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# Healthy Communities Must Also Be Sustainable Communities

## S Y N O P S I S

The author contends that healthy communities must be both environmentally and socially sustainable, given that health depends on the quality of the built and natural environments, and that global change resulting from the industrial economy is affecting the web of life. He argues that suburban sprawl wastes scarce resources and disproportionately places those resources in the hands of suburban dwellers. Urban areas can be made more environmentally sustainable, especially with respect to energy consumption, which will help reduce air pollution and climate change and contribute in other ways to improved health.

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Population health, viewed within an ecological framework, can be understood as an expression of the functioning of the many ecosystems and natural cycles that constitute earth's life support systems. Although, for the moment, longevity continues to increase in most countries, these health gains will dissipate if life's ecological infrastructure is not sustained.<sup>1</sup>

Public health measures over the ages have frequently focused on environmental interventions to protect and promote health. Nearly 2,500 years ago, Hippocrates wrote about the importance of air, water, and other environmental factors in the locating and planning of cities and housing; the Romans built aqueducts to bring fresh water to their cities, sewers to cart away the waste, and drained marshes, thus reducing malaria. Our modern era of public health traces its roots to the

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application of these same principles in the 19th and early 20th centuries, in the face of the massive adverse health effects of urbanization and industrialization.<sup>2</sup> Indeed, the environmental movement has long recognized that we best understand and relate to environmental damage when it is expressed in terms of its effect on human health. However, in the mid-20th century a subtle but important shift in our perception of the environment began to manifest itself. With the growth in both scientific and popular understanding of ecology came the realization that the environment was not something "out there," something separate and apart from humans, but rather that we are but one species in the web of life, a part of the ecosystem.

The sections that follow describe the unsustainable nature of our present way of life, the concept of the sustainable community, and the relationship between the built environment and health. Urban energy use is one of the key issues linking sustainability, the built environment, and health.

## DEFINITIONS

**Built environments.** Built environments are those built by humans for humans. A recent report on Health and Environment by Health Canada described it thus:

The built environment is part of the overall ecosystem of our earth. It encompasses all of the buildings, spaces, and products that are created, or at least significantly modified, by people. It includes our homes, schools, and workplaces, parks, business areas, and roads. It extends overhead in the form of electric transmission lines, underground in the form of waste disposal sites and subway trains, and across the country in the form of highways.<sup>3</sup>

We in North America are 80% urbanized and spend almost 90% of our time indoors, making the built environment our principal environment today. Modifying the natural and built environments has been and remains a key strategy in the struggle to improve the health of the public.

**Direct and indirect health effects.** A direct health effect refers to the effects of the built environment on people who live within that environment. Many of these are positive, such as shelter from the elements, warmth, and clean water supply. However, many are negative, such as indoor air pollution and traffic.

Indirect health effects means the effects on the health of people as a result of changes in the natural envi-

ronment resulting from the construction and operation of built environments. These effects may be experienced by people who are remote from the built environment that generates the effect. So, the rise in the incidence of disease caused by global warming is an indirect health effect of increased carbon dioxide emissions. An indirect health effect of urban water pollution is the contamination of the food chain, including the fish we eat.

**Environmental and social sustainability.** A recent Canadian definition suggests that an ecological (or sustainable) community may be defined as one that:

does not erode the natural capital (air, water, land, renewable, and non-renewable resources) of the earth, and whose structure and function result in a harmonious relationship with the local, regional and global ecosystems.... [E]cological cities are also characterized by the strength, health, and vitality of their communities and economies.<sup>4</sup>

In a 1996 US report from the President's Council on Sustainable Development, healthy and sustainable communities were described as:

communities where natural and historic resources are preserved, jobs are available, sprawl is contained, neighborhoods are secure, education is lifelong, transportation and health care are accessible, and all citizens have opportunities to improve the quality of their lives.<sup>5</sup>

For Roseland, the idea of sustainable communities is derived from the many new ways of thinking about the design, construction, and operation of communities (and more broadly, of society as a whole) that are encompassed in Healthy Cities/Communities principles.<sup>6</sup> The concept of a sustainable community thus transcends its ecological and technological origins to embrace the economic, social, political, and cultural means by which we can create communities that are both environmentally and socially sustainable.

## THE NEED FOR ENVIRONMENTAL SUSTAINABILITY

Both the quality of our housing and of the wider urban environment and the need for greater ecological sustainability are significant determinants of health and deserving of priority attention. The 1996 Report on the Health of Canadians identified three challenges related to the phys-

ical environment that are crucial to improving the health of the public:

- foster a healthy and sustainable environment for all: reduce pollution, sustain ecosystem health, reduce resource consumption;
- ensure suitable, adequate and affordable housing;
- create safe and well-designed communities.<sup>7</sup>

Public health in the 21st century will be characterized by an ecological approach to the environment, an approach that was first legitimized in the Ottawa Charter for Health Promotion, which lists a stable ecosystem and sustainable resources among the prerequisites for health.<sup>8</sup> This ecological approach will be especially important in built environments at the local level, the settings—homes, schools, hospitals, workplaces and, of course, communities—in which people lead their lives. Addressing the links between health, sustainability, and the built environment is an issue that is central to public health—and thus of vital concern to cities and communities that wish to be healthy.

**Our ecological footprint.** In a world where half of humanity lives in urban environments, and where global ecosystems and natural cycles are daily affected by our urbanized and industrialized way of life, it becomes increasingly difficult to treat the natural and built environments as separate. Humanity's influence is so pervasive and so massive that we can no longer maintain the pretense that we are separate from the planet. Our urban and industrialized way of life has a massive impact on the natural environment.

This impact has been graphically described by Wackernagel and Rees as the “ecological footprint.”<sup>9</sup> An ecological footprint is the area of biologically productive space required per person in order to maintain their current lifestyle. This requires calculating such factors as how much land is required for food production, housing, transportation, and consumer goods and services. The calculation takes into account land categories, including forest, pasture, arable land, sea space, fossil energy land,

and built-up land. The largest single component of the ecological footprint is energy consumption. An ecological footprint is measured in hectares, with one hectare equal to 2.471 acres.

Based on 1993 data, America had a footprint of 10.3 hectares per capita, compared with 7.7 hectares per capita in Canada and 5.9 hectares per capita in Sweden. Globally, there are just 1.7 hectares of biologically productive land available per person (if we leave 0.3 hectares for the rest of creation) while we already use 2.3 hectares per person, on average, or 35% more than is available. Our ecological footprint on the earth has become so massive that, were everyone to achieve the American standard of living to which many aspire, using our current technologies, we would need five more planets to sustain us. Clearly, the American way of life makes excessive demands on the earth's resources and is not environmen-

tally sustainable. This undermines our ability to foster healthy communities.<sup>10</sup> Reducing our ecological footprint must therefore become a priority concern for communities and nations if we are to ensure worldwide human and ecosystem health in the future. Our current use of resources does not provide sustainability even in the short term, and certainly not if we continue to aim to increase our gross domestic product and concomitant resource use at a “modest” 3.5% annually, which results in a doubling time of 20 years, or a 32-fold increase in one century. Creating more sustainable communities thus becomes an important public health strategy.

**Our ecological footprint has become so massive that, were everyone to achieve the American standard of living to which many aspire, we would need five more planets to sustain us today.**

**Unsustainable suburbs.** “A sustainable community exacts less of its inhabitants in time, wealth and maintenance, and demands less of its environment in land, water, soil, and fuel.”<sup>11</sup>

Unfortunately, North America has devised the most environmentally unsustainable form of urban settlement ever seen: suburban sprawl. The ecological footprint of suburban sprawl is far higher than the footprint of higher density—and often more livable—European-style urban settlements.<sup>9</sup> To begin with, suburban sprawl consumes large areas of (often) high-quality agricultural land, since cities have generally grown where there is sufficient farm land around them to support the population and create a

thriving agricultural economy in the first place. Thus, suburban sprawl threatens the sustainability of our domestic agricultural resource base and our ability to feed ourselves.<sup>12</sup> In addition, suburban sprawl requires more hard infrastructure per capita, which consumes more resources and costs more.<sup>5</sup>

Suburban sprawl is also enormously wasteful of another vital resource: energy. Reliance on cars for transportation is one of the main contributory factors to both urban air pollution and global warming.<sup>13</sup> In addition, widely dispersed, low-density, single-family dwellings are very energy inefficient with respect to heating and cooling in comparison with row housing, mid-rises and other forms of clustered housing.<sup>9</sup> Since urban air pollution represents an immediate threat to health and global warming a long-term threat, becoming more energy efficient is one of the most vital challenges that healthy cities and communities face.

#### SUSTAINABLE COMMUNITIES: THE EXAMPLE OF ENERGY EFFICIENCY

**Urban energy efficiency.** “In a sense, cities are themselves energy-using technologies, and like [all] energy-using technologies, they can be designed for more or less efficiency.”<sup>14</sup> While we can point to many ways in which energy contributes to our quality of life, almost all forms of energy use have health costs associated with them.

To begin with, there are occupational, environmental, and community health costs arising from the extraction, processing, and transportation of the fuels themselves as well as the materials used in the construction of energy systems. In addition, there are health costs arising from the construction and operation of energy systems themselves—be they nuclear power plants, hydro dams, or solar panels on the roof of a house.

The actual use of energy also has health impacts, most notably from the pollutants emitted (carbon dioxide, heavy metals, acid emissions, radioisotopes), some of which may have long-term, even multigenerational, impacts on health. Other health effects of energy use include deaths and injuries from motor vehicle accidents, fires, and explosions. Finally, there are health costs related to the disposal of wastes and the decommissioning of power plants.<sup>15</sup> Among the most important health

effects of energy use are the deaths and disease that result from air pollution:

The vast majority of the pollutants most clearly linked to increased morbidity and mortality are energy related. In 1994, energy-related emissions [in the US]—such as those from power plants, vehicles, and industry—accounted for more than 90% of emissions of sulfur dioxide, carbon monoxide, nitrogen oxides, and volatile organic compounds, and for most of the smallest particulates (under 2.5 microns in diameter).<sup>15</sup>

Moreover, the carbon dioxide emissions that result from the combustion of fossil fuels are the principal factor driving global warming, which may have very significant direct and indirect health implications in the future.<sup>16</sup> However, while Alexandre and De Michelis point out that three quarters of all energy consumption occurs in urban areas, this is because that is where people are and “not because urban communities are inherently less efficient than lower density settlement patterns. On the contrary, the higher densities and inherent efficiencies of urban form tend to make per capita energy use in cities lower than average.”<sup>17</sup>

Indeed, they cite a 1993 Canadian study that found energy use per capita in Toronto to be 25% less than for the general population. They argue that “since energy use is most concentrated within cities, local actions to increase energy efficiency and to foster the introduction of clean alternative energy sources are critical factors both to avoid long-term risks of global climate change and to improve the quality of life at the local level.”<sup>17</sup>

In addition to having energy-efficient buildings, sustainable communities are energy-efficient in other respects, such as the design of the urban form (with important implications for transportation) and in the reduction of the “embodied energy” involved in constructing and then operating the infrastructure—principally highways and roads, water and sewage treatment systems, and the community’s energy production system.

One key aspect of energy use, with a wide range of health implications, is the energy used in transportation of people and goods.

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**Urban transportation.** Globally, transportation accounts for 60% of the consumption of oil products, with Canada second only to the United States in terms of per capita transportation-related energy consumption in 1994.<sup>14</sup> According to the Organization for Economic Cooperation and Development (OECD), global transportation energy consumption will increase 73% between 1990 and 2030.<sup>18</sup>

In addition to fossil fuel depletion and air pollution, transportation adversely affects the environment because of infrastructure development, which takes up a great deal of land and permanently changes the character of the land surface, in particular by increasing run-off and encroaching on natural habitats.<sup>12</sup> Other environmental effects include air pollution and modification of water systems, solid waste, noise, accidents, and partition or destruction of neighborhoods.<sup>12</sup> The major issue with respect to the relationship between transportation and urban development is that low-density residential suburbs with separated industrial, residential, and commercial sectors, combined with long commuting distances and inadequate public transportation (itself a function of low-density development) means that a typical suburban dweller uses much more energy for transportation needs than a typical downtown dweller.

For example, in a study of the Toronto region, Gilbert found that from the core to the periphery, density declines fourfold, car ownership per household goes from 50% to almost 100% and miles driven per capita more than triples.<sup>19</sup> The result is a three-fold increase in estimated carbon dioxide and other emissions per capita as one moves from the core to the outer suburbs. The health implications are obvious.

A good public transit system, on the other hand, contributes to the overall health and well-being of the community and its citizens. The health benefits of a good transit system are both direct and indirect:



- *Direct health benefits.* In addition to lower rates of respiratory and heart disease resulting from reduced pollution, direct health benefits include lower accident rates because mass transit is a safer form of travel. According to Litman, public transit has 0.66 fatal accidents per billion vehicle miles, which is about 1/20th the rate for automobiles. Injuries are also reduced.<sup>20</sup> Another potential benefit is a more active lifestyle. People walk and bicycle more, even run—including to the transit stop.

- *Indirect health benefits.* Indirect health benefits may include less congestion, reduced commuting time, less noise, less stress, less cost, higher incomes, less social isolation, increased access for disadvantaged groups, the conservation of energy and resources, and a lessening of the trend toward global warming.

## CONCLUSION

By having built and continuing to build energy-inefficient suburbs, we are effectively locking ourselves into a long-term energy consumption pattern that is neither

sustainable nor healthy nor—if the true costs were to be applied—affordable. The economic costs associated with the health consequences of urban air pollution are very substantial today. And while the health impacts of global warming may seem to be a long way off—both chronologically and geographically—they are well within the “lifetime” of the suburbs we are building today, and the lifespan of the infants now living in those suburbs. To be healthy, communities must be more energy efficient, more sustainable, and will need to focus on steadily reducing their per capita “ecological footprint.”

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