

A Systems-Based Evaluation Planning Model for Health Communication Campaigns in Developing Countries

RONALD E. RICE
DENNIS FOOTE

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Systematic evaluation of health and nutrition communication campaigns in less developed countries is of paramount importance, because poor health conditions continue to stifle human and national potential, high levels of governmental and individual resources are involved, and the cumulative knowledge about how to design communication interventions effectively in such settings is inconsistent. This chapter presents a systems-theoretic framework for planning evaluations of health communication campaigns in less developed countries, to identify relevant variables and processes, and to facilitate more effective and focused efforts.

Simply stated, systems theory argues that there are common structures and processes operating in phenomena regardless of the research

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discipline applied (Berrien, 1968; Bertalanffy, 1968; Buckley, 1968). These structures include a system (a set of interacting elements, components, or subsystems functioning within a common boundary) and a surrounding environment (a set of inputs and constraints). A system such as a rural community exists in an initial state in an environment (such as the state of high infant morbidity and mortality in a developing country), receives inputs (such as a health campaign), processes them according to goals and constraints (such as improved health, insufficient water, or cultural norms concerning illness and maternal care), and develops outputs (such as lower infant mortality or a reorganized health care delivery system). Campbell, Steenbarger, Smith, and Stucky (1982) have applied this systems perspective in evaluating a community counseling project, concluding that taking a systems perspective leads to a widening of the scope of the original evaluation questions, increasing the range of evaluation tools necessary to understand the system—from a linear, experimental model to a multi-methodological description of interacting subsystems, expanding the kinds of measures and data sources deemed appropriate, and developing some relativistic interpretations of results.

The proposed evaluation planning model (derived to some extent from Suchman's 1967 four-part evaluation model) involves the following stages, although in an ongoing project these stages represent processes that are interrelated and interactive:

- (1) specifying the goals and underlying assumptions of the project
- (2) specifying the process model at the project level
- (3) specifying prior states, system phases, and system constraints
- (4) specifying immediate as well as long-term intended poststates
- (5) specifying the process model at the individual level
- (6) choosing among research approaches appropriate to the system
- (7) assessing implications for design

This chapter describes the model in detail, using examples from evaluations carried out on infant health interventions in Honduras and The Gambia. The evaluations, while not perfect implementations of the model, follow a process very close to that described in the following sections.

Specifying the Goals and Related Projects

Assessing Behavior Change and Causal Processes in Health Campaigns

Development health communication campaigns, and more specifically infant health and nutrition campaigns, have a considerable history (some of which is reviewed and referenced by Hornik, 1985, 1988, and chap. 14, this volume). Early health education interventions perceived their role as information provision, without special emphasis on changing people's behaviors. Over the past two decades, projects have given behavioral outcomes an increasing priority.

One of the earliest mass media-based health education campaigns to evaluate behavioral changes as a measure of success was conducted in Tanzania. In 1973, a major campaign titled *Mtu Ni Afya* (Man Is Health) was carried out, and in 1975, a Food Is Life campaign was conducted (Hall & Dodds, 1977; Mahai et al., 1975). Both campaigns used formative research in the preparation of radio messages, study guides, and the training of indigenous group leaders. The listeners were organized into study groups; a total of more than 1.5 million adults participated in the campaign. Evidence from the Man Is Health campaign showed that behavior change was possible on a large scale at a low cost. The most striking example from the health campaign was the construction of 700,000 latrines, as promoted on the radio broadcast. The Food Is Life campaign created an increased awareness of the need for more food production, the establishment of vegetable gardens and poultry production, improved dietary habits, day-care center creation, and changes in certain food habits.

Other nutrition campaigns have improved their success through a social marketing approach (see Solomon, chap. 4, this volume). Early examples of this approach include projects carried out in the Philippines, Ecuador, and Nicaragua by Manoff International, Inc. (Cooke & Romweber, 1977a, 1977b, 1977c). In the Manoff projects, for example, the contractor prepared and arranged the broadcast of a series of commercial radio spot announcements recommending a particular nutrition behavior. Each series was broadcast several times a day for more than a year. The themes covered depended on local conditions; in Nicaragua,

for example, the project encouraged families to combat children's dehydration resulting from diarrhea by relying on a drink mothers could prepare easily at home, a rehydration fluid consisting of sugar, salt, water, and lemon juice.

The principles underlying these approaches have been adopted and refined in many subsequent projects, with the campaigns discussed in this chapter representing the next major step—paying particular attention to preassessments of the intended audience's needs and characteristics; to the social, material, and logistical support needed to reinforce behavioral change; to the quality of the message propagated; and to the causal relationships among components of the intervention. These general classes of improvements in evaluating health campaigns, then, are specifically addressed in the evaluation planning model developed below: identifying behavioral as well as attitudinal and cognitive subsystem elements, understanding the preexisting states of the social and individual contexts, and detailing the processes linking each subsystem.

The Honduran and Gambian Projects

One of the major causes of infant mortality in developing countries is diarrheal disease. It occurs at significant levels in practically every country, made worse by poor nutrition and bad sanitary conditions. The percentage of infant deaths in 1982 attributed to diarrhea ranges from 10% in Indonesia to 50% in Sri Lanka and Laos (World Health Organization, 1981). In 1985, there were more than 5 million diarrhea-related infant deaths worldwide (Rohde & Northrup, 1986). Death is typically caused by dehydration—loss of fluids and electrolytes—before the child's natural defenses can defeat the cause of diarrhea. Less acute consequences—malnutrition and waste of human and material resources—are even more common (CIBA Foundation, 1976). In the 1970s, the infant mortality rate in Honduras reached nearly 1.2 per 1,000, nearly ten times the overall mortality rate, a quarter attributed to, and two-fifths associated with, diarrhea (Ministerio de Salud Publica y Asistencia Social, 1972, 1977, 1978). Figures from The Gambia are less well documented, but in general are probably slightly lower.

Since the 1960s a diverse set of approaches to reducing diarrhea-related infant mortality have been studied, including immunization, improved water availability, disposal of excreta, weaning education, reduction of infection through animals and insects, and oral rehydra-

tion therapy (ORT) (Ashworth & Feachem, 1985; Esrey, Feachem, & Hughes, 1985; Feachem, 1986; Feachem, Hogan, & Merson, 1983; Hornik, 1985). ORT is a comprehensive approach that includes breastfeeding, improved nutrition, and sanitary practices. In addition, an inexpensive oral rehydration solution (ORS) that treats the dehydration by replacing fluids and electrolytes has been developed. ORT-oriented campaigns have significantly decreased diarrhea-related infant deaths in Bangladesh, India, Trinidad and Tobago, Haiti, Nicaragua, and Turkey (World Health Organization, 1983: 20), and have improved many aspects of infant health status in these and other countries (Milla, 1985). There are, however, considerable problems associated with ORS, such as dangers from improperly mixed solutions, worsening of diarrhea symptoms, and difficulties in distributing ingredients (Hornik, 1985).

In a joint effort to improve prevention and treatment of diarrheal infant mortality, the U.S. Agency for International Development (USAID) and the Ministries of Public Health of Honduras and The Gambia have collaboratively supported a large-scale project in Mass Media and Health Practices (MMHP). A subsequent USAID-supported project, HEALTHCOM, has expanded the approach to more than 20 countries, and has helped to carry on the effort in Honduras. In Honduras, ORS (comprising sodium, glucose, potassium, and bicarbonate, called Litrosol) was distributed in packets to be mixed with one liter of water. In The Gambia, ORS was mixed at home, with eight bottle caps of sugar, one cap of salt, and three bottles (one liter) of water, partially due to the expense of ORS packets (over a dime, not including internal distribution costs) and partially to avoid production dependencies.

Specifying the System and Its Components

Figure 7.1 presents an overview of the proposed evaluation planning model. Taking a systems perspective, this model shows that before any intervention, there exists a prior state (say, of the people, their family, their community, the environment, the economy, mortality and morbidity rates, sanitary conditions, nutritional levels, and so on) that is the baseline to which ongoing and final evaluation measurements are compared, and constraints existing in the system that affect how the population interacts with the intervention.

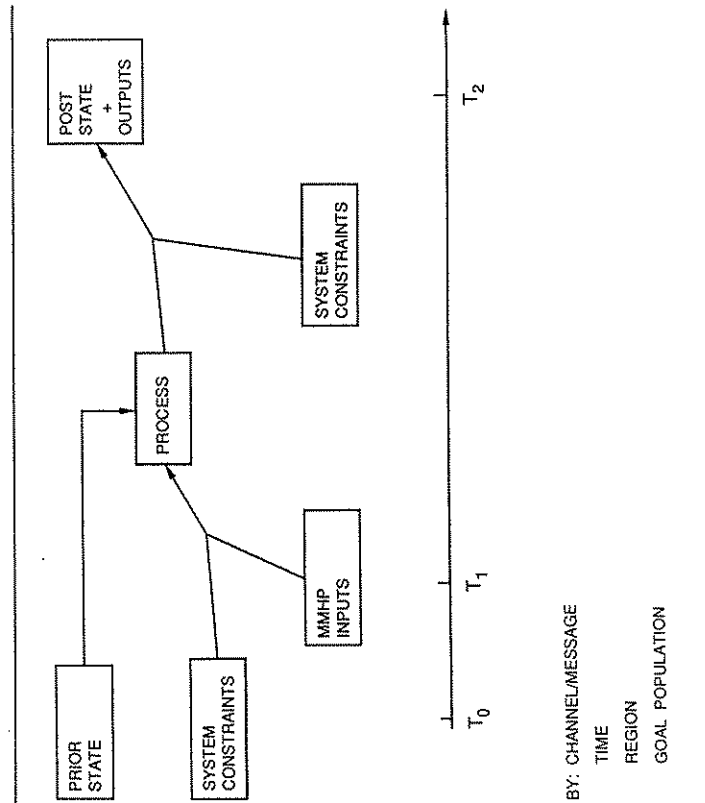


Figure 7.1. Overview of Evaluation Planning Model

The prior state, system constraints, and the intersection of system constraints and intervention inputs interrelate and feed into the process component. For example, perhaps a family learns new approaches to hygiene and wants to perform them, but cannot because personal, cultural, or economic conditions prevent them from buying soap or using sufficiently clean water. Thus system constraints can "block" or transform the progression from process to output.

The subsequent condition of the goal population constitutes a new or poststate. This poststate, which includes outputs from the process components, consists of the information, attitudes, behaviors, and health status of individuals, as well as many of the conditions measured in the prior state component. Many of the values of the variables

measured may not have changed; some would not be expected to change. And some new aspects of the system may have been introduced, such as new health communication infrastructures, different administrative procedures, or, in the long run, a rise in population growth, leading to a new set of constraints and conditions. Of course, because such interventions occur over time (for the original intensive interventions in both Honduras and The Gambia, over two years), this whole model may repeat itself in various phases (in the two original interventions, five phases).

Perhaps the most important analytical aspect of an evaluation of a complex campaign is the need to consider, measure, and assess the effect of the major variables that help explain why certain outputs occurred, as well as why certain others did not. These explanations are typically couched in terms of *program* or *theory* failure. Broadly, program failure results when the program is not or cannot be implemented as planned (such as the use of inappropriate messages or language, dependency on an insufficient distribution system, or reliance on unavailable resources). Theory failure, assuming successful program implementation, occurs when one or more of the hypothesized causal links do not occur (such as when people who know what the appropriate behavior is, understand why it might be to their advantage to adopt it, and have access to the necessary resources nevertheless fail to adopt), or have unexpected effects (such as when greater participation in a campaign-related event is associated with decreased learning).

The likelihood of program and theory failure increases as we move along the process components from more immediate outcomes (such as knowledge levels) to longer-term outcomes (such as health status or mortality rates), for three basic reasons. First, we generally hypothesize that the components are causally related and thus those subjects who do not choose to, fail to, or are unable to complete one component become unavailable for the remaining components. Second, the cumulative effect of constraints and intervening variables, over which the implementor has no control, is almost certain to decrease the probability of occurrence of the postulated causal processes. Third, even if each component is accomplished, the relative strength of change is stochastic, so that the final outcome from many successful components may still be hard to detect (see McGuire, chap. 2, this volume, for a summary of this as well as alternate models).

Specifying the Prior State and System Constraints

Specifying the Prior State

The prior state of the environment can be conceptualized as clusters of variables, identified by theoretical processes and prior empirical results. For the MMHP evaluation, the clusters of variables by content included the following:

- (1) *community/population* variables such as anthropological, economic, social, and demographic characteristics of the population; health, communication, government, and kinship infrastructures; and cultural beliefs and behaviors that affect MMHP issues
- (2) *household* variables such as enumeration of household occupants, number of young children, SES level or other appropriate measure of wealth and status of household, educational level, and household literacy rate
- (3) *communication* variables such as access, exposure, usage, and preference for various media; individual literacy; interpersonal communication channels; community volunteer networks; and fieldworkers and medical practitioners
- (4) *sanitation* variables such as water sources, food preparation practices and facilities, cleaning beliefs and practices, and the "goal" concepts and practices as the primary contents of MMHP messages
- (5) *information, attitudes, and behaviors* relating to child diarrhea such as causes of diarrhea, response behaviors, relative seriousness of diarrhea, and distinctions among the severity of episodes
- (6) *nutrition* variables such as dietary recall, feeding patterns at various ages, and maternal/infant nutritional status
- (7) *general health* variables such as health histories, birth and death histories, medicine use, contact with medical/health agents, anthropometric measures, and national decline in health due to economic conditions
- (8) *child-care practice* variables such as caretaker responsibilities, exposure to contaminating, conceptions of normal infant development, breast-feeding beliefs and practices, and supplemental feeding beliefs and practices

Specifying System Phases

Fundamental to understanding the evaluation process is the fact that the system, and thus the implementation of the treatments, exists and changes over time—perhaps in phases, even through economic and military upheavals. (For example, while the results of the two MMHP projects generally show significant improvements, some measures of health status declined, likely due to the tremendous drop—26%—in per capita income from 1981 to 1987 in the region due to Central American conflicts; Bell, 1987.) Description and analysis of the prior state and system constraints will lead to specification of variables by system phase, identifying when certain interventions should be applied, and for which goal populations.

The MMHP campaigns organized their messages in phases according to temporal fluctuations (the rainy and dry seasons affect the type and amount of diarrhea) and a model of cumulative impact. Activities were phased to train health workers at the beginning, and to follow a sequence of information, enabling behaviors, and reinforcement in messages for the general population. Figure 7.2 shows the relative emphasis on prevention versus treatment, and on media versus interpersonal communication, during the five phases in Honduras. During Phase I, prior to the rainy season, the diarrhea rate was low. This phase focused upon critical enabling messages identified during the preprogram investigation, to establish ORT as standard operating procedure. Training included instruction in ORT. During the rainy season of Phase II, diarrhea rates were high. The central messages here, conveyed by the intensive media intervention, were the purpose, availability, proper mixing, and regimen for ORS. In Phase III, after the rainy season had passed, the intervention messages promoted selected prevention behaviors, as well as maintaining the treatment behaviors. Phase IV was during the next rainy season, with a high rate of diarrhea, so the intervention returned to its treatment focus, with selected prevention messages. In Phase V, after the rainy season had passed, the role of breast-feeding in ORT, and its more general benefits, was emphasized.

Specifying System Constraints

The sociocultural/economic characteristics of the goal audiences play a very important role in communication interventions, due to the

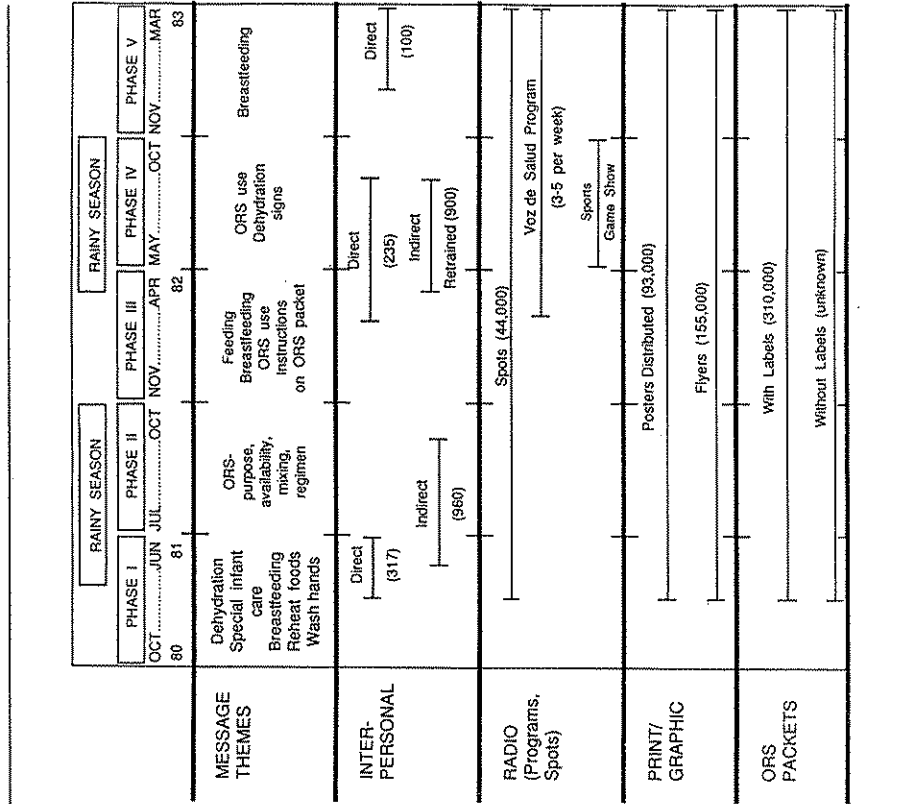


Figure 7.2. Intervention Plan by Phase: Honduras
SOURCE: Applied Communication Technology (1985, p. 13).

difficulty of translating new information into firmly held behaviors. Other more practical constraints operate as well. It is thus necessary to detect and measure system constraints that may block or transform the progression from inputs to outputs. Major categories of constraints include the following:

- (1) *resource* constraints such as access to water, heat, soap, medicine, health agents, media, literacy, and ORS packets (for example, in Honduras, mothers most likely to use ORS were in more rural, less educated, and

less wealthy regions, indicating that home ORT filled a need not provided by local health services or resources in poor regions)

- (2) *cultural* constraints such as traditional beliefs about causes of diseases, difficulty in distinguishing between bottle- and breast-feeding, and notions of privacy in using hygiene facilities (for example, diarrhea is often seen as a normal way to purge harmful illnesses such as measles, or as unrelated to dehydration; Green, 1986)
- (3) *medical community* constraints such as resistance to new treatments, maintenance and extension of training, infrastructure in rural areas, and conflict with traditional rural health actors
- (4) *environmental* constraints such as weather, possible epidemics, and unintegrated institutional constituencies in various ministries, and discrimination against the rural poor in clinics
- (5) *input delivery* constraints such as delays or reductions in broadcasts, insufficient broadcasts, transport difficulties, uneven or restricted ORT materials, legal obstacles to distribution, and insufficient working radios

The pervasiveness of system constraints, even as manifested in how interventions are designed (see below), may well prevent any substantive improvement in the population's health status (Wallack, chap. 16, this volume). Once the linkages between intervention inputs and potential outputs (different system components) are specified theoretically (as in the process component), it becomes crucial to identify distinctions among planned inputs (media, medical practices, ORS packets, and so on), delivery constraints, real inputs, resource and access constraints, and engaged inputs, and final engagement by target individuals (what is perceived as being input by the target audience).

Between the planned intervention inputs and the engagement of such inputs by the goal population lie possible constraints. For example, a series of radio spots with a given frequency of broadcast may be planned inputs, but the broadcasters do not receive the scripts in time or choose not to broadcast all the spots according to schedule; the result is "real inputs," which in turn are greater than the inputs actually "engaged" by the goal population. In The Gambia, 60% of household compounds have at least one working radio receiver; in those compounds 75% of the women listen to Radio Gambia, which delivers the MMHP spots, so only 45% of the women in the general population can potentially directly engage in processing the campaign's radio messages. Compare this "engaged" radio input to the 3% literacy rate by individual women, which would prevent any substantial engagement with print messages. Thus one strategy in the Gambia project was to

provide color-coded flyers or wall posters, which were explained and reinforced through radio messages. These "engaged inputs" must be considered the basis for potential measures of exposure, attention, and recall in analyzing change and poststate measurements, and as such still do not represent the final basis upon which to assess theory failure or success. Thus tests of program success should use data on planned and real inputs; tests of theory success should use data on real and engaged inputs.

Media inputs. Each planned media input (such as radio spots) could be coded for goal audience and frequency, region, and station. Specific messages can be coded, by implementation phase, within each specific input. That is, only a few messages in certain media are project inputs in each phase for each subaudience. Therefore, the relative efficacy or recall of those messages, by medium, can be compared to the relative efficacy or recall of different messages, by medium, in later phases (as discussed by Flora, Maccoby, & Farquhar, chap. 10, this volume). For example, in the Gambia project, the color-coded mixing-instruction flyers were the most significant media/print input: Having one at home predicted earlier learning and use of ORS, and less forgetting and lack of adoption (Snyder, 1987; also see Griffiths, Zeitlin, Manoff, & Cook, 1983, who report similar results from an Indonesian campaign). Recall of radio spots, on the other hand, was most influential only as a reinforcement after the respondent had already learned about ORS. In Honduras, 80% reported that they had a radio, and 85% of those (or 67% overall) demonstrated that they had a working radio. Averaged over several waves, from 9 a.m. to 10 a.m., 19% listened to their radios, and 60% of those reported hearing the campaign spot, representing 12% of the population. From noon to 1 p.m., the figures were 35%, 81%, and 28%, respectively. Collecting such data for specific times helps planners and evaluators identify where the greatest engagement may occur.

Resource inputs. The distribution of ORS packets, with associated print material, is considered a planned resource input, which also must be monitored to determine engaged inputs to goal populations. Differential distribution by channel (say, commercial and public health outlets) or by geographical region (closer or farther from roads) may prove to be a factor in explaining why intervention efforts were differentially successful in various regions. Constraints to delivery of ORT packets to goal populations can be monitored through questionnaire data, but might be also monitored through delivery invoices or inventory records.

Audience inputs. Relevant populations other than the goal caretaker/child population—direct contacts such as health workers and physicians, and indirect contacts such as volunteer care workers—can be viewed as additional inputs or constraints. Goal audiences can be asked about these interpersonal diffusion channels that may help to spread or resist mass media inputs (Coleman, Katz, & Menzel, 1966; Flora et al., chap. 10, this volume; Hornik, chap. 14, this volume; McAlister, Ramirez, Galavotti, & Gallion, chap. 13, this volume; Rogers & Kincaid, 1981). For example, local health workers have been shown to be a significant influence in campaigns to teach correct ORS mixing, or to support proper weaning as one approach to reducing diarrhea-related infant deaths (Ashworth & Feachem, 1985; Kumar, Monga, & Jain, 1981).

In order to assess possible degradation or elaboration of input content, throughout the progression from mass media and medical contacts to the goal caretaker/child population, intervening populations could be measured during the poststate component, during their interaction with the goal audience, and in interviews with health care providers and community leaders. For example, in The Gambia, village health volunteers trained by the health workers were identified by red flags outside their compounds. Local mothers could come to these "red flag volunteers" to learn how to mix the ORS correctly; however, the volunteers were not supported throughout the campaign by the health workers, so this indirect interpersonal channel disappeared.

Specifying Immediate and Long-term Project Goals

Measures of success in a health communication project may include a wide variety of outcomes (summarized in Figure 7.3). In the Honduran and Gambian projects, categories of *cognitive* outcomes included attention to—and recognition, recall, and knowledge of—nutritional and preventive behaviors and ORT messages. Categories of *behavior* outcomes included response to diarrheal episode (administration of ORT, taking child to clinics, and the like), infant feeding practices, water purity, and prevention and personal hygiene. Categories of *health* outcomes included nutritional status (weight and height relative to international age norms), morbidity (frequency, severity, and duration of diarrhea), and mortality. Categories of *system* outcomes included the

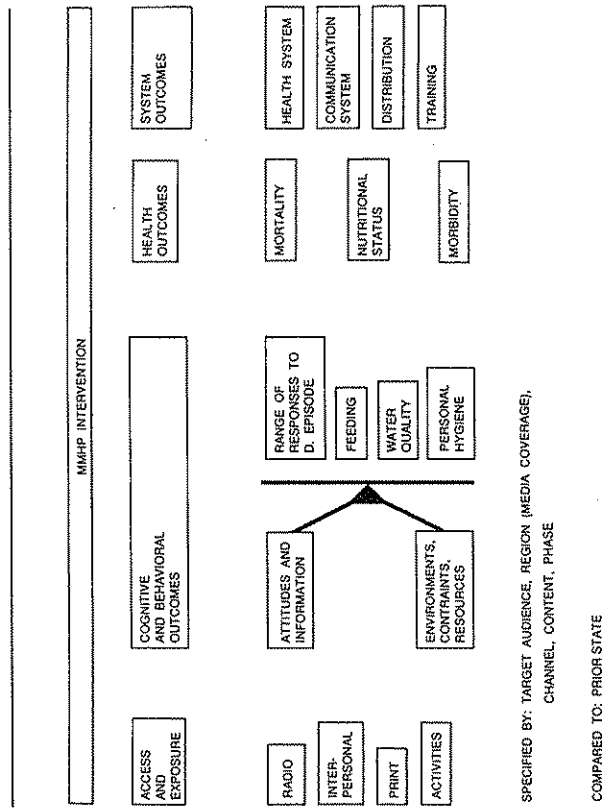


Figure 7.3. Categories and Relationships of MMHP Outcomes

institutionalization of ORT in the health system and the communication system (Are the messages incorporated in the content of other development messages and projects?), distribution of ORT in clinics and through community outlets, and incorporation of ORT in national and local training. Table 7.1 summarizes a few selected results from the Honduras and The Gambia projects under each of these categories of outcomes.

Specifying the Process Model at the Individual Level

The individual-level process model used in the MMHP projects is derived from three theoretical foundations of health communication campaigns:

- (1) The public health belief model, which considers whether individuals believe they are susceptible, whether the messages are relevant, and whether the individuals have options: Concepts such as self-efficacy, internal information processing, and attitudes are important components of this model (Fishbein & Ajzen, 1975; Flora et al., chap. 10, this volume).
- (2) The social marketing model, which emphasizes the identification of markets and audiences, and how to place and price a product (see Alcaalay & Taplin, chap. 5, and Solomon, chap. 4, this volume).
- (3) The twelve-step communication/persuasion matrix: McGuire (chap. 2, this volume), in this matrix, shows communication variables as inputs (source, message, channel, receiver, and destination factors) and the "successive response steps that must be elicited in the public if the communication campaign is to be effective" as outputs. McGuire (and others, such as Petty & Cacioppo, 1986) argues forcefully that there are crucial and complex interactions among the inputs and outputs of the matrix process. One input factor that may facilitate an early response step may inhibit a later one. Clearly, a national health communication project will be hard put to evaluate these kinds of microprocesses. The focus, in this process stage, will often be on more easily observable or measurable groupings of the 12 response steps.

Attention (Step 2 in McGuire's matrix) generally can be measured only by the surrogate of recall (Step 8), which really lies after the most crucial steps: exposure, attention, reaction, comprehension, yielding, and storing. Evaluation efforts should gather information on some factors affecting these prior stages, such as cultural constraints against yielding to a particular argument about, say, the amount of liquids a baby can ingest, or against comprehension of the distinction between bottle- and breast-feeding.

Adoption of the advocated message is based on this decision process, but takes form in the behavior stage (Step 10), which can be measured directly via observations, indirectly by a respondent's report of behaviors, or indirectly via system measures such as ORT distribution or clinic patient load. Postbehavioral consolidating (Step 12) would take the form of changed cultural, family, or personal norms and behaviors.

Figure 7.4 shows how the MMHP evaluation attempted to monitor or measure some of these individual processes. Each of these steps is accompanied by measurement or monitoring of intervening variables and system constraints that prevent full linkage to the next step, and of

TABLE 7.1 Selected Results from Evaluations of ORT Campaigns in Honduras and The Gambia (in percentages)

Variables	Pre (1981/82)	Post (1983/84)	Long-Term Post (1987)
Honduras Project			
Access and exposure			
has radio in home	77	73	67
has heard radio spot featuring project characters	59	78	69
has seen a poster		47	
has instructional flyer		15	3
Learning			
knows product name	49	71	99
can complete project jingles	50-70	20-83	12-80
can define dehydration	38	39	22
learned about ORS from community health workers		29	12
nurse, doctor, or clinic		39	61
ORS packet		49	4
radio		27	6
knows should continue breast-feeding during diarrhea		83	82
Behavior			
has tried ORS	0	62	85
percentage of cases treated	9	36	49
continued breast-feeding during diarrhea		72	98
gave more liquid than normal during diarrhea		79	
Health status			
stunting	29	36	
wasting	<1	<1	
percentage of deaths of children under 5 that involved diarrhea	39	29	
The Gambia Project			
Access and Exposure			
has radio in compound		68	73
has heard radio messages about diarrhea		69	81
has copy of mixing instructions		77	55
has been to clinic in last three months		80	82

(continued)

TABLE 7.1 Continued

Variables	Pre (1981/82)	Post (1983/84)	Long-Term Post (1987)
Learning			
aware of ORS	55	89	95
could name ORS ingredients and quantities	1	78	41
knows to give ORS at first sign of diarrhea	85	73	
knows to make ORS fresh every day	32	62	
knows proper amount to give	11	21	
learned about ORS from health workers/clinics	95	89	76
posters	0	23	0
radio	2	36	5
Behavior			
has tried ORS	48	85	86
percentage of cases treated with ORS	4	62	10
continued breast-feeding during diarrhea	88	88	96
stopped other feeding during diarrhea	32	3	7
Health status			
stunting	16	17	
wasting	4	14	

unforeseen outputs of a prior step. Table 7.1 provides a few of the measures and values of access and exposure used in the projects.

The application of this evaluation approach has generated several useful outcomes for designers of these and similar interventions. They relate both to diagnosis of problems within a given project (what this model calls *program failures*) and to design principles for this type of project (here subsumed as *theory failures*). Some examples of such outcomes in this case, drawn from the information in Table 7.1 and other sources, include the following:

- (1) When emphasis and reinforcement of specific messages are not sustained, initial gains can quickly be lost. For example, in The Gambia the intervention was vastly reduced in intensity after 1984, and case treatment ratios dropped from 62% to 10% within a few years. Even prior

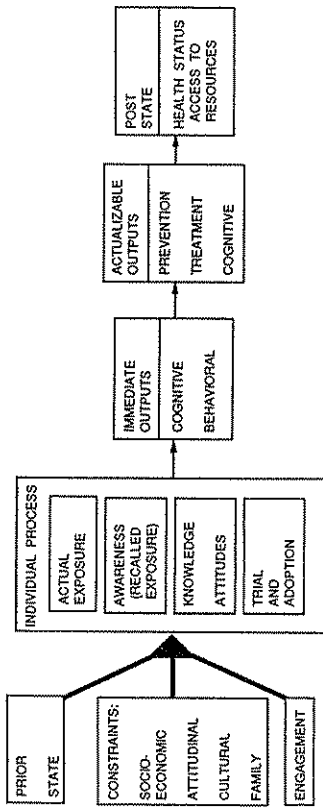


Figure 7.4. Detail of Variables Typically Measured at Stage of Individual Processing, with Classes of Inputs and Outputs

to that, it was clear that mothers were not following a simple pattern of adoption followed by sustained use. Snyder (1987), analyzing seven aggregated waves of The Gambia data, showed that use of ORS was maintained by 70% of the initial adopters after five months, 50% after 13 months, and only 30% after 21 months (also see Table 7.1 for results from the three-year follow-up surveys). Although only 8% started using ORS and then stopped permanently, 57% started, stopped, and started again. Thus behavior maintenance should be a major challenge and goal of future campaigns, rather than just inducing one-time changes in learning, attitudes, or behaviors.

- (2) There was considerable difficulty in learning some concepts, such as dehydration, and the benefits of ORS for dehydration rather than for diarrhea. Future interventions will have to consider whether to position such treatments according to the popular views or to teach a scientifically current conception.
- (3) Learning through different channels has different adoption and retention characteristics. The presence of mixing flyers that mothers put up in their homes significantly influenced earlier learning about and use of ORS, and later forgetting or disadoption of ORS, whereas the recalling of radio messages led to earlier forgetting and disadoption. One explanation is that putting the flyer up was associated with taking action concerning ORS, while remembering hearing the message was not necessarily associated with immediate action. When hearing was contemporaneous with learning about ORS or adopting it, then respondents learned earlier

and maintained use longer (Snyder, 1987). Campaigns should plan and orchestrate their approaches to take maximum advantage of the differences in impact and timing.

Choosing Among Research Approaches

The MMHP evaluation used six major study groupings that differed markedly from one another in magnitude, study population, and measurement requirements:

- (1) a *longitudinal* study (to develop sets of measures and observations, and to detect sequencing and linkage among process components). In The Gambia and Honduras, surveys were conducted monthly. In both projects, about four main instruments were repeated at different intervals on a large panel of women.
- (2) a *mortality* study (to detect change in mortality due to infant diarrhea in treatment area). In Honduras, an interrupted time-series analysis was conducted on the proportion of infant and early childhood deaths attributable to diarrhea for two years prior to, and the two years during, the campaign.
- (3) an *opinion leader and health professional interview* study (to elicit assessment of project impact and organizational success).
- (4) an *ethnographic* study (to provide more anthropological insights into impacts, customs, and beliefs).
- (5) an *archival* study (to assess clinical and hospital measures of infant mortality, morbidity, treatment, and so on).
- (6) a *cost-effectiveness* study (to aid in understanding relative payoffs for future programs).

Particular project contexts may lead to emphasis or rejection of one or more of these studies. For example, analyzing archival data depends on the existence, validity, and timely availability of relevant data. In Honduras, lack of measurement precision and evidence of marginal returns from changing the media mix or frequency lessened the possibility of a complete cost-effectiveness study. Because of such often unpredictable constraints, along with problems of decreased funding for complete project evaluation, insufficient experimental control, trade-offs between internal and external validity, and the like, triangulation by means of multiple methodologies and data sources is necessary and becoming more prevalent (Heath, Kendzierski, & Borgida, 1982; Schneider, 1982).

Implications for Design

Sampling

Issues of sampling and control groups are crucial to any campaign evaluation (see, for example Cook & Campbell, 1979; Flay & Cook, chap. 8, this volume). Insights from analysis of the prior state and system constraints, given a set of project goals, will help establish proper sampling frames and units of analysis.

For example, because health delivery infrastructure and broadcast media are typically in place before project intervention, these often establish treatment, and thus sampling, boundaries. Because the objectives of the MMHP evaluation included developing a transnational model of health communication evaluation, the primary objective of sampling was to enable generalizations to the full range of conditions (prior states, inputs, and constraints) represented in developing countries rather than to make possible precise statements about aggregate national levels in a given country.

Particular system contexts and constraints will influence the analytical level. For example, noninstitutional infant care is delivered in the "home"; therefore, all individual variables must be linked to a "home unit." But what is a home? In Honduras, a household was defined as a living unit that contains both a place for cooking and a place for sleeping. Thus in Honduras, 750 mothers were randomly selected from 20 stratified villages.

In The Gambia, the "home" is a compound of 10 to 100 people, consisting of physical structures enclosing polygamous multifamily living units. Thus infant care can never be attributed solely to the attitudes and cognitive and behavioral levels of one individual. Thus in The Gambia, 1,029 mothers were sampled from compounds selected randomly from 20 stratified villages.

Control Groups

Because resources for fieldwork are limited, it is crucial to think through carefully the value to evaluation of mounting data-collection efforts in nontreatment areas (see, for example, Cook & Campbell, 1979; Jamison et al., 1975; Suchman, 1967). The Gambia project, which was nationwide from the beginning, was able to have 20 treatment villages receiving multiple measurements and 8 villages measured only once (to test for measurement effects), but no nontreat-

ment controls. In the Honduras project, because the government rapidly expanded from the pilot site to a national campaign to promote the use of ORS, we could not identify a group outside of the treatment area that had not received some kind of treatment, however minor. Furthermore, because the project effort was not a uniform effort within the pilot region, it was not possible to assign households randomly to treatment conditions. Thus neither project involved nontreatment groups, but both projects incorporated nonrepeated measures groups to test for measurement influences.

Comparisons within the treatment area. Five sources of data within the treatment area from the study groupings can be used for within-treatment control purposes, as in the Honduras project:

- (1) *Household as its own control:* Local interviewers returned for repeated measurements to households that could then serve as their own controls for many variables.
- (2) *Making use of staged implementation:* If, because of phases in system constraints, components of the campaign are introduced in different phases in different regions of the treatment area, the study can compare as-yet untreated segments of the population within the measurement sample to treated segments.
- (3) *Natural variations in exposure:* Because of the vagaries that can be expected in mounting a complex intervention, there will be program failure in some components of the campaign. These variations, if inputs are adequately monitored, can be used for comparison purposes.
- (4) *Self-determination of exposure:* Some people will select not to expose themselves to a health campaign, because they do not have access to a radio, because they do not choose to talk to health workers, and so on. Although not necessarily comparable, they can be a source of some kinds of information with which to compare exposed respondents.
- (5) *Measurement effects:* A smaller sample in both Honduras and The Gambia was interviewed only once or twice across the longitudinal survey to compare to the larger sample, which may have been sensitized by the multiple interviews. The results are, in fact, slightly more positive for those in the repeated waves than for these treatment effects groups, but both were considerably higher than the baseline figures.

Comparisons with nontreated populations. Data about people outside the treatment area can be obtained from several sources. *Archival data and ethnographic studies* were mentioned previously. *Other health projects* functioning in many regions can sometimes provide useful baseline information. The MMHP project used similar standardized

SOURCES OF CONTROL	OUTCOMES		
	COGNITIVE	BEHAVIORAL	HEALTH
<u>Within Treatment Area:</u>			
Household as own control	XX	XX	XX
Staged implementation	XX	XX	
Natural variation in exposure	X	X	X
Self-selected exposure			X
Measurement effects	XX	X	
<u>Outside Treatment Area:</u>			
Archival data		X	
Ethnographic studies	XX	X	XX
Data from other studies	X	X	X
One-shot studies	XX	XX	X

Figure 7.5. Usefulness of Control Data Obtained from Within and Outside the Treatment Sample

NOTE: X = source of weak control; XX = source of good control; blank = no control comparison is possible.

data on infant growth and weight available from the National Center for Health Statistics. *Special one-shot studies* may assess the level of a belief or practice in a nontreatment area when results in the treatment area are ambiguous.

The question of controls in a longitudinal study. Figure 7.5 summarizes the usefulness of the sources of control data for variables

falling in each of the outcome categories. For example, beliefs, practices, and levels of knowledge can change quickly on exposure to campaign intervention, so repeated measures can capture changes in these outcomes between implementation stages, but probably not levels of health status variables, such as changes in mortality due to dehydration.

In the Honduran and Gambian projects, the focus was on infant feeding and child-care practices in traditional communities, areas where rapid changes are not expected to occur in the absence of external stimuli. Further, with so many regional differences and with other government-supported interventions occurring, it would have been difficult to identify or interpret results from control sites. Thus it seemed that monitoring other information inputs (via the ethnographic and interview studies) into the treatment villages would be a more efficient way to evaluate rival explanations for change than collecting measures on control populations whose comparability is open to some doubt. If mothers begin preparing ORS in the household, this change in behavior can be attributed only to the health education campaign, because it represents the adoption of a new behavior.

A five-year follow-up survey in both countries of women drawn from equivalent samples, as in the original evaluation, enabled analyses of the long-term effects as well as of nationwide historical effects. Table 7.1 provides a few selected results from these surveys.

Conclusion

This chapter has argued that evaluation of purposive communication projects in less developed countries has much to gain from the use of a generic planning model based upon a systems approach. Using the example of ORT projects in two developing countries, the model highlights the need to identify and measure seven evaluation components from a systems perspective. The use of such a planning model could not only help guide the development and execution of evaluation efforts, but, equally important, provide a common framework for use in related projects.