

Kenneth C. Land and Abbott L. Ferriss. 2002. "Conceptual Models for the Development and Use of Social Indicators." Pp. 337-352 in Wolfgang Glatzer, Roland Habich, and Karl Ulrich Mayer (eds.), *Sozialer Wandel und gesellschaftliche Dauerbeobachtung. Festschrift for Wolfgang Zapf*. Opladen: Leske+Budrich.

# **CONCEPTUAL MODELS FOR THE DEVELOPMENT AND USE OF SOCIAL INDICATORS**

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## **Introduction – Reflections on Wolfgang Zapf and German Social Reporting**

Wolfgang Zapf is one of the leading members of the German social science community of the past 30 years. He was the pioneer in the development of social indicators in post-war Germany and in the production of the first German Social Report in the 1970s. One of us remembers well Professor Zapf's defense of the social indicators used in the first German Social Report against an unrelenting attack by a fellow participant at a conference on social indicators and social reporting in 1978 at the Unesco Headquarters in Paris, France. The passing of time has stood Professor Zapf's work well. The key importance of his work in the 1970s was that it was conducted and published and thereby provided a foundation upon which social scientists subsequently could build and improve.

In this brief paper, as a tribute to Professor Zapf's social indicators and social reporting work, we review some examples of how conceptual models can guide the development and uses of social indicators. We first review Land's (2002) updating of his social systems model (first published in 1975) of how social indicators can be developed and connected conceptually for the assessment of impacts of social programs, organizations, and institutions on society. Then we sketch the essentials of Ferriss's (2001) development of the "telesis" conceptual model as a device for showing how social indicators can be used to set goals and develop programs to change social conditions. As an illustration of the application of these conceptual models, we study the successes and shortcomings of the *Healthy People 2000* program in the United States.

## **The Use of Social System Models in Social Impact Assessment – Updating Land’s 1975 Conceptual Model**

Conceptual models for the definition, development, and use of social indicators can be quite useful. One of these, developed early in the social indicators literature by Land (1975), applied a social systems perspective to the definition and organization of several types of social indicators for the purpose of social impact assessment. Recently, in an essay on the use of social indicators for assessing the impact of private, not-for-profit sector on society, Land (2002) presented a modified and updated version of this conceptual model, which we now review.

Consider the problem of using social indicators to measure the impact of the nonprofit sector on society. For this purpose, Land (2002) adapted the **social systems conceptual scheme for social indicator models** introduced by Land (1975), as diagrammed in Figure 1. This diagram identifies five types of descriptive indicators bound together in the context of a social system model connecting all indicator variables, a mode which itself contains analytic indicators. This model begins with the conventional distinction between **exogenous variables** (those determined outside the model) and **endogenous variables** (those determined within the model). Within the class of exogenous variables, the scheme further distinguishes between **input descriptive indicators** (those exogenous variables which can be manipulated in a nonprofit organizational or institutional context) and **nonmanipulable exogenous descriptive**

**indicators** (those exogenous variables which are determined outside the system under consideration and cannot be manipulated).

Similarly, within the class of endogenous variables, the scheme distinguishes between **output descriptive indicators** (indicators of the quantity and other characteristics of organizational or institutional products, as they relate to the primary mission of the organization/institution), **end-product or outcome descriptive indicators** (indicators of the benefits of organizational/institutional outputs for those individuals or populations served by, or otherwise involved with, the organization or institution), and **side-effect descriptive indicators** (indicators of general social conditions influenced by the output and outcome indicators).

The distinction of **output** from **outcome indicators** is a key point of updating of the schematic model of Figure 1 from that presented in Land (1975). When used in the assessment of the impacts of an organization or institution, it has become apparent in the intervening decades that it often is useful to distinguish the direct products produced from the benefits these products may have for those individuals or populations involved with the organization or institution. Specific examples in the case of a specific type of nonprofit organization are cited below.

Relating these five sets of indicators, the figure portrays a model or system of relationships which identify certain parameters or **analytic indictors** of the production and related processes represented in the model. The main relationships determining the output and outcome indicators are indicated by solid arrows and those determining the side-effects with broken arrows. The arrows connecting the output and outcome indicators to the side-effect indicators are labeled **second-order impact analytic**

**indicators**, because they seem to be the type of indicator that Bauer (1966) and his collaborators were commissioned in the original social indicator effort to assess the impact of the space program on American society. Furthermore, this is a two-headed arrow in explicit recognition of the fact that this relationship can be such that side-effects both influence, and are influenced by, the social conditions measured by the output/outcome indicators.

Insert Figure 1 About Here

It should be emphasized that the situation illustrated in Figure 1 is more of an **ideal-type** than an actual description of any particular social indicators research effort. Nonetheless, the configuration in the figure is helpful in illuminating the measurement and analytical problems underlying social indicators research efforts. In the case of the pioneering social indicators effort of Bauer (1966) and his collaborators to assess the impact of the space program on American society, the basic output indicators were a successful moon flight and the time necessary to complete the flight, whereas the input indicators pertained to the monetary, physical, and manpower resources allocated to the program. Nonmanipulable descriptive indicators included such constraints as the state of physical science and technology in the 1960s and the availability of trained manpower. Finally, side effects of the space program included indicators of the concentration of space program employees and resources in particular occupations and geographical locales and the impacts of these concentrations on the social life of the corresponding

communities. Other side effects include spin-offs of technologies initiated in the space program to civilian uses.

As an illustration of how the conceptual scheme of Figure 1 could be applied to the measurement of the impacts on society of nonprofit organizations, consider, following Land (2002), the case of nonprofit organizations whose primary mission pertains to the provision of services. Examples of this type of nonprofit organization in the United States would be the American Red Cross and nonprofit health care organizations. The objectives of such organization are to foster mutual benefit and pluralism, serve "thin" markets not served by private or public sectors, and enhance quality, variety, compassion and efficiency in service delivery. Therefore, an obvious focus for the measurement of societal impacts could be on the production of outputs (services delivered) and the associated outcomes for clients or participants. But it also may be desirable to measure the side effects of the services delivered on the lives of clients and communities in which they live.

To make the discussion concrete, suppose the service organization whose impact is to be measured is a Meals-on-Wheels organization whose primary mission is to deliver hot meals within some particular well-defined geographical area to elderly individuals who have disabilities that prevent preparation of hot meals for themselves. In the terminology of Figure 1, a large array of different types of indicators can be defined in this case: **input indicators** for such an organization could include such quantities as the dollar values of the foods and facilities used in the production of the meals to be delivered, the numbers of individual volunteers and/or paid workers involved in the production and delivery of the meals and the time and transportation costs involved in

this delivery; **nonmanipulable exogenous indicators** could include measures of the geographic dispersion or density of locations to which the meals are to be delivered; **output indicators** could include such quantities as the numbers of meals delivered and persons served (both as an absolute number and as a percentage of the total population of potential clients); **outcome indicators** could focus on characteristics of the organization's clients or participants and on client satisfaction with the meals delivered; **side-effect indicators** could be defined in terms of the effects of the delivery of the meals on the nutritional or health status of the clients and on the impact of the delivery of the meals and the satisfaction of the clients therewith on their overall subjective well-being or quality-of-life; and, finally, assuming data for a reasonable array of such indicators could be compiled, **analytic indicators** relating, for example, input indicators to output, outcome, and side-effect indicators could be estimated.

Three comments are pertinent for this illustration. First, it is clear that the data requirements necessary to operationalize such a scheme for the measurement of the impacts of any specific service organization are substantial. In most cases, a full assessment of impacts of nonprofit service organizations of the manner described will require the compilation of both organizational-specific operational data as well as sample survey data on the clients/participants served by the organization. Nonetheless, though difficult, this goal can be achieved, at least in one aspect or another in specific applications; some examples are described in Greenway (2002).

Second, a key point to note about the measurement of the impacts of service organizations is the distinction among output, outcome, and side-effect indicators.<sup>1</sup> If the

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<sup>1</sup> The distinctions here are similar to those made by Greenway (2002). However, in contrast to the classification utilized here, Greenway does not treat participant satisfaction and participant characteristics

primary mission of nonprofit service organizations is the delivery of specific services, then output indicators typically can be defined in terms of measures of the quantity and quality of products or services delivered and/or measures of individuals served. By contrast, outcome indicators pertain to measures of the end product or final delivery/consumption of the services/products. These include measures of client characteristics and client satisfaction. Client characteristics typically include such basic demographic variables as age, income level, race/ethnicity, gender, marital status, etc. They might also include additional information pertaining to client's status prior to delivery of outputs, referral source, and other relevant background information. The specific information that is collected on clients must be adapted to each specific service organization and be determined by its service methodology and its funding and licensing requirements. Client satisfaction as an outcome measure provides an intersection with a vast research literature on consumer satisfaction in marketing research (see, e.g., Sirgy and Samli, 1995). It can include various dimensions of satisfaction with the service/product delivered as well as overall satisfaction with the service provider.<sup>2</sup> Side effects of the delivery of specific products/services and the satisfactions created thereby can include a variety of measures of the impacts of these on other aspects of the

as outcome measures. Rather, she classifies these as output measures. Greenway's outcome measures category then refers to what are termed side-effect indicators here. Thus, in the Meals-on-Wheels example, Greenway would consider impacts of the meals on client nutrition or health as an outcome, whereas it is considered a side-effect indicator here. That is, outcome measures are here limited to those end-product or consumption indicators that pertain to the services/products that it is the primary mission of the service organization to deliver. Thus, unless the Meals-on-Wheels organization defines an improvement in nutritional or health status of its clients as its primary mission, measures of this type would be considered as side-effect indicators, not as outcomes of service/product delivery.

<sup>2</sup> On the basis of the research on the psychodynamics of satisfaction measures of subjective well-being cited earlier, it can be concluded that client responses to queries about satisfaction with products should be taken relatively quickly after the product is delivered.



individual's life. These side effects usually can be measured in terms of changes experience by the clients/participants in terms of values, attitudes, knowledge, skills, behavior, and conditions of life.

Third, in addition to the output, outcome, and side-effects indicators cited above which have focused on the impacts of the services delivered on the individuals served, additional indicators could be defined to address relational, distributional and community impacts in the manner indicated by Greenway (2002) and Wolpert (2002). For instance, questions of the relative efficiency of nonprofit service organizations with respect to the delivery of services could be posed both with respect to comparisons of nonprofits with each other and to comparable government or market sector organizations. To the extent that a nonprofit service organization incorporates the redistribution goals of charitable nonprofits, measures such as those defined below for charitable organizations could be constructed. Efforts to ensure representative boards, the use of sliding fee schedules, outreach efforts and similar indicators also could be defined. The distinction between the impacts of human service programs at the level of individual participants in the program and community-level impacts also is important. A Meals-on-Wheels program may be very successful in affecting the social conditions and quality-of-life of its clients and yet not have a substantial community-wide impact on these conditions for a community's elderly residents unless it reaches a large percentage of the eligible population. In addition, community-level conditions are affected by aspects of the community other than the outputs of individual, human service programs -- such as local economic conditions, public policies, and other elements of nonprofit and private social institutions such as civic groups, churches, neighbors, and families. Trends or constraints on social

conditions placed by these structural features of a community easily can cancel out or even reverse any positive impacts of a nonprofit service organization.

### **The Uses of Indicators to Set Goals and Develop Programs to Change Conditions – The Telesis Model**

Fredrich August von Hayek, an Austrian economist who died in 1992, advocated free-market capitalism as the most efficient means of distributing goods and services. Many in the world now agree with him (Cassidy, 2000). The free market system must be supported by norms and values that uphold private property, respect for contracts and honesty in dealings. Through such a system, human activity in distributing information, producing goods and services, buying and selling, needs are satisfied efficiently. The market is the mechanism. When the market fails to satisfy needs, corrective action is appropriate (Cassidy, 200, p. 51).

To gauge the satisfaction of needs, a number of social conditions of the U.S. population now are monitored by social indicators. Indicators provide a system of information on the population by age, sex, location, and a host of other defining characteristics. We evaluate information on present conditions and needs in terms of our values. Values, based largely on Judeo-Christian traditions, define a condition as desirable or undesirable. The undesirable becomes the object for remedial or corrective action. Remedial steps include services that the market system has not provided. Thus, the capable young who can not pay the price of an education under normal market prices are provided scholarships so that talents are not wasted. Indigent persons in need of

medical care are provided emergency treatment. When the business cycle dips, demand falls, and employees are laid off, the unemployed are supported to allay suffering. These and myriad other adjustments are required when the market fails to provide the services that the norms and values of society define as desirable. Social indicators measure trends in these conditions and needs.

The free flow of information is critical for efficient functioning of the free market and of democratic systems. Dr. Theodore D. Woolsey stated this position most eloquently when he stepped down as chairman of the (U. S.) Council of Professional Associations on Federal Statistics: “The citizen reads or hears about the rate of inflation; the rate of unemployment; changes in the cost of living; the growth and movement of the population; estimates, however poor, of illegal immigration; crime rates; the degree of success we are having in education of our children; the rate of divorce; the increasing numbers of single-parent families; the spread of AIDS; the number of teenagers killed in auto accidents or committing suicide; and hundreds of other descriptors of today’s life. These social indicators, if you like, absolutely must be made available to any interested citizen with a minimum of expense and difficulty because an informed electorate is an absolute requirement of a working democracy” (Woolsey, 1987).

While these indicators inform the electorate to animate a working democracy, they also may be used to set goals for future change. Identifying such goals and setting about altering their direction or rate of change is a process called **telesis**, which means “[p]rogress that is intelligently planed and directed; the attainment of the desired ends by the application of intelligent human effort to the means” (*Webster’s New Collegiate Dictionary*, 1977; Ward, 1903, used the term in a broader sense; Commager, 1967).

Ferriss (2001) recently has described several interrelated telic conceptual schemes for the use of social indicators in large, complex societies such as the United States.<sup>3</sup> Ferriss's conceptual schemes complement and extend Land's (1975) model in various ways.

Ferriss's **overall telesis model** (Figure 2) commences with the proposition that the values of a society tell us that the direction and rate of change in social conditions, as measured by one or more indicators, are undesirable. Then the society's political and social will determines that the conditions should be changed. Goals are set to reduce certain indicators by "x" amount by "t" time. In the **teleological process** sketched in Figure 3, steps to alter the indicator are determined and resources are applied to achieve the desired goal by the specified time. As time passes, progress is assessed by monitoring the indicators to determine whether they are moving in the desired direction. If not, supplementary steps are taken to influence changes in the indicators (Figure 4). If the goals of reducing indicators by "x" by time "t" are attained, we may then reassess progress and set new goals. The success of the telic action rests upon knowing what interventions will alter the course of the indicators. Success, also, rests upon applying sufficient financial and human resources to stimulate change. Figure 3, elaborates upon the steps set forth in Figure 2. Figure 4 presents greater detail of **the Program Implementation Cycle** of Figure 3. The telic process is extensive and considerable additional elaboration could be set forth, especially in the selection of goals and in the application of resources. Examples will now clarify the process.

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<sup>3</sup> For additional details and substantive applications to education and the well-being of children, see Ferriss (2001).

## Figure 2 About Here

Values of society, cultural values, are the starting point in the initiation of social change, as illustrated in Figure 2. For example, the following values were ranked among the top five in recent surveys of the American public (Inglehart, 1990, p. 119): “A world at peace (free of war and conflict); family security (taking care of loved ones); freedom (free choice, independence); happiness (contentedness); and self-respect (self-esteem).” Such cultural values as these define the desires (wants) of people in society. For example, “family security” translates into the need, among other things, to preserve life, to live free from harm, and identifies the goal of “longer healthy life,” shown in Figure 2.

When people realize that their values are not being realized, they may desire a change in such conditions. Social indicators help to establish the discrepancy between the actual condition and the desired. Trends in the indicator reveal the direction of change, whether improving or declining. As pointed out by Woolsey (1987), social indicators are “absolutely necessary for a working democracy.” That a gap exists in social conditions relative to the desired is a call to action. The pattern of optimism that change is possible, also, must be present. If pessimism prevails, believing that things always will be the same, that change is impossible, the Telic model would not apply until more optimistic values are accepted.

Social indicators are measures of the human condition with respect to particular aspects of life, say, the unemployment rate, the mortality rate from breast cancer of 45 to 49 year old females, or the percent of 18 year-old youth not in school and not in the labor force, as suggested by Woolsey in the quotation above. Social indicators, then, are used to

establish the reasonable extent of change in a rate by x-amount that is to be achieved by y-years time. In thus setting goals, social indicators serve the development of policies to bring about the desired change. Policies are implemented through specific programs. Figure 2 identifies as an example a program that recently has been underway in the U. S.: *Healthy People 2000*, to be described later.

Insert Figure 3 About Here

Program implementation of the full teleological process is presented in greater detail in Figure 3. Figure 3 shows that it is necessary to know what steps will alter the direction or rate of change in an indicator. The “cause-effect sequence” refers to the understanding that if a certain step is taken it will have a predictable effect. Thus, the early identification of breast cancer in females leads to eliminating the condition through surgical intervention; or, training the unemployed in new and needed skills will lead to employment in new technological industry.

Knowing the steps of the cause-effect sequence for any indicator requires knowledge, knowledge gained through practical experience, experiments, demonstrations, and tests. For example, in the case of the development of the *Healthy People* program to reduce cigarette smoking, many prior studies had proved the adverse consequences of cigarette smoking and others had shown that stopping the habit led to improved health (CDCP, March 24, 1989, Feb. 26, 1999). Such information about causes and effects helped establish the goal of reducing cigarette consumption. The next problem was to determine what programs held promise to effect change in the indicator.

The implementation of the program is designed to alter the social condition, as measured by indicators. This cycle is illustrated in Figure 4.

Insert Figure 4 About Here

The Program Implementation Cycle begins with the setting of a goal to change an indicator by x-amount by time t. The process of determining appropriate interventions will rest upon knowledge of the cause-effect sequences, past experience, and wisdom to select reasonable steps. For example, the use of mass media to influence behavior has been effectively employed in some cases. In others, community organizational efforts involving face-to-face interaction has been more effective. In the *Healthy People* example, to be presented next, the clinical approach employing the doctor-patient relationship was attempted and found inadequate to the problem. More effective methods were then introduced.

Lester Ward, who first advanced the concept of telesis in social affairs, believed that change could most effectively be accomplished through legislative initiatives (Ward, 1906; Commager, 1967). Whether through legislation or through private initiatives, resources – money, workers, cooperation of actors, etc. – are required. As with any social movement, the generation of public interest and support is necessary. Dependence upon governmental support is one approach, as *Healthy People* illustrates. But private interests can also be successful. Without resources of funds and manpower, the telic process will falter.

As time passes, social indicators will reveal change in social conditions. Monitoring progress involves identifying these changes, not only in the aggregate, but also with respect to sectors of the target population. Segments of the population differ in prevalence rates. Attention must be directed toward the most critically affected segments. If progress is not being realized, interventions should then be evaluated for their effectiveness, and, if found lacking, new steps initiated. Thus, the sequence of the implementation cycle would begin again (Figure 4).

### **An Illustration – *Healthy People 2000* in the United States**

In 1979, the U. S. Surgeon General published *Healthy People: 2000*. It set forth a strategy for improving the health and quality of life of the American people, a Telic strategy. Indicators in the form of time series of mortality, morbidity and other survey indicators gave evidence of persistent health concerns. To establish objectives, regional “hearings” were held to assemble evidence from experts as to the best experience and understanding of the underlying causes of the several medical conditions. These working groups of professionals identified objectives for the program to reduce prevalence. The best available expertise identified steps to take toward achieving the objectives (U.S. Department of Health and Human Services, 1990). These steps are identified in our model (Figures 2 and 3) as the application of experiments and practical experience to setting goals and developing programs to alter the direction or rate of change of the social indicator.



The Surgeon General set forth the following **three major goals of the program**:

- (1) Increase the span of healthy life of Americans.
- (2) Reduce health disparities among Americans.
- (3) Achieve access to preventive services for all Americans.

These goals were to be implemented through 319 specific objectives (U.S. Centers for Disease Control and Prevention, National Center for Health Statistics, 1998).

### **Specific Goals**

Goals are specified in terms of health indicators and, frequently, in terms of the age, sex, ethnic group or other identifying traits of the population segment most deficient. For example, for Goal 1, the life expectancy at birth of the population is supplemented by an indicator of the death rate of people aged 74 and younger, and the infant deaths per 1,000 live births. An average years of healthy life is calculated by combining death rates with rates of acute and chronic illness, impediments and handicaps. For example, with a life expectancy at birth of 73.7 years in 1980, the years of dysfunctional life was estimated, using life table methods, at 11.7 years, reducing expected years of healthy life to 62 years. To extend life expectancy, one of the goals was to reduce infant mortality from about 10 per 1,000 live births to 9 by 1990, and that goal was achieved. As will be illustrated later, not all goals were achieved.

For Goal 2, life expectancy is separated into color (white, black), the life expectancy being lower for blacks than whites (in 1987: whites 75.6 years, blacks 69.4 years). By 1987, infant mortality rates since 1970 had declined 19 percent for both white and blacks. Death rates for people 74 years and younger also had declined during this

period, but at a slower rate. This illustrates the necessity of employing indicators, not only of the gross measure, but also of sub-categories, in this case, color, sex, and age.

Indicators for Goal 3 included the percentage of pregnant women receiving first trimester prenatal care, by color; the percentage of children immunized by time of school entry; and the percentage of people who lack a source of primary health care (U. S. Department of Health and Human Services, 1990, pp.43-51).

Thus, the three general goals of the program became 319 specific objectives to improve health, each with steps designed to alter the course of given health conditions of segments of the population. The morbidity and mortality statistical systems and sample surveys of health practices of the population were in place to monitor progress toward the goals. Let us now examine a specific goal, cessation of cigarette smoking.

### **Cigarette Cessation Program**

The Surgeon General has considered tobacco a health hazard for some time and in 1964 issued a landmark report linking smoking to disease. His position advocating smoking cessation was supported by some 7,000 studies showing the effects of tobacco use on health (CDCP, March 24, 1989). Tobacco use causes one in six deaths in the U. S. Cigarette smoking causes 434,000 deaths yearly. It causes 21 percent of coronary heart disease deaths, 87 percent of all lung cancer deaths, and 82 percent of deaths from chronic obstructive pulmonary disease.

These causes of mortality affect different segments of the population. For example, the percentage of smokers among persons 20 years of age and over was 26 percent in 1991. The goal for 2000 was 15 percent. Rates were higher among blue-collar

workers, persons with less than a high school education, blacks, men more than women, Indians more than Hispanics, and women in general more than pregnant women, etc. In fashioning programs to reduce prevalence, these differentials provided clues to target population segments.

### **Models of Change**

Initially a universal medical model sought to reduce smoking. Health professionals were to change smokers one at a time. When the monitors of the program observed that the clinical model did not work, public health officials took an environmental approach, advocating increases in taxes on cigarettes and restricting of smoking in public areas, and other programs. The U. S. Congress passed the Federal Cigarette Labeling and Advertising Act of 1965, and the Public Health Cigarette Smoking Act of 1969. They required that cigarette packages carry a warning that they injure health. They banned TV and radio broadcasting of cigarette advertising. By June 30, 1995, state legislatures had joined the fight and had passed 1,239 laws addressing tobacco use (Shelton, et. al., Nov. 3, 1995). [As noted above, Lester F. Ward, who originally used the term, “telesis.” in his studies, advocated legislative initiatives as the most direct means of bringing about change (Ward, 1906; Commager, 1967).]

Laws restricted minors access to cigarettes after 1988. Requiring smoke-free indoor air ventilation began as early as 1984. Legislatures introduced marketing restrictions more slowly but they were introduced. The cumulative total of these provisions has been increasing since 1982 but has increased quite rapidly since 1992 (CDCP, June 8, 1999). More recently the private sector began offering devices to aid

abstinence from smoking. In recent years, states have sued tobacco companies to recoup costs of treatment of illnesses attributed to tobacco use. With these funds some States have initiated multimedia campaigns designed to reduce smoking, especially among youth. These efforts have reduced prevalence of cigarette smoking. The percent of smokers, by sex, shows the long-term success of the program. By 1997, only 25.5 percent of males and 21.3 percent of females smoked cigarettes. Rates of smokers among males varied by state from 16.1 percent in Vermont to 31.7 percent in Missouri and 33.1 percent in Kentucky (U. S. Centers for Disease Control and Prevention, 1998), reflecting differences in effectiveness among States.

### **Specific Reductions in Indicators**

The preceding merely illustrates one effort of the *Healthy People/Disease Prevention* program. Other efforts were stated as specific reduction of indicators, as illustrated as follows:

“Objective 1.1 Reduce coronary heart disease deaths to no more than 100 per 100,000 people.

“Objective 1.1a Reduce coronary heart disease deaths among blacks to no more than 115 per 100,000 people.” (U. S. Centers for Disease Control and Prevention, National Center for Health Statistics, 1998)

The goal for reducing infant mortality is being achieved. The rate stood at 7.2 in 1997. The goal for death rates of children 1 – 14 years of age, likewise, is being achieved. Success has not shone upon the death rates for ages 15 to 24. Reducing young adult mortality from accidents and violence has been more intractable, but some progress

lately has been observed. However, reduction in the death rates among those 25 to 64 years is being achieved.

In addition to attention to use of tobacco, health promotion goals include attention to physical activity and fitness, nutrition, alcohol and other drugs, family planning, mental health and mental disorders, violent and abusive behavior, and a community-based program of health education (U. S. Department of Health and Human Services, 1990). These and other efforts have brought about an increase in life expectancy, Figure 5. Life expectancy at birth in 1999 was 72.5 years for males and 78.8 years for females.

### **Cause-Effect Sequences**

The use of the telic process to stimulate change in the direction and rate of change in indicators rests heavily upon knowledge of cause-effect sequences. Some 7,000 experimental and observational studies established that cigarette smoking causes health hazards. Cancers, in particular, became the focus of studies and the objective of control efforts (Greenwald and Sondlik, 1986). Other research identified approaches to changing behavior. Recent research on prevention of cancer is establishing a linkage with nutrition, and efforts of the private sector are afoot to educate the public in the salutary effects of fruits and vegetables in the diet (American Institute for Cancer Research, 2000). As experimental research and epidemiological observations uncover new knowledge of causes, preventive efforts will enter the telic through the program implementation cycle (Figure 4).

Figure 3 indicates that Resources are applied to Programs. This implies Federal, State and Local fiscal and personal resources, and private as well as public efforts. While

resources applied to the improvement in life expectancy, itself, cannot be separated from other health efforts, in 1997 the magnitude of health expenditures, to illustrate, was \$1,082.4 billion. Of this, public expenditures were \$507.1 billion. Out-of-pocket private expenditures for health care in 1997 were \$1,841 per consumer unit. Total health expenditures in 1997 in the U. S. were 13.5 percent of the Gross Domestic Product. This compares with 10.4 percent for Germany's GDP and 4.0 percent in Turkey. (National Center for Health Statistics, 1999). Thus, massive public and private expenditures are being devoted to improving health in the United States..

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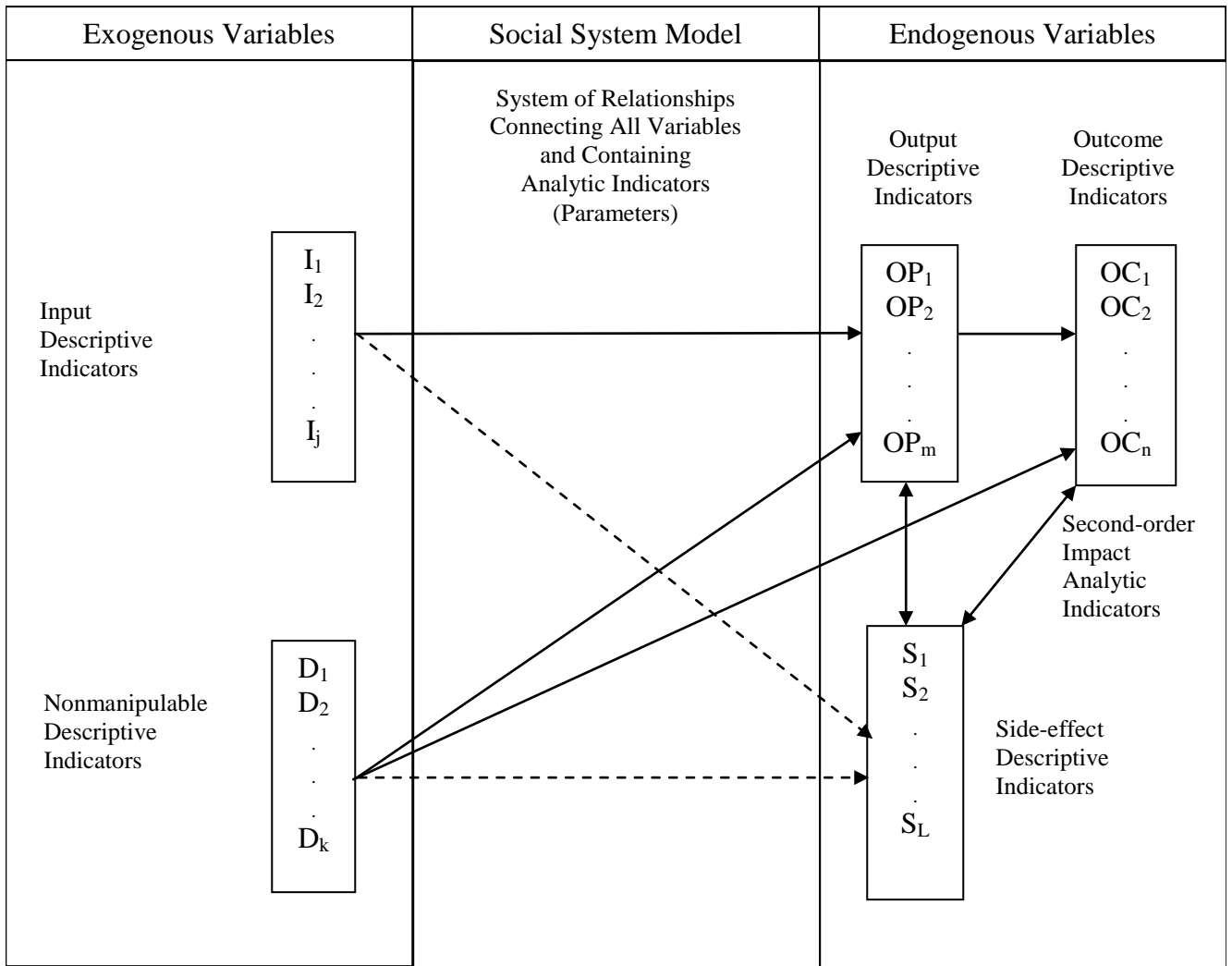
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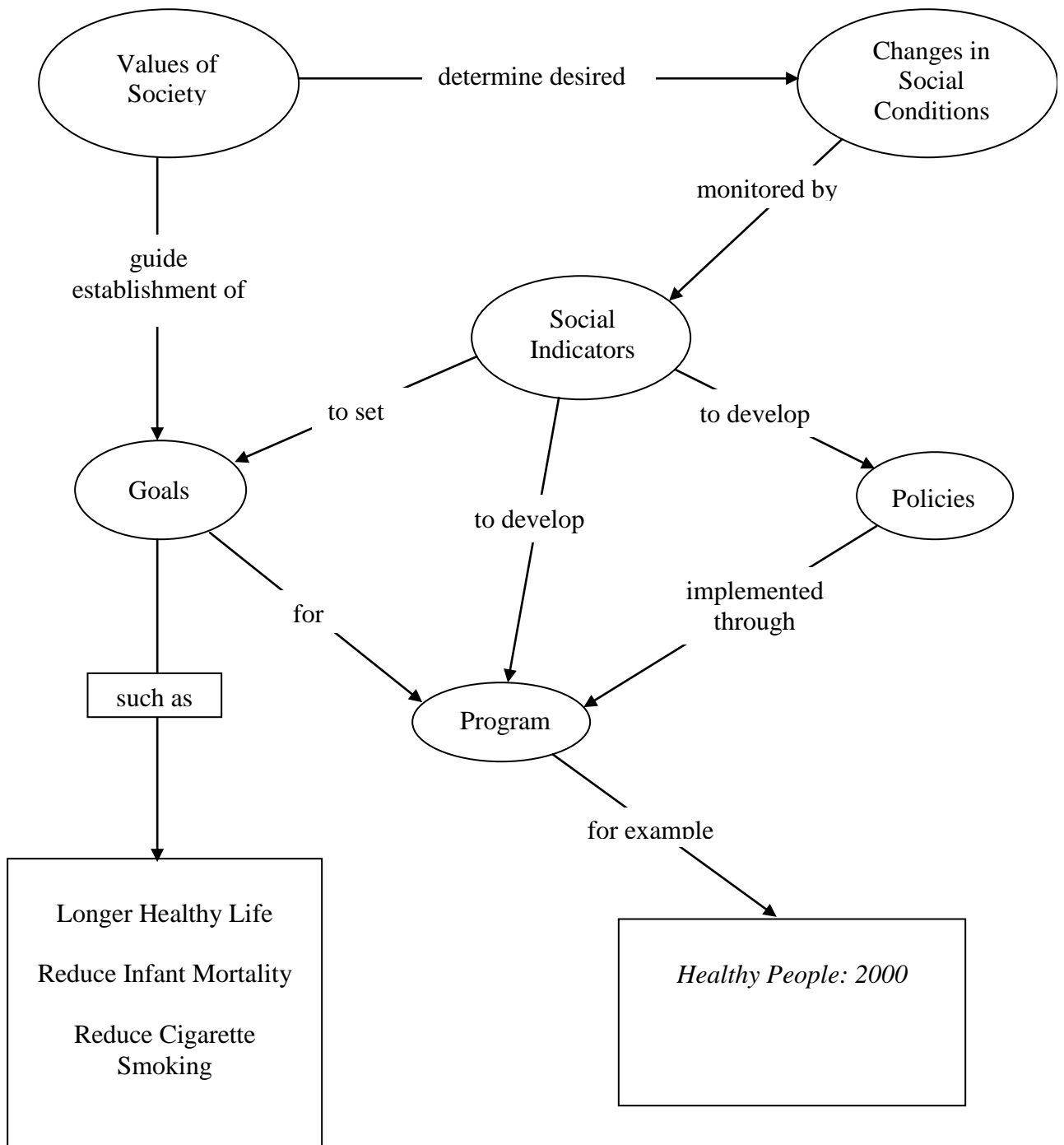
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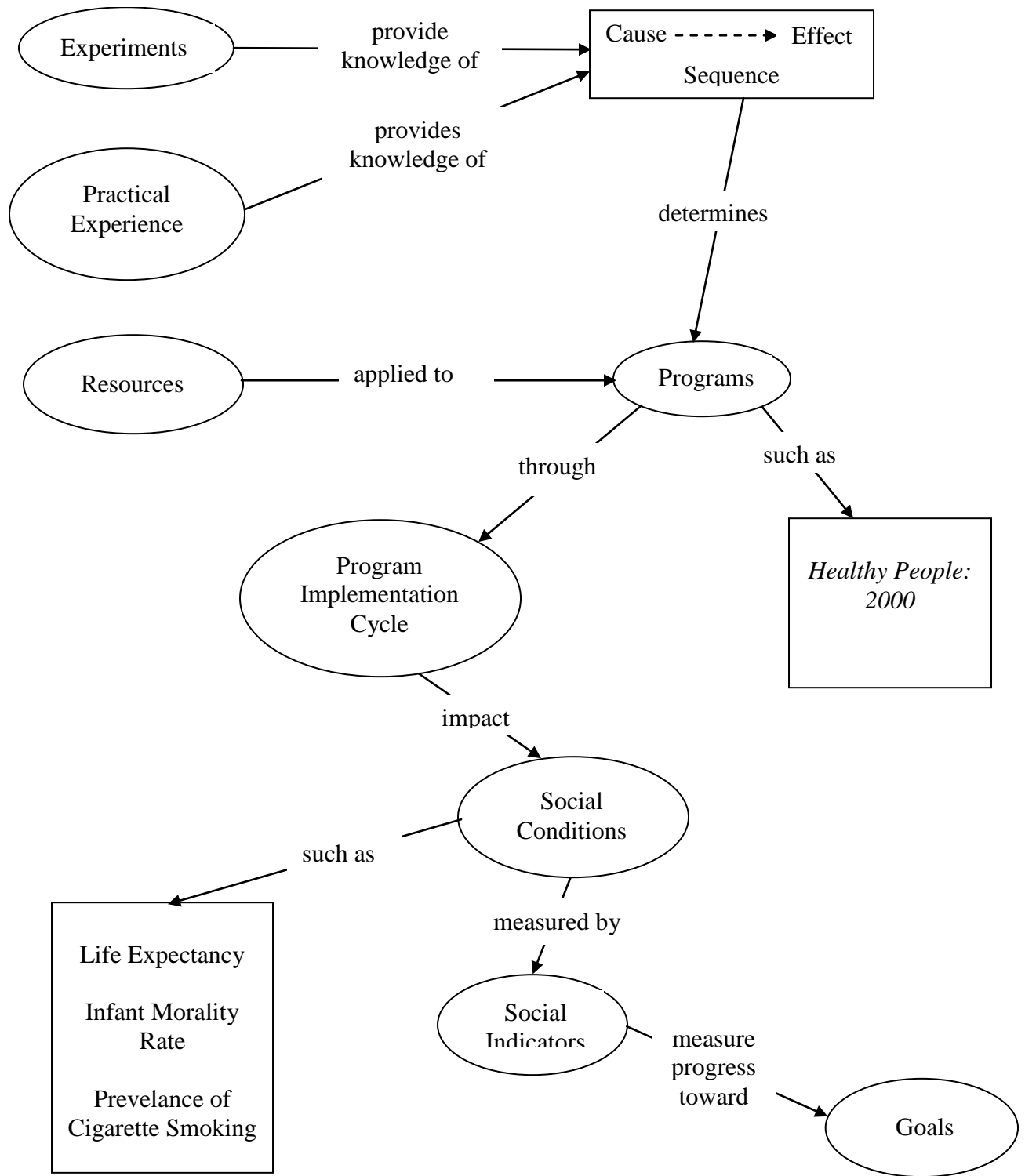
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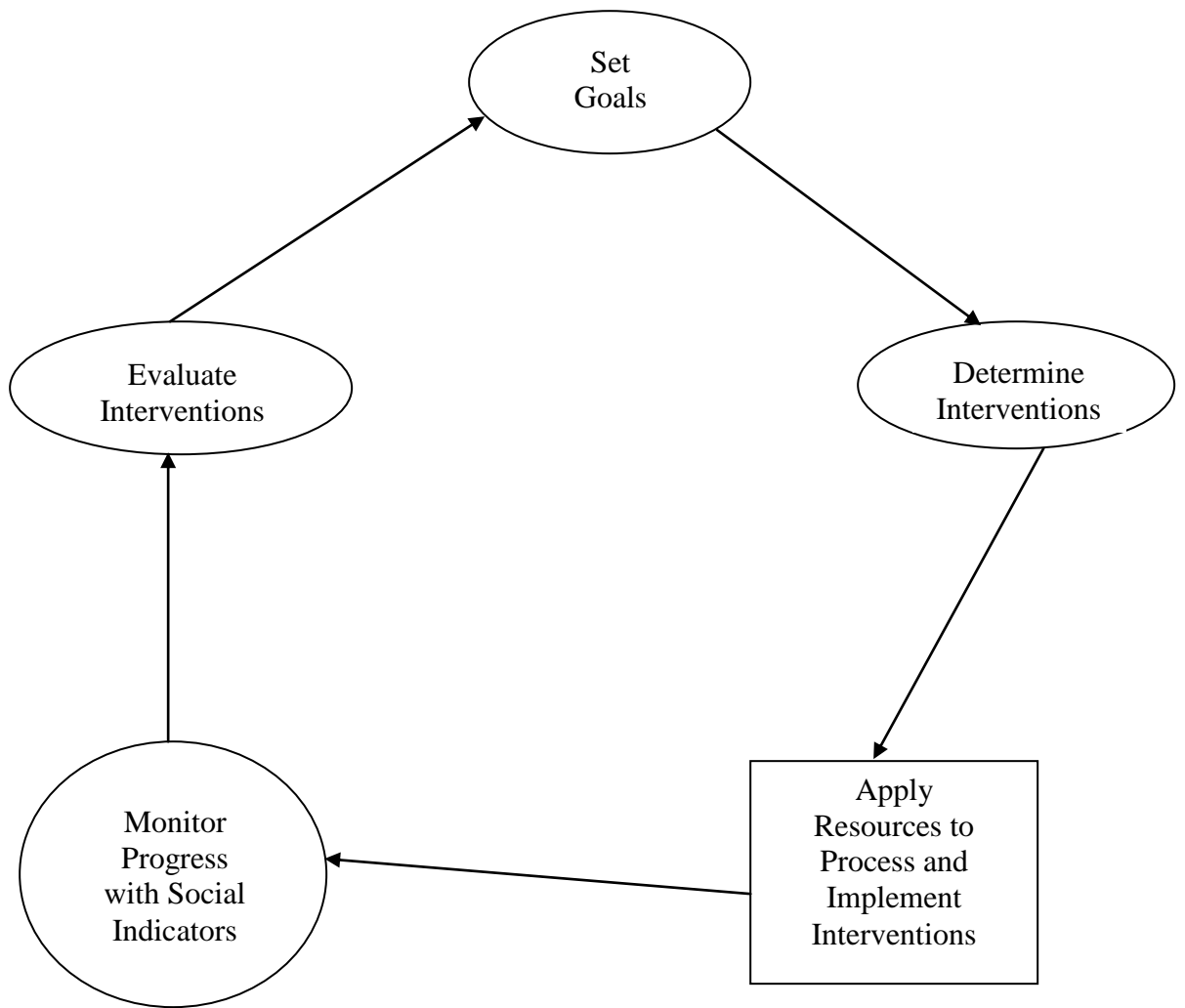
**Figure 1. Relationships Among Indicator Types.**



**Figure 2. Overview of Telesis.**



**Figure 3. The Teleological Process.**



**Figure 4. Program Implementation Cycle.**