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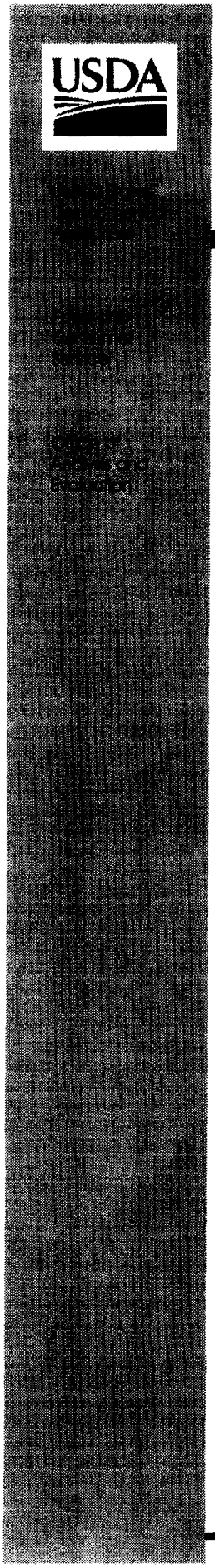

Charting the Course for Evaluation:

How Do We Measure the Success of Nutrition Education and Promotion in Food Assistance Programs?

Summary of Proceedings

February 28, 1997

CHARTING THE COURSE FOR EVALUATION:

HOW DO WE MEASURE THE SUCCESS OF NUTRITION EDUCATION AND PROMOTION IN FOOD ASSISTANCE PROGRAMS?

Summary of Proceedings

February 28, 1997

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This document was prepared under Contract Number 53-31984-035 between the Department of Agriculture and KRA Corporation of Silver Spring, Maryland. The contents of this document do not necessarily reflect the views or policies of the Department, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

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BACKGROUND

"Charting the Course for Evaluation: How Do We Measure the Success of Nutrition Education and Promotion in Food Assistance Programs?" brought together nutrition educators, traditional evaluators, market researchers, and experts at evaluation of health promotion efforts to establish a dialogue to identify and push forward the state of the art in evaluating nutrition education and promotion efforts. The conference took place on July 13 and 14, 1995 in Arlington, Virginia.

As the Food and Consumer Service (FCS) began to focus on integrating nutrition education into all its food assistance programs, it became clear that the FCS needed to be able to measure the effectiveness of such programs to ensure that limited resources were spent wisely. The agency also was looking for mechanisms to identify what program components worked best, under what circumstances, and at what cost. The goal was to assist everyone at the program delivery level to provide the best, most cost-effective nutrition programs possible.

To address these issues, the Food and Consumer Service assembled people with experience to provide their perspective evaluating a broad range of nutrition education, health promotion, and social marketing programs. This report shares what was learned at the conference by summarizing the major conference themes and presenting a synopsis of each session. The conference was divided into three sections:

1. **A retrospective look at what traditionally has been measured and how it has been measured in nutrition education programs**
2. **A look at state-of-the-art theories and methods for selecting evaluation techniques**
3. **Some lessons learned from ongoing and past programs**

Full transcripts of the conference can be obtained by contacting:

USDA Food and Consumer Service
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OVERVIEW OF MAJOR THEMES

Designing and implementing nutrition education in nonclinical settings differs radically from conducting clinical research. Yet the speakers made convincing arguments that the experimental designs used for clinical science often guide expectations for what nutrition education programs can accomplish and how they should be evaluated. Their ideas about developing and evaluating behavior-focused nutrition education programs using models appropriate for population settings are summarized below.

1. Set appropriate objectives and manage expectations.

Nutrition education usually involves trying to change complex behaviors. Nutrition educators need to think through the type of intervention they will be doing before they set objectives. As one speaker noted, "the effect size for clinical interventions is large and hopefully fast. In a public health intervention, it's small, and at best, it's gradual."

Yet nutrition educators (and other health promotion practitioners) often set themselves up to fail by setting objectives for public health interventions that require large changes in behavior very quickly. In contrast, private sector marketers—who operate in the same environment as pubic health interventions—declare success with much smaller changes than health educators expect to make. A private-sector objective might be increasing sales by 2 or 3 percent, compared to a public-health objective of cutting the smoking rate in half. Furthermore, private sector marketers target consumers predisposed to their product, but nutrition educators are often working with those segments of the population that are least interested in making the change.

Public sector nutrition and health educators must guard against supervisors or funding agencies that expect to see change on a fiscal year basis; most of the successful health promotion efforts, such as decreasing stroke mortality and smoking, have measured change in decades, not years. Educators must make sure that expectations and objectives are appropriate for community-based programs directed at thousands of people, not clinical research looking at 60 subjects. Educators must also ensure that change is measured using evaluation models that are appropriate for their programs.

2. Define meaningful, measurable outcomes.

Often the outcomes selected for nutrition education programs are too global to meaningfully measure a program's effect, or to be measured with any accuracy. The science of measuring dietary change is relatively in its infancy. Most of the research on measuring diet has been epidemiological (particularly the relationship between diet and health outcomes), nutritional science (i.e., the relationship between diet and underlying biological mechanisms), and public health (broad-scale trends in large populations). Currently, a wide range of measures is used to evaluate dietary change, illustrating both the complexity of such change and the difficulty of measuring it.

Outcomes need to be realistic given the state of the target audience. For example, it would be unrealistic to expect a target audience with no prior knowledge of or interest in a particular behavior to embrace it immediately; a more realistic outcome would be to increase their knowledge of the behavior and its benefits to them.

Identifying and measuring intermediate variables in addition to outcomes is often critical to measuring progress. Behavior change can take a long time, frequently longer than the evaluation period, and intermediate variables help determine if progress is being made. More important, measuring intermediate variables helps identify those factors most important to behavior change, so efforts can be concentrated there.

Intermediate variables can take a number of forms depending upon the structure and objectives of the intervention. For example, if the intervention is a community initiative, intermediate variables can measure the new programs, policies and practices that are consistent with the initiative. Intermediate variables include anything that could influence the behavior change, such as interpersonal, environmental, accessibility, and availability factors.

3. Design interventions using appropriate theoretical models and design evaluations using the same models.

A recent FCS-sponsored review of the nutrition education literature found that nutrition education "works" when it is based on theory and has behavior change as a goal. Individual, social and environmental factors all play roles in behavior change, and interventions that influence all these factors are most likely to be successful.

The knowledge-attitude-behavior paradigm, used frequently with nutrition education programs, has serious deficiencies. It does not take into account any variable outside the individual, such as environmental factors. Research has not shown that it is necessary to change attitudes to change behavior (in fact, sometimes behavior changes first). Furthermore, the paradigm does not differentiate between types of knowledge, specifically "how-to" knowledge, versus motivational knowledge. Without motivation, people are unlikely to change behavior.

Theoretical models appropriate for nutrition education include: 1) stages of change, 2) social learning theory, 3) the health belief model, and 4) diffusion of innovations. Social marketing is not a theory; it is a process that can be used with any of these theoretical models to develop health promotion and disease prevention programs.

Often, some combination of these models should be used to develop successful programs. Also, at least one speaker thought program planners should pay more attention to developing policies and new services and less to messages about behavior. Finally, planners must ensure that the evaluation measures what the intervention was designed to do. Sometimes an intervention is designed to increase knowledge but measures behavior change instead. Then program managers wonder why they failed. Program planners and evaluators must work together to ensure the evaluation model fits the intervention model and measures the appropriate variables.

In addition, planners must determine the appropriate research approach. The gold standard for public health evaluations—randomized, controlled trials—is sometimes not appropriate for nutrition education programs delivered in community settings. Controlled trials assume that control or comparison communities receive no intervention. If the intervention is a community one, it may be impossible to hold out control or comparison communities.

Planners have a wide range of research approaches from which to choose. If a randomized, controlled trial is not the right approach for a particular intervention, alternatives include: time-series analyses, comparing indicator levels between groups with differential likelihood of exposure to a program, determining any other plausible explanations when change occurs rapidly, and assessing whether the observed outcome is in fact credibly explained by the process one thought would lead to change.

4. Include both formative and process evaluation activities.

All too often, outcome evaluation is the only type of evaluation used for nutrition education and communication efforts. Many speakers believed that formative and process evaluation are critical to the development and implementation of successful programs. If resources are limited, they recommend putting formative and process evaluation first. Skipping these activities may result in a flawed program. Outcome evaluators may conclude the intervention did not work, when in fact the materials needed refinement or delivery strategies required adjustment.

As one speaker put it, "one of the roles for research is to identify what matters for a particular target population in a particular place and then to guide the development of successful interventions." Formative research and evaluation assure the best possible program by identifying appropriate target audiences and ensuring program messages and activities are relevant and meaningful to them. Formative evaluation encompasses many aspects of program development: target audience selection, concept and message testing, pretesting, and market testing, to name a few.

Several speakers noted that identifying the determinants of behavior during the formative stage is important. One way to isolate determinants is to compare those who are engaging in the desired behavior with those who are not, and examine the variables upon which they differ. The importance of message testing before rolling out a program was repeatedly emphasized.

Process evaluation was deemed critical because it allows ongoing monitoring of programs and enables timely refinements—helping programs achieve success. Process evaluation activities include tracking participation in program events, tracking media coverage, and tracking progress made by change agents, such as coalition members. Carefully constructed process evaluation activities have many uses. They provide invaluable mechanisms for measuring intermediate outcomes. They allow mid-course adjustments to improve the program. They provide progress measures to funders and coalition members. And community leaders can use them to attract and maintain support and resources.

SUMMARY OF INDIVIDUAL SESSIONS

Contemporary Budget and Policy Realities:

The State of Nutrition Education in USDA and the Importance of Evaluation

Eileen Kennedy, Sc.D.

Executive Director

USDA Center for Nutrition Policy and Promotion

One out of six Americans is reached by a direct service delivery program operating out of USDA's Food and Consumer Service (FCS). Evaluation of FCS programs has been an ongoing effort. But there is often the perception that there is less we can say about the effectiveness of nutrition education programs than about the effectiveness of service delivery programs. Three questions are relevant to the discussion of evaluating nutrition education programs.

What works? Even when there is an agreed-upon outcome, there has been quite a difference of opinion on the paradigm that should be used for nutrition education and nutrition communications: nutrition education or social marketing. An example of the recent dialogue is shown in the following paragraphs:

Social marketing seeks to change consumer behavior by satisfying consumer desires and wants, but not by fostering consumer understanding of food and nutrition. The marketeers seek to promote specific behaviors without consumer understanding and in contrast, educators seek to build a framework into which learners can fit new information. . .Social marketing is cultural impoverishment because it promotes behaviors instead of teaching people to think.

Vanden Heede and Pelican, 1995

Nutrition educators do not understand social marketing. Social marketing provides a problem-solving process from which behavior change strategies are formulated and translated into discrete and integrated tactics aimed at specific behavior change. The emphasis is on consumer research to determine the most relevant and effective tactic to change behavior in a target audience, not what self-designated experts believe to be important for the target population to know or practice.

Lefebvre et al., 1995

This divergence of opinion also has implications for evaluation criteria and methodology in nutrition education. We have begun to look at trying to identify what the appropriate paradigm is, and, given that, what our ultimate measure of success should be. Should it be behavioral change, knowledge gained, or some combination? Over what time period? And clearly, given the policy reality, at what cost? Finally, what should the role of government be?

In what context does nutrition education work? Understanding the process leading to the outcome of a program is critical. For example, with the Supplemental Food Program for Women, Infants, and Children (WIC), we measured the effect on health outcomes. But we were also able to identify some key factors as to why WIC worked and was cost efficient in the United States when similar supplementary feeding programs in developing countries had high costs relative to outcomes. These key factors included higher levels of caloric supplementation and an integrated program, combining supplemental feeding with health care and nutrition education. Part of understanding the process of a program includes looking at when nutrition education works by itself and when it needs to be integrated with other interventions.

At what cost? More and more often, we are being asked which intervention achieves a given objective in the most cost-effective manner. Often, this question is "larger" than nutrition education. We are not asked to identify the nutrition education intervention that is most cost effective, but rather, given a nutrition education program, some jobs program, and a feeding program, for example, which is the most cost effective?

To answer these types of questions, we need to look more and more at the mix of programs needed to accomplish a particular objective. To be able to do this type of analysis for nutrition education, we need to do a lot of thinking about methodological needs and how we cost both the inputs into nutrition education and the outputs. For example, what is a gain in knowledge "worth" in a cost effectiveness analysis? This is an area that is ripe for very applied research. The science is there, but the application is lacking at the moment.

Implications for the Government

Contemporary budget and policy realities drive us, the Federal government, to reassess the role we have in nutrition education by answering two questions: 1) What is our comparative advantage? and 2) What is the most cost effective way of implementing the Federal government's role in nutrition education?

To summarize, in nutrition education we are headed toward a multifaceted approach to intervention strategies. Our evaluation strategies also have to be multifaceted and must include formative, process, and outcome evaluation research.

I. WHERE WE'VE BEEN

Overview: A Review of the Role of Evaluation in Recent Nutrition Education Research and Interventions

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Background

Recently, USDA contracted for a review of nutrition education research and intervention.[1] The focus of this presentation is on the evaluation measures used in the 217 studies reviewed. One criterion for inclusion in the review was that the studies had to be based on an experimental design involving random assignment, or on a quasi-experimental design where there was a comparison group. Another criterion was that there should be some validity and reliability of evaluation instruments, and these should be at acceptable levels. Only about a quarter of the studies screened met these criteria.

Summary of the Review Findings

The review examined two major questions:

1) *Does nutrition education work? If so, what are the success elements across interventions?*

2) *What are the implications for nutrition education program implementation, policy, research and demonstrations?*

The review found that nutrition education works. It is a significant factor in improving dietary practices, when behavior change is the goal, and the educational strategies are designed with that as a purpose.

The "behavior change as a goal" approach differs from interventions that disseminate information with the expectation that such information will result in changes in attitudes and behavior. In many cases the "knowledge-attitudes-behavior" model was misapplied. For this model to work, the "knowledge" must be motivational.

Knowledge-Attitudes-Behavior Model

The word "knowledge" has many meanings. There is "awareness knowledge" and "how-to knowledge." Social psychologists talk about "anticipated consequences knowledge" that is likely to enhance motivation to take action, while "instrumental knowledge" is the kind needed by people to act on their motivations.

Motivational knowledge is about the potential positive or negative consequences of behaviors. Examples of motivational knowledge include the following: 1) understanding about anticipated consequences, such as that eating lots of fatty foods may increase heart disease rates; 2) perceived susceptibility to disease, which is a kind of personal risk appraisal; 3) perceived severity, which is people's own fear about conditions such as breast cancer.

[1]This review is summarized in Contento, I. and others, "The Effectiveness of Nutrition Education and Implications for Nutrition Education Policy, Programs, and Research: A Review of Research," ***Journal of Nutrition Education***, 1995; 27(6), 277-418.

4) perceived benefits, such as that exercise will make you feel fit; and 5) a sense of mastery, or self efficacy, can also be motivating.

"How-to" information tends not to be motivational, although very important. It is the kind of information that seems to be used most often in the reviewed studies. The following examples are helpful if you are already motivated.

- A teaspoon weighs 5 grams and is 45 calories.
- Here is the Food Guide Pyramid. You can see that you should eat 6 to 11 servings of grains, cereals, pasta, and rice a day; 5 servings of fruits and vegetables; and 2 servings each of meat and dairy. Eat fats and sugars sparingly.
- This label means that each serving of this cereal has 8 grams of fiber. This is 32 percent of the Daily Value for fiber.
- Here is how you modify a popular recipe to make it lower in fat.

A school health education evaluation of 30,000 students and about 1,000 classrooms also sheds some light on the knowledge, attitudes, and behavior relationship. It found that 5 to 15 hours of instruction produced an enormous effect on program-specific nutrition knowledge. With a few more hours, an effect on more general knowledge could be produced. It took 25 to 50 hours to bring about a change in practices. Interestingly, attitude changes took 25 to 50 hours to produce, and even then the effects were small. The idea that knowledge leads to attitude change to behavior change may not be correct.

In general, the review found the more successful programs were those that: 1) set behavior change as a goal, 2) incorporated communications that were motivating, 3) taught strategies for behavior change, 4) included active involvement of both the individual and the community, and 5) attempted to build health-enhancing environments.

Evaluation Instruments Used in the Studies

Preschool children: Of 21 studies, 7 measured only knowledge; 6 measured knowledge and behavior, and a few measured attitudes. "Behavior" was measured differently in different studies, and included choosing a picture of a nutritious snack versus a low-nutrient snack; actually observing and recording behavior; and food preferences (because for preschool children, preferences are highly correlated with consumption). Some studies examined the role of peers modeling the behavior; some examined the use of rewards, positive attention by adults, and adult modeling in changing preferences.

School-aged children: Out of 17 general nutrition education studies, 15 measured knowledge, 12 measured attitudes, and most measured a variety of behaviors. Behavioral measures included observation of school lunch choices and school plate waste; observed snack preferences; 24-hour recalls; 3-day food records; food choice inventory; food frequencies; a lifestyle questionnaire; and frequencies of food-related behaviors. Skills were measured in several studies, and several looked at a variety of social-psychological variables, including self-esteem, self-efficacy, and health locus of control (the degree to which a person feels in control of his or her health or feels it is controlled by external factors). Self-efficacy was measured by asking children if they were "not sure," "sure," or "very sure" that they could choose the healthful alternative most of the time given two foods. Some

studies used physiologic measures, including serum cholesterol, urinary sodium, skin folds, blood pressure, body mass index, and weight.

Adults: Many of the 62 studies measured nutrition knowledge, but the proportion using knowledge as an outcome measure was much lower than for school-age children, probably reflecting the difference in goals for educational interventions with adults versus children. Knowledge measured was often program specific, rather than general nutrition knowledge. Attitudes were measured in relatively few studies. Behavioral measures included 24-hour dietary recalls, variously analyzed for food groups, fat intake, or nutrients; food frequencies; "dietary intakes," self-report of trying recommended behaviors; checking and knowing own cholesterol level; purchase intention; simulated purchase; sales of specific items in cafeteria/vending machines/restaurants; and sales of specific items in grocery stores. Physiologic measures were used in many studies and included serum cholesterol, weight, blood pressure, and overall risk.

Pregnant women/caregivers of infants: Fourteen studies were with pregnant women and 15 related to promoting breastfeeding. Knowledge and attitudes were measured in only a few studies; behaviors were measured more frequently and included mean number of prenatal visits, intake from each of the food groups, coffee and alcohol consumption, vitamin-taking behavior, and well-baby visits. Most of the interventions evaluated impacts on infants as the outcome measure. Breastfeeding behaviors included breastfeeding duration or percent of mothers breastfeeding at a specified time postpartum; qualitative behaviors (e.g., position used, latch-on); and delay of introduction of solid food. Physiologic measures were common and included mothers' weight gain during pregnancy, pregnancy-related complications, delivery complications, infants' birth weight, percent of low-birth-weight infants, number of weeks of gestation at delivery, APGAR scores, and postnatal complications score.

Older adults: Of 14 studies, 4 measured knowledge (3 measured general knowledge) and 2 measured attitudes. Behavioral measures included 24-hour recalls, food frequencies, observation of consumption in a residential dining room, shelf inventory of food items in the home, self-reported change of any kind, use of health services, health status, health behavior, and exercise. Health risk appraisals were used in three studies, and some studies used physiologic measures, including body weight, blood pressure, serum lipids, urinary sodium, and health insurance claims for medical visits.

Inservice training of nutrition intermediaries, such as teachers, paraprofessionals, professionals: Knowledge was commonly measured in the 21 studies; attitudes were measured in several. Behavioral measures used to evaluate the outcome of training included fidelity to the curriculum, whether teachers increased the amount of teaching they did because of their preparation in nutrition education, and quantity of teaching. In three of the six studies with food service workers, the evaluation measure was whether they actually reduced the fat and sodium in the school lunches as a result of training.

Summary

The most important observation that arises from an overview of these 217 studies is the wide variety of outcome measures used to evaluate nutrition education effectiveness. Most studies, regardless of population category, measured knowledge, attitudes, or other related social-psychological variables and behaviors. Many interventions also used physiological parameters as outcome measures. Within these categories, a wide variety of measures were used.

In particular, the types of measures used to evaluate "behavioral change" varied widely from study to study.

Often, the behaviors being measured were intakes of foods or nutrients as measured by food recalls or records, food frequency questionnaires, or observation. Other studies used behavioral intentions or self-reported likely choices among foods as proxy measures. Actual purchases were used to evaluate point-of-choice interventions, as were many other measures. This wide range of evaluation measures illustrates the complexity of dietary change and the difficulties of measuring such change.

Confounding Issues in Evaluations of Nutrition Interventions

William Smith, Ed.D.

Executive Vice President

Academy for Educational Development

Human Behavior in Relationship to Health: What We've Learned

Over the past 20 years, there has been some consensus in America that there is a relationship between human behavior and health, and some relationship between human behavior and disease. The second part of that consensus is that government has some responsibility to combat disease and protect health. Therefore, government has the obligation to help people adopt healthier behavior. Looking at causes of mortality in the United States in 1990, about 19 percent of it was due to tobacco. Diet and activity were a close second, and alcohol was number three. Further down the list were AIDS and firearms. Clearly, human behavior is important in reducing mortality.

We have made huge progress in this century in protecting human health. For example, there were 21,000 cases of polio in 1952 in the United States. In 1994, there were four cases. In 1941, there were almost 900,000 cases of measles; by 1993, there were 281. But there were 1,500 cases in 1983 and 25,000 in 1990. Why? Because we allowed our immunization program to go "through the floor," particularly in high-risk populations. We didn't eradicate measles, we put a strong program together which brought it down. When we discarded that program, measles went back up.

There has been tremendous success in the heart disease area. Stroke mortality is probably the biggest single success in the past two decades, having declined by 50 percent. Key behavioral measures increased significantly during that time period: people assessing their own risk increased from 50 percent to 75 percent, physician visits increased by 70 percent, and blood pressure readings increased by 95 percent.

HIV/AIDS and fatal drunk driving are two more examples. In San Francisco, using a very sophisticated model, they have concluded there were 8,000 new cases of HIV in 1987. In 1995, that number is anticipated to be around 650. Why? It's a combination of very complex factors, some of them regulatory, some educational and perceptional, some technological. With drunk driving, the number of alcohol-related fatalities in the United States is down by 31 percent. Why? Again, a combination of factors—air bags, driving age, better enforcement, community-based advocacy and very, very powerful messages.

Models to impact behavior and health can be put into three big categories: regulatory choices, new services (i.e., immunizations or counseling and testing services), and messages. We spend far too much time talking about messages, too little time talking about services, and a little bit less time talking about enforcement opportunities that help influence

behavior. All of these things can be used at different levels of society, government, the private sector, and the community.

The Vaccine Model: Inappropriate for Measuring Behavior Change

Four factors confound our understanding of different human behaviors and how they relate to health, evaluation and research: 1) the complexity of human behavior; 2) the instability of human behavior over time; 3) the difficulty of replicating interventions; and 4) the fact that we are thinking about our programs as prevention "vaccines."

Much of our research and evaluation has been driven by the vaccine model. Research that establishes a vaccine has to look at three things: 1) Does it work, is it efficacious? 2) Is it stable, does it change? 3) Are there side effects? Those are the three principal characteristics of a good vaccine. It's stable. It works. And it doesn't have any side effects.

However, trying to develop a prevention "vaccine" for behavior is much different from developing a vaccine against disease. The vaccine model is very linear. It says we develop vaccines in a case-control setting, test them to establish their validity, and then we establish their replicability in populations. For example, the prevention program is developed in Minneapolis. Then it is "injected" into Chicago. But there is greater variability in the settings for prevention programs than in human bodies. There is variability in the host. Different "hosts"—prevention program settings—can differ dramatically from each other on relevant dimensions, such as environmental influences and characteristics of the people being targeted by the intervention, whereas human bodies are comparatively interchangeable. There is variability over time. There is also variability in the prevention vaccine itself.

One problem with the case-control model is that its constraints do not allow us to modify interventions once they are in place. For example, let's look at a very powerful, interesting study, the 22-community, 4-year Community Intervention Trial for Smoking Cessation (COMMIT). It targeted heavy smokers (more than 25 cigarettes a day), but also looked at moderate smokers. It was a comprehensive, community-wide program with two goals: to ensure exposure to smoking messages and to alert people, particularly heavy smokers, to cessation opportunities in their communities. The results showed no effect in heavy smokers in the intervention communities, and only some effect in moderate smokers. The conclusion drawn was, "now we have evidence that community intervention just doesn't work."

However, a strong secular trend was affecting both intervention and control communities. Change occurred in both communities; everybody was getting better at decreasing smoking rates. The study showed that the intervention did not produce an effect any stronger than a very strong secular trend. Much of what was going on in the intervention group was going on in the control group as well. Because it was a case control program, there were a lot of things that occurred during the 4 years that the interventionists could have changed because they found out they weren't working as well. But they didn't change them because they were testing a vaccine and the vaccine can't be changed in the middle of the test.

These are some problems with the vaccine model: 1) the nature of the intervention itself might change; 2) the amount of time necessary for change may be different from the study time period; 3) expectations may be too high; 4) the importance of secular trends is not factored in; and 5) interventions cannot be adjusted to local needs in research projects.

Research and Evaluation Paradigms

Three distinct research and evaluation questions that we are all confronted with when working on prevention

programs are the following:

1. Does X work? (X usually compares one type of intervention to another)
2. Given that we know X works over there, did it work here?
3. How do I get X to work this time?

The third question is a marketing research question, or it might be described as clinical research for those offended by the marketing vocabulary.

Clinical and marketing models provide better paradigms for integrating research and evaluation than the vaccine model. In the clinical model, a physician looks at two different patients and determines how those patients differ and what treatment each needs. The physician then monitors the effects of the treatment and adjusts it as needed. In the marketing model, the marketer looks at two different consumers, determines how they are different, and develops a program to position the product so that it provides a benefit to each consumer. Then the marketer monitors the program to see how it is working, refining it as necessary.

The vaccine model is linear. It says we hypothesize something. We test it. We evaluate it and then we put it into practice. The clinical/marketing model is circular. It says research and action are interrelated. We need to assess things first, make some plans based on that assessment, test out that planning in real life, go to scale, and then look at and monitor the thing because we're going to be making mistakes all over the place. Then we'll make some adjustments. And when we make adjustments, we're right back at the beginning.

In using these models, start not with the people, but with the behaviors and an understanding of how complex they are. Think about the targets for those behaviors. Then ask yourself three questions: What are my policy options? How can I build better services? And how can I come up with a message that's a little bit clever and persuasive, too? One role for research is to identify what matters for a particular target population in a particular place and then to guide the development of successful interventions.

Key to understanding behaviors is identifying the determinants of the behavior. To identify determinants, look at those who engage in a behavior and those who do not (doers and nondoers), and then compare their answers. For example, in a study of condom use among women in the Caribbean, there was no difference between users and nonusers in AIDS knowledge, perceived severity of the disease, or perceived susceptibility to it. However, there were differences in terms of whether they talked with friends about condoms and whether a sex partner once suggested using a condom. If a program could get sex partners to suggest using a condom, it could probably do something to influence condom use. Having this knowledge totally reframes the issues that the program should address.

Summary

We are facing choices and evaluation and research can help us make those choices. The confounding issues are the complexities of the human behavior we're facing, the instability of those behaviors over time, the difficulty in replicating interventions, and this prevention vaccine myth. Thinking about improving the balance between basic research, evaluation research, and something more like marketing or clinical research may be useful.

II. CHARTING A NEW COURSE

Using Communication and Behavioral Models in Designing Evaluations

Research has shown the importance of a theoretical base for successful nutrition education interventions. Each of the first three sessions in this section covers a theoretical model often used in designing nutrition education interventions today. Besides describing the model, each speaker also presents examples of its application from his or her own work.

The ***health belief model*** has three components: 1) readiness, including individuals' perceptions about their susceptibility to a disease and the disease's severity, their motivation to make any changes, and their subjective estimate of whether or not the regimen is safe and whether it would actually have an effect; 2) factors that modify the disease's perceived threat, such as demographic characteristics, structural variables (e.g., prior contact and knowledge about the disease), and quality of care; and 3) likelihood of taking action to avoid the disease, determined by assessing whether the perceived benefits of preventive action outweigh the perceived barriers.

Social learning theory, or social cognitive theory, posits three overall determinants of behavior: 1) personal factors, such as attitudes and values; 2) environmental influences on behavior (external to the individual); and 3) the behavior itself. Central to the theory are the concepts of reciprocal determinism (the three determinants can influence each other), perceived self-efficacy (a person's confidence in his or her ability to engage in a behavior; the higher the confidence, the more likely the person will be able to do it); reinforcement for the behavior; modeling of the behavior to make it easier to adopt; self-regulation, which concerns how people react when they attain goals; and observational learning.

The ***transtheoretical model of stages of change*** outlines six stages for behavior change based on the individual's current behavior: 1) precontemplation, when the individual is either unaware of or not interested in making a change; 2) contemplation, when the person is thinking about changing, usually within the next six months; 3) preparation, when the individual actively decides to change and plans a change; 4) action, when the person attempts the change; 5) maintenance, when the individual sustains the change for six months or longer; and 6) termination, when the behavior has become so ingrained that the person is no longer in the stage cycle.

The final session in this section describes ***social marketing,*** an often misused and misunderstood term. Social marketing is a disciplined, research-based process of adapting commercial marketing techniques to influence the voluntary behavior of target audiences so that they increase their own or society's well being. Social marketing's key features include a focus on behavior change, an emphasis on formative and process evaluation activities, recognition that the behavior being promoted has competition, segmentation of audiences, and development of products for each segment.

Health Belief Model

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Background on the Model

The health belief model, derived from social-psychological theory, was first delineated by Rosenstock in 1966. Originally developed to explain preventive health behavior or compliance with preventive health behaviors, it was based upon Llewin's goal-setting theory. Llewin essentially described the individual as existing in a life space composed of regions, some of which are positively valued, others negatively valued, and some neutral. Disease would be a region of negative value.

Rosenstock took Llewin's hypotheses further and created a model with three components: individual perceptions, modifying factors, and likelihood of taking action to avoid disease. The individual perceptions refer to 1) perceived susceptibility to the disease—people would have to perceive themselves as personally vulnerable or personally susceptible, and 2) perceived severity of the disease—they would have to believe that the occurrence of the disease would have a moderately severe effect on some component of their lives.

The perceived threat of the disease is modified by demographic and structural variables, cues and action, mass media campaigns, and advice from others. Demographic variables include age, sex, race, ethnicity, socio-psychological variables, personality, social class, appearance, and reference group pressure. For example, if a person has friends that consider the disease a serious problem then he or she may think of it as a more serious problem. Structural variables include prior contact and knowledge about the disease; if a person does not know very much about it, it is difficult to feel much of a threat.

As a result of an individual's original perception as modified by these variables, the likelihood of the individual taking action will be affected by the cost-benefit ratio: whether or not the perceived benefit of the preventive action is greater than the perceived barrier. In other words, taking action would be beneficial and not entail important barriers such as cost, inconvenience, pain and embarrassment.

Rosenstock's model was modified a few years later by Becker and Naiman at Johns Hopkins University, although it remained a three-component model. Individual factors were subsumed under "readiness," and two other elements were added to this component: motivation to make any changes, and the subjective estimate of whether or not the regimen was safe and whether it would actually do something. With nutritional therapy, very often people simply don't want to believe that making dietary changes has any effect. Modifying factors are similar to the old model, with a quality of care characteristic added. This characteristic involves whether or not the intervention program helps patients to reduce the complexity of their regimen, and the relationship between the caregiver and the patient.

Applying the Model

Let's review two studies examining the relationship between this model and adherence to hypocholesterol

eating patterns—those that are low in cholesterol and low in total fat. Both of the studies were done following a group intervention over a fairly long period of time. One study was with hypercholesteremics or people who had a history of early coronary disease. The other study used a group of men involved in the Multiple Risk Factor Intervention Trial (MRFIT), all of whom were at high risk of developing cardiovascular disease based upon their cholesterol, blood pressure, and smoking habits.

Based on the health belief model, for the first study we constructed a series of 20 statements, with 4 different compliance factors represented by 5 statements each. The statements were designed to reflect adherence to dietary regimens. Study participants responded to each statement using a seven-point scale of agreement. We also collected information as to their subjective assessment of their adherence by asking people whether they never followed their eating pattern, seldom followed it, followed it half the time, usually, or always. And we used a food record rating as an objective assessment, which measured saturated fat, polyunsaturated fat, and dietary cholesterol content of the diet.

Our analysis examined how much of a role each factor played in participants' adherence to the regimen. Perception of threat was the greatest predictor of whether or not they complied using their own subjective assessment. Quality of care—that is, the health professional's sensitivity and ability to simplify the regimen to make it possible for more people to adhere—was also important. The cost-benefit and social support factors were least important to adherence in this study.

With the study of MRFIT participants, we analyzed only the objective assessment because we didn't have enough data to analyze the self assessment. Also, we added some additional elements to the model to see if we could improve its predictive ability. We added an element called external environmental media (how much information people get from magazines and groups such as the American Heart Association) and internal and external locus of control (the degree to which a person feels in control of his or her health or feels it is controlled by external factors).

In this population, cost benefit turned up to be the most predictive of their compliance. Cost benefit in this situation meant they felt that following the eating pattern was beneficial and the benefit was greater over time. Quality of care was also important in this study. Threat of disease was not very high and we think it's probably because these individuals had a long period of intervention and no longer felt at great risk of the disease. As for external environmental media, information from groups such as the American Heart Association seemed to be most important.

Social support turned out to be the least important factor in both studies; it may be because both studies had very intensive intervention programs and participants may have felt they had a great deal of support within the program.

Summary

In conclusion, we believe that the health belief model does predict adherence to eating patterns low in cholesterol and total fat. However, the relative importance of the components varies depending upon the type of population, the type of intervention program, and the measure of adherence being used.

Social Learning Theory

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Overview of Social Learning Theory

Social learning theory had its roots back in the 1940s; however, today's focus will be on the more recent formulations, particularly the work of Dr. Albert Bandura of Stanford University. The more recent term for this theory is social cognitive theory. The theory is very broad and incorporates many different components to explain and predict behavior. It has been used to explain behavior ranging from dietary behavior and physical activity to clinical behaviors, such as phobias. It is widely used for intervention design and very much respected for its ability to guide researchers and practitioners toward concepts that they should bring into their intervention strategies.

The theory assumes that people are active in determining their own behavior, that is, they do not simply act according to how they are rewarded. They continually think about their behavior, different actions they can take, and what the incentive would be for that behavior. Then they select a course of action.

The theory states that there are three overall determinants of behavior: 1) personal factors, such as attitudes and values, that the individual holds; 2) environmental influences on behavior (external to the individual, including the influence of family and friends, physical factors, and availability); and 3) the behavior itself, including behavioral capability and outcome expectancies. Behavior capability involves how-to knowledge and skills—if someone does not have very basic skills-related knowledge and does not have any of the skills required to engage in the behavior, they won't be able to do it. Outcome expectancies are the anticipated results of the behavior; they can be positive or negative, short or long term. In part, assessment of outcome expectancies provides an incentive for behavior.

Principles Underlying Social Learning Theory

Reciprocal determinism, says that attitude and behavior are mutual determinants; personal factors can influence behavior and behavior can influence personal factors. For example, if I hold a positive attitude toward exercise, that may lead me to exercise. As I begin to exercise more and more, that behavior causes me to rethink and strengthen my attitudes toward exercise.

Perceived self-efficacy is a statement about the confidence a person has that he or she can engage in a behavior. The higher the confidence, the more likely the person is to be able to do it.

Reinforcement. Different kinds of reinforcement include extrinsic reinforcement, where someone could be paid for making behavioral change, for example, and intrinsic reinforcement, such as feeling good about goals attained or changes made.

Outcome expectancies. Observing someone else making the behavior change ("modeling" it) and being rewarded for doing so reinforces the value of the action, thereby conveying outcome expectancies to the observer.

Self-regulation. People set goals, watch their performance, and regulate their behavior. Some will reward themselves if they attain their goals; others will adjust their goals and do better next time.

Observational learning, or modeling. People can acquire behaviors and skills, even values, by observing the behavior of others. They can even learn things like perceived efficacy. When people see a similar model successfully doing a behavior, they come to believe that they are more capable because someone like them is engaging in that behavior.

An Example of Social Learning Theory (SLT) in Design and Intervention

The High Five program in Alabama is part of the 5 A Day for Better Health initiative. It consists of a school-based intervention to increase the consumption of fruits and vegetables in 28 schools. The program is being evaluated with a very strong randomized experimental design. The intervention was designed using social learning theory so it focused our attention on multiple determinants of behavior. We sat down with the model and developed strategies that would be linked to the model in the belief that this would produce the strongest intervention. Some examples:

Environmentally focused strategies: We focus on parents and do a number of things to try to modify their behavior, which will, in turn, influence their children's behavior. We also work directly with food services.

Behavioral capability. Children's ability to ask for fruits and vegetables from their parents was an important skill, as was preparation, because kids in the age groups we are working with prepare many of their own meals. Also, skill-related knowledge was needed; for example, some kids were not familiar with a large variety of fruits and vegetables.

Outcome expectancies. The intervention includes stories that relay the positive effects of fruit and vegetable consumption and self-efficacy. It also includes role playing that gets children to practice the target behavior, such as asking skills. This provides children a successful experience in a controlled environment, so they come to believe they are more capable or confident in their ability to use some of these skills.

Reinforcement, self-regulation, and observational learning. Sometimes very small things, like stickers, have great reinforcement value. For self-regulation, we tried to help children set goals. We gave the kids and the parents simple tools for self-monitoring. Observational learning included role playing, skits (including some targeting parents), and things like teachers leaving fruits and vegetables visible for the children to eat.

Linkage Between Social Learning Theory and Evaluation Design

Use of this model can help us with evaluation in several ways. It will:

1. Lead to stronger interventions, which lead to larger effect sizes that are more readily detected in evaluations.

2. Guide measurements, because it involves looking at the environment and examining behaviors and personal factors carefully.

❸ Allow consideration of mediators. What is it between the program implementation and the outcome (dietary consumption) that produced the change? For example, with 5 A Day, mediators might include improved self-efficacy, asking skills and availability—a personal factor, a behavioral skill, and an environmental factor. We would postulate that these mediators account for the change and we would be very careful to measure each of them.

Evaluation Measures

For environment, we look at social influences and measure availability through parents using a measure developed by Baranowski. Behavioral capability is measured by looking at asking skills and key knowledge. Positive and negative outcome expectancies are measured on a 20-item scale. Self-efficacy is measured across meals, by looking at the aggregate self-efficacy for eating five fruits and vegetables per day. Process evaluation measures include how well the reinforcement activities were executed, how self-regulation has been executed, and how some of the observational learning activities were executed.

Summary

Social learning theory is a general theory. It explains many behaviors, but it can be readily adapted to dietary behavior. It is very useful in intervention design and in measurement, through defining mediators and guiding us toward different kinds of measures that we can utilize.

Stages of Change: The Transtheoretical Model

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Background on the Model

Stage models are not necessarily theories in and of themselves; rather, they are a good way to look at how behavior change might occur. While there have been many stage models over the years, this presentation focuses on the Prochaska and DiClemente transtheoretical model. Originally developed to understand smoking cessation, this model has been applied to a variety of other behaviors, including addictions, weight loss, and dietary change.

The stages-of-change model has three basic assumptions: 1) behavior change involves a series of cognitively different steps; 2) common stages and processes of change exist and can be applied across a wide range of health behaviors; and 3) interventions may be more effective if we tailor them to the stage of change that people are in at the time.

The transtheoretical model identifies the following stages, based upon the individual's behavior and, for some stages, some length of time related to the behavior:

1. ***Precontemplation,*** when the individual is either unaware of or not interested in making a change
2. ***Contemplation,*** when the person is thinking about changing, usually within the next 6 months
3. ***Preparation,*** when the individual actively decides to change and plans a change, usually within 1 month; sometimes the person may have tried to change
4. ***Action,*** when the person is attempting to make changes, but has been doing so for less than 6 months
5. ***Maintenance,*** when the individual sustains the change for 6 months or longer
6. ***Termination,*** when the behavior has become so ingrained that the person is no longer in the stage cycle

People do not necessarily move through the stages in a linear progression; they often try to change, relapse, and then try again before succeeding. Relapses can occur at any point in the process before termination is reached.

At followup, after baseline consumption was controlled, people who got the tailored messages decreased their fat intake much more than people who got the nontailored message or the control group. However, social learning theory, the health belief model, and persuasion theory were used as well as stages of change, so we can't really say that all of the effects were due to stages of change.

Practical Uses: Measuring Stages of Change

For program planning, individuals can be grouped according to the stage they are in relative to the behavior to be changed. Then, education can be designed for each stage, based upon the process identified as most likely to ease moving through the stage.

How do we know what stage people are in? First we look at current self-reported behavior related to a targeted objective, to separate doers from nondoers. Then we try to separate them further based on how long they have been doers. We then look at readiness to change. We might measure relapse history if we think past attempts will predict something about future attempts. We may also look at decisional balance, or pros and cons. People in more advanced stages tend to endorse more of the positives of the behavior and people in earlier stages tend to endorse more of the negatives.

An example from 5 A Day:

- How many servings of fruits and vegetables do you eat?
- (For those eating 5 or more) How long have you been eating 5 or more servings?
- (For those eating fewer than 5) Are you seriously thinking about eating more fruits and vegetables in the next 6 months?
- Are you planning to eat more fruits and vegetables in the next month?

Some challenges of measuring stages of change deal with asking these kinds of questions in different populations. Do the questions work with children? With persons of low literacy? With different ethnic groups?

For programs that use stages of change, some questions to ask to evaluate use of the model:

- Did the program appropriately assess stages of change of the participants?
- Was cognitive testing done?
- Did the designers think about what the questions meant?
- Were the intervention stages appropriate?
- Was the research designed so that comparisons could be made between an intervention group and a control or comparison group, using either experimental or quasi-experimental designs?

- Was change in stages looked at, and intermediate outcomes plus behavior change?

Persuasion and Social Marketing

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What Is Social Marketing?

Social marketing is an adaptation of commercial marketing technologies to programs designed to influence the voluntary behavior of target audiences to increase individual well-being and/or that of the society as a whole. Social marketers are very action-oriented. They are interested in theory, but in terms of what aspects of theory can be used to help design programs.

Key Features of Social Marketing

Focus on behavior changes. How is educating or providing information going to lead to behavior change? Sometimes education has a boomerang effect. For example, many health models encourage program planners to tell people about risk factors so that they know they are at risk; when that was done with breast cancer to encourage mammography, mammography rates actually dropped. This drop occurred when some women concluded they didn't need a mammogram because they didn't have the risk factors.

Insist on marketing research in the formative, pretesting, and monitoring stages. Many programs conduct formative research to develop strategies, then develop materials and put them in the field without testing them. Private sector marketers go out and see whether they work. Monitoring research reveals what's working during the project, so it can be changed if necessary.

Recognize that the behavior change being promoted has competition. When people are being urged to do something, in their mind they have alternatives—and those alternatives have important payoffs and benefits. Sometimes the competition may not be directly related to individual behavior. For example, when trying to get mothers in developing countries to immunize their kids, we found that the competition was taking care of their husbands. Immunizing the kids involved being gone all day, getting home late, and getting hassled by the husband because dinner was late.

Don't develop one product for all markets. In the private sector, General Motors doesn't develop one Chevrolet to fit everybody. They develop lots of different Chevrolets with different options. Yet, often there is one intervention program, even though it makes sense that different members of the target audience are going to respond to different kinds of interventions. Target audience members can be segmented many different ways; stages of change is one; lifestyle research—looking at differences in people's life patterns and the kind of people they are—is another.

Social marketing is more than communications. Social marketing is not social advertising. Behavior is the bottom line and many things have to be put into place before people will undertake the desired behaviors; advertising is just one part of it.

Behavioral Models

Behavior is influenced by four factors:

1. ***Perceptions of expected benefits.*** People have to get something in exchange for engaging in the behavior.
2. ***Perceptions of expected costs.*** People have to pay some costs to undertake the behavior.
3. ***Community-level effect.*** People do things if other people are doing them, even if their personal consequence calculation isn't all that favorable.
4. ***Ability to affect outcomes,*** or self-efficacy, is the confidence people have that they can make the behavior change.

Behavior comes about in stages; different interventions are appropriate for each stage. The stages described below are similar to those discussed in the stages-of-change presentation.

During *precontemplation,* the major issues are education and changing values. Many people are not undertaking the behavior because they don't know about it or because they think it is not appropriate for them.

Contemplation can be divided into early and late stages. Intervention strategies need to differ for the two stages. Benefits are more important early in the contemplation stage—as people think about it, they've got to see a lot of benefits or they're not going to move on and think about it anymore. Later in the contemplation stage, when they know and endorse the benefit, costs become much more important—reducing cost and bringing social influence to bear is very important.

For the *preparation* and *action* stages, self-efficacy is critical. Even if target audience members think the cost/benefit ratio is favorable and there is a lot of group pressure, if they don't think they can do it themselves, they won't do it.

Summary

To summarize the social marketing perspective on intervention programs:

- Monitoring and pretesting (process and formative evaluation) are important parts of an evaluation strategy for any intervention program.
- Emphasize audience segmentation and potentially more sophisticated segmentation in programs.
- Examine the tradeoff between costs and benefits in your target audiences' minds.

- Look at competition (in the target audiences' minds) for the behavior being promoted.
- Intervention programs are dynamic, and ongoing process evaluation is crucial.

Using Formative Evaluations to Identify Target Populations

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Background

Diet and physical activity patterns are two major causes of death in the United States today. The Centers for Disease Control and Prevention (CDC) began the Nutrition and Physical Activity Communications Project (NuPAC) to see if a communications campaign could be put together focusing on nutrition and physical activity that would work within their existing and planned activities. NuPAC efforts for the past year have focused on formative evaluation, which has provided the foundation for the communications efforts. The behavior changes we are trying to communicate are:

- Choose a diet with plenty of fruits and vegetables.
- Choose a diet low in fat.
- Accumulate 30 minutes or more of moderate-intensity physical activity over the course of most days of the week.

The process outlined in CDC's health communications wheel is being used to develop health communications activities around these objectives. We are almost finished with the first three stages—background research, communication objectives, and target audience. We will be going on to identify message concepts and pretest those to select the communication channels that we think will be effective in reaching our target audiences. We will be developing materials and a plan for dissemination, and we will continually assess what we do.

The Target Audience

People are classified by their stage of change for physical activity and dietary behavior, specifically making a change to lower-fat eating or increasing their fruit and vegetable consumption. For example, with physical activity, they are classified based upon whether they are thinking about making a change in their physical activity, whether they have started to make a change, or whether they have that behavior in place.

Based on a literature search, environmental scan and initial market analysis, the first cut of the target audience is people age 29 to 54 years, with middle income and middle education (those not completing high school or obtaining a doctoral degree or higher are excluded), who are contemplating or preparing to make a change in either their dietary behavior (with respect to fruits and vegetables and fat) or their physical activity. The initial group consists of whites and African Americans, but long-range plans will include other groups as resources are developed.

Focus Groups: Understanding the Target Audience

Sixteen focus groups were conducted in four cities across the United States to get a sense of what the target audience thinks about, to explore the importance of good health and what that means to them, and to explore the costs and benefits of healthy eating and physical activity, their knowledge of the long-term consequences of unhealthy eating (high fat and low fruit and vegetable consumption) and physical inactivity and the health recommendations in those areas, and whether they saw physical activity and nutrition as going together.

There was no variation across the groups by region of the country and very little variation by race. Family was a priority for everyone, and everyone described their lives as busy and stressful. Life stage influenced behavior; for example, people with younger children were much less able to make some of the recommended changes compared to people whose children were grown or who were in a different life stage for other reasons.

Participants saw spiritual, mental, and physical health as very intimately connected, and found being healthy very desirable. Many knew what they should be doing and had tried many times to do it, but putting it into practice was extremely tough. Chief obstacles included lack of time and lack of internal motivation. Participants thought children were very motivating, because the changes would benefit the participants themselves, the children and other people in their lives.

Next Step: Message Development

As for message development, the physical activity recommendation was the most eye-opening. Participants said they did not understand what "accumulate" meant and doubted that they would derive health benefits from less vigorous activity than that previously recommended. The challenge is to work backwards and figure out ways to convey the validity of the physical activity message without portraying it as exercise. Participants saw exercise as going to the gym rather than things one could do around the house, around the yard, or around the neighborhood.

Messages will be developed keeping in mind the holistic health, mind and body connection; the experience the audience has had with trying these behaviors; and the preferences of target audience members. For example, women wanted support and encouragement with concrete tips. Messages may focus on positioning change as a lifelong thing, rather than to attain a short-term goal as some participants think of it now.

The Knowledge-Attitudes-Behavior Model and Defining "Behavior Changes"

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Assumptions in the Design and Evaluation of Dietary Behavior Change Interventions

- Theory provides the basis for intervention programs. An understanding of human behavior is organized as a theory and its related models will facilitate helping people change their dietary behavior.

- The best theory will account for the most variance in the targeted dietary behavior. But predictive efforts so far fall well short of 100 percent—a review of 21 studies by Stefflaw found that the models used predicted roughly 20 to 21 percent of the variance in the dietary behaviors.

- An intervention based on the best theory will result in the most change and the most readily obtained change. An important issue here is that the intervention does not work directly on the targeted behavior; it affects the mediating variables and those mediating variables are theoretical constructs.

How do we select a theoretical model for use in the design and evaluation of a program? First, it should be applicable to the dietary behavior problem of interest to us; not all theories are applicable. Second, there should be some prior likelihood that the theory predicts the targeted dietary behavior; some do a better job than others. Third, there should be some likelihood that the intervention is based on the model, and that it impacts the mediating variables and the targeted dietary behavior. Finally, the same model should be used to develop and evaluate the intervention.

The Knowledge-Attitudes-Behavior (KAB) Paradigm

There are two major constructs in the KAB model: knowledge affects attitudes and attitudes affect behavior. The model is very interpsychic; it is all based on the individual, and includes no environmental factors. Essentially, the model says that everything is under volitionary control, and that is not always the case. The assumption is that increases in knowledge lead to more positive attitudes, which affect behavior. A variant is that increases in knowledge affect behavior and increases in positive attitude lead to more likely and more frequent targeted dietary behaviors.

Is Knowledge Related to Attitude?

Knowledge is multifaceted. The many different kinds of knowledge include instrumental knowledge and motivational knowledge. Once knowledge is categorized, we move beyond the KAB paradigm because we have gone into motivational issues and different theories that might predict the behavior. A key issue is that what is potentially motivating knowledge for one group may not be motivating knowledge for another. For example, for someone who is 60 or 70 years old, preventing heart attacks and cancer may be particularly salient and motivating, whereas for teenagers those are far away issues and are unlikely to be motivating.

Several studies of nutrition education programs have failed to find a link between knowledge and attitudes. For example, the Teach Well project, which is a nutrition education program within school systems, included a measure of knowledge that combines instrumental knowledge and motivational knowledge. When this knowledge variable was correlated with all the other psycho-social variables, not one correlation was statistically significant—no relationship between knowledge and attitudes. Similarly, with the Gimme Five project, the highest correlation between the knowledge variable and psycho-social variables was about .21; most of the relationships were about .1 to .15. When all of the variables were put into a model predicting fruit and vegetable consumption, the knowledge variable was not predictive of behavior.

Is knowledge related to behavior? Well, probably some knowledge is necessary, but it is certainly not sufficient. We have not clearly defined what necessary knowledge is. A recent article in Health Education Research found that knowledge variability is not particularly important in understanding dietary behavior change. The study examined if knowledge one year predicted dietary behavior change the following year, and found that knowledge accounted for less than 1 percent of the variance in the behavior change.

Is There a Relationship Between Attitude and Behavior?

As early as the 1930s, there were reasons to believe that attitudes are not related to behavior (see Bettinghaus, 1986). When relationships are observed, only a small percentage of the variance is accounted for by the attitudes. Some theories, such as dissonance theory, argue that one needs to induce a change in behavior to change attitudes, rather than vice versa.

Time to Dispense with the Knowledge-Attitude-Behavior Paradigm

Interventions manipulating knowledge or attitudes have not usually resulted in behavior changes. The bottom line is that knowledge-attitudes-behavior provides a poor model for designing or evaluating behavior change programs. The KAB paradigm does not reflect our best understanding of the influence of human behavior; any of the theories presented earlier provides a much more interesting alternative to trying to explain behavior and include a lot more influences than knowledge and attitudes. Also, the relationships implied do not seem to work often. When they do, they account for a very small percentage of the variance in behavior.

Alternatives to the Knowledge-Attitudes-Behavior Paradigm

We need to develop a deeper understanding of the factors that affect dietary behaviors. For example, if we can understand why kids are not eating fruits and vegetables, then perhaps we can design an intervention that affects fruits and vegetables. We have developed a family reciprocal determinism model that examines how family members relate to one another (merging family characteristics) and in turn how the family relates to characteristics of the environment. It's important to include environmental factors but many psycho-social models, particularly KAB, ignore them.

Another aspect of kids' fruit and vegetable consumption is the availability/accessibility paradigm. If fruits and vegetables are not at home, there is no way that kids can eat them. Furthermore, if they are in the home but not in an accessible form, it is unlikely that a third grader is going to go home, open the vegetable drawer, peel some carrots, slice them, get their favorite dip and make a snack. We have tried to identify the factors that affect the availability of fruits and vegetables; an interaction of environmental, personal, and behavioral variables affects each succeeding step in the availability/accessibility paradigm.

Choosing Evaluations That Fit the Intervention and Stage of Development: Breakout Sessions

Doing the Best Evaluation Possible

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This session's focus, rather than evaluating print materials as originally planned, is how to do the best evaluation possible while overcoming the many barriers to it, with the least amount of error and at the lowest cost.

The Distinction Between Reporting and Evaluation

Reporting is describing what was done, how much of it was done, what methods were used, how many people participated, and their characteristics. Evaluating is how well the program did, what difference it made, what changed and for whom, to what extent was the change maintained, and at what cost. Evaluation also delves into what caused the change. Was it your information? Was it your program, or another one? Or was it the attention, encouragement and support people got from your program, rather than the intervention itself?

Evaluate Before Developing the Program

The most important time to start evaluating is before the program is developed. Needs assessment is particularly important. We have the best chance of doing a good job if we find out what people want beforehand—and the form they want it in. Evaluating before developing a program or materials is particularly important if resources are limited. Try to save money by not making mistakes in the first place.

For example, a food safety specialist wanted to do food safety training with child care providers. She needed to know what form the training should take—such as videotapes, workshops, a newsletter—and what food safety topics should be covered in it. We created a survey that we sent to a random sample of child care center teachers and family day care home providers. We asked them two primary questions: what do they want to learn and how do they want to learn it?

They wanted information related to safe food within the unique environment of the child care setting. The form they wanted it in was a newsletter. Their second two choices were a booklet and fact sheets; they rated a teleconference, hotline assistance, audiovisual tapes, and workshops low. This is a simple example of how we could have wasted a lot of money on a set of videotapes that wouldn't have had the usage that we would have liked. The child care providers wanted a booklet or a newsletter. That's what we provided, and the response has been tremendous.

Saving Money

The more money spent on evaluation, the more money saved in programming dollars. Perhaps we are so resistant to evaluation because we fear knowing what we are doing wrong. Good evaluation takes the guesswork out of program planning. There are a number of ways to save money when conducting evaluation.

Take advantage of built-in evaluation mechanisms. For example, program staff working on the WIC/EFNEP breastfeeding initiative wanted to know the most cost-effective way to target their program. Should they go in before the baby is born? Should they make one visit? How does that work compared to three visits before and in the hospital and just one followup and then phone contacts? Different instructors were taking different approaches, so they had a built-in experimental design. All they had to do was collect information on the different factors (number of visits, home versus phone contacts, etc.), then separate out the data by those factors.

Use existing instruments. Often, an existing instrument can be used to help save money, if it is tested within your own group. For food safety items, we just got the USDA food quality initiative grant to create a database of items. Custom instruments can be created by accessing the database, pulling the items up by topic, aligning the survey the way you want, and then choosing from different sets of directions or constructing your own.

Cooperate with others. Sometimes, states can create a consortium to conduct evaluation and get more data for less money. For example, the National Food Service Management Institute formed a consortium of 14 States to conduct needs assessment with 11 populations for the Nutrition Education and Training (NET) program. Pooling their resources and developing instruments that they all shared was much less expensive for the States than developing separate instruments. Each state tailored the instruments for their populations (e.g., Mississippi uses the title "food service administrators" rather than "food service directors"), and added a few items unique to their needs.

Do some of the evaluation yourself. Hire out the parts for which you lack the time or expertise. For example, some administrative tasks can be handled in house, including photocopying questionnaires, stuffing and mailing envelopes, and doing some data coding.

Use a random sample. If the population is 5,000 people, nothing is gained by surveying everyone—a random sample of 1,000 or even 500 will provide the same information as surveying the whole group, but it will cost a lot less.

Don't collect or analyze anything extra. People frequently collect too many demographics. Don't collect data unless the information will be used. Asking about income, in particular, makes people uneasy. If a random sample is used, race is not needed unless the data will be analyzed by that factor.

Other Evaluation Tips

Use the most direct measure possible. Sometimes we ask teachers what kids like to learn. Sometimes we ask EFNEP instructors what works best with EFNEP clients. The best way to do it is to get to the actual audience.

Use information gathering first. Talk to the audience, perhaps in a focus group, to find out what language they use, what response categories need to be added, etc. Once everything learned has been incorporated into your instruments, go back to the audience and pretest them. One focus group isn't enough because the first focus group just leads you to everything that needs to change. Ask the second group about the changes made.

Gather data in a format easily used. For example, if the percent of kids whose knowledge improved must be reported, make sure data collection and analysis is set up to answer that question.

Reviews start with you. After an instrument is constructed, sit down and complete it. You'll find all sorts of

things wrong. Then test it with expert reviewers and with the target group.

Think about what you want the final product to be. When the evaluation is finished and you want to talk to others about it, what do you want to talk about? What is it that you want to know? What can you do a good job on?

Sources of error include dishonesty (about what is eaten), inaccurate estimation (even dietitians aren't good at that), inaccurate recall, and misinterpretation of items. After the data is collected, sometimes we make errors in interpretation. Sometimes we find that we did not have enough people to be representative of the population.

Evaluating Materials

Materials development is so expensive that it is important to conduct assessments to make sure the developed materials are what the audience needs. When evaluating these materials, make sure what's being taught is what's being measured. If the program goal is to increase knowledge, don't get mixed up and say, "we taught them knowledge so now we're going to have behavior change." Often we teach knowledge, then assess behavior.

If we want to change behavior, we need to teach people in a way that they learn the skills necessary to change behavior. We also need to teach them the way they want to be taught. For example, kids want to learn with games, demonstrations, experiments, and food preparation. Information presented by the teacher comes out dead last—yet

Evaluating Social Marketing Promotions

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Social Marketing in the Context of Health Promotion

There are five strategies for health promotion in the 1990s: 1) strengthen community action, 2) help people develop the personal skills to have a healthy lifestyle, 3) build healthy public policy, 4) create supportive environments in which people can practice their skills, and 5) reorient health services so they become more focused on prevention and health promotion issues, rather than only on disease management issues.

To execute these five strategies, health promoters need to play three roles:

❶ ***Enablers***. Working with individuals, communities, work sites, and different organizations to foster healthier environments and public policies, plus the development of personal skills.

❷ ***Mediators.*** The 1990s is the age of coalitions. Health promoters need to mediate and negotiate between very diverse groups of individuals and organizations to form coalitions around achieving healthy objectives for the community.

❸ ***Advocates*** for each of the five strategies described above.

Social Marketing in Health Promotion: What it Is and What it Isn't

Social marketing is not a theory for health promotion, nor is it health education with new words and new enthusiasm. It is not focused only on changing individuals' beliefs, attitudes and behaviors. Social marketing is a framework in which to approach understanding and addressing health and social issues through environmental changes, public policy, and behavior changes for some segment of the population. None of us who do this for a living is naive enough to assume that simply putting posters up in a classroom is going to change anybody's behavior. We're also not naive enough to believe that simply changing a regulation means that everyone then conforms to it. The multi-factorial issues involved in behavior change must be addressed.

Social marketing emphasizes research and audience analysis. It uses a product, price, place, and promotion mix to very specifically and very precisely target the audiences of interest. When you see a public service announcement (PSA), a poster, or a pamphlet, do not think you are seeing social marketing. When you see a comprehensive program in which these things are part of the tactics used to reach a target audience, then you are seeing social marketing.

Three Models of Behavior Change

The following models are useful when developing social marketing programs, because they help us to understand what is likely to happen when a behavior change is introduced into a population.

Diffusion of Innovations

Thousands of studies of a variety of behaviors illustrate that whatever the innovation, most of the time adoption of an innovation follows an s-shaped curve. At the beginning of the process, very few people are aware of the behavior change they are being asked to make. Over time, more and more people start engaging in, or adopting, that behavior. There is usually a critical point on the s-shaped curve around 25 percent. When about 25 percent of the population has adopted a new health behavior, the curve begins to accelerate quickly.

What we try to do is get that curve as high as we can to reach the most people who will adopt that behavior, and then sustain it over time. Contrast that with a "fad" curve, which is when a few people start adopting a behavior, but less than 25 percent do, and then people start dropping off and the curve basically goes away. Until about 25 percent of the population makes the behavior change, there is a slim chance of maintaining the behavior in the population.

Social Learning Theory

Social learning theory encompasses different ways to make people change their behavior, the process for doing so, and some things to think about to help people change their behavior.

When people are at a very low level of awareness about the health behavior, building awareness is the key focus. As more and more people start getting involved in the behavior, the program strategy shifts to providing information. Next, it gets people to try the behavior, then it reinforces the behavior. Many of us think that once we get people engaging in a behavior, we can stop. The whole idea behind social learning theory and behavior change theory is that people must be reinforced. When that step is left out, people relapse.

As we move up the s-shaped diffusion curve, the next step becomes contextual support or environmental and public policy changes. By this point, we are into the population group that diffusion of innovations terms the late majority or the laggards. These are the people who are really tough to change; the environment needs to start changing and their friends and people around them need to change before they will change, too. Finally, sustainability needs to be built in to make sure that the behavior can be practiced repeatedly to avoid relapses.

Stages of Change

Stages of change is another way of segmenting the population based on their behavior. What we try to do with communications and marketing programs is address specific segments of the population. One example is people who might be precontemplators and would need awareness-building strategies to start. People who are in the contemplation stage need to have more information to get them to buy into the value of the behavior. As they move into the action phase, they need to have opportunities to try these behaviors and have their efforts reinforced.

Consumer-based Health Communications (CHC)

A model for creating messages to target audiences is Consumer-based Health Communications (CHC). The CHC model stresses understanding the consumer's reality as well as epidemiological and clinical research. It focuses on consumer research to get a vivid picture of what the audience's values, beliefs, attitudes, desires, needs,

and current behavior are. Then we can better create a message that fits their lifestyle and their psychology, not just our scientific facts.

We use CHC to create message strategies that help us define a specific action that we want people to take. This action will be a step toward the health behavior. In the 5 A Day program, for example, the target audience currently eats roughly 2.5 to 3.5 servings of fruits and vegetables each day. We tell them, "You're eating three and that's great. Just add two more," rather than telling them to eat five servings.

The CHC process also involves looking at the kinds of benefits we promise the target audience; the supports we use for those benefits; and the times, places and states of mind—or "openings"—we can use to reach people. Finally, the process includes identifying the image or tone the campaign should have so that the target audience will react to it in a favorable way.

Evaluation Issues

For social marketing programs, we need to think about what outcomes we are evaluating. With the 5 A Day program, many would try to evaluate the recommended health behavior: eat five fruits and vegetables a day. They would probably measure this in the population as a whole. That's the wrong evaluation point for a social marketing program. We are not trying to get the population to eat five servings of fruits and vegetables a day. We are trying to get a specific target audience to add two servings. We need to be very clear when we are developing social marketing programs about what a marketing communications program can expect to achieve.

Formative research is another important part of developing a social marketing program. The first step is looking at the audience and segmenting it into the most practical and feasible groups given the program's resources and objectives. Once the audience segments are identified, we spend more time trying to understand each segment's needs, beliefs and attitudes. We also compare the target segments with those already engaging in the desired behavior. We then spend time trying to understand the channels that people will listen to and respond to. Which ones are credible? Authoritative? Which ones are most accessible? We also look at the environment to figure out what can help send the message and reinforce it.

Concept testing is another part of formative research. Once we have some program ideas, we try them out with some target audience members before developing them. That way we know in advance if the materials or services are something the audience is likely to use. Market testing on the products to be developed is another step in the formative research process. When we think we have come up with a great new product, we write out a paragraph to describe it and test it with audience members to see whether they are even interested in it. We test out promotional strategies in a similar fashion.

Product pricing is another area of market testing. Pricing is not necessarily how much we will charge for the product. It includes other costs, such as social costs, time and effort, etc. The other side of pricing is benefits. What are the positive things that people can receive from engaging in this behavior, and how do we make them tangible and real? All the obstacles, or barriers, can be removed but if people aren't motivated to do something, they won't. It's important to focus on benefits and positive motivations when working on product pricing.

Program monitoring data is most helpful when it is available quickly—within a few weeks. That way, the program can be changed to meet new needs. A program monitoring system tallies targets and message types.

To whom is the message being delivered? What is being said to them and at what intervals? Program monitoring should be time based. This chronological point of view allows you to understand, step by step: 1) how your program is rolling out, 2) how it is being refined, and 3) what impact that has on how you are reaching and effecting changes in your target audiences.

Program monitoring can include going out to the message receivers and getting feedback from them—whether they are intermediary gatekeepers or target audience members—through customer satisfaction surveys and other techniques. Many studies also look at indirect and unintended effects. For example, the early cholesterol education messages were along the lines of: "Eat low-fat diets. Low cholesterol levels are best." Many parents reacted by putting infants and very young children on very low-fat diets, raising concern among pediatricians. In response, the message was modified to emphasize that the behaviors were not recommended or necessary for children under 2 years of age.

Obstacles to Evaluation

There are five common obstacles to conducting evaluation in social marketing programs:

1. ***Research*** is reserved only for the "big" decision, which is usually about money. But most of the decisions made—about who will be targeted, how they will be reached, and what the message is going to look like—are all big decisions in social marketing programs.

2. ***Survey myopia.*** Research does not have to be done by surveys; qualitative research has a role to play as well. Surveys and randomized designs keep many people away from doing this kind of evaluation; it doesn't have to be that way.

3. ***Research is expensive.*** There are lots of inexpensive ways of getting research done. For example, college or university students often need practical experience doing research, and are available free (for class credit) or at relatively low cost.

4. ***The sophisticated researcher myth.*** Program staff can do solid research to answer some basic questions and pick up very good leads about how to structure a program.

5. ***Most research is not real.*** We commission these big studies that result in voluminous reports that sit on the shelf. Social marketing research needs to be action-oriented. It has to lead to very specific and very tangible options and recommendations for modifying the program to make it more effective. Doing this type of research requires quick turnaround.

Examples

The *Know Your Cholesterol* campaign, part of the Pawtucket Heart Health Program, began in 1985. It included a screening education program, dietary recommendations and a follow-up protocol (mail and telephone surveys of people identified at screenings as having high cholesterol levels). The campaign products included a nutrition self-help kit that all participants received, tip sheets about nutrition, the "rate your plate" score, a restaurant program with menu labeling, and a grocery-shelf labeling program. The campaign also included outreach to physicians, telemarketing, newspaper and radio public service announcements, a 4-week series of news

paper columns, targeted direct mail, various presentations, and community events including cholesterol screening, counseling, or referral events (SCORE).

Every person who went through events that included a behavior change component filled out a process tracking form. It included the date, the person's name, address, telephone number, date of birth, and gender. We collected them on more than 100,000 people. It allowed us to do many interesting market tests and market tracking studies.

The tracking system was used to monitor what was happening in the campaign and with participants. For example, the SCORE events were promoted to 500 35- to 55-year-old men through direct mail. We tracked how many of them came in for a screening event during the month. Three hundred physicians received mail pieces educating them about the new consensus development guidelines, 165,000 people were getting behavior-change messages through the media, and about 1,500 people got screened in the first 4 weeks of the program.

How people fall in the different categories can also be tracked, which helps assess how many people are changing behavior. For example, we found that more people lowered their blood pressure level than increased it during the first 4 weeks (and during the subsequent 2-month followup period). We also tracked participation by site, which told us where to concentrate our efforts as we rolled the program out, and provided demographic information about participants.

Another example of tracking comes from the 5 A Day program, where media coverage and public awareness are tracked. Are the media covering the 5 A Day message the way it is being put out to them? Or are they putting their own spin to it? How many people are aware of 5 A Day and the 5 A Day messages?

For the media content analysis, a sample of 1,100 news clips appearing between July 1992 and October 1993 was coded for key program messages and the tactics used to disseminate the message. Eighty-six percent of the clips had 5 A Day core messages in them. Forty-one percent mentioned specific health benefits for eating five fruits and vegetables a day. Twenty-eight percent included healthy eating strategies. Five percent talked about barriers to eating five fruits and vegetables a day. From this we learned that our core messages were getting good coverage, and health benefits were receiving a fair amount. But relatively few stories were telling people how to eat five servings of fruits and vegetables a day.

Thinking about the media as a target audience, the challenge is to get them to start giving people more ideas about ways they could stay healthy. We would prefer they spend less time on specific health benefits because the consumer audience isn't worried about health benefits.

Audience tracking studies have been conducted for the last 4 years for 5 A Day, beginning with a baseline in 1991. At baseline, only 8 percent of people in the U.S. population knew that five or more was the number of servings of fruits and vegetables a person should eat each day for good health. By the following September, roughly 22 percent knew; 29 percent knew in 1993 and it leveled off at 27 percent in 1994.

Going back to diffusion theory, we're at the point where something may start happening if 5 A Day doesn't become a fad. As we saw on the earlier graph, 5 A Day has reached the critical mass of 25 percent of the population. If it's a fad, we will begin to see decreases in awareness. Otherwise, increases will continue.

Conclusion

People also look at these numbers and say, "You're not doing a whole lot out there; it's only 29 percent." Twenty-nine percent represents more than 60 million people who now know that they are supposed to be eating five fruits and vegetables a day. Social marketing often gets held to accounting measures that people are used to using with small-group research (20-60 people). If we only get 20 percent of 60 people that change, we say, "That was bad work, bad study, bad design." If we get 20 percent of 260 million people, it's a whole different number. The 5 A Day campaign saw almost a 400 percent increase in the number of people aware in 2 years. Population-based behavior changes take time.

Program Evaluations in the Community

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Background on Coalitions

Coalitions take a community approach to addressing complex problems, such as cardiovascular disease. Schools, people from different sectors throughout the community, health organizations, and businesses all come together to identify what they can do in their sector to make a difference. What are the specific programs, policies, and practices that they put in place to effect the program mission? A nutrition-related coalition could be looking at preventing cardiovascular diseases or some cancers, enhancing birth outcomes or child development, and improving nutrition for older adults. Dietary risk factors play a part in all these issues.

Examples used in this presentation are from our work with Kansas LEAN, which is a statewide coalition initially started with the Kaiser Family Foundation Project LEAN efforts. They found local funding from the Kansas Health Foundation. From Kansas LEAN came the Kansas LEAN School Health Intervention projects in Dighton and Salina, Kansas. The projects focused on a community coalition effort to support components such as nutrition education, modifying school lunches so they are healthier, and some physical activity opportunities in the community. These two projects were so well received that the funding agent, along with the state health department and other agencies, found funding to replicate these initiatives in six more Kansas sites.

Evaluating Coalition Activities

There are many things to consider in selecting your evaluation questions: 1) What do members and leaders of the community partnership want to know? 2) What are you interested in learning about the effects of your project? 3) What are the requirements from grant makers and others? 4) What are their interests—are they interested in a process, or the outcome? Also consider the resources that are available to address the questions.

When we approach evaluating a community coalition or a partnership, we need to consider a number of questions around process measures, intermediate outcomes, and more distal outcomes. We look at the process of an

initiative from its beginning to its end. For example, was the community mobilized to reduce risks for cardiovascular disease (CVD)? Did the people who represent the different sectors (schools, health organizations) take action toward their mission? Did they take steps toward implementation? Were members satisfied with the partnership? Were they satisfied with the planning? The leadership? Were resources used appropriately?

For our projects, the community had key questions for intermediate outcome measures. First, we asked what changes in the community resulted from the initiative. What new programs, policies, and practices took place in the initiative that were consistent with the mission? It takes a while to get to the bottom line, for example reducing cardiovascular disease or cancer. Intermediate outcomes help illustrate how much progress is being made. Other questions assessed whether the changes were important to reducing risk for CVD, and what critical events seem to spur rates of community change.

Questions for more distal outcome measures included the following: Is there a change in behavior related to risks for CVD? Does the initiative have a community-level outcome related to the risks for CVD? Is the community-level outcome related to changes facilitated by the initiative?

We used a monitoring system to get at the process in some intermediate outcomes, such as community change and community action. We used surveys to measure member satisfaction and outcomes, such as how important the community changes are. Most of what is presented refers to some time-series designs, such as looking at change over time or growth over time. When possible, we used group designs to look at comparison communities.

Detail on Measurement Techniques

Monitoring system. The monitoring system looks at process and intermediate outcome assessments. It addresses two primary questions: Was the community mobilized to reduce risk for CVD? What changes in the community resulted from the initiative?

The monitoring system is a way of tracking major events and accomplishments in a coalition. It is useful for understanding the initiative, deciding where to focus efforts, promoting awareness of accomplishments, recruiting support, and securing grants. It's a log system where people involved in the initiative record what they are doing. Log entries are clarified and categorized by the people in charge of monitoring.

The data is then graphed and provided to coalition leaders. For example, in the category of community change, changes in programs, policies and practices related to the program mission would be recorded, such as changing school lunch menus to reduce fat, adopting a nutrition assessment with students, and changing supermarket practices. The graphs provide evidence for the funders and community members of the types of changes that are being made in the community to support the effort.

Assessment of how important changes are to reducing CVD. We sent out a survey to coalition members and experts in the field to assess how important each community change is for the goal of reducing cardiovascular disease. The experts can use the literature to assess the importance of each change, and the community members often know the kinds of things that need to change in their community. What's important in one community might not be important in another. Each change is rated on a five-point scale (five is the highest rating). The changes are then multiplied by the rating and graphed to get a sense of what changes are most important. In our communities, most of the changes were rated "4" or "5."

Satisfaction surveys. It's important to learn if coalition members are satisfied with the initiative, but getting coalition leaders to ask members how things are going is often hard. We used a survey to assess member satisfaction, thereby informing the partnership of the strengths and weaknesses of the coalition. The survey results provide a good opportunity to celebrate the coalition's successes and make corrections to address problems.

Community-level indicators for CVD. These indicators are ways to obtain information about the more distal effects of the prevention effort (and some measures of a community's health potential), by counting opportunities in the community for low-fat eating, physical activity, smoke-free living, etc. They provide a strong picture of the initiative's effects on cardiovascular health in the community as a whole. Categories of indicators include the following: 1) information and skills building; 2) point of purchase information; 3) healthy menus in schools and work sites; 4) environmental changes, such as healthy alternatives in vending machines; 5) policy and regulation, such as looking at publicly funded food programs that follow nutrition guidelines; 6) formal work-site policies that support healthy eating.

We can also look at the relationships between intermediate outcomes, community change, and community-level outcomes. For example, as community changes increase, we see a decrease in a community-level outcome: the percentage of adults who are overweight. As the community changes level off, there is less of a decrease in that outcome.

Interviews with key participants. This instrument looks at process, intermediate outcome, and the more distal outcomes. It asks, "What critical events seem to spur rates of community change?" It provides a way of learning about important events in the life of the initiative, helps identify factors that affect the initiative's success, helps identify negative side effects, and provides a history of the initiative. We ask people to list each critical event. Then we ask them why it was important, what the context was, what the consequences were, and so on. We also ask people to reflect on the lessons they learned about the initiative, and to look at future directions.

Lessons Learned

1. The primary purpose of the evaluation is to support movement, not to judge success or failure.
2. Evaluation should begin early, and be an integral part of the development process.
3. Evaluation should be participatory and collaborative. The monitoring system can help establish and maintain effective functioning of the initiative; it provides a picture of where energy is being spent and whether the initiative is producing the desired effects.
4. Feedback to coalition members and funders should be provided at regular intervals, especially early in the initiative's development. We provide data monthly early on, and then quarterly after a couple of years.
5. Community leadership can use evaluation information to attract and maintain support and resources.
6. Grant makers can use evaluation information to encourage productivity and accountability.

Choosing Appropriate Dietary Data Collection Methods to Assess Behavior Changes

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It is important to separate measuring dietary change from measuring diet. There is a big difference between the two. The science of measuring dietary change is in its infancy. Most of the research on measuring diet is in three areas:

1. Epidemiology (particularly trying to measure a relationship between diet and health outcomes)
2. Nutritional sciences (mostly trying to understand the relationship between diet and some kind of underlying biological mechanisms)
3. Public health (to describe broad-scale trends in large populations)

But the science of dietary change per se, especially in the context of intervention trials, is relatively underdeveloped.

Questions for Evaluating Diet Intervention Studies

What kind of intervention is it? Is it a clinical intervention, with multiple groups over a long period of time, or is it a public health intervention where the intensity per individual is relatively limited? The effect size for clinical interventions is large and hopefully fast. In a public health intervention, it's small, and at best, it's gradual.

What do you expect to happen because of it? For example, consider 30 percent energy from fat. In 1990, we started at 38 percent. Do you expect a relatively fast decrease where the change is maintained, or is it going to be some squiggly line where over time it gets down to 30 percent? The underlying process that you expect to take place is going to affect how you evaluate.

How can expected outcomes be operationalized in real measures? Often, we think of outcomes in very global, nonspecific, and meaningless ways. We think of dietary adequacy, food security, and nutrition knowledge. At the community level, we look at availability of healthful foods, availability or existence of nutrition programs, or media coverage. Individual measures can be aggregated to get community measures, but they need to be kept separate conceptually. A survey on a random sample of the population can be aggregated, but it still needs to be

1. Participant burden—if the burden is high, they won't cooperate and the sample will be biased. Fatigue will be an issue for those who do complete it.

2. Complexity of administration—sometimes self-administered instruments won't work; sometimes a trained dietitian is needed to handle data collection.

3. Complexity of analysis—Know how the study will be analyzed. Sometimes it's just too complex.

4. Scientific measurement issues in terms of validity and reliability.

5. Responsiveness—does the instrument measure the behavioral target and is the behavior going to change enough that statistically the measure can pick it up. Sometimes, shorter instruments do a better job than longer ones. It depends on what each is measuring. For example, in one study using a 98-item food frequency questionnaire and an 18-item diet habits questionnaire, the responsiveness for the diet habits questionnaire was higher.

How will it be assessed? Separating the effect of the intervention on the measure versus the effect of the intervention on behavior is very difficult. It could be done with objective measures, but with self-report, bias is always an issue. Problems with validity and reliability abound with the current dietary intake measures.

Comparison of Standard Dietary Intake Measures

A number of measures can be used when trying to evaluate how an intervention has changed people's usual eating habits. Major considerations when making a choice among the following measures include cost and bias—to what extent do people tell you what you want to hear, what they think they should be eating, and/or what your intervention told them?

24-hour recalls provide nutrient information and are useful with an intervention-control design where the outcome can be measured by comparing the mean of one group to the mean of the other. If individual outcomes are of interest, the measure is problematic because intraindividual variability is so high. Multiple 24-hour recalls would be needed, which is very expensive. Unannounced 24-hour recalls have relatively low bias: People may preferentially forget what they ate, but they can't change it. However, they can't always say exactly what they ate. They may not remember details. Compliance is high with this measure, because people don't have to prepare anything—just spend 20 minutes answering questions.

A state-of-the-art system for collecting 24-hour recall information is the University of Minnesota's Nutrient Data System. This computer system prompts for information about each food, providing standardization and eliminating the need for clinical dietitians to do the interviews.

Four-day diet records. This method is very expensive and time consuming for participants and evaluators. Also, the bias is extraordinary because people do what they think the interventionist wants them to do for the four days. Other problems include a potential lack of understanding about what was eaten (e.g., was the chicken breaded?) and literacy. Compliance is horrible.

Food frequency questionnaires are inexpensive and useful because they generate information on nutrients

and usual food use. However, people don't really know the answers, i.e., if they are asked how often over the last 6 months they ate broccoli, they cannot retrieve the answer from memory; they have to construct it. The most easily biased dietary assessment tools are food frequencies. Other limitations are the extent to which people can describe what they are eating and literacy. Compliance is fair; the questionnaires generally take 20-40 minutes to complete.

For intervention research, standard food frequency questionnaires may not be useful because they will not be sensitive to the behavioral target of the intervention. For example, if the intervention is fat modification, most food frequencies don't have enough specificity to detect if people did what the intervention told them to do unless they are customized. Also, a summary section is needed to allow adjustment of the data; otherwise, the more foods asked about in a category, the higher consumption will be.

An alternative to traditional food frequency questionnaires is the short food frequency questionnaire; these work well if the nutrient of interest is concentrated in a few foods, such as calcium or beta-carotene. They do not work well with macronutrients, except for alcohol. And they do not control for total energy.

Diet habits questionnaires typically include 18 to 25 items asking people about their dietary habits (using a four-point response scale); they can be used to scale dietary intake. A moderate amount of bias results from people providing "socially desirable" answers rather than true answers. Compliance is pretty good, and they validate well for percent energy from fat and for measuring fruits and vegetables. However, they are tricky to develop, requiring some expertise in psychometric theory and a lot of expertise in evaluation research. Another issue with these questionnaires is that the results aren't easily interpretable—instead of energy from fat, the result is a number like 1.36.

Measuring Stages of Change

Stages of change correlate well with other measures of diet. For example, some results from the *Working Well* trial on fat intakes showed those in precontemplation to decision stages had fat intakes of 39.3 percent. When they got into the action stage, it dropped to 37 percent. In maintenance, it dropped to 30.5 percent. The same thing is true for fiber, and for fruits and vegetables: The percentage is flat until the action stage, where it increases.

Closing Thoughts

Don't make up a measure and think it's going to work. Spend time pilot testing and understanding how you are going to analyze it. It's very difficult to come up with items that are meaningful, reliable, and valid. The measures used need to be appropriate to your population, in terms of language and in terms of the administration method. Make sure your measures have some responsiveness. They must be sensitive to the intervention both in terms of the effect size and whether they fit with the behavioral or cognitive target of your intervention.

Avoid science by democracy. Look at some experts' work rather than having everyone working on a project vote on what they like or don't like.

Finally, consider the money it costs and the time it takes to hire a consultant. Do some pretesting, and do some thinking to make sure the tool is going to work. Making certain your measures work when evaluating these studies is essential.

III. MEASURING CHANGE IN THE REAL WORLD: LEARNING FROM ONGOING AND PAST PROJECTS

How Related Fields Use Evaluation to Document Changes in Health Behaviors

What We've Learned So Far: Ten Observations for the Real World

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1. It is possible to change behavior and to measure those changes.

However, it all depends on what kind of change, with whom, and how one intends to intervene. Changing behavior is very complex and measuring those changes is very complicated. Very often, measuring change takes decades. While nationwide drops in smoking prevalence and stroke mortality are behavior-change success stories, we have been working on smoking for 30 years, and high blood pressure for 25 years. Behavior change cannot be measured in fiscal years, and it is important to resist policy/decisionmakers who will determine your program's success on a year-to-year basis. When smoking or high blood pressure rates are examined annually, there are fluctuations. Only by looking across decades do we see a dramatic drop.

Changing behavior—and measuring that change—also depends upon the type of intervention and the type of evaluation. Successful interventions are based on multiple theories and models, and are very complicated, multidimensional interventions with many different strategies. Their evaluations also are multidimensional with many evaluation methods and measures. We cannot expect to see similar kinds of changes with a one-dimensional program or evaluation effort.

2. If you can afford an intervention, then you can afford to evaluate it.

Often, in the "real world," we are handed just enough time and just enough money to do the intervention. Make sure evaluation is built into the timetable up front, and make sure decision-makers and budgeters understand what is required to do the evaluation as well s the intervention.

Not every evaluation has to be elaborate. Often, there are quick and easy ways to monitor the program, so the excuse of no money or time to evaluate is rarely valid. However, there is a minimum below which the intervention and the evaluation won't work. In situations where you are not sure you have the resources to intervene or evaluate, think through whether you can make a change and measure that change before committing resources to it. Sometimes these are questions we don't ask because we have been given an assignment. As professionals in our field, we need to ask them more often.

3. Evaluate to achieve—not just measure—success.

Evaluation really is how success is achieved, and that is what is most important in the real world. Outcome evaluations are terrific for policymakers and decisionmakers, and for pilot programs before replication. But if the program has a limited time frame, process evaluation is critical for mid-course corrections, because there may not be a chance to replicate. Those changes need to be made the first time around.

Pretesting and other formative research is vital, to ensure the program is the best it can be initially. It is especially important if the time frame is short and mid-course corrections may not be able to be made. But lack of pretesting can also cause problems in large programs with very elaborate outcome evaluations: flaws in the materials may impact the outcome of the program, leading evaluators to conclude that the program didn't work when in fact the materials needed to be refined.

4. The evaluation designer and the program designer must work together on both aspects of the program.

The same theories and models need to be used for intervention and evaluation design; both parties need to be working from the same premise. Evaluators need to understand what the program can do, so they can design appropriate measures. Without close collaboration with the program designer, they may be measuring things that are unrealistic to measure and missing areas where great progress could be shown. Similarly, program designers need to build in evaluation needs from the start, to ensure they are getting the right information in the right way from the field and from the consumer.

5. Programs are designed to effect more than one type of change. Evaluations should measure more than one type of change.

As several speakers noted yesterday, the role of our interventions isn't so simple as changing behavior. Rather, our interventions must change all of the variables, or as many as we can, that we think influence the behavior. Then we hope that behavior change follows. If a program is trying to affect a whole series of variables, then evaluation needs to measure intermediate factors as well as behavior change (i.e., interpersonal, environmental, accessibility and availability changes).

6. You don't have to replicate costly evaluations if you can use other studies as proxy measures.

Not every program has to have the most elegant evaluation design. Often, other people have already done it, and their work can be used to illustrate that your program can have an effect. One example is the meta-analysis done by Isobel Contento and her team. Another is a review showing the results of well designed campaigns. Sponsored by the National Heart, Lung, and Blood Institute, it looked at hundreds of articles discussing public health, media, and community campaigns.

Once you have reviewed other studies, concentrate on evaluation measures that assure the quality of your intervention—otherwise it won't have an effect.

7. The elegance of the evaluation should match the complexity of the intervention.

Sometimes the evaluation team is stronger, in power or in dollars, than the intervention team. If the evaluation is not linked back to what the intervention realistically can be expected to do, the intervention will be shown up as a failure without ever having a chance. Conversely, if the intervention is flawed, the evaluation design cannot overcome that flaw.

8. The desired outcomes—and what the evaluation measures—should be based on realistic expectations for the length and complexity of the intervention.

Both the intervention and the evaluation need to be realistic based upon the status of the target audience. For example, at one point when the National Heart, Lung, and Blood Institute was working on high blood pressure and cholesterol education, they had two very different target audiences. For serum cholesterol, the American public did not know what it was. NHLBI worked with precontemplators, trying to introduce them to the issue and get them interested in it. For high blood pressure, the audience was people who have high blood pressure and have been on medication for years. These were people in the maintenance stage who found it very hard to comply with treatment over the rest of their lives. The program designers were being very realistic about the kinds of changes they wanted to see for the cholesterol program versus the high blood pressure program.

Also, we need to redefine what a realistic outcome is. In public health, we work with the hardest audiences to reach, then expect dramatic changes. If we make small changes, we feel we have failed. Contrast our approach to that of the private sector. Alan Andreasen sometimes uses Chevrolet as an analogy—that there is not one kind of Chevy, there are many of them for different audiences. Consider that maybe 3 percent of Americans want to buy a Chevy. Then split that 3 percent into the different Chevy models, and look at the percentage who will actually buy—perhaps 10 percent. The numbers are getting very small, but the manufacturer still shows a profit.

What do we do in public health? We take the hardest market to reach, not the easiest. We are always working with people who are at high risk, who have all kinds of barriers to behavior change. Then we look for a decline by 50 percent in the stroke rate. Or we want to get all Americans to quit smoking. If we make a 5 percent change, we think we have failed and often we lose budget. We need to step back and think about what is realistic to accomplish.

9. Evaluations, like interventions, need to be designed with a purpose and a target audience in mind.

Market segmentation applies to evaluations as well as interventions. If policy/decision makers are the audience, they want to know what kind of change occurred because of your efforts. If you want to go back to a program target audience, they may be most interested in whether the intervention works for people like them. Implementation managers want to know what is working, so they know what they need to fix.

10. Some components of evaluation design are transferable from program to program; methods and instruments should be more widely shared.

It is much more common to see cross-sharing of implementation strategies, materials, and training rather than of evaluation designs and instruments. There are many lessons to be learned from conducting evaluations that should be shared. When starting to evaluate something, remember to call a peer and see if they have anything in their files that will help you get started.

The Child and Adolescent Trial for Cardiovascular Health (CATCH)

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Background

The primary goal of the Child and Adolescent Trial for Cardiovascular Health (CATCH) was to assess the benefit of school-based interventions designed to promote healthful behaviors in children and ultimately to reduce their risk of cardiovascular disease. The hypothesis of CATCH was that the interventions would lower the consumption of total fat (specifically saturated fat) and sodium; increase physical activity and nonuse of tobacco; and that these changes would favorably influence blood lipids, blood pressure, physical activity, and diet.

CATCH was unique in several aspects:

- It was the first such trial to integrate a number of successful approaches in a multi-year program involving the entire school environment, school children and their parents, in an ethnically diverse population, in four geographic areas of the United States.

- It identified and measured change at two levels: 1) the institution, through changes in policies and practices for all children in the school; and 2) the individual child, through classroom and parent involvement programs.

- The trial design used the school as the unit of intervention and analysis and a large number of schools were randomized to evaluate the intervention with adequate power.

CATCH has been ongoing since 1987. It is currently in Phase III, which involves tracking the behaviors and cardiovascular risk factors of the cohort until 1997. Field centers are the University of California at San Diego, the University of Minnesota, the University of Texas at Houston, Tulane University, and a coordinating center out of the New England Research Institute. CATCH funding is provided by the National Heart, Lung, and Blood Institute.

Overview of the Students, Schools, and Interventions

CATCH involved approximately 5,100 students who were in the third grade when the intervention began in the 1991-1992 school year. Of these students, 79 percent participated in the blood assessment at followup and formed the primary cohort for student-level study findings. The cohort's average age was 8.76 years at baseline. It was approximately 52 percent male, 13 percent African American, 14 percent Latino, 69 percent Euro-American, and 4 percent other or non-classified ethnic groups.

The 5,100 students represented 61 percent of third-graders enrolled in the 96 public schools participating in the study. Schools were recruited based upon distance from the study centers, ethnic diversity, food service characteristics, their commitment to offer at least 90 minutes of physical education per week, and their agreement to participate in a 3-year study requiring cooperation with random assignment to treatment and control status. Randomization occurred after all baseline measurements were completed.

There were 56 intervention schools (14 per field center) and 40 control schools (10 per field center). Intervention schools were further randomized into two equal subgroups. One received a school-based program consisting of school food service changes, physical education, and the CATCH curriculum. The other received the same school-based program plus a home and family-based program. Control group schools received the usual, if any, health curricula, physical education and food services, but none of the CATCH interventions. The CATCH interventions began in the 1991-92 school year and continued as students progressed through grades 4 and 5.

The CATCH interventions consisted of the following components:

- In-class curricula that focused on diet, physical activity, and tobacco usage
- Home curricula and family fun nights, supporting behavioral change in children
- School environment programs relating to food service changes (lowering fat, particularly saturated fat, and sodium in school meals) and a physical education program designed to increase the levels of moderate to vigorous physical activity in children
- For fifth graders, a smoking prevention program consisting of a classroom curriculum, home curriculum, and active encouragement of CATCH intervention schools to be smoke-free environments

Tracking and Evaluation

Baseline measurements of school and student-level behavioral outcomes were made at the beginning of third grade and each spring in third through fifth grade, with one exception: menu analysis was made at baseline, and during the fourth and fifth grade spring semesters. Physiological measurements on students were done at the beginning of grade 3 and at the end of grade 5.

Eat Smart: Food Service Intervention

The intervention school districts used one of two types of food delivery systems: either the food service director planned the menus and purchased food for all schools, but each school prepared the food, or the district had a central kitchen and delivered to satellite school kitchens.

Eat Smart, the food service intervention, was designed to give children tasty meals for school lunch and, where available, breakfast (59 of the 96 schools). Menus averaged no more than 30 percent of total energy from total fat, no more than 10 percent of energy from saturated fat, and a reduction of 25 percent in sodium levels.

The program involved four major intervention areas: menu planning, food purchasing, food preparation (including recipe modification in food production), and program promotion. Thirty *Eat Smart* guidelines were developed to assist with program implementation. The guidelines were based on the assumption that if a school cafeteria could meet all applicable guidelines and use the nutrient criteria, the dietary objectives of the *Eat Smart* program could be attained. Guidelines included activities such as skinning chicken, de-fatting ground beef, and whipping butter.

Materials developed to assist food service personnel included:

- A school meal program guide for school food service directors, managers, and technicians
- A recipe file box that included quantity recipes meeting both the USDA reimbursable meal pattern and the *Eat Smart* fat and sodium criteria
- A vendor product handbook that contained a list of products meeting fat and sodium criteria (and acceptable to students)
- *Newsline,* a one-page, two-sided bimonthly bulletin distributed to all cafeterias
- Intervention posters to display the *Eat Smart* guidelines and food preparation techniques so staff could use them as a quick visual reference

Implementation of *Eat Smart* was supported by comprehensive training sessions, annual booster sessions for food service staff, and monthly visits by CATCH personnel to observe and document implementation of the guidelines, solve problems, and provide feedback and support to food service staff.

Process and Outcome Nutrition Measures

The *Eat Smart* process evaluations were designed to assess implementation of the intervention, contextual factors, and external and competing programs that may affect implementation and influence study outcomes. Measures included:

- *Exposure (dose),* to document the amount of the intervention participants received. Dose was measured by training attendance forms, intervention visits, promotional activities, school meal participation, and nutrient content of school meals relative to program goals.
- *Fidelity,* to document the degree to which protocols were followed by food service staff.
- *Characteristics of the schools* and staff that could mediate the impact of training and the extent of program implementation (food service staff knowledge, demographic characteristics, experience, self-efficacy, turnover rates, other programs independent of CATCH that may have impacted CATCH outcomes) and characteristics of the students that could affect program implementation through school meal participation.

Main outcome measures for nutrition were designed at the school and individual level. At the school level, changes in food service offerings were assessed using the average of five menu days. Vendor product information was also collected at baseline, interim and followup. At the individual level, a health behavior questionnaire assessed reported knowledge, intentions, choices, efficacy, and support. Dietary intakes were assessed using a food-record-assisted 24-hour dietary recall. Physiologic measures related to nutrition also were assessed.

All *Eat Smart* process and outcome measures have been published in a supplement of *Health Education Quarterly,* No. 2, 1994.

Results

Student participation in school lunch did not change as a result of the intervention. When meals were examined, there was a slight decrease in total calories of the school lunch menus in the intervention schools. However, the energy levels still met the one-third RDA. Significant decreases in both total and saturated fat were observed in intervention schools. Although reductions were also seen in control schools, they were less dramatic. Sodium content increased in both intervention and control schools. When sites were analyzed independently, it became apparent that vendor products were responsible for the increase.

Looking at student-level outcomes, a comparison of baseline to followup data shows that fat intake was significantly reduced by children in the intervention schools, and the reduction was much greater than in control schools. Much of the reduction in fat came from lower intakes of saturated fatty acids.

There was a corresponding increase in the percentage of calories from protein and carbohydrate in the intervention schools compared to the control schools. Data are showing that the vitamin and mineral intakes of the children were not affected due to these changes in the diet.

Physiologic measures showed no differences in body size at baseline or followup between the intervention and control schools. Growth was within normal limits of expected patterns for the age group. Similarly, pulse rate and blood pressure were not significantly different for students in intervention versus control schools. However, students' total blood cholesterol fell .4 milligrams more in the intervention than in the control schools.

Summary

CATCH was successful in demonstrating that a school-based program involving school food service, physical education, classroom curricula, and the family can be successfully implemented in diverse populations in four areas of the United States. CATCH successfully changed both the policies and the practices of schools and children's behaviors by the end of the 3 years, even given these modest exposure levels.

National Dairy Council

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Background

As part of an effort to update the dairy industry's *Food, Your Choice* nutrition education program, research was commissioned on the needs for dairy product information in the classroom. The goal was to provide a nutrition education program that teaches children the importance of choosing nutritious foods, while stressing the benefits of dairy products. The study had three objectives:

- Determine whether there is a role for dairy farmer organizations in schools, and if so, define the attributes and dimensions of that role

❷ Assess potential opportunities for enhancing dairy product exposure and usage in the school setting by generating alternative and ideal methods for presenting nutrition information to students and education professionals

❸ Determine perceptions about the optimal grade level for presenting nutrition information so that resources could be channeled efficiently

Research to date has covered four phases: 1) focus groups, to investigate the scope and boundaries of both nutrition curricula and product issues; 2) a large-scale, national study to provide statistically reliable and actionable strategic marketing and planning information; 3) a pilot test; and 4) tracking utilization and acceptance of the program over time.

Research Highlights

Nutrition was rated important by all audiences surveyed (administrators and school board members, teachers, food service personnel, parents, and students). Food service personnel were more likely to rate it extremely important.

Teaching nutrition was thought to be more important at the elementary level than upper grades. Current teaching patterns reflected this perception, with nutrition more likely to be taught at the elementary level (43 to 48 percent of teachers said they taught nutrition in first through sixth grade). Eighth grade was the point at which teaching nutrition begins to drop. Consistent with these findings, there was strong support for nutrition education at all grade levels, but competition (from subjects such as math, drug education, physical education, and sex education) was less intense at the elementary level.

However, satisfaction with existing nutrition programs was not optimal; only 13 percent of teachers rated them excellent (although another 69 percent rated them very good or good). Qualitative work revealed that teachers were trying to format their own nutrition education program by looking at articles in magazines, newspapers, etc. Consequently, interest in something new was very high, with 52 percent saying they would definitely be interested in a new program.

Developing the New Program

Research identified the following decision criteria for teachers selecting a new program:

- Cost—budgets are tight
- Fit with regular curriculum, such as math, science and reading, otherwise, there may not be enough time to justify it
- Number of hands-on activities
- Intrinsic interest for both students and teachers

The National Dairy Council decided to target educational efforts at the elementary level, while reaching out

to teens with the dairy message through the entertainment media. For nutrition education efforts, the target audiences were teachers and superintendents, supplemented with activities targeted toward food service directors.

Two versions of *Nutrition, It is Elementary* were developed: *Snack Stars* targets second and third grade and *Snack Tricks* targets fourth and fifth grade. Both programs were built around the smart snacking concept, which was rated highly by educators. They reasoned that because students eat a lot of snacks, it is important for them to make the right choices. Also, snacking is an area of eating that is fun and an area kids can control.

Each version of the program consisted of: 1) six 30- to 60-minute lessons; 2) a teacher guide offering a teaching plan and suggestions for indepth student involvement; 3) posters; 4) black-line masters; and 5) portfolio covers.

Evaluation: The Pilot Test and Monitoring

The pilot test had four specific objectives: 1) measurement of the extent to which the program increased students' knowledge of nutrition overall; 2) students' positive perceptions and knowledge of dairy products as they relate to snacking; 3) exploration of teachers' reactions to the program based upon their participation in the pilot test; and 4) identification of whether any modifications were necessary before full-scale marketing of the program.

The pilot test included eight second-grade and eight fourth-grade classrooms, recruited from the quantitative study. Teachers were asked to teach the program over a 3-week period, and they administered the pre- and post-tests to students. Results of the pilot test showed that students increased their knowledge of nutrition and the five food groups. After the program was taught, primary students' knowledge jumped from 17 percent to 81 percent correctly identifying all five food groups. Intermediate students' knowledge increased from 35 percent to 84 percent. Perceptions of specific dairy products being snacks that are really good for you also increased significantly.

The program was modified slightly based upon teacher input and produced for the 1993-94 school year. Dairy Council members distributed the program in a variety of ways, including direct mail, workshops, and key teacher contacts. Some charged for the program while others gave it away. Once received, 45 percent of the teachers used the program (regardless of distribution method), and another 27 percent said they planned to use it before the end of the school year. The primary reason for not using the program was time constraints. The program was used as it was intended—as a supplemental nutrition program rather than a core program. Teachers planned to modify the program just as they do other curricula, adding their own creativity and tailoring it to their particular class.

Minnesota Heart Health Program

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Background

The Minnesota Heart Health Program (MHHP) was a community-based 13-year research and demonstration program that started in 1980. It involved six communities, three of which were intervention sites and three of which were controls or comparisons. The goal was to improve the health of the people of the community by 1) lowering the population levels of blood cholesterol, blood pressure, and cigarette smoking; 2) increasing physical activity; and 3) reducing the morbidity and mortality from heart disease.

The Grocery Store and Restaurant Programs

Needs assessment indicated that, rather than pamphlets and classes, what people in the community wanted was help where they purchased food and where they ate food. Programs in the grocery stores, the restaurant program *Dining à la Heart,* and school lunch programs were designed to address these needs.

As the MHHP evolved, pretesting with consumers taught us how to talk to them—and how not to. For example, the program's original message was, "Increase the use of various foods of plant origin, including grain, cereal products, legumes, seeds, vegetables and fruits." People did not understand. They wanted to know four things: 1) what foods to eat, 2) how much food to eat, 3) how frequently to eat the food, and 4) how to prepare the food. What the MHHP planners learned about how to communicate with people has been used by many other nutrition educators since. For example, the metaphor of a meat portion being the size of a deck of cards or the palm of one's hand came out of this work.

Most of the evaluation data collected was qualitative data and process data. Participation was examined first, then whether people were aware of the programs, behavior, and sales. For example, with the grocery store program, all of the major stores in two cities participated in the program, and two-thirds of those in the other city participated. Awareness of the shelf labels was about half the people responding to community surveys in all three cities. For *Dining à la Heart,* the restaurant program, about three-fourths or more of the people in each city noticed the hearts on the menu. Of those eating in *Dining à la Heart* restaurants, a little more than a third of those in each city reported that the hearts changed their menu choice.

In the grocery store program, video presentations, taste testing, and signs were used in the stores. Effectiveness of these tactics was evaluated by looking at sales data. For example, sales of top round increased significantly for the two weeks following a video presentation and taste testing featuring it. However, sales data for both grocery stores and restaurants was much more difficult to obtain when the MHHP program was conducted than it is now. At the time, it involved many site visits and creative ways of measuring change in product movement.

The School Lunch Program

The focus of the school lunch program was to lower the fat and sodium in individual menu items. After the program was in place, data collection consisted of analyzing the menu to see how often various items were offered.

Substantial change was seen. Examples include: offerings of buttered vegetables went down, while those of plain vegetables went up, and offerings of sausage pizza decreased, while those for cheese pizza went up.

Summary

The Minnesota Heart Health Program evaluation taught program planners:

- What questions to ask.
- What data are useful and how to use them.
- How to work with experts at the implementation sites to design evaluation plans and to set up the intervention and evaluation so that it fits into existing systems.
- How to measure success—sometimes, significant differences are not the only measure of success. For example, increasing sales a half percent at a grocery store represents a great deal of money to the store owners.
- How to be flexible.

Final results were published in the *American Journal of Public Health* in 1994.

Project LEAN

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Steps to Program Implementation

1. ***There must be agreement in the field about a particular recommendation.*** First, there is a level of scientific consensus and then there is agreement about a particular recommendation. Such agreement is often hard to achieve and often does not last very long. The scientific evidence can change, requiring modifying a recommendation.

2. ***Find a window of opportunity and seize it.*** Planners must be ready and able to act and respond to available funding and institutional support. Sometimes the opportunity can come and go quickly based on scientific consensus, availability of funding, and other variables.

3. ***Move quickly.*** Begin the planning process quickly.

4. ***Build partnerships.*** This step is important so that others are involved and buy into the agenda for the program, creating a broader range of support for it. More partners provide more credibility and legitimacy.

5. ***Conduct formative research.*** Focus groups give a voice to the consumer by providing an understanding of what the consumer needs and wants.

6. ***Develop policy and advocacy strategies*** to give the program a presence in the policy environment and to begin creating environmental change that will support the program's message.

7. ***Launch the program with as much visibility as possible.*** The more people that hear and know about it, the more credible its implementation will be.

8. ***Support community implementation*** of the program as a way to disseminate the message and tailor it to different audiences.

Evaluation

In the past, in the "real world" evaluation was often an afterthought or something to tie into the program after it was designed. It may have been designed when funders were asking about the cost-effectiveness of the program, how their money was spent, and what the impact of the program was. In this time of government downsizing, the days of funding big national programs with intervention and control or comparison communities over a 10-year period are gone. Today's programs will require a variety of funding sources. Sometimes there will not be time to think out all aspects of program design and evaluation planning. The challenge is to put together programs that will be sustained, are fundable, and can be evaluated.

Issues to consider when designing an evaluation:

1. ***Cost.*** Don't make the evaluation larger than the program itself. Avoid trying to answer broad outcome questions. Don't let the evaluation dictate the program by adding in components because they can be evaluated.

2. ***The magnitude of the intervention.*** Particularly with community programs, a long process of planning and development may be required before the program is in place. Look for reasonable outcomes given the time period of the program, rather than outcomes that cannot be achieved in a short time-frame. Also, don't make the evaluation an intervention. Don't collect so much data that the evaluation winds up influencing people's behavior, their thoughts, or how they relate to the program issues.

3. ***The audience for the evaluation.*** This is a critical consideration. Thinking through the kinds of questions the audience may have about the program helps focus the kind of evaluation that is done. Sometimes audiences for evaluation change, or their questions change. The evaluation cannot be retrofitted to answer new questions.

4. ***Know what is important beyond health outcomes.*** For example, it might be cost savings, gaining a marketing edge, or positioning nutrition in a positive light to garner greater support in the future.

Example: Project LEAN

Project LEAN—Low-fat Eating for America Now—was initiated by the Kaiser Family Foundation in 1988 when a consensus was attained about the importance of dietary fat as a major risk factor for chronic disease. The foundation immediately created the Partners for Better Health to help develop the program. Partners for Better Health represented 34 Federal agencies and professional and industry associations that shared a commitment to reducing fat in the American diet. The foundation funded Project LEAN for 3 years. In 1991, it was transferred to the American Dietetic Association's National Center for Nutrition and Dietetics.

The goals of the program were to accelerate a trend toward lower fat consumption by increasing the availability and accessibility of low-fat foods and to promote greater collaboration.

Focus groups conducted across the country provided information that helped identify strategies to address needs. For example, greater awareness of the need to reduce dietary fat intake was necessary, so mass media strategies were developed to increase awareness—a public service advertising campaign sponsored by the Ad Council, and a national publicity effort to bring attention to the Project LEAN message. The focus groups also revealed that taste and convenience were the most important factors in determining behavior change. People wanted the food to taste as good as the food they were currently eating and were very interested in convenience and quick preparation. Chefs and food journalists were selected as important and effective spokespersons for influencing popular taste.

Partnerships were formed to strengthen, reinforce, and multiply the message. Ten community programs were funded to create institutional change in the marketplace. Many other states and communities picked up the campaign on their own, tailoring it to their local needs.

Evaluation

Evaluation of Project LEAN consisted of a number of activities:

National media. Tracking of public service advertising showed that PSAs appeared in 50 percent of television viewing households. Print ads reached 16.5 million readers, and 2,800 radio stations played the PSAs. Print publicity consisted of 291 articles reaching 34 million readers. Television and radio appearances reached 27 million viewers and listeners.

Hotline. The hotline number included in the public service advertisements generated 300,000 calls in 12 months, peaking at 25,000 to 28,000 calls per month.

Leveraging of funds was tracked because the Kaiser Family Foundation was interested in whether its investment helped to bring additional funds to support the program. The foundation allocated $3.5 million over 3 years; an additional $354,500 was raised from collaborating organizations, many of whom were members of Partners for Better Health and who co-sponsored programs, training programs, special events, and various other activities. The corporate sector contributed $94,000, government provided $236,000, and professional associations provided $23,000.

Community program evaluation of the 10 foundation-funded sites was done by an external evaluator and involved tracking the process of implementation at the community level. All of the sites were provided with na-

tional materials but also developed their own and tailored their strategies to reach local populations. Institutionalization—whether the program continued beyond the foundation funding by obtaining additional resources to continue—was also examined. Most sites were found to have formed alliances with State or community agencies and to have obtained some type of additional funding, either as permanent space, dedicated staffing, or in-kind support.

Evaluation methods included key informant interviews, followup institutionalization interviews, analyses of monitoring reports that each site submitted, and site visits. All information was compiled into a case study analysis of each site. These analyses were then examined to identify themes. Themes included: 1) a grocery-store component with high-level commitment of key corporate personnel; 2) media activities enhanced by mutually beneficial partnerships (e.g., other agencies in the community that wanted to team with Project LEAN); and 3) strong and active community coalitions.

Conclusions for Nutrition Program Planning and Future Evaluations

1. Intermediate measures provide valuable short-term indicators of success. For example, looking at whether the program was fully implemented and whether it was sustained is an important marker of implementation success.

2. An action-oriented evaluation design provides useful feedback to participating organizations. It lets them know how they are doing and how they can improve what they are doing. It allows the program to be changed to adapt to environmental changes.

3. The evaluation should be on a scale no larger than the intervention. It needs to look at the issues that are going to be affected by the program intervention itself.

4. There is a need to create sustainable programs at low cost. As the policy climate changes, we need to rethink the kinds of programs that can be supported over the long term, and who is going to support those programs. We need to educate and inform foundations and other potential funders of the importance of nutrition.

5. We need to continue to create national templates that local programs can use and adapt to their population, like Project LEAN and 5 A Day.

6. We need to build on the cumulative effect of previous programs.

We need to be aware of the negative consequences of our efforts and be frank about the limitations of what we can accomplish. Don't oversell; it will cause more damage than good. Also, don't undersell. Make the efforts you have put into your programs known to all.

5 A Day

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The 5 A Day Program

The goal of the 5 A Day program is one of the Year 2000 Health Objectives: To increase the average consumption of fruits and vegetables to five servings a day by the year 2000. In addition, there are two specific program objectives: 1) increase public awareness of the importance of eating at least five portions of fruits and vegetables every day, and 2) give them the skills to do so.

The program began in California in 1986, funded by a National Cancer Institute grant. The State developed the public-private partnership underlying the program and demonstrated that it could work. They also developed the theme, logo, and the first set of materials.

When the program came to the national level 2 years later, it was not clear how to proceed. This confusion was due in part to the fruit and vegetable industry having a large number of small players that were not as organized as the Meat Board or the Dairy Council. The solution was to form the Produce for Better Health Foundation, enabling NCI to work with a nonprofit foundation to partner with the industry. The foundation now has more than 800 members, including the Produce Marketing Association, the United Fresh Fruit and Vegetable Association, the Food Marketing Institute, a variety of individual commodity boards, manufacturers, supermarkets, suppliers and merchandisers.

Program components include 1) supermarkets, as the major point of sale; 2) the mass media effort, which is designed to keep 5 A Day in print, radio and television media by coming up with newsworthy information and trying to keep the program fresh; 3) redirected advertising dollars provided by the produce industry; 4) food service, which 5 A Day is beginning to move into; 5) the community component; and 6) the research component.

The Community Component

The community component is based on the premise that awareness can be created through the media. What seems to be more effective in the community is also to be personally relating with people. We want to explore all the creative ways to draw people into the 5 A Day message. We want to get them to be aware of it, help them build skills, etc.—techniques to bring home to people the message and some ideas and skills about how to do it.

The public-private partnership combination is also important at the community level. Having a health authority connected with the industry to guarantee that this message is good for a person's health has been shown to work well. At the national level, NCI provides the credible health source. The produce industry provides the skills and capacity to reach the public in ways that NCI could not. At the local level, the health department is the appropriate partner since it is also part of the Public Health Service. The health department generally has developed working relationships with other agencies in the government with similar agendas.

One of the purposes of developing a network for the program is to provide at the community level the necessary interactive components of successful behavior change interventions. By working with the health department, hopefully a huge network is already in place. State agencies participating in 5 A Day are licensed. As part of the license, they are asked to conduct a variety of activities, including at least one function each year or one major theme-related program event.

Theoretical Constructs

Social cognitive/learning theory, community information processing, the health belief model, social marketing, and stages of change are the major theories incorporated into the program. NCI attempted to use a matrix approach to get at the major constructs that are important for creating behavior change. Creating awareness is one of these. So is motivation—that it is important for the population to be motivated if they are going to make changes. Consumers need to have the skills and feel that they can make the changes. Social support from family, co-workers and schoolmates is also important. The food system and environmental support are also critical. A person might have the best of intentions and motivation, but if the options are not available in the school or work cafeteria, then the probability of doing the desired behavior is low.

Channels

There is a window of opportunity for doing channel-specific projects with specific target populations. Ultimately, we hope to get community change, but we are not going to get there by a broad effort. We need to focus on specific channels, such as schools, food assistance programs, work sites, and supermarkets—so we can be effective and hopefully expand from there.

Intervention and Evaluation Efforts

The Centers for Disease Control and Prevention are funding roughly 25 States to do 5 A Day interventions. Many states organize coalitions for 5 A Day in a variety of ways based on what fits in their environment. NCI has funded 5 A Day evaluation efforts in four states and is in the process of funding more. In addition, nine flagship evaluation projects will be using randomized designs to look at the effect of 5 A Day in target populations in specific channels—work sites, schools, churches, and the WIC program. Some common measures will be used across the nine sites and have been made available to the States as well.

As for national evaluation activities, a baseline study was conducted before the industry began the national program in 1991. The purpose of the study was to measure consumption and get information on knowledge, attitudes, and stages of change. A followup survey will be conducted in the fall of 1996. Process evaluation activities include retail activity reports, quantities of materials sold by the Produce for Better Health Foundation, the growth of State agency licensees, and the analysis of State activity reports. NCI also tracks national media coverage of the program and has done so since it began.

We want to develop substudies to connect 5 A Day with outcomes. One example is developing case studies to get a better handle on what happens at the State level. In specific localities within the four evaluation States, we would like to measure what sales and other activities take place during 5 A Day week. Ultimately, we would like to develop an index that would show the intensity of the intervention in the various States and connect that with various outcomes. For example, many States conduct the Behavioral Risk Factor survey; we might make some connections there.

Charting the Course from Lessons Learned

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Problems with Current Outcome Evaluation Models

Using randomized, controlled trials at the community level as the gold standard for evaluating nutrition and communication education programs is a major mistake. It is a major mistake for practical reasons. We don't have the resources to do it very often. But of more importance, it is a mistake for theoretical reasons. It answers the wrong question very well.

Randomized trials, such as the Stanford Community Program, the Minnesota Heart Health Program, the Pawtucket Heart Health Program, and the COMMIT smoking trials, have either had very small effects or no effects at all, according to their evaluators. At the same time as those gold standard programs appear not to be working, we see very large changes in health behavior associated with other public health education and communication programs, such as the National High Blood Pressure Education Program and the AIDS communication programs that have gone on around the world.

For example, the Stanford program did its evaluation using treatment and control cities over a 4- or 5-year period. One of its outcome measures was the level of cholesterol in the diet. During that period, treatment cities' level of cholesterol in the diet declined slightly more than control cities. However, after the end of the treatment period, dietary intake of cholesterol in control cities was declining three times as fast as in the treatment cities during the treatment period. So the major treatment control trial found no effects until afterwards in the control cities, when there were very nice effects.

What is going on here? There are two major hypotheses. One possible explanation is that these inferences about effects are inappropriate because, in fact, there really were no effects. That isn't even slightly credible. The alternative is that public health education and communication programs were at least partly responsible for the observed sharp changes in behavior and that the treatment-control model that fails to find such effects is actually at fault. But the model of influence on population change implicit in controlled trials and testable in controlled trials does not match our model of what influences widespread behavior change.

Evaluations need to respect the model of change under which we operate—not somebody else's model of change. The model of those who are doing these sorts of programs should be identified. What evaluation designs are consistent with programs such as the National High Blood Pressure Education Program, Project LEAN, or 5 A Day? To help us think about that, a brief description of how the process for change occurs for the National High Blood Pressure Education Program is shown below.

> A woman sees some public service announcements, a local TV health reporter's feature story, and a discussion on Oprah about the symptomless disease of hypertension. She checks her blood pressure in a newly-accessible shopping mall machine. Those results suggest a problem. She tells her spouse, who has also seen the ads and encourages her to get a checkup. She goes to a physician, who confirms the presence of hypertension and encourages her to change her diet and then return for monitoring.

Meanwhile, the physician has become more sensitive to the issue because of a recent *Journal of the American Medical Association* article and some recommendations from his professional society, a conversation with a drug retailer, recent conversations with colleagues, and exposure to television discussions of the issue. The patient talks with friends at work about her experience, which increases their concern, so they go to have their blood pressure checked. She returns for another check-up and her pressure is still elevated although she has reduced her level of cooking salt. The physician decides to treat her with medication. The patient is ready to comply because all the sources around her, personal, professional and mediated, are telling her that she should.

This program is effective not because of PSAs or specific programs in physician education. It is successful because the National High Blood Pressure Education Program has changed the professional and public environment as a whole around the issue of hypertension. That is the basic model of effects, or influences on behavior change, that we have talked about.

What does this imply about the model of population-wide behavior change? That we have a national culture, not just the local culture alone. That local activities build on a spine of national programs that work together. Don't evaluate, don't try to compare treatment and controls that are geographically defined unless there is really going to be a difference in exposure to messages. Don't accept trials as negative evidence until you look hard at the evidence for differences in exposure between the so-called treatment and control areas.

Message Exposure

In general, we have done very well in developing good theory and practice in developing messages. But we need to look at how we assure exposure with an appropriate frequency over time for those well-developed messages. That is, we need to be sure we achieve not only good messages, but messages people are actually exposed to.

A randomized design that establishes that a great intervention has had an effect is meaningless if the intervention is not replicable on any scale that matters. We have to spend as much energy designing interventions that are workable on a real scale as we do designing the perfect message. We spend too little time worrying about exposure and how to get it.

Alternative Models of Change

We often strive to achieve very rapid change in a short time, and there are instances where this has occurred. A Philippine immunization program resulted in a change from 32 percent of the children fully immunized on time to 56 percent in one year. There is evidence that programs trying to affect babies' sleeping position to avoid Sudden Infant Death Syndrome (SIDS) have had very rapid effects. In Switzerland, condom use associated with AIDS communication went from 8 percent of those with casual partners using a condom with those partners all the time to 48 percent.

So we have examples of rapid change. But, these are unusual programs and each is not always replicable under the conditions in which we ordinarily work. In the Philippine immunization program, people were already getting their children immunized, but they were getting them immunized late. They did not know they needed to bring them in by 12 months. Information was enough to change behavior. SIDS is greatly feared and moving babies

Condom use is a harder behavior. But the Swiss Stop AIDS campaign was accompanied by massive media coverage of the risks of HIV and its association with unprotected sex. Attributing the change to the campaign alone would be difficult, although that was probably important.

Some alternative models of change to consider:

- ***A slow-change model versus a rapid-effects model.*** Depending upon which of these is appropriate, your intervention will be designed differently.

- ***An individual cognitive model versus a collective social norms model*** or an environmental model. Sometimes we think people will change just because they know something different, but other times we think they will change only when the community around them changes and changes its ideas.

- ***A direct-exposure model versus diffusion through interaction.*** The first model posits that people hear the messages and are affected. The second, that people hear messages and talk with other people, and the other people are as likely to be affected as they are.

- ***A single learning model versus a multiple-channel, multiple-exposure, wear-them-down model.*** That is, do we really expect someone to change upon hearing 5 A Day once? Clearly not. It is a multiple-exposure, multiple-channel, wear-them-down model. Keep going out with the message; at some point it becomes part of a collective social norm.

Each of these implies something about who will be affected, through what channels, and how fast they will change behavior. These intervention models are what should be used in our decisions about how to evaluate. If we think that the second model of each pair described above (except the first pair) is really the more likely intervention model, our evaluation should be designed accordingly. Similarly, if our program will be happening nationally, or partially nationally, we won't get discrete treatment and control cities. We should consider that when selecting an evaluation model—i.e., a controlled trial would be inappropriate because there will be no true control community.

Alternate Evaluation Models

Are there ways to do credible evaluations that don't require randomized or controlled communities? Yes, at times. Will these designs produce believable effects for lab researchers? No. However, we have two tacks. We can use their design—the vaccine or placebo control design—and surely find that our programs don't work because they don't fit the model. Alternatively, we can use our designs and try to convince them of the credibility of the evidence we put forward. We have to take the second tact, though it is not easy. It would be a mistake for us to try to live within those designs that are inappropriate for the way we think our programs work. Here are four alternative evaluation designs:

❶ ***Time series analysis,*** which is a very powerful procedure. It is a longer-term design, but very convincing. It is tough to argue that there was not some effect with national programs using it. This is particularly true if an indicator has a known trend over time and the effects of the program can occur fairly quickly and are substantial. This type of analysis will work for programs like the National High Blood Pressure Education Program. It is very hard to argue that something else important was going on starting in 1972, exactly when the national program began, and that it was associated with a very sharp decline in rates.

❷ These analyses can also be more complex, such as ***comparing indicator levels between groups with differential likelihood of exposure to a program*** in before and after cross-sectional samples. For example, consider a case in Zambia involving a weekly radio soap opera trying to get people to talk about AIDS and encourage safer behavior, particularly more condom use. We compared people who had greater and lesser probabilities of being exposed to the program. We based the comparison upon who owned and listened to a radio, and looked at the proportion of women who had ever used a condom, which increased during the time period. If the radio program was responsible for the increase in women using condoms, we would expect a more rapid rate of change among the high-access sample (those who own and listen to radios). We didn't see that. So our conclusion was that access to the program had no effect.

However, it is unlikely that in a nine-month period a radio soap opera was going to profoundly influence condom-use behavior. What should have happened was some intermediate variables would have changed, such as talking in the household about AIDS and the risks of AIDS, which the program encouraged. Here we saw a greater advantage to the high-access sample than the low-access sample; those who had easy access to radio were more likely to talk than those without access. However, when we looked at whether those who actually listened to the program were more likely to talk to their spouse, we found no difference.

❸ ***When change occurs rapidly and there are no other plausible explanations,*** we can make a case that our program caused the change. For example, with the Philippine immunization program, the change in proportion of 11-month-old children who received all eight vaccinations on time is tough to explain, other than by the presence of the immunization program.

❹ ***When the observed outcome is credibly explained by a process we thought would lead to change.*** If we can show that the people who are exposed to the program and the people who are more knowledgeable are those who are in fact engaging in the appropriate behavior, we can make a stronger case for the effects of the program. For example, our program increases knowledge in order to stimulate behavior change, like the Philippine immunization program that told parents children should have their vaccinations by 1 year of age.

Summary

We need to be sure the program model is what is driving the evaluation, not vice versa. It will rarely be the case that control-treatment designs will serve your purposes very well, although at times they will. Make sure and think through the model of influence being used. Know how the program is supposed to work, who it is supposed to affect, how fast, and what levels of exposure have to be achieved. Design the evaluation around the model of influence rather than borrowing a model of evaluation from fields that are largely inconsistent with our models of influence.