

**Developing Quality of Life Indices for The San Diego County Alcohol and Drug
Services Agency at the Regional and Community Level; Conceptual,
Methodological and Applied Issues**

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Introduction

Health and well-being of individuals to a large degree depends upon and in turn contributes to healthy, vibrant, livable communities. This interrelatedness implies a need for a systemic approach to problems affecting the quality of life for individuals, families and their communities. Translated into public policy, such approach takes into consideration a plurality of factors working at different scales, from individual and family levels to neighborhood, larger community and regional levels in order to develop efficient policy instruments. It also requires that a plurality of actors – from governmental agencies to community leaders, to grass-roots organizations, to ordinary citizens – become engaged in the development and realization of public policy initiatives.

One of the most serious yet preventable threats to individual and public health and well-being is posed by the use and abuse of substances: alcohol, tobacco and illicit drugs (ATOD). As ATOD prevention and intervention efforts increase, so does the consensus among researchers and practitioners that the systemic approach to the development, delivery and monitoring of preventive and intervening measures offers the best venue for their success. As an integral part of this approach, a system of measurements has to be developed to produce indicators reflecting the status of the ATOD problem before, during and after the measures take place.

This paper discusses conceptual, methodological and applied issues related to the development of a system of indicators that informs and guides cooperative public and private efforts in the area of ATOD prevention and service delivery. It first considers broader issues of quality of life and ways of assessing its multiple domains through objective and subjective indicators. Since ATOD use and abuse affects and is affected by quality-of-life domains in a systemic manner, the paper identifies several interrelated factors that mitigate these effects. It then discusses examples of social indicators that

have been shown by earlier studies and policy applications to adequately describe risk and protective factors affecting quality of life through ATOD use and abuse. Finally, it proposes a system of indicators to be used for the integrated delivery of services at the regional and community level in San Diego County. We argue for a multi-step implementation of the proposed system of quality of life indicators and provide a prioritized list of indicators, from the ones that should be developed and utilized in the near term to the ones that will be likely to benefit from community and user feedback and further research. We also discuss available and potential data sources to be utilized at different stages of the implementation process.

I. Quality of Life as a Multi-Dimensional System

1.1 Quality of Life and Its Evaluation

Ameliorating quality of life is considered “the most apparent goal of health promotion activities directed toward the general public” (Evans 1994: 49); thus, the first goal of the *Healthy People 2010* program includes helping people to “... improve their quality of life” (U.S. Department of Health and Human Services 2000). While on the surface the concept of quality of life appears to be intuitive, non-contentious and easy-to-use, there is little agreement among researchers or practitioners about what ought to constitute quality of life, and no standard definition of the latter have emerged so far (Evans 1994). The lack of formal definition makes it difficult to study, measure or monitor quality of life. Yet three distinctive perspectives on the latter have emerged since the early 1940s when a formal academic inquiry into characteristics and assessment of quality of life began (Evans 1994).

One of the three paradigms focuses on “people’s objective circumstances in a given cultural or geographic unit” (Diener and Suh 1997) and employs objective, quantitative statistics to measure quality of life such as income, crime rate, infant mortality rate or substance abuse rate. Quality of life in this approach is represented by major domains such as physical and mental health and safety, family life and presence of children, work or school, financial security, leisure, and so on. These domains may be

further divided into sub-domains such as parenting and spouse-partner sub-domains that constitute the family domain, or income and housing as components of the financial security/material well-being domain (Hagerty et al. 2001, Johnston 1988).

The second paradigm focuses on subjective nature of quality of life such as a sense of personal or subjective well-being, happiness, life satisfaction, or perceived quality of life (Evans 1994, George 1992, Neal 1983). Quality of life was once defined as “a sense of achievement in one’s work ...a feeling of identification with one’s community, a sense of fulfillment of one’s potential” (Campbell et al. 1976). The concept of subjective well-being (SWB) has emerged as an attempt to “directly measure the individual’s cognitive and affective reactions to his or her whole life, as well as to specific domains of life” (Diener and Suh 1997: 200). Some researchers propose that three interrelated components – life satisfaction (cognitive state), pleasant effect and unpleasant effect (affective states) - constitute subjective well-being (Diener and Suh 1997, Shen and Lai 1998). Other conceptualizations propose that subjective well-being is a composite of cognitive assessment, affective reaction, and absence of ill-being; or even simply of joy, pleasure, contentment and so on (Evans 1994).

A number of studies have found that there is little correlation between one’s subjective sense of well-being and life satisfaction, and objective qualities of one’s living conditions, larger environment and even health parameters (Campbell et al. 1976, Diener et al. 1993, Okun and George 1984). While it appears to provide an argument against using objective indicators when assessing quality of life, subjective quality of life assessment is not without its own shortcomings, sometimes of ethical nature (Cummins 2000). If used in the normative welfare applications, such as planning and public policy, subjective indicators of individual life satisfaction may fail to provide the most useful and clear guiding principles for policy development. Land and other scholars have argued that it may sometimes be impossible to achieve both individual and collective satisfaction especially since the areas of life most crucial to an individual’s overall life satisfaction are frequently those “least amenable to public policy actions” (Land 1983:5). Recent research on subjective quality of life that established high variability in importance and relevance of different aspects of life for respondents over a fairly limited period of time lends an additional argument in favor of describing quality of life using objective

indicators (Bar-On et al 2000, George 1992, Evans 1994).

The third paradigm utilizes an approach that describes quality of life in holistic terms, as a combination of objective circumstances and subjective assessments (Allen 1991, Diener and Suh 1997, Hagerty et al. 2001, *Healthy People 2010*). Scholars working in this tradition attempt to measure “the totality of life experience” and “the quality of a person’s whole life” (Hagerty et al. 2001: 7). To study objective circumstances of quality of life, they utilize the life domain framework separating individual’s life experience into such domains as work or school life, family life, leisure life, financial situation, relationships with friends, neighbors and larger society, and so on. Based on Hagerty et al. (2001) report on the status and directions for research on quality of life indexes we propose that the following five quality of life domains be utilized in public policy applications aimed at improving quality of life: 1) Physical & mental life; 2) Work & school life; 3) Family & home life; 4) Leisure life & friendships; 5) Community life & societal involvement.

Clearly, the importance of these domains for any given individual will vary depending on many subjective characteristics. Evans (1994) suggests that the role of each domain for an individual is mitigated by six separate dimensions including satisfaction or cognitive appraisal; skills, both general and domain-specific; social support; personality or dispositional factors; biosociophysical environmental factors, event and conditions; and affective tone. These dimensions act as filters or buffers of a sort that may convey without modification, magnify (increase or decrease) or neutralize positive or negative influences exerted by objective life domains on individual’s subjective sense of happiness and well-being. For example, the dimension of social support was shown to lessen the negative role of individual’s poverty, a component of life’s financial domain, on his or her assessment of quality of life (Durlak 1998).

We suggest conceptualizing quality of life as a system with two major components or subsystems: quality of life domains (objective subsystem) and quality of life assessment (subjective subsystem)¹. These subsystems influence each other through the quality of life dimensions, which act as bi-directional connections between the

¹ This interpretation is close to the interactive model of quality of life proposed by Cummins (2000) although it is not identical: we suggest a different mechanism of interaction between the quality of life subsystems.

former. From the public policy perspective, it is the interrelations between quality of life domains and its dimensions capable to increase positive aspects and diminish negative aspects of one's life that are of most urgent interest. These interrelations are best described by risk and protective factors framework.

1.2 Risk and Protective Factors in the Quality of Life System

A particular interest in identifying factors or relationships that augment positive influences on people's lives and counteract negative ones has been shown by disciplines concerned with the physical and mental health and well-being: medical and psychological research and practice (Bar-On et al 2000, Cox et al 1992, Parmenter 1994, Steinhausen and Metzke 2001). A substantial body of literature exists that utilizes the risk and protective factors framework in the analysis of various health-related and behavioral outcomes such as levels of physical activity (Ross 2000), depression (Gore et al. 1992), suicide thoughts and attempts (Borowsky et al 2001, Rubenstein et al. 1998), teenage pregnancy (Gillmore et al. 1992, Kalil and Kuntz 1999), academic success or failure in school (Bowen and Bowen 1998, Schulenberg et al. 1994), and alcohol, tobacco and illicit drugs use and abuse (to be discussed below).

In this framework, risk factors are defined as “those characteristics, variables, or hazards that, if present for a given individual, make it more likely that this individual, rather than someone selected from the general population, will develop a disorder” (Mrazek and Haggerty 1994: 127), in other words, risk factors tend to increase the probability of a future negative quality of life outcome or several outcomes (Hawkins et al. 1992). Protective factors are those factors that “modify, ameliorate or alter a person's response to some environmental hazard that predisposes to a maladaptive outcome” (Rutter 1985).

Discussing risk factors, Joseph Durlak notes that “it is usually accumulation of risk rather than the presence of any single risk factor that affects outcomes, and that multiple risk factors usually have multiplicative rather than merely additive effects” (Durlak 1998: 512). However, the nature of the relationship between risk and protective factors is still debated among researchers. Several models describing this relationship

have emerged. One of them is a compensatory model; it states that risk factors and protective factors have a direct and independent effect on the outcome. It implies that the factors' influences simply add up in a linear fashion (Hollister-Wagner et al. 2001, Sugland et al, 1993). Two others are interaction models. The risk-protective model proposes that the higher the risk is, the stronger the effect of protection becomes, but the number of protective factors does not really matter for the outcome. The protective-protective model is similar to the risk-protective model, but it considers multiple protective factors as they interfere with the risk: each additional protective factor significantly decreases the likelihood of a negative outcome. Finally, the challenge model proposes a curvilinear relationship between risk and outcome: a small amount of risk does not result in negative outcomes because it initiates a healthy coping behavior which protects an individual from exposure to risk, but if no risk at all (no challenge) or too much risk is present, the likelihood of a negative outcome increases exponentially (Hollister-Wagner et al. 2001).

Risk and protective factors operate between objective quality of life domains and subjective quality of life assessment. They exist in every dimension of the quality of life system, from individual's cognitive appraisal, affective tone and other personality or dispositional factors, to his or her skills, presence and type of social support, to environmental factors, event and conditions. Bi-directional nature of the connections in the quality of life system implies that risk and protective factors may be both causes and consequences of quality of life outcomes, such as adolescents' drug use, delinquent behavior and so on. For example, personal coping or problem-solving skills have been shown to protect from early onset of substance abuse (Dekovic 1999, Pollard and Hawkins 1999), which affects the life domain of physical and mental health directly, while further increasing personal coping skills, producing a higher sense of subjective well-being, and indirectly affecting each of the individual's major life domains.

1.3 Levels of Risk and Protection

So far we have been focusing on health and overall quality of life from the standpoint of an individual, yet it has been argued that there are effects independent of individual-level characteristics that exert a strong influence of health and quality of life

outcomes (Steptoe and Feldman 2001). Community-level characteristics such as overall socioeconomic status, level of social capital, neighborhood cohesion and neighborhood stress level were shown to significantly influence individual self-rated health, psychological distress and depression, smoking and physical activity independently of individual level risk factors (Kawachi et al. 1997, Robert 1998, Ross 2000, Steptoe and Feldman 2001). It has long been noted by sociologists that social phenomena are subject to “compositional effects” when factors affecting processes at individual or household level cannot be simply applied to explanations of aggregate, higher-level social conditions, and vice versa (Land 1983). This principle of hierarchical organization of social phenomena suggests that distinctive levels of sociospatial aggregation should be present in the analysis of the quality of life system, from individual and family levels to neighborhood and community levels, to regional and country levels, to global or international levels¹. Part of the system, risk and protective factors mediating health and quality of life outcomes exist on each of these multiple sociospatial levels.

From a public policy standpoint, the hierarchical nature of quality of life implies a design of a multi-level system of prevention and intervention, from measures targeting individuals to ones intended for families and households, to regional and state-wide policy initiatives, and so on. It follows that policies that augment protective factors and counteract or diminish risk factors need to be designed as a system of multi-level measures and initiatives. Following Hagerty et al. (2001), we suggest that the following seven levels were used in the development, delivery and monitoring of public policy, including public health policy measures: 1) Individual; 2) Family or household; 3) Community or neighborhood; 4) Regional; 5) State; and, where applicable, 6) National; and 7) International.

¹ For a discussion of the territorial dimension and spatial variations of quality of life see the works by Cicerchia (1996), and by Turksever and Atalik (2001).

A similar system has been suggested by recent prevention and intervention research. Joseph A. Durlak in his review of 1,200 prevention outcome studies directed toward children's well-being differentiates five major levels, or domains, of risk: community, school, peer group, family, and individual (Durlak 1998: 513-514). At each of these levels, he identifies multiple and complex risk factors responsible for major negative quality of life outcomes such as poor physical health, drug use, adolescent pregnancy, and so on. At the community level, two major aggregate risk factors have emerged: impoverished neighborhoods - those with low level of social services, high rate of crime, violence and drug use, few social ties among residents, and general climate of hopelessness, - and ineffective social policies (pp. 514-515). A single risk factor at the school level, poor quality schools, is further characterized by low levels of academic achievement, low expectations for student performance, ineffective leadership, and poor relationship among teachers, principals, parents, and students (p. 514). Peer-related risk factors include negative peer pressure or modeling, and peer rejection. At the family level risk factors range from indirect ones such as low socioeconomic status (parents' education, occupation and income), which decreases the quality of parental support and increases the rate of negative life events, to ones with a more direct effect, such as parental psychopathology, marital discord and punitive childrearing (Durlak 1998, Wills et al. 1996). Early onset of target problems and problems in other areas constitute risk factors at the individual level, while stress is identified as a separate factor present at each of the five levels (Durlak 1998: 514).

Turning to protective factors, Durlak argues that their system is similar to that of risk factors, with protective factors working at same multiple sociospatial levels and exerting effect on several rather than just one important quality of life outcomes (p. 516). Protective factors thus are fairly symmetrical to the risk factors described above: effective social policies and social norms at the community level, high quality schools, positive peer modeling, good parent-child relationship, individual self-efficacy and personal and social skills, and, working at every level, social support (p. 516). However, it will be a mistake to consider risk and protective factors "simply each other's opposites ... (although in some cases) risk and protection seem to lie along the same continuum and are inversely related" (p. 518). Indeed, many researchers consider conceptual properties

of protective factors to be different from conceptual properties of risk factors (Dekovic 1999, Hawkins et al. 1995, Jessor et al. 1995).

1.4 Risk and Protective Factors in Substance Abuse Prevention

The risk and protective factors framework has been extensively scrutinized in academic research and through practical applications in the last twenty years, particularly in the area of prevention of adolescent ATOD use. This focus is understandable given the unfortunate fact that the alcohol, tobacco and illicit drug use continues to be a major factor threatening health and quality of life of adults and youth alike.

Thus, the *Healthy People 2010* report alerts that the percentage of adolescents in grades 9 through 12 who smoked in the past month increased in the 1990s from 28 to 35 percent. The consequences of these trends are grave given the fact the almost half of adolescents who continue smoking regularly will die eventually from a smoking-related illness, and more than half of adult smokers became daily smokers before age 18 years. In 1998, 21 percent of adolescents aged 12 to 17 years reported that they used alcohol or illicit drugs in the past month (U.S. Department of Health 2000). Since most initiation of tobacco and alcohol use occurs between 12 years and 18 years of age and relatively rarely after the age of 21 (Wills et al. 1996), understanding risk and protective factors affecting this age group is of crucial importance for successful ATOD prevention and intervention programs.

While not all researchers and practitioners address risk and protective factors at every sociospatial level or for every quality of life dimension, most studies and programs include multiple factors working at several levels along multiple dimensions. Most evidence to date has been accumulated for risk and protective factors acting on the individual, peer group and family levels although no "primary causal factor" has emerged yet (Sullivan and Farrell 1999). For example, in their cross-sectional study of urban minority high school students in New York City, Walter and colleagues demonstrated that the risk factors suggested by the socialization model – friends' ATOD use, parents' ATOD use, and peers' ATOD use - have the strongest explanatory power of the self-reported adolescent use of alcohol, cigarettes and marijuana (Walter et al 1993). These

risk factors were identified by other studies as well (Loeber 1990, Yoshikawa 1994). Other important albeit less significant risk factors included past-year adverse life circumstances (familial deaths or hospitalization, parental discord, economic hardship, exposure to crime), academic failure and poor parental support. Discussing the prevention research to date, the authors reported that prevention strategies based on models of social normative influence and socio-environmental in orientation had been shown to bring results far exceeding those of the “just say no” approach (Walter et al 1993).

Several recent studies have demonstrated that the environmental, or community-level, factors exert statistically-significant influence on adolescent ATOD use. Thus, a study of Colombian youth and their families found that the environmental factors such as the level of violence and frequency of robbery in the neighborhood, availability of drugs, and the adolescent’s and mother’s church attendance were important not only as interactional effects mediating the relationship between adolescent behavior and their families, but also as a significant main effect (Brook et al 2001). The specific risk factors included violence directed toward the subject, general violence in the neighborhood, drug availability, low familism¹, and infrequent church attendance (Brook et al 2001: 198). Other recent studies reported empirically-supported results that high levels of community disorganization and poverty (Sampson et al 1997) as well as legal and normative expectations for substance use behavior were responsible for increased adolescent ATOD use (Pollard and Hawkins 1999). Supporting community environment approach to risk and protection, Link and Phelan (1995) argue that “individually-based risk factors must be contextualized” to include basic social conditions such as socioeconomic status and social support “if we are to craft effective interventions” (p. 80).

Most researchers agree that prevention of negative quality of life outcomes such as substance abuse or psychiatric disorders requires more than simply the elimination of risk factors; a careful consideration of protective factors must be present as well (Day et al 1993: 1304). While it is suggested above that protective factors work on every sociospatial level (Durlak 1998), majority of studies to date have focused on the

¹ An element of Columbian value system that places the needs and rights of the family and community over individuals’ needs and rights (Brook et al 2001: 186).

individual-level ATOD protective factors including a positive social orientation, high intelligence, a resilient temperament, healthy beliefs and clear standards for behavior, and social bonding - warm and affective relationships and commitment to conventional lines of action (Pollard and Hawkins 1999). Only social bonding has been conceptualized as working on several levels, from peer group to community (Pollard and Hawkins 1999, Catalano and Hawkins 1996). Still, we believe that protective factors at higher sociospatial levels, such as family and neighborhood-level resilience, community-wide healthy beliefs and clear behavioral standards, exert protective effect independent of individual-level protective factors.

Analyzing the most successful prevention programs, Durlak notices that “multilevel prevention programs are more likely to be successful than single-level interventions” when targeting both risk and protective factors (Durlak 1998: 515-516, Sullivan and Farrell 1999). These programs will benefit from synergistic qualities of many risk and protective factors: since they are common for several major negative quality of life outcomes, “programs that successfully modify these common factors are likely to prevent multiple problems simultaneously” (p. 517). Such systemic approach requires that cross-disciplinary and collaborative prevention programs be established in order to achieve multiple positive outcomes in the most cost-effective ways (p. 518).

To maximize efficiency, preventive and intervention measures should focus on geographical areas or population groups exposed to high overall level of risk and should combine strategies strengthening assets and those reducing risk factors (Pollard and Hawkins 1999). Prevention that takes into consideration large-scale environmental factors, particularly ones working at the community or regional level such as educational attainment, poverty, community norms, hold a distinctive promise as it affects the largest number of adolescents potentially at risk of starting to use substances long before they contemplate trying ATOD (Wills et al. 1996). Yet it is important to remember that some risk factors may be more resistant to change than others (Durlak 1998).

II. Measuring Quality of Life

2.1 Assessment of Quality of Life Using QOL Indicators

Consistent with the above definitions of quality of life as either objective or subjective phenomenon, two approaches have been utilized when assessing quality of life: through objective indicators, frequently called social indicators, or through subjective one, such as subjective well-being indicator. Not all agree that the term “social indicator” is limited exclusively to objective measurements. For example, Land (1983) argues that social indicators are a general category that includes satisfaction, or subjective, indicators, as well as normative welfare indicators (or, in today’s public policy language, benchmarks) and descriptive indicators used in social reporting. Yet Diener and Suh (1997) make a clear distinction between social indicators, an instrument of objective measurement, and subjective well-being measures, which assess people’s evaluations of their lives and their societies. Other instruments proposed by scholars that incorporate both objective and subjective measures include Quality of Life Index by Johnston (1988), Physical Quality of Life Index by Ogwang (1997) and Diener’s Basic and Advanced QOL Indexes (1995).

In this paper, we use the term “quality of life indicators” to describe quality of life in the broadest sense, as related to any kind of human living conditions, behavior, and opinions. Such definition includes both objective and subjective components of quality of life (objective QOL indicators and subjective QOL indicators, respectively). Objective QOL indicators are thus equated with normative and descriptive social indicators discussed in (Bauer 1966, Land 1983, Diener and Suh 1997).

Although used by Mancur Olson to characterize social indicators, the following definition seems to give the best interpretation of a normative QOL indicator as a “statistic of direct normative interest which facilitates concise, comprehensive and balanced judgment about the condition of major aspects of a society ... a direct measure of welfare ... if it changes in the ‘right’ direction, while other things remain equal, things have gotten better or people are better off “ (*cited in Land 1983: 4*). While normative QOL indicators prescribe actions as in case of planning and public policy, descriptive QOL indicators simply make a record of social conditions or their changes (Bauer 1966,

Land 1983).

Besides their potential to inform and guide public policy, there are several other benefits to the use of objective QOL indicators. The main conceptual strength is their objectivity: they can be easily defined and measured without relying on individual perceptions because a widespread agreement usually exists about the meaning and value of what's being measured (Diener and Suh 1997). They can also be calculated with little measurement error and with sufficient precision. There are numerous sources of secondary data to calculate objective QOL indicators. As far as they include measures across several life domains, they can “capture important qualities of the society that are not adequately assessed by either subjective well-being measures or economic indices” (Diener and Suh 1997: 195). Since most of the secondary data is collected by the government during decennial censuses or regular surveys, it is low-cost or free for the public (at least, in the US), an important consideration given the expensive nature of properly collected subjective information. Other strengths of the secondary data include its comparability across geographical areas and levels and in time, and a promising possibility to use administrative data.

Among principal weaknesses of objective QOL indicators are several measurement and conceptualization problems. The former include unreliable reporting of events or inadequate records or sampling procedures used in collecting the data and constructing the indicators (Strauss and Thomas 1996), the latter evokes the fact that subjective decisions still have to be made when selecting and measuring the variables (Diener and Suh 1997). Other conceptualization problems include ambiguity and internal consistency of indicators – when it is not universally clear or agreed-upon that bigger indicator-values indicate a better or worse state of affairs (Michalos 1992, *cited in* Cicerchia 1996) as well as comparability and weighting of indicators (Cicerchia 1996).

When developing QOL indicators, one of the first issues to consider is the intended use of the indicators, i.e. whether they will be prescriptive (normative), or descriptive. If the QOL indicators will be used to inform and guide public policy development, a recent report by Hagerty and colleagues, entitled “Quality of Life Indexes for National Policy: Review and Agenda for Research”, recommends that the following criteria be adopted (Hagerty et al. 2001: 2-11):

1. the index must have a clear practical, or public policy, purpose;
2. the index should help public policymakers develop and assess programs at all relevant levels of aggregation: individual, family, community, state, country, and international;
3. the index should be based on time series to allow periodic monitoring and control;
4. the index should be grounded in well-established theory;
5. the components of the index should be reliable, valid, and sensitive (be able to show changes to public policy inputs);
6. the index should be reported as a single number but can be broken down into components¹;
7. the domains in aggregate must encompass the totality of life experience;
8. each domain must encompass a substantial but discrete portion of the QOL construct;
9. each domain must have the potential to be measured in both objective and subjective dimensions;
10. each domain within a generic QOL instrument must have relevance for most people;
11. if a specific domain is proposed for a non-generic instrument, it must be demonstrated to contribute unique variance to the QOL construct beyond the generic domains for the target group;
12. domains must be potentially neutral, positive or negative in their contribution to the QOL construct;
13. domains differ from dimensions of personality, cognitive processes, and affect in that (the dimensions) cannot be measured objectively;
14. the subjective dimension of each domain has both a cognitive and an affective component.

¹ It is worth noting that the authors have reported a disagreement over this criteria: the minority argued that due to philosophical problems in combining separate life domains, high variations of domains' importance for different people, and unnecessary complexity constructing single comprehensive indexes is problematic (Hagerty et al. 2001: 6). As Stockwell and Neal (1991) note, "no one has yet devised a list of factors that are both theoretically and empirically justified, and that would be universally acceptable as encompassing all the factors that ought to be included in any overall summary index" (p. 393).

The next section discusses several measurement and data issues a researcher needs to consider when designing QOL indicators.

2.2 Measurement and Data Considerations for Quality of Life Indicators

The first dilemma an investigator or practitioner faces is whether a selection of one or several characteristics will best describe a condition or outcome under consideration. Selection of several characteristics allows one to more fully describe the phenomenon, area or population group of primary concern, however choosing too many variables makes it increasingly more difficult to make meaningful comparisons between phenomena, areas or population groups. Thus, when choosing variables as quality of life indicators, it is better to select a limited number of key parameters describing major quality of life domains and dimensions rather than attempting to fully characterize each of them with all possible theoretically meaningful variables.

Development of a composite quality of life index combining several simple variables has been used in many studies to overcome the problem of choosing either too few or too many simple indicators (Hagerty et al. 2001). A composite Quality of Life Index is constructed from several univariate or even multivariate indicators using different methods, the most common being a calculation of a regular or weighted average or a sum of its component variables (Campbell et al. 1976, Furuseth 2000, Shen and Lai 2001). There are two main benefits to the use of a composite indicator: it allows to combine several, even many, conceptually-sound variables to describe quality of life, yet it is presented as a single number that is easy to use when comparing any number of social or geographic entities under study (Hagerty et al. 2001). However, any composite index has its weaknesses. Some of them are germane to any QOL indicator, whether univariate or multivariate, such as an inevitable subjectivity of a choice of component variables. Problems can also result from a so-called “excessive neutrality” of indicators, i.e., their tendency to over-generalize by either excluding various subpopulation groups (ethnic minorities, people with disabilities and so on) or neglecting measures of variation, distribution and inequality (Cicerchia 1996). A problem specific to composite indexes is that of weighting: how to assess the relative contribution (or the weight) of each simple

variable comprising the aggregate index (Diener and Suh 1997, Evans 1994, Hagerty et al 2001, Oregon Progress Board 2001). Finally, when many simple variables are used in calculations, a question of whether to calculate more than one composite index arises (Stockwell and Neal 1991).

There has been a substantial debate on the issue of weighting the relative influence of index's components. Various statistical techniques including principal component analysis and factor analysis have been utilized to identify individual contribution of its variables and their association with each other (Cox et al 1992, Ogwang 1997, Shen and Lai 1998, Stockwell and Neal 1991). Still, without further research validating different – or similar – weights assigned to variables in a quality of life index it is difficult to avoid explicit or implicit subjectivity in this matter (Ferriss 2000). Some practical applications of the QOL indexing have involved focus groups and community consensus-building approaches to identify the most important components of the quality of life indicators (Furuseth 2000, Jacksonville Community Council 2000).

Whether simple or composite indicators are chosen, the issue of how best to measure and calculate a relevant social characteristic needs to be resolved. For example, when assessing the need for drug-addiction treatment, should the absolute (estimated number of drug addicts in a given area) or relative (percent of population who are estimated to be drug addicts) measures be used? What is better when describing poverty levels across several geographic areas: to show total number of people in poverty in each area, percent of population that are in poverty in each area, or the relative position of each area in relation to the regional poverty level? The general agreement is that all three measures should be used if practically possible as each of them provides valuable information about a given aspect of quality of life (Myers 1992, *Pierce County Benchmarks 1997*).

When comparing geographic areas or population groups is important, as in normative indicators, it may be useful to evaluate current status of the problem in each unit of analysis given other relevant conditions present in the unit, for example, whether, given its demographic makeup and socioeconomic status, the unit has a crime level that is higher or lower than expected. A simple way to estimate this is to compare a relative share of a problem variable in its regional total with a relative share of a “control”

variable such as population in its regional total for every geographic unit (this approach is used in calculating the index of dissimilarity) (Shaw and Wheeler 1994). A more sophisticated way to solve this problem is to model the outcome for every unit of analysis using, for example, the multiple linear regression technique, and then compare observed and predicted levels of the indicator (*Social Capital...*).

Another important consideration is the selection of a geographical level of analysis: whether the indicator should be calculated at the most spatially-detailed or most aggregated level. Choosing the level of aggregation not only affects the complexity of the data presented; changing geographical boundary definitions leads to a fallacy known as the Modifiable Areal Unit Problem (MAUP), when the relationships identified by an analysis may change depending on the geographical unit used in the analysis (Fotheringham and Wong 1991, Openshaw 1984).

Besides, the data used in developing quality of life indicators frequently comes already aggregated to different geographical levels, for example, to Census tracts or postal zip codes. In this case, a decision has to be made whether to use the data as is, risking to encounter the MAUP problem, or to allocate (recalculate) the data from different datasets to a single set of boundaries. Various allocation techniques are employed to compensate for incompatible geographical boundaries; all of them require a decision on the part of the analyst about the type of the spatial distribution of the characteristic in question across geographic areas, i.e. whether it is distributed evenly or whether some concentration exists. Frequently, a dasymetric mapping approach is used in order to account for the areas where the characteristic in question cannot be present (DeMers 2000). Inevitably, when a decision to allocate the data is made, the resulting recalculations contain some error stemming from the assumptions used in the process.

When comparisons need to be made not only between geographic areas (e.g., communities or neighborhoods), but also between the latter and the region-wide indicator, a couple of approaches are used. A region-wide indicator can be simply shown together with a community-level indicator leaving the audience to estimate the magnitude of the difference, or formal measures of difference (percent, standard deviations, etc.) can be calculated and presented. A region-wide indicator can be expressed as a unit, for example, 1 or 100 percent, and sub-regional indicators then can be calculated as

percentage or times above or below the regional level (*Charlotte Neighborhood...2000*).

A particular issue to consider when normative QOL indicators are developed is whether the relationship between the characteristic in question and the desired public policy outcome is linear or nonlinear: whether maximizing or minimizing the value of the QOL indicator has unequivocal positive or negative meaning for the common good. A case in point is the number of policemen or doctors per capita: while more doctors probably means more medical services available, should this indicator be increased indefinitely? The question of an optimum range of a normative QOL indicator may not be fully resolved within the academic field; it may require a political decision if the indicator is to be used for public policy development.

Development of any indicators to a large degree depends on the available data. The following considerations should be taken into account when the data source is considered: data's relevance, its format and accessibility, its cost, the age of data, its areal coverage (extent), possible sources of error in the data (e.g., whether the data comes from a sample, was collected, or was estimated/projected), whether historical series are available and the future data will be collected (Foote and Huebner 1995). Sometimes, no empirical longitudinal data exists that supports the causal relationship between a QOL indicator and a desired public policy outcome. When only cross-sectional data is available, a care shall be taken in order not to interpret a correlation between variables as a cause-and-effect relationship.

2.3 Indicators of Risk and Protection in the Substance Abuse Prevention

Both objective and subjective indicators are used extensively to describe and measure risk and protection in substance abuse cases. While the above considerations are fully applicable to the development of risk and protection indicators, some specific issues need to be taken into account.

Most of the risk and protective factors discussed in academic literature are multidimensional constructs, or composite indexes, requiring further disaggregation into separate indicators (Durlak 1998, Sullivan and Farrell 1999); for example, the risk factor of "community disorganization" or the protective factor of "social bonding" may be

expressed as per capita crime rate or participation rate in volunteer community organizations, respectively. A fairly large number of individual variables may be required to describe each risk or protective factor according to its complete conceptual “portrait”.

Some scholars suggest that risk and protection factors are continuous rather than simply dichotomous variables and should be measured as such: “more risk” or “less risk” rather than “risk” or “no risk”. When comparing risk and protection, z-scores of a continuous distribution are frequently calculated (Pollard and Hawkins 1999). Other studies treated risk and protective factors as dichotomous and only considered the observations (responses) that attained extreme scores – approximately the upper or lower 20 percent of scale’s distribution (Dekovic 1999, Newcomb and Felix-Ortiz 1992, Sullivan and Farrell 1999).

Different opinions exist as to whether risk and protective factors are complimentary, i.e., if by decreasing the risk the protection increases automatically. While Durlak (1998) has cautioned that risk and protection should be assessed separately, Newcomb and Felix-Ortiz (1992) used the same measure to extract both risk and protective variables from the opposite extremes of its scale.

Although frequently risk or protective factors are summed or averaged to come up with an aggregated risk or protection index, it has also been shown that the risk factors possess multiplicative rather than additive effects, i.e. the probability of a negative outcome increases geometrically when the number of risk factors increases in a linear fashion (Kalil and Kunz 1999). It is also likely that different factors contribute differentially to overall risk and protection thus making summation or averaging inappropriate choices when quantifying risk and protection factors (Pollard and Hawkins 1999). Some factors may exert a direct influence on the outcome (main effects), while others contribute interaction, or indirect, effects (Sullivan and Farrell 1999). Steinhausen and Metzke (2001) propose to consider four factors that influence adaptive outcomes: the first pair of opposite factors – risk vs. compensatory factors - contributes main effects, while the second pair – vulnerability vs. protective factors – contributes interaction effects on behavioral problems (p. 260).

Survey research is most often the only venue to directly assess the full range of theoretically meaningful risk and protective factors, and most studies used survey data

rather than secondary data for the development of indexes of risk and protection. While this approach furnishes rich and relevant information, it has a number of weaknesses. Rarely sufficient data is collected to describe subpopulations or smaller geographic areas. Few surveys are repeated regularly or at all. The data collection is very expensive. Thus, although subjective indicators of risk and protection provide the most valuable information about an individual, a group or a community, it is objective indicators that are primarily used for the development, implementation and monitoring of public policy.

III. Developing Quality of Life Indices for The San Diego County Alcohol and Drug Services Agency

3.1 Building a System of QOL Indicators: Main Principles

Once developed, the San Diego County Quality of Life Indicators System (SDCQOLIS) must serve a clear practical purpose: to inform and guide cooperative public and private efforts in the area of alcohol, tobacco and other drugs use prevention and service delivery. The second important goal is to maximize the system's utility for other public policy applications, both community-sponsored and initiated by the San Diego County and local governments in order to achieve the mission of the County of San Diego "...to improve the region's Quality of Life" (*County of San Diego...*).

The first goal will be achieved by building the Quality of Life Indicators System in the ATOD risk and protective factors framework discussed above. Maximization of public utility of the SDCQOLS will be achieved by constructing indicators of risk and protective factors as a part of a larger multi-domain quality of life system. Developing a multi-level system of indicators – for the county as a whole, its regions, community collaborative sub-regions and their parts – will simultaneously address both the programmatic goals of ATOD prevention and a broad range of potential community-based initiatives.

To be successful, the SDCQOLIS must be implemented as an open, dynamic and feedback-sensitive system. This includes a possibility for future growth and incorporation of new theoretically meaningful and reliable indicators and data sources, and for

assessment of current and future needs of community collaboratives and other current and future community partners. Possible future data sources may include survey data allowing to measure subjective perceptions of risk and protection in the community as well as subjective well-being and overall life satisfaction.

The system's implementation has to be a multi-step process, moving from few simple indicators to more complex and numerous indicators as the system's users learn about and adopt the system. The system and its documentation have to be open for regular outside evaluation including a thorough scrutiny by experts and a scientific peer review process¹.

3.2 Building a system of QOL indicators: specific recommendations

3.2.1 Risk and Protection Life Domains and Dimensions

Based on the review of recent academic research and science-based applications in the area of ATOD prevention and intervention, we propose that the SDCQOLS be organized as a multi-domain, multi-dimension, and multi-level system. The system will describe the following major life domains: 1) physical and mental life (Individual Domain), 2) leisure life and friendships (Peer Domain), 3) family and home life (Family Domain), 4) work and school life (School Domain), and 5) community life (Community Domain). These life domains are particularly relevant to ATOD prevention efforts among youth, yet in an aggregate form they encompass the totality of a person's whole life experience as well as address other important criteria of quality of life evaluation outlined in the report by Hagerty et al. (2001; *see above*).

Risk and protective factors are some of many dimensions affecting subjective assessment of one's quality of life and objective characteristics of one's life domains. As such, risk and protective factors exist along the following generalized quality of life dimensions: 1) overall and domain-specific skills; 2) personality (dispositional) factors; 3) cognitive functions; 4) emotional functions; 5) broad environmental factors including social support. These categories applied to the risk and protection framework translate

¹ This satisfies the criteria of "science-based best practices" in the prevention of substance use and abuse developed by the Center for Substance Abuse Prevention (*Science-based Practices...* 1998)

into risk and protective dimensions and are comprised of multiple factors affecting ATOD use among adolescents (see Table 1).

Risk and protective factors represent complex social phenomena that are best assessed through both objective and subjective indicators. Keeping in mind that only a limited number of subjective indicators are available for parts of San Diego County, we propose to disaggregate each of the risk and protective factors into its components that can be measured objectively. They are listed and discussed in the next section.

<TABLE 1 ABOUT HERE>

3.2.2 Risk and Protection Indicators

For the *Individual* life domain, the following indicators of risk and protective factors are proposed.

1. Constitutional factors

Children born with substance dependence are at a very high risk of substance abuse later in life; children who suffered from early childhood physical and emotional traumas are likely to exhibit emotional instability, sensation-seeking, and poor impulse control, which are related to higher risk of ATOD use in adolescence (Brook et al. 2001, Hawkins et al. 1992, Pollard and Hawkins 1999).

1.1. Percent of children born with Fetal Alcohol Syndrome

1.2. Children 0 to 4 years who were victims of abuse and neglect

2. Alienation

Suicidal and violent behaviors, particularly an early onset of aggressive behavior, are considered strong indicators of social alienation and have shown a high correlation with substance use and abuse among adolescents (Borowsky et al. 2001, Dekovic 1999).

Unconventionality (rebelliousness and delinquency) is also related to illegal drug use among adolescents (Brook et al. 2001).

2.1. Student-committed crimes in elementary schools

2.2. Students-crime victims in elementary schools

2.3. Death from suicide per 10,000 of children under 21

2.4. Students suspended from school for antisocial behavior

3. *School performance*

Poor school performance in early grades is associated with increased risk, while academic competence and aspirations to go to college have been shown to protect students from ATOD use (Dekovic 1999, Jessor et al. 1995, Mathias 1996, Resnick and Burt 1996, Schulenberg et al. 1994, Walter et al. 1993). Besides, reading at or above grade level was shown to be a protective factor for educational progress of youth with severe aggression and emotional disturbance (Vance et al. 1998).

3.1. Percent of children entering school ready to learn

3.2. Percent of 3rd-graders at or above 75th percentile in mathematics

3.3. Percent of 3rd-graders below 25th percentile in mathematics

3.4. Percent of high school students accepted into college

4. *Early initiation of substance use*

The earlier the problem behavior starts, the higher the risk of its continuation and eventual adoption (Durlak 1998, Hawkins et al. 1992, Pollard and Hawkins 1999). This indicator should be developed from self-reported survey data where available.

4.1. Young juvenile arrests for alcohol and drug crimes

4.2. *Age when any ATOD were used for the first time; age when a regular use began¹*

5. *Interactions with antisocial peers*

Practically every study on ATOD use among adolescents has confirmed this indicator to be the best predictor of the problem behavior (Hawkins et al. 1992, Pollard and Hawkins 1999). This indicator should be developed from self-reported survey data where available.

5.1. *Friends and peers approving of or using ATOD;*

5.2. *Friends and peers involved in antisocial behavior*

¹ Text *in italics* denotes that survey data is needed to construct a given indicator

6. *Age and gender*

It has been shown that male gender and young adolescence are strongly associated with the onset of substance use (Dekovic 1999, Hawkins et al 1985, Neher and Short 1998, Walter et al. 1993).

- 6.1. Percent and number of 12 to 18 year-olds among all persons and persons under 21
- 6.2. Gender ratio for persons ages 10 to 17 and 18 to 20¹

In the *Peer Group* life domain, the risk and protective factors and corresponding indicators are as follows:

1. *Peers' use of substances*

The most powerful predictor of ATOD behavior is a youth's association with a peer group, and particularly, friends who use or approve of using the substances (Hawkins et al. 1992, Pollard and Hawkins 1999, Walter et al. 1993). The variables are developed from a survey data where it is available.

- 1.1. *Percent of high-school students who used alcohol in the last 30 days*
- 1.2. *Percent of high-school students who used illicit drugs in the last 30 days*
- 1.3. *Percent of high-school students who used tobacco in the last 30 days*

2. *Peers' involvement in high-risk behavior*

Involvement in high-risk and violent behavior is a predictor or, as in case of driving under influence, a direct measure of ATOD use (Hawkins et al. 1992, Loeber 1990, Pollard and Hawkins 1999). It may influence a teenager directly if his or her peer group is involved, or indirectly, by creating an atmosphere, or even a culture, of violence and drug abuse. Teenage pregnancy has been associated with many negative outcomes including ATOD use and abuse (Gillmore et al. 1992).

- 2.1. Juvenile arrests per 1,000 juveniles for crimes against property
- 2.2. Juvenile arrests per 1,000 juveniles for vandalism
- 2.3. Juvenile arrests per 1,000 juveniles for alcohol and drug crimes
- 2.4. Juvenile DUI arrests per 1,000 juveniles
- 2.5. Birth rate per 1,000 females ages 10-19

¹ Gender ratio is a purely descriptive indicator.

2.6. Repeated birth rate per 1,000 females ages 10-19

Indicators of risk and protective factors in the *Family* domain include:

1. *Family health, mental and other illnesses*

Mental and other serious illnesses among members of an adolescent's immediate family are frequently responsible for additional strain and a lack of quality time spent with the adolescent, which increase the chances for the initiation of ATOD use. For example, maternal psychopathology significantly increases the odds of the adolescent's illegal drug use (Brook et al. 2001)

- 1.1. Percent of low-birth weight infants
- 1.2. Percent of infants born without a health insurance
- 1.3. Families without mental health insurance

2. *Family history of substance use and abuse, and high risk behavior*

Having low or no drug use among parental models, including siblings and more distant family members, is one of the strongest protective factors of the youth ATOD use (Brook et al. 2001, Hawkins et al. 1992, Pollard and Hawkins 1999, Sullivan and Farrell 1999, Walter et al. 1993). Since this measure is best described by self-reported survey data, the proposed variables are used to approximate the former.

- 2.1. Pregnant women per all women 15-44 admitted to alcohol or drug treatment
- 2.2. Persons with dependent children under 18 in drug treatment
- 2.3. Persons with dependent children under 18 in alcohol treatment

3. *Low parental resources and skills*

Adolescents from both single-parent families and "blended" families are more likely to use substances (Vakalahi 2001, Wills et al. 1996). This is to a large extent due to fewer resources, both material and emotional, that are available for children, higher incidence of family poverty and other problems that are more typical of single-parent families. In addition, children of divorced parents show less coping and social skills and more substance-using friends (Neher and Short 1998). Parental monitoring was shown to decrease unsupervised time and to minimize the exposure to negative social influences

(Mathias 1996, Stacey et al. 1992); in case of working parents, day-care centers may provide this function for younger adolescents.

- 3.1. Percent of infants whose mothers received early prenatal care
- 3.2. Percent of children in single-parent households
- 3.3. Number of child care slots available per 100 children under age 13

4. Lack of mutual attachment and nurturing

Strong bonding with one's parents, frequent and open communication style have been shown to offer a protection from ATOD use among adolescents (Brook et al. 2001, Dekovic 1999, Durlak 1998, Sullivan and Farrell 1999).

- 4.1. *Self reported measure, survey data where available*

5. Family conflict and management problems

Family conflict, violence and incapable parenting are strong predictors of ATOD use among adolescents (Brook et al. 2001, Hawkins et al. 1992, Pollard and Hawkins 1999).

- 5.1. Domestic violence calls per 1,000 persons
- 5.2. Domestic violence cases per 1,000 persons
- 5.3. Children abused or neglected per 1,000 persons under age 18

In the *School* domain, several indicators are proposed to describe risk and protective factors:

1. Commitment to school

Students committed to school who enjoy it or at least attend it regularly are a lot less likely to start ATOD use (Fergusson and Lynskey 1996, Hawkins et al. 1992, Pollard and Hawkins 1999). Schools with higher graduation rate also tend to have a better overall atmosphere, higher expectations for student performance, more effective leadership, and better relationship among teachers, principals, parents, and students (Durlak 1998).

- 1.1. Percent of public school students who drop out of grades 9-12
- 1.2. Average daily attendance rate
- 1.3. Percent of new public school students

2. Academic progress

Students who strive to do their best at school are at a lower risk of ATOD use; schools with more students doing well also tend to not tolerate ATOD behavior (Hawkins et al. 1992, Pollard and Hawkins 1999, Wills et al. 1992).

- 2.1. Percent of 8th-grade students at or above 75th percentile in mathematics
- 2.2. Percent of 8th-grade students below 25th percentile in mathematics
- 2.3. Percent of 10th-grade students at or above 75th percentile in mathematics
- 2.4. Percent of 10th-grade students below 25th percentile in mathematics
- 2.5. Percent of public school students who graduate in 4 years

3. *Opportunities and perceived rewards for school involvement*

Students involved in clubs, sports and other extracurricular activities are less likely to feel the urge or to have the time to experiment with ATOD (Brook et al. 2001, Hawkins et al. 1992, Pollard and Hawkins 1999, Sullivan and Farrell 1999).

- 3.1. Number and membership in school clubs per 100 high-school students
- 3.2. Availability of before- and after-school programs on campus
- 3.3. *Perceived rewards for school involvement*

In the *Community/Larger Environment* domain, a number of risk factors can be decreased through fairly simple measures such as land use zoning changes and regulations of alcohol and tobacco licenses (*Preventing Problems...* 1999, *Research-based Principles...* 2001, Stewart 1997). These factors and their indicators include:

1. *Availability of substances (alcohol and tobacco)*

Easy access to alcohol, tobacco and illegal drugs is associated with high risk of ATOD use among adolescents (Altman et al. 1989, Hawkins et al. 1992, Pollard and Hawkins 1999 Wills et al. 1996). Implementation of community clean-air laws, increased taxation of alcoholic and tobacco products, strict enforcement of tobacco sales laws has been associated with lower consumption of these products by adolescents (Durlak 1998, *Preventing Problems...* 1999, *Research-based Principles...* 2001). Since increased alcohol outlet density is directly associated with increased consumption, measures of alcohol and tobacco outlet accessibility (for example, location within a walking distance) are important neighborhood characteristics (Cicerchia 1996, Stewart 1997).

- 1.1. Number of alcohol outlets and/or number of tobacco outlets per square acre
- 1.2. Number of alcohol outlets and/or number of tobacco outlets per 1,000 persons
- 1.3. Number alcohol outlets and/or number of tobacco outlets within a walking distance (easy driving distance for rural areas) from school (1/4 mi; ½ mi in rural areas)
- 1.4. Youth ages 10-20 residing within a walking distance (easy driving distance for rural areas) from alcohol outlets and/or from tobacco outlets (1/4 mi; ½ mi in rural areas)
- 1.5. Percent of merchants that sell alcohol and/or tobacco
- 1.6. Cumulative years of operation of alcohol outlets and tobacco outlets within a walking distance (easy driving distance for rural areas) from school
- 1.7. Alcohol outlets and/or tobacco outlets opened less than a year ago

2. *Laws and norms favoring the use of substances*

Community mobilization against laws and norms favoring the use of substances can be instrumental in increasing protection and decreasing risk of adolescent ATOD use and abuse (Hawkins et al. 1992(a), Hawkins et al. 1992(b), Pollard and Hawkins 1999).

- 2.1. Percent of the area where land use zoning allows alcohol and/or tobacco sales
- 2.2. Alcohol and/or tobacco outlets within a walking distance (1/4 mile) from daycare centers, clubs, libraries, churches, parks, beaches and playgrounds
- 2.3. ATOD treatment centers per 1,000 admissions by place of residence
- 2.4. Persons in ADOT treatment
- 2.5. Voting on ATOD-related propositions
- 2.6. Percent of public events that are alcohol-free
- 2.7. Percent of adults who are dependent on ADOT
- 2.8. Percent of ADOT sales to minors

3. *Media advertisement of tobacco and alcohol*

Media portrayals of substance use as fashionable and exciting play a major role in adolescents' adoption of smoking and drinking (Pierce and Gilpin 1995, Wills et al. 1996).

- 3.1. Percent of regional billboards advertising substance use
- 3.2. Billboards with substance use advertising within 1,000 feet of schools, parks, playgrounds, daycare centers
- 3.3. Billboards with ADOT prevention advertising within 1,000 feet of schools, parks, playgrounds, daycare centers

4. Community disorganization

The importance of a living environment free from neighborhood violence, with low drug availability and use has been demonstrated in several studies (Brook et al. 2001, Hawkins et al. 1992, Pollard and Hawkins 1999).

- 4.1. Violent deaths per 10,000 youth years 10 to 19
- 4.2. Adult arrests for alcohol and drug crimes
- 4.3. Deaths from AIDS
- 4.4. Rate of drug-related deaths
- 4.5. Rate of alcohol-related deaths
- 4.6. Homelessness

5. Community attachment

Stable communities rich in social capital and civic engagement are more likely to control antisocial behavior of their youth (Hawkins et al. 1992, Pollard and Hawkins 1999).

- 5.1. Percent of registered voters
- 5.2. Percent of registered voters participating in the latest elections
- 5.3. Actual voting behavior
- 5.4. Percent living in the same house as 5 years ago
- 5.5. Percent of membership in civic organizations that is local

6. Social and economic deprivation

Lower socioeconomic status, limited educational opportunities, and particularly

extreme levels of social and economic deprivation such as poverty and poor housing, are associated with substance use (Bursik and Webb 1982, Hawkins et al 1992, Vakalahi 2001, Wills et al. 1995, Wills et al. 1996).

- 6.1. Percent of persons below poverty level
- 6.2. Percent of public school students in free and reduced-cost lunch programs
- 6.3. Unemployment rate
- 6.4. Percent of people living in overcrowded conditions
- 6.5. Percent of persons 25+ without a high-school diploma¹
- 6.6. Infant mortality rate
- 6.7. Percent of old and dilapidated housing

7. *Availability of constructive recreational activities and opportunities for community involvement*

Opportunities for youth to participate in extra-curricular activities such as involvement in sports and clubs, attending libraries and churches, represent protective mechanisms as they reinforce behaviors oriented toward conventional institutions and norms (Brook et al. 2001, Hawkins et al. 1992, Pollard and Hawkins 1999, Sullivan and Farrell 1999, Vakalahi 2001).

- 7.1. Public parks acreage per 10,000 persons
- 7.2. Public libraries per 10,000 persons
- 7.3. Civic institutions (volunteer, neighborhood, religious organizations) per 10,000 persons
- 7.4. Community centers, youth clubs per 10,000 persons

The proposed list of indicators is further divided into priority variables, and other variables (see Table 2). The variables were prioritized according to their relevance for ATOD prevention, data availability including validity and reliability of data sources,

¹ Low family income and less-than-high-school parental education were suggested as risk factors for academic performance and affective investment in school, which tend to protect against ATOD use among adolescents (Bowen and Bowen 1998).

existence of most recent and time-series data, and data timeliness and costs; and ease-of-use by target audiences.

<FIGURE 2 ABOUT HERE>

It has to be noted that some of the suggested indicators serve both as outcome measures of prevention and intervention and as input measures of risk or protective factors, i.e. “risk and protective factors may be both causes and consequences of adolescents’ drug use” (Sullivan and Farrell 1999: 134). In the absence of longitudinal subjective data provided by surveys such situation is hard to avoid. Besides, a bi-directional relationship may exist between input and output measures: the outcomes may also influence changes in risk or protection. For example, certain preventive measures may decrease the number of adolescents that drink and drive (a positive outcome). The same outcome is likely to act as a protective factor as fewer youth embark on destructive behavior further decreasing the risk factor in the peer domain.

3.2.3 Risk and Protection Levels

Risk and protective factors have been shown to operate at different sociospatial levels. Consistent with the community and region-wide orientation of the San Diego County ATOD efforts, the QOL indicators shall be developed at following sociospatial levels: neighborhoods (approximated by Census tracts), communities (approximated by community collaboratives), sub-regions (approximated by HHSAs), and regional level (San Diego County). This includes providing the data in the forms of tables, charts and maps, both static and interactive, for each sociospatial level (with Census tracts being the smallest units for which the data is presented). Presenting consistent information across sociospatial levels addresses a major shortcoming of many social indicators: incomparability over time and across localities (Greenwood 2001).

In cases when the allocation of the data is required (for example, when the data is reported for zip codes only), the GIS-based allocation procedures will have to be developed to implement assumptions about the data distribution.

The variables proposed above shall be calculated as relative values: percentages,

rates per capita, or rates per 10,000. Sufficient “raw” data used to derive each relative variable should be available to users as well; doing so increases users’ confidence in the data (see, for example, *1997 Pierce County Benchmarks*). A variable indicating a relationship between actual and expected contribution of an area to the total of all areas shall be provided where appropriate; it will allow evaluating to what extent a community’s population or socioeconomic structure is responsible for a particular problem. An index of dissimilarity for each area above the Census tract level shall be calculated to provide an objective measure of spatial concentration of an outcome.

Time series data shall be included where available to facilitate an analysis of trends. As Land (1983) notes, “without ... regularly repeated observations, measurement and analysis of social change can be neither scientific nor relevant to policy” (p. 22).

It is important to point out that most of the data needed for the SDCQOLS has been already collected and is available through the San Diego QOL Data Warehouse. Collecting additional data will require cooperation between governmental agencies at the local, regional and state level.

3.2.4 Implementation

The SDCQOLS shall be implemented in several stages (Fig. 1). At the first stage, the risk and protection indicators proposed above will be developed and made publicly available online. These indicators will describe risk and protective factors in relation to the major life domains at the regional through Census tract level, and will include general demographic and socioeconomic characteristics of each area. Once the indicators become available, the HHS community partners and general public will start to accumulate experience in the utilization of the simple QOL indicators and will provide feedback. An assessment and a review of the system and its documentation will be sought from outside experts and academic peers at this time.

At the second stage, after the users’ feedback, expert assessment and the indicators’ behavior will have been analyzed, a decision will be made whether to develop composite QOL/Risk and Protection indices from the simple QOL indicators (each composite index will characterize a separate risk or protective factor, such as

“community disorganization” or “opportunity for prosocial community involvement”). If composite indices are implemented, again, the community partners, general public and outside experts will be given sufficient time to utilize the system, to provide feedback and suggestions. At this point, a decision can be made whether to proceed with the development of the domain-specific quality of life indices and a global Quality of Life Index.

These implementation stages refer to the increasing complexity of measurement of QOL indicators and should not be confused with the three levels of the San Diego QOL Data Warehouse architecture. With regard to the latter, the implementation of progressively complex quality of life indicators can occur at each level of the database, from “ready-to-use” tables, charts and maps (Level I) to interactive queries and maps (Level II), to advanced analytical functions (Level III).

Interactions with community partners and policymakers need to be an integral part of constructing indicators in order to achieve the goals of simplicity and accessibility of indicators (Caiazza 2001).

Conclusions

This paper argues that issues of substance use and abuse should be approached in a systemic manner, from the quality of life perspective. To be successful, initiatives in the area of substance use prevention and intervention need to address major quality of life domains – individual, friends and peers, family, school and work, and community life – as well as principal quality of life dimensions including skills, social support and social networks, and larger biosociophysical environmental influences.

The risk and protective factors framework discussed in the paper provides an approach to the substance abuse prevention that is both theoretically sound and realistic. Risk and protective factors that themselves are components of quality of life dimensions represent links between quality of life domains and quality of life outcomes, either negative, in case of an increased risk, or positive, when a sufficient protection is available. This framework, although discussed here primarily in relation to substance abuse prevention, can be applied to the analysis of other quality of life outcomes.

This paper proposes a multi-dimensional data system that will offer rich and reliable information about important aspects of quality of life in San Diego County. Consistent with the risk and protective factors framework, the data system will provide information about major quality of life domains and specific quality of life dimensions that serve as risk and protective factors for the substance abuse prevention.

The data produced by the system will allow policy-makers, community leaders, members of grass-root organizations and general public to evaluate the urgency of substance-abuse problems in their community and identify the most crucial risk factors and the most promising protective factors that affect their community. It will help in concentrating community efforts in areas that have been shown by research and best science practice to be most influential for substance abuse prevention. With time, the system will also allow the monitoring of the efficiency of community efforts to combat substance use and abuse. The system will provide the basis for a transparent and open process of community collaboration in the area of prevention and intervention that is informed and supported by objective, scientifically-defensible data. As the system grows and matures, it will be able to serve as a guide for public policy initiatives in other areas of quality of life amelioration.

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Table 1. Quality of Life Risk and Protective Dimensions

Life Domains	Quality of life dimensions	
	Risk Factors	Protective Factors
Individual	<ul style="list-style-type: none"> - Constitutional factors (early childhood physical traumas, sensation-seeking, poor impulse control); - Alienation (extreme shyness or rebelliousness, early aggressive behavior, poor social coping skills); - Failure in school performance, low academic competence; - Early initiation of substance use; - Interactions with antisocial peers; - Age (12 to 18 years old) and gender (male) 	<ul style="list-style-type: none"> - Interaction with prosocial peers; - Positive social orientation; - Healthy beliefs and clear standards; - Social bonding; - Female gender; - High intelligence
Peer group	<ul style="list-style-type: none"> - Peers' use of substances; - Peers' involvement in high-risk behavior 	<ul style="list-style-type: none"> - Interaction with prosocial peers; - Social bonding; - Healthy beliefs and clear standards
Family	<ul style="list-style-type: none"> - Family health, mental and other illnesses; - Family history and approval of substance use and abuse, high risk behavior; - Low parental resources and skills; - Lack of mutual attachment and nurturing; - Family conflict, abuse and management problems 	<ul style="list-style-type: none"> - Strong family attachment; - Competent parenting; - Family opportunities for prosocial involvement; - Family rewards for prosocial involvement
School	<ul style="list-style-type: none"> - Low degree of commitment to school; - Lack of academic progress; - Few opportunities for school involvement; - Low perceived rewards for school involvement 	<ul style="list-style-type: none"> - School opportunities for prosocial involvement; - School rewards for prosocial involvement
Community	<ul style="list-style-type: none"> - Availability of substances; - Laws and norms favoring the use of substances; - Media advertisement of tobacco and alcohol; - Community disorganization; - Low community attachment; - Many personal and community transitions; - Social and economic deprivation; - Extreme social and economic deprivation 	<ul style="list-style-type: none"> - Availability of opportunities for community involvement and prosocial recreational activities; - Community rewards for prosocial involvement

Fig. 1 Development process for the San Diego County Quality of Life System

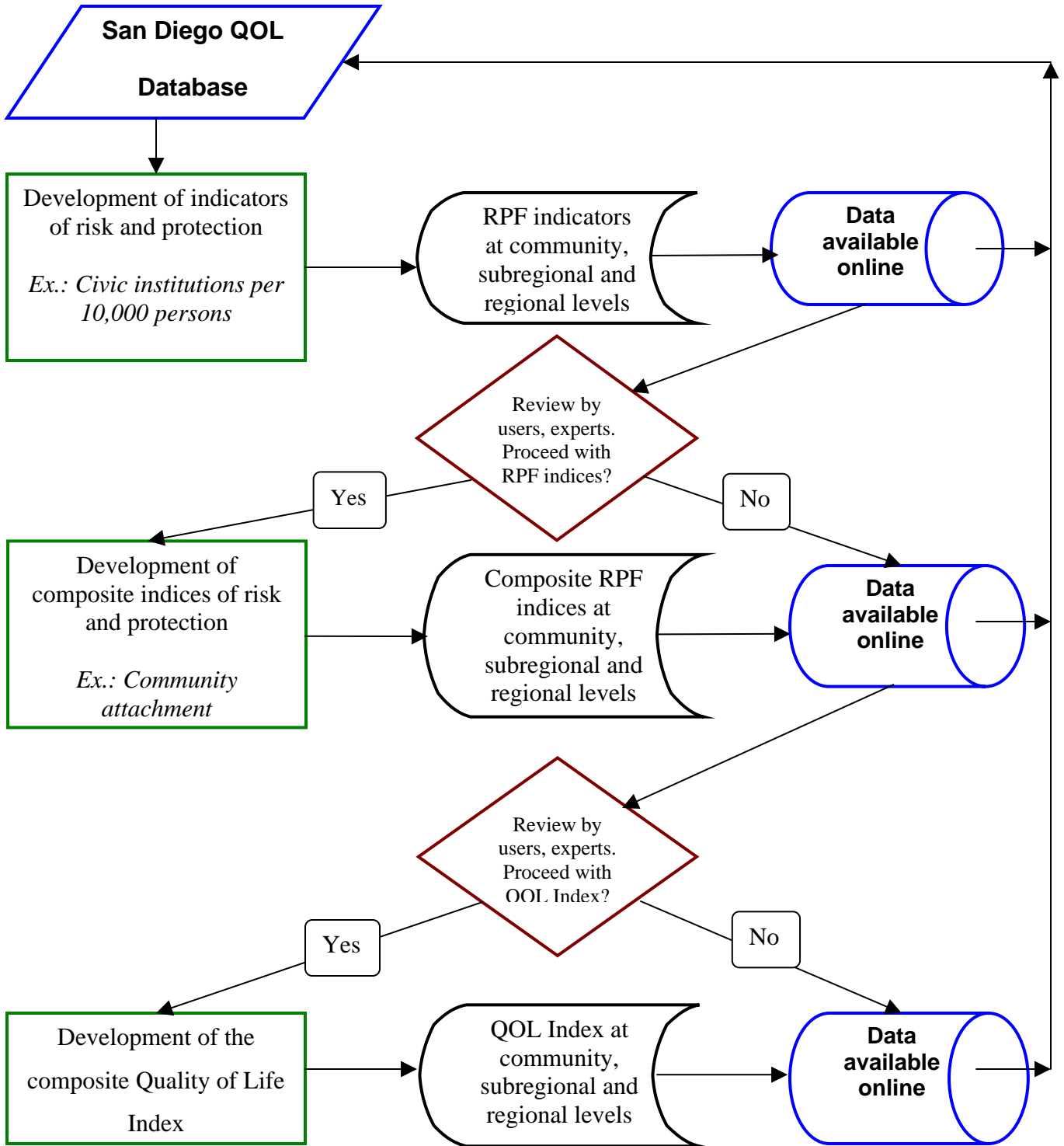


Fig 2. Risk and Protective Factors: Priority Indicators

Legend	INDIVIDUAL				<i>Text in italics</i>	
	Quality of Life Domain	Risk and Protective Factors	Data is in the QOL database	Survey data	Suggested priority variable	
	INDIVIDUAL Indicators of risk and protective factors					
Alienation	Student-committed crimes in elementary schools	Students - crime victims in elementary schools	<i>Death from suicide per 10,000 of children under 18, under 21</i>			
School performance	<i>Percent of 3rd-graders at or above 75th pnr in math</i>	<i>Percent of 3rd-graders at or below 25th pnr in math</i>				
Early initiation of substance use	From surveys where available					
Interactions with antisocial peers	From surveys where available					
<i>Age (12 to 18 years old)</i>	<i>Youth 12 to 18 years old, % of all persons and persons under 21</i>					
PEER GROUP Indicators of risk and protective factors						
Peers' use of substances	Percent of high-school students who used alcohol in the last 30 days	Percent of high-school students who used illicit drugs in the last 30 days	Percent of high-school students who used tobacco in the last 30 days			
Peers' involvement in high-risk behavior	<i>Juvenile arrests per 1,000 juveniles for crimes against property</i>	<i>Juvenile arrests per 1,000 juveniles for vandalism</i>	<i>Juvenile arrests per 1,000 juveniles for alcohol and drug crimes</i>	<i>Juvenile DUI arrests per 1,000 juveniles</i>	<i>Birth rate per 1,000 females ages 10-19</i>	<i>Repeated birth rate per 1,000 females ages 10-19</i>
FAMILY Indicators of risk and protective factors						
Family health, mental and other illnesses	<i>Percent of low-birth weight infants</i>	<i>Percent of infants born without a health insurance</i>				

Family history of substance use and abuse, high risk behavior	Pregnant women per all women 15-44 admitted to drug or alcohol treatment	Persons with children under 18 in alcohol or drug treatment	
Low parental resources and skills	Percent of infants whose mothers received early prenatal care	Percent of children in single-parent households	Number of child care slots available per 100 children under age 13
Lack of mutual attachment and nurturing	From surveys where available		
Family conflict and management problems	Domestic violence calls per 1,000 persons		

SCHOOL

Indicators of risk and protective factors

Commitment to school	Percent of public school students who drop out of grades 9-12			
Academic progress	Percent of 8th-graders at or above 75th pnr in math	Percent of 8th-graders at or below 25th pnr in math	Percent of 10th-graders at or above 75th pnr in math	Percent of 10th-graders at or below 25th pnr in math
Low perceived rewards for school involvement	From surveys where available			

COMMUNITY ENVIRONMENT

Indicators of risk and protective factors

Availability of alcohol	Alcohol outlets per square acre	Alcohol outlets per 1,000 persons	Alcohol outlets near schools (1/4 mile in urban areas; 1/2 in rural areas)	Youth ages 10-20 residing within a walking distance (1/4 mile; 1/2 in rural areas) from an alcohol outlet	Percent of merchants that sell alcohol
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Availability of tobacco	Tobacco outlets per square acre	Tobacco outlets per 1,000 persons	Tobacco outlets near schools (1/4 mile in urban areas; 1/2 in rural areas)	Youth ages 10-20 residing within a walking distance (1/4 mile; 1/2 in rural areas) from a tobacco outlet	Percent of merchants that sell tobacco	
Laws and norms regarding the use of substances	Percent of the area where land use zoning allows alcohol and tobacco sales	Alcohol and tobacco outlets within a walking distance from parks, beaches, playgrounds (1/4 mile)	Alcohol and tobacco outlets within a walking distance from daycare centers, clubs, libraries, churches (1/4 mile)	ATOD treatment centers per 1,000 admissions by place of residence	Persons in ATOD treatment	Voting on ATOD-related propositions
Community disorganization	Violent deaths per 10,000 youth under 21	Persons arrested for ATOD crimes	Rate of drug-related deaths	Rate of alcohol-related deaths	Deaths from AIDS	
Community attachment	Registered voters	Registered voters participating in the latest elections	Actual voting behavior	Percent living in the same house as 5 years ago		
Social and economic deprivation	Percent of persons below poverty level	Percent of public school students in free and reduced-cost lunch programs	Unemployment rate	Percent of people living in overcrowded conditions	Percent of persons 25+ with out a high-school diploma	Infant mortality rate
Availability of recreational activities, opportunities for community involvement	Public park acreage per 10,000 persons	Public library numbers per 10,000 persons	Civic institutions (volunteer, neighborhood, religious organizations) per 10,000 persons			