Room	Hotel Socializing	Food Lines	Hanging Out / Street	Clubs/Work/Treatment
5.1.3 13-24 Daily Routine	Alone in Room	Hotel Socializing	Food Lines	Hanging Out / Street	Clubs/Work/Treatment
5.1.4 25-36 Daily Routine	Alone in Room	Hotel Socializing	Food Lines	Hanging Out / Street	Clubs/Work/Treatment

Tenant/Building Manager Interactions

5.2.1 Present Normal Interactions	Personal/Treatment-based	Friendly Affirming	Limited/none	Rules or Trade Based	Controlling/Threatening	Aggressive/Violent
5.2.2 1-12 Normal Interactions	Personal/Treatment-based	Friendly Affirming	Limited/none	Rules or Trade Based	Controlling/Threatening	Aggressive/Violent
5.2.3 13-24 Normal Interactions	Personal/Treatment-based	Friendly Affirming	Limited/none	Rules or Trade Based	Controlling/Threatening	Aggressive/Violent
5.2.4 25-36 Normal Interactions	Personal/Treatment-based	Friendly Affirming	Limited/none	Rules or Trade Based	Controlling/Threatening	Aggressive/Violent

Tenant/Tenant/Interactions

5.3.1 Present Normal Interactions	Personal/Treatment-based	Friendly Affirming	Limited/none	Rules or Trade Based	Controlling/Threatening	Aggressive/Violent
5.3.2 1-12 Normal Interactions	Personal/Treatment-based	Friendly Affirming	Limited/none	Rules or Trade Based	Controlling/Threatening	Aggressive/Violent
5.3.3 13-24 Normal Interactions	Personal/Treatment-based	Friendly Affirming	Limited/none	Rules or Trade Based	Controlling/Threatening	Aggressive/Violent
5.3.4 25-36 Normal Interactions	Personal/Treatment-based	Friendly Affirming	Limited/none	Rules or Trade Based	Controlling/Threatening	Aggressive/Violent

Tenant/Community Worker Interactions

5.4.1 Present Normal Interactions	Personal/Treatment-based	Friendly Affirming	Limited/none	Rules or Trade Based	Controlling/Threatening	Aggressive/Violent
5.4.2 1-12 Normal Interactions	Personal/Treatment-based	Friendly Affirming	Limited/none	Rules or Trade Based	Controlling/Threatening	Aggressive/Violent

5.4.3 13-24 Normal Interactions

Personal/Treatment-based

Friendly Affirming

Limited/none

Rules or Trade Based

Controlling/Threatening

Aggressive/Violent

5.4.4 25-36 Normal Interactions

Personal/Treatment-based

Friendly Affirming

Limited/none

Rules or Trade Based

Controlling/Threatening

Aggressive/Violent

6.1 Open Ended Questions

6.1.1 What is good about your hotel/rooming house?

6.1.2 What is not good about your hotel/rooming house?

6.1.3 What are the helpful services/people in your hotel/rooming house?

6.1.4 What are the harmful services/people in your hotel/rooming house?

6.1.5 What are the helpful services/people in the DTES?

6.1.6 What are the harmful activities/people in the DTES?

Appendix B: Complete Linear Tabulation of Survey Data

1.2	Interviewer						
1.3	Julie 56%	Sera 9%	Jono 8%	Nate 4%	Lisa 1%	Heidi 22%	Todd 1%
1.4							
1.5	Basic Demographic Information						
2.1.1	Gender	Male 80%	Female 20%				
2.1.2	Age	Range 19-85	Average Age 40	Less than 30 15%	Older than 50 12%		
2.1.3	Birth Country	Canada 90%	Other 10%				
2.1.4							
2.1.5	Ethnicity	Aboriginal 24%	European 60%	Hispanic 5%	Western Asia 10%	African 1%	
2.1.6	Religion	Traditional 23%	Christian 40%	Buddhist 3%	Islam 1%	None 30%	Other 3%
2.1.7	Picture ID	Yes 52%	No 48%				
2.1.8	Years in DTES	Range 3 weeks - 30 years	Average 9.4 years	Less than 1 yr 27%	1-20 yrs 52%	Over 20 yrs 21%	
	Wellness/Illness History						
2.2.1	Family History	Childhood Inst 10%		Hx of foster care 27%	Raised by single parent 40%	Raised both parents 29%	
2.2.2	Family Economic Hx	Social Assistance 21%	Low Income 48%	Middle Income 26%	Upper Income 5%		
2.2.3	Trauma Hx	Prenatal 34%	Neonatal 23%	Cognitive of ECT 55%	Adolescent 50%	Adult 19%	None 10%
2.2.4	Early Childhood Trauma	Normal Experiences 15%	Some trauma 24%	Significant trauma 61%	Completed Secondary 25%	Attended Post Sec 12%	
2.2.5	Education	Non completion primary 8%	Completed primary 13%	Significant Occasions 18%	Rare family connections 20%	No family connections 33%	Court restricted 3%
2.2.6	Family Interactions Present	Regular 26%					
2.3.1	Wellness/Illness Status						
2.3.2	Mental Health Issues	None significant 24%	Mood Based 44%	Reality Based 22%	Organic Brain 10%	No significant healthy 6%	
2.3.3	Socialization	Regular/healthy 25%		Rare healthy 27%			
2.3.4	Spiritual Expression (SP)	Regular SP 19%	Occasional SP 31%	Rare SP 22%			
3.1.1	Present Housing Status	Homeless 24%	Housed 86%				
3.1.2	Low income 19%	Hard to house 70%	Not housing ready 11 %				
3.1.3	Market 78%	Non market 0	None 22%	For profit 2 0%	Deregulated 1 24%	Deregulated 2 4%	None 22 %
3.1.4	Best practice 50%	For profit 1 0%	For Profit 2 0%				
3.2.1	General Housing History						
3.2.2	Present 1-12 Months (50%+)	Homeless 22%	Shelter 0%	Transitional 78%	Low Income 0%	Institution 0%	Friends/Family 0%
3.2.3	13-24 Months (50%+)	Homeless 16%	Shelter 8%	Transitional 70%	Low Income 4%	Institution 4%	Friends/Family 0%
3.2.4	25-36 Months (50%+)	Homeless 15%	Shelter 4%	Transitional 59 %	Low Income 13%	Institution 5%	Friends/Family 4%
3.3.1	25-36 Months (50%+)	Homeless 11%	Shelter 3%	Transitional 52%	Low Income 17%	Institution 13%	Friends/Family 4%
3.3.2	SRO Housing History						
3.3.3	Present 1-12 Months (50%+)	Best Practice 50%	For Profit 1 0%	For Profit 2 0%	Deregulated 1 24%	Deregulated 2 4%	None 22%
3.3.4	13-24 Months (50%+)	Best Practice 30%	For Profit 1 0%	For Profit 2 28%	Deregulated 1 14%	Deregulated 2 3%	None 25%
3.3.5	25-36 Months (50%+)	Best Practice 1%	For Profit 1 22%	For Profit 2 29%	Deregulated 1 10%	Deregulated 2 7%	None 31%
3.3.6	25-36 Months (50%+)	Best Practice 1%	For Profit 1 6%	For Profit 2 35%	Deregulated 1 10%	Deregulated 2 11%	None 37%
3.4.1	Reason for Housing Change						
3.4.2	Present	No changes 61%	Moved/Better housing 20%	Evicted non payment 1%	Evicted breaking rules 1%	Evicted no reason 3%	Moved other 14%
3.4.3	1-12 Months (50%+)	No changes 60%	Moved/Better housing 17%	Evicted non payment 6%	Evicted breaking rules 4%	Evicted no reason 6%	Moved other 7%

3.4.3	13-24 Months (50%+)	No changes 56%	Moved/Better housing 11%	Evicted non payment 6%	Evicted breaking rules 3%	Evicted no reason 1%	Moved other 23%
3.4.4	25-36 Months (50%+)	No changes 48%	Moved/Better housing 9%	Evicted non payment 10%	Evicted breaking rules 4%	Evicted no reason 3%	Moved other 26%
Market Housing Characteristics							
3.5.1	Present Features	Guest Fees/Prostitution 11%	Public Drug Dealing 11%	Minimum Standards 23%	Safe and Clean Building 25%	Food Programs/Activities 25%	Advocacy 5%
3.5.2	1-12 Months (50%+)	Guest Fees/Prostitution 19%	Public Drug Dealing 18%	Minimum Standards 23%	Safe and Clean Building 19%	Food Programs/Activities 19%	Advocacy 3%
3.5.3	13-24 Months (50%+)	Guest Fees/Prostitution 27%	Public Drug Dealing 26%	Minimum Standards 26%	Safe and Clean Building 9%	Food Programs/Activities 6%	Advocacy 6%
3.5.4	25-36 Months (50%+)	Guest Fees/Prostitution 31%	Public Drug Dealing 31%	Minimum Standards 31%	Safe and Clean Building 7%	Food Programs/Activities 0%	Advocacy 0%
Risk Factors to Homelessness							
Income History							
4.1.1	Present income	employed 1%	social assistance 49%	social assistance 33%	deregulated income 3%	panhandling 8%	no income 6%
4.1.2	1-12 Months (50%+)	employed 4%	social assistance 41%	social assistance 34%	deregulated income 8%	panhandling 8%	no income 5%
4.1.3	13-24 Months (50%+)	employed 10%	social assistance 34%	social assistance 36%	deregulated income 8%	panhandling 8%	no income 4%
4.1.4	25-36 Months (50%+)	employed 13%	social assistance 23%	social assistance 38%	deregulated income 10%	panhandling 7%	no income 9%
Mental Illness History							
4.2.1	Present Status 1-12 Months (50%+)	1 19%	2 25%	3 25%	4 27%	5 4%	
4.2.2	13-24 Months (50%+)	1 19%	2 19%	3 32%	4 24%	5 6%	
4.2.3	25-36 Months (50%+)	1 19%	2 20%	3 18%	4 31%	5 12%	
Addiction History							
4.3.1	Present Status 1-12 Months (50%+)	1 15%	2 15%	3 22%	4 30%	5 18%	
4.3.2	13-24 Months (50%+)	1 17%	2 9%	3 18%	4 22%	5 34%	
4.3.3	25-36 Months (50%+)	1 13%	2 9%	3 13%	4 24%	5 41%	
4.3.4	25-36 Months (50%+)	1 17%	2 11%	3 11%	4 17%	5 44%	
Sex Trade Linkage History							
4.4.1	Present Status 1-12 Months (50%+)	1 86%	2 4%	3 3%	4 4%	5 3%	
4.4.2	13-24 Months (50%+)	1 86%	2 3%	3 4%	4 1%	5 6%	
4.4.3	25-36 Months (50%+)	1 86%	2 3%	3 3%	4 1%	5 7%	
4.4.4	25-36 Months (50%+)	1 86%	2 2%	3 2%	4 2%	5 8%	
Predator/Prey Tendencies							
4.5.1	Present Status 1-12 Months (50%+)	1 12%	2 20%	3 48%	4 17%	5 3%	
4.5.2	13-24 Months (50%+)	1 15%	2 22%	3 38%	4 20%	5 5%	
4.5.3	25-36 Months (50%+)	1 19%	2 36%	3 25%	4 15%	5 5%	
4.5.4	25-36 Months (50%+)	1 13%	2 53%	3 16%	4 16%	5 2%	
How Does Market Housing Affect You?							
Daily Habits							
5.1.1	Present Daily Habits	alone in room 16%	hotel socializing 23%	food lines 16%	Hanging Out / Street 29%	Clubs/Works/Treatment 16%	
5.1.2	1-12 Months (50%+)	alone in room 18%	hotel socializing 12%	food lines 18%	Hanging Out / Street 36%	Clubs/Works/Treatment 16%	
5.1.3	13-24 Months (50%+)	alone in room 15%	hotel socializing 12%	food lines 18%	Hanging Out / Street 33%	Clubs/Works/Treatment 22%	
5.1.4	25-36 Months (50%+)	alone in room 25%	hotel socializing 8%	food lines 15%	Hanging Out / Street 31%	Clubs/Works/Treatment 21%	

Tenant/Building Manager Interactions							
5.2.1	Present Interactions	Personal/Wellness-based 12%	Friendly Affirming 52%	Limited/none 19%	Rules of Trade-based 11%	Cont/Threat 6%	Aggress/Vio 0%
5.2.2	1-12 Months (50%+)	Personal/Wellness-based 13%	Friendly Affirming 25%	Limited/none 26%	Rules of Trade-based 23%	Cont/Threat 11%	Aggress/Vio 2%
5.2.3	13-24 Months (50%+)	Personal/Wellness-based 0%	Friendly Affirming 19%	Limited/none 36%	Rules of Trade-based 25%	Cont/Threat 15%	Aggress/Vio 5%
5.2.4	25-36 Months (50%+)	Personal/Wellness-based 0%	Friendly Affirming 13%	Limited/none 53%	Rules of Trade-based 16%	Cont/Threat 16%	Aggress/Vio 2%
Tenant/Tenant Interactions							
5.3.1	Present Interactions	Personal/Wellness-based 2%	Friendly Affirming 63%	Limited/none 30%	Rules of Trade-based 3%	Cont/Threat 2%	Aggress/Vio 0%
5.3.2	1-12 Months (50%+)	Personal/Wellness-based 0%	Friendly Affirming 41%	Limited/none 45%	Rules of Trade-based 5%	Cont/Threat 7%	Aggress/Vio 2%
5.3.3	13-24 Months (50%+)	Personal/Wellness-based 0%	Friendly Affirming 25%	Limited/none 53%	Rules of Trade-based 6%	Cont/Threat 9%	Aggress/Vio 7%
5.3.4	25-36 Months (50%+)	Personal/Wellness-based 2%	Friendly Affirming 21%	Limited/none 60%	Rules of Trade-based 3%	Cont/Threat 12%	Aggress/Vio 2%
Tenant/Community Workers Interac							
5.4.1	Present Interactions	Personal/Wellness-based 11%	Friendly Affirming 26%	Limited/none 62%	Rules of Trade-based 1%	Cont/Threat 0%	Aggress/Vio 0%
5.4.2	1-12 Months (50%+)	Personal/Wellness-based 8%	Friendly Affirming 25%	Limited/none 67%	Rules of Trade-based 0%	Cont/Threat 0%	Aggress/Vio 0%
5.4.3	13-24 Months (50%+)	Personal/Wellness-based 1%	Friendly Affirming 16%	Limited/none 80%	Rules of Trade-based 3%	Cont/Threat 0%	Aggress/Vio 0%
5.4.4	25-36 Months (50%+)	Personal/Wellness-based 2%	Friendly Affirming 13%	Limited/none 82%	Rules of Trade-based 3%	Cont/Threat 0%	Aggress/Vio 0%

Appendix C: Complete List of Tenant Based Best Practice Definitions

Positive Responses	Clean	Affordable	Supportive	Other
Safe				
(*BP) security	(*DL) clean		*(DC) caring staff	*(PR) feels like home
* (BP) security	*(MN)clean		*(DC)love	*(PR) an oasis in the DTES
*(TL) safety	*(ML)well maintained		*(DP)pleasant staff	*(MB) activites and movie night
(*MN) safe	*(ML) clean		*(DL)caring staff	*(DC) breakfast
(*DR) 24hr security	*(RH) clean		*(DL)love	*(DL) free phone
(*PR)security	*(LT)clean-no bugs		*(DL) support	*(DP) kitchen
*(ML) secure	*(JM) clean		*(TP) help to stay away from drugs	*(DL) food program
*(MB) 24hr security	*(DD) clean		*(TP) support	*(PN) food
*(VB) peaceful	*(SS)clean environment		*(TP) encouragement	*(DS) work opportunities
*(K) cameras	*(SY)clean		*(PN) good staff	*(DS) runs smoothly
*(DL) secure			*(DS) helpful	*(SY) showers
*(JM)secure			*(TL) friendly	*(SY) kitchens
*(RT) no violence			*(JB) programs	*(DP) food supports
*(RS)safe and secure			*(JB) support	*(RH) quiet
*(DD)safe and secure			*(JB) friendship	*(VB) quiet
*(DP) safe			*(DP) supportive staff	*(TK) breakfast program
			*(DP) love	*(TK) community kitchen
			*(DP) listening	*(DL) breakfast program
			*(PR) best caring management	*(DL) community kitchen meals
			*(NZ) helpful,caring staff	*(LH) food breakfst program
			*(ML) supportive staff	*(TK) beats sleeping outside
			*(MB) friendly,caring staff	
			*(RH) support	*(LT) quiet
				#(DK) big rooms

*(TK) supportive staff/lookout
 *(LH) support
 *(RT) friendly staff
 *(RS) supportive staff
 *(JS) good staff- "like family"
 *(TP) support to stay away from drugs
 *(FR) honest staff
 (*DD) sense of community
 *(DD) supportive staff
 *(SS) staff are polite and respective
 *(DS) helpful mgmt
 *(JS)helpful staff
 *(DJ)staff care for me-buy me paints
 *(ES) supportive staff

*(RS) meals
 *(JS) rooms look new
 *(PL) coffee in the morning
 *(FR) good location
 *(FR) nice location
 *(DD) community kitchen
 *(DD) Jacobs Well

Negative Responses

Safe	Clean	Affordable	Supportive	Other
*(DP) bad area	*(DP) not clean enough		# (JB) staff not supportive	* (DC) meals need to be delivered
*(DL) abuse from tenants	*(TK)cleanliness issues			* (DP) gaveyard staff sleep
*(SS) bad location	* (LH) cleanliness issues			* (DP) mold in entrance way
#(DK) no security doors	#(C) dirty			* (DP) all bathrooms not accessable
#(DK) windows don't lock	# © pest problems			* (DP) no private bathrooms
#(JC) doors don't lock	* (RS) toilets are dirty			* (DP) all showers not available
#(H) doors don't lock	# (MH) dirty building			* (PN) no guests after 10pm
#(AF) windows don't lock				* (PN) tenants with mental health problems
#(AF) doors don't lock				* (JB) mice

#(MH) no cameras
#(MH) no security
doors

* (DC) mice

* (DP) tiny rooms

* (DP) too hot in rooms

* (DP) not enough
common areas

* (ML) rooms too small

*(TK) no overnight
guests

*(DL) mice

*(TR) mice

*(TR) too cold in
rooms

*(LT) rooms too hot

*(JM) tenants
abusing supportive
staff

(DK) no showers

#(JC) no curtains in
womens bathroom

#(JC) no locks on
bathroom doors-men
come in

#(H) rooms too small

(H) drug trafficking in
rooms

#(C) small rooms

* (RT) need stricter
rules

(AF) not enough heat

(AF) rampant drug
use

* (JS) movie night
ended

* (PL) people using
drugs

(MH) vandalism

(MH) excessive drug
use

**Emergent Models of Wellness:
A Case Study of Management Practices in Single Resident Occupant Hotels of
Vancouver CA**

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Abstract

Emergence is the phenomenon of collective intelligence exhibited by a population of independent agents (the swarm). The theory of emergence has become a useful framework for exploring salient features of dynamical systems. This framework provides insight into hitherto intractable problems in sociology and economics. One such problem is the definition of a mathematical model of homelessness that enables policy evaluation with respect to the holistic wellness of the impacted individuals. Swarm simulations provide numerical and visual results to the researcher allowing both quantitative and intuitive hypothesis testing. This paper defines a basic swarm model of homelessness, details some initial experiments and provides justification for a dynamical systems model. A description of a survey taken in an area of Vancouver with high rates of homelessness is also provided.

Keywords: *emergence, homelessness, swarm engineering.*

INTRODUCTION

Emergence is the phenomenon of collective intelligence exhibited by a population of independent agents [1-5]. The manifestation of collective intelligence is conditional on certain criteria: population diversity and density are high; interaction levels are high, random and exchange local information; environmental rate of change does not preclude adaptation. Examination of emergent principles is becoming a common framework for exploring salient features of dynamical systems. Visual results allow the researcher to formulate hypotheses on an intuitive level, a key feature of exploratory data analysis (EDA). The problem examined in this paper is the definition of a mathematical model for homelessness that allows policy evaluation with respect to the holistic wellness of impacted individuals. This is accomplished by:

1. Providing a background justifying the use of dynamical systems modeling.
2. Describing a survey given to people living in an area of Vancouver with high rates of homelessness.
3. Defining a basic swarm model of homelessness, and detailing initial experiments.

BACKGROUND

Recent changes in management policies at several single resident occupancy (SRO) hotels in Vancouver have produced significant positive changes with respect to the wellness of residents. These changes have been characterized as opening feedback loops between residents and management/ownership, eliminating harmful elements from the building (illegal activity), and supplying resources and opportunity to residents and local

individuals. Bottom-up organization was observed; residents quickly formed social networks and asserted ownership in the enhanced living space. The correspondence to emergent principles (discussed later) is strong and surprising.

This paper suggests that the criteria regarding population diversity and density, interaction levels and other emergent principles are met within a single SRO (or its immediate neighbourhood) and justify dynamical systems modeling.

SURVEY

In order to construct an empirically based model of the organization observed in the SROs, surveys were taken at several SRO hotels to quantify demographics and individual wellness. Some surveys were repeated six months later to examine trends. The survey included questions as outlined below. The format lists each field in terms of possible categories and provides category descriptions. [Fields with only one category are binary.]

1. **Childhood History:** Institutionalized in Childhood – Juvenile centre, military reform school, orphanage, hospital, residential school (for any period of time).
2. **Social Status:** Lower Income – below poverty line.
3. **Trauma:** Possible Prenatal Trauma – suspected significant use of drugs, alcohol during mother's pregnancy. Possible "Neonatal" Trauma – emotional, physical or social neglect of a child under 2 years of age. Cognitive of (ECT) or Possible ECT – as above age 2-13. Adolescent Trauma – as above age 13-18. Adult Trauma – as above over age 18.
4. **Health Issues:** No Significant Health Issues – No medical condition that interferes with work or ability to participate in recreational or social activities. Infectious Disease – e.g. HIV, Hepatitis, Tuberculosis, Sexually Transmitted Disease (STD).
5. **Mental Health Issues:** No Significant Mental Health Issues – no mental health condition. Mood Disorder – Depression, Anxiety, Bi-Polar, Obsessive Compulsive Disorder (OCD). Reality Disorder (Psychosis) – Schizophrenia. Personality Disorder – Anti-Social, Schizoid, Histrionic, Narcissistic. Organic Brain Disorder – Fetal Alcohol Effects(FAE), Fetal Alcohol Syndrome(FAS), stroke, brain tumour, brain injury.
6. **Social Interaction:** Healthy Regular Social Interaction – Daily interaction with 1 or more friends, family members or colleagues. Occasional Healthy Regular Social Interaction – weekly interaction. Rare Healthy Regular Social Interaction – monthly interaction.
7. **Spiritual Expression:** Regular Spiritual Expression – weekly worship or meditative spiritual activity alone or in a group.
8. **Childhood Trauma:** Level of Childhood Trauma – 0-18 years. Normal Experiences – nurturing, supportive, stable parents. Some Trauma – 1-5 experiences of mild to moderate abuse. Significant Trauma – any experience of significant trauma.
9. **Socialization:** Regular - 1 supportive visit, conversation with 1 or more family member per month. Significant Occasion – 2-10 connections during holidays or

special occasion. Rare – Less than 2 visits per year.

10. **Housing Status:** Low Income – can live independently without support. Hard to House – requires support and advocacy to maintain safe and supportive housing. Not Housing Ready – cannot avoid eviction despite tenant support worker or advocacy supports.
11. **Housing Characteristics:** Market – Housing without program or criteria for entry. Non-Market – Social Housing or housing with program or criteria for entry. Best Practice – well maintained, possible tenant support program. For Profit – fairly well maintained, possible limited illegal activity. Deregulated – poorly maintained, significant illegal activity.
12. **Income History:** Social Assistance 1 - \$780/month (disability benefit). Social Assistance 2 - \$590/month. Social Assistance 3 - \$510 (regular social assistance).
13. **Mental Health State:** Mental 1 – see Mental Health Issues. Mental 2 – mental disability but no treatment needed (can self-regulate). Mental 3 – treatment compliant (has clear diagnosis and functions well). Mental 4 – sometimes treatment compliant (functions and is hard to house or not housing ready). Mental 5 – undiagnosed or not treatment compliant (hard to house or not housing ready).
14. **Addiction State:** Addictions 1 – responsible use of legal substance. Addictions 2 – marijuana, alcohol or prescription drug use in a way that does not impair functioning. Addictions 3 – marijuana, alcohol, prescription drug use in a way that impairs functioning. Addictions 4 – any drug or alcohol use that puts tenants at risk for eviction. Addictions 5 – drug use (including heroin and cocaine), alcohol use that causes person to be non-housing ready and forced to steal, engage in prostitution or organized crime to facilitate drug use.
15. **Sex-Trade Linkage:** No Sex-Trade Linkage – no sex trade activity (STA). Sex Trade 2 – 1 or more STAs per week in controlled environment outside person’s home. Sex Trade 3 – 1 or more STAs per week in home or controlled environment. Sex Trade 4 – 1 or more STAs per week in home only. Sex Trade 5 – 1 or more STAs per week in uncontrolled environment (back alleys/cars).
16. **Predator-Prey:** Prey 1 – 1 or more loss incidents per week (individual is stolen from, taken advantage of or forced to do something against their will). Prey 2 – 1 or more loss incidents per month. Predator/Prey – no predator/prey tendencies. Predator 1 – 1 or more acquisition incidents per month (person steals, takes advantage or forces someone to do something against their will). Predator 2 – 1 or more acquisition incidents per week.

Compiled results are available upon request from communitybuilders.ca.

EMERGENCE

One early major contributor to the theory of emergence is L. v. Bertalanffy [6] who used the term *general system theory* to describe the study on inter-related parts.

“General system theory is a logico-mathematical science of wholeness; its rigorous development is technical (mathematicized) where verbal descriptions are not expendable. Problems are *seen* and

recognized before they can be formalized mathematically.”

Bertalanffy notes that the success of general systems theory is due to the following.

1. There is a limited number of simple mathematical expressions which will be preferably applied to describe natural phenomenon. [Laws with identical structure will thus occur in different fields.] Conceptualization schemes are also limited.
2. Order exists in reality itself and admits the application of our conceptual constructs.
3. A general definition of a system allows one to show correspondences from one field to another. Meta-principles apply across the more specific fields.

While systems can be viewed as collections of agents, it is important to examine characteristics of the agents and the environment requisite for emergence.

- Agents must exhibit differing abilities to react to each other and the environment (eg. Agents have different tendencies in similar situations).
- Agents should obtain local information regularly, and from many sources. No information about the population as a whole (that is, global statistics) is required to make decisions toward optimization [7-8].
- The environment must not change [with respect to population self-preservation factors] faster than a sub-population can adopt an alternate [self-preserving] mode of behaviour. For example, the depletion of resources in one area should be balanced by the time required to move to a new region. [Cataclysmic events are generally not helpful in discussing alternate possible modes of existence for the population.]

Emergent Principles

Emergent principles are inferred from characteristics exhibited by a specific population drawing analogies from ants, bees and other social insects, individuals, groups, business (companies, monopolies, cartels), cities, regions, and nations. As such, emergence is one of many biologically-inspired computing methods.

1. **More is different:** the properties exhibited by a population are dependent on the size of the population. Critical values associated with population size relate to fundamental increases in capability. This non-linear relationship has a counterpart in the chaos theory phenomenon of bi-furcation (the sudden change in steady (stable) states of a dynamical system).
2. **Ignorance is useful:** coarse grained information is readily accessible and processable. [Information approximation is ignorance of details.] Yet, groups of individuals using these approximations, who lack true (global) knowledge, can persist resiliently in changing environments. Local knowledge, coupled with massive local information exchange, is sufficient for optimal-tending behaviour by the entire population.
3. **Encourage random encounters:** random exchange of information allows the pursuit of multiple goals. This practice is most famous for its use in genetic algorithms, where codings for problem solutions are randomly permuted and mutated, and then propagated based on their fitness. The pursuit of multiple goals increases the population ability to adapt to a changing environment. Random encounters are often

critical components of population models [9].

4. **Signs exhibit patterns:** the modes and content of communication between individuals and groups of individuals provide insight into global population states. How and what individuals are communicating corresponds to how the environment is affecting the entire population.

Neighbours are information: primary sources of new information are an agent's current neighbours. Face-to-face interactions are a high-bandwidth mode of communication (for humans) due to body-language, tone and tenor.

While individuals may be restricted to a specific locality, information can be quickly communicated via local mobility and varied partner information exchange.

Emergence and Community

For model building in an SRO environment, the effect of the SRO environment should be considered with respect to wellness of individuals. C. Alexander [10] has pondered the function of the city as it relates to the individual and the forming of communities. Four theses are presented:

- T1.** The most basic and urgently needed kind of contact is intimate contact.
- T2.** Social pathologies (e.g. delinquency and mental disorder) follow inevitably from lack of intimate contact.
- T3.** Urbanization inevitably produces the so-called autonomy-withdrawal syndrome; society must overcome this syndrome to recreate intimacy.
- T4.** To create urban spaces that allow intimacy, a specific set of rules for city housing must be followed.

Defining wellness, especially in a holistic sense, is problematic. One measure of individual wholeness is sensitivity to deviations from normalcy. Conversely, lack of wholeness can be construed as insensitivity. Some symptoms of desensitization are: propensity for violence, decline of the respect for life, casualness to human hurt, and craving for heightened experience [11].

Thus, participation in small groups or communities are indicative of individual wellness. "The state is ... the will to do something in common" [12].

Social entrepreneurship, as a related topic to emergence and community, is discussed in [13-15].

SWARM ALGORITHM

Open source software for many types of swarm simulations is available from www.swarm.org [16]. The swarm model for the SRO follows a common pattern in the swarm community. A world is defined in which the agents can interact. Interaction rules are defined, and a population of agents is introduced. Interactions are recorded for a given number of iterations and statistics are collected on agent-agent and agent-world interactions.

In order to abstract from the many factors for ability, interaction modes, and definitions of wellness evident in the survey, each agent defines wellness in a single resource value.

This value quantifies both wellness (health) and resources. The world of the agents contains sinks (which decrease the wellness of the agent) and sources (which increase agent wellness).

Each agent also has a propensity to share resources with others. When agents encounter each other, a probabilistic exchange occurs. Each agent can share with the other. An agent can also unilaterally refuse (or offer) resources to the other agent. By defining different modes (always share, sometimes share, never share) and rates of sharing, the dispersion (and rate of dispersion) of resources in the world can be monitored.

A typical simulation consists of the following: a 10 x 10 map contains 20 sources and 30 sinks. 500 agents are randomly distributed and interactions recorded for 100 iterations. For a probability of sharing equal to 0.5 for each agent, 27000 agent-agent resource exchanges take place (compared to 10000 source/sink exchanges). For this simple model, the net flow of resources f may be determined as

$$f = n_{sink} r_{sink} - n_{source} r_{source}$$

where n_{sink} (n_{source}) is the number of sinks (sources) in the map and r_{sink} (r_{source}) is the average exchange rate of the sinks (sources). The above example demonstrates an overall decrease in average agent resources with a variance that decreases dramatically (at epoch 10) and then slowly increases for the rest of the simulation.

Implementation

Simulations were written in C++ for use with Scopira®, a visual programming language algorithm development [17] (www.scopira.org).

RESULTS

The feasibility portion of this study regarding use of swarm has been completed. The survey taken in Vancouver has been described and an overview of emergence theory presented with application to the SRO model.

CONCLUSIONS

This paper introduces the application of swarm engineering to a difficult sociological problem, homelessness. The literature examined shows a strong inter-disciplinary tradition for systems engineering. Taken with the observed evidence of emergent phenomenon at the SROs, study of emergent principles promises to be a insightful process.

Future Work

The swarm simulation will be refined to account for differentiated interactions between agents. Distribution of sinks and sources will be examined for a tipping point in terms of source/sink distribution at which individual agent wellness is significantly improved.

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