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Communicating Environmental Risks

A Guide To Practical Evaluations

Risk Communication Series

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Communicating Environmental Risks: A Guide to Practical Evaluations

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CONTENTS

CONTENTS (continued)

PREFACE

Information programs play an important role in EPA's strategy to manage environmental risks. Whether the hazard is naturally occurring (e.g. radon) or manufactured (e.g. asbestos insulation), individuals often can take steps that reduce their own exposure. Experience demonstrates, however, that expanding public awareness, increasing knowledge, changing attitudes, and motivating behavioral changes are difficult objectives to reach.

In some cases, communication activities have achieved significant reductions in health risks. Communicators have learned a lot about how to develop and disseminate more effective information materials, but serious health risks remain. Close attention to each phase of the risk communication program, planning, design, implementation, and evaluation, will be critical to determining future successes.

This guidebook was developed to help EPA program staff evaluate the effectiveness of their risk communication activities. Several important points are emphasized. First, risk communication budgets are never ideal, but some type of evaluation can be incorporated into almost any size budget. Second, no one evaluation strategy is appropriate for every situation; you must tailor an evaluation to meet your particular needs. Third, more attention should be paid to outcome evaluation—determining the effects the activities had on the target audience(s).

This project was sponsored by EPA's Risk Communication Program, Office of Policy, Planning, and Evaluation (OPPE) under Cooperative Agreement Number CR814676-02. It was written by Michael J. Regan and William H. Desvousges at the Research Triangle Institute under the supervision of Dr. Ann Fisher, OPPE. Some sections have been excerpted from *Making Health Communications Work,* written by Elaine Arkin for the U.S. Department of Health and Human Services.

1 INTRODUCTION

Communicating About Environmental Risks

Each year, citizens face growing amounts of information about environmental hazards such as radon, lead, incidental tobacco smoke, and others. It is increasingly important for citizens to become informed about such potential health risks. Therefore, as part of its program to manage environmental risks the U.S. Environmental Protection Agency (EPA) develops and distributes information to different groups about the nature of a particular hazard, and what can and is being done to manage the risk and its consequences.

Risk communication activities are important for several major reasons:

- To explain regulatory actions being taken and put residual risk in context—for citizens, private interest groups, the regulated community, and legislators and government officials;
- To help citizens provide informed input into risk management decisions at the local level (e.g., siting waste disposal facilities);
- For use by EPA when it does not have regulatory authority for dealing with some risks, or when the risks are experienced by people within their homes, which limits the types of regulatory intervention that would be effective.

The term "risk communication" means different things to different people. For the purposes of this guidebook, risk communication is the purposeful exchange of information between interested parties about environmental risks. Careful attention to risk communication practices and process will help you to maximize the potential for success.

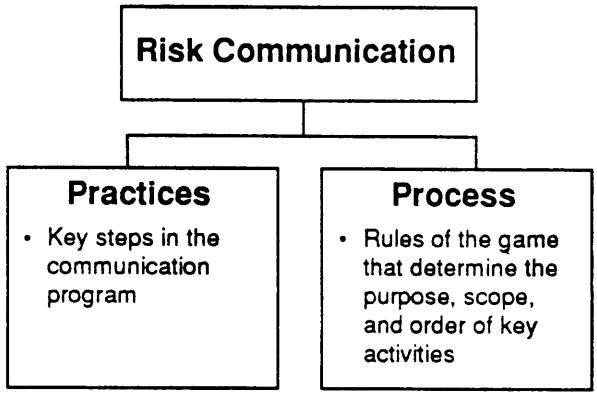

Figure 1. Dimensions of Risk Communication

Risk communication *practices* are steps taken by EPA's program staff to design and disseminate messages about risk to a target audience. These steps include identifying the target audience(s), developing and pretesting different risk messages, producing information materials (e.g., brochures, handbooks and posters, public service announcements, and videotapes), identifying appropriate communication channels (e.g., media, civic groups, schools), and distributing the materials.

Risk communication is complex and is subject to many limitations. Here are some examples:

- The emotion-laden attitudes surrounding environmental risks, coupled with the detailed technical knowledge needed to un-

derstand these phenomena, often act as barriers to the comprehension of important information.

- Print materials and videotapes require that the user be motivated to seek out risk information about a particular topic.
- Conflicting perceptions of risk among individuals make it difficult to develop effective risk messages.
- The news media have difficulty reporting scientific risk estimates.
- Certain goals, such as changing behavior, are more difficult to achieve than simply reaching the audience.

Risk communication is more than simply designing and delivering risk messages to the public (or other target audience); it is a two-way *process* that provides government, industry, and individual decision makers with the information they need to make decisions aimed at controlling or managing risks. For example, a community workshop might be held in which public officials and residents exchange information about the proposed cleanup of a Superfund site that would be both technically sound and socially acceptable.

The process of exchanging information can be undermined by many potent issues, such as scientific uncertainty, interest group pressure, disrespect, or just plain stubbornness. These and other problems pose potent threats to effective risk communication but often can be anticipated and mitigated.

More information on risk communication issues can be found in the selected readings at the end of the chapter.

Why Evaluate Risk Communication Programs?

Evaluation is a purposeful effort to determine effectiveness. It is essential to risk communication because it provides feedback about whether risk messages are received, understood, and internalized by those for whom they are intended. Without evaluation, it is impossible for communicators to choose those messages and channels that use limited resources most effectively. Instead, communicators are left to their own subjective interpretations about what works and what doesn't. A lack of evaluation, therefore, affects both the quality of the individual risk communication effort and the primary goal: improving public health.

Evaluating Risk Communication

Evaluation can be used for any of the following purposes:

- To conduct a *formative* evaluation to help program planners, managers, and/or staff improve developing or ongoing communication activities;
- To conduct a *process* evaluation to identify how well the administrative and organizational aspects of the activities are functioning;
- To conduct an *outcome* evaluation to help the sponsor or others in authority decide the extent to which risk communication activities are successful and what should be their ultimate fate.

All three types of evaluation mentioned here will greatly enhance the ability to ensure that resources allocated for risk communication are, in fact, used for activities that continue to meet the target audience's needs.

The ideal way to apply evaluation findings is to improve ongoing risk communication activities. In addition, evaluation results are valuable for other uses:

- To justify your effort;
- To provide evidence of need for additional funds or other resources;
- To increase institutional understanding of and support for risk communication activities;
- To encourage ongoing cooperative ventures with other organizations;
- To avoid making the same mistakes in future risk communication efforts.

The EPA Office of Air and Radiation (OAR) in cooperation with the US Consumer Product Safety Commission developed a booklet entitled, *The Inside Story: A Guide to Indoor Air Quality*. An *outcome* evaluation was conducted by EPA of the booklet's effectiveness in providing information on indoor air pollution to the general public. This evaluation demonstrates an important lesson: Useful information can be gathered quickly and at low cost.

How To Use This Guidebook

The guidebook explains how to plan a practical, cost-effective evaluation strategy that can be integrated with your risk communication effort. It identifies risk communication objectives, which evaluation techniques are most suitable for different goals, and how to go about the evaluation itself. While it has been developed specifically for EPA, the guidebook's principles are relevant for evaluating risk communication activities in other government agencies.

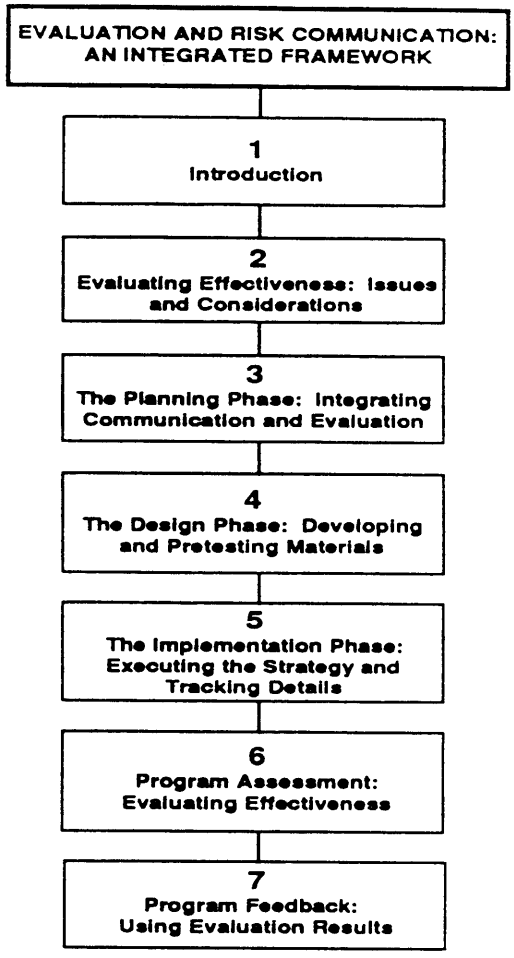

Figure 2. Guidebook Outline

The guidebook has seven chapters. Chapters 1 and 2 introduce the most important issues and considerations in evaluating risk communication efforts. Chapters 3-7 present a framework that integrates evaluation with different phases of the risk communication effort: planning (Chapter 3), design (Chapter 4), implementation (Chapter 5), program assessment (Chapter 6), and program feedback (Chapter 7). This five-phase framework has been adopted here to facilitate thinking about where and when various evaluation techniques and activities are most effective.

Throughout the guidebook, checklists and questions are provided to make planning easier. Additional readings are provided at the end of

each section to direct you to more complete information about specific subjects. The Appendices include a glossary and other sources of information.

Selected Readings

Covello, Vincent T., David B. McCallum, and Maria T. Pavlova, eds., *Effective Risk Communication*, Plenum Press, (1989).

Krimsky, Sheldon, and Alonzo Plough, *Environmental Hazards*, Dover, MA: Auburn House Publishing Co., (1988).

National Research Council, *Improving Risk Communication*, Washington, DC: National Academy Press, (1989).

Interagency Task Force on Environmental Cancer and Heart and Lung Disease. "Evaluation and Effective Risk Communication Workshop Proceedings." Washington, DC, (June 1988).

U.S. Department of Health and Human Services, *Making Health Communication Programs Work*, Bethesda, MD: National Cancer Institute, NIH Publication No. 89-1493, (1989).

U.S. Environmental Protection Agency. *The Inside Story: A Guide to Indoor Air Quality—How Well Is It Working?*, Washington, DC: Office of Policy, Planning, and Evaluation, EPA 230-01-073, (1990).

2 EVALUATING EFFECTIVENESS: ISSUES AND CONSIDERATIONS

Thinking About Evaluation

Evaluations usually are initiated by someone in management who wants to know what effect the communication effort is having on the target audience. The evaluator's job is to think through exactly what type of evaluation is appropriate.

Timing is an important aspect of evaluation—good evaluations cannot be simply tacked on the end of a risk communication effort. Planning for evaluation early can be a cost-effective strategy and can increase the effectiveness of risk communication activities. Thus, communicators can gather better information and have it available when it is most useful—before full implementation.

This chapter will help you think about the purpose of the evaluation, what resources are available, and what constraints will influence your activities.

Determining an Appropriate Evaluation

You should consider several questions before deciding what kind of evaluation will be best for your program:

- How long will the program last? Will the implementation phase be long enough to permit measurement of significant effects and periodic adjustment?
- Do you want to repeat or continue your program?
- Can you evaluate your objectives in the foreseeable future?
- Which components of the program are most important to you?
- Are there management or public demands for program accountability?
- Will an evaluation report help communication efforts compete with other agency priorities for future funding?

The table on the next page describes several types of evaluation and the types of information that each would try to collect. Chapters 4-6 describe how to use each of these types: formative (Chapter 4), process (Chapter 5), and outcome (Chapter 6).

Coping with Problems in Evaluation

Many considerations will influence what type of evaluation you can do and how well you can do it. Some limitations can be overcome, while others cannot.

Working With Stakeholders—Keep in mind that the interests of various stakeholders might be affected by an evaluation's findings. Stakeholders might include agency planners, managers, and program staff, oversight management (e.g., Congress), or the target audience. For example, an outcome evaluation might show that a communication activity did not increase the target audience's knowledge. This

Types of Evaluation

The following types of evaluation have been adapted to serve the goals of evaluating risk communication programs.

Formative—Evaluation during the formative stages of a risk communication effort assesses the strengths and weaknesses of materials or campaign strategies before implementation. It permits necessary revisions before the full effort goes forward. Among other things, materials can be tested for the following:

- clarity
- tone
- comprehensiveness

Process—Process evaluation examines the procedures and tasks involved in implementing an activity. This type of evaluation also can collect information about the administrative and organizational aspects of the overall effort, such as:

- number of staff working on the project
- schedule of activities
- number of materials distributed
- attendance at meetings
- number of calls to a hotline
- number of public inquiries received as a result of a public service announcement
- articles printed

Outcome—Outcome evaluation is used to collect and present information needed for judgments about the effort and its effectiveness in achieving its objectives. Not *all* risk communication efforts are suitable for outcome evaluation. Herman, et al. note that outcome evaluation is most suitable when "the program has clear and measurable goals and consistent replicable materials, organization, and activities." Outcome evaluation can obtain descriptive data on a project and document the immediate effects of the project on the target audience (e.g., percent of the target audience showing increased awareness of the subject). It is possible to get long-term results, but most agencies cannot afford long-term evaluation.

An outcome evaluation can collect the following information about the program:

- changes in knowledge and attitudes
- expressed intentions of the target audience
- changes in behavior

Adapted from U.S. Department of Health and Human Services, 1989.

finding might determine the future allocation of resources to risk communication efforts.

Herman, et al. observe that "a good and useful evaluation depends upon sharing information and upon cultivating a constituency of potential users who believe that the evaluation addresses prime issues of concern and has produced valid, reliable, and credible results—in other words, a constituency who will trust the findings." The evaluator should identify potential users of the findings and involve them in the planning and/or execution of the evaluation. Emphasize that an effective evaluation can improve the performance of ongoing or future communication efforts.

Facing Resource Constraints—Limited resources may force you to choose between formative, process, or outcome evaluation. No technique, independently, will provide you with a complete picture of what happened. Some experts will tell you that if you must choose, you should choose outcome evaluation—the only way to certify that you accomplished your objectives. Others will advise that process measures can improve program management by helping you understand *why* you did or did not accomplish your objectives.

Every program planner faces constraints to undertaking evaluation tasks, just as there are constraints to designing other aspects of a communication effort. These constraints may include the following:

- limited funds
- limited staff time and capabilities
- length of time allotted to the effort
- limited access to computer facilities
- agency restrictions on hiring consultants or contractors
- policies limiting the ability to gather information from the public
- management perceptions regarding the value of evaluation
- ambiguous goals and multiple objectives of the risk communication effort
- difficulties in designing appropriate measures for communication programs
- difficulties in separating the effects of your activities from other influences on the target audience in "real world" situations

These constraints make it necessary to weigh existing limitations against the requirements for a credible evaluation. It is not true that "something is better than nothing." If an evaluation design, data collection, or analysis must be compromised to fit limitations, you must make two important decisions:

1. Do the required compromises make the evaluation results invalid?
2. Is an evaluation strategy essential compared with other compelling uses for existing resources? For example, if the risk communication activity costs $10,000 and it would cost $15,000 for a credible evaluation of its effectiveness, there may be better uses for the $15,000.

Determining the Scope of Your Evaluation

Ideally, you would want more than one type of evaluation. Rarely does anyone have access to resources for ideal risk communication efforts, much less an ideal evaluation component. Scarce resources, therefore, should be matched with those evaluation activities that are most important.

Set Evaluation Objectives and Priorities—After you've determined which types of evalu-

ation are relevant for your needs, think about these questions:

1. What aspects of the risk communication activities are most important to evaluate?

2. Which evaluation activities will contribute the most to improving the current risk communication effort?

The previous discussion of formative, process, and outcome evaluation can help guide you in setting evaluation priorities.

Match Priorities with Resources—People often underestimate the amount and types of resources available to them for evaluation. Think carefully about what resources are available:

- staff and other people resources, such as committee members, associates from other programs, and volunteers

- budget funds and "in kind" resources such as computer time, mailing costs, and printing services available from another source

With a little creative thinking, you will find that you can include some form of evaluation for almost any size of budget. The chart on page 9 gives examples of evaluation tasks you might consider if you don't really have an evaluation budget ("minimal resources"), and if you have a moderate budget for evaluation. It also gives you examples of the kinds of evaluations you might ideally consider ("substantial resources").

The table is intended to present general guidelines for thinking about what can be done. Once you begin to look at the costs of the specific evaluation activities presented in the following chapters, you can revise the scope of your evaluation.

Summary

This chapter has introduced the different types of evaluation and when they are most useful. Throughout the guidebook, examples from previous evaluations are provided to help you think about how you might use evaluation. After reading the next several chapters, you can return to this section to clarify your priorities and determine an appropriate scope for your evaluation. Keep in mind that evaluation of risk communication activities is doable, affordable, and can help you achieve your objectives.

Suggested Readings

Green Lawrence, W., and Frances Marcus Lewis, *Measurement and Evaluation in Health Education and Health Promotion*, Palo Alto, CA: Mayfield Publishing Co., (1986).

Herman, Joan L., Lynn Lyons Morris, and Carol Taylor Fitz-Gibbons, *Evaluator's Handbook*, Newbury Park, CA: Sage Publications, (1989).

Stecher, Brian M., and W. Alan Davis, *How to Focus an Evaluation*, Newbury Park, CA: Sage Publications, (1987).

U.S. Department of Health and Human Services, *Making Health Communication Programs Work*, Bethesda, MD: National Cancer Institute, NIH Publication No. 89-1493, (1989).

Table 1. Evaluation Options Based on Available Resources

TYPE OF EVALUATION	RESOURCES REQUIRED		
	Minimal	**Modest**	**Substantial**
Formative	Readability test	Central-location intercept interview	Focus groups, individual in-depth interviews
Process	Record-keeping (e.g., monitoring activity timetables; number of callers to a hotline or attendees at a community event)	Program checklist (e.g., check adherence to program plans)	Management audit (e.g., thorough management review of activities)
Outcome	Activity assessments (e.g., demographics of callers to a hotline) Print media review (e.g., monitoring of content of articles appearing in the media)	Progress in attaining objectives (e.g., periodic calculation of percentage of target audience aware or participating) Public surveys (e.g., telephone surveys of self-reported knowledge or behavior)	Assessment of target audience for knowledge gain (e.g., pretest and posttest of change in audience knowledge) Studies of public behavior/health risk change (e.g., data on mitigating activities or changes in public's risk status)

Adapted from U.S. Department of Health and Human Services 1989.

3 THE PLANNING PHASE: INTEGRATING COMMUNICATION AND EVALUATION

Planning the Risk Communication Effort

Planning for evaluation and risk communication together will improve the timing and coordination of important activities, reduce cost, and increase the quality of feedback.

During the planning phase, you must decide whether a risk posed by an environmental hazard can be addressed through communication. Risk communication activities during the planning phase might consist of the following:

- Identify target audiences.
- Determine goals and objectives of the effort.
- Write program plan and timetable.

This is not a comprehensive list but it demonstrates the nature of activities taking place.

Preparing for Evaluation

In the planning phase, you should build on an understanding of your evaluation objectives and priorities (see Chapter 2) and begin creating an *evaluation design*. Regardless of the type of evaluation you want to do, the five steps described below will help you piece together the key steps for an effective evaluation.

These steps should serve as general guidelines to get you started.

Evaluation: Five Basic Steps

Step 1: Clarify Risk Communication Goals and Objectives.

Step 2: Determine Information Needs for Evaluation.

Step 3: Collect the Information.

Step 4: Analyze the Data.

Step 5: Draw Conclusions.

Step 1: Clarify Risk Communication Goals and Objectives

The terms *goals* and *objectives* often are used interchangeably, but the slight difference is significant. The goals of a program highlight what the program is expected to accomplish overall; the objectives are the intermediate outcomes that are necessary to get there. A risk communication strategy cannot be evaluated without a clear set of goals and objectives.

The primary goal of risk communication programs efforts is to achieve reductions in environmental risks. But expectations should be reasonable. In practice, it is difficult to set specific targets and time frames for improvements (e.g., a 5 percent reduction in environmental health risks within five years). Also, the relationship between cost and effective-

ness remains unclear. Many factors other than risk communication activities will influence the exposure of the targeted audience to the hazard and to information about that hazard. Nevertheless, every attempt should be made to define the goals clearly and explicitly so that they are measurable.

In response to several scientific studies on the health effects of various indoor air pollutants, the EPA developed a risk communication strategy with the goal *to reduce the potential health risks of individuals from exposure to indoor air pollutants* [EPA (1990)].

The objectives describe the desired risk communication *outcomes*, but not the specific steps for getting there. These steps will be determined later in developing the risk communication strategy. Examples of risk communication program objectives might be to increase awareness, to increase factual knowledge, to change commonly held attitudes, or to motivate behavioral change.

The stated objectives of the EPA risk communication program for indoor air were *to inform, to raise consciousness and to provide realistic pollution prevention solutions that could be easily implemented in respondents' homes.* (Note: this effort did not state actual mitigation activities as an objective).

If you want to evaluate your success in achieving the stated objectives, you must clarify exactly what you expect to take place. Arkin (1988) recommends ranking objectives to direct the attention of resources as well as making them

- specific,
- realistic or attainable,
- prioritized to direct the allocation of resources,
- measurable to assess progress towards the goal, and
- time specific.

Once written, these objectives serve as a kind of written "contract" that should allow management to assess the adequacy of the activities planned. In addition, they help planners and staff articulate their intentions. With a clear description of what you hope to accomplish, you will be able to take several important steps to plan your evaluation and data collection strategies, including targeting exactly what is to be observed or measured.

Step 2: Determine Information Needs for Evaluation

Measuring Effectiveness—One of the most important things to keep in mind as you are setting objectives is to ask yourself; is it possible to evaluate the communication objectives? You should be creative and thoughtful in choosing indicators that represent the objectives being measured. These indicators will be different for formative, process, and outcome evaluations. For example, a formative evaluation will be interested in the effectiveness of various components of the communication effort while an outcome evaluation would be more interested in investigating overall effects. Determining what information you need to collect for the evaluation need not be an additional step; it should be an integral part of planning the risk communication strategy.

The table below presents the types of information that can be collected to answer different evaluation questions.

Examples of Evaluation Questions

1. **How many people were reached?** ***(process evaluation)***
   - Amount of time on radio and television and estimated audience at those times
   - Print coverage and estimated readership
   - Numbers of education materials distributed
   - Numbers of speeches/presentations and size of audiences
   - Number of other organizational and personal contacts
2. **Did they respond?** ***(process evaluation)***
   - Number of in-person, telephone mail inquiries (location of inquirers, where they heard of the program, and what they asked for)
   - Number of new organizations, businesses, media outlets, etc. participating in the program
   - Response (e.g., filled-out evaluation forms) from presentations
3. **Who responded?** ***(outcome evaluation)***
   - Demographics of responders (e.g., gender, education, income)
   - Geographic residence of responders
4. **Was there change?** ***(outcome evaluation)***
   - Changes in knowledge and/or attitudes
   - Changes in intentions (e.g., individuals say they will try not to smoke indoors)
   - Actions taken (e.g., increase in enrollment in radon testing)
   - Policies initiated or other institutional changes made

Adapted from Arkin, 1988.

Developing an Audience Profile—Before designing risk messages and materials, a needs assessment should be conducted to develop a profile of the targeted audience, their characteristics, habits, needs, resources, and interests. This baseline data can be used later for both improving materials (formative) and measuring progress in achieving goals and objectives (outcome).

After you have developed a profile of your targeted audience, it may be useful to build a system to track their characteristics so you can

- periodically assess progress and the need for modification or new activities, and
- identify the change in status among the target audience when your effort is completed.

Often, audience surveys are inappropriately timed, are sporadic, or are incompatible and results cannot be compared. To avoid these problems, plan early for appropriate audience tracking.

In 1988, the EPA's Office of Toxic Substances *planned* a public information program to help the public understand information related to toxic substances released in the environment. A needs assessment was commissioned to identify current awareness, knowledge, perceptions, concerns, needs, and wants of various public groups (e.g., affected citizens, environmentalists, community leaders, local government staff, health and media professionals, educators, and students) about toxic substances.

Step 3: Collect the Information

Choosing Data Collection Techniques—Once you have determined the information requirements for the evaluation, you need to choose data collection techniques. Questionnaires, focus groups, key informant interviews, and telephone surveys are only some of the collection techniques available to evaluators. No one set of techniques is appropriate for every evaluation—be sure to choose those that fit your particular needs and resources. Chapter 4 describes some of the most useful techniques.

In many cases, scarce resources will limit the extensive use of sophisticated survey instruments. It is possible, however, to gain valuable feedback from less formal evaluation tools. Kline, et al. (1989) have developed an excellent catalogue of "quick and easy" evaluation tools that are practical and easy to use.

Determining When to Measure—Your data collection strategy can and should piggyback on other risk communication activities. Try passing out evaluation forms at civic group meetings to get feedback on the presentation of materials or to identify weaknesses in the communication strategy. Or distribute public newsletters that contain a tear-off coupon for audience feedback. When and how often you collect information will depend in part on resource constraints. Chapter 6 discusses how timing of measurement affects the formal evaluation design.

Step 4: Analyze the Data

After collecting the data, look at how well the information relates to the risk communication objectives to evaluate whether they are effective. The analysis can only be as good as the information collected during the evaluation. In the case of qualitative information, there will necessarily be a high degree of subjectivity to the analysis. In the case of quantitative assessment, such as that for outcome evaluation, the analysis will require using statistical techniques. Don't be intimidated by the prospect of using statistics; experts are available within the Office of Policy, Planning and Evaluation or nearby research centers and universities. Additional resources are listed in the selected readings at the end of chapter 6.

Step 5: Draw Conclusions

Once you have collected and analyzed the data, you must be able to draw conclusions about the effectiveness of various program components or of the overall program. In most cases, the results of the evaluation probably will highlight some successes as well as some failures. For example, you might find that although most groups understood the message, particular subgroups of the target population remained confused about the magnitude of risks. Or, you might find that certain segments of the audience received the communication, but that behavioral change was much lower than intended.

Remember, risk communication is a difficult and complex process, and even experienced practitioners face unpredictable obstacles requiring new skills and approaches. Keep in mind that learning can take place from both successes and failures. If a particular activity is not effective, evaluation can help identify the cause and thereby improve future efforts.

If you are going to make recommendations that are controversial, make sure that you can support your findings with solid evidence.

Summary

The five steps in this chapter provide a rough guide for developing an evaluation strategy or design. The following chapters will help you fill in the blanks by describing the evaluation activity most appropriate to a particular project phase: Chapter 4, "The Design Phase: Developing and Pretesting Materials," emphasizes formative evaluation; Chapter 5, "The Implementation Phase: Executing the Strategy and Tracking Details," highlights process evaluation; and Chapter 6, "Program Assessment: Evaluating Effectivensss," outlines outcome evaluation. Remember, each of these evaluation types requires preparation during the planning phase of the project. In addition, evaluation activities might overlap in different phases of the program.

Selected Readings

Arkin, Elaine, "Evaluation for Risk Communicators." Presented at the Workshop on Evaluation and Effective Risk Communication, Washington, DC, June 2-3, 1988.

Dillman, Don A., *Mail and Telephone Surveys: The Total Design Method*, New York: John Wiley and Sons, (1978).

Kline, Mark, Caron Chess, and Peter M. Sandman, *Evaluating Risk Communication Programs: A Catalogue of "Quick and Easy Methods,"* Rutgers University, NJ: Environmental Communication Research Program, (1989).

U.S. Environmental Protection Agency, *The Inside Story: A Guide to Indoor Air Quality—How Well is it Working?*, Washington, DC: Office of Policy, Planning, and Evaluation, EPA 230-01-073, (1990).

4 THE DESIGN PHASE: DEVELOPING AND PRETESTING MATERIALS

Designing the Risk Communication Effort

Once the planning phase is over, it is time to get the ball rolling. Communication activities will include the following:

- Identifying messages and materials;
- Deciding whether to produce new materials;
- Developing message concepts;
- Developing draft materials;
- Choosing communication channels.

In one case, EPA's Office of Toxic Substances *designed* a public information program to help the public understand information related to toxic substances released in the environment. In the design phase, communicators tried to

- identify and evaluate existing educational materials to prevent duplication of effort and assure optimal use of EPA resources.
- identify credible sources of information and potential delivery channels (e.g., League of Women Voters chapters, homeowners associations) to guide the design of communications activities.
- test messages explaining the meaning and implications of toxic emissions (e.g., public understanding of terms such as emission, risk, toxicity, dose, exposure, and health effects).

Many sources exist for help with the activities above. Risk communication materials exist from previous EPA programs. In addition, the risk communication literature has many guidelines for designing an activity.

Formative Evaluation: Pretesting Materials

Pretesting draft materials is a type of formative evaluation used to help ensure that communications materials will work. Pretesting is used to answer questions about whether the materials meet the following criteria:

- understandable
- relevant
- attention-getting and memorable
- attractive
- credible
- acceptable to the target audience

These are factors that can make the difference in whether materials work or don't work with a particular group; they also involve value judgments by the respondents in the pretest and your interpretation of what they mean. Most pretesting involved a few persons chosen to represent the intended target audiences, rather than a statistically valid sample (see Chapter 6 for more information on choosing a sample). Pretesting is generally "qualitative research", research that can be interpreted somewhat loosely to provide clues about audience acceptance and direction regarding materials production and use. It can screen out materials and approaches that clearly won't work, but

such qualitative pretesting cannot guarantee success.

Pretesting Methodology: Going About the Evaluation—The best methods for a particular risk communication effort depend upon the nature of the materials, the target audience, and the amount of time and resources available for pretesting. No formula exists for selecting a pretest methodology, nor is there a "perfect" method for pretesting. Methods should be selected and shaped to fit each pretesting requirement, considering the objectives of and resources available for each project.

This chapter describes some methods for pretesting environmental health risk concepts, messages, and materials. In addition, sample questionnaires are included in Appendix A and other pretesting materials are included in Appendix C, for you to adapt. Each method has both benefits and limitations. Sometimes combining methods will overcome the limitations of individual procedures. For example, *focus group* interviews may be used to identify issues and concerns relative to a particular audience, followed by *individual interviews* to discuss particular concerns in greater depth.

Readability testing should be used as a first step in pretesting draft manuscripts. This might be followed by contacting target audience respondents through individual questionnaires or interviews regarding the materials. *Central location interviews* or *theater testing* of messages for television or radio permits contact with larger numbers of respondents and is especially useful prior to final production of materials. Guidance on how to choose the most suitable method for a particular situation follows the descriptions of pretesting methods.

Pretesting offers both the opportunity and the temptation to structure the test and interpret the results to support or justify a preconceived point of view. It is natural to want your favorite concepts or messages to test well, but there is no need to test unless you are willing to consider the results objectively.

One final point: pretesting does not *guarantee* success. Good planning and sound pretesting can be negated by mistakes in final production. The message in a radio PSA on radon testing, for instance, may pretest well, but then be flawed by an execution that uses an actress who seems too happy to be concerned about possible exposure. Similarly, leaflet copy that pretests well may be rendered ineffective by a poor layout, hard-to-read type, and inappropriate illustrations.

EPA pretested an early draft of a booklet for citizens about lead in drinking water. The pretests revealed that the draft was more appropriate for managers of the water supply system, did not convey the important message that testing was the only way to determine whether there were high levels of lead at the household's water tap, and did not tell citizens how to get their water tested. These problems were remedied in the final version of *Lead and Your Drinking Water*, and respond to a basic risk communication rule: Don't alert people to what they perceive as a new risk without telling them how to reduce it.

Excuses for Avoiding Pretesting

"I don't have the time or money."

Pretesting needs to be included as one step in your risk communication development process from the beginning. Your project plans

should include time and resources for the pretest *and* for any changes you might need to make as a result of the pretest. Otherwise, you may not have the funds, and your boss may see the time for pretesting and alterations in materials as a delay in production rather than evidence of careful program development.

"My boss won't support pretesting."

Use the information in this guide and in the Suggested Readings to convince him or her that you need to pretest. Beautiful materials and an elegant program design can't guarantee that the target audience will pay attention, understand and relate to your messages. It's cheaper to find out whether the materials have a chance to work before they are produced than to have to start over later, or worse—have an unsuccessful program. Once you have pretested, be sure to explain to your superiors (in person or in a report) how it worked and how you modified your approach in response to the pretesting. Build a case for their acceptance of future pretesting. Using quotes from the target audience or anecdotes to illustrate your findings can make your report more interesting and memorable.

"I can tell the difference between good and bad materials—I don't need to pretest."

Many people have said this over the years, only to find out they can be wrong. Your training and experience are essential credentials, but are you sure you can react objectively to materials you have created or are responsible for? Can you really assume the role of people who are different from you (if you are not representative of the target audience) and see your materials through their eyes? For example, the "don't drink and drive" program learned through pretesting that teenagers were more threatened by the possibility of losing their license than the threat of injury, death, or parental disapproval.

"Our artist/producer says that pretesting can't be used to judge creativity."

Graphics staff, artists, and creative writers may be sensitive to criticism from "nonprofessionals," including the target audience. Explaining the purpose of pretesting or involving them in the pretest process may help them understand and appreciate the process. You should explain that you are testing all elements of the communication—your original communication strategies, the message, the presentation—and not just their work. By testing *alternative* concepts you can provide the creative staff with direction without telling them their work "failed."

Pretesting Methods

The most frequently used pretesting methods are as follows:

- focus group interviews
- readability testing
- self-administered questionnaires
- central location intercept interviews
- theater testing

These methods are described below. There is a summary chart on page 26 to help you compare the advantages and disadvantages of each method.

1. Focus Groups

Focus groups are a form of qualitative research adapted by market researchers from group therapy. They are used to obtain insights into target audience perceptions, beliefs, and language. A focus group interview is conducted with a group of about 8 to 10 people.

Using a discussion outline, a moderator keeps the session on track while allowing respondents to talk freely and spontaneously. As new topics related to the outline emerge, the moderator probes further to gain useful insights.

Focus groups are especially useful in the concept development stage of the communication process. They provide insights into target audience perceptions, misconceptions, attitudes, and beliefs on an environmental risk issue, allow planners to explore perceptions of message concepts, and help trigger the creative thinking of communication professionals. The group discussion stimulates respondents to talk freely, providing valuable clues for developing materials in the audience's own language and suggestions for changes or new directions.

Focus groups also can be used to supplement quantitative research. Market researchers originally developed this technique to explore in greater depth the data from large scale consumer surveys. Obtaining in-depth information from individuals typical of the target audience can provide insights into what the statistical data mean, or why individuals respond in certain ways.

Respondents selected for focus groups should be typical of the intended target audience. Various subgroups within the target audience may be represented in separate group discussions, especially when discussing sensitive or emotional subjects, to segregate respondents by age, sex, race, or whatever other variable is likely to hinder freedom of expression. Respondents are recruited one to three weeks in advance of the interview sessions, usually by telephone. They may be recruited using the telephone directory and interviewed by phone to determine if they qualify for the group. Or they may be recruited from among members of a relevant organization, place of employment, or other source. Lastly, private firms can be hired to identify participants and appropriate facilities. Recruiting respondents "at random" is *not* required because the results from focus group research are not intended to be statistically representative.

There are several important criteria for conducting effective group interviews. Ideally, respondents should not know the specific subject of the sessions in advance, and they should not know each other. Knowing the subject may result in respondents formulating ideas in advance and not talking spontaneously about the topic during the session. Knowing other respondents may inhibit individuals from talking freely. Finally, all respondents should be relative "newcomers" to focus group interviews. This permits more spontaneity in reactions and eliminates the problem of "professional" respondents who may lead or monopolize the discussion. For the same reasons, you may want to exclude health professionals and market researchers from focus groups.

Desvousges and Smith (1988) present the following lessons for implementing focus groups:

- Work with civic groups, church organizations, and social organizations to reach target segments.
- Make sure the organizational structure of the group knows about the session and its objective.
- Send people a confirmation letter and a brochure about your organization to reduce anxiety about intentions.
- Don't try to hold focus groups with respondents who might have difficulty with a topic. One-on-one in-depth interviews may be a better alternative for targeting these individuals.

- Have clear objectives and a written agenda to keep the sessions on track and to ensure that all important topics are covered.
- Select a relaxed setting with an informal format. Community halls, church halls, or local meeting places all work well. Refreshments help to break the ice.
- Keep the session to no more than two hours. While a break is generally unnecessary, a short one can sometimes help reorient the discussion if people are tending to pursue extraneous matters and offers a natural opportunity to shift gears and review issues in a different way.
- Remain at the location for a while after the session officially ends. Remember discussion of important or controversial topics can influence people after they leave the session. So attention to informal opportunities for discussion can moderate impacts and ease anxieties.

There is no firm rule about the number of focus groups that should be conducted. The number of groups depends upon your needs and resources. If target audience perceptions appear to be comparable after a few focus groups (you'll need at least two groups to make this decision), you may not find out any more by convening additional sessions. If perceptions vary, and the direction for message development is unclear, additional groups may be beneficial. In this case, revisions in the discussion outline after a few groups can help clarify unresolved issues in the additional groups.

Use an experienced, capable moderator, with skills for handling the group process. The moderator should not be designated as an expert in the subject matter being discussed; rather, a good moderator builds rapport and trust and probes respondents without reacting to, or influencing, their opinions. The moderator must be able to lead the discussion, and not be led by the group. The moderator must emphasize that there are no right or wrong answers to questions posed. A good moderator understands the process of eliciting comments, keeps the discussion on track, and makes it clear that he or she is not an expert on the subject. You will need to rehearse with the moderator to point out any topics or concerns you want emphasized or discussed in more depth.

In 1990, EPA sponsored a series of focus groups to pretest daft materials explaining the health risks from radon in drinking water. Specific suggestions for improving the materials were made:

- **Change title to "Radon and Well Water."**
- **Eliminate information that is not specific to private well users.**
- **Include information about water testing and treatment.**
- **Design a simpler layout.**
- **Display the EPA logo more prominently.**
- **Replace "mitigation" with a more familiar phrase.**
- **Include sources for more general radon information at the end and in the factsheet.**

The results of focus group interviews should be interpreted carefully. It is useful for an unseen observer (e.g., behind a one-way mirror) to take notes as well as to tape record or videotape the session for later review. In interpreting the findings from group interviews, you should look for trends and patterns in target audience perceptions rather than just a "he said . . . she said" kind of analysis.

Group discussion should not be used when individual responses or quantitative information is needed. For example, when assessing the final copy for a booklet, it is more important to gather individual rather than group reactions to indicate the individual's actual comprehension, perceptions and potential use. However, self-administered questionnaires can be completed by each participant *prior* to beginning a group discussion to combine individual and group reactions.

Focus group aids are included in Appendix B.

2. Readability Testing

"Readability testing" simply predicts the approximate educational level a person must have in order to understand written materials. Risk communication materials such as pamphlets, flyers, posters, and magazine articles are designed for distinct target groups; a readability test will indicate if they are written at a level most of the audience can understand. Assessing the readability of a pamphlet or another printed message will not guarantee its effectiveness and is by no means an absolute indicator of success.

Readability formulas use counts of language variables such as word and sentence length. The formulas have been devised statistically to predict readability. Generally speaking, the reading level required to understand a given pamphlet will be higher when its sentences are long or when it has many polysyllabic words.

Readability formulas measure only the *structural difficulty* (i.e., vocabulary, sentence structure, and word density) of written text. They do not measure other factors related to how "readable" a certain text is, such as sentence "flow," conceptual difficulty, organization of material, the influence of format or design of materials on comprehension, accuracy, or credibility. Readability tests are conducted by program staff and do not include participation by the audience for whom the materials are being produced. Consequently, readability testing supplements but does not supplant the need to pretest with the target audience.

Despite its limitations, readability testing is useful because it

- can be performed quickly,
- is virtually without cost,
- provides a tangible measure, and
- reminds the writer to choose words and terms carefully.

Based on a review of the advantages, disadvantages, and predictive validity of 12 selected readability formulas, the NCI Office of Cancer Communications chose the SMOG grading formula for testing the readability levels of its public and patient education materials. SMOG was chosen because it is both simple to use and accurate. Complete instructions for using the SMOG readability test for print materials are included in Appendix C.

Environmental health risks often involve many polysyllabic words and complex terms; readability formulas have not been designed to take into account such special terminology. In some cases, extensive use of multisyllable words known to be understandable to a particular audience (e.g., "radioactive") may lead to a high readability score. Therefore, as with all pretesting, readability test results should be used as indicative and not predictive of problems or success.

3. Self-Administered Questionnaires

Self-administered questionnaires offer several advantages. They:

- Enable program planners to elicit detailed information from respondents who may not be accessible for personal interviews (e.g., doctors, teachers, or residents of rural areas);
- Allow respondents to maintain their anonymity and reconsider their responses;
- Do not require interviewer time and can be done relatively inexpensively;
- Can be answered by many respondents at once;
- Can be mailed to respondents along with the pretest materials;
- Can be distributed to respondents gathered at a central location;
- Can be used where personal interviews are not feasible;
- Offer an inexpensive pretesting technique for agencies with minimal resources.

A self-administered questionnaire should be designed and then pilot tested with five to ten respondents. Usually, questionnaires and pretest materials are distributed to respondents after they have been contacted, but they also may be mailed to potential respondents without advance notification. Respondents are asked to review the materials on their own, to complete the questionnaire, and then to return it within a specified time.

The questionnaire should be relatively short and clear or respondents may not complete it. Clear, concise instructions to the respondent are important because there is no interviewer to offer clarification. Open-ended questions can be used to assess comprehension and overall reactions to materials and close-ended questions to assess such factors as personal relevance and believability of the material. Measures of attention or recall may not be reliable when used with this technique because respondents can refer back to the material.

Resources are invested primarily in questionnaire development and analysis of results. The analysis costs can be kept lower by minimizing the number of open-ended questions.

Self-administered questionnaires have certain disadvantages:

- The primary problem is the possibility of a low response rate.
- It is important to over-recruit respondents and recontact respondents to encourage them to return their questionnaires to ensure a sufficient number of returns.
- The data collection may take longer than with other methods (e.g., central location intercept interviews) because of delays in responses, especially if the questionnaires are mailed.
- The type of respondents who return the questionnaires may be different from those who do not respond, and this approach cannot be used with respondents who have reading and writing limitations. Hence, a certain degree of bias may be introduced, so results should be interpreted with this in mind. (Phone calls to those who did not respond will permit a comparison of respondent/nonrespondent answers.)

4. Central Location Intercept Interviews

Central location intercept interviews involve stationing interviewers at a point frequented by individuals from the target audience and asking them to participate in the pretest. There are two advantages to this:

- A high traffic area (e.g., a shopping mall, hospital waiting area, or school yard) can

yield a number of interviews in a reasonably short time.

- A central location for hard-to-reach target audiences can be a cost-effective means of gathering data.

A typical central location interview begins with the intercept. Potential respondents are stopped and asked whether they will participate. Then specific screening questions are asked to see whether the potential respondents fit the criteria of the target audience. If so, they are taken to the interviewing station (a quiet spot at a shopping mall or other site), are shown the pretest materials, and asked questions. The questions can help assess the following:

- comprehension
- intentions
- individual reaction
- personal relevance
- credibility
- recall (if test situation includes exposure to the materials prior to the interview)

These interviews cannot tell you about behavioral responses over time unless you sample before and after the communication effort.

Although the respondents intercepted through central location interviews may not be statistically representative of the target population, the sample is usually larger than those used in focus groups or individual in-depth interviews. You may be able to get a more representative sample if your audience has easily identifiable characteristics (e.g., pregnant women).

Unlike focus groups or in-depth interviews, the questionnaire used in central location intercept pretesting is highly structured and contains primarily multiple choice or close-ended questions to permit quick response. Open-ended questions, which allow "free flowing" answers, should be kept to a minimum because they take too much time for the respondent to answer and for the interviewer to record responses. The questionnaire, as in any type of research, should be pilot-tested before it is used in the field. Several sample questionnaires are included in Appendix A.

A number of market research companies throughout the country conduct central location intercept interviews in shopping malls. In some cases, interactive computer programs have been used effectively to stimulate interest of potential interviewees. Clinic waiting rooms, churches, Social Security offices, schools, worksites, or other locations frequented by individuals representative of the target audience also can be used for this purpose. Be sure to obtain clearances or permission to set up interviewing stations in these locations well in advance.

Posters can be tested in the kind of setting (e.g., a clinic waiting room or schoolroom) where they will be used. Posters should be mounted on a wall along with other materials—just as they are expected to be used—where the target audience passes, gathers, or waits. Selecting respondents from among those who have been "exposed" to the poster in its "natural setting" prior to the interview, and then moving to a nearby but separate location to ask questions, will permit an assessment of factors such as comprehension and personal relevance, and also whether

- the material attracts attention, and
- the respondent can recall the material when exposed to it in a "natural" setting.

The major advantage of the central location intercept approach is its cost-effectiveness

for interviewing large numbers of respondents in a short amount of time. For example, in one recent mall-intercept survey, researchers got 400 interviews in one day at a modest cost of $5 each. Because these interviews are intended to provide guidance ("qualitative" information), the size of the sample should only be large enough to give you answers to your pretest questions. If you have interviewed 30 respondents and most of them feel similarly about your materials, you are probably ready to stop. If, however, there are substantial disagreements or differences among respondents, or their responses have raised new questions, additional interviews should be conducted until you are satisfied that you have clear direction from the respondents. You may decide to revise (and perhaps test again) after fewer interviews if it is clear that changes are needed.

Designing a central location intercept pretest can be relatively easy. A few simple questions ("Do you own a home?" "How old are you?" "Do you have teenage children?") can identify respondents typical of the target audience quickly at the point of intercept.

Questions to assess comprehension and target audience perceptions of the pretest materials form the core of the questionnaire. A few additional questions, tailored to the specific item or items being tested ("Do you prefer this picture—or this one?"), also may be constructed to meet program planners' particular needs. The interview should be no longer than 10 minutes. If it must be longer, you may need to design special incentives to convince the respondent to continue the interview (e.g., a small payment or gift, or a plea regarding the importance of the subject and their opinions).

Central location intercept interviews should not be used if respondents must be interviewed in depth or on emotional or very sensitive subjects. The intercept approach also may not be suitable if respondents are likely to be skeptical or resistant to being interviewed on the spot (e.g., commuters anxious to return home). Although it is time-consuming to set up prearranged appointments, they actually may save time if respondents are unwilling to cooperate in a central location.

5. Theater Testing

"Theater" tests are so-called because they gather a large group of respondents in a room (or "theater"-style setting) at once to react, usually to audio or audiovisual materials,. Commercial services conduct theater-style tests for advertising agencies; this technique can be adopted for environmental risk messages. In commercial theater testing, up to 300 respondents are recruited by telephone to a central location, such as a hotel. Respondents are asked to watch a "pilot" television program to judge whether it should be aired.

Commercials are included in the program; some are control (constant) spots, while others are being tested. At the conclusion of the program, respondents are asked whether they recalled any commercials (or PSAs), and then asked questions regarding content and personal relevance. A similar sequence can be used to test radio PSAs.

Theater testing quickly gathers a large number of responses. Unlike some other pretest methods, the materials being tested are embedded within a program, with commercials, to simulate a natural viewing situation. This permits the assessment of how likely the audience is to pay attention to and remember the message.

Because commercial testing services are costly, you should consider conducting your own. A guide to conducting your own theater-

TABLE 2. PRETEST METHODS: SUMMARY

I. **Individual**

a. ***Self-administered Questionnaires*** *(mailed or personally delivered)*

Purpose:	To obtain individual reactions to draft materials
Application:	Print or audiovisual materials
Number of Respondents:	Enough to see a pattern of responses (Minimum 20; 100-200 ideal)
Resources Required:	Lists of respondents; Draft materials; Questionnaire; Postage (if mailed); Tape recorder or VCR (for audiovisual materials)
Pros:	Inexpensive; Does not require staff time to interact with respondents (if mailed); Can be anonymous for respondents; Can reach homebound, rural, other difficult-to-reach groups; Easy and (usually) quick for respondents
Cons:	Response rate may be low (if mailed); May require follow-up; May take long time to receive sufficient responses; Respondents self-select (potential bias); Exposure to materials isn't controlled; May not be appropriate if audience has limited writing skills

b. ***Individual Interviews*** *(phone or in person)*

Purpose:	Probe for individual's responses, beliefs, discuss range of issues
Application:	Develop hypotheses, messages, potentially motivating strategies; Discuss sensitive issues or complex draft materials
Number of Respondents:	Minimum of 10 per type of respondent
Resources Required:	Lists of respondents; Discussion guide/questionnaire; Trained interviewer; Telephone or quiet room, Tape recorder
Pros:	In-depth responses may differ from first response; Can test sensitive or emotional materials; Can test more complex/longer materials; Can learn more about "hard-to-reach" audiences; Can be used with individuals who have limited reading and writing skills
Cons:	Time consuming to conduct/analyze; Expensive, and may yield no firmer conclusion or consensus

c. ***Central Location Intercept Interviews***

Purpose:	To obtain more quantitative information about materials/messages
Application:	Broad range, including concepts, print, audiovisual materials
Number of Respondents:	30-100 per type (enough to establish pattern of response)
Resources Required:	Structured questionnaire; Trained interviewers; Access to mall, school, other location; Room or other place to interview; Tape recorder or VCR (for audiovisual materials)
Pros:	Can quickly conduct large number of interviews; Can provide "reliable" information for decision-making; Can test many kinds of materials; Can use to get respondents for self-administered questionnaire; Quick to analyze close-ended questions

TABLE 2. PRETEST METHODS: SUMMARY (continued)

Cons:	Short (10 min.) interviews; Incentive/persuasion needed for more time; Cannot probe; Cannot deal with sensitive issues; Sample is restricted to individuals at the location; Respondents choose to cooperate and may not be representative
II. Group	
a. Focus Group Interviews	
Purpose:	To obtain in-depth information about beliefs, perceptions, language, interests, concerns
Application:	Broad; concepts, issues, audiovisual or print materials, logos/other artwork
Number of Respondents:	8-12 per group; Minimum 2 groups per type of respondent
Resources Required:	Discussion outline; Trained moderator; Lists of respondents; Meeting room; Tape recorder; VCR (for audiovisual materials)
Pros:	Group interaction and length of discussion can stimulate more in-depth responses; Can discuss concepts prior to materials development; Can gather more opinions at once; Can complete groups and analyses quickly; Can cover multiple topics
Cons:	Too few respondents for making generalizations; No individual responses (group influence) unless combined with other methods; Respondents choose to attend, and may not be typical of the target population
b. Theater Testing	
Purpose:	To test audiovisual materials with many respondents at once
Application:	Pretest audio or audiovisual materials
Number of Respondents:	60-100 per type (enough to establish a pattern of response)
Resources Required:	Lists of respondents; Questionnaire; Large meeting room; AV equipment
Pros:	Can test with many respondents at once; Large sample may be more productive; Can be inexpensive; Can analyze quickly
Cons:	Few open-ended questions possible; Can require more elaborate preparation; Can be expensive if incentives required
III. Nonparticipatory	
a. Readability Tests	
Purpose:	To assess reading comprehension skills required to understand print materials
Application:	Print materials
Number of Respondents:	None
Resources Required:	Readability formula; 15 minutes
Pros:	Inexpensive; Quick
Cons:	"Rule of thumb" only—not predictive; Does not account for environmental or health terminology; No target audience reaction

Source: U.S. Department of Health and Human Services 1989.

TABLE 3. APPLICABILITY OF PRETESTING METHODS

	Nonparticipatory	Qualitative		Qualitative or Quantitative			
	Readability Tests	Focus Groups	Self Tests	Individual Interviews	Central Location Interviews	Mail Questionnaires	Theater Tests
1. Concept Development		●		●	●		
2. Poster	●	●			●		
3. Flyer	●	●	●	●	●	●	
4. Booklet	●	●	●	●	●	●	
5. Notification Letter	●	●	●	●	●	●	
6. Storyboard		●			●		
7. Radio PSA		●			●		●
8. TV PSA		●			●		●
9. Videotape		●					●

Adapted from U.S. Department of Health and Human Services 1989.

style tests is included in the HHS (1989) planner's guide in the selected readings. You can choose a setting where the target audience gathers and where they can assemble in a large group (e.g., a senior citizens center, a school auditorium) to conduct your own theater-style test at lower cost.

Determining What and How Much To Test

Qualitative research should be conducted in the early stages of program development before full funds have been committed to materials production and while messages can be changed if necessary. As noted earlier, testing can be useful at the concept development stage, once audiences and communication strategies have been determined, and prior to message development. Exploration with the target audience at this stage, most frequently through focus group discussions, can help determine appropriate message appeals (e.g., fear arousing vs. factual), effective spokespersons (e.g., a scientist, public official, or member of the target audience), and appropriate language (determined by listening to the group discussion).

Testing of drafted materials prior to final production permits identification of flaws prior to the expenditure of funds for final production, and especially prior to the use of materials with target audiences.

A combination of methods can be used to assess an audience's comprehension, the message's believability, personal relevance, acceptability, and other strong and weak points. Methods should be selected to suit the purpose of the testing, the sensitivity of the subject, and the resources available for testing. Adequate investigation is especially important when developing sensitive or potentially frightening messages, presenting complex, new information, or designing a new approach. In these cases, pretesting can reveal potential problems, but must be carefully structured, conducted, and analyzed.

Qualitative research responses cannot be considered representative of the public, nor can they be projected to the population as a whole. If representativeness is required, more formal methodologies should be used. However, for most pretesting purposes, qualitative methods may be more valuable because they provide insights into thinking and reasons for attitudes or misunderstandings that are vital to refining messages and materials.

When deciding when, whether, and how much you should use pretest methods in developing your program, consider:

- How much do you know about the target audience?
- How much do you know about them in relation to your environmental risk problem or issue?
- Is your issue or problem new, controversial, sensitive, or complex?
- Have you conducted related research that can be applied to this topic?
- Can you afford to make a mistake with a particular message or audience?

Planning and Conducting Pretests

The level of effort and staff resources required will vary considerably from one pretest to the next. Most pretesting is conducted with small samples of respondents who are typical of the target audience and who are easily accessible. The results, combined with your professional judgment, provide important direction for improving messages and materials.

This section provides practical suggestions. These suggestions should help you reduce the time and costs involved, whether or not commercial research firms are hired to supply field work and tabulation. The cost estimates in the chart on page 32 are for direct costs only— not included are staff time to provide direction or other support you would provide to the firm conducting the test. In some cases, you may reduce these costs by conducting pretests on your own, with the help of an expert. Some market researchers will tell you that bad research is worse than no research, and you must use professionals; others say that with proper instruction, you can do some testing on your own. As long as you know the limitations, some information is better than none. Both points of view are valid; venture on your own with care.

As in the planning stage of program development, a first step in planning a pretest is to formulate the objectives. These objectives should be stated specifically to provide a clear understanding of what you want to learn. Measures of attention, comprehension, believability, and personal relevance are key.

Designing the Questionnaire—When a questionnaire is used, specific questions to identify strengths and weaknesses in rough messages and materials should be developed based on the pretest objectives. Questions should not be asked just to satisfy someone's curiosity.

There are several ways to keep down costs for pretesting questionnaires:

- Keep the questionnaire short and to the point.
- Try to use as many close-ended or multiple choice questions as possible for easy tabulation and analysis.
- Whenever possible, borrow questions from other pretesting studies.
- Try to develop codes for quantifying responses in advance when open-ended questions are necessary. However, the point behind a pretest is to have less structure and more probes to find out how to develop effective risk communication materials and strategies.

Sample questionnaires are included in Appendix A as one resource. In addition, Chapter 6 contains a description of the major components of a questionnaire used for outcome evaluation.

Recruiting Respondents—If your budget does not allow you to hire a market research firm to recruit for various types of pretesting activities, you can recruit respondents yourself. Providing information or a speaker to a local church, school, civic or social organization may encourage members to participate in a pretest.

Another way to ensure sufficient participation is to recruit more people than actually are needed. Often respondents who agree to participate do not show up. If all participants do show up, they should be included in the pretest, or the "extra" respondents should be informed that too many respondents are present, given the agreed-upon incentive, thanked, and allowed to leave.

Here are some other ways to increase participation:

- Schedule the pretest at a time that is most convenient for respondents (e.g., at lunch or after work).
- Choose a safe and convenient site.
- Provide transportation.
- Arrange for child care during the time of the pretest, if necessary.

Trained interviewers should be used whenever possible. For focus group and in-depth interviews, this is essential. If your office has no experience in focus group studies, you might consider hiring a good, experienced moderator, observing and taping the sessions, and using them as training to develop in-house skills. Local advertising agencies may be of assistance in identifying a good moderator. Continuing education courses in interpersonal communication or group interaction may be useful for staff training or identifying potential interviewers.

For conducting central location interviews, university and college departments of marketing, communications, or health education might be able to provide interviewer training and student interviewers. Pretesting a poster or a PSA is an excellent "real world" project for a faculty member to adopt as a class project. Students in these departments are being trained in research methods, and pretesting can give them a chance to develop their skills.

Facilities—Pretesting facilities should be quiet and comfortable. Meeting rooms at churches, office buildings, or other institutions can be used for conducting focus group or individual in-depth interviews. If an observation room with a one-way mirror is not available, you may allow staff to listen by hooking up speakers in a room nearby, or by audiotaping or videotaping the session. If necessary, one or two observers can sit at the back of the room, but they need to keep quiet so the focus group respondents will not be influenced by their comments.

Getting Help—Many resources exist for obtaining professional assistance in pretesting. Faculty at university departments of marketing, communications, health education, psychology or sociology can be helpful in designing and conducting pretests. Marketing research firms specializing in respondent recruitment, interviewing, tabulation, and other services sometimes have facilities for conducting group sessions and other techniques. The American Marketing Association's *Marketing Services Guide* lists suppliers and services geographi-

cally throughout the United States. Also, advertising clubs (many affiliated with the American Advertising Federation) and chapters of the Public Relations Society of America sometimes undertake public service projects at no charge to nonprofit organizations. Other sources include the Marketing Research Association and the Association of Public Opinion Researchers.

One caution: individuals trained in commercial pretesting may not be completely aware of all the nuances and subtleties involved in risk communication. They will be able to draw on their commercial experience for selecting the appropriate pretest methodology. However, other factors such as the wording and interpretation of questions and results are influenced by the complexities of risk information. You should be prepared to supervise and guide your consultants.

Summary

To yield useful results, a pretest should be planned carefully. Ample time should be allowed for

- contracting with support firms (if necessary),
- arranging for the required facilities (1-2 weeks),
- developing and testing the questionnaire (2-3 weeks),
- recruiting interviewers and respondents (2-4 weeks),
- gathering the data (1-2 weeks),
- analyzing the results (1 week),
- making the appropriate alternations in messages or materials, and
- pretesting again, if needed.

And adequate pretesting should include the following:

- carefully defining the target audience,
- recruiting from that audience,
- considering tests with "gatekeepers" or intermediaries,
- defining the purpose of materials prior to designing questionnaire,
- locating a trained interviewer and interpreter for some tests,
- carefully assessing results, and
- considering using a "mix" of methods to tailor your pretesting to your needs.

Without adequate planning, pretesting may not serve its intended purpose—to improve your messages and materials. Instead, it could become expensive research that is of little or no use.

Selected Readings

American Marketing Association, *Marketing Services Guide*, Chicago: published yearly.

Basch, Charles E., "Focus Group Interview: An Underutilized Research Technique for Improving Theory and Practice in Health Education," *Health Education Quarterly* 14(4):411-448, (1987).

Desvousges, William H., and V. Kerry Smith. "Focus Groups and Risk Communication: The Science of Listening to Data." *Risk Analysis* 8(4), (1988).

Sudman, Seymour, and Norman M. Bradburn, *Asking Questions: A Practical Guide to Questionnaire Design*, San Francisco, CA: Jossey-Bass Publishers, (1986).

U.S. Department of Health and Human Services, *Making Health Communication Programs Work*, Bethesda, MD: National Cancer Institute, NIH Publication No. 89-1493, (1989).

ESTIMATED COSTS OF PRETESTING, 1988

These estimated costs are included to suggest how you should budget for pretesting *using commercial firms*. Actual costs will vary depending upon geographic location, audience to be recruited, amount of effort contributed by staff, companies and respondents. The potential for such contributions may be significant for some issues. However, be careful not to jeopardize the quality of results with a too-skimpy budget.

Qualitative Studies
(Estimated costs for 10 general population respondents for 1.5 hours)

	Focus Group (One)	Individual In-depth Interviews (Ten)
a. Questionnaire development	$ 100 - 300	$ 200 - 500
b. Recruitment	350 - 600	400 - 600
c. Respondent fees	0 - 400	0 - 300
d. Facilities, travel	250 - 500	150 - 500
e. Moderator/interviewer	300 - 500	400 - 600
f. Analysis and report	300 - 1,800	450 - 2,500
Total	$1,300 - 4,000	$1,600 - 5,000

Quantitative Surveys
(Estimated costs for 100 general population respondents for 15-20 minutes)

	Door-to-Door	Central Location (Intercept/ Single Site)	Telephone (Local)	Mail
a. Questionnaire development	$ 400 - 3,000	$ 200 - 3,000	$ 400 - 3,000	$ 500 - 3,000
b. Questionnaire production +travel/facility, phones/mail	400 - 1,000	200 - 500	300 - 500	100 - 300
c. Screen/conduct interviews	2,500 - 4,000	1,500 - 2,000	1,000 - 1,500	0
d. Code/keypunch/tabulation	500 - 1,000	500 - 1,000	500 - 1,000	500 - 1,000
e. Analysis & report	1,000 - 3,000	1,000 - 3,000	1,000 - 3,000	1,000 - 3,000
Total	$ 4,800 - 12,000	$ 3,000 - 9,500	$ 3,000 - 9,000	$ 2,100 - 7,500

Note: Although many costs increase consistently with increases in sample size, "Questionnaire Development" and "Analysis/Report" increase more slowly, reducing the cost-per-interview with larger samples.
Source: U.S. Department of Health and Human Services 1989.

5 THE IMPLEMENTATION PHASE: EXECUTING THE STRATEGY AND TRACKING DETAILS

Process Evaluation

Once the program is under way, potential problems can be identified before they become serious. You can build a monitoring system into your program to help you identify any problems, flaws, or oversights regarding materials, implementation strategies, or channel selection before they become major impediments to success.

Often, problems can be quickly corrected if you can identify them. For example, if you ask the public to call for more information, you should provide a mechanism (e.g., a simple response form) for telephone operators to record questions asked and answers given. A frequent review of responses will identify whether incorrect or inadequate information is being given, any new information required to respond, and inquiry patterns.

Frequently, program implementation takes longer than you might expect—materials may be delayed at the printer, a major news story may preempt your publicity, or a new priority may delay community participation. A periodic review of planned tasks and time schedule will help you alter any plans that might be affected by unexpected events or delays. There is nothing wrong with altering your plans to fit the situation—keeping in mind what you are trying to achieve. In fact, you may risk damaging your program if you are not willing to be flexible and alter specific activities when needed.

Process evaluation, tracking how and how well your program is working, can provide tangible evidence of program progress, often useful to provide encouragement and reward to participants and evidence of success to your own office. It can also assure that the program is working the way in which you planned—a vital assurance prior to undertaking any more formal outcome evaluation.

A program to increase the number of households checked for radon was designed to educate children in the classroom about the hazards of radon and have them take home materials to encourage their parents to have their house tested. The program provided teacher training and classroom materials, but after allowing sufficient time for the teachers to complete their instruction, there was no significant increase in requests for home tests for radon. The program managers concluded that using children to influence their parents was not an effective strategy. However, a more careful review of what happened showed that teachers did not send materials home with the children; they had been given master copy suitable for photocopying but not suitable for mimeographing. Because they only had access to a mimeograph machine, the materials were not used.

Establishing Process Evaluation Measures

To help avoid major operational problems because specific tasks aren't working, you should make sure that program checks are in place. Mechanisms in place should track the following:

- work performed, time schedules, and expenditures (internal resources)
- publicity, promotion, and other outreach
- participation, inquiries, or other responses
- functioning and quality of response systems (distribution, inquiries, response)

Some ways of tracking include the following:

- Reviewing materials inventory weekly;
- Getting clipping services of print media coverage;
- Supplying "bounce-back" cards or making follow-up phone calls with television and radio stations;
- Monitoring logs of television/radio stations for frequency and time of PSA airings;
- Monitoring volume of inquiries and length of time to reply;
- Reviewing telephone responses for accuracy and appropriateness;
- Checking distribution points to assess materials use (and make sure that materials are still available);
- Making phone calls or arranging meetings with participating organizations to review progress and problems;
- Conducting focus groups or telephone interviews with program participants/ target audience members;
- Following up with key individuals in the community to check their preparedness and interest and to identify problems.

These process measures will tell you how the program is operating, and may tell you whether the target audience is responding; these measures will *not* tell you about the program effects: whether the audience learned, acted, or made a change as a result. Therefore, it is important to evaluate the results of your program—its effect or outcome (see Chapter 6).

Summary

Periodically you should assess whether

- activities are on track and on time,
- the target audience is being reached,
- some strategies appear to be more successful than others,
- some aspects of the program need more attention, alteration, or elimination,
- time schedules are being met, and
- resource expenditures are acceptable.

The process evaluation and other tracking measures you established should permit this assessment. You should establish specific intervals to review progress. Preparing progress reports—with successes, modified plans, and schedules—can help you keep all your agency and program players informed and synchronized.

Selected Readings

King, Jean A., Lynn Lyons Morris, and Carol Taylor Fitz-Gibbon, *How to Assess Program Implementation*, Newbury Park, CA: Sage Publications, (1987).

U.S. Department of Health and Human Services, *Making Health Communication Work*, Bethesda, MD: National Cancer Institute, NIH Publication No. 89-1493, (1989).

U.S. Environmental Protection Agency, *Communicating Radon Risk Effectively: A Mid-Course Evaluation*, Washington, DC: Office of Policy, Planning and Evaluation, EPA 230-07-87-029, (1987).

6 PROGRAM ASSESSMENT: EVALUATING EFFECTIVENESS

Outcome Evaluation

Often people assume the impact of risk communication programs cannot be evaluated, or that it costs too much money or takes too much expertise. These concerns are based on real constraints, but they should not prevent you from conducting an effective outcome evaluation.

Outcome evaluation methodologies try to measure changes in the target audience's awareness, knowledge, attitudes, and/or behavior. In some cases, outcome evaluation uses qualitative measures to get an indication of the audience impacts. Unlike the pretesting methods, however, quantitative measures often are used to draw definitive conclusions about the overall impact.

Measuring Effectiveness

Measuring the effectiveness of a risk communication program involves subtle considerations. For example, Viscusi, Magat, and Huber [1986] described effectiveness in terms of exercising a "sound judgment." Deciding on what constitutes sound judgment, however, remains somewhat subjective, even in light of the best scientific evidence available.

What is clear, however, is that attitudinal/behavioral measures of effectiveness are necessary because simply asking people about effectiveness can be very misleading. For example, Smith et al. [U.S. EPA, 1987] found that almost 90 percent of homeowners receiving a radon fact sheet considered it very effective. Attitudinal/behavioral measures of effectiveness showed these same homeowners to have less understanding of key radon concepts and a greater divergence between their perceived and technical risks compared to similar homeowners who received experimental brochures.

The State of Maryland sponsored an information program to explain the health risks from radon. This Maryland radon study considered three questions related to effectiveness. First, what do the various indicators show about the overall effectiveness of the risk communication program? Second, how do these findings compare with other public information efforts to improve public health? Third, can the effects of the EPA's experimental risk communication program be isolated from the effects of other sources of radon information?

This section discusses four measures that can be used to assess effectiveness:

- *awareness* of the risk and its potential consequences
- *knowledge* about risks and mitigation
- *attitudes* toward the risk
- *behavior* toward the risk

The choice of evaluation measures can influence the outcome of the final evaluation. The following discussion presents the pros and cons of each measure and develops guidelines

cons of each measure and develops guidelines for situations in which each may be appropriate.

Awareness—Did the target audience see the risk message? How many times? Where? Increased awareness is a basic indicator for any risk communication program because it is a necessary condition for any subsequent behavioral actions to reduce the risk. Increased awareness, however, does not guarantee that the desired behaviors will occur. Nevertheless, it is a starting point or building block that underlies almost every model of behavioral changes (see McGuire [1985]).

Awareness can be appraised from several perspectives:

- the absolute levels in a follow-up survey of each target group
- the change in awareness in each target group between baseline and follow-up surveys
- the change in awareness in an experimental group compared to a control group

Each of these perspectives provides somewhat different insights into the effectiveness of the risk communication program. More information on choosing a perspective for the evaluation is presented later in this chapter.

The Safe Water Drinking Act of 1974 requires that the public be notified when maximum contaminant levels are exceeded. Bruvold et al. (1985) interviewed 60 respondents in 15 California communities that had recently received a notification letter. The study found that respondents who recalled seeing the letter (68 percent) were much more likely to have specific knowledge about the contaminant and its effects.

Attitudes—What did they think about the risk and its potential consequences? Did the risk message affect their views? Did they use the information to form more correct attitudes toward the risks? Attitudes are an important measure of risk communication effectiveness. Aizen and Fishbein [1977] argue that attitudinal change is an important condition for behavioral change. They also argue that attitudes that are closely linked to the behavioral patterns under investigation can also help to predict changes in that behavior. Most experts tend to agree that attitudinal measures are an important part of evaluating communication effectiveness. There is far less agreement, however, over the ability of attitudinal measures to predict behavior (McGuire [1985]).

In the Maryland radon survey, evaluators developed a survey questionnaire that included three attitudinal measures for which respondents were asked to strongly agree, agree, disagree, or strongly disagree. The three statements were as follows:

- **"It is important to test my home to find out if I have a radon problem."**
- **"If I had a radon problem it would be costly to fix."**
- **"Even if a radon problem was fixed, my home would still be worth a lot less."**

These three statements corresponded closely to the risk communication messages that emphasized that testing is important, that remediation need not be expensive, and that remediation can be effective. If the messages were received and processed, the proportion agreeing to the first would increase, and the proportions disagreeing to the second and third would increase.

One way to evaluate effectiveness compares personal risk assessments made after receiving the information with the technical risk assessments for the same individuals. Ideally, we would like people to make decisions that reflect the proper amount of precautionary behavior. Unfortunately, the definition of "proper" for policy purposes is not necessarily clear cut. Even if attitudes change in a "rational" way, the adjustments might be far from perfect.

Knowledge—Did the target audience learn anything more about the source or processes responsible for the risk? Many risk communication programs have as a primary objective increasing knowledge—whether people learned factual information presented in the information materials. Like attitude changes, knowledge can be viewed as both an endpoint and a precondition for some desired behavioral action, such as testing for radon. As an endpoint, we are interested in measuring whether our risk communication program transferred information to citizens about the risk. As a precondition for behavior, we are interested in evaluating whether the transfer of certain types of information has an effect on the level or type of behavioral change.

In the Maryland radon study, evaluators administered a seven question "radon quiz" in both the baseline and follow-up surveys (see Appendix A). The quiz was multiple choice with three answer choices. The same questions were used in both surveys. The advantage of this strategy is that each question can be examined for improved performance. The only potential disadvantage is that the strategy could alienate some members of the panel sample who had answered the same questions three months earlier. This was found not to be a problem.

Different materials can be compared to determine which type is more effective in conveying information about both the nature of the risk and what can be done to mitigate the potential effects.

Knowledge can be affected by many variables, such as education, income, and gender. Simply measuring knowledge at the end of the program will not tell you what accounts for changes in learning. You can control for these "confounding" variables with an appropriate research design.

Behavior—Did they change their behavior in response to the information? In some cases, behavioral change is an explicit objective of the risk communication program; in other cases it is not. This indicator attempts to evaluate effectiveness in getting people to take preventative measures to reduce their own personal exposure to an environmental hazard, in getting them to attend a community meeting, or in getting them to address other kinds of risk-related behavior. In the case of mitigation, activities might include the following:

1. Purchasing specific equipment—homeowners have been observed to see if they purchased radon testing kits. If their homes tested positive for radon, they were observed to see whether they installed basement fans or air filters, among other mitigation techniques.

2. Changing consumption patterns—changes in the consumption of certain foods, such as organic vegetables, have taken place in response to information about the potential health impacts of agrochemicals.

3. Changing personal habits or routines—researchers have begun looking at the smoking habits of adults in response to information about health impacts of indoor air pollution, especially on young children.

Choosing a Design

Green et al. recommend the true experimental design as the best evaluation design. This design consists of five elements:

1. Representative sample of the target population or program
2. One or more pretests (measures preceding the communication activity)
3. Unexposed groups for comparison
4. Random assignment of the sample to experimental and control groups
5. One or more posttests to measure effects after the communication activity

You can simplify the evaluation without a total loss of valid results. However, the last variable—post-testing—is essential for outcome evaluation. Although resources may force you to compromise on any of the first four variables, remember that the additional cost of looking at all five variables is modest because of the high initial investment in planning the evaluation. You can get a better understanding of behavior by knowing something about other groups. If you measured for changes in behavior without a control group, you would have a hard time explaining why behavior did or did not change.

It is possible to choose more than one design for the same evaluation. For example, you might use an experimental/control group design for comparing attitudinal changes and focus only on the experimental group for measuring changes in knowledge. You may want to keep it simple, especially if it is your first evaluation, by selecting only one design. In addition, you are encouraged to find a qualified expert within your agency or at a nearby research center or university.

Experimental and Control Groups

An important factor in planning an evaluation is to think about who is to be measured and when. An experimental group is the sample of the target audience to be tested for levels of or changes in awareness, knowledge, attitudes, or behavior. A control group—one that is similar in all respects to the experimental group except for the specific risk communication activity—is sometimes chosen to isolate the effects of uncontrollable variables (e.g., income, gender, etc). There are three possible designs to choose from:

- experimental group only
- experimental group and a non-equivalent (not randomly assigned) control group (often called a comparison group)
- experimental group and a true (randomly assigned) control group

Note that in all cases, you will be measuring the experimental group—those people who are intended to receive the risk messages. A control group is chosen by the same methods as the experimental group. These people are measured at the same time as the experimental group but are not exposed to the risk communication materials.

In the Maryland radon study, three communities were chosen for the study. Each community had high reported levels of radon and was similar in socio-economic terms. Hagerstown received an integrated but modest media campaign—radio and print public service announcements and a utility bill insert. Frederick received the same media campaign plus a community outreach program that included presentations, posters, and related activities. Randallstown served as the comparison community and received no special radon information.

Without a control group, it is hard to know how good the results of your evaluation are, whether the results would have been as good with some other risk communication activity, and even whether the effort had any effect on the results at all. *It is recommended, therefore, that you use a control group.*

It is difficult to control for all variables, but some of the major variables, such as income, race, and education, can be observed easily. More importantly, the sampling procedure can determine whether the control group is true (randomly assigned) or non-equivalent (non-randomly assigned). Random assignment is the best way to avoid complex explanations of differences between groups because it increases the likelihood that factors affecting the outcome are spread evenly over the two groups. Random assignment is also important for generating statistically reliable results. More information on sampling--how to choose experimental and control groups—is included later in this section as well as in the selected readings at the end of the chapter.

Timing and Testing

Deciding when to test requires some careful thinking. In some cases, the decision will be based on constraints of the program such as a deadline for finishing the final report. You may also have to decide on allowing time for program effects to take place but not so long that the effects might wear off.

You have three choices for when to administer a test:

- posttest only
- pretest and posttest
- time series (a series of tests before the program is implemented and after it is finished)

Each of these options uses a posttest to determine the outcome measures for chosen indicators, although the posttest-only option does not tell you about changes over time.

Pretesting and posttesting, whether for experimental and/or control groups, allow you to observe changes in key indicators over time. The effect of pretesting, however, might alter the outcome measures being observed. For example, a baseline interview might sensitize an individual to be more receptive to the ensuing risk message. You might be able to get around this problem by pretesting a random half of both the control and experimental groups. You could then statistically compare differences within each group to determine whether the differences are significant. If you find no reason to think the sensitization bias exists, then you can compare the entire experimental and control groups to evaluate differences.

In the Maryland radon study, researchers were concerned about the problem of sensitization bias resulting from re-interviewing the same people. They developed a design that used two independent samples from each community. A baseline survey was conducted with one sample from each community during December 1987. Evaluators then conducted follow up surveys with both samples from each community. This design allowed researchers to conduct before and after surveys, thereby avoiding interpersonal differences between measurements. In addition, the study used independent samples to test for sensitization bias, which was found to be insignificant.

Time series testing is useful if you have the money and the interest in measuring changes in key indicators over time. These tests may take place during the communication program to

track progress or can be used after the program to see if the changes are temporary or lasting.

Summary

Many different combinations of groups and tests can be used in developing an evaluation design. Different factors may influence your decision:

- How much money do you have?
- What information do you need to make a sound judgment?
- When do you need the information the most?

In general, the best design is one that includes multiple tests with an independent group to test for sensitization. More information on when to test can be found in the selected readings or from qualified experts.

Choosing a Sample

Sampling is a method for selecting a group of individuals from the entire population. Although we try to collect samples that are representative of the entire population, some degree of uncertainty exists. The goal for the statistician is to draw a sample in a way that minimizes uncertainty and allows us to make generalizations about characteristics of the population as a whole.

In some statistical analyses, such as the evaluation on indoor air pollution (see box below), the sample chooses itself. When the individuals requested the indoor air booklet, they distinguished themselves from the rest of the population. It would be dangerous to generalize about characteristics, such as attitudes or awareness, beyond the limited population of responses.

In other cases, you will identify a population and then choose a representative sample at random from the population. However, the manner in which you select people at random influences the reliability of the final results. For example, an interviewer standing on a street corner who chooses attractive candidates for interviews is said to be subject to personal selection bias—he cannot generalize about the entire city's population from his sample because it is not representative. This problem may be overcome with more systematic procedures, such as selecting every fifth person, regardless of his appearance or other factors. Even so, it is unlikely that the population on a particular street on any given day is representative of the whole population.

To evaluate the effectiveness of a booklet on indoor air pollution, EPA evaluators drew a simple random sample from requests for the booklet received by the Agency's Public Information Center (PIC). These requests were drawn from a large box that had been used to store information requests. Rather than polling all 9,000 requests, evaluators consulted with OPPE's Statistical Policy Staff and, considering time, resource constraints, and likely responses rates, decided to draw a sample of 450 households.

The sample was selected randomly by drawing every twentieth request from the box. The advantage of a true random sample is that evaluators can generalize about the population at large. In the case of the indoor air booklet, however, the population consisted of those households who had requested the booklet, not the general population. Evaluators, therefore, had to limit their generalizations to those people who requested the booklet.

The preferred technique to avoid the bias of personal selection is to use mechanical methods of selecting a random sample. One option is to assign a number to every individual in the population (e.g., city, county) and then use a table of random numbers to make the selections for you. These tables usually contain instructions on how to use them to appropriately select the sample for you. Often, computers are used to pick a random sample, especially if the sample is going to be large. Instead of drawing the sample yourself, you may be able to purchase one from a sampling firm.

Even randomized techniques can introduce some types of bias that will cause the sample to be unrepresentative of the overall population. You must decide whether the characteristic, such as income, would likely influence what you are trying to analyze. If you are unsure, consult an expert.

Several sources at the end of this chapter can help you to determine an appropriate sample size. Sample size is important because it is one determinant of how far you can generalize your results to the population. When trying to determine the size of the sample, one rule of thumb might apply: choose as large a sample as time and money permit [Fitz-Gibbon, et al., (1987)]. A large sample has a better chance of representing a large group; a smaller sample reduces the likelihood of representativeness. Remember, however, that other statistical considerations may influence your confidence level more than sample size.

Collecting Outcome Data

Evaluation instruments, such as achievement tests, questionnaires, personal interviews, records, reports, or checklists, are used to collect data. Some combination of instruments may be necessary to collect the best information. For example, you may use focus groups to find out what is known about the health risks from air pollution before designing a questionnaire to test a larger group for knowledge.

Outcome evaluation is difficult to execute because of the type of information needed to measure knowledge and attitudes. Nevertheless, questionnaires do exist that can guide your own work. Both mail and telephone survey methods can collect reliable data. These instruments are particularly useful with large samples.

In evaluating *The Inside Story: A Guide to Indoor Air Quality*, the EPA used a telephone survey to collect information on knowledge, attitudes, and behavior (see Appendix A). The questions looked at the following respondent characteristics:

- **reading the booklet**
- **judgments about pollution**
- **learning from the booklet**
- **feelings about the booklet**
- **mitigating actions**

A telephone survey was used to collect the necessary data.

Page 44 takes you through a questionnaire to show how each of the questions gathers information related to the key indicators: awareness, knowledge, attitudes, and behavior. With a better understanding about the type of information to gather, you can adapt the questions to your own risk issue.

Analyzing Data

Statistics will help you put your data into a more manageable and comprehensible form, but they cannot make up for a poor design.

Communicating Radon Risk Effectively: Maryland Baseline Survey

EPA sponsored an evaluation of its radon risk communication program in Maryland jointly with the State. The study used a questionnaire to collect information on awareness, attitudes, knowledge, and behavior as indicators of effectiveness. The questionnaire consisted of 26 easy-to-answer questions. The numbers and letters beside each question are used to compile the data which makes analysis easier. To understand how each of the questions was used to collect relevant information, turn to Appendix A and refer to the following guidelines:

Questions 1 and 2: General Attitudinal Profile

These questions develop a profile of the respondent's attitude toward environmental issues in general. A ten point scale is used in question 2 to get a relative measure of concern for various types of pollution. The analysis then can explore how these attitudes might influence key indicators, such as knowledge and awareness.

Questions 3-6: Awareness

These questions explore the respondent's awareness of radon as a potential health problem. Questions 4 A-F attempt to identify the sources used for information about radon, such as magazines, newspapers, radio, TV, PSA's, utility bill inserts, personal relationships, or a state hotline number. Questions 5 and 6 explore the respondent's understanding of the government agencies that might be responsible for disseminating information to the public. The difference between the results in the baseline and follow-up surveys can be used to assess the effectiveness of the communication program in reaching the intended audience(s).

Questions 7-11: Behavior and Attitudes

These questions explore the behavior and attitudes of respondents who have and have not tested their homes for radon. Questions 8A-D simply examine preventative measures, such as testing and mitigation, taken to reduce potential health impacts. Questions 7, 9, 10 and 11 highlight the sources of attitudes that influence the respondent's willingness to test.

Questions 12-18: Knowledge

These questions test for specific knowledge about the characteristics of radon, its potential health effects, testing, and mitigation. This baseline knowledge was used to help develop appropriate materials that address information gaps or misinformation.

Questions 19-26: Key Characteristics of Sample

These questions look at variables that might determine whether the sample is representative of the overall population as well as to compare the experimental and control groups. In addition, this information can be used in the planning phase to identify and target priority groups for information materials.

With a good design, data analysis can be used to form opinions, develop theories, or make decisions. Fitz-Gibbon, et al. [1987] suggest three ways in which statistical techniques can be applied: to describe data, to generate hypotheses, and to test hypotheses.

Describe Data—if you have tested public knowledge about risks from hazardous wastes and someone asks you to describe the scores, you will need some way to summarize the scores in an accurate way. Graphs, charts, and other visuals aids are examples of descriptive statistics.

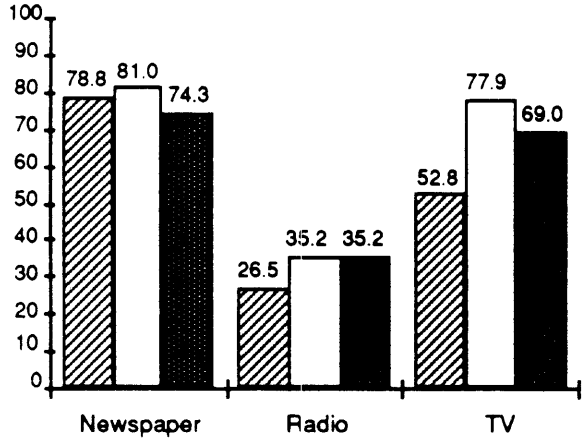

Figure 3. Sources of Awareness for Three Groups Hearing About Radon

Generate Hypotheses—if you have collected a large amount of information in a questionnaire, you can use exploratory data analysis to see if there are any patterns in the data or to generate hypotheses about the relationships between key variables. For example, baseline information gathered in the New York radon study indicated that respondents' individual characteristics and attitudes affected the number of correct responses on the radon quiz.

Test Hypotheses—the same procedures used to search a set of data for relationships can also be used to test hypotheses, to see if there is strong evidence that a relationship is more than just a chance pattern in the particular data. Since data are necessarily drawn from small samples, we can use inferential statistics, such as regression analysis, to give us confidence that our sample is representative of the population as a whole. For example, in the New York radon study, a regression technique estimated the effect of attitudinal and other variables on the radon quiz score, showing that prior awareness and higher education levels improved performance. Sources in the selected readings explain inferential statistics in greater detail.

Selected Readings

Aizen, I., and M. Fishbien, "Attitude-Behavior Relations: A Theoretical Analysis and Review of Empirical Research," *Psychological Bulletin* 84:888-918, (1977).

Bruvold, W.H., L.A. Wardlaw, and J.M. Gaston, "An Evaluation of Public Notification Requirements in California," *Journal of American Water Works Association* 77(3):40-43, (1985).

Dillman, Don A., *Mail and Telephone Surveys: The Total Design Method*, New York: John Wiley and Sons, (1978).

Fitz-Gibbon, Carol Taylor, and Lynn Lyons Morris, *How to Design a Program Evaluation*, Newbury Park, CA: Sage Publications, (1987).

Freedman, David, Robert Pisani, and Roger Purves, *Statistics*, New York: W.W. Norton and Company, (1978).

Kline, Mark, Caron Chess, and Peter M. Sandman, *Evaluating Risk Communication Programs: A Catalogue of "Quick and Easy" Feedback Methods*, Rutgers University, NJ: Environmental Communication Program, (1989).

Lipsey, Mark W., *Design Sensitivity Statistical Power for Experimental Research*, Newbury Park, CA: Sage Publications, (1990).

Selected Readings (continued)

McGuire, William J., "Attitudes and Attitude Change," in Gardner Lindzey and Elliot Aronson, eds., *Handbook of Social Psychology*, volume 2, third edition, New York: Random House, pp. 233-304, (1985).

Rowntree, Derek, *Statistics Without Tears: A Primer for Non-Mathematicians*, New York: Charles Scribner's Sons, (1981).

U.S. Environmental Protection Agency, *Communicating Radon Risk Effectively: A Mid-Course Evaluation*, Washington, DC: Office of Policy, Planning and Evaluation, EPA 230-07-87-029, (1987).

U.S. Environmental Protection Agency, *Communicating Radon Risk Effectively: Radon Testing in Maryland*, Washington, DC: Office of Policy, Planning and Evaluation, EPA 230-03-89-048, (1989).

U.S. Environmental Protection Agency, *The Inside Story: A Guide to Indoor Air Quality—How Well Is It Working?*, Washington, DC: Office of Policy, Planning and Evaluation, EPA 230-01-073, (1990).

Viscusi, W. Kip, W.A. Magat, and Joel Huber, "Informational Regulation of Consumer Health Risks: An Empirical Evaluation of Hazard Warnings," *Rand Journal of Economics*, 17(Autumn):351-65, (1986).

7 PROGRAM FEEDBACK: USING EVALUATION RESULTS

Apply What You Have Learned

Take the time to apply what you have learned to modify your program or to advise others who are planning similar programs. For example

- Reassess goals and objectives.
  - Has anything changed (e.g., with the target audience, the community, or your agency's mission) to require revisions in the original goals and objectives?
  - Is there new information about the environmental risk that should be incorporated into the program messages or design?
- Determine areas where additional effort is needed.
  - Are there objectives that are not being met? Why?
  - Are there strategies or activities that did not succeed? Are more resources required? Do you need to review why they didn't work and what can be done to correct any problems?
- Identify effective activities or strategies.
  - Have some objectives been met as a result of successful activities?
  - Should these be continued and strengthened because they appear to work well?
  - Or should they be considered successful and completed?
  - Can they be expanded to apply to other audiences or situations?
- Compare costs and results of different activities.
  - What were the relative costs (including staff time) and results of different aspects of your program?
  - Are there some activities that appear to work as well but cost less than others?
- Reaffirm support for the program.
  - Have you shared the results of your activities with the leadership of your office and agency?
  - Did you share this information with the individuals and organizations outside your agency who contributed?
  - Do you have evidence of program effectiveness and continued need to convince your agency to continue your program?
  - Do you have new or continuing activities that suggest the involvement of additional organizations?
- Decide to end a program that did not work.

Share What You Learned

The ideal way to apply evaluation findings is to improve your ongoing program. You also can use what you learn from process or outcome evaluation measures to

- justify your program with management
- provide evidence of need for additional funds or other resources

- increase institutional understanding of and support for risk communication activities
- encourage ongoing cooperative ventures with other organizations.

It is often difficult to find the time to analyze and report on what you have learned and share it with others. Nevertheless, what you learn from implementing a communication program might be invaluable to someone who is faced with a similar responsibility. Even if you cannot prepare a formal report or article to let others know what you have learned, consider alternatives such as:

- letters about your findings to appropriate environmental, public health, or health education journals
- a poster presentation at a relevant professional meeting
- a program description and sample materials sent to a related clearinghouse, federal or state agency
- local professional newsletters
- letters, phone calls, brief reports or meetings with your peers in similar organizations.

Letting others know about your program may prompt them to tell you about similar experiences, lessons, new ideas or potential resources.

Write an Evaluation Report

Taking the time to write a report about an evaluation task that you have conducted is useful for several reasons. The report can provide

- the discipline to help you critically analyze the results of the evaluation and think about any changes you should make as a result,
- a tangible product for your agency,
- evidence that your program or materials have been carefully developed—to be used as a "sales" tool with gatekeepers (e.g., television station public service directors),
- a record of your activities for use in planning future programs,
- assistance to others who may be interested in developing similar programs or materials, and
- a foundation for evaluation activities in the future (e.g., it is easier to design a new questionnaire based on one you have previously used than to start anew)

Careful Analysis—Often evaluation tasks are added to other responsibilities that already represent full time commitments. This means there is seldom sufficient time to think about the meaning of evaluation findings. If you are conducting or observing a pretest or another evaluation task, it may be easy to develop conclusions about the effectiveness of your materials or program during the time the tasks are being conducted. Avoid this temptation and take the time to review enough findings to have a good basis for concluding how well your materials or program work, or what changes should be made.

Writing a report can provide the opportunity to consider everything that happened in the course of the evaluation, how these events relate to the purpose of the evaluation, and any recommendations for modification to improve your materials or program.

A Tangible Product—Outcome and other evaluation tasks require a considerable investment of scarce program time and funds. Presenting your agency with a product may be particularly useful if there is a lack of support for evaluation. It can help others not only to see

that something was received for their investment, but also to understand why the evaluation was valuable.

Evidence of Effectiveness—If you want intermediaries (e.g., a television station, clinic, school, organization, or employer) to use your materials or program, you may have to convince them of its value. An evaluation report offers proof that the materials and program were carefully developed. This evidence can help explain why your materials or program may be better than others.

A Formal Record—What you learned in conducting an evaluation, both the process and the results, may be applicable to future programs to be planned by you or others. Don't forget to highlight unanticipated events outside your control that helped or hindered the risk communication activity. Staff may change and your memory may fade; an evaluation report is assurance that lessons learned are available for future application.

Help for Others—Sharing your evaluation report with peers who may be considering the development of similar programs may help them to design their programs more effectively, convince them to use (or modify) your program instead and establish your reputation for good program design.

A Foundation for Future Evaluation Efforts—It is much easier to design an evaluation based on former experience than to start "from scratch." A report outlining what you did, why, as well as what worked and what should be altered in the future provides a solid base from which to plan a new pretest or outcome evaluation. Be sure to include any questionnaire or other instruments you used in your report so that you can find and review them later.

Report Outline—Consider including these sections in your report:

- Background: purpose and objectives of the program
- Description: what was evaluated
- Purpose: why the evaluation was conducted
- Methodology: how it was conducted (with whom, when, how many, instruments used)
- Obstacles: problems in designing or conducting the evaluation
- Results: what you found out, how interim results lead to mid-course corrections of the risk communication effort, and what application it has to the program (program recommendations)
- Resources: money and staff time used for conducting the evaluation

Although the report should provide a clear record of what you did, it should not be any longer or more formal than needed. Keep it short and easy to read. Attach any questionnaires, tally sheets or other instruments you used as appendices instead of describing them in narrative form. Don't make it any harder a task than necessary!

Finally, make sure to share it with whoever might find it useful, as well as program implementers who provided feedback. The best report is of no value if it is filed unread.

Remember, risk communication activities play a key role in reducing the threats posed by environmental hazards. The effectiveness of risk communication has been improved by applying the principles of evaluation. This guidebook was developed to help you design an evaluation that is appropriate for your situation, but making it work well is up to you.

Selected Readings

Green, Lawrence W., and Frances Marcus Lewis, *Measurement and Evaluation in Health Education and Health Promotion*, Palo Alto, CA: Mayfield Publishing Co., (1986).

Hawkins, J. David, and Britt Nederhood. *Handbook for Evaluating Drug and Alcohol Prevention Programs*. U.S. Department of Health and Human Services, DHHS Publication No. (ADM) 87-1512, (1987).

Morris, Lynn Lyons, and Carol Taylor Fitz-Gibbon, *How to Present an Evaluation Report*, Beverly Hills, CA: Sage Publications, (1978).

U.S. Department of Health and Human Services, *Making Health Communication Programs Work*, Bethesda, MD: National Cancer Institute, NIH Publication No. 89-1493, (1989).

BIBLIOGRAPHY

Aizen, I., and M. Fishbien, "Attitude-Behavior Relations: A Theoretical Analysis and Review of Empirical Research," *Psychological Bulletin* 84:888-918, (1977).

American Marketing Association, *Marketing Services Guide*, Chicago: published yearly.

Arkin, Elaine, "Evaluation for Risk Communicators." Presented at the Workshop on Evaluation and Effective Risk Communication, Washington, DC, June 2-3, 1988.

Basch, Charles E., "Focus Group Interview: An Underutilized Research Technique for Improving Theory and Practice in Health Education," *Health Education Quarterly* 14(4):411-448, (1987).

Bruvold, W.H., L.A. Wardlaw, and J.M. Gaston, "An Evaluation of PUblic Notification Requirements in California." *Journal of American Water Works Association* 77(3):40-43, (1985).

Covello, Vincent T., David B. McCallum, and Maria T. Pavlova, *eds., Effective Risk Communication*, Plenum Press, (1988).

Desvousges, William H., and V. Kerry Smith, "Focus Groups and Risk Communication: The Science of Listening to Data." *Risk Analysis* 8(4), (1988).

Dillman, Don A., *Mail and Telephone Surveys: The Total Design Method*, New York: John Wiley and Sons, (1978).

Fisher, Ann, Maria Pavlova, and Vincent Covello, (eds), *Evaluation and Effective Risk Communication: Workshop Proceedings*, Cincinnati, OH: Center for Environmental Research Information, EPA-600-9-90-054, (1990).

Fitz-Gibbon, Carol Taylor, and Lynn Lyons Morris, *How to Design a Program Evaluation*, Newbury Park, CA: Sage Publications, 1987.

Freedman, David, Robert Pisani, and Roger Purves, *Statistics*, New York: W.W. Norton and Company, (1978).

Green, Lawrence W., and Frances Marcus Lewis, *Measurement and Evaluation in Health Education and Health Promotion*, Palo Alto, CA: Mayfield Publishing Co., (1986).

Hawkins, J. David, and Britt Nederhood, *Handbook for Evaluating Drug and Alcohol Prevention Programs*. U.S. Department of Health and Human Services, DHHS Publication No. (ADM) 87-1512, (1987).

Herman, Joan L., Lynn Lyons Morris, and Carol Taylor Fitz-Gibbons, *Evaluator's Handbook*, Newbury Park, CA: Sage Publications, (1989).

Interagency Task Force on Environmental Cancer and Heart and Lung Disease, "Evaluation and Effective Risk Communication Workshop Proceedings," Washington, DC, June 1988.

King, Jean A., Lynn Lyons Morris, and Carol Taylor Fitz-Gibbon, *How to Assess Program Implementation*, Newbury Park, CA: Sage Publications, (1987).

Kline, Mark, Caron Chess, and Peter M. Sandman, *Evaluating Risk Communication Programs: A Catalogue of "Quick and Easy" Feedback Methods*, Rutgers University, NJ: Environmental Communication Program, (1989).

Krimsky, Sheldon and Alonzo Plough, *Environmental Hazards*, Dover, MA: Auburn House Publishing Co., (1988).

Lipsey, Mark W., *Design Sensitivity Statistical Power for Experimental Research*, Newbury Park, CA: Sage Publications, (1990).

McGuire, William J., "Attitudes and Attitude Change," in Gardner Lindzey and Elliot Aronson, eds., *Handbook of Social Psychology*, volume 2, third edition, New York: Random House, pp. 233-304, (1985).

Morris, Lynn Lyons, and Carol Taylor Fitz-Gibbon, *How to Present an Evaluation Report*, Beverly Hills, CA: Sage Publications, (1978).

National Research Council, *Improving Risk Communication*, Washington, DC: National Academy Press, (1989).

Rowntree, Derek, *Statistics Without Tears: A Primer for Non-Mathematicians*, New York: Charles Scribner's Sons, (1981).

Stecher, Brian M., and W. Alan Davis, *How to Focus an Evaluation*, Newbury Park, CA: Sage Publications, (1987).

Sudman, Seymour, and Norman M. Bradburn, *Asking Questions: A Practical Guide to Questionnaire Design*, San Francisco, CA: Jossey-Bass Publishers, (1986).

U.S. Department of Health and Human Services, *Making Health Communication Programs Work*, Bethesda, MD: National Cancer Institute, NIH Publication No. 89-1493, (1989).

U.S. Environmental Protection Agency, *Communicating Radon Risk Effectively: A Mid-Course Evaluation*, Washington, DC: Office of Policy, Planning and Evaluation, EPA 230-07-87-029, (1987).

U.S. Environmental Protection Agency, *Communicating Radon Risk Effectively: Radon Testing in Maryland*, Washington, DC: Office of Policy, Planning and Evaluation, EPA 230-03-89-048, (1989).

U.S. Environmental Protection Agency, *The Inside Story: A Guide to Indoor Air Quality—How Well Is It Working?*, Washington, DC: Office of Policy, Planning and Evaluation, EPA 230-01-073, (1990).

Viscusi, W. Kip, W.A. Magat, and Joel Huber, "Informational Regulation of Consumer Health Risks: An Empirical Evaluation of Hazard Warnings," *Rand Journal of Economics* 17(Autumn):351-65, (1986).

GLOSSARY

Audience profile. A technique used to collect information about the characteristics, habits, needs, resources, and interests of a particular group of individuals (see baseline study).

Baseline study. The collection and analysis of data regarding a target audience or situation prior to intervention.

Central location intercept interviews. Interviews conducted with respondents who are stopped at a highly trafficked location that is frequented by individuals typical of the desired target audience.

Channel. The route of message delivery (e.g., mass media, community, interpersonal).

Closed-ended questions. Questions that provide respondents with a list of possible answers from which to choose; also called multiple choice questions.

Control (comparison) group. A sample randomly selected and matched to the target population according to characteristics identified in the study to permit a comparison of changes between those who receive the intervention and those who do not. A *comparison* group serves the same function but it is not randomly selected (or otherwise lacks the match desired for statistical analysis).

Convenience samples. Samples that consist of respondents who are typical of the target audience and who are easily accessible; not statistically projectable to the entire population being studied.

Design. A comprehensive statement of evaluation objectives, methods, and techniques.

Diagnostic information. Results from pretesting research that indicate the strengths and weaknesses in messages and materials.

Experimental group. A sample of the target audience who are chosen to receive a communication treatment.

Focus group interviews. A type of qualitative research in which an experienced moderator leads about 8 to 10 respondents through a discussion of a selected topic, allowing them to talk freely and spontaneously.

Formative evaluation. Evaluative research conducted during program development. May include state-of-the-art reviews, pretesting messages and materials, and pilot testing a program on a small scale before full implementation.

Goal. The overall improvement the program will strive to create.

Impact evaluation. Research designed to identify whether and to what extent a program contributed to accomplishing its stated goals (here, more global than outcome evaluation).

In-depth interviews. A form of qualitative research consisting of intensive interviews to find out how people think and what they feel about a given topic.

Intermediaries. Organizations, such as professional, industrial, civic, social or fraternal groups, that act as channels for distributing program messages and materials to members of the desired target audience.

Objective. A quantifiable statement of a desired program achievement necessary to reach a program goal.

Open-ended question. Questions that allow an individual to respond freely in his or her own words.

Outcome evaluation. Research designed to account for a program's accomplishments and effectiveness; also called "impact" evaluation.

Polysyllabic words. Words that contain three or more syllables.

Pretesting. A type of formative research that involves systematically gathering target audience reactions to messages and materials before they are produced in final form.

Process evaluation. Evaluation to study the functioning of components of program implementation; includes assessments of whether materials are being distributed to the right people and in what quantities, whether and to what extent program activities are occurring, and other measures of how and how well the program is working.

PSA. Public service announcement; used without charge by the media.

Qualitative research. Research that is subjective in that it involves obtaining information about feelings and impressions from small numbers of respondents. The information gathered usually should not be described in numerical terms, and generalizations about the target populations should not be made.

Quantitative research. Research designed to gather objective information from representative, random samples of respondents; results are expressed in numerical terms (e.g., 35 percent are aware of X and 65 percent are not). Quantitative data are used to draw conclusions about the target audience.

Random sample. A sample of respondents in which every individual of a particular population has had an equal chance of being included in the sample.

Readability testing. Using a formula to predict the approximate reading grade level a person must have achieved in order to understand written material.

Recall. In pretesting, used to describe the extent to which respondents remember seeing or hearing a message that was shown in a competitive media environment; usually centers on main idea.

Risk management. The selection of risk control options.

Stakeholder. Someone with an interest or "stake" in the outcome of the evaluation.

Self-administered questionnaire. Questionnaires that are filled out by respondents themselves; mailed directly to the respondent, or filled out by respondents gathered at a central location.

Target audience. The desired or intended audience for program messages and materials. The *primary target audience* consists of those individuals the program is designed to affect. The *secondary target audience* is that group (or groups) that can help reach or influence the primary audience.

APPENDIX A

QUESTIONNAIRES

1. Communicating Radon Risk Effectively (Maryland Baseline Survey)

2. Indoor Air Quality Booklet Survey

3. Managing Environmntal Risks at Public Schools: A Survey of Local School Districts

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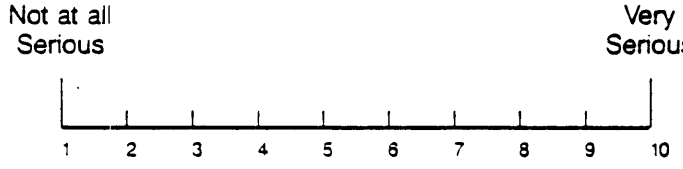
Communicating Radon Risk Effectively: Maryland Baseline Survey

Telephone # _____ RTI ID # _____

1. Compared to other issues the State of Maryland faces, do you think environmental issues are: ***(READ LIST; CIRCLE ONE NUMBER.)***

   a. MORE IMPORTANT 01
   b. JUST AS IMPORTANT 02
   c. LESS IMPORTANT 03
   d. DON'T KNOW ***(DON'T READ)*** 94

2. We're interested in finding out how serious you think the risks from some types of pollution are to your community and to your household. On a scale from 1 to 10, with 1 meaning NOT AT ALL SERIOUS and 10 meaning VERY SERIOUS, please tell me how serious you think the risks from each type of pollution are to your community and to your household. ***(READ LIST, SCALE, AND CATEGORIES; PROBE FOR NUMBER.)***



	Your community	Your household
a. LEAD IN DRINKING WATER	____	____
b. HAZARDOUS WASTES IN LANDFILLS	____	____
c. RADON IN HOMES	____	____

3. For the rest of the interview I'm going to ask questions mainly about one of the sources I mentioned—radon in homes. During the past few months, have you seen or heard anything about radon? ***(CIRCLE ONE NUMBER.)***

   a. YES 01
   b. NO 02
   c. DON'T KNOW ***(DON'T READ)*** 94

   → **Skip to Question 5 on page 3**

4A. In the past few months have you seen anything in a newspaper or magazine or heard anything on the radio or TV about radon?

a. YES ..... 01 → **Continue**
b. NO ..... 02 → **Skip to Question 4B**

Was that in the newspaper or magazine, or was it on the radio or TV? ***(CIRCLE ALL THAT APPLY.)***

a. NEWSPAPER 01
b. MAGAZINE 02
c. RADIO 03
d. TV 04

4B. Have you seen or heard any public service ads about radon in a newspaper or magazine, or on the radio or TV in the past few months?

a. YES ..... 01 → **Continue**
b. NO ..... 02 → **Skip to Question 4C**

Was that in the newspaper or magazine, or was it on the radio or TV? ***(CIRCLE ALL THAT APPLY.)***

a. NEWSPAPER 01
b. MAGAZINE 02
c. RADIO 03
d. TV 04

4C. Have you seen a poster, read a utility bill insert, or heard a presentation about radon in the past few months?

a. YES ..... 01 → **Continue**
b. NO ..... 02 → **Skip to Question 4D**

Was that a poster or utility bill insert? ***(CIRCLE ALL THAT APPLY.)***

a. POSTER 01
b. UTILITY BILL INSERT 02
c. PRESENTATION 03

4D. Have you talked about radon with a friend, relative, or coworker in the past few months?

a. YES ..... 01 → **Continue**
b. NO ..... 02 → **Skip to Question 4E**

Was that a friend, relative, or coworker? ***(CIRCLE ALL THAT APPLY.)***

a. FRIEND 01
b. RELATIVE 02
c. COWORKER 03

4E. Have you called the State of Maryland toll-free number for radon information?

a. YES 01
b. NO 02

4F. In the past few months have you learned anything about radon in some other way?

a. YES ..... 01 → How was that? _____
b. NO ..... 02 _____

5. Information about radon comes from many sources. If you wanted to know more about radon, which government agency would you contact? ***(DO NOT READ LIST; CIRCLE THE AGENCY.)***

a. MARYLAND DEPARTMENT OF THE ENVIRONMENT 01
b. MARYLAND DEPARTMENT OF HEALTH AND MENTAL HYGIENE 02
c. LOCAL HEALTH DEPARTMENT 03
d. U.S. ENVIRONMENTAL PROTECTION AGENCY 04
e. OTHER *(SPECIFY)* _____ 05
f. DON'T KNOW ***(DON'T READ)*** 94

6. If you wanted to learn about radon-related health problems, which of the following sources would you trust the most to give you that information? ***(READ LIST; CIRCLE ONE NUMBER.)***

a. MARYLAND DEPARTMENT OF THE ENVIRONMENT 01
b. MARYLAND DEPARTMENT OF HEALTH AND MENTAL HYGIENE 02
c. LOCAL HEALTH DEPARTMENT 03
d. U.S. ENVIRONMENTAL PROTECTION AGENCY 04
e. FAMILY DOCTOR 05
f. SOME OTHER SOURCE *(SPECIFY)* 06
g. NO ONE ***(DON'T READ)*** 07
h. DON'T KNOW ***(DON'T READ)*** 94

7. People have different opinions about radon. How much do you agree or disagree that the following statements are your opinion? ***(READ ANSWER CHOICES AFTER FIRST STATEMENT.)***

	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
a. IT IS IMPORTANT TO TEST MY HOME TO FIND OUT IF I HAVE A RADON PROBLEM	01	02	03	04	94
b. IF I HAD A RADON PROBLEM, IT WOULD BE COSTLY TO FIX	01	02	03	04	94
c. EVEN IF A RADON PROBLEM WAS FIXED, MY HOME WOULD STILL BE WORTH A LOT LESS	01	02	03	04	94

8A. Have you had your home tested for radon? ***(CIRCLE ONE NUMBER.)***

a. YES ..... 01 → **Continue**

b. NO ..... 02 → **Skip to Question 9**

c. DON'T KNOW ***(DON'T READ)*** ..... 94 → **Skip to Question 9**

8B. When did you get your results? ___/___ MONTH/YEAR
(If "don't know", enter "94/94")

8C. Were the results over 4 picocuries per liter?

a. YES ..... 01 → **Continue**

b. NO ..... 02 → **Skip to Question 11**

c. DON'T KNOW ***(DON'T READ)*** ..... 94 → **Skip to Question 11**

8D. Did you do followup testing, anything to fix the problem, both, or nothing?

a. FOLLOWUP TESTING 01

b. FIX PROBLEM 02

c. BOTH 03

d. NOTHING 04

e. DON'T KNOW ***(DON'T READ)*** 94

→ **Skip to Question 11**

9. People may have various reasons for deciding not to have their home tested for radon. What is the main reason you have not had yours tested. ***(DON'T READ LIST; ALL THAT APPLY.)***

a. NEVER THOUGHT ABOUT IT 01

b. DIDN'T KNOW IT WAS POSSIBLE 02

c. DON'T THINK I HAVE A PROBLEM IN MY HOME 03

d. DIDN'T KNOW HOW TO TEST 04

e. THOUGHT TESTING WAS TOO EXPENSIVE 05

f. DON'T THINK TESTS ARE RELIABLE 06

g. NOT INTERESTED 07

h. DIDN'T KNOW IT WAS A PROBLEM IN THIS AREA 08

i. WOULD RATHER NOT KNOW IF THERE IS A PROBLEM 09

j. NOTHING CAN BE DONE ABOUT RADON ANYWAY 10

k. FIXING A PROBLEM IS TOO EXPENSIVE 11

l. CONCERNED ABOUT CONFIDENTIALITY 12

m. JUST HAVEN'T GOTTEN AROUND TO IT 13

n. OTHER *(SPECIFY)* _____ 14

o. DON'T KNOW ***(DON'T READ)*** 94

10. Suppose your local health department was offering a radon test for a one-time cost of $10, $25, $50, $100. The cost would cover two radon detectors, the results, and a booklet about radon. Would you take part in such a radon testing program? ***(CIRCLE ONE NUMBER.)***

a. YES 01

b. NO 02

c. DON'T KNOW ***(DON'T READ)*** 94

11. Suppose you are just moving to this area and you want a home like the one you're in now. You have narrowed the choice to two houses that are almost identical. The only difference is that House 1 has radon levels 2, 5 times higher than the government's guidelines for action, while House 2 has no radon but costs an additional $5,000, $10,000, $15,000, $20,000. Which house would you buy? ***(CIRCLE ONE NUMBER.)***

a. HOUSE 1 01

b. HOUSE 2 02

c. DON'T KNOW ***(DON'T READ)*** 94

Some people have heard a great deal about radon while others have heard very little. We're interested in learning how much people know about radon. For the next group of questions, I am going to read you three choices. Please tell me which answer you think is best. If "don't know" is your best answer, then say that.

Record Responses

12. Where does most radon in homes come from?
    a. INDUSTRIAL POLLUTION 01
    b. NATURAL URANIUM IN SOIL 02
    c. OR HOME APPLIANCES 03
    d. DON'T KNOW ***(DON'T READ)*** 94

13. Which of the following best describes radon? Radon has:
    a. A SLIGHT ODOR 01
    b. A STRONG ODOR 02
    c. OR NO ODOR AT ALL 03
    d. DON'T KNOW ***(DON'T READ)*** 94

14. When radon is measured in a home, which of the following will affect the level?
    a. THE TIME OF YEAR IT'S MEASURED 01
    b. THE AMOUNT OF INDUSTRIAL POLLUTION AROUND THE HOME 02
    c. OR THE NUMBER OF APPLIANCES IN THE HOME 03
    d. DON'T KNOW ***(DON'T READ)*** 94

15. How can you test your home for radon?
    a. YOU CAN DO IT WITH A HOME TEST 01
    b. ONLY TRAINED PERSONNEL CAN TEST 02
    c. OR YOU CANNOT TEST FOR RADON 03
    d. DON'T KNOW ***(DON'T READ)*** 94

16. When do health problems from being exposed to radon usually occur?
    a. WITHIN A FEW WEEKS 01
    b. IN A FEW YEARS 02
    c. OR NOT FOR 10 TO 30 YEARS 03
    d. DON'T KNOW ***(DON'T READ)*** 94

17. What kind of health problems are high levels of radon exposure likely to cause?
    a. MINOR SKIN PROBLEMS 01
    b. EYE IRRITATIONS 02
    c. OR LUNG CANCER 03
    d. DON'T KNOW ***(DON'T READ)*** 94

18. What can homeowners do to reduce high radon levels in their homes?
    a. REMOVE THE APPLIANCES CAUSING THE PROBLEM 01
    b. HIRE A CONTRACTOR TO FIX THE PROBLEM 02
    c. OR THERE IS NO WAY TO FIX THE PROBLEM 03
    d. DON'T KNOW ***(DON'T READ)*** 94

19. People sometimes describe themselves in various ways. For each statement I read please tell me if these things are true about you always, often, sometimes, or never. ***(READ LIST AND SCALE; CIRCLE ONE NUMBER FOR EACH STATEMENT.)***

	Always	Often	Sometimes	Never	Don't know
a. I TRY TO FIX THINGS AROUND THE HOUSE	01	02	03	04	94
b. I EXERCISE AND/OR WATCH WHAT I EAT TO PROTECT MY HEALTH	01	02	03	04	94
c. I ASK MY PHYSICIAN A LOT OF QUESTIONS ABOUT MY HEALTH	01	02	03	04	94
d. I WAIT UNTIL I HAVE A LOT OF INFORMATION BEFORE I DECIDE TO BUY SOMETHING LIKE A NEW APPLIANCE	01	02	03	04	94
e. I QUESTION INFORMATION FROM EXPERTS OR OTHER AUTHORITIES	01	02	03	04	94

20. Please tell me how active you are in each of the following types of organizations or activities. ***(READ LIST AND SCALE; CIRCLE ONE NUMBER FOR EACH STATEMENT.)***

	Very active	Somewhat active	Not at all active	Don't know
a. CIVIC CLUB (KIWANIS, LEAGUE OF WOMEN VOTERS)	01	02	03	94
b. CHURCH OR RELIGIOUS ORGANIZATION	01	02	03	94
c. VOLUNTEER ACTIVITIES (RED CROSS, UNITED WAY)	01	02	03	94

Now, we have just a few more general background questions.

21. About how many years have you lived at this address? _____ YEARS

22. Is your home a: ***(READ LIST; CIRCLE ONE NUMBER.)***

a. SINGLE-FAMILY HOME 01
b. MOBILE HOME 02
c. DUPLEX 03
d. TOWNHOUSE 04
e. CONDOMINIUM 05
f. DON'T KNOW ***(DON'T READ)*** 94

23. To the best of your knowledge was your home built: ***(READ LIST; CIRCLE ONE NUMBER.)***

a. BEFORE 1940 01
b. BETWEEN 1940 AND 1976 02
c. AFTER 1976 03
d. DON'T KNOW ***(DON'T READ)*** 94

24. Are you planning to move during the next year? ***(CIRCLE ONE NUMBER.)***

a. YES 01
b. MAYBE 02
c. NO 03
d. DON'T KNOW ***(DON'T READ)*** 94

25. Does your home have a basement? ***(CIRCLE ONE NUMBER.)***

a. YES 01
b. NO 02
c. DON'T KNOW ***(DON'T READ)*** 94

→ **Skip to Question 27 on page 8**

26. Is any part of your basement used as living space by you or your family? ***(CIRCLE ONE NUMBER.)***

a. YES 01
b. NO 02
c. DON'T KNOW ***(DON'T READ)*** 94

27. How many people are there in your household? _____

28. How many children under 12? _____

29. Do you smoke cigarettes or other tobacco products? ***(CIRCLE ONE NUMBER.)***

a. YES 01
b. NO 02

30. Does anyone else in your household smoke? ***(CIRCLE ONE NUMBER.)***

a. YES 01
b. NO 02

31. What was the highest grade of school that you completed? ***(CIRCLE ONE NUMBER.)***

a. NO SCHOOL 01
b. GRADE SCHOOL (1-8) 02
c. SOME HIGH SCHOOL (9-11) 03
d. HIGH SCHOOL GRADUATE (12) 04
e. SOME COLLEGE (13-15) 05
f. COLLEGE GRADUATE (16) 06
g. POSTGRADUATE (17+) 07

32. What is your age? _____ YEARS

33. Is your racial or ethnic background ***(CIRCLE ONE NUMBER.)***

a. WHITE OR CAUCASIAN 01
b. BLACK OR NEGRO 02
c. HISPANIC 03
d. ASIAN OR PACIFIC ISLANDER 04
e. NATIVE AMERICAN INDIAN 05

34. ***(ASK ONLY IF UNCLEAR.)*** What is your sex? ***(CIRCLE ONE NUMBER.)***

a. MALE 01
b. FEMALE 02

35. I'm going to read a list of income categories for FAMILY income from all sources BEFORE taxes during 1986. Please tell me to stop when I get to yours. ***(CIRCLE ONE NUMBER.)***

a. $5,000 OR UNDER 01
b. $5,001 - $15,000 02
c. $15,001 - $25,000 03
d. $25,001 - $35,000 04
e. $35,001 - $50,000 05
f. $50,001 - $65,000 06
g. $65,001 - $80,000 07
h. $80,001 AND OVER 08

36. If you had to sell your home today, what do you think your home and property would sell for? $_____ ***(PROBE FOR APPROXIMATE)***

Thank you very much for your cooperation.
Your answers will be most helpful in this study.

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OMB 2010-0014
Expires 5/88

Radon Information Effectiveness Survey: Maryland Baseline Screener

Final Interview Code		
01 Ineligible, Not Residential Number	06 Answering Machine/Service	11 Language Barrier
02 Ineligible, Not Homeowner	07 No Result From Dial	12 Interview Completed
03 Ring, No Answer	08 Fast Busy/Computer Tone	13 Partial Data
04 Nonworking Number	09 Unable to Contact	14 Final Interview Refusal
05 Double Wrong Connection	10 Physically/Mentally Incompetent	15 Other

Hello, my name is _____. I'm calling from the Research Triangle Institute (RTI), in North Carolina. We are conducting a study on what people know and think about environmental issues. It won't take much of your time and your answers will be kept strictly confidential. *(Additional information, if necessary:* Your cooperation is very important because we want to find out what the general public knows about environmental issues. This is not a sales call. The study is sponsored by the State of Maryland.)

1. **Is this ___-___-____?**
   - Yes . . . . . 01 — *CONTINUE*
   - No . . . . . 02 — *"Thank You," HANG UP*

2. **Does this number serve a:** *(READ ALL CHOICES, MARK ONE.)*
   - Residence . . . . . 01 — *CONTINUE*
   - Business/institution . . . . . 02 } — *"Thank You," HANG UP*
   - Or something else . . . . . 03 }

3. **Do you own your residence?**
   - Yes . . . . . 01 — *CONTINUE*
   - No . . . . . 02 — *TERMINATE*

4. **As part of our study, I need to randomly choose an adult who makes or shares in important household decisions. Please tell me the first names of the adult decisionmakers in your household.** *(IF RESPONDENT CAN'T ANSWER, ASK FOR ADULT, REPEAT INTRODUCTION.)*

   1. Woman's Name: _____ 2. Man's Name: _____

   Third Decisionmaker: _____ Fourth Decisionmaker: _____

   (TO CHOOSE RESPONDENT, LOOK AT LABEL AND CHOOSE THE FIRST NAME IF THE NUMBER IS A "1" OR THE SECOND NAME IF IT'S A "2". IF YOU HAVE TWO MEN OR TWO WOMEN DECISIONMAKERS, JUST WRITE THE SECOND NAME IN THE MAN'S SPACE AND FOLLOW THE SAME CHOICE SELECTION RULE. IF MORE THAN TWO DECISIONMAKERS, THEN CONSULT YOUR RANDOM SELECTION TABLE. CIRCLE NUMBER OF PERSON SELECTED.)

   May I please speak to NAME OF SELECTED DECISIONMAKER. *(IF NOT AVAILABLE, SCHEDULE A CALLBACK.)*

   READ INTRODUCTION IF PERSON ANSWERING IS NOT THE RESPONDENT.

TERMINATION

Thank you very much for your cooperation. Our study involves only homeowners, so I won't need any more of your time. Thank you again for your help.

INDOOR AIR QUALITY BOOKLET SURVEY OBS # _____

Name_____

Address_____

_____

Phone_____ REGION_____

Date Time Result Recall Code

Abbreviations:

NA = no answer
NH = respondent not home
WR = will return
DISC = disconnect
AM = answering machine
WN = wrong number
IC = interview completed
PIC = partially completed
RC = return call
ET = eastern time

I = IDENTICAL TO A PRIOR QUESTION
VS = VERY SIMILAR TO A PRIOR QUESTION
S = SIMILAR OR BASED ON A PRIOR QUESTION

********** ALL CAPS ARE NOT READ **********

Hello. Is this the _____ residence?
(last name)

(IF NO, The number I was calling is _____ and it was for _____ residence.)
(full name)

(IF WRONG NUMBER, I am sorry to have bothered you.)

My name is _____ and I'm conducting a study to determine the effectiveness of the recent publication, The Inside Story: A Guide to Indoor Air Quality. This is not a sales call.

Your household was chosen randomly from the group of people who requested this publication from the Environmental Protection Agency.

I'd like to ask you some questions about the booklet. It's very important to us to know what you think, so we can tell whether our efforts to inform you are working. All answers you give will be kept strictly confidential. This will only take a few minutes.

USE IF RELUCTANT: Again, this is not a sales call. It is a study sponsored by the Environmental Protection Agency.

1. First of all, did your household receive the Guide to Indoor Air Quality from EPA? (It has a blue and grey cover.)

A. NO.....01
---I'm sorry. One was sent to your household but apparently failed to reach you. Would you like me to arrange for another copy to be sent to you? (REAFFIRM ADDRESS) May I ask you a few general questions about the environment? CONTINUE WITH QUESTIONS 2-4 AND 8-37, SKIPPING QUESTIONS 19 AND 20.

B. YES.....02

** Are you the person in your household most familiar with the booklet?

i) NO--May I speak with him/her?
--Is there a convenient time when he/she will be available to talk with me? SCHEDULE CALLBACK
ii) YES

** About how much time did you spend reading this booklet?

a. LESS THAN 10 MINUTES.....01
b. 10 TO 30 MINUTES.....02
c. 30 TO 60 MINUTES.....03
d. OVER AN HOUR.....04

e. DID NOT READ.....00
* IF 0 MINUTES, CONTINUE WITH QUESTIONS 2-4 AND 8-37, SKIPPING QUESTIONS 19 AND 20

2. Compared to other environmental issues that might affect your health, do you think indoor air pollution is:

a. more important.....01
b. just as important.....02
c. or less important.....03
d. DON'T KNOW.....04

3. On a scale from 1 to 10, with one meaning **not at all serious**, and 10 meaning, **very serious**, tell me how serious you think the risks from each of the following types of pollution are to your household.

a. first, lead in drinking water _____
b. hazardous wastes in landfills _____
c. indoor air pollution _____

4. I'm going to read several statements. **Please** tell me whether you strongly agree, agree, disagree or **strongly** disagree with each statement. If you don't know, just say **"don't know."**

1 2 3 4 99

a. Most indoor air pollution comes **from** nearby industries.....SA A D SD DK
b. Ordinary household products can **cause** indoor air pollution.....SA A D SD DK
c. The best way to reduce indoor air **pollution** usually is to remove the source of the pollution.....SA A D SD DK
d. The only health effects coming **from** indoor air pollution are short-term.....SA A D SD DK
e. Most people need to test their **homes for** a wide variety of indoor air pollutants.....SA A D SD DK
f. Radon is the only major indoor **air pollutant**..SA A D SD DK
g. Reducing indoor air pollution is **always** very expensive.....SA A D SD DK

Now some statements about the booklet; **again**, strongly agree, agree, disagree, strongly disagree.

1 2 3 4 99

5. a. The booklet was written in everyday **English**...SA A D SD DK
b. The organization of the booklet **was hard** to follow.....SA A D SD DK
c. The booklet covered what you needed **to know**...SA A D SD DK
d. The booklet helped you identify possible sources of indoor air pollution **in your** home..SA A D SD DK
e. The booklet described practical **ways to** reduce indoor air pollution in your **home**.....SA A D SD DK

6. On a scale of 1 to 10, with 1 meaning **not informed** and 10 meaning **very informed**, how informed did you feel you were about indoor air pollution:

a. before you received the Guide to Indoor Air Quality? _____
b. after you received the booklet? _____

7. Can you think of any particular information in the booklet that you found most informative or helpful?

CIRCLE ALL THOSE ANSWERS WHICH APPLY. **ANSWERS ARE NOT READ**
a. GENERAL DESCRIPTION OF CAUSES OF INDOOR AIR POLLUTION..01

b. HOW INDOOR AIR POLLUTION AFFECTS YOUR HEALTH.....02
c. DESCRIPTION OF STEPS TO REDUCE INDOOR AIR POLLUTANTS...03
d. REFERENCE GUIDE (MIDDLE OF BOOKLET).....04
e. MEASURING POLLUTANTS IN THE HOME.....05
f. ADDITIONAL SOURCES OF INFORMATION.....06
g. BUILDING A NEW HOME.....07
h. INFORMATION ON WEATHERIZING HOMES.....08
i. SICK BUILDING SYNDROME.....09
j. APARTMENT LIVING.....10
k. RADON.....11
l. ENVIRONMENTAL TOBACCO SMOKE.....12
m. BIOLOGICAL CONTAMINANTS, SUCH AS BACTERIA AND MOLD.....13
n. CARBON MONOXIDE.....14
o. NITROGEN DIOXIDE.....15
p. RESPIRABLE PARTICLES THAT ARE RELEASED WHEN FUELS ARE INCOMPLETELY BURNED.....16
q. ORGANIC CHEMICALS AND GASES, SUCH AS PAINTS,VARNISHES AND FUELS.....17
r. FORMALDEHYDE.....18
s. PESTICIDES.....19
t. ASBESTOS.....20
u. LEAD.....21
v. OTHER (SPECIFY) _____ ...22
w. DON'T KNOW/NO OPINION.....99

INDICATE ALL THAT APPLY. **ANSWERS ARE NOT READ.**

** Within the last year, have you taken, or do you have plans to take, any measures to reduce _____ in your home?

8. **Radon**

NO.....01
YES.....02

What have you done or are you doing?
a. TEST HOME RADON LEVELS _____ PCI/L
b. MORE INFORMATION OR PROFESSIONAL ADVICE (E.G. EPA GUIDELINES)
c. SEAL CRACKS AND OTHER OPENINGS IN BASEMENT FLOOR
d. INCREASE VENTILATION
e. TREAT RADON CONTAMINATED WELL WATER
f. DECREASE SMOKING IN HOME
g. PLANS TO _____
h. OTHER (SPECIFY) _____

9. **Environmental tobacco smoke**

NO.....01
YES.....02

What have you done or are you doing?
a. STOP SMOKING

b. DISCOURAGE OTHERS FROM SMOKING
c. ASK SMOKERS TO SMOKE OUTSIDE
d. PLANS TO _____
e. OTHER (SPECIFY) _____

10. **Biological contaminants**, such as bacteria or mold

NO.....01
YES.....02

What have you done or are you doing?
a. INSTALL FANS VENTED TO THE OUTDOORS IN THE KITCHEN AND/OR BATHROOM(S)
b. INCREASE USE OF THE FANS VENTED TO THE OUTDOORS IN THE KITCHEN AND/OR BATHROOM(S)
c. VENT CLOTHES DRYER OUTSIDE
d. CLEAN HUMIDIFIER MORE FREQUENTLY
e. USE ONLY DISTILLED WATER IN THE HUMIDIFIER
f. EMPTY WATER TRAYS IN APPLIANCES MORE FREQUENTLY
g. CLEAN AND DRY, OR REMOVE; WATER-DAMAGED CARPET(S)
h. DECREASE USE OF BASEMENT AS A LIVING AREA
i. CONSCIOUSLY ATTEMPT TO MAINTAIN HUMIDITY AT 30-50%.
j. VENTILATE THE ATTIC AND CRAWL SPACE TO PREVENT MOISTURE BUILD-UP
k. PLANS TO _____
l. OTHER (SPECIFY) _____

11. **Carbon monoxide and nitrogen dioxide**

NO.....01
YES.....02

What have you done or are you doing?
a. PROPERLY ADJUST GAS APPLIANCES
b. VENT GAS SPACE HEATERS AND FURNACES
c. PROPER FUEL IN KEROSENE SPACE HEATERS
d. INSTALL EXHAUST FAN, VENTED TO THE OUTDOORS, OVER GAS STOVE
e. INCREASE USAGE OF EXHAUST FANS, VENTED TO THE OUTDOORS, OVER GAS STOVE
f. CHOOSE PROPERLY SIZED WOOD STOVES CERTIFIED TO MEET EPA EMISSIONS STANDARDS
g. CHECK SEAL ON WOOD STOVE DOOR
h. TRAINED PROFESSIONAL VISIT--INSPECT, CLEAN AND TUNE-UP CENTRAL HEATING SYSTEM
i. DECREASE IDLING OF CAR IN GARAGE
j. PLANS TO _____
k. OTHER (SPECIFY) _____

12. **Respirable particles**, which are released when fuels are not completely burned,

NO.....01
YES.....02

What have you done or are you doing?
a. VENT FURNACES TO THE OUTDOORS
b. CHOOSE PROPERLY SIZED WOOD STOVES CERTIFIED TO MEET EPA EMISSIONS STANDARDS
c. CHECK SEAL ON DOOR OF WOOD STOVE
d. CHANGE FILTERS ON CENTRAL HEATING AND COOLING SYSTEMS AND AIR CLEANERS
e. TRAINED PROFESSIONAL VISIT--INSPECT, CLEAN AND TUNE-UP CENTRAL HEATING SYSTEM
f. PLANS TO _____
g. OTHER (SPECIFY)_____

13. **Organic chemicals and gases**, such as from paints and fuels?

NO.....01
YES.....02

What have you done or are you doing?
a. MORE AWARE OF MANUFACTURER'S DIRECTIONS
b. USE PRODUCTS OUTDOORS OR IN WELL-VENTILATED AREAS
c. DISCARD UNUSED OR LITTLE-USED CONTAINERS SAFELY
d. BUY QUANTITIES TO BE USED SOON
e. PLANS TO _____
f. OTHER (SPECIFY)_____

14. **Formaldehyde**

NO.....01
YES.....02

What have you done or are you doing?
a. USE EXTERIOR GRADE, LOWER EMITTING, PRESSED WOOD PRODUCTS
b. MAINTAIN MODERATE TEMPERATURES AND REDUCE HUMIDITY LEVELS TO 30-50%
c. INCREASE VENTILATION, PARTICULARLY AFTER NEW SOURCES OF EMISSION HAVE BEEN INTRODUCED.
d. PLANS TO _____
e. OTHER (SPECIFY) _____

15. **Exposure to pesticides**

NO.....01
YES.....02

What have you done or are you doing?
a. MORE AWARE OF MANUFACTURER'S DIRECTIONS
b. MIX OR DILUTE OUTDOORS
c. APPLY ONLY IN RECOMMENDED QUANTITIES
d. TAKE PETS OR PLANTS OUTDOORS TO APPLY
e. GREATER USE OF NON-CHEMICAL METHODS OF PEST CONTROL

f. SELECT PEST CONTROL COMPANY CAREFULLY
g. DECREASE STORAGE OF UNNEEDED PESTICIDES INSIDE THE HOME
h. DISPOSAL OF UNWANTED CONTAINERS MORE SAFELY
i. STORAGE OF CLOTHES WITH MOTH REPELLENTS IN SEPARATELY VENTILATED AREAS
j. INDOOR SPACES CLEAN AND WELL-VENTILATED IN ORDER TO ELIMINATE OR MINIMIZE USE OF AIR FRESHENERS
k. PLANS TO _____
l. OTHER (SPECIFY) _____

16. **Asbestos**

NO.....01
YES.....02

What have you done or are you doing?
a. PROFESSIONAL ADVICE TO IDENTIFY POTENTIAL ASBESTOS PROBLEMS
b. TRAINED AND QUALIFIED CONTRACTORS
c. REPLACE WOODSTOVE DOOR GASKETS WHICH MAY CONTAIN ASBESTOS, FOLLOWING PROPER PROCEDURE
d. PLANS TO _____
e. OTHER (SPECIFY) _____

17. **Lead**

NO.....01
YES.....02

What have you done or are you doing?
a. PAINT TESTED FOR LEAD
b. MORE CARE IN NOT DISTURBING LEAD-BASED PAINT
c. COVER LEAD-BASED PAINT WITH WALLPAPER OR OTHER BUILDING MATERIAL
d. USE WELL VENTILATED AREAS FOR HOBBIES AND HOUSEHOLD MAINTENANCE ACTIVITIES INVOLVING LEAD
e. CONSULT HEALTH DEPARTMENT ABOUT REMOVAL AND CLEANUP IF LEAD EXPOSURE IS SUSPECTED
f. TEST BLOOD LEVELS
g. TEST DRINKING WATER FOR LEAD
h. PLANS TO _____
i. OTHER (SPECIFY) _____

(VS)
18. In the past year, about how much money have you spent on testing for or reducing indoor air pollution in your home?

a. NONE.....01
b. < $100.....02
c. $100 - 199.....03
d. $200 - 499.....04
e. $500 - 999.....05
f. $1000 OR OVER.....06

19. Have you contacted any of the sources listed in the booklet?

a. NO.....01
b. YES.....02

Which one(s)? _____

_____

20. Have you shared the booklet or recommended the booklet to others not in your household?

a. NO.....01
b. YES
Who would that be?
FAMILY/RELATIVES--NOT LIVING WITH THEM.....02
FRIENDS/NEIGHBORS.....03
OTHER (SPECIFY)..____..04

****

Now just a few general background questions and we'll be finished.

(I)
21. About how many years have you lived at this address? _____

(I)
22. Do you own your own home?

a. NO.....01
b. YES.....02
c. DON'T KNOW.....99

(VS)
23. What type of home is it?

a. SINGLE-FAMILY HOME.....01
b. MOBILE HOME.....02
c. DUPLEX.....03
d. TOWN-HOUSE.....04
e. CONDOMINIUM.....05
f. APARTMENT.....06
g. OTHER (SPECIFY) _____.....07
h. DON'T KNOW.....99

(I)
24. To the best of your knowledge was your home built:

a. before 1940.....01
b. between 1940 and 1976.....02
c. or after 1976.....03
d. DON'T KNOW.....99

(VS)
25. Are you planning to move during the next year or two?

a. NO.....01
b. YES.....02
c. MAYBE.....03

(I)
26. Does your home have a basement?

a. NO (GO TO 28).....01
b. YES.....02

(I)
27. Is any part of your basement used as living space by you or your family?
a. NO.....01
b. YES.....02

(I)
28. How many people are in your household? _____

(I)
29. How many under the age of 12? _____

30. How many over the age of 60? _____

(VS)
31. Does anyone in your household smoke cigarettes or other tobacco products?

a. NO.....01
b. YES.....02

(I)
32. What was the highest grade of school that you completed?

a. NO SCHOOL.....01
b. GRADE SCHOOL (1-8).....02
c. SOME HIGH SCHOOL (9-11).....03
d. HIGH SCHOOL GRADUATE (12).....04
e. SOME COLLEGE (13-15).....05
f. COLLEGE GRADUATE (16).....06
g. POSTGRADUATE (17+).....07

(VS)
33. Please tell me which age category you are in.

a. 18 - 24.....01
b. 25 - 34.....02
c. 35 - 44.....03
d. 45 - 54.....04
e. 55 - 64.....05
f. 65 and over.....06

(VS)
34. What is your racial or ethnic background?

a. WHITE OR CAUCASIAN.....01
b. BLACK OR NEGRO.....02
c. HISPANIC.....03
d. ASIAN OR PACIFIC ISLANDER.....04
e. NATIVE AMERICAN INDIAN 05
f. REFUSAL.....99

(I)
35. What is your sex? **(ASK ONLY IF UNCLEAR)**
a. MALE.....01
b. FEMALE.....02

(VS)
36. I'm going to read a list of broad income categories for **family** income from all sources **before** taxes during 1988. (1986 USED IN MD STUDY) Please tell me to stop when I get to yours.

a. $5,000 or under.....01
b. $5,001 - 15,000.....02
c. $15,001 - 25,000.....03
d. $25,001 - 35,000.....04
e. $35,001 - 50,000.....05
f. $50,001 - 65,000.....06
g. $65,001 - 80,000.....07
h. $80,001 and over.....08
i. REFUSAL.....99

Thank you very much for your cooperation.

37. Is there anything you could suggest to improve this booklet or future information on indoor air quality? (FOR THOSE WHO HAVE NOT READ THE BOOKLET: Is there any specific information about indoor air quality you would find useful?)

Again, thank you. Your responses will be combined with others and analyzed to help us improve our communications about indoor air quality.

MANAGING ENVIRONMENTAL RISKS AT PUBLIC SCHOOLS: A SURVEY OF LOCAL SCHOOL DISTRICTS

By completing this questionnaire you will help us to evaluate and improve federal and state programs to provide information and assistance to local school districts on reducing student and staff exposure to environmental health risks. Your response will be strictly confidential.

This form should be completed by the Superintendent of Schools or by the individual who is responsible for determining or supervising the actions your district takes to address potential environmental problems. The questions that follow are for your entire district.

Q1 What is your position with this school district? (Circle the number of the best answer)

1 SUPERINTENDENT

2 OTHER (please specify) _____

_____
name and position title

Q2 How many years have you been employed in this district?

_____ YEARS

Q3 Who is responsible for deciding what actions will be taken by this school district about environmental health issues? (Circle the numbers of <u>all</u> that apply)

1 LOCAL BOARD OF EDUCATION

2 SUPERINTENDENT OF SCHOOLS

3 OTHER (specify) _____

Q4 Who is responsible for directly supervising any actions this district takes about environmental health issues?

_____
Position or Department

Q5 About how often does your district use the following sources to obtain information on potential environmental problems in the schools? (Circle the number of the best answer for each information source listed)

	SELDOM	SOMETIMES	OFTEN
Newspapers and other print media	1	2	3
Radio or television news	1	2	3
State education department	1	2	3
State health department	1	2	3
Regional or national Environmental Protection Agency Office	1	2	3
Other (Such as the State School Board Association, environmental groups, other state agencies, etc. please specify) _____	1	2	3

Q6 In the past year, what has been the combined level of concern expressed by parents, students, faculty and staff about each of the following? (Circle number of best response for each item)

	NONE	LITTLE	SOME	GREAT	DON'T KNOW
Student use of drugs and alcohol	1	2	3	4	9
Student use of tobacco	1	2	3	4	9
Asbestos in school buildings	1	2	3	4	9
Radon in school buildings	1	2	3	4	9
Other indoor air pollution	1	2	3	4	9
Outdoor air near schools	1	2	3	4	9
Lead in drinking water	1	2	3	4	9
Other drinking water concerns	1	2	3	4	9
Other (specify) _____	1	2	3	4	9

Q7 What do you think the relative health risk is for students and employees in your district's facilities for each of the following? We recognize it is difficult to know exactly how significant different risks are, but please circle the number of the response that best reflects your opinion about each issue.

	NO RISK		SOME RISK		GREAT RISK	DON'T KNOW
Student use of alcohol and drugs	1	2	3	4	5	9
Student use of tobacco	1	2	3	4	5	9
Asbestos in school buildings	1	2	3	4	5	9
Radon in school buildings	1	2	3	4	5	9
Other indoor air pollution	1	2	3	4	5	9
Outdoor air near schools	1	2	3	4	5	9
Lead in drinking water	1	2	3	4	5	9
Other drinking water concerns	1	2	3	4	5	9
Other (specify) _____	1	2	3	4	5	9

ABOUT LEAD IN DRINKING WATER

Q8 From where does your school district obtain its supply of drinking water? (Circle numbers of all that apply)

1 SCHOOL OWNED WATER SUPPLIES
2 PURCHASE FROM LOCAL COMMUNITY
3 PURCHASE FROM PRIVATE SUPPLIER
4 OTHER (please specify) _____

Q9 Does your district have a program for testing drinking water for contaminants, metals or other problems? (Circle number of best response)

1 NO
2 YES → How often do you test drinking water supplies? _____

Q10 How familiar are you with state and federal regulations and guidelines for testing for and correcting lead in school drinking water? (Circle number of best answer for each)

	NOT AT ALL FAMILIAR		SOMEWHAT FAMILIAR		VERY FAMILIAR
State regulations and guidelines	1	2	3	4	5
Federal regulations and guidelines	1	2	3	4	5

Q11 Which of the following has your district used to help determine your district's actions on testing for and correcting lead in drinking water problems? (Circle the numbers of all that apply)

1 NO INFORMATION HAS BEEN OBTAINED
2 PRINTED MATERIALS FROM THE ENVIRONMENTAL PROTECTION AGENCY
3 PRINTED MATERIALS FROM STATE HEALTH DEPARTMENT
5 NEWSPAPER AND OTHER PRINTED MEDIA
6 WORKSHOPS OR SEMINARS SPONSORED BY (specify) _____
8 OTHER (Such as state school board association, contractors, national education organization, etc. Please specify) _____

Q12 Has your district specifically tested for lead in drinking water in the district's buildings? (Circle number of best answer)

1 NO → Is your district currently planning to test for lead levels in drinking water in the next 12 months?
   1 NO → Why not? _____
   2 YES _____
   Skip to Question 15
2 YES

Q13 When did your district first test for lead in drinking water, and when did your district most recently test for lead in drinking water? (List date, or approximate number of months or years ago)

First test . . . . . _____

Most recent test . . . . . _____

Q14 What did these tests find? (Circle numbers of all that apply)

1 NO RETESTING OR CORRECTIVE ACTIONS WERE NECESSARY

2 RETESTING NECESSARY AT SOME SITES → Has this been completed? 1 YES 2 NO

3 CORRECTIVE ACTIONS WERE NECESSARY →

a. What types of problems, or potential problems, were found? (Circle numbers of all that apply)

1 WATER SUPPLY PROBLEMS
2 PLUMBING PROBLEMS
3 WATER COOLER PROBLEMS
4 OTHER (specify) _____

b. Please describe the problem and any difficulties in taking corrective action.

_____

_____

c. What is the status of corrective actions? (Circle numbers of all that apply)

1 SOME CORRECTIVE ACTIONS HAVE BEEN COMPLETED
When? _____
2 SOME CORRECTIVE ACTIONS ARE PLANNED WITHIN _____ MONTHS
3 SOME OR ALL CORRECTIVE ACTIONS HAVE NOT BEEN SCHEDULED
Why not? _____

Q15 If your district has, or will, test for and correct any lead in drinking water problems: (Circle numbers of all that apply)

	DISTRICT STAFF	PRIVATE CONTRACTORS	STATE STAFF	DON'T KNOW
Who did, or would do, the testing?	1	2	3	9
Who did, or would do, any corrective actions?	1	2	3	9

Q16 From what sources were funds obtained, or where will funds be obtained, to implement testing for and correcting lead in drinking water problems?

_____

Q17 In the spring of 1989, the Environmental Protection Agency (EPA) sent a flyer to all local school districts and state health and education agencies announcing a manual entitled "Lead in School Drinking Water." From where, if at all, have you obtained or will you obtain this manual? (Circle numbers of all that apply)

1 NOT AWARE OF THIS MANUAL
2 NO CURRENT PLANS TO OBTAIN THIS MANUAL
3 GOVERNMENT PRINTING OFFICE USING ORDER FORM IN THE FLYER
4 STATE DEPARTMENT OF EDUCATION OR DEPARTMENT OF HEALTH
5 FROM THE REGIONAL EPA OR FEDERAL EPA OFFICES
8 OTHER (Specify) _____
9 DON'T KNOW

Q18 Have you received the manual? (Circle number of best response)

1 NO → **Please Skip to Q22**
2 DON'T KNOW → **Please Skip to Q22**
3 YES

Q19 Using the five point rating scales beside each item, please indicate if you think the manual, "Lead in School Drinking Water" is: (Circle 9 if you don't recall or have not used the manual)

	NOT				VERY	DON'T RECALL
Clear and Understandable	1	2	3	4	5	9
Instructive and Informative	1	2	3	4	5	9
Complete	1	2	3	4	5	9

If you did not find the manual to be complete, what else did you require?

_____

_____

Q20 Did the manual affect your district's actions or plans regarding testing the drinking water for lead? (Circle number of best response)

1 NO
2 YES, SOMEWHAT
3 YES, DEFINITELY

Q21 If the manual "Lead in School Drinking Water" had not been available, where would your district have sought guidance on testing and correcting for lead in drinking water supplies? (Circle numbers of <u>all</u> that apply)

1 INFORMATION MAY NOT HAVE BEEN SOUGHT
2 STATE HEALTH DEPARTMENT
3 REGIONAL EPA OFFICE
4 ENVIRONMENTAL CONSULTING FIRMS
8 OTHER (specify) _____

Q22 Have you seen the list published in the spring of 1989 of lead lined water coolers that the Environmental Protection Agency recommends should be tested, repaired or replaced? (Circle number of best answer)

1 NO
2 YES

Q23 How important do you think each of the following has been in motivating and helping your district to take action on potential health risks due to lead in school drinking water? (Circle number of best response for each item)

	NOT IMPORTANT				VERY IMPORTANT	DON'T KNOW
State requirements and recommendations	1	2	3	4	5	9
Federal requirements and recommendations	1	2	3	4	5	9
State technical assistance	1	2	3	4	5	9
State financial assistance	1	2	3	4	5	9
EPA materials and technical assistance	1	2	3	4	5	9
Concerns expressed by the public, media parents and staff	1	2	3	4	5	9
Other (specify) _____	1	2	3	4	5	9

Q24 Please indicate how serious each of the following has been in impeding any action your school district might take about lead in drinking water? (Circle number of best answer for each item)

	NOT SERIOUS				VERY SERIOUS	DON'T KNOW
Inadequate district funds	1	2	3	4	5	9
Inadequate state funds	1	2	3	4	5	9
Inadequate information from the Environmental Protection Agency	1	2	3	4	5	9
Inadequate information from state agencies	1	2	3	4	5	9
Inadequate expertise in district	1	2	3	4	5	9
Inadequate staff to handle extra work	1	2	3	4	5	9

Q25 Please add any other comments you have about the federal Environmental Protection Agency's requirements or about the materials and technical assistance they provided about lead in drinking water.

_____

_____

_____

ABOUT RADON GAS IN YOUR SCHOOLS

Q26 How familiar are you with state and federal regulations and guidelines for testing for and correcting the presence of radon gas? (Circle number of best answer for each)

	NOT AT ALL		SOMEWHAT FAMILIAR		VERY FAMILIAR
State regulations and guidelines	1	2	3	4	5
Federal guidelines	1	2	3	4	5

Q27 Which of the following has your district used to help determine your district's actions on testing for and correcting radon gas problems? (Circle the numbers of all that apply)

1 NO INFORMATION HAS BEEN OBTAINED

2 PRINTED MATERIALS FROM THE ENVIRONMENTAL PROTECTION AGENCY

3 PRINTED MATERIALS FROM STATE HEALTH DEPARTMENT

5 NEWSPAPER AND OTHER PRINTED MEDIA

6 WORKSHOPS OR SEMINARS SPONSORED BY (specify) _____

8 OTHER (Such as state school board association, contractors, national education organization, etc. Please specify) _____

Q28 Has your district specifically tested for radon gas in the district's buildings? (Circle number of best response)

1 NO → Is your district currently planning to test for radon gas problems in the next 12 months?

1 NO → Why not? _____

2 YES _____

Skip to Question 31

2 YES

Q29 When did your district first test for radon gas, and when did your district most recently test for radon gas? (List date, or approximate number of months or years ago)

First test . . . . . _____

Most recent test . . . . . _____

Q30 What did these tests find? (Circle numbers of all that apply)

1 NO RETESTING OR CORRECTIVE ACTIONS WERE NECESSARY

2 RETESTING NECESSARY AT SOME SITES → Has this been completed? 1 YES 2 NO

3 CORRECTIVE ACTIONS WERE NECESSARY

a. What types of problems were found?

_____

_____

b. What difficulties have you had addressing these problems?

_____

_____

c. What is the status of corrective actions? (Circle numbers of all that apply)

1 SOME CORRECTIVE ACTIONS HAVE BEEN COMPLETED

When? _____

2 SOME CORRECTIVE ACTIONS ARE PLANNED WITHIN _____ MONTHS

3 SOME OR ALL CORRECTIVE ACTIONS HAVE NOT BEEN SCHEDULED

Why not? (specify) _____

Q31 If your district has, or will, test for and correct any radon gas problems: (Circle numbers of all that apply)

	DISTRICT STAFF	PRIVATE CONTRACTORS	STATE STAFF	DON'T KNOW
Who did, or would do, the testing?	1	2	3	9
Who did, or would do, any corrective actions?	1	2	3	9

Q32 From what sources were funds obtained, or where will funds be obtained, to implement testing for and correcting radon gas problems?

_____

Q33 From where, if at all, have you obtained, or will you obtain, the report "Radon Measurements in Schools"? (Circle numbers of all that apply)

1 NOT AWARE OF THIS REPORT
2 NO CURRENT PLANS TO OBTAIN THIS REPORT
3 GOVERNMENT PRINTING OFFICE.
4 STATE DEPARTMENT OF EDUCATION OR DEPARTMENT OF HEALTH
5 FROM THE REGIONAL EPA OR FEDERAL EPA OFFICES
8 DON'T KNOW
9 OTHER (Specify) _____

Q34 Have you received the report "Radon Measurements in Schools?" (Circle number of best response)

1 NO → **Please Skip to Q38**
2 DON'T KNOW
3 YES

Q35 Using the five point rating scales beside each item, please indicate if you think the report, "Radon Measurements in Schools" is: (Circle 9 if you don't recall or have not used the report)

	NOT				VERY	DON'T RECALL
Clear and Understandable	1	2	3	4	5	9
Instructive and Informative	1	2	3	4	5	9
Complete	1	2	3	4	5	9

If you did not find the report to be complete, what else did you require?

_____

_____

Q36 Did the report affect your district's actions or plans regarding testing for radon? (Circle number of best response)

1 NO
2 YES, SOMEWHAT
3 YES, DEFINITELY

Q37 If the report "Radon Measurements in Schools" had not been available, where would your district have sought guidance on testing for and correcting radon gas problems? (Circle numbers of all that apply)

1 INFORMATION MAY NOT HAVE BEEN SOUGHT
2 STATE HEALTH DEPARTMENT
3 REGIONAL EPA OFFICE
4 ENVIRONMENTAL CONSULTING FIRMS
5 OTHER (specify) _____

Q38 How important do you think each of the following has been in motivating and helping your district to take action on potential health risks due to radon gas? (Circle number of best response for each item)

	NOT IMPORTANT				VERY IMPORTANT	DON'T KNOW
State requirements and recommendations	1	2	3	4	5	9
Federal recommendations	1	2	3	4	5	9
State technical assistance	1	2	3	4	5	9
State financial assistance	1	2	3	4	5	9
EPA materials and technical assistance	1	2	3	4	5	9
Concerns expressed by the public, media parents and staff	1	2	3	4	5	9
Other (specify) _____	1	2	3	4	5	9

Q39 Please indicate how serious each of the following has been in impeding any action your school district might take about radon gas? (Circle number of best answer for each item)

	NOT SERIOUS				VERY SERIOUS	DON'T KNOW
Inadequate district funds	1	2	3	4	5	9
Inadequate state funds	1	2	3	4	5	9
Inadequate information from Environmental Protection Agency	1	2	3	4	5	9
Inadequate information from state	1	2	3	4	5	9
Inadequate expertise in district	1	2	3	4	5	9
Inadequate staff to handle extra work	1	2	3	4	5	9

Q40 Please add any other comments you have about the federal Environmental Protection Agency's guidance or about the materials and technical assistance provided about radon gas.

_____

_____

_____

_____

ABOUT YOUR DISTRICT'S FACILITIES

Q41 Approximately what proportion of your facilities were built, or totally remodeled, in each of the following time periods? (Circle number of best answer for each time period)

	NONE OR VERY FEW		MOST OR ALL
Since 1980	1	2	3
1960 - 1979	1	2	3
1940 - 1959	1	2	3
Before 1940	1	2	3

IF YOU NEED MORE INFORMATION

☐ Check this box if you would like information how to obtain the EPA Lead in School Drinking Water manual and the name and number of the contact person in your state government.

☐ Check this box of you would like information how to obtain the EPA report "Radon Measurements in Schools" manual and the name and number of the contact person in your state government.

☐ Results of this survey will be aggregated so no school district can be identified. If you would like a summary of the results of this survey, check this box.

IS THERE SOMETHING WE OVERLOOKED?

Please use this space for anything you would like to add about the U.S. EPA, the materials it provides, the assistance it offers, mandates, recommendations, etc.

Thank you for your assistance!

APPENDIX B

FOCUS GROUP MATERIALS

1. Screening Questionnaire

2. Focus Group Format Guide

3. Background Information on Health Concerns and Home Repairs

SCREENING QUESTIONNAIRE

1. First of all, are you the

a. male head of household	
b. female head of household	
c. neither	TERMINATE

2. Do you own or rent your home?

a. own	
b. rent	TERMINATE

3. From what source do you get your water for household use?

a. city provides water	(RECRUIT 5)
b. community -owned well	(RECRUIT 1)
c. private-owned well	(RECRUIT 4)

4. Into which of the following age categories do you fall?

a. 21-34	(RECRUIT 3)
b. 35-49	(RECRUIT 3)
c. 50-64	(RECRUIT 3)
d. 65+	(RECRUIT 1)

5.Have you ever considered lead in your drinking water to be a problem?

a. yes	
b. no	SKIP TO QUESTION 7

6. How concerned are you regarding lead in your drinking water? Are you

a. very concerned	TERMINATE
b. somewhat concerned	TERMINATE
c. not very concerned	
d.not at all concerned	

7. When was the last time you were in a group discussion lasting longer than half an hour?

a. less than a year ago	
b. more than a year ago	
c. never	SKIP TO INVITATION

8. What was the subject of that discussion group?

_____

IF SUBJECT SAYS _____
_____, THEN TERMINATE.

Focus Group Format

Design session to last two hours. An hour and 40 minutes of that will actually be used for discussion. The remainder is reserved for refreshments and mingling after the discussion.

Evaluate both pieces of literature in each group. Present the shorter brochure first and discuss it for about 40 minutes. Introduce the longer brochure second and discuss it for about an hour. Some of the discussion about the second brochure will include comparisons between the two.

Introduction
Good morning. My name is and I work at the We are doing a study to learn how homeowners make decisions about their homes and the health issues related to their homes. Each of you was selected to participate in today's discussions because you, or you and your spouse, are a homeowner. We've invited you here today to talk about some environmental issues that relate to your homes.

Icebreaker
First we are going to work our way around the table and introduce ourselves. Tell us your first name, how long you have lived in your present home, and then describe your favorite room in the home.

Ranking Cards *(First Focus Group Only)*
Now I'm going to give each of you 2 cards. The first card has a list of five common household concerns, the second has a list of ten common health concerns. I would like for you to put your first name on each card, then rank the items on this card from one to five, and on this card from one to ten, to indicate how seriously you consider each of these problems or concerns. One should indicate your most serious concern.

Pamphlet I
I am going to hand each of you a fact sheet that contains information relating to your homes. Take a few minutes to read the brochure. When everyone is finished, I will ask you a few questions.
(Hand out pamphlets. Allow 3-5 minutes to read)

What general information does the pamphlet convey about radon
- •What do you think radon is?
- •What are the dangers of radon?
- •What are the chances of having radon in your home?

How much information does the pamphlet provide
- •What , if anything, would you do after reading this fact sheet?
- •What other information, if any, would you need to determine if radon is a problem in your home?
- •Where do you think you might obtain that information?

Does the pamphlet encourage the homeowner to take action
- •How likely would you be to measure the radon level in your home after you finished reading this fact sheet?
- •What would you do if you discovered that your home had a high level of radon?

How concerned is the homeowner about radon relative to other household problems

Let's look at the cards you filled out earlier.

- Other than radon, what problems do you worry about in your home?
- Where would you rank radon exposure among these problems?

How concerned is the homeowner about radon relative to other health concerns

- Now think for a minute about health concerns. What are some other health concerns that you worry about?
- Where would you rank the risk of lung cancer from radon exposure?

How is information distributed?

- Where do you think you might have found this fact sheet?
- If you were in charge of telling homeowners about radon, would you want to use this fact sheet?
- If so, how would you make it available?
- What changes would you make to this fact sheet?
- What other methods would you use to inform homeowners about radon?

Ranking Cards *(First Focus Group Only)*

I'm going to pass out 2 more cards. These are just like the ones you already have. The first card has a list of five common household concerns, the second has a list of ten common health concerns. I would like for you to put your first name on each card, then rank the items again, based on how you now feel about each of these concerns. Again, let one should indicate your most serious concern. When you are finished, you can pass the cards back to me.

Brochure II

Now I am going to hand you another pamphlet. It may contain some of the same information as the first one, but please read it carefully. It is a little longer, so you'll have more time to read. When everyone has finished, I will ask you some more questions.

How much information does the pamphlet provide

- What new information did you learn from this pamphlet?
- Would you need to learn more before you decided to find out if radon is a problem in your home?
- What additional kinds of information would you need?
- Where do you think you could obtain this information?

How does the homeowner perceive the risks associated with radon exposure?

- Does this pamphlet change your ideas about the dangers of radon?
- Are you more or less concerned about radon?
- If you tested the air in your home and the results showed a concentration of 20pCi/La, what would you do next?
- If the test showed 1 pCi/La what would you do?
- At what level of radon concentration would you become concerned enough to take corrective measures?
- What about water? How many of you obtain your water from a city or county water utility? Where do the rest of you obtain water?
- At what level of radon concentration in your water would you become concerned enough to take corrective measures?

Does the pamphlet instruct the homeowner to take corrective measures

- If you decided that you needed to reduce the level of radon in your home, how would you go about doing that?

What are the homeowner's expected costs of radon reduction?

- If the source of radon in your home is soil gas, how much do you think it would cost to reduce the radon level?
- What if the source is water?

How concerned is the homeowner about radon relative to other problems

- If you were planning some home improvement next month, say for example, converting your electric water heater to gas, and you discovered what you considered to be an unsafe level of radon in your home, what would you do?
- After reading the second pamphlet, how do you rank radon among other household problems? (Handout two more sets of blank cards)
- What about health concerns? Where would you rank radon among the health concerns you listed earlier?

How is information distributed

- Where do you think you might find this pamphlet?
- If you were in charge of telling homeowners about radon, would you use this pamphlet?
- What changes, if any, would you make?
- How would you make this pamphlet available to homeowners?
- If you were in charge, which pamphlet, the first or the second, would you prefer to use?
- What other methods would you think would be effective in telling homeowners about radon?.
- What do you know now that you didn't know before reading these pamphlets?

Brochure III

We're going to look at one last pamphlet. This one is fairly short, but contains different information, so please read it carefully. When everyone has finished, I will ask you a few more questions.

What type of risk information does the fact sheet convey?

- What new information did you learn from this pamphlet?
- What additional information would you like?
- Does this pamphlet change your ideas about the dangers of radon?
- Are you more or less concerned about radon?

How is information distributed

- If you were in charge of telling homeowners about radon, would you use this pamphlet?
- What changes, if any, would you make?

Priorities for Home Change

___replacing roof

___replacing furnace/heating system

___major landscaping changes

___major exterior changes, e.g. painting house or new entrance way

___reducing radon level in house

___adding a new room or conversion

___replacing plumbing to reduce lead in your drinking water

Your Health Concerns

___cancer of the colon

___heart disease

___diabetes

___lung cancer from exposure to tobacco smoke

___AIDS

___lung cancer from exposure to radon gas

___breast cancer/testicular cancer

___cancer from exposure to pesticides or other chemicals

___Alzheimer's disease

___stroke

___neurological disorders from exposure to lead in your drinking water

APPENDIX C

PRETESTING MATERIALS

1. Field Review Form

2. Pre-Post Booklet Testing Form

3. How to Test for Readability

FIELD REVIEW FORM

Acc No. _____
Date _____
Reviewer _____

Target Audience (if different from Screening Form):
Topic (if different from Screening Form):
Major Messages (list):

Persuasive Technique (describe):

Distinguishing Qualities (describe):

	Excellent				**Poor**
Production Quality: (Comments)	5	4	3	2	1
Content: (Comments)	5	4	3	2	1
Credibility: (Comments)	5	4	3	2	1
Ability to Attract Attention: (Comments)	5	4	3	2	1
Ability to Convey Information: (Comments)	5	4	3	2	1
Ability to Change Attitudes: (Comments)	5	4	3	2	1
Ability to Elicit Appropriate Action: (Comments)	5	4	3	2	1

Appropriate for National Distribution: _____ Yes _____ No _____ Limited Use (describe)
(Comments)

Overall Rating: 5 4 3 2 1
(specify any particular strengths/weaknesses)

Recommend for further consideration (e.g., promotion, replication, purchase, adaptation, testing or evaluation)?
_____ Yes _____ No

Please explain recommendation:

Return to:

Considerations for Field Review

1. Target audience—What audience is the material best suited for? For whom should it not be used? Consider the language style, use of terminology, length, appropriateness of examples and format in determining the target audience.

2. Persuasive technique—Are the messages positive and upbeat? Are positive role models used? Fear appeals? Authority figures (who)? Peer pressure?

3. Distinguishing qualities—Innovative or unique presentation, format or style? Fills a need for specific audience or message?

4. Production qualities—Is the material professional in appearance, attractive, well-written? Is the production format appropriate for the intended use (e.g., setting, equipment required)? Should production changes be considered (e.g., use of less or more color)?

5. Content—Clear and accurate? Up to date? Appropriate message, tone and appeal? Stimulating? New knowledge? Perpetuate myths or stereotypes? Balanced and credible? Biased or judgmental?

6. Elicit action—Describes desired behavior? Illustrates skills required? Demonstrates appropriate behavior?

7. Credibility—Is production or distribution source credible for target audience? For intermediaries (e.g., teachers or parents)? Is message, theme, presentation credible?

8. Appropriate for national distribution—Will materials stand alone, or require training for use? Inappropriate for some audiences (e.g., culturally inappropriate) or geographic areas?

9. Recommendation for evaluation—Are there questions or uncertainties that need to be resolved prior to determining disposition? Should materials be tested?

Pre-Post Booklet Testing Form

Source: U.S. Environmental Protection Agency

I. Pretest Questions

As you probably are aware, Toms River is the site of a pilot project designed to inform residents about potential environmental hazards associated with the Superfund site, and to encourage their involvement in EPA's decision-making process for cleanup of the site.

We would appreciate your willingness to share your reactions to the attached fact sheet by reading it and answering a few questions. We do not ask your name and all information you provide will remain confidential.

Because only a few Toms River citizens are being asked to help judge this material, your response is particularly valuable.

Before you begin, please check the appropriate answers to these four questions.

1. How much would you say you know about the Toms River Superfund study?
   A little ____ Some ____ A lot ____
2. Is there anything in particular you want to know about the study?
   Yes ____ No ____
   If yes, please specify.
   (Note: more knowledge questions can be added here.)
3. Are you or any member of your family an employee/former employee of (Superfund site company)?
   Yes ____ No ____
4. Are you a member of any group particularly concerned about the environment?
   Yes ____ No ____

Now, please turn the page and read the fact sheet.

II. Posttest Questions

Now that you have finished reading the fact sheet, please answer the questions below. You may refer back to the fact sheet as you consider your response if you wish.

1. In your own words, what would you say is the purpose of the Superfund study?
   (Note: additional knowledge questions can be added here.)
2. How much of the information in the fact sheet was new to you?
   Most of it ____ Some of it ____ None ____
3. Do you have questions about the Superfund study which were *not* answered in the fact sheet?
   Yes ____ No ____
   If yes, please list:
4. Was there anything you particularly *liked* about the fact sheet?
   Yes ____ No ____
   If yes, what?
5. Was there anything you particularly *disliked* about the fact sheet, or found confusing?
   Yes ____ No ____
   If yes, what?
6. This fact sheet is most appropriate for (check all that apply):
   General public ____ College graduates ____ Professionals ____
7. Would you recommend the fact sheet to a friend or family member?
   Yes ____ No ____
8. The following are a series of phrases describing the fact sheet. Please circle the *one* choice on each line that most closely reflects *your opinion.*

a. very interesting	somewhat interesting	not at all interesting
b. very informative	somewhat informative	not informative
c. accurate	partially accurate	inaccurate
d. very clear	somewhat clear	confusing
e. very useful	somewhat useful	not useful
f. unbiased	biased towards government	biased towards industry
g. easy to read	understandable	hard to understand
h. complete	somewhat complete	incomplete

9. Would you like to say anything else about the fact sheet? Please comment: _____

_____

_____

_____

Thank you very much for your help in reviewing this fact sheet.

How to Test for Readability

The SMOG Readability Formula
To calculate the SMOG reading grade level, begin with the entire written work that is being assessed, and follow these four steps:

1. Count off 10 consecutive sentences near the beginning, in the middle, and near the end of the text.
2. From this sample of 30 sentences, circle all of the words containing three or more syllables (polysyllabic), including repetitions of the same word, and total the number of words circled.
3. Estimate the square root of the total number of polysyllabic words counted. This is done by finding the nearest perfect square, and taking its square root.
4. Finally, add a constant of three to the square root. This number gives the SMOG grade, or the reading grade level that a person must have reached if he or she is to fully understand the text being assessed.

A few additional guidelines will help to clarify these directions:

- A sentence is defined as a string of words punctuated with a period (.), an exclamation point (!) or a question mark (?).
- Hyphenated words are considered as one word.
- Numbers which are written out should also be considered, and if in numeric form in the text, they should be pronounced to determine if they are polysyllabic.
- Proper nouns, if polysyllabic, should be counted, too.
- Abbreviations should be read as unabbreviated to determine if they are polysyllabic.

Not all pamphlets, fact sheets, or other printed materials contain 30 sentences. To test a text that has fewer than 30 sentences:

1. Count all of the polysyllabic words in the text.
2. Count the number of sentences.
3. Find the average number of polysyllabic words per sentence as follows:

$$\text{average} = \frac{\text{Total \# of polysyllabic words}}{\text{Total \# of sentences}}$$

4. Multiply that average by the number of sentences *short of 30.*
5. Add that figure on to the total number of polysyllabic words.
6. Find the square root and add the constant of 3.

Perhaps the quickest way to administer the SMOG grading test is by using the SMOG conversion table. Simply count the number of polysyllabic words in your chain of 30 sentences and look up the approximate grade level on the chart.

An example of how to use the SMOG Readability Formula and the SMOG Conversion Table is provided on the following page.

U.S. Department of Health and Human Services, Making Health Communication Programs Work, Bethesda, MD: National Cancer Institute, NIH PUblication No. 89-1493, (1989).

Example Using the SMOG Readability Formula:

Sample only: Information may not be current.

In Controlling Cancer—
You Make a Difference

The key is action. You can help protect yourself against cancer. Act promptly to:

- Prevent some cancers through simple changes in lifestyle.
- Find out about early detection tests in your home.
- Gain peace of mind through regular medical checkups.

Cancers You Should Know About

Lung Cancer is the number one cancer among men, both in the number of new cases each year (79,000) and deaths (70,500). Rapidly increasing rates are due mainly to cigarette smoking. By not smoking, you can largely prevent lung cancer. The risk is reduced by smoking less, and by using lower tar and nicotine brands. But quitting altogether is by far the most effective safeguard. The American Cancer Society offers Quit Smoking Clinics and self-help materials.

Colorectal Cancer is second in cancer deaths (25,100) and third in new cases (49,000). When it is found early, chances of cure are good. A regular general physical usually includes a digital examination of the rectum and a guaiac slide test of a stool specimen to check for invisible blood. Now there are also Do-It-Yourself Guaiac Slides for home use. Ask your doctor about them. After you reach the age of 40, your regular check-up may include a "Procto," in which the rectum and part of the colon are inspected through a hollow, lighted tube.

Prostate Cancer is second in the number of new cases each year (57,000), and third in deaths (20,600). It occurs mainly in men over 60. A regular rectal exam of the prostate by your doctor is the best protection.

A Check-Up Pays Off

Be sure to have a regular, general physical including an oral exam. It is your best guarantee of good health.

**This pamphlet is from the American Cancer Society.*

How Cancer Works

If we know something about how cancer works, we can act more effectively to protect ourselves against the disease. Here are the basics.

1. Cancer spreads; time counts—Cancer is uncontrolled growth of abnormal cells. It begins small and if unchecked, spreads. If detected in an early, local stage, the chances for cure are best.
2. Risk increases with age—This is not a reason to worry, but a signal to have more regular, thorough, physical check-ups. Your doctor or clinic can advise you on what tests to get and how often they should be performed.
3. What you can do—Don't smoke and you will sharply reduce your chances of getting lung cancer. Avoid too much sun, a major cause of skin cancer. Learn cancer's Seven Warning Signals, listed on the back of this leaflet, and see your doctor promptly if they persist. Pain usually is a late symptom of cancer; don't wait for it.

Unproven Remedies

Beware of unproven cancer remedies. They may sound appealing, but they are usually worthless. Relying on them can delay good treatment until it is too late. Check with your doctor or the American Cancer Society.

More Information

For more information of any kind about cancer—free of cost—contact your local unit of the American Cancer Society.

Know Cancer's Seven Warning Signals

1. Change in bowel or bladder habits.
2. A sore that does not heal.
3. Unusual bleeding or discharge.
4. Thickening or lump in breast or elsewhere.
5. Indigestion or difficulty in swallowing.
6. Obvious change in wart or mole.
7. Nagging cough or hoarseness.

If you have a warning signal, see your doctor.

We have calculated the reading grade level for this example. Compare your results to ours, then check both with the SMOG conversion table:

Readability Test Calculations

Total Number of Polysyllabic Words	= 38
Nearest Perfect Square	= 36
Square Root	= 6
Constant	= 3
SMOG Reading Grade Level	= 9

SMOG Conversion Table*

Total Polysyllabic Word Counts	Approximate Grade Level (±1.5 Grades)
0-2	4
3-6	5
7-12	6
13-20	7
21-30	8
31-42	9
43-56	10
57-72	11
73-90	12
91-110	13
111-132	14
133-156	15
157-182	16
183-210	17
211-240	18

*Developed by: Harold C. McGraw, Office of Educational Research, Baltimore County Schools, Towson, Maryland.