3

Collecting and Analyzing Evaluation Data

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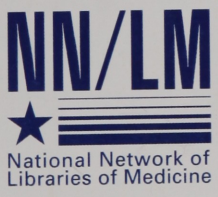

Outreach Evaluation
Resource Center

National Library of Medicine

Planning and Evaluating Health Information Outreach Projects
Booklet

3

The Planning and Evaluating health Information Outreach series

Booklet 1
Getting Started with Community-Based Outreach

Find potential partners and collect information about the community (community assessment) that will generate ideas for health information outreach projects.

Use booklet 3 to design methods to collect and analyze community assessment data.

1

Booklet 2
Including Evaluation in Outreach Project Planning

Take the information gathered during your community assessment to develop an outcomes-based project and a plan for outcomes, pre-program, and process assessment.

Use booklet 3 to design methods to collect and analyze outcome, pre-program and outcomes assessment data.

2

Booklet 3
Collecting and Analyzing Evaluation Data

Design quantitative and qualitative methods to collect and analyze data for your community assessment plan developed in Booklet 1 and your outcomes, pre-program, and process assessment plan developed in Booklet 2.

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Collecting and Analyzing Evaluation Data

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Planning and Evaluating Health Information Outreach Projects
Booklet

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Collecting and Analyzing Evaluation Data
Planning and Evaluating Health Information Outreach Projects, Booklet 3
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This booklet is part of the *Planning and Evaluating Health Information Outreach Projects* series, designed to supplement *Measuring the Difference: Guide to Planning and Evaluating Health Information Outreach.*[1] This series also supports evaluation workshops offered through the Outreach Evaluation Resource Center of the National Network of Libraries of Medicine (NN/LM). The goal of the series is to present step-by-step planning and evaluation methods. Along with providing information about evaluation, each booklet includes a case study and worksheets to help you with your outreach planning.

The series emphasizes the relationship between *planning* and *evaluation*—this is why both words are part of the series title. By including evaluation in the planning stage, you are committing to doing it and you are more likely to make it integral to the overall project. Conversely, in planning the evaluation you identify outcomes, which in turn help you to carefully assess project activities and resource needs.

These booklets are aimed at librarians—from the health sciences sphere, particularly—and representatives from community organizations who are interested in conducting health information outreach projects. We consider "health information outreach projects" to be educational or awareness activities designed to enhance community members' abilities to find and use information. A goal of these activities might be to equip group members to better address their—and their family members' and peers'—questions about health. Such outreach often focuses on online health information resources such as the Websites produced by the National Library of Medicine. Projects may also include other sources and formats of health information.

The first booklet, *Getting Started with Community-Based Outreach* is designed for those who have an idea for working with their communities but do not know how to start. It describes these steps:

1. Find partners for health information outreach projects,
2. Learn more about the outreach community, and
3. Inventory resources and assets.

The second booklet, *Including Evaluation in Outreach Project Planning*, is intended for those who need guidance in designing a good evaluation plan. It discusses the following:

1. Develop an outcomes-based project plan,
2. Develop an outcomes assessment plan,
3. Develop a pre-project assessment plan, and
4. Develop a process assessment plan.

The third booklet, *Collecting and Analyzing Evaluation Data*, will probably be more understandable to those with some experience in conducting health information outreach, but those just starting in health information outreach also may find it useful for planning their outreach programs. It presents these steps for quantitative methods (processes for collecting data and turning them into statistics) and qualitative methods (processes for collecting non-numeric descriptive information and summarizing it):

1. Design your data collection methods,
2. Collect your data,

3. Summarize and analyze your data, and
4. Assess the validity of your findings.

We strongly endorse partnerships among organizations from a variety of environments, including health science libraries, community-based organizations, and public libraries. We also encourage broad participation of members of target outreach populations in the design and implementation of the outreach project. We try to describe planning and evaluation methods that accommodate this approach to community-based outreach. Still, we may sound like we are talking to project leaders. In writing these booklets we have made the assumption that one person or a small group of people will be in charge of initiating an outreach project, writing a clear project plan and managing the evaluation processes.

We also encourage evaluation practices that adhere to the Program Evaluation Standards developed by the Joint Committee on Standards for Educational Evaluation, which can be found at http://www.eval.org/EvaluationDocuments/progeval.html [2] The *utility* standards require that evaluation findings will serve the information needs of the intended users, primarily those implementing a project or those with some vested interest in it. The *feasibility* standards direct evaluation to be cost-effective, credible to the different groups who will use evaluation information, and minimally disruptive to the project. The *propriety* standards uphold evaluation that is conducted ethically, legally, and with regard to the welfare of those involved in or affected by the evaluation. Finally, the *accuracy* standards indicate that evaluation should provide technically adequate information for evaluating a project.

We sincerely hope that you find these booklets useful. We welcome your comments, which you can email to **nnlm@u.washington.edu.**

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We also deeply appreciate Cathy Burroughs' groundbreaking work, *Measuring the Difference: Guide to Planning and Evaluating Health Information Outreach* and thank her for her guidance in our creating the booklets in this update and supplement, the *Planning and Evaluating Health Information Outreach Projects* series.

While conducting an outreach project, you will need to make several decisions. As you monitor project activities, you will need to decide whether to make changes to your plans. As the project nears its end, you will decide how to report the results. You and others invested in the project, referred to as stakeholders, will have to decide if your outreach project should be continued. If you are going to make good decisions about your outreach project, you need information or *data*. In this booklet we use the word "data" to include numbers, facts, and written descriptions of comments gathered through counting, surveying, observing, interviewing, or other investigations.

During community and pre-project assessment, data can help you identify groups in your community that are in particular need of health information outreach. Data also can be used to assess the resources and challenges facing your project. While you are implementing your activities and strategies, data can provide you with feedback for project improvement — this is called process assessment. During outcomes assessment, data can provide the basis for you and other stakeholders to identify and understand results and to determine if your project has accomplished its goals.
Therefore, much care must go into the design of your data collection methods to assure accurate, credible and *useful* information.
To really understand and assess an outreach project, multiple and mixed methods are required:

- "Multiple methods" means collecting data from more than one source and not relying on one survey or test or focus group to provide an adequate assessment of your program.
- "Mixed methods" means that a variety of types of information sources are used to assess your project.

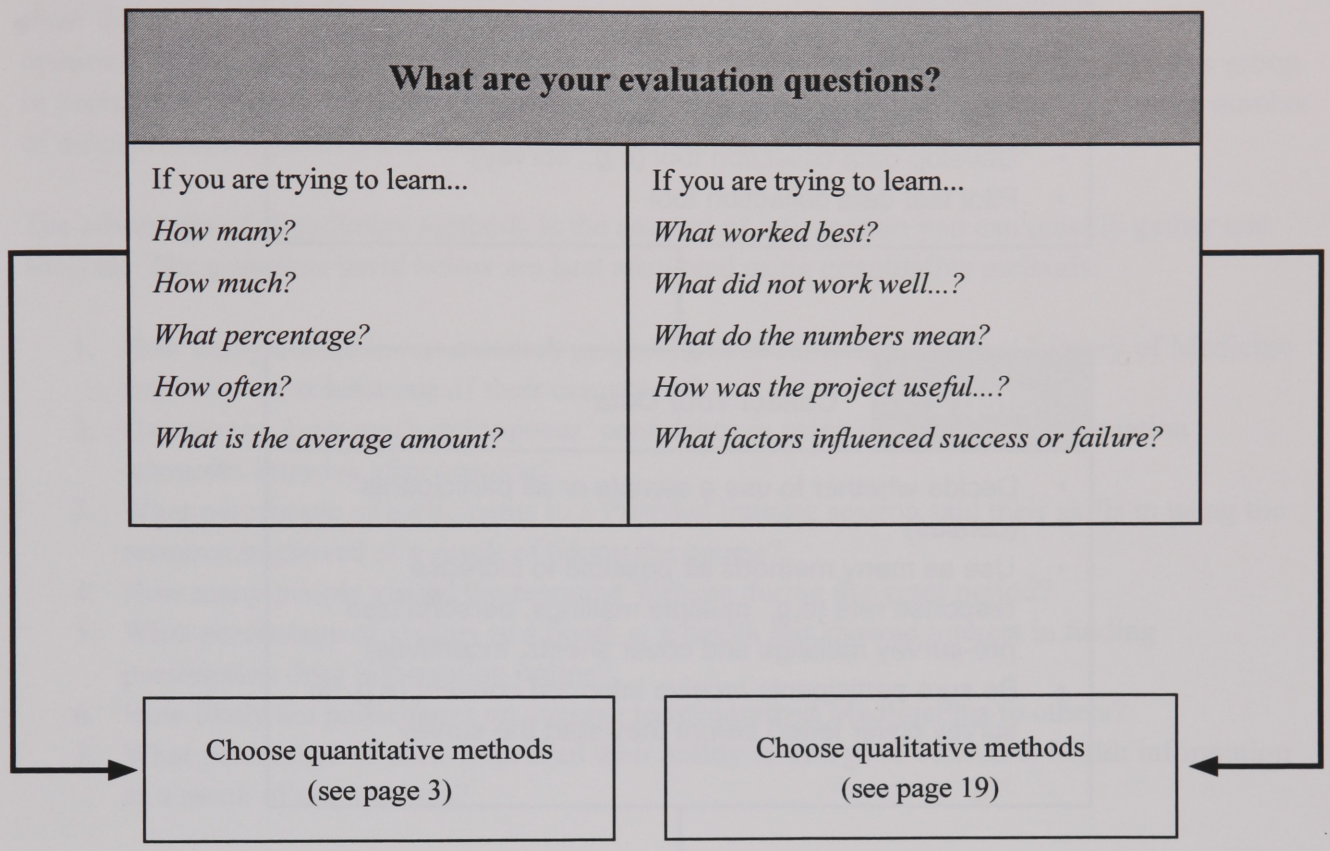
Good evaluation usually combines both *quantitative* and *qualitative* methods. Quantitative methods gather numerical data that can be summarized through statistical procedures. Qualitative methods collect non-numerical data, usually textual, that can provide rich details about your project. Each approach has its particular strengths and, when used together, can provide a thorough picture of your project.

This booklet is organized into two sections: one for quantitative methods and one for qualitative methods. After a brief overview, each section focuses on a specific method that is common and applicable to a variety of evaluation projects. In the quantitative section, surveys are the chosen method. For the qualitative section, interviewing is the method addressed.

However, we should note that neither surveys or interviews are limited to collecting one type of data. Either method can be designed to collect qualitative or quantitative data and, often, they are designed to collect a combination of both.

You pick the type of method based on the evaluation question you want to answer. Figure 1 is designed to help you make a decision about the type of method to use.

Figure 1: Choosing Type of Method



Evaluation Using Quantitative Methods

Step 1 — Design Your Data Collection Methods

- Write your evaluation questions
- Develop data collection tool (e.g., survey)
- Pilot test data collection tool

↓

Step 2 — Collect Your Data

- Decide whether to use a sample or all participants (census)
- Use as many methods as possible to increase response rate (e.g., multiple mailings, personalized pre-survey mailings and cover sheets, incentives)
- Be sure participants receive informed consent (e.g., in survey cover letter) before they start the survey

↓

Step 3 — Summarize and Analyze Your Data

- Compile descriptive data (frequencies percentages, averages, medians, modes)
- Put data into tables to aid analysis
- Write a paragraph describing what each table indicates about your evaluation questions

↓

Step 4 — Assess the Validity of Your Findings

Describe any shortcomings of your data collection and how it affects your interpretation (e.g., low response rates; problematic questions)

Any data that can be counted is considered quantitative data, including attendance at classes or events, participation or drop-out rates, test scores, and satisfaction ratings. Quantitative methods show the *degree* to which certain characteristics are present, such as frequency of activities, opinions, beliefs, or behaviors within a group. They can also provide an "average" look at a group or population. For example, you might use quantitative methods to determine the average number of times workshop participants look up health information online every week.

The advantage of quantitative methods is the amount of information you can quickly gather and analyze. The questions listed below are best answered using quantitative methods:

1. How many clinics in our outreach project have bookmarked National Library of Medicine resources on at least one of their computers?
2. On average, how much did trainees' confidence in using online health information resources improve after training?
3. What percentage of participants in a PubMed training session said their skills in using the resource improved as a result of taking the course?
4. How many people visited the resource Website during the grant period?
5. What percentage of visitors to a booth at a health fair showed interest in finding prescription drug information online?
6. How likely are participants on average to recommend MedlinePlus to others?
7. What percentage of users improved their ability to find good consumer health information as a result of our sessions?

Appendix 1 describes some typical methods for collecting quantitative data. The rest of this section will focus on one of the most popular quantitative methods: surveys. This method has been chosen because of its usefulness at all stages of evaluation. Surveys use a standard set of questions to get a broad overview of a group's opinions, attitudes, self-reported behaviors, and demographic and background information. Discussion is limited to written surveys such as those sent electronically or through the mail.

Step One — Design Your Data Collection Methods — *Quantitative Methods*

A data collection method is a procedure for gathering information. For surveys, the method comprises two parts: the questionnaire and the group that receives it. The first step in designing your survey is to write out the general *evaluation* questions you want to answer. *Evaluation* questions are different from your *survey* questions, which are specific, carefully formatted questions designed to collect data related to the evaluation questions.

For instance, listed below are some sample *evaluation* questions.

- *Community or pre-project assessment.* During the planning stages of an outreach project, you can use surveys to assess your outreach community members' beliefs, attitudes, and comfort levels in areas that will affect your outreach strategies. Evaluation questions may be:

  —*"What health information resources do people in this community use most often?"*
  —*"How many people are experienced Internet users?"*

  If you have a logic model, you should review the resource and activities columns to help you to focus the needs assessment questions.

- *Process assessment.* Surveys are often used mid-project to get participants' feedback about the quality of the activities and products of your outreach project. So your evaluation questions might be:

  — *"How do participants rate the effectiveness of our teaching methods?"*
  — *"How do participants rate the usefulness of the online resources we are providing?"*
  — *"How many people are likely to use the health resources after the training session?"*

  You should look at the activities and inputs column of your logic model to determine the questions you might want to ask.

- *Outcomes assessment.* At this stage, you use surveys to help assess the results of your outreach project. So questions might include:

  — *"Do participants use the online resources we taught after they have completed training?"*
  — *"Have participants talked with their physicians about something they found at MedlinePlus?"*
  — *"How many health care professionals trained in our study said they retrieved information from MedlinePlus to give to a patient?"*

  When designing a survey for outcomes assessment, you should review the outcomes columns of your logic model.

Table 1: Aligning Evaluation and Survey Questions

Evaluation Question	Items for the Survey
"How do participants rate the quality of the training session?"	• How satisfied were you with the information presented during the training session? (response options: very satisfied/somewhat satisfied/neutral/somewhat dissatisfied/very dissatisfied) • Would you recommend this session to others? (response options: yes/no/don't know) • Do you think you will use the online resources in the future? (response options: yes/no/don't know)

The second step is development of survey questions for your questionnaire to help you answer your evaluation questions. One approach is to use a format like that shown in Table 1 to align survey questions with evaluation questions.

Before you actually design your questionnaire, you might want to look at existing ones for their format and layout. Examples 1-6 will give you some ideas for formatting survey questions. You also could try contacting colleagues with similar projects. They may be willing to share their surveys. Journal articles about health information outreach projects sometimes include complete copies of questionnaires. If not, the article will provide the authors' contact information so that you can request copies of their surveys. Writing surveys can be tricky, so you should consider using questions from other projects that already have been tested for clarity and comprehension. However, if you do copy verbatim from other surveys, *always* be sure to secure permission from the original author or copyright holder.

Example 1 Two-Option

Have you used MedlinePlus since the training session?

☐ Yes ☐ No ☐ Not sure

Comments

- The yes-no item works well for collecting factual information, like peoples' participation in activities, exposure to publicity materials, or experience with specific online resources.
- Other two-option formats are "true/false," "support/oppose" or "agree/disagree."
- Include a "don't know" or "not sure" option for participants who either cannot remember or are not sure about the information you are requesting.

Example 2: Best Option

The last time you looked for health information on the Internet, who were you getting it for? (choose one)

- ☐ Myself
- ☐ A family member
- ☐ A friend or coworker
- ☐ A supervisor
- ☐ A client
- ☐ Other (please describe_____)

Comments

- Best option items are good for collecting information about the respondent's attributes and behaviors.
- Make sure that choices do not overlap so that each person can easily choose *only* one response.
- Provide an "other" response for options that are not included on the list.

Example 3: Multiple Option

Where do you get health information? (check all that apply)

- ☐ From my doctor or clinic
- ☐ Newspapers and magazines
- ☐ Television
- ☐ Radio
- ☐ Friends or family members
- ☐ Other (please describe_____)

Comments

- This is a faster version of the "yes/no" format: a check means "yes" and blank means "no."
- If your list of options gets to be more than 6 or 7 items, use a "yes-no" format instead. If the list is too long, people may not consider every item. When forced to respond, they are more likely to look at each item.
- Use "Other" even if you think you have listed all possible responses. People will use this option if they are not sure where their option fits.

Example 4: Rating Scales

Version 1 Please check the option that indicates your level of agreement with the statement.

Because of the training session, I am much more confident about my ability to find information about my health concerns.

☐ Strongly Agree ☐ Somewhat Agree ☐ Uncertain ☐ Somewhat Disagree ☐ Strongly Disagree

Version 2 Please circle the option that indicates your level of agreement with the statement.

How helpful were the group exercises?

Very helpful 1 2 3 4 5 6 7 Not at all helpful

Comments

- These two formats are good for collecting information from respondents about their attitudes, feelings, beliefs, and opinions.
- A neutral point is usually recommended for participants who do not have strong opinions in either direction about the item.
- You can provide as many response choices as you want, but most experts believe 5-7 options are adequate.

Example 5: Rank-Order

Listed below are different health topics that could be included on a consumer health Website. Rank the features in terms of how important each topic is to you, with "1" as the most important feature and "7" as the least important.

__ Specific health conditions
__ Wellness information
__ Alternative medicine
__ Prescription drugs
__ Health insurance, Medicaid, Medicare
__ Clinical trials
__ Health news

Comments:

- This format should be avoided. Ranking items is a difficult task for respondents. Also, you may force respondents to rank two items that are of equal importance to them. When possible, choose a rating scale (Example 4) instead of a rank-order item.
- Statistical analysis of rank-ordered items is very tricky because responses across individuals are not comparable. Using the item above as an example, two people may rank Prescription Drugs as the most important feature of a Website relative to the other features in the list. However, the first respondent may think everything on the list is important and the second may think nothing is important, so a "1" tells you nothing about the strength of the importance to each respondent. To analyze this type of data, the best you can do is show how many times an item was ranked, for instance, as 1 or 2.

Example 6: Open-Ended

List at least two important things you learned in the training session today

1._____

2._____

Comments:

- This format yields qualitative data, but it is often helpful in interpreting the statistical information you gather on your survey. To analyze open-ended questions, use the methods described beginning with Step Three of the "Qualitative Methods" of this booklet on page 22.
- Avoid starting a survey with open-ended questions. Open-ended questions can be overwhelming and people may choose to not take the survey. Draw the respondent in with some interesting, easy quantitative questions and save your open-ended questions for later in the survey.

The visual layout of your survey is also important. Commercial Websites that offer online survey software give examples of how to use layout, color, and borders to make surveys more appealing to respondents and easier for them to complete. There are several popular commercial products to create Web-based surveys, such as SurveyMonkey (http://surveymonkey.com/).

Once you have designed your survey, be sure to pilot test it before you send it to your target audience. Even if you think your wording is simple and direct, it may be confusing to someone else. It is very easy for survey questions and options to be misunderstood, and a pilot test will reveal areas that need to be clarified. First, ask one or two colleagues to take the survey while you are present and request that they ask questions as they respond to each item. *Make sure they actually take the survey*, because they will not pick up confusing questions just by reading it.

Once you have made adjustments to the survey, give it to a small portion of your target audience and look at the data. Does anything look out of place? For instance, if a large percentage of people are picking "other" on a multiple-option question, you may have missed a common option. Only after you have piloted the survey are you ready to administer it.

The design stage also entails seeking approval from appropriate committees or boards that are responsible for the safety and well-being of those participating in your project. If you are working with a university, most evaluation research must be reviewed by an Institutional Review Board. Evaluation methods used in public schools often must be approved by the school board and community-based organizations may have their own review processes that you must follow. Because many evaluation methods pose little to no threat to participants, your project may not require a full review. Therefore, you should considering meeting with a representative from the Institutional Review Board or other committee to find out the best way to proceed with submitting your evaluation methods for approval. Most importantly, it is best to identify all of these review requirements while you are designing your methods; otherwise, your evaluation may be significantly delayed.

Step Two — Collect Your Data — *Quantitative Methods*

As part of planning your survey, you will decide whether to collect data from a subgroup (sample) of your target population and generalize their responses to the whole population or to collect data from the entire group targeted by the survey (census). *Sampling* is used when working with large groups of people where it is impractical to send a survey to everyone, so you send the survey to a portion of the group. *Random sampling* means everyone in the population has an equal chance of being included in the sample. For example, if you want to know how many licensed social workers in your state have access to online medical journals, you probably do not have to survey all social workers. If you use random sampling procedures, you can assume (with some margin of error) that the percentage of all social workers in your state with access is fairly similar to the sample percentage. In that case, your sample provides adequate information at a lower cost than a census. For details about random sampling, see Appendix C of *Measuring the Difference*. [1]

With smaller groups, it is possible to conduct a *census* by sending the survey to everyone. In this case, any information you summarize is a description of the group of respondents only. For instance, if you survey all seniors who were trained in your outreach project to use MedlinePlus and 80% of them said they used it at home one month after the session, you can *describe* how many of your trainees used MedlinePlus after training. This percentage provides important information about a result of your outreach project. However, because you have not randomly sampled from among all seniors who have ever been trained on MedlinePlus, you cannot make a *generalization* that 80% of all seniors who get training on MedlinePlus use it within one month of training.

The quality of your survey data, whether collected through a sample or a census, depends heavily on how many people complete and return your questionnaire. The percentage of people who return a survey is known as *response rate*. When a high percentage of people respond to your survey, you have an adequate picture of the group. But when you have a high percentage of nonrespondents, characteristics of the group remain unknown to you, making it difficult for you to interpret your results. Therefore, your results may be biased and unreliable. For instance, the respondents may have been more enthusiastic or more dissatisfied compared to nonrespondents. If the survey was administered electronically, those who returned the survey may be more computer-literate. However, though you may suspect bias when your response rate is low, you may not know how or by how much.

Statisticians seldom agree about what constitutes an adequate response rate, but few would accept levels below 50%. Using techniques like those described in Figure 2, survey researchers usually obtain response rates in the range of 50-80% [3], which seems to be the acceptable standard among most survey researchers.

Figure 2: How to administer surveys

1. When using mail surveys, always send a *personalized* pre-survey letter to the target audience from someone influential or well-liked by the group. For electronic or on-line surveys, send a personalized pre-survey e-mail message announcing that a survey will be sent via email within the next week.
2. Within a week of the pre-survey letter, send the survey with a personalized cover letter (e.g., *"Dear Jane Smith"*) or personalized email with a link to the survey.
3. Within a week after sending the survey, send a personalized reminder postcard or email.
4. Within two weeks, send or email another survey, again with a personalized cover letter.
5. Keep track of undeliverable surveys. If you mail surveys, be sure to use first class mail so undeliverable surveys are returned to you. If you send surveys through email, keep track of the returned emails and, if possible, send print surveys to those participants. This mixed-method approach has been shown to increase response rates for electronic surveys.
6. Consider using these tips to increase your response rates:
   - Certain survey design principles may increase response rates. Be sure to start your survey with interesting questions that are easy to answer. Do not start with open-ended questions because they may make the survey seem overwhelming to respondents. Most research shows that demographic questions should be at the end of the survey because respondents find them boring or, in some cases, offensive.
   - Incentives may help your response rate. For mailed surveys, research indicates that the best time to send an incentive is *with* the first survey, not after the survey has been returned to you.[5] For web surveys, one study showed that being entered into a lottery for a larger financial incentive seemed to work better than prepaid or postpaid incentives.[6] It is important to note, however, that most survey researchers think that making multiple contacts (such as those described in this box) has an equal or greater positive effect on response rates compared to incentives. So if you have to choose between incentives or postage for replacement surveys, choose the latter.

Figure 2 defines a typical protocol for administering mailed surveys. Studies show that these procedures are effective for surveys sent either through regular mail or email. [3,4] Because online surveys are becoming increasingly popular, Appendix 2 of this booklet presents more detailed suggestions for designing and sending electronic surveys that may help to increase response rates. [4]

Getting a high response rate can be difficult, even when you implement procedures for improving it. If you fail to get a return rate of 50% or more, you may wonder if the data are worth analyzing. Very few evaluators would discard data. Instead, they would analyze it but try to discern where the bias might be. If resources allow, they also may attempt to contact nonrespondents with a short version of the survey to assess the level of bias in the sample. Evaluators also may compare their findings from surveys against information they have collected through focus groups, interviews, and other qualitative methods to see if the numbers are consistent with survey findings. The important thing is that you report your data along with the potential biases so that readers of your report can make an informed assessment of the credibility of the findings.

The cover letter is an important part of the survey process. It should include information that might affect an individual's decision to participate. On the one hand, it is a motivational tool to induce the recipient to take the time to respond to the survey. The cover letter can also serve as a vehicle to inform the individual of any potential risks to participation. This is called "informed consent." If you must have your project reviewed through an institutional review board (IRB) or some other type of review board, you should get specific details of what should be in the letter. If you are not working with an IRB, evaluation ethics still require you to provide some standard information for respondents before they take the survey:

- Why you are conducting the survey and why their participation is important,
- How you plan to protect the respondent's confidentiality or anonymity,
- The risks and benefits to the respondents who choose to participate,
- The voluntary nature of their participation and their right to withhold answers at any point in the survey, and
- How their responses will be reported and to whom.

Once you have received the last of your surveys, you will have accumulated raw data that you must try to understand. To do so, you must summarize the raw data so you can then analyze it.

Step Three — Summarize and Analyze Your Data — *Quantitative Methods*

The first step in analyzing quantitative data is to summarize the responses using *descriptive* statistics. When you collect and summarize quantitative data, your result is a *distribution of scores* for each item on your survey (except open-ended items). A distribution is simply the collection of all ratings or scores for a particular item, ordered from the lowest to the highest value. Table 2 presents some of the most common descriptive statistics: frequency counts, percentages, and measures of central tendency (mean, median, and mode).

Table 2: Examples of Descriptive Statistics

Question: *Please indicate your level of agreement with this statement.*
I am more confident about finding prescription drug information on the Web after taking this training session.

Response		Strongly agree	Somewhat agree	Uncertain	Somewhat disagree	Strongly disagree	Total	Missing
Response value		(5)	(4)	(3)	(2)	(1)		
N	100							
Frequencies		54	36	5	2	0	97	3
Percent		54.0%	36.0%	5.0%	2.0%	0.0%	97.0%	3.0%
Valid Percent		55.7%	37.1%	5.2%	2.1%	0.0%		
Mean	4.41							
Median	5							
Mode	5							

Definitions

N	Number of people responding to the survey. (Note: 100 people returned a survey, but only 97 responded to this particular question.)
Frequencies	The number of respondents choosing each response.
Percent	The number of those choosing that response divided by the number of people who completed the *survey*.
Valid Percent	The number of respondents choosing that response divided by the number of respondents who answered the *question*. In this example, we had 100 people complete the survey, but only 97 actually responded to this particular question.
Mean	The mean is the "average" response in your distribution. It is computed by adding all responses and dividing by the number of respondents who answered the *question*.
Median	The median is the score that is in the middle of the distribution, with half of the scores above and half below. To find it, sort your distribution from highest to lowest ratings, then find the number that equally divides the distribution in half. For the 97 people who completed this distribution, the 49th score divides the distribution in half. The 49th (median) score is a "5." When the majority of ratings fall either at the high or low end of a rating scale, as they do here, the median is usually the preferable measure of central tendency because it is not affected by a few extremely low or high ratings.
Mode	The mode is the most frequent response. For many demographic and two-option questions, the mode is the only measure of central tendency that can be reported. This is also true for questions that ask respondent to provide more than one response, such as "check all that apply" questions.

Table 3: Participants' Self-Report of Confidence in Using Databases N=50

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
The training session helped me develop more confidence in using MedlinePlus.	23 46%	16 32%	9 18%	2 4%	0 0%
The training session helped me develop more confidence in using PubMed.	10 20%	22 44%	13 26%	3 6%	2 4%
Analysis: The majority of respondents agreed or strongly agreed that the training sessions helped them gain confidence in using the NLM online resources. Ratings seemed to be slightly more positive for MedlinePlus. This indicates that we achieved our objective of increasing confidence in use of online resources with the majority of our participants.					

Tables are very helpful for understanding your data. Tables 3-7 show formats that will help you analyze your descriptive data. After you compile a table, write a few notes interpreting the numbers.

You may simplify your data to make the positive and negative trends more obvious. For instance, in Table 4, the "Strongly Agree" and "Agree" responses were combined into a "Positive" category and the "Disagree/Strongly Disagree" responses were put into a "Negative" category.

Table 4: Participants' Self-Report of Confidence in Using Databases N=50

	Positive (Strongly Agree/ Agree)	Neutral (Neither Agree or Disagree)	Negative (Disagree/Strongly Disagree)
The training session helped me develop more confidence in using MedlinePlus.	39 78%	9 18%	2 4%
The training session helped me develop more confidence in using PubMed.	32 64%	13 26%	5 10%
Analysis: This table makes the pattern of positive ratings more obvious for the items introduced in Table 3. It also confirms that ratings were more positive for the MedlinePlus session compared to the PubMed session. One explanation might be that PubMed is more difficult to use and requires a longer training session or more training sessions compared to MedlinePlus.			

Table 5: Average Number of NLM Resources Used Before and One Month After Training N=80

	Average # of Websites Before Training	Average # of Websites One Month After Training	Difference
How many of the following Websites have you used in the past month. (Check all that apply of 6 resources.)	1.85	3.37	1.52
Analysis: Of the six Websites we demonstrated in the training session, participants on average had used less than two of them before training. One month after training, they had, on average, visited more than three of the Websites. This finding suggests that we chose Websites that our participants found to be useful.			

Sometimes, you may want to see how participants' attitudes, feelings, or behaviors have changed over the course of the project. Table 5 also shows you how to organize pre-project and post-project data into a chart that will help you assess change. Table 5 also presents means rather than percentages. Data that represent a wide range of scores, such as attendance rates for a large number of training sessions, sometimes are easier to analyze using averages. You could also use means or medians in place of percentages if you have rating scales such as those presented above in Step 1 (see Example 4).

You may wonder if the findings vary for the different groups you surveyed. For instance, you may wonder if nurses, social workers, or members of the general public found your resources as useful as the health librarians who had your training. To explore this question, you would create cross-tabulation tables.

Table 6: Average Number of NLM Resources Used Before and One Month After Training Broken Down by Profession N=80

	N	Average # of Websites Before Training	Average # of Websites One Month After Training	Increase in Use
Health Science Librarians	20	3.7	4.3	.6
Social Workers	20	1.3	3.0	1.7
Nurses	20	2.2	3.6	1.4
General public	20	.2	2.6	2.4
Analysis: We did not seem to increase the variety of Websites used by the health science librarians, probably because, on average, they already had used more than half of the Websites we demonstrated. Our training seemed to have the greatest impact on the general public, who had used very few of the Websites. For planning future sessions, we may want to conduct a preliminary survey to find out what Websites are popular with health science librarians so we can adjust our training content to cover Websites they do not know.				

Table 7: Comparison of Those Who Used Resources After Training Compared to Targets in Objectives

	Actual	Goal	Difference
Numbers of participants using MedlinePlus after training	62%	50%	+12%
Number of participants using PubMed after training.	45%	50%	-5%
Analysis: We exceeded our criterion for the number of participants who used MedlinePlus after they took our training sessions. However, we were slightly under our goal for PubMed. On the other hand, because PubMed is more academic and MedlinePlus is more consumer-oriented, it is possible our users simply had more occasion to use MedlinePlus the month following the session. We may want to explore this in a follow-up interview with a few users who took both sessions to see if there are ways to improve the PubMed training.			

Finally, you also may want to compare your findings against the criteria you identified in your objectives.

Step Four — Assess the Validity of Your Findings — *Quantitative Methods*

Validity refers to the accuracy of the data collected through your survey: did the survey collect the information it was designed to collect? It is the responsibility of the evaluator to assess the factors that may affect the accuracy of the data and present those factors along with results. Threats to validity of surveys usually fall in one of the following categories:

- *Response rate*. As mentioned above, when small percentages of respondents return surveys, the potential for bias must be acknowledged. Even when using the strategies discussed earlier in Step 2 (see Box 1), you may not obtain an adequate response rate. If resources allow, you can assess the degree of bias somewhat with follow-up interviewing or surveying of nonrespondents. For instance, if you suspect that those who responded were biased in the favorable direction, you could conduct a phone survey with a random selection of 10% of your respondents with a few simple questions to explore the extent of bias.
- *Low completion rate of specific sections of surveys.* If many respondents do not complete certain sections of the survey, you will have to question the findings of that part of the survey. For instance, respondents may not finish the survey, leaving final sections or pages blank. To avoid this problem, keep your surveys as short as possible. For electronic surveys, provide a "progress bar" that tracks the percentage of questions completed as the respondent proceeds through the survey.
- *Low completion rate of questions.* Even if you have a respectable response rate, you may have questions that are left blank by a number of respondents. There are several reasons why respondents do not answer particular questions. They may not find a response that applies to them, the question format may be confusing, or they do not understand the question. The best strategy for avoiding this problem is to carefully pilot your questions. If your survey asks questions that are sensitive or threatening, your best strategy for getting responses is to conduct an anonymous survey.
- *Socially desirable responding.* Sometimes respondents are embarrassed to answer questions truthfully. If possible, avoid using questions that ask people to disclose information that may be embarrassing or threatening. This challenge may occur if your survey asks respondents to report health behaviors such as drinking, drug use, or even dietary habits. If you must ask such questions, providing anonymity may enhance the accuracy of responses. You may be able to find published studies that estimate the extent to which people in general overestimate or underestimate certain health behaviors (such as daily calorie consumption).

You cannot *prove* validity. You must build your case for the credibility of your survey by showing that you used good design principles and administered the survey appropriately. After data collection, you assess the shortcomings of your survey and candidly report how they may impact interpretation of the data.

Surveys allow you to collect a large amount of quantitative data, which then can be summarized quickly using descriptive statistics. This approach can give you a sense of the experience of participants in your project and can allow you to assess how closely you have come to attaining your goals. However, based on the analysis given for each table on pages 15 and 16, you may notice that the conclusions are tentative. This is because the numbers may describe what the respondents believe or feel about the questions you asked but they do not explain *why* participants believe or feel that way. Even if you include open-ended questions on your survey, only a small percentage of people are likely to take the time to comment.

For evaluation, the explanations behind the numbers usually are very important, especially if you are going to make changes to your outreach projects or make decisions about canceling or continuing your efforts. That is why most outreach evaluation plans include a combination of qualitative and quantitative methods.

Evaluation Using Qualitative Methods

Step 1 — **Design your data collection methods**

- Write your evaluation questions
- Develop data collection tool (e.g., interview guide)
- Pilot your interview guide

↓

Step 2 — **Collect your data**

- Interview a purposeful sample of participants. Have an idea of your sample size, but be flexible (add more to answer new questions; stop interviewing if you hear nothing new)
- Provide informed consent information to participants before starting the interview
- In preparation for Step 3, make notes immediately after each interview

↓

Step 3 — **Summarize and analyze your data**

- Read through all text and generate a list of themes
- Code all interview data systematically
- Organize data by theme
- Interpret the findings

↓

Step 4 — **Assess the validity of your findings**

Describe any information that could affect your conclusions (exceptions to the typical themes, alternative explanations)

Qualitative methods produce non-numerical data. Most typically these are textual data such as written responses to open-ended questions on surveys, interview or focus group transcripts, journal entries, documents, or field notes. However, qualitative researchers also make use of visual data such as photographs, maps, or videos.

The advantage of qualitative methods is that they can give insight into your outreach project that you could never obtain through statistics alone. Qualitative methods seem particularly useful for answering the following types of questions:

1. Why were certain activities more effective than others?
2. What important changes happened with clients as a result of their training?
3. How did our clients use the resources outside of training?
4. Why did some clients continue to use the resources while some did not?
5. What barriers were discovered in implementing the project? Which ones were dealt with effectively and which ones continued to be a problem?
6. What unexpected outcomes (positive or negative) occurred as a result of our project?
7. How was the intervention *valuable* to clients and different stakeholder groups?

Qualitative evaluation methods are recommended when you want detailed information about some aspect of your outreach project. Listed here are some examples of the type of information best collected through qualitative methods:

- *Community or pre-project assessment.* Qualitative methods are useful for identifying factors in the community that may impact the implementation of your project. These may include readiness of different groups in the outreach community to use the technological resources you want to introduce, community resources that can help your outreach effort, or level of support among community leaders for your project. This type of information is usually discovered better through qualitative methods like interviews and observations of the community.
- *Process assessment.* Qualitative methods are useful for getting specific feedback about outreach activities from those involved in the project and answering the "why" questions of process assessment: Why are morning training sessions more popular than evening ones? Why do we have more women signing up for training sessions than men? Who in the community is not signing up for training sessions and why?
- *Outcomes assessment.* Qualitative methods can provide compelling examples of your results in a way that numbers will never capture. While numbers may tell you how many people use MedlinePlus after a training session, you will get examples of how they used it through qualitative methods like interviewing or responses to open-ended questions. Because of the exploratory nature of most qualitative methods, you also are more likely to find out about unexpected outcomes (positive and negative) when you talk with those involved in the project.

Appendix 3 describes some typical qualitative methods used in evaluation. Interviewing individual participants will be the focus of the remainder of this booklet because it is a qualitative method that has broad application to all stages of evaluation.

As with quantitative methods, your first step in an interviewing project is to write your

Step One Design Your Data Collection Methods — *Qualitative Methods*

evaluation questions. The process for writing evaluation questions is the same as the one described under quantitative methods. In fact, you may decide that you want to use both quantitative and qualitative methods to answer the same evaluation questions. For instance, if the evaluation question is

"Do participants use the online resources we taught after they have completed training?"

You may decide to include a quantitative "yes/no" question on a survey that is sent to all participants, but you may decide to interview ten or twelve participants to see *how* they used it.

Your next step is to design an interview guide: a list of questions that you plan to ask each interviewee. Interviewing may seem less structured than surveys, but preparing a good interview guide is essential to gathering good information. An interview guide includes all of the questions you plan to ask and ensures that you collect the information you need. Patton discusses different types of interview questions such as those presented in Table 8. [7]

Table 8: Types of Questions

Type of Question	Information collected	Example
Experience/behavior	What did respondents do?	"The last time you needed health information, where did you go to get it?"
Sensory questions	What did respondents experience through their five senses? (This is a variation on the experience/behavior question but focuses on what they saw, heard, touched, smelled, or tasted.)	"How did your doctor act when you showed her the information you found at MedlinePlus?"
Opinion/Value questions	What do respondents think or believe to be important?	"What do you like best about MedlinePlus?"
Feeling questions	What were respondents' emotional reactions?	"How did you feel when you could not find information about your child's health condition?"
Knowledge questions	What factual information does the respondent know?	"What are the busiest times of day for the computer lab?"
Background/Demographic	What are the characteristics of your respondent?	"What do you do for a living?"

The order of the questions also can influence the interview. You need to start with questions that will allow you to gain rapport with the interviewee. Patton includes the following tips for developing and ordering interview questions [7]:

- Start with noncontroversial experience or behavioral questions that are easy to answer, straightforward, and do not rely on much recall. Sometime interviewees can provide better opinions and feelings if participants first describe an actual experience.
- Questions about the present are easier to answer than questions about the past and future. If you plan to ask about the future or past, ask a "baseline" present question like "Where do you usually go when you need to find health care information?" Then you can ask "Have you gotten health information anywhere else?" followed by "Are there other sources of health information you know about that you might use in the future?"
- Knowledge and skill questions may be threatening when posed out-of-context. Try embedding them with experience questions. For instance, you might first ask, "What training sessions have you taken to learn about online consumer health resources" followed by, "What are some things you learned in those sessions?"
- Use some demographic question like "how long have you worked in the medical center?" to establish rapport with the interviewee. You also may need to ask this type of background question to make sense of the rest of the interview. However, keep demographic questions to a minimum because they can be boring and they may be too personal to be asked early in the conversation.
- Avoid questions that can be answered with one word or phrase. Rather than asking "how effective was the training session?" which sounds a lot like a survey question, ask "What did you learn at the training session?" or "How did the training session help you?"
- Try to ask about one idea per question. You might introduce a line of inquiry with multiple ideas in a statement like "Now I want to ask about what you like and dislike about PubMed." But focus by asking, "First, what do you like?"
- Be sure to use language that the interviewee understands. It is sometimes difficult to recognize jargon or acronyms, so you might want to pilot test your questions with someone outside of your field to make sure the language is understandable.
- Avoid starting questions with "why." Why questions tend to be unfocused and you may not get the information you really want. Less focused questions are also more difficult for the interviewee to answer. Instead of asking, "Why did you decide to become a hospital volunteer?" you might ask "What attracted you to becoming a volunteer at this hospital?" or "When you decided to become a volunteer, what made you choose to work in a hospital."

As with a survey, it is a good idea to pilot your interview questions. You might pilot your guide with someone you are working with who is familiar with your interviewees. (This step is particularly important if your interviewees are from a culture that is different from your own.) Sometimes evaluators consider the first interview a pilot interview. Any information they gather on the first interview is still used, but they revisit the question guide and make modifications if necessary.

Finally, be sure your interview project is reviewed by the appropriate entities. Interviews are so personal, they may not seem like research and you may forget they are subject to the same review procedures as surveys. So do not make this assumption, or you may face a delay in collecting your data.

Step Two **Collect Your Data** — *Qualitative Methods*

Like quantitative methods, interviewing requires a sampling plan. However, random sampling usually is not recommended for interviewing projects because the numbers of interviewees are so small. Instead, most evaluators use purposeful sampling (sometimes called *purposive* sampling), in which you choose participants that you are sure can answer your questions thoroughly and accurately.

There are a number of approaches to purposeful sampling and use of more than one approach is highly recommended. The following are some examples described by Patton [7]:

- You may want interviewees who represent the "typical" user or participant, such as the typical health information consumer or typical health care provider in your community.
- To illuminate the potential of your project, you may decide to interview people who have made the most out of the training you have offered.
- To explore challenges to your strategies and activities, you might choose to interview those who did not seem to get as much from the project or chose not to participate in outreach activities.
- You may decide to sample for diversity, such as interviewing representatives from all of the different stakeholder groups in the project.
- You might set criteria for choosing interviewees, such as participants that completed 3 of 4 training sessions.
- If you have difficulty identifying potential interviewees, you can use a snowball or chain approach where you ask knowledgeable people to recommend other potential interviewees.

There *are* occasions where random sampling of interviewees is warranted. In some cases, you will increase credibility of your results if you can demonstrate that you chose participants without knowing in advance how they would respond to your questions. In some circumstances, this is an important consideration. However, you must realize that a random sample generated for qualitative evaluation projects is too small to generalize to a larger group. It only shows that you used a sampling approach that would rule out biases in choosing interviewees. [7]

Convenience samples, in which participants are chosen simply because they are readily accessible, should be avoided except when piloting survey methods or conducting preliminary research. The typical "person-on-the-street" interviews you sometimes see on the evening news is an example of a convenience sample. This approach is fast and low-cost, but the people who agree to participate may not represent those who can provide the most or best information about the outreach project.

A common question asked by outreach teams is "how many interviews do we need to conduct?" That question can be answered in advance for quantitative procedures, but not for qualitative methods. The usual suggestion is that you continue to interview until you stop hearing new information. However, resource limitations usually require that you have some boundaries for conducting interviews. Therefore, your sampling design should meet the following criteria:

- You should be able to articulate for yourself and stakeholders the rationale for why you have selected the interviewees in your sample.
- Your list of interviewees should be adequate in number and diversity to provide a substantial amount of useful information about your evaluation questions.
- The number and diversity of your interviewees should be credible to the project's stakeholders.

As you plan, always be prepared to add a few interviews in case you find information that should be pursued further. Your interviews may uncover some exciting, unexpected responses that you will want to explore further.

The ethics of interviewing require that you provide introductory information to help the interviewee decide whether or not to participate. You can provide this information in writing, but you must be sure the person reads and understands it before you begin the interview. If your project must be reviewed by an institutional review board, you must follow its guidelines for providing informed consent to interviewees. However, with or without institutional review, you should provide the following information to your interviewees:

- The purpose of the interview and why their participation is important;
- How their responses will be reported and to whom;
- How you plan to protect the interviewee's confidentiality;
- The risks and benefits of participation;
- The voluntary nature of their participation and their right to refuse to answer questions or withdraw from the interview at any time.

If you want to record the interview, explain what will happen to the recording (e.g., who else will hear it, how it will be discarded). Then gain permission from the interviewee to proceed with the recording.

Step Three talks about summarizing and analyzing your interview data. In preparation for this step, you should take reflective notes about what you heard. These notes differ from the notes you take during the interview to describe what the participant is saying. Reflective notes are taken shortly after the interview (preferably within 24 hours) and include your commentary on the interaction. Miles and Huberman [8] suggest these memos should take from a few minutes to a half hour. Some of the issues you might include in reflective notes are the following:

- What do you think were the most important points made by the interviewee? Why do you consider these important (e.g., the respondent talked about the topic several times or no other interviewee mentioned these points.)
- How did the information you got in this interview corroborate other interviews?
- What new things did you learn? Were there any contradictions between this interview and others?
- Are you starting to see some themes emerging that are common to the interviews?
- Be sure to add descriptive information about the encounter: time, date, place, informant.
- Start to generate a list of codes with each reflective note and write the codes somewhere in the margins or in the corner of your memo.

Miles and Huberman [8] also offer other suggestions for these reflective notes:

- Was there any underlying "meaning" in what the informant was saying to you?
- What are your personal reactions to things said by this informant?
- Do you have any doubts about what the informant said (e.g., was the informant not sure how open he or she could be with you)?
- Do you have any doubts about the quality of the information from other informants after talking with this person?
- Do you think you should reconsider how you are asking your interview questions?
- Are there other issues you should pursue in future interviews?
- Did something in this interview elaborate or explain a question you had about the information you are collecting?
- Can you see connections or contradictions between what you heard in this interview and findings from other data (such as surveys, interviews with people at other levels of the organization, etc.)?

These notes may include things like themes that seem to be emerging, questions that have arisen during a specific interview, or conclusions you may want to confirm at another interview. This practice will make Step Three a little less overwhelming.

Step Three — Summarize and Analyze Your Data — *Qualitative Methods*

As with quantitative data, you must develop a plan for compiling and analyzing qualitative data. Analysis may seem overwhelming because of the sheer volume of the information you collect, but it will seem more manageable if you approach it in phases.

Plan. First, during planning and interviewing keep the amount of data you collect under control. As described in Step One, you should check your interview guide against your evaluation questions to make sure you only ask questions that are relevant to your project. This will prevent you from collecting unnecessary data. As discussed in Step Two, you should keep notes that will help you become familiar with your data as you collect it.

Code. Once you have completed most of your interviews, the next step is to *code* the data. In this step, you identify, categorize, and label the themes or patterns in your data. Review your transcripts, reports, and notes, indicating major themes in the margins. Make a list of the themes as you read. You can also read your notes keeping your evaluation questions in mind. For instance, you may have conducted interviews to learn how participants in a training session are using the training and whether they have recommendations for improving future sessions. Therefore, you may read through the notes looking for examples that fit themes related to "results" "unexpected outcomes," "barriers to project implementation," and "suggestions for improvement." It is perfectly acceptable to have a list of themes ahead of time and to add themes as you read.

Once you have reviewed the material and generated a list of major themes, go back to your documents and code more systematically. You do this by identifying "units" of information and categorize them under one of your themes A unit is a collection of words related to one main theme or idea and may be a phrase, sentence, paragraph or several paragraphs. You can tell you have too many words if you need more than one major theme to categorize the unit.

One simple approach to coding is to highlight each unit of information using a different color for each major theme. You can print the data and use highlighting markers, but the highlighting function of a word processing program also works nicely.

Organize. Next, put all the units with the same highlight color together on one page with a heading that reflects the category they represent. You might want to use bullets to separate the different units. Now, read through each list and see if you can find subthemes. For instance, under results, you might find "results affecting participants" and "results affecting the community." You could use the comment function in Word to note these subthemes, but it might be easier to print the list with a large right margin and write the subthemes in the margins.

Figure 3: Coding Interview Data

The following section is from a fictional interview with a lay health adviser from a faith-based outreach program. It has been coded using the highlighting method described in the text. The colors have the following codes:

=uses of MedlinePlus	=outcomes	= barriers	= suggestions for improving the program

Interviewer: Describe some ways you have used MedlinePlus in your work here?

Respondent 1: This lady from the community came to see me because she was having terrible heartburn – almost every day. We looked up heartburn on MedlinePlus.

Interviewer: What did you find?

Respondent 1: We found out there are better medicines than what she was taking and she did not have to get a prescription. She talked to the pharmacist because she is on other medication, because MedlinePlus said don't mix these pills with other pills. But the pharmacist told her it was okay for her to take them, but that if the heartburn comes back she should see her doctor.

This woman said the medicine got rid of her heartburn almost immediately.

Interviewer: Do you have any other examples?

Respondent 1: There was a woman whose sister was diagnosed with breast cancer and she was so worried. We read a little bit about it and found out that "stages" tell you now serious the cancer is. She went back and asked her sister about her breast cancer and found out it was stage 1. That means her sister has a really good chance of surviving it.

So this lady was so relieved.

Also, everyone was hearing about this bird flu and we were coming up on Thanksgiving. The ladies who come to our Thursday brown-bag lunch meeting were saying they didn't know if they should serve turkey this year. So the other lay health adviser and I printed some information off of MedlinePlus, passed it around and we discussed it.

We discovered that bird flu is not in the United States, so we can have turkey for Thanksgiving as always!

Interviewer: Have you had any problems finding information for people?

Respondent 1: No, we can always find information on the topics people bring up. But sometimes people don't want to tell us too much about their problems, especially if it is kind of a sensitive topic. We all know each other around here, so people don't always want you to know things about them.

Interviewer: So how do you help them?

Respondent 1: We try to just show them in general how to search for a health topic, then give them privacy with the computer. It works okay as long as they know a little bit about using a computer.

Interviewer: What kind of help could the librarian give you with getting MedlinePlus known in your community?

Respondent 1: We have some new lay health workers starting in a month or so and she does a good job of showing how to use MedlinePlus, so it would be good if she could come to some of their training sessions.

Transcript, Page 4

Figure 4: Organizing and Analyzing the Coded Data

The "Uses of MedlinePlus" theme has been organized onto one page and subthemes have been identified. A description is also provided for each theme and subtheme. Note that the interviewee is identified so that the coder can go back to read the original interview. You might also want to put the page number of the unit.

Code "Uses of MedlinePlus" Code Description: Uses of MedlinePlus by Health Advisors	
• **Respondent 1:** This lady from the community came to see me because she was having terrible heartburn – almost every day. We looked up heartburn on MedlinePlus.[p4]	Learn about health problem
• **Respondent 1:** We found out there are better medicines than what she was taking and she did not have to get a prescription. She talked to the pharmacist because she is on other medication, because MedlinePlus said don't mix these pills with other pills. But the pharmacist told her it was okay for her to take them, but that if the heartburn comes back she should see her doctor. [p4]	Learn about prescription drug
• **Respondent 1:** There was a woman whose sister was diagnosed with breast cancer and she was so worried. We read a little bit about it and found out that "stages" tell you now serious the cancer is. She went back and asked her sister about her breast cancer and found out it was stage 1. That means her sister has a really good chance of surviving it. [p4]	Learn about a loved one's health problem
• **Respondent 1:** Everyone was hearing about this bird flu and we were coming up on Thanksgiving. The ladies who come to our Thursday brown-bag lunch meeting were saying they didn't know if they should serve turkey this year. So the other lay health adviser and I printed some information off of MedlinePlus, passed it around and we discussed it. [p4]	Learn about current health topics Get information for presentation
• **Respondent 1:** We try to just show them in general how to search for a health topic, then give them privacy with the computer. It works okay as long as they know a little bit about using a computer. [p4]	Teach use of M+

Notes: One of the projected outcomes of teaching lay health advisers about M+ was that people in the community would have better access to useful health information. Our interview with Respondent 1 gave us an idea of how the lay health advisers use M+. Respondent 1 used it one-to-one to help community members find information about health conditions and about drugs. She helped another person look up information about a family member's health condition. This is an important use of M+ because this woman was quite worried but she couldn't go to her doctor to ask about her sister's illness. Because she was not her sister's caretaker, she could not talk to her sister's doctor. Where else could she learn about breast cancer? The lay health workers also used the information to inform a group about a timely topic that has been in the news a lot. Finally, they tried to help community members who do not want to disclose their illness by just giving general instructions on how to use M+.

The process described here is just one of many approaches that can be used. For instance, a method using the "text-to-table" function in Microsoft Word is described in a publication at http://idde.syr.edu/Krathwohl/Chapter14/Considerations.htm [9]. For complicated projects involving a great deal of data there are a number of software packages on the market designed specifically for qualitative data analysis, like ATLAS.ti (http://www.atlasti.com) and NVivo 7 (http://www.qsrinternational.com.)

Interpretation. The interpretation stage involves making sense of the data. The most basic approach is to summarize the themes that you identified in the data. (See "Notes" in Figure 4.) Then, you could use some of the following approaches to further analyze your data:

- Write answers to some of your evaluation questions like "What results did we get?" "What worked well?" "What were the challenges?" and "What can be improved?"
- See if you can come up with a classification scheme for your data. For instance, you might be able to classify your interview data into categories of how MedlinePlus is used after training.
- The analysis might even involve some counting. For instance, you might count how many users talked about looking up health information for themselves and how many used it to look up information for others. This will help you assess which uses were more typical and which ones were unusual. However, remember these numbers are only describing the group of people that you interviewed; they cannot be generalized to the whole population.
- See if the themes differ by group. For instance, you may find that users in the health professions and general public users value different features of MedlinePlus.

There are numerous approaches to analyzing qualitative data. Two excellent resources for beginners are "Analyzing Qualitative Research" at the University of Wisconsin-Extension Website, [10] or Glesne's *Becoming Qualitative Researchers*. [11] *Qualitative Data Analysis* by Miles and Huberman [8] also provides methods for analysis, although a little more advanced.

Step Four — Assess the Validity of Your Findings — *Qualitative Methods*

As with surveys, you will need to assess the validity of your interview data. Qualitative researchers use the word "trustworthiness" instead of validity, but the concept is the same. Validity actually refers to the accuracy of the data collection instrument. In interviewing, you as the interviewer are the "instrument," so you need to assess the steps you took to guarantee that the interview data you collected is as thorough, accurate, inclusive of all viewpoints, and unbiased as possible. Following some of the steps listed below will help you assess the validity of your findings:

- Be sure you can articulate the rationale behind your sample.
- As you identify themes and patterns, seek information that does *not* support your findings. For instance, if you are interviewing participants from an online resource training project and getting glowing responses, seek out some interviewees who did not seem to get as much from the training.
- Use multiple methods of data collection and look for consistency. This is called "triangulation." When you interview, you should use at least one other source of data and see if the sources corroborate one another. For instance, you may compare your data to some focus group data from the same project. You do not have to triangulate with other qualitative data. In evaluation, it is not unusual to compare interview findings with survey data.
- Have more than one person code and analyze the data. Both coders should work independently at first, then come together to compare and discuss findings. The coders are not likely to have identical findings. However, there will be some overlap in concepts and the dissimilarities are likely to provide a more thorough interpretation.
- Ask participants to read your interpretations. They can tell you if you are representing their views thoroughly and accurately.
- Get an outsider to review your evaluation data, data collection processes, and methods to see if he or she agrees with your conclusions.

You can find more information about validating your qualitative data in the references listed at the end of Step 3 [8,10,11].

Take Home Messages

Collecting and Analyzing Evaluation Data

1. Be prepared to mix qualitative and quantitative data. Mixed approaches often tell the whole story better than either approach alone.
2. Quantitative methods are excellent for exploring questions of "quantity": how many people were reached; how much learning occurred; how much opinion changed; or how much confidence was gained.
3. The two key elements of a successful survey are a questionnaire that yields accurate data and a high response rate.
4. With surveys, descriptive statistics usually are adequate to analyze the information you need about your project. Charting and making comparisons also can help you analyze your findings.
5. Qualitative methods are excellent for exploring questions of "why": why your project worked; why some people used the online resources after training and others did not; or why some strategies were more effective than others.
6. A good interview study uses a purposeful approach to sampling interviewees.
7. Analysis of interview data entails systematic coding and interpretation of the text produced from the interviews. Multiple readings of the data and revised coding schemes are typical.
8. In interviewing, you as the interviewer are the "instrument," so you need to assess the steps you took to guarantee that the interview data you collected is as thorough, accurate, inclusive of all viewpoints, and unbiased as possible.

1. Burroughs C. **Measuring the difference: guide to planning and evaluating health information outreach.** [Web document]. Seattle, WA: National Network of Libraries of Medicine, Pacific Northwest Region, September, 2000 [cited 26 June 2006]. <http://nnlm.gov/evaluation/guide/>.
2. The Joint Committee on Standards for Educational Evaluation. **The standards for program evaluation.** Thousand Oaks, CA: Sage, 1994.
3. Cui, WW. **Reducing error in mail surveys.** [Web document]. Practical assessment, research & evaluation 2003;8(18) [cited 14 June 2005]. <http://PAREonline.net/getvn.asp?v=8&n=18>.
4. Dillman DA., Tortora RD, Bowker D. **Principles for constructing web surveys** (technical report 98-50). [Web document]. Pullman, Washington: SESRC, 1998 [cited 26 June 2006]. <http://survey.sesrc.wsu.edu/dillman/papers/websurveyppr.pdf>.
5. Armstrong JS. **Monetary incentives in mail surveys.** Public Opinion Quarterly 1975; 39: 11-116.
6. Bosnjak M, Tuten TL. **Prepaid and promised incentives in web surveys.** Social science computer review 2003; 21(2): 208-217.
7. Patton, MQ. **Qualitative research and evaluation methods.** 3rd ed. Thousand Oaks, CA: Sage, 2002.
8. Krathwohl, DR **Considerations in using computers in qualitative data analysis methods of educational and social science research: an integrated approach. [Web document].** Online revision of 2nd ed. Chapter 14. Long Grove, IL: Waveland Press 2005 [cited 6 October 2005]. <http://idde.syr.edu/Krathwohl/Chapter14/Considerations.htm>.
9. Taylor-Powell ET, Renner M. **Analyzing qualitative research. [Web document]. Madison, WI: University of Wisconsin Extension 2003** [cited 4 October 2005]. <http://cecommerce.uwex.edu/pdfs/G3658_12.PDF>.
10. Glesne C. **Becoming qualitative researchers.** 2nd ed. New York: Longman, 1999.
11. Miles MB, Huberman **M Qualitative data analysis** 2nd ed. Thousand Oaks, CA: Sage, 1994.

Examples of Commonly Used Quantitative Evaluation Methods

Method	Examples of Sources	Examples of information collected
End-of session evaluations or surveys	• Trainees • Service recipients	• Satisfaction with training • Intentions of using the resources in the future • Beliefs about the usefulness of the resources for various health concerns • Confidence in skills to find information
Tests (best if conducted before and after training)	• Trainees	• Ability to locate relevant, valid health information • Ability to identify poor quality health information
Follow-up surveys (conducted some time period after training) • Attitude or opinion scales (e.g., strongly agree, agree, etc.) • Dichotomous scales (yes/no)	• Trainees • Collaborative partners	• Usefulness of resources for health concerns (becoming more informed about treatments, learning more about a family member's illness) • Use of resources as part of one's job • Level of confidence in using the resource • Sharing the resource with other co-workers, family members, etc. • Use and usefulness of certain supplemental products (listservs and special Websites)
Records • Frequency counts • Percentages • Averages	• Website traffic information • Attendance records • Distribution of materials	• Hits to Website • Amount of participation on listservs • Training participation levels • Retention levels (for training that lasts more than one session) • Numbers of people trained by "trainers" • Number of pamphlets picked up at health fairs
Observations • Absence/presence of some behavior or property • Quality rating of behavior (Excellent to Poor)	• Trainee behavior • Site characteristics	• Level of participation of trainees in the sessions • Ability of trainee to find health information for the observer upon request • Number of computers bookmarked to resource Website • Number of items promoting the resources made available at the outreach site (handouts, links on home pages)

Ways To Improve Response Rates for Electronic Surveys

Electronic surveys provide an excellent alternative to mail or telephone surveys. In general, they can be much less expensive. Companies like SurveyMonkey [http://surveymonkey.com] make creating Web-based surveys easy for novices and fairly affordable. Research has provided some insight into best practices for electronic surveys.

1. Carefully consider how the choice of electronic survey may affect response rates. Some groups, like employees in an organization with Internet access, members of professional organizations, or listserv participants may be computer-oriented and may prefer electronic surveys. Others may have limited use of technology or choose not to use it.
2. Use the general principles of administering surveys described on page 11 in Figure 2. Send a preliminary, personalized cover letter, alerting respondents to the coming web-based survey. If possible, make sure the letter comes from someone they trust or like and make sure the respondent can see the name without opening the email (such as in the "FROM" or "SUBJECT" field.) If people do not recognize the sender of an email message, they may not open it.
3. Keep the survey as simple as possible so that it will load quickly.
4. Start with a simple, interesting question. Use recognizable formats (two-option questions; rating scales) that look like questions respondents have seen on print surveys. Be sure that the respondent can see each item and related responses on one screen.
5. Use question formats similar to those seen on written surveys.
6. Do not have items that force respondents to answer before they can move on to the next item. Such items frustrate respondents and could cause them to before finishing.
7. Give instructions for the respondents with the least amount of computer experience. Some people may not understand how to scroll for more questions, how to use drop-down boxes, etc. If you find that the instructions take up too much space, consider different formats for respondents with different levels of computer experience.
8. Use grouping mechanisms (like color or boxes) to help respondents connect questions and responses.
9. Give participants an indication of the survey's length. When possible, put all questions on one screen so respondents can see the length of the survey. For short surveys, put all questions on one page. For surveys with multiple pages, use a "progress bar" available in many online survey software packages or notations like (Page 1 of 6) on each page. In the introductory screen, give information such as the number of total questions, number of screens, or estimated time to complete the survey. If respondents tire of answering questions and see no end in sight, they are likely to quit before finishing.

Source: Dillman DA., Tortora RD, Bowker D. [4]

Examples of Commonly Used Qualitative Methods

Method	Description	Examples
Interviews	People with knowledge of the community or the outreach project are interviewed to get their perspectives and feedback	• Interviews with people who have special knowledge of the community or the outreach project • Focus group interviews with 6-10 people • Large group or "town hall" meeting discussions with a large number of participants
Field observation	An evaluator either participates in or observes locations or activities and writes detailed notes (called field notes) about what was observed	• Watching activities and taking notes while a user tries to retrieve information from an online database • Participating in a health fair and taking notes after the event • Examining documents and organizational records (meeting minutes, annual reports) • Looking at artifacts (photographs, maps, artwork) for information about a community or organization
Written documents	Participants are asked to express responses to the outreach project in written form	• Journals from outreach workers about the ways they helped consumers at events • Reflection papers from participants in the project about what they learned • Electronic documents (chats, listservs, or bulletin boards) related to the project • Open-ended survey questions to add explanation to survey responses

Using Mixed Methods

Part 1: Planning a Survey

A health science library is partnering with a local agency that provides services, support, and education to low-income mothers and fathers who are either expectant parents or have children up to age 2. The projects will provide training on search strategies to staff and volunteers on MedlinePlus and Household Product with a goal of improving their ability to find consumer health information for their clients. The objectives of the project are the following:

Objective 1: At the end of the training session, at least 50% of trained staff and volunteers will say that their ability to access consumer health information for their clients has improved because of the training they received .

Objective 2: Three months after the training session, 75% of trained staff and volunteers will report finding health information for a client using MedlinePlus or Household Products.

Objective 3: Three months after receiving training on MedlinePlus or Household Products, 50% of staff and volunteers will say they are giving clients more online health information because of the training they received.

All staff and volunteers will be required to undergo MedlinePlus training conducted by a health science librarian. Training will emphasize searches for information on maternal and pediatric health care. The trainers will teach users to find information with Health Topics, Drug Information, Directories, and Clinical Trials. The training will also include Household Products.

To evaluate the project outcomes, staff and volunteers will be administered a survey one month after training. Worksheet 1 demonstrates how to write evaluation questions from objectives, then how to generate survey questions related to the evaluation questions. (This worksheet can be adapted for use with pre-program and process assessment by leaving the objectives row blank.)

Part 2: Planning an Interview

After six months of the training project, the team considered applying for a second grant to expand training to clients. They have decided to do a series of interviews with key informants to explore the feasibility of this idea. Worksheet 2 demonstrates how to plan an interview project. The worksheet includes a description of the sampling approach, the evaluation questions to answer, and some interview questions that could be included on your interview guide.

Blank versions of the worksheets used in the case example are provided on pages 38 and 39 for your use.

Planning a Survey

Objective 1	At the end of the training session, at least 50% of trained staff and volunteers will say that their ability to access consumer health information for their clients has improved because of the training they received.
Evaluation Questions	• Do staff and volunteers think the training session improved their ability to find good consumer health information? • Did the training session help them feel more confident about finding health information for their clients?
Survey Questions	• **The training session on MedlinePlus improved my ability to find good consumer health information.** (strongly agree/agree/neutral/disagree/strongly disagree) • **The training session on MedlinePlus made me more confident that I could find health information for the agency's clients.** (strongly agree/agree/neutral/disagree/strongly disagree)

Objective 2	Three months after the training session, 75% of trained staff and volunteers will report finding health information for a client using MedlinePlus or Household Products.
Evaluation Questions	• Did the staff and volunteers use MedlinePlus or Household Products to get information for clients? • What type of information did they search for most often?
Survey Questions	• **Have you retrieved information from MedlinePlus or Household Products to get information for a client or to answer a client's question?** (yes/no) • **If you answered yes, which of the following types of information did you retrieve (check all that apply)** ( ) A disease or health condition ( ) Prescription drugs ( ) Contact information for an area health care provider or social service agency ( ) Clinical trials ( ) Information about household products ( ) Other (please describe _____)

Objective 3	Three months after receiving training on MedlinePlus or Household Products, 50% of staff and volunteers will say they are giving clients more online health information because of the training they received.
Evaluation Questions	• Are staff helping more clients get online health information more often now that they have had training on MedlinePlus or Household Products? • What are some examples of how they used MedlinePlus or Household Products to help clients?
Survey Questions	• **The training I have received on MedlinePlus or Household Products has made me more likely to look online for health information for clients.** (strongly agree/agree/not sure/disagree/strongly disagree) • **Since receiving training on MedlinePlus or Household Products, I have increased the amount of online health information I give to clients.** (strongly agree/agree/not sure/disagree/strongly disagree) • **Give at least two examples of clients' health questions that you have answered using MedlinePlus or Household Products.** (open ended)

Planning an Interview Project

Interview Group	Staff
Sampling Strategy	• Agency director • Volunteer coordinator • 2 staff members • 2 volunteers • 2 health science librarian trainers
Evaluation Questions	• How ready are the clients to receive this training? • What are some good strategies for recruiting and training clients? • How prepared is the agency to offer this training to their clients? • Do the health science librarians have the skill and time to expand this project?
Sample Questions for the Interview Guide	• What are some good reasons that you can think of to offer online consumer health training to clients? • What are some reasons *not* to offer training? • If we were to open the training we have been offering to staff and volunteers to clients, how likely are the clients to take advantage of it? • What do you think it will take to make this project work? (Probe: recommendations for recruitment; recommendations for training.) • Do you have any concerns about training clients?

Interview Group	Clients
Sampling Strategy	Six clients recommended by case managers: • All interviewees must have several months experience with the agency and must have attended 80% of sessions in the educational plan written by their case manager. • At least one client must be male • At least one client should not have access to the Internet from home or work
Evaluation Questions	• How prepared and interested are clients to receive training on online consumer health resources? • What are the best ways to recruit agency clients to training sessions? • What are the best ways to train clients?
Sample Questions for the Interview Guide	• When you have questions about your health, how do you get that information? • How satisfied are you with the health information you receive? • If this agency were to offer training to you on how to access health information online, would you be interested in taking it? • What aspects of a training session would make you want to come? • What would prevent you from taking advantage of the training?

Planning a Survey

Objective	
Evaluation Questions	
Survey Questions	

Objective	
Evaluation Questions	
Survey Questions	

Objective	
Evaluation Questions	
Survey Questions	

Planning an Interview Project

Interview Group	
Evaluation Questions	
Sampling Strategy	
Sample Questions for the Interview Guide	

Interview Group	
Evaluation Questions	
Sampling Strategy	
Sample Questions for the Interview Guide	

Checklist for Booklet Three *Collecting and Analyzing Evaluation Data*

Consider whether your question is best answered using quantitative methods, qualitative methods, or both.

Quantitative Methods - Surveys

Step One	Design Your Data Collection Methods
☐	Write evaluation questions that identify the information you need to gather.
☐	Write survey questions that are directly linked to the evaluation questions.
☐	Pilot test the questionnaire with a small percentage of your target group.
☐	Have your methods reviewed by appropriate individuals or boards.
Step Two	**Collect Your Data**
☐	Decide whether to administer the survey to a sample or to everyone in your target group.
☐	Follow procedures known to increase response rates.
☐	Write a cover letter to motivate and inform respondents.
Step Three	**Summarize and Analyze Your data**
☐	Summarize your survey data using descriptive statistics.
☐	Organize your data into tables to help answer your evaluation questions.
☐	If assessing outcomes, compare findings to targets in your objectives.
☐	Write a brief description of the results.
Step Four	**Assess the Validity of Your Findings**
☐	Critically review your data for shortcomings.
☐	Candidly report to stakeholders how any shortcomings may affect interpretation.

Qualitative Methods - Interviews

Step One	Design Your Data Collection Methods
☐	Write evaluation questions that identify the information you need to gather.
☐	Write an interview guide using open-ended questions.
☐	Pilot test the interview guide with one or two people from your target group.
☐	Have your methods reviewed by appropriate individuals or boards.
Step Two	**Collect Your Data**
☐	Design a purposeful data collection plan.
☐	Include information to motivate and inform respondents.
☐	After each interview, spend a few minutes to write notes about the interview.
Step Three	**Summarize and Analyze Your Data**
☐	Read through your interview transcripts and notes to develop a code list.
☐	Write a brief description of each theme.
☐	Code all your interview data systematically.
☐	Organize the coded text by code or theme.
☐	Interpret the findings.
Step Four	**Assess the Validity of Your Findings**
☐	Revisit the rationale behind your purposeful sample.
☐	Look for data that disproves your conclusions or seems to contradict main themes.
☐	Look for corroboration of your conclusions through other evaluation data.
☐	Have two or more coders work on the same data and discuss different interpretations.
☐	Ask participants to review your conclusions to see if descriptions are accurate and thorough.
☐	Get an outside reviewer to look at the data and see if he or she agrees with your conclusions.

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