BEYOND INDICATORS: FROM RISK ASSESSMENT TO PRACTICAL STRATEGIES FOR PROMOTING ADOLESCENT HEALTH AND WELL-BEING

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Abstract

Public health professionals and clinical program directors increasingly need well-defined, measurable, population-based health indicators in order to develop, manage and evaluate physical and mental health programs for adolescents. Recent findings from research on adolescent development and new conceptual models of what it means for adolescents to be healthy can help professionals meet these responsibilities. An ecological and holistic approach to adolescent health provides the strongest context for monitoring and evaluating adolescent health status. Hence, adolescent health assessments increasingly include measures of health and well-being, contextual and behavioral antecedents, and positive behavioral outcomes, in addition to the more traditional indicators of risk, morbidity and mortality. As they work with communities to implement holistic assessments and interventions, professionals often encounter technical and measurement challenges, as well as demands to reduce costs—all of which are somewhat offset by the data management benefits of information technology and problem definition strategies. This Research Brief identifies and reviews six options for professionals and communities to consider in creating adolescent health assessments as the foundation and structure of community mobilization for adolescent health. The options include: 1) adding a small number of questions to a pre-existing survey of adolescent health behavior; 2) linking pre-existing administrative and health databases using individual or geographic identifiers to develop a community-level snapshot of adolescent health; 3) adopting a grass-roots approach with locally developed indicators and benchmarks; 4) engaging experts in youth development and community assessment to consult during the planning and assessment phase; 5) relying on local resources and expertise to develop instruments and interventions; and 6) using a resource such as a (proposed) Resiliency and Protective Factor Modular Evaluation Data Set (RPF-MED). Given the complexities inherent in developing a definitive holistic adolescent health assessment, the authors encourage pragmatic action.

Background: The Importance of Adolescent Health Indicators

Public health professionals increasingly need well-defined, measurable, and population-based indicators of functional and mental health status in order to develop, manage and evaluate health programs for adolescents. In fact, adolescents account for higher proportions of morbidity, mortality and health care costs than any other group of young people aged 1 to 19, with most of the observed adolescent morbidity and mortality due to preventable risk factors[1]. For example, four types of events accounted for 70 percent of deaths reported in 1999 among youth and young adults between 10 and 24 years of age: motor vehicle crashes (31%), other unintentional injuries (12%), homicides (15%) and suicide (12%)[2]. Additional preventable events including unintended pregnancy (890,000 pregnancies among 15 to 19 years olds)[3], and sexually transmitted diseases (about 3 million cases)[4] contribute to adolescent morbidity rates each year. Additional causes of suboptimal health include substance abuse, mental health issues, untreated severe dental conditions, and nutritional disorders. These adolescent health issues demand attention. Clinical service delivery systems have also been under pressure to monitor health status and outcomes as a way to assess the quality of managed care as well as health insurance coverage. Furthermore, increasing numbers of communities are seeking new ways to respond to the academic, social and health needs of youth in order to assure smoother transitions to adulthood.

A convergence of policies, expectations, and technologies in the 1990s focused increased attention on the expansion and improvement of systems for collecting adolescent health indicators:

- Indicators were needed to demonstrate fiscal accountability and quality assurance.
- The explosion in information technology greatly increased data availability and analytic capacity.
- Enhanced information technologies and analytic capacities, in turn, raised policy makers' expectations about data availability and analyses.
- The focus shifted from the limited goals of preventing trauma and other negative outcomes to the more encompassing goals of also promoting health and well-being[5].
- Policy changes, including managed care and welfare reform, reinforced the need for timely and appropriate data to monitor a wider range of positive outcomes.
- Research about adolescent development greatly expanded the understanding of factors influencing adolescent health.
- The limitations of traditional data reports became more obvious because they failed to account for the complex underlying causes of morbidity and mortality.

Within this context, it is clear that to fulfill their policy and planning responsibilities, public health professionals needed an expanded set of scientifically valid, population-based indicators of adolescent health. The set of indicators needed to include a limited number of well-defined measures of functional and mental health status; data on protective characteristics, such as resilience, associated with positive outcomes; data on risk factors associated with negative outcomes; and measures of key contextual antecedents and conditions (family, school and community) that impact health status. Criteria for these needed indicators were developed to insure scientific validity and appropriateness for the range of assessments[6,7].

Figure 1. Criteria for Selecting, Evaluating and Developing New Indicators

1. The indicator is quantifiable (a numerator and denominator are specified). Rates and numbers can be generated.
2. A data source or data collection instrument is identified.
3. Individual level data are preferred to aggregate data (e.g., student vs. school level data).
4. Reliable data are used; items from surveys have been subject to test/re-test reliability measures.
5. Where possible, definitions are comparable to those included in national or state reports or surveys.
6. Data can be disaggregated by age, gender, race/ethnicity, and/or income.
7. Indicators can be linked to geographic identifiers to enable contextual analyses for particular geographic areas (e.g., a particular city or neighborhood).
8. Data on associated risk factors are available.
9. Each indicator or topic area can be linked to related family, school, and/or community measures.
10. Indicators have been validated in populations similar to the one in which they will be applied.
11. Research has shown that new indicators are linked to the health outcomes of interest.
12. Indicators that have been validated in causal models through experimental and/or quasi-experimental research are more useful for policy.
13. Data can be collected and reported in a timely manner.
14. Outcomes are subject to change, given appropriate policies and practices.
15. Trend data for at least five years are, or will be, available.
16. The target audience for the health assessment considers this indicator to be important.
17. The costs of data collection are sustainable.
18. A summary can be developed to present a profile or "tell a story".

There are numerous national indicator reports and adolescent health surveys, such as those in Figure 2, that public and clinical health professionals can consult when planning a local needs assessment or indicator report. These reports document national, regional, and local measures of health status and

can be used to communicate state and/or national health conditions and needs. Indicator reports also help mobilize community attention and support for adolescent health, make it possible to document health trends, and serve to promote increased funding for adolescent health. Ideally, indicator reports make it possible to "tell a story" about adolescent health that can help policy makers and public health professionals focus their work on key public health issues.

Over time, national reports and chartbooks have become more responsive to, and inclusive of, adolescent health issues, as detailed by Oliva (2000). The earliest reports provided little information specific to adolescents[8], while more recent ones included so many indicators that it became difficult for the field to set priorities[9]. In response, CDC worked with a national expert panel to select a subset of 21 Critical Health Objectives[10] for youth that work toward the prevention or reduction of the most common and costly threats to adolescent health: injury, violence, reproductive health risk behaviors, substance use, mental health and suicide, and chronic disease. Adolescent health indicators, presented in widely disseminated national reports, have influenced national and state policy and resource allocation, while community-level "report cards" have used locally collected indicators for similar purposes[11].

Nationally representative, comprehensive reports, surveys and databases, such as those profiled in Figure 2, focus on the health and well-being of youth (or youth as a subgroup of the general population). Recent reports define health more broadly than earlier reports to include, for example, mental health, housing, and food security, in addition to traditional measures of morbidity and mortality, and include more indicators, more subgroups (age groups of 10-14, 15-19, and 20-24; ethnicity, region), more contextual information (e.g., parents' income), and more graphs and explanatory text that make them easier to use. The most recent work is readily available on the web, and often includes interactive tables from which local data profiles can be extracted (see, for example, www.cdc.gov/yrbs). Professionals can draw on these reports in developing their own local adolescent health assessments and community data profiles. As Oliva et al. (2000) reported, however, there are still major challenges and gaps in existing sets of indicators.

Figure 2. Selected Indicator Reports and Nationally Representative Surveys

Trends in the Well-Being of America's Children and Youth 2002[12] presents information on 89 indicators within the domains of population, family, neighborhood; economic security; health conditions and health care; social development and behavioral health, including teen fertility; and education and achievement. Indicators are drawn from more than 20 data sources, including federally collected data, national surveys, and specific studies from peer reviewed journals. Thirteen of the 53 indicators specific to adolescents report positive assets or attributes with trends by age group, race, ethnicity, and gender. (http://aspe.hhs.gov/hsp/02trends/)

America's Children: Key National Indicators of Well-Being 2003[13]**,** contains explanatory material and graphs that show trends, with some showing breakdowns by age, region or race/ethnicity. Many of the indicators are described for all youth under age 18 or other large age groupings, so they are of limited use for those focusing on adolescents. Furthermore, as is true of most federal reports, the focus is on problems and risk behaviors, not on strengths and assets. (http://www.nichd.nih.gov/publications/pubs/childstats/americas03.htm)

1997/98 Health and Health Behavior Among Young People: Health Behavior in School-aged Children: A WHO Cross-National Study International Report[14.] monitors progress toward world-wide adolescent health improvement goals. The report, based on large samples of youth from 28 countries, covers seven domains, including family and peer relations, school environment, socio-economic inequalities, exercise, leisure-time activities, eating habits, dental care, dieting, substance use, and sexual behavior. Each chapter includes a literature review that describes the rationale for the measures and their significance. Statistical analyses include correlations between responses from different domains, for example, relating dietary practices to parents' socio-economic status. The 2001/02 International Report, *Young People's Health in Context: Health Behavior in School-Aged Children*, a WHO collaborative cross-national study (HBSC), will be published on 4th June 2004. (http://www.hbsc.org/news.html)

Child Trends Data Bank provides current data for over 80 child health indicators and over 60 indicators for types of programs and interventions that may influence outcomes for children and teens. Domains include health, social/emotional development, income/assets/work, education and skills, demographics, and family and community. The format is easily accessible, and data can be searched by subgroup, age, and alphabetically. (http://www.childtrendsdatabank.org/)

The **Youth Risk Behavior Survey (YRBS)**[15], explores behavioral risk factors associated with the most important causes of mortality and morbidity in youth and adults. Questions, for a nationally representative sample of youth in 7th, 9th, and 11th grades, survey risk behaviors in four domains: intentional and unintentional injuries; unintended pregnancies and sexually transmitted diseases; tobacco, alcohol, violence and other risk-taking behaviors; and cardiovascular disease (dietary habits and physical activity). (http://www.cdc.gov/HealthyYouth/yrbs/index.htm)

Monitoring the Future (MTF) 2002[16] assesses changing lifestyles, values, and preferences of American youth. Each year since 1980, approximately 50,000 students in 8th, 10th and 12th grade from approximately 420 public and private secondary schools have be en surveyed. In addition, follow-up questionnaires are mailed to a sample of the graduating class for a number of years after their initial participation. The study collects detailed information on tobacco, alcohol and drug use, attitudinal correlates of drug use, positive attitudes, and life experiences, but not related socio-economic status and environmental factors. (http://www.monitoringthefuture.org/)

The National Longitudinal Study of Adolescent Health (Add Health)[17] has two components: a school-based survey of adolescents and an in-home survey of adolescents and their parents. The school-based survey of a representative sample of youth in grades 7-12 includes questions about health-related behaviors. The in-home survey over-samples particular subgroups of these youth. Add Health is based on ecological theory, that is, that families, friends, schools, and communities influence health choices. Surveys are linked to data from pre-existing neighborhood and community databases to enable such analyses. (http://www.cpc.unc.edu/projects/addhealth/)

Kids Count, a project of the Annie E. Casey Foundation, produces annual reports with benchmarks of child well-being and a web-based interactive data base for national and state-by-state evidence of the status of children in the U.S. The reports and indicators are designed to enrich local, state, and national discussions to secure better futures for all children. (http://www.aecf.org/kidscount /)

The Child Well-Being Index is an evidence-based measure of trends over time in the quality of life or well-being of America's children and young people. The summary indices give a sense of the overall direction of change (improvement or deterioration) in the well-being of America's children and youths, as compared to two base years of the indicators, 1975 and 1985. (http://www.soc.duke.edu/resources/child_wellbeing/)

Strengths, Limitations and Gaps in Existing Indicator Reports and Surveys

Recent national indicator reports incorporate a broader view of child and adolescent health and well-being than earlier reports, including more than the traditional indicators of morbidity and mortality. All reports present trends, such as socio-economic status of children and their families, educational achievement, and risk-taking behaviors, and discuss the rationale for choosing specific indicators. More recent reports include correlations between health outcomes, gender, race/ethnicity, and, in one report, socioeconomic status (SES). With the exception of WHO, Add Health, and Kids Count, however, the reports focus on individual risks in isolation from family and community context. Add Health is the only nationally representative data set with measures that make contextual analysis possible. Despite their strengths there are challenges in using the national indicator reports for adolescent health promotion, challenges that are related to contexts, definitions, comparability, level of collection, and gaps and omissions.

Contextual analysis. Despite the presentation of large numbers of contextual variables and health status measures, recent indicator reports do not typically explore the implications of relationships between sets of indicators. For example, US reports do not present health indicators in multi-dimensional context, such as by household type, poverty, and/or immigrant status. In contrast, although the WHO report includes fewer indicators, it provides more intensive contextual analysis.

Inconsistent definitions. Definitions of indicators for new and non-traditional aspects of health status, such as dietary habits, levels of physical activity, reported health status or symptoms, or measures of positive youth development and family strengths, tend to be inconsistent. More coordination among researchers during the design phase would facilitate comparisons of health status across different samples of adolescents. National efforts are underway to select domains and coordinate indicators and measures, an effort that will be of significant help to health professionals and researchers[18].

Non-comparability of samples. Another challenge in using the national indicator reports is that samples for which the data are reported are often not comparable. For example, national indicator reports that are compiled from many administrative sources typically include *all* incidents of the selected indicators for the population, while surveys, such as YRBS, MTF, WHO and Add Health, *sample* respondents from the relevant populations. Professionals must be aware of limitations imposed by the type of sample and data collection method when selecting reports for comparison to their local health profiles.

Appropriate levels for collecting each type of indicator. To avoid costly duplication of effort and to ensure that data are collected at the optimum level, federal, state, and local government representatives need to be involved in the discussions and allocations of data elements to surveys and data collection profiles. The respective roles of community members, providers, program managers, and

researchers must also be considered so that datasets can be structured for use in program development and management at multiple levels, including local, state, and federal levels. That makes it possible to use the indicators and data collection as a basis for assessing trends as well as the impact of new interventions and/or changes in funding allocations.

Gaps and omissions. Gaps in the data sets and indicator reports impose additional challenges. Data on demographics, family structure, neighborhood characteristics and economic security for adolescents are still limited, and typically cannot be correlated with health status and well-being. In addition,

- Summaries primarily discuss the epidemiology of the outcome and focus on negative messages;
- Sample sizes limit the number of racial/ethnic groups, states and local jurisdictions available for analysis; and
- Qualitative data and the analytic narratives that put the statistics in context are rarely included.

As a result, public health professionals often cannot use the numbers to tell the story to explain alternatives for policy makers. Even more troubling, the numbers may mask problems because the data do not tell the whole story. However, communities can use a problem analysis diagram (see Figure 3) to begin to define and clarify pathways from antecedents to outcomes.

Problem Analysis

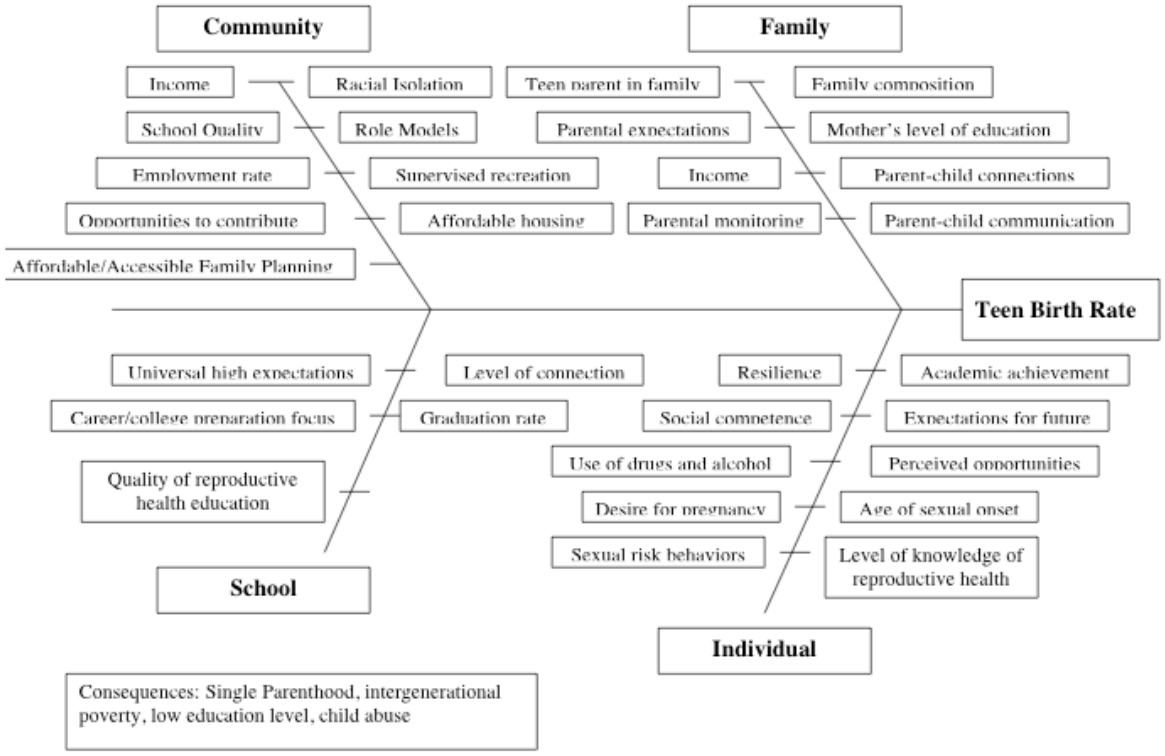
Problem analysis can help communities determine appropriate, effective intervention points that address outcomes sharing a common set of underlying antecedents. By reviewing indicator reports and the research literature related to particular indicators, communities can identify either causally related or strongly associated antecedent factors that might provide targets for adolescent health interventions. Communities should expect to collect and use data from many sources to create their problem analysis diagram. A useful reference for developing a problem analysis diagram (fish bone diagram) and for understanding how a problem analysis diagram can contribute to and strengthen the organization and management of health promotion or clinic activities can be found at http://erc.msh.org/quality/indes.cfm.

The sample problem analysis, pertaining to the issue of teenage pregnancy prevention, includes selected factors, specific to individuals, family, school, and community, that are associated with the occurrence of teen pregnancy or one of its precursors[19]. The problem analysis helps to clarify linear relationships among risk, protective, and causal factors and the possible pathways through which positive or negative outcomes are realized. The relationships and direction of associations between factors can be indicated with arrows in a diagram or model.

Communities need to review and analyze data for the majority of these factors in order to

understand the nature of local teen pregnancy issues. An indicator framework that presents adolescents within a multi-dimensional context should include the traditional domains of physical and mental health, safety, education, behavior and economic security, but with added contextual domains, the individual, and his or her family, school and community. Problem analysis can help communities move away from one-dimensional prevention efforts toward more holistic approaches linked with outcomes that share a common set of underlying antecedents.

Figure 3. Problem Analysis Diagram: Adolescent Pregnancy



Toward a More Holistic and Ecological Assessment

In an effort to obtain the greatest possible value from limited resources for adolescent health, policy makers, health care professionals, advocates and communities have been working to optimize data collection strategies. A major goal is to identify a single set of health indicators that meet a wide range of needs, including monitoring, assessment, and program evaluation. This effort has led health professionals and researchers to identify conceptual models that support a comprehensive, balanced approach to measurement and monitoring, and that can be used to mobilize communities to improve the health status of young people. The challenge in achieving this goal is reflected in the wide range of new approaches and data sources, among them the Index of Child Well-being[20], Child Trends (www.childtrends.org) for papers and briefs on this topic, Child Trends DataBank for specific data and indicators (www.childtrendsdatabank.org), and Kids Count (www.aecf.org/kidscount).

National data collection efforts have begun to incorporate measures of youths' perceived social supports, positive role models, and positive behaviors, as well as risk behaviors. Fundamentally, this shift in philosophy to a more highly contextualized analysis will influence the types of interventions that are selected to promote adolescent health. If we see youth as competent individuals and community assets, the approaches we take are likely to be more supportive and positive. Focusing on strengths and healthy development points to the need to ensure access to services and opportunities for all youth to thrive. This approach turns our attention to creating supportive environments, and calls for data collection that focuses on adolescents' strengths and assets, as well as their problem status. It also recognizes that adolescents need socially supportive communities and positive role models in order to develop positive, socially responsible behavior. For example, as they attempt to strengthen parent-child connections, enhance resiliency, and build on the assets of young people, communities need to be able to document improvements in general functioning, health, and overall well-being.

In their review and assessment of seven representative surveys and their constituent measures that the field uses to capture the "multiple processes"[21] through which adolescents develop their individual skills and behaviors, Cagampang, Brindis and Oliva[22] found considerable agreement about essential domains, but less agreement about measures. Each of the surveys measures positive youth development at the community (opportunities and supports) and the individual level (individual skills).

Figure 4. Seven Surveys that Assess Adolescent Health

Mobilizing Communities to Promote Adolescent Health

- *Profiles of Student Life: Attitudes and Behavior Survey* (PSL-AB, Search Institute, 1999). PSL-AB focuses on assets, resiliency, and community support. Search Institute pioneered the use of positive youth development in adolescent health assessment and in the use of assessment tools to mobilize community action. (www.search-institute.org)
- *Communities That Care Youth Survey* (CTC, Developmental Research Associates, Inc., 1993). CTC emphasizes comprehensiveness, measurement accuracy and scientific validity in assessing health risk behaviors; community, family and peer norms; and attitudes toward health risk behaviors as a basis for mobilizing community action. (http://www.channing-bete.com/positiveyouth/pages/CTC/CTC.html)
- *Community Change for Youth Development Survey* (CCYD, Connell, Gambone, and Smith, 1999). This survey is particularly appropriate for older teens. CCYD's focus on the importance of behavior change as the desired outcome, and on community involvement, institutional change, and work as positive youth development strategies provide a grounded approach to assessment and community mobilization.

Monitoring Adolescent Health

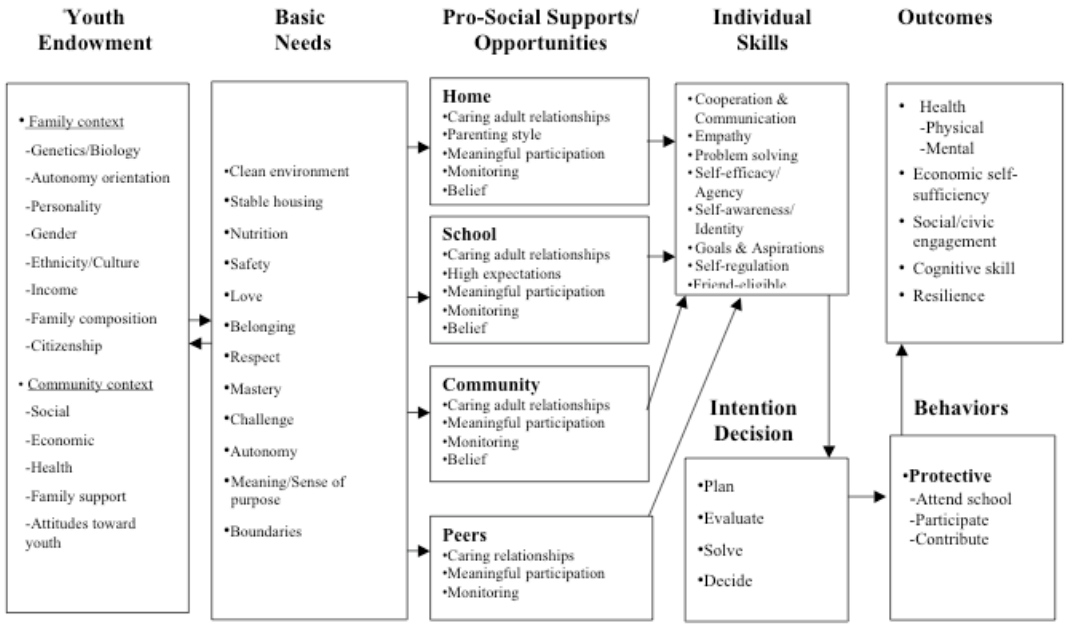
- *Youth Risk Behavior Survey* (YRBS, Centers for Disease Control, 2001). YRBS assesses a wider range of health risk behaviors, though in less detail, than CTC. YRBS conducts a bi-annual risk assessment for a representative sample of U.S. youth, but has yet to include family contextual variables and measures of positive adolescent health. YRBS would have increased value for adolescent health promotion if it also included questions from these domains. (http://www.cdc.gov/HealthyYouth/yrbs/questionnaire.htm)
- *California Healthy Kids Survey: Resiliency Module* (CHKS/HKRM, California Department of Education, 1998). CHKS/HKRM is breaking new ground in the assessment of positive youth development. CHKS/HKRM survey large and culturally diverse samples of California youth to measure a wide range of risk behaviors and students' protective factors (perceptions of support, external assets) and resilience (internal assets). It also includes the Add Health school connectedness scale. Contextual analyses include relationships between school environment and/or protective factors, and risk behaviors and/or academic performance. (http://www.wested.org/pub/docs/chks_surveys_summary.html)

Conducting Research

- *Youth and Family Project Survey* (YFPS, Barber, 1994). Barber's re-examination of the health effects of parents' approach to monitoring and regulating children's behavior has had both national and international influence. The additional elements of his model—connection, opportunity, autonomy, and belief—hold much promise for an international system of adolescent health indicators that include youth development measures. While the YFPS was not designed to monitor adolescent health, its value as a research instrument would be enhanced by a larger and more nuanced set of positive measures of adolescent health and well-being.
- *The National Longitudinal Study of Adolescent Health (AddHealth, Udry et al., 1997).* Add Health serves as a beacon, because of its scale and scientific quality, use of data from multiple independent sources, longitudinal design, causal models, and sheer scope of the effort. It would be strengthened by including additional questions to measure youth development and positive health outcomes. (http://www.cpc.unc.edu/projects/addhealth/codebooks)

Drawing on these surveys and comprehensive reviews of the youth development literature,[23] the authors propose a model that synthesized the adolescent health continuum. As shown in Figure 5, the model includes a structural level composed of youth endowment and basic needs; a process level that documents pro-social supports and opportunities (external and internal assets); and outcomes that include individual skills, intention/decision, behaviors, and long term outcomes.

Figure 5. Youth Development Framework: Indicators*



* Protective Factors Shown – Risk Factors the Inverse

New Domains, Indicators and Analysis

A consensus is emerging about the areas (domains) to be included in datasets used to document adolescent health and well-being. The remaining challenge is to develop widely accepted, scientifically validated measures, for example, of adolescents' sense of connection to meaningful adults, peers, and school; parenting style (e.g., warm, nurturing, clear expectations and consequences, monitoring); and school quality. Further, relationships among these types of measures, reductions in risk taking behaviors and improvements in health status (including academic success) need to be better developed.

Yet, how can communities decide which strategies are needed to address health needs, and how can they prioritize their work within available fiscal and human resources? In reality, they must build on what research has clearly shown: risk behaviors tend to cluster. That is, engaging in one risk is often

associated with other negative outcomes. For example, adolescents who drink alcohol are more likely to drive under the influence, have unprotected sex, use illicit substances, and/or engage in other unsafe and violent behaviors. In addition to focusing on a specific issue, such as alcohol use, communities need indicators that can account for the multiple dimensions and connections among health risk behaviors. Furthermore, the focus on eliminating risk behaviors limits the definition of health to the absence of problems, when in fact experts now agree that health and well-being are highly interrelated. If that is true, then documentation of assets and protective factors, such as connection to supportive and pro-social adults, needs to be at the center of data collection and monitoring efforts.

Examples: Context Matters

Individual identifiers: California birth data from vital statistics have been linked with hospital discharge and Medicaid data to explore the characteristics of teenage mothers, an important step beyond relying solely on vital statistics for evidence of their health status.

Geographic identifiers: Linking census-based housing information, community SES level, and school-level data with individual-level indicators, has revealed important connections between living in low-income communities and health outcomes such as low birth weight, asthma and higher mortality rates. Community level data from schools, social service agencies, local surveys, police departments, recreational agencies, etc., can be geographically layered to provide contextual evidence of factors that shape adolescents' health status.

Participation in programs designed to promote pro-social supports and opportunities enhances the entire range of individual skills that characterize youth development. For example, of interventions in Catalano's review of 25 well-evaluated programs, at least 20 addressed self-efficacy, pro-social norms, and social, emotional, moral, cognitive, and behavioral competencies. Eleven emphasized clear positive identity and resiliency. There was much less agreement, however, on how to measure these constructs. With the exception of substance abuse (measured by 12 of the 25 programs), none of the outcomes was measured by more than eight of 25 programs, and no program measured more than 11 outcomes. Perhaps the range and selectivity of outcomes reflects the categorical nature of many funding sources, but it does make it difficult to understand and empirically test a holistic picture of youth development.

Sources of social capital indicators (measures of familial and community contextual factors and resources that shape external assets and opportunities available to youth) include administrative data from the educational system (e.g., college enrollment and attendance rates); health measures of outcomes and behaviors (e.g., vital statistics, health surveillance, social service data, crime data), and physical health (e.g., death certificates, hospital discharge data, emergency room data). Among the social context domains that influence youth development, administrative data are strongest in the domains of safety, social norms, and opportunities for skill-building.

Risk behaviors are often reported, but not evaluated in a larger context that includes attitudes and behaviors that are associated with or contribute to them. Although there appears to be strong consensus in measuring and monitoring such health behaviors as tobacco, alcohol, and drug use, sexual behavior, and injury, little has been done to strengthen our analyses of these areas. Thus, beyond the "tip of the iceberg" set of indicators that receive a great share of public attention, much remains to be done to refine the set of antecedent and contextual factors that impact the indicators being measured.

Despite a fairly comprehensive analytical record, then, it is difficult to identify the behavioral pathways clearly enough for action, as the following questions suggest.

- Given the large number of indicators for a wide variety of adolescent health problems, and the fact that some may cluster across and within the behaviors, which antecedent factors are amenable to individual, family, and community levels of intervention?
- What are the underlying mechanisms of the observed behaviors? Which of these antecedent factors should be targeted first? And which should be targeted subsequently?
- What level of effort is needed at each leverage point? Are the antecedent factors similar across gender, ethnic/racial, and developmental ages?
- If not, how do communities prioritize among the factors in shaping their strategies?

Technical and Measurement Challenges

As they work with communities to promote adolescent health, professionals encounter a range of technical and measurement challenges, as listed below.

- The adolescent health profile should include data from several sources, in order to sidestep problems such as potential biases inherent in any one type of data collection strategy. At the same time, this raises a number of other concerns, including limitations or inconsistencies in measurement and timeliness.
- This use of triangulation (collection of data about a particular domain/concept from three or more sources) by collecting data that represents several sources or perspectives helps to identify consistencies and inconsistencies in data.
- Layering data from different sources within specific communities or geographic areas (using common geographic codes) enables the linking of individual, social and community contextual factors to create multi-layered descriptions of adolescents' health status across neighborhoods.
- When the adolescent is furnishing the information, how do we reliably assess the family's SES? What are the most effective ways to measure risk-taking behavior? How accurately can

adolescents recall behaviors over their lifetime? Over a year, six months, or one month? How honestly can they respond to questions that create cognitive dissonance?

- How can representative and adequately large samples of urban and ethnic minority youth be obtained?
- How can time lags be reduced between data collection and release?
- How can analysts avoid attributing dramatic changes in the number of cases, such as for chlamydia, when the increased incidence is actually due to greater sensitivity of tests to identify previously undetected cases?
- How can consensus be achieved on a parsimonious set of indicators (level of resiliency, assets, strengths, and other aspects of youth development), and how can their relationships to health protective factors be established? And who should be at the table when those decisions are made?
- How can data be collected on all adolescents, including those encountered in school settings, out-of-school youth, as well as homeless, incarcerated, or other marginalized youth who may be especially at risk?
- Given the difficulty of obtaining parental consent for adolescents to participate in surveys that include risk-related topics, how representative are school-based samples of the total adolescent population?

Often community groups do not have sufficient resources to develop scientifically valid surveys or to collect data from multiple sources on their own. They may not know how to obtain comparison groups or to use a simulated comparison group, or how to conduct the analyses in order to set adolescent health priorities and select interventions. Obtaining sufficient data at the appropriate geographic unit of analysis can also be challenging.

Excessive length and cost of survey data collection, compromised confidentiality, and federal regulations affecting access to personal health data may also be problematic. In spite of these challenges, there are established ways to deal with these threats to confidentiality. For instance, a third party can match the data files and then strip the elements used to match the files before sending the data on to the researcher for analysis. Sample sizes need to be adequately large and representative of residents in the targeted geographical areas in order to preserve confidentiality. As experts debate which elements to integrate, assurance is necessary that the indicators selected are scientifically valid, that the data elements measuring the indicator or its proxy are feasible to collect in a variety of settings and over consistently long periods of time, and that these can be linked to a broad array of antecedent factors, as well as community indicators.

Rewards for developing comprehensive community level data are substantial, as the example in the field of substance abuse demonstrates, because many health risk behaviors have common antecedents, and by addressing the antecedents, a larger range of negative health behaviors can also be potentially addressed.

Lessons Learned in the Area of Substance Abuse

The Robert Wood Johnson Foundation's publication, *Substance Abuse: The Nation's Number One Health Problem: Key Indicators for Policy* (Schneider Institute for Health Policy at Brandeis University, 2001), includes an analysis of short- and long-term trends in tobacco, alcohol and illicit drug use. Based upon 30 years of data, the researchers conclude that substance abuse causes more deaths, illnesses, and disabilities than any other preventable health problem today, and that there is a significant gap between what is known about prevention and treatment and what is actually implemented. The Chartbook identifies a number of factors that influence trends in substance abuse, including early use, media depictions of use and abuse, and prevalence and use of treatment services. It also discusses the economic implications of substance abuse; the relationship between substance abuse and education, income, and gender; and the role of regulatory strategies to reduce tobacco use and alcohol abuse. The Foundation has also created an online substance abuse resource center (http://substanceabuse.rwjf.org) that consolidates a wealth of data and reports from the Foundation, grantees, and other sources about the abuse of alcohol, tobacco, and illicit drugs and efforts to prevent harm from their use. Communities can use this resource as a starting point to consider options they wish to explore in responding to the issue of substance abuse.

Six Options for Community Action

After sketching a problem analysis diagram or using another approach to organize an adolescent health needs assessment, professionals and communities can consider six options as they plan a more formal assessment as a basis for mobilizing resources for adolescent health. They can: 1) add a small number of well-validated questions to a pre-existing survey of adolescent health behavior; 2) link pre-existing administrative and health databases using individual or geographic identifiers to develop a community-level snapshot of adolescent health at a moment in time; 3) adopt a grass-roots based approach, such as *Results-Based Accountability* (Friedman 1996); 4) engage youth development and community assessment experts to consult during the planning and assessment phase; 5) rely on local resources and expertise; and/or 6) use a resource such as a (proposed) Resiliency and Protective Factor Modular Evaluation Data Set (RPF-MED) to guide the assessment and promotion. With any of these options they should collect longitudinal data in order to magnify the value of their work.

1. Add questions to a pre-existing survey

The easiest approach to constructing a more comprehensive profile is to integrate a discrete and well-defined set of questions on context and assets into an existing data collection instrument. For example, YRBS contains extensive measures of health risk behaviors, but almost nothing about protective factors. Communities can add a small number of questions on antecedents or positive health

behaviors to begin to build a more comprehensive profile. For example, the states of Alaska and Colorado have incorporated items from the Search Institute as part of their biannual YRBS. CDC is also exploring the inclusion of more asset-based elements in their survey. Program evaluators can also include risk behavior questions on participant surveys in order to establish local comparability with national data.

There is a growing need for the collection of national cross-sectional data on youth, collected and linked at the individual level that incorporates both the data collected through the YRBS and questions that measure assets, strengths and context. California has incorporated internal and external assets on its version of the YRBS (The California Healthy Kids Survey) in order to link supportive school and family-school activities with school-wide levels of student risk behaviors and academic performance (from statewide achievement tests aggregated at the school level). A similar approach would enable a larger number of communities to assess trends and initiatives. Longitudinal assessments of academic performance have been initiated in some states and regions in order to comply with the measurement-based Federal initiative, No Child Left Behind. Linking those with resilience and risk measures would help to identify more effective health promotion strategies. In view of the potential survey burdens, states could select representative sub-samples of schools to monitor.

As we learn more from using these more comprehensive data collection instruments about the factors and relationships that motivate positive behaviors and reduce negative behaviors, there will be a greater likelihood of changing the behaviors of both early adopters (leaders in the adoption of innovations) and the majority who change their preferences and behaviors more slowly.

2. Use individual and/or group identifiers to develop a community level snapshot

Data collected from various levels (state, county, city, neighborhood) that include geographic identifiers can be combined into one set that is useful for local program planners or evaluators. Others may be linked using individual identifiers. Linking pre-existing data sets with locally collected data can substantially reduce local costs of administering and analyzing surveys, while reducing burdens for both respondents and administrators.

Another option would be to link regional results from national data sets from two or more domains, such as the health-focused YRBS and the education-focused National Assessment of Educational Progress (NAEP) to provide a context for understanding local health and education data. Linking the three types of data would also diminish the artificial divide that the public perceives between health and education resources and outcomes.

State level results can also serve as a comparison point, or benchmark for local results that are developed through a data profile or problem diagram. The website, http://www.greatvalley.org/publications/indicators.aspx, has links to publications that California's Great Central Valley Center has developed to aggregate and update indicators from an exceptionally

wide range of sources into a comprehensive, contextualized, multi-volume regional profile. For example, its publication, *Assessing the Region via Indicators: Education and Youth Preparedness*[24] presents and interprets four major categories of indicators: family and home life, economic stability, education, and health. Each indicator is presented in numbers and charts for the whole region, for sub-regions and for counties. The indicators are each defined and interpreted in context by asking: "why is this important?" and "how are we doing?" Where they are available, data are presented by ethnic group and immigration status. These documents provide a strong starting point for adolescent health promotion in the Great Central Valley, the most economically underserved region of the state, and provide a model for how compilation of comprehensive indicators can provide a foundation and context for adolescent development initiatives.

Another California example, the California Healthy Kids Survey (CHKS), is conducted statewide and district level analyses at the school level links health behaviors from the CHKS with measures of internal (personal) and external (contextual) assets as well as educational outcomes[25]. CHKS analysis found a strong positive relationship between test performance and the percentage of youth who ate breakfast the day of the examination and an inverse relationship between the use of alcohol and other drugs on campus and academic performance. They also reported a very strong, positive, step-wise relationship between students' perceptions of school safety with school-level academic performance. Finally, school-level academic performance was positively related to the percentage of students who experienced high levels of environmental assets, including caring relationships, high expectations, and opportunities for meaningful participation at school. All three of these assets were also positively associated with lower levels of involvement in risk behaviors, and high levels of positive youth development.

3. Adopt a grass-roots approach

Mark Friedman of the Fiscal Policy Center, Washington, D.C. has developed a grass-roots strategy, *Results-Based Accountability,*[26] to help communities organize themselves to promote effective health improvement strategies. Among others, Alaska, California, Georgia, Maryland, and Vermont, have used this approach to improve the health of children and youth. *Results-Based Accountability* creates a process through which interdisciplinary and interagency groups work at the community level to learn a specific vocabulary and stepwise approach to collaboration. The group uses non-technical language to describe what the community wants and expects as a result of their efforts. For example, results or outcomes are defined as a condition of well-being, such as, "all teens will be healthy." Five quantitative indicators, such as the area's teen birth rate, insurance coverage rates, participation in exercise and nutrition programs, etc., support each result. Participating agencies then develop programs targeting the indicators and monitor their progress with a related set of performance measures. This framework does not require an *a priori* definition of domains or

categories, nor does it require age, cultural or racial balance, because it assumes that the group, in its wisdom, will select an appropriate set of indicators.

The "headline" indicator, one that could be reported on the front page of a newspaper, has to be expressed as a summary measure, such as the rate per 1,000 births to teens aged 15-19, and has to have at least five years of trend data. Community groups are also encouraged to identify other relevant information about the indicator that can be used to present the "story behind the indicator." Individual surveys of youth can be incorporated into the process in order to increase the focus on adolescents' assets. However, there is no specific requirement for the story content, nor is there an effort to present both an assets and resiliency model, along with the indicator data.

Results-Based Accountability uses a simple and clear planning approach that policy makers and the public can easily understand; the linkage between performance measures and budgetary outcomes captures the attention of stakeholders and policy makers.

4. Engage outside experts

Communities can turn to consultants who specialize in helping communities to organize appropriate adolescent health interventions and evaluations. Communities may wish to receive external technical assistance from consultants such as the Search Institute, Developmental Health Associates, Public/Private Ventures, the Forum for Youth Investment, Mark Friedman, or others experienced in doing this work. Local consultants can be identified and assessed by talking with others engaged in the community networks. Before selecting their consultants, communities need to consider what they hope to accomplish and review the progress consultants have been able to make in comparable communities. The Problem Analysis Diagram provides an effective initial planning strategy. Communities are likely to benefit from the process when they are able to identify available resources and focus realistically on a set of key indicators where interventions promise to be most effective. Once communities have worked to identify the focus of their initiative, they can use web-based data banks provided by professional organizations, such as the American Evaluation Association (www.eval.org) or The American Public Health Association (www.apha.org), to connect with consultants that meet their needs.

5. Local resources and expertise

Public health departments, colleges and universities, and local non-profit organizations are good starting points to identify health planners with the skills to lead or contribute to a community-wide adolescent health assessment and development effort. People in these organizations are well equipped by virtue of their training and organizational resources to undertake such an effort. Experienced community health promoters and developers report that collaborative approaches are likely to be the most effective, and are typically a precondition for effective action. For detailed, accessible guidance, new managers and organizers might consult "The Guide to Managing for Quality", a web-based resource

developed by UNICEF and Management Sciences for Health (http://erc.msh.org/quality/index.cfm). This resource provides techniques and guidance to help groups focus on the needs and experiences of potential participants in order to develop responsive and effective ways to accomplish program goals. It also shows how all who are involved in program development can contribute their insights and expertise to meet the needs of adolescents in their community. The strategy is iterative so it can be used for evidence-based planning, staff development, problem solving, and evaluation.

Many communities begin by creating a data profile. The problem diagram provides a deeper level of analysis, by linking indicators that comprise a structural system. Hence, the data profile and the problem diagram together identify resources, priorities, and can help select effective interventions and build public commitment. In the process of creating data profiles and problem diagrams, individuals build the knowledge and experience they need to become community leaders, better equipped to encourage policy makers to take action on the community's priorities. With their knowledge of strategies and of the community, leaders will be better prepared to select effective interventions. Finally, the plan can mobilize community resources and engage political leadership.

Fundamentally, monitoring indicators is an iterative process: after communities demonstrate relationships between assets/strengths and reductions in risk-taking behaviors to their own satisfaction, they can test alternative approaches to strengthening adolescent health and well-being more globally.

6. Create a Resiliency and Protective Factors Modular Evaluation Data Set (RPF-MED)

This review describes the scope of the challenges associated with developing and/or assembling a comprehensive set of well-validated health indicators to account for all the elements in an ecological model of adolescent health. The challenges reinforce the value of developing and promulgating a Resiliency and Protective Factors Modular Evaluation Data Set (RPF-MED). This ready resource would enable communities to avoid duplicating development costs, meanwhile side stepping challenges associated with creating new sets of indicators.

A RPF-MED should be assembled from the kinds of indicators and related measures that have been discussed in this paper. They should be organized in modules with domains including the following:

- Community and family context (supportive and caring environment);
- Developmental opportunities (support for building resilience, high expectations for achievement and social competence, opportunities for community service);
- Adult supervision and monitoring (disciplinary style at home and in the community, support for developing a sense of psychological autonomy); and
- Outcomes that include positive as well as risk behaviors.

This modular structure should have indicators that help to measure: young people's need for a

safe and structured environment; their sense of belonging and membership in their family and community; their sense of independence and control over their life; and growing mastery, self-confidence and competence from participating in increasingly challenging experiences. Thus, RPF-MED should contain a series of questions to measure assets and resiliency in target populations, access to resources, and behavioral outcomes.

Once such a modular system is in place, communities can choose which protective indicators to include as part of their community youth assessment, linking for example, to the Youth Risk Behavior Survey (YRBS) or the California Healthy Kids Survey (CHKS). Communities could select validated measures from different domains to measure the strengths and assets of their adolescent populations. Additional sources include Child Trends (www.childrends.org) and the Institute of Medicine's publication, Helping Communities Promote Youth Development[27]. The RPF-MED would also incorporate a guide for how to select appropriate survey items and to plan for the amount of time available to gather the data.

In Conclusion: Realism AND Action Are Required

Given the complexities inherent in developing and implementing a definitive holistic adolescent health assessment, the authors encourage realism as well as action. Regardless of their approach, communities need to be realistic, as well as ambitious when they decide to promote adolescent health.

What is clear from this review of the research is that health status is responsive and cumulative: youth who experience greater levels of familial and community support are much more likely to have better current health and academic performance. They also tend to be healthier over the long term[28]. Experience with this approach has shown that by focusing assessments on positive and desirable behaviors, health professionals and policy makers instigate an increasing spiral of positive and desirable behaviors. In contrast, focusing solely on negative outcomes can, at best, document a reduction in problem behaviors, and is likely to do so only for the specific measured behaviors. In the end, the challenge for public health professionals is to work together to achieve consensus on a common conceptual model and definition of healthy adolescence and to work with others to adopt a common approach for collecting data for purposes of monitoring, planning, decision-making, and evaluation.

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