

Health, human development and the community ecosystem: three ecological models

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SUMMARY

Health, as both an expression and a component of human development, has to be seen in an ecological way as 'the pattern that connects', and the radical and subversive nature of an ecological approach needs to be recognized. Three ecological models are presented, that of health; the links between health, environment and economy (or between 'health for all' and sustainable development); and the social, environmental and economic dimensions of a healthy and sustainable community.

The 'Mandala of Health', as a model of the human ecosystem, presents the determinants of health as a set of nested influences, ranging from the biological and personal to the ecological and planetary, including the social and political.

Key words: health; ecology; community

The health–environment–economy model shows the crucial links between health (or social wellbeing) and environmental and economic wellbeing, with a particular focus on two key public health principles—equity and sustainability. The final model applies these concepts at the community level, introducing such issues as viability, conviviality and liveability.

These models could be used to better understand health, to define key criteria for healthier public policies and to define some key action areas for healthy city projects. It is in their application that their value—and their 'subversiveness'—will be tested.

INTRODUCTION

Since 1989 there has been a growing interest in synthesizing the concepts of health promotion and sustainable development (Hancock, 1989; La Trobe University 1989; Kickbusch, 1990; Labonte, 1991a, 1991b) and applying them at the local level (Hancock, 1990). In this paper, three models are presented that, taken together, provide an ecological/ecosystemic way of understanding health, health and sustainable development, and healthy communities.

Reference to ecological understanding, is taken to mean understanding 'the pattern that connects' (Bateson, 1975). It may also mean that in its application, it is 'a potentially subversive subject' which 'if taken seriously as an instrument

of the long run welfare of man [sic] would endanger the assumptions and practices accepted by modern science' (Sears, 1964) and in the sense of Bookchin's (1970) observation that when ecology is applied to the human situation it is 'intrinsically a critical science—in fact critical on a scale that most systems of political science failed to attain'.

These models have conceptual and educational merit, and moreover may be useful contributions to defining the determinants of health and of healthy communities, indicating priorities and directions for action and for determining criteria for monitoring progress and assessing results.

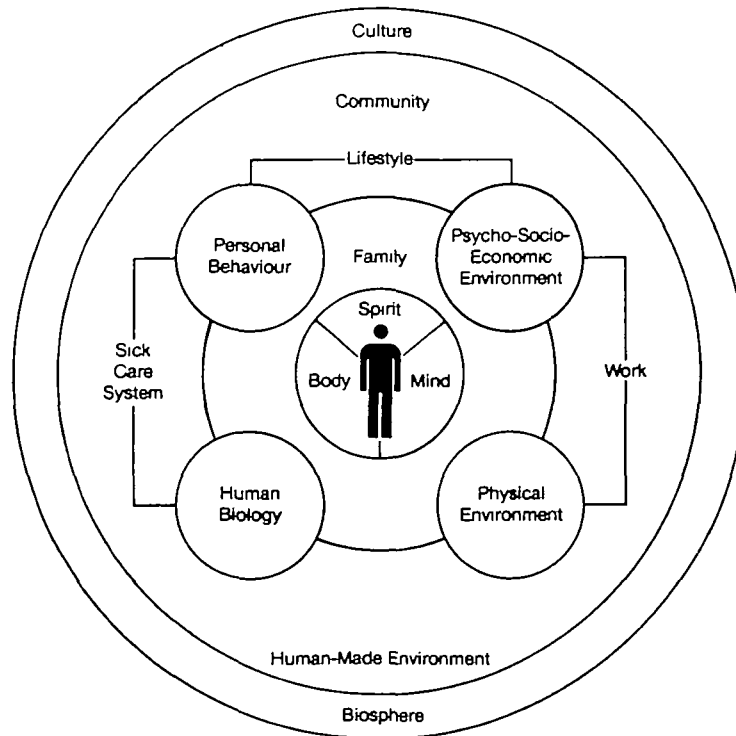
The Mandala of Health: a health model of the human ecosystem

This model (Figure 1) was first developed in the early 1980s (Hancock and Perkins, 1985) and has since gained widespread acceptance. It will not be described at length here, but a few words of explanation are warranted.

The model is based in part upon an understanding of human ecology as the interaction of culture with environment (Dansereau, 1966). Thus, the outer level of the Mandala encompasses culture and the biosphere, which ultimately is our living planet, Gaia (Lovelock, 1979). Secondly, health is understood in its holistic sense, so the health of the individual at the centre is shown to have body, mind and spirit dimensions. Thirdly, the Mandala has 'shells' or system levels extending outwards from the individual (it is not shown, but it is implicit that there are system level 'inwards' from the individual, incorporating organs, cells, molecules, atoms and subatomic

systems). The systems expanding out from the individual are the family, the community and its built environment and the wider society and natural environment, here exemplified by culture and biosphere. Fourthly, the model integrates the social sciences in its upper half (psychology, sociology, economics, politics, anthropology) with the natural sciences in its lower half (physics, chemistry, biology, engineering, ecology). Finally, the model indicates that the 'health care' system (here more correctly described as sick care services) is only one determinant of health, albeit one that at least in theory integrates the physical and social sciences.

The model should not be seen as static, but rather as a dynamic three-dimensional model in which the various elements 'change' in shape and size according to their relative importance over time and in different communities. Moreover, the model is not definitive and all encompassing; in particular it fails to explicitly address two key



THE MANDALA OF HEALTH

Fig. 1: A model of the human ecosystem

determinants of health, namely equity and sustainability (they are dealt with explicitly in the next model).

The model does, however, provide a useful way of depicting some of the major determinants of health and has proven useful as a basis for teaching; whole courses have been developed based on the mandala. Moreover, the mandala makes it clear that no single strategy and no effort focused on only one aspect of the determinants of health can be wholly successful; it thus implies multi-level, multi-faceted, multi-disciplinary approaches.

Human development: the focus for sustainable health

Health for All has been a major social goal of all nations since it was adopted by the World Health Assembly in 1977. Sustainable development has become a major goal for many nations since the publication of the Brundtland Report in 1987 (World Commission on Environment and Development, 1987). It has become increasingly important that these two global movements and their national and local manifestations are better integrated.

Each concept has important contributions to make to the other; health contributes its emphasis upon equity, its concern with the broad social ecosystem and its concern for human health; sustainable development contributes its emphasis upon future generations, natural ecosystems and the health of other species. The model shown in Figure 2, which has evolved from the work of a 1989 conference (Hancock, 1989) has at its focus human development. It builds upon two key principles of public health first proposed a decade ago—ecological sanity and social justice (Hancock, 1981).

The concept of human development may be one that enables diverse groups and sectors such as health, human rights, education, environment, economy, etc. to coalesce around a common objective. It also is deliberately intended to remove the emphasis upon economic development that seems to have become the focus of much corporate and government discussion of sustainable development.¹ It would be better by far if we could talk about the need for a system of economic activity that enhances human development while being environmentally and socially sustainable; the term 'socially sustainable' is included to make the point that economic activity must not only preserve the environment, it must

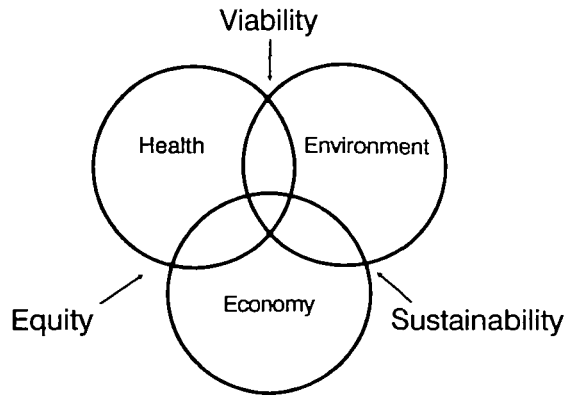


Fig. 2: A model of human development

also preserve and indeed enhance the social system and strengthen the social resources of a community (see e.g. Osberg, 1990).

The model suggests the interrelationship between health (and more generally, social factors), environment and economy. The economy must be environmentally sustainable, which means that economic activity must not deplete renewable resources (plants, animals, soil) by using them beyond a sustained yield basis; must not pollute the air or terrestrial or aquatic ecosystems to a greater extent than they can naturally accommodate; must not disturb and distort the atmosphere and other 'great cycles' and systems to such an extent that ecosystem viability is impaired; and must use nonrenewable resources sparingly. Sustainability is essentially a biocentric concept, the focus being on maintaining the sustainability of life on earth in general, and not specifically on sustaining human life. Indeed, 'deep' ecologists—those who have a profound commitment to nature and take a strongly biocentric position—argue that life on earth would be more sustainable with fewer humans, perhaps even with none!

The economy has to be not only environmentally sustainable but also socially sustainable. A key concept here is that of equity. The earth's resources and the wealth generated by economic activity must be so distributed that everyone's basic human needs are met. The prevailing ethical principle is that of equity; people in a fair and just society will have an equal opportunity to achieve health and to maximize their own human potential. In societal terms, there is evidence that the health of a community depends not only upon its absolute level of wealth, but upon the equitability

with which that wealth is distributed (Wilkinson, 1986).

Human health depends not only upon the generation and equitable distribution of wealth but upon a viable environment. In this sense, viability is an anthropocentric concept; we are concerned not only with the sustainability of life in general, but with the creation of environmental conditions that support human life and wellbeing in particular. The requirements for viability are somewhat narrower than those for sustainability, since it is entirely possible to conceive of a world where life in general is sustained but human life becomes untenable, at least for most people, as we are seeing in the Sahel and other parts of the world today.

The concept of viability has implications not only for the natural environment but for the built environment that we humans create for ourselves, while of course the impact of that built environment on the ecosystem has implications for sustainability (these considerations, along with considerations of a more social nature in communities are considered in a third model).

The health–environment–economy model makes the point that the economy both underpins human health and the environment and, at the same time, that the economy is—or should be—subservient to those broader imperatives. It also ensures that issues of human wellbeing and social equity are incorporated in the discussion of sustainable development. Thus this model is primarily of value in considering broad social, economic and environmental policies; in some ways, it is best viewed as a central model for healthy public policy, proposing principles of policy development at a national or provincial/state level with the objective of maximizing human rather than economic development.

Health and the community ecosystem

This third model (Figure 3) attempts to integrate the concepts of health and sustainable development in the context of the community. This model is thus of interest and relevance to communities that are attempting to be both healthy and sustainable (Hancock, 1990). In it, the central focus is either health or human development; in effect, the two can be considered to be the same for all practical purposes. The model suggests three qualities for each of the community, the environment and the economy, that should be present if human health and development is to be maximized.

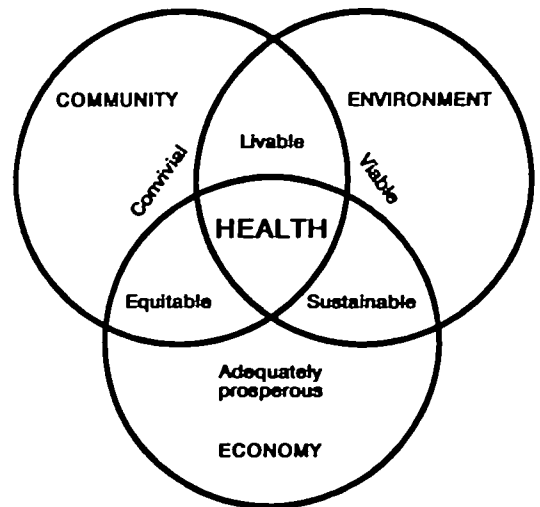


Fig. 3: A model of health and the community ecosystem

The *community* itself needs to be convivial; that is to say, it needs to have social support networks, its members need to live harmoniously together and participate fully in the life of their community. In addition, the built environment of the community needs to be liveable, that is to say the urban structure should be designed in such a way as to support conviviality and to provide a viable human environment. Finally, the community needs to be equitable, that is to say its members are treated with fairness and justice, all their basic needs are met and they have an equal opportunity to achieve their maximum potential.

The primary quality of *the economy* is that it has to be adequate: that is to say that it generates enough wealth to enable all its members to achieve a satisfactory level of health. As already indicated, this economic wealth must be equitably distributed within the community, in other words the economy must be socially sustainable. Finally, the economy must be environmentally sustainable, as indicated earlier.

The *environment* must have three qualities. It must be sustained over the long term, so that the great web of life in all its richness and diversity is maintained. It must be viable for humans, which requires a suitable range of temperature and solar radiation, clean air and water, and plants and animals to provide food. Finally, the environment must be considered not only in terms of the natural environment but the built environment,

which must be liveable from a community and human standpoint.

The synthesis of health, social and community wellbeing, environmental sustainability and economic vitality is one that is attracting a great deal of attention among urban professionals and academics at present. For example, in the Toronto region alone, reports in the first six months of 1991 at the City (CityPlan '91), Metropolitan (Towards a Liveable Metropolis 1991) and regional (Royal Commission, 1991) levels have explicitly addressed this issue, while government agencies at the provincial and national level have also begun to examine these ideas. Moreover, there is a ferment of activity underway at the community level, with a variety of projects seeking to address such topics as liveable cities, safe communities, green communities, community enrichment, community economic development, community gardens and community education, to name but a few. What all these activities seem to share in common is a recognition that the old, fragmented, sectoral way of doing things no longer works. We need a new, holistic approach, which can develop whole communities and address their environmental, social, economic, land use and health/human development needs in an integrated manner.

This model helps to do that. While not exhaustive, it does address many of the topics of concern and shows how they are related. But beyond that, it begins to address the need for 'wholeness' identified by Christopher Alexander and his colleagues in their work on a new theory of urban design. They note that 'this quality [of wholeness] does not exist in towns being built today. And indeed, this quality *could* not exist, at present, because there isn't any discipline which actively sets out to create it'. (Alexander *et al.*, 1987).

UTILITY OF THE MODELS

The utility of the Mandala of Health has been shown over the past decade; it has proved a useful conceptual and educational tool as a means of educating people about the range of determinants of health. It was never intended as an analytic or predictive model, although it does demonstrate some of the interrelationships and some of the hierarchies involved in determining health. It can also be used to illustrate strategies for change, moving out from the personal and biological strategies at the centre of the Mandala through the community development strategies in the middle

ranges to the political strategies implicit in the outer sphere of the Mandala.

The health–environment–economy model reflects the growing concern within governments—or at least among some governments—to more closely coordinate and integrate policy. In Ontario, for example, two Premiers' Councils (a Premier is the Prime Minister of a province in Canada) were set up in 1987, one on health, the other on the economy, while a provincial Roundtable on Environment and Economy was established in 1988. These organizations bring together Ministers and key community, professional and business leaders to seek a more comprehensive and strategic approach in each of these vital areas of policy. More recently, the need to create close links between those three policy fields has been recognized and a committee of the Premier's Council on Economic Renewal has proposed—in a scenario for 2002—that the three Councils work together to develop a strategic agenda for the Province based on wellbeing, environmental protection and wealth generation (Premier's Council on Economic Renewal, 1992). Thus the integration of health, environment and economy is becoming an important topic for provincial strategic policy. One implication of this is the need to restructure the Cabinet committee structure to reflect these strategic priorities and to give the Cabinet Office the mandate and authority to actively pursue the coordination of the government's strategic policy agenda.

Another way in which the integration of health, environment and economy is being pursued, albeit slowly, is in the development of new indicators of economic and social progress. There is widespread recognition that Gross National Product is a very poor indicator and that we need new indicators that reflect our environmental, social and economic conditions more accurately. One recent example is the development and use by the United Nations Development Program of a Human Development Index (UNDP, 1990).

An outcome of the York Conference referred to earlier was the creation of a working group to develop indicators of a sustainable society based on health, economy and environment. In a working paper for the group, Gosselin *et al.* (1991) proposed a set of 20 indicators in four fields (health, environment, economy, equity) selected on the basis of seven criteria including their scientific basis, how long they had been collected for and how frequently, the possibility for

geographic disaggregation and their synthetic value (i.e. their ability to integrate all four fields). It was also intended that the indicators be reasonably easy to collect, use and understand and that they could be presented in a manner that the media and the public would find attractive. While the work is now on hold due to lack of funding, the first steps are there and the concept has proven useful.

The community ecosystem model is also being applied. Mention was made of the use of the model in a number of recent planning reports; a growing number of municipalities in Ontario are trying to come to grips with the problem of integrating social and environmental objectives into what has been a rather traditional land use planning process.

One use for the model that has been explored has been to take the six qualities of the healthy community and use them as principles for developing policies in a land use planning context. I have conducted two such workshops with local planning groups to date, applying the principles to such topics as transportation, leisure and recreation, housing and human services. In all cases, but perhaps especially in the cases of housing and of transportation, asking what would be a sustainable, viable, liveable, convivial, equitable and prosperity-supporting system of transportation or housing policy has led to some quite interesting and exciting suggestions for policy, ones which seek and to some extent succeed in integrating all or most of the principles. For example, public transport is clearly more environmentally sustainable, viable and equitable than private cars, and can contribute to prosperity, liveability and conviviality; at the same time, particular attention would have to be paid to ensuring that a public transport system is truly equitable, convivial and supportive of prosperity.

Another potential use of the model is that it defines six categories of potential indicators of a healthy city/community (and, in fact, a seventh—health status—at the centre). To my knowledge, it has not yet been used to this end, perhaps that is the next challenge!

As with the mandala, all of these models have to be viewed not as static entities but as the basis for a dynamic process. It is in their application that their utility is to be evaluated. Both health promotion and the Healthy City concept are in fact *defined* as processes (Ottawa Charter, 1986; Hancock and Duhl, 1986), while the Healthy City/Healthy Community process requires a new

approach to managing communities, one based upon new styles, new structures and a focus upon inclusive processes (Tsouros, 1990). Thus the models presented here have to be seen in a dynamic way, as living, moving community processes. As Alexander *et al.* (1987) noted:

We believe that the task of creating wholeness in the city can only be dealt with as a *process*. It cannot be solved by design alone, but only when the process by which the city gets its form is fundamentally changed.

If these models help create a new understanding of the 'wholeness' of health, human development and communities and if they contribute to the development of new, holistic processes, they will have served their purpose.

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The initial development of the Mandala of Health was carried out jointly by myself and my dear friend and colleague Fran Perkins; it was somewhat modified and expanded as a result of discussions with another dear friend and colleague, Jennifer Welsh.

The health–environment–economy model was originally generated as a result of discussions with the steering group for the York Conference on Health–Environment–Economy, whose members were drawn from Health and Welfare Canada and Environment Canada. The transformation of the model from a triangle to three intersecting spheres was the result of discussions at the conference itself.

My original version of the community ecosystem model was strengthened as a result of discussions with two other dear friends and colleagues, Ilona Kickbusch and Ron Labonte. Ron is currently working on an expanded version of this model, which he calls the 'holosphere of health' (Labonte, 1991a, 1991b).

I gratefully acknowledge the important input of these and many other people whose ideas may have been incorporated, unwittingly, in these models.

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NOTE

¹ It is noteworthy that in these circles the concept of 'sustainable development' has undergone a metamorphosis through sustained development to 'sustained growth' which ends up twisting the concept into the very opposite of what was intended—viz. the statements of the G-7 summits.

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