



Capital Health

Guidelines for Developing Surveys / Questionnaires

**DEVELOPED BY THE
Performance Excellence Program
Revised 2009**

These guidelines are intended as a guide to help you begin planning your survey. They discuss the key concepts involved in survey development, but they are not intended to be a complete handbook on the subject. If you would like more information or assistance with your survey, please contact the Performance Excellence Program, Capital Health

Guidelines for Developing Surveys/Questionnaires

What is a survey?

A survey is a set of directed questions aimed at stakeholders or participants to gather information.

Is a survey the best way to collect the data or information you need? To make this decision, first identify the alternate ways of obtaining this information (e.g. observation, health record reviews, group discussions, lab test results, etc.). After identifying the alternate methods of collecting the data, identify the benefits or any limitations associated with the various methods. If you determine that a survey is the most suitable method, then consider what method of administration you will use. Remember that no one method is the most suitable in all situations.

Survey methods

Surveys may be administered face to face, over the telephone, or by mail. The purpose of the survey as well as a careful consideration of the advantages and disadvantages of each type will help determine the most suitable method.

Face to face interviews:

Advantages

- Allow considerable flexibility in survey design and delivery in that they allow the interviewer the opportunity to probe to when an incomplete response is offered, or when new insight is given.
- Allow the interviewer to easily visually screen potential respondents for certain characteristics (e.g. a survey for men only).

Disadvantages

- In face to face interviews it is more likely that a respondent will provide an inaccurate response for threatening questions.
- The interviewer may distort the response due to a bias he/she may have toward the respondent.
- The cost of conducting face to face interviews can also be high, especially where training and travel are necessary.

Telephone interviews:

Advantages

- Allow flexibility in survey design and delivery.
- The interviewer is able to screen the potential respondents for suitability by asking certain questions (e.g. did you recently attend an outpatient clinic?).
- The respondent is less likely to offer inaccurate responses to threatening questions than during a face to face interview since there is a higher degree of anonymity over the telephone than in person.

Disadvantages

- It may be difficult to prevent the respondent from consulting with others.
- The costs are generally higher than for mail surveys.
- People get annoyed with so many telephone surveys/ offers and may not answer

Mail surveys:

Advantages

- Avoid interviewer bias toward the respondents.
- Lower costs compared with the other methods of data collection (e.g. training, travel, labour).

Disadvantages

- Cannot screen the respondents or control the sequence in which questions are answered.
- Long time frame (often takes weeks to receive the completed surveys).
- lower return rate (without incentives)

Whatever methods you choose you need to design a survey tool (questionnaire) first.

Before Constructing the Survey

What information do I need?

Don't start writing questions. First ask yourself,

What information do I need to capture with this survey?

Focus on identifying the main issues, rather than writing the questions. This will act as an outline when it is time to write the actual survey questions.

What will I do with the responses once they are collected?

Decide how the survey responses will be coded and analysed. Taking the time to plan ahead to this stage will often save valuable time later on. Making these decisions now may influence the format of the questions being asked in the survey. For example, it is much more difficult to code and analyse a narrative than a *yes/no* response.

Keep in mind any constraints or resources such as time, budget, personnel, software, etc. and issues such as population size and sample size, and the amount and variety of information required. Decisions regarding question format will be made easier if you recognize your limitations with respect to the task of coding and analysing the data.

Constructing the Questions

Each question must have a purpose.

- Ensure that there is a reason for asking each question.
- Refer back to the main topic areas to be covered in the survey and focus on one issue at a time. Then try to develop a question or a series of questions that will result in the required information.
- Don't ask a question unless it will result in *useful* information (i.e. useful vs. interesting; “need to know” vs. “nice to know”).

What kind of information is being sought?

It is important to understand what type of information is required. There are four basic categories of responses, each describing a different factor:

- X **Attitudes** - What people say they want?
e.g., Should the minimum driving age be increased from 16 years to 18 years?
- X **Beliefs** - What people think is true.
e.g., Does smoking during pregnancy result in lower birth weight?
- X **Behaviours** - What people do.
e.g., What medications are you currently taking?
- X **Attributes** - What people are.
E.g. How old are you?

The purpose of the survey will determine which types of responses are required and what kinds of questions to ask. For example, if the purpose of the survey is to determine the level of knowledge in a particular area, questions should be developed to measure the respondents' beliefs.

It is important that you do not make inferences about a person's behaviour based on information about his/her attitudes. Although attitudes are often good indicators of behaviour, you should not make these assumptions. Instead, ask questions about the respondents' attitudes *and* behaviours.

Here is an example of a survey asking about a respondent's attitudes, beliefs, behaviours and attributes on the same topic. Questions, such as these, may not appear sequentially in a survey, but be scattered between others.

Example:

- Should persons under the age of 21 be allowed to buy cigarettes? (Attitude)
 - Do you think that people who start smoking as children are more likely to smoke when they are adults? (Belief)
 - At what age did you start to smoke? (Behaviour)
-

- How old are you? (Attribute)

In general, the first questions in a survey should be very simple, straight forward and easy to answer to put the respondent at ease with the subject matter. The more personal questions (usually regarding attitudes and behaviours) will follow. Questions about the respondent (attributes) should come at the end of the survey.

Characteristics of a Good Question.

- ✓ Words are simple and familiar to the target respondents.
- ✓ The question is clear and as specific as possible.
- ✓ The question covers only one issue at a time.
- ✓ There are no double negatives used.
- ✓ The question is not too demanding.
- ✓ The question is not leading or biased.
- ✓ The question should be applicable to all respondents.
- ✓ The question should be as short as possible without losing meaning.
- ✓ The question should not be objectionable.*

Maximize the quality of responses and ensure cooperation.

In order to maximize the quality of responses, you need high cooperation from the respondents as well as a low level of distortion (i.e. honest responses). There are several ways to increase the probability that these two conditions will exist.

- ✓ The survey should be interesting.
- ✓ Questions should not be difficult to answer or time consuming.
- ✓ Avoid embarrassing or personally threatening questions* (avoid intense probing).
- ✓ Questions should be worded to facilitate recall and to motivate the respondent.
- ✓ Questions should follow a logical sequence (e.g. general to specific, easy to difficult, impersonal to personal, etc.).
- ✓ Guarantee confidentiality.

*Certain subjects make it difficult to avoid the use of objectionable or threatening questions. Threatening questions can be defined as, “questions on topics about which many respondents are reluctant to talk fully and honestly” (Bradburn and Sudman, 1979). If your subject matter is considered to be threatening, you should pay particular attention to the structure and length of questions, as well as the method of administration.

Open-ended versus closed-ended questions.

There are two basic types of questions: open-ended and closed-ended (examples on next page).

Open-ended questions:

- ✓ No response choices are given and respondents must create their own responses. This type of question allows for free thought and suggestions from the respondents.
- ✓ Helpful in exploring a topic to determine the key issues and will provide input for developing closed-ended questions for later use.
- ✓ The respondent is required to recall, organize, and express his/her thoughts. This can be difficult or bothersome for some respondents. Often these responses may be incomplete or irrelevant, and are often very difficult to interpret, code, and analyse.

Closed-ended questions:

- ✓ response choices are provided.
- ✓ response options can be gradations of a single dimension (e.g. strongly agree, mildly agree, neither agree nor disagree, mildly disagree, strongly disagree).
- ✓ some closed-ended questions give answer choices that are not gradations of a single dimension, but instead offer a choice of unordered, independent responses. This type of question is useful for ranking preferences and determining priorities.
- ✓ closed-ended questions are useful for determining the degree or intensity of thoughts and behaviours, and facilitate statistical analysis.
- ✓ limited to a specific topic and must be answered in a certain way. This may result in missing out on an important dimension not covered in the survey.

Some questions are actually a combination of open-ended and closed-ended questions. A list of responses is provided, but the respondent is also given the opportunity to create his/her own response (i.e. "Other" or "comments" is an option). The advantage of this type of question is that if the options given are not adequate, the respondent can still record an appropriate response. The use of a "N/A" (not applicable) option may be indicated.

The choice of question type may often be determined by subject matter. For example, scientific or technical issues often require a specific response for ease of coding. In this case, the closed-ended question is more appropriate. However, studies related to social issues may require more individuality in responses, and therefore, open-ended questions are more appropriate.

Question type may also be determined by the researcher's level of knowledge. If the researcher has a thorough understanding of the subject matter, specific closed-ended questions may be asked. If the researcher has limited knowledge of the subject matter, it is often better to ask open-ended questions in order to gain a better understanding of the topic and the relevant issues. This may be administered as a focus group or written survey. In this case, a follow-up survey which asks specific, closed-ended questions is often helpful.

EXAMPLES

Open-ended

- 1 How do you think we can increase the efficiency of the patient tray distribution process?
- 2 Where should we focus our building maintenance efforts at this time?
- 3 What do you think the term '*core values*' means?
- 4 What aspects of the admitting process need to be improved?

Closed-ended

- 1 Do you think the voice mail system should be improved?
 Yes No Not Sure
- 2 How old are you?
 - 1 19 years or under
 - 2 20-29 years
 - 3 30-39 years
 - 4 40-49 years
 - 5 50-59 years
 - 6 60 years or over
- 3 How satisfied are you with the care you received during your hospital visit?
 - 1 Very satisfied
 - 2 Somewhat satisfied
 - 3 Somewhat dissatisfied
 - 4 Very dissatisfied
- 4 Which of the following describe your current workplace concerns? Please check all that apply.

Low morale	<input type="checkbox"/>
Fear of job loss	<input type="checkbox"/>
Unsafe working conditions	<input type="checkbox"/>
Overworked staff	<input type="checkbox"/>
Unsatisfactory compensation	<input type="checkbox"/>
Lack of leadership	<input type="checkbox"/>

Descriptive Statistics

Before you finalize your questions you need to consider the type of data that will result from the questions.

- If you are asking questions about a diagnosis or gender, for example. You will be collecting **nominal** (named) data.
- If you use a Likert scale or a pain scale you will be collecting **ordinal** (ordered) data.
- If you are using a scale which has equal intervals such as age or length of stay you are using **continuous** data.

Knowing which type of data you are collecting helps you to use the appropriate descriptive statistic. The statistics used in surveys are descriptive statistics: means, modes and medians.

Modes

The data category which occurs most often. Modes are most appropriate for nominal and ordinal data.

- Example of nominal data: blue, brown, green, green, grey, blue, green, brown, black, red.
The mode here is green because it occurs most frequently.
- The mode is often expressed as a percentage of the whole, e.g. "Green" is the primary mode.
It appears 30% of the time in the example above.
- Example with ordinal data

Likert scale (forced choice)

Very satisfied 2

Satisfied 25

Dissatisfied 8

Very dissatisfied 2

Median

Median (middle) is the value of the term that is larger than or equal to half of the other terms and smaller than or equal to half of them.

- To calculate the median put all the scores in ascending or descending order.
- Find the middle value (e.g. if you have 5 scores the middle one is the 3rd on the list).
The value of the 3rd term is the median.

Examples: Ages = 22, 27, **31**, 34, 86 Median = 31

- Medians may be used with ordinal, and continuous data. The median is not affected by extremes (outliers) and is sometimes a better representative measure of the sample than the mean.

Mean

Means are the average. Sum all the values and divide by the number of values.

- Means can only be used with continuous data.
 - Means and medians are often used together to show presence (extent) of outliers.
- Examples: Ages = 22, 27, 31, 34, 86 Mean = 40

Instructions

At the top of the survey provide the respondent with instructions on how to complete the questions. For example: circle the response that comes closest to your opinion; check all the boxes that apply.

It may be helpful to provide an actual example of a mock question and how you would like the respondent to complete it.

Physical Layout and Appearance of the Survey

There are some simple guidelines to follow when deciding on the layout of the survey:

- ✓ the survey should be neat, easy to read, and balanced on the page.
- ✓ items (questions) should be numbered consecutively.
- ✓ there should be sufficient space allotted for each question and response (i.e. space between questions as well as space for open-ended responses).
- ✓ the font and type size must be easy to read.
- ✓ questions should follow a logical sequence as outlined above (e.g. easy to difficult, attribute questions last, etc.).

Pilot Testing Your Survey

If you have developed your own survey, it is essential that it be tested by group similar to the survey's target population or, if that is not an option, by colleagues. Choose a small number of people who are willing to not only answer the survey but give you critical feedback. If you have a very small number of subjects in your population, you may not be able to choose any subjects for pilot testing. In this case you must rely on collegial comments. If you do use subjects from your sample then their completed surveys cannot usually be included in your data analysis, and they must be excluded from the sample. The exception to this rule is when the survey instrument does not require changes after pilot testing.

This evaluation of the survey should include the colleagues' and test groups' overall impressions of the survey as well as comments regarding the content and wording of the questions and the instructions. This pretest will ensure that the questions are easy to understand, they measure what is intended, the expected responses are adequate, and no biases are suggested.

When you have the completed surveys from the pilot test, process the data through all steps of

data input and analysis. Critically review the results to ensure that you are going to be able to use the data you collect and that they are going to tell you what you want to know. Make any necessary changes to the survey. If you make major changes, you will also need to pilot the revised survey. The following Evaluation Guide suggests some specific questions to ask the pilot testers.

Pilot Testing the Survey

Evaluation Guide

The attached survey will be used as part of an evaluation of the XYZ Program. Please help us improve the survey by first completing it and then answering the following questions. This Evaluation Guide is intended as a guide only. Please feel free to add additional comments directly on the survey or on an additional sheet of paper. Please return this evaluation guide along with the completed survey to Name by Date.

- 1 Were the instructions on how to complete the survey concise, clear, and complete?
- 2 Were there any statements / questions that you could not answer because the intent was not clear (i.e. ambiguous, requires further definition)?
- 3 Were there any questions that you could not answer because the appropriate response was not provided?
- 4 Are there any statements / questions that you think should be deleted from the survey?
- 5 Are there any statements / questions that you think should be added to the survey?

Sampling

Sampling is a method of collecting data from part of the population you want to survey. The advantages of sampling are timeliness, accuracy, reduced costs and reduced response burden on the population. The results from a sample can tell you about the population you are measuring.

How many people should I sample?

The answer depends on the size of the population, the preferred degree of precision (variability, confidence, and margin of error) and the anticipated response rate. Size of the survey population: The size of the sample does not increase in direct proportion to the size of the population.

Example of sample sizes in relation to population sizes

Population	Sample	Population	Sample
50	44	10,000	370
100	80	100,000	383
500	217	1,000,000	384
1,000	278	10,000,000	384
5,000	357		

Degree of precision is made up of three components:

- Variability - If everyone thought the same way you would only have to sample the opinion of one person to get the views of the whole population. Because one doesn't know how homogeneous the population is before one sample them, one uses a maximum variability (0.5) for all sample calculations. This is also called the preliminary estimate of the proportion.
- Confidence level - Generally, statistical studies use levels of 90, 95, or 99 percent. The greater the confidence level, the more accurately a sample represents the true proportion within the entire population. A confidence level of 95 per cent means 19 samples out of twenty would contain the true population proportion. This is an acceptable level for surveys.
- Margin of error is the precision you require or maximum amount of error you can live with. Error intervals are measured in percentage points. The smaller your error interval, the more confident you can be that your sample accurately reflects the larger population. The acceptable margin of error is usually $\pm 5\%$ but can also be $\pm 10\%$ or $\pm 2\%$ depending on the need for reliability. The smaller the margin of error the larger the sample size required. The optimal sample size will be the one that balances what is theoretically desirable against what is practically feasible.

For example, if you are measuring satisfaction of a population and you choose a $\pm 5\%$ margin of error and the satisfaction is 85%. That means that your findings may err either side of 85% by 5%. The satisfaction level could be 90% or 80%.

Choose the margin of error you feel comfortable with.

Example of selecting a sample size from a table. Choose the table that shows your selected variability (0.5) and confidence level (95%). Select the row that shows your

population size (e.g. 300) and the column showing the margin of error ($\pm 5\%$). The suggested sample size is 169.

Anticipated return rate - Depends on method of survey administration, e.g. face to face interviews - very high response rate, 80% to 100%; phone surveys - 70% to 80% response rate; mail surveys 40% to 50% response without incentive or follow-up. Can be improved to 60% with incentives and follow-up.

Non-respondents often have different characteristics from respondents. If non-response rate is high, survey estimates may be badly biased and unrepresentative of target population. Once you have chosen a sample size from a table you need to adjust this, by the response rate, so that you send enough surveys to get back the estimated number of responses that you need.

Taking the sample size of 171 from the previous example, let's assume that you are using a mail-out survey with no incentives. Your estimated response rate will be approximately 40%. Now divide the sample size by the anticipated response rate. ($171/40\% = 427.5$) 428. This is the number of surveys you need to send out in order to get 171 returned.

There are formulas and tables for calculating sample size. (Contact Quality and Decision Support for assistance). If you wish to calculate sample size at a confidence of 99% or 95% only, you may use the Sample Size Calculator at <http://www.surveysystem.com/sscalc.htm#ssneeded>

Now you know many people you need, who do you pick for your sample?

A sample is a subset of a population. It is considered representative if its features are characteristic or typical of the entire group. With a representative sample, you can make generalizations about the entire population with a measurable degree of precision and confidence.

A sample chosen in a haphazard fashion or because it is handy, however, is not likely to be

representative. Probability sampling techniques are used to ensure representativeness. They guarantee that each member of a population has an equal chance of being selected. (1)

There are three types of probability sampling: random, systematic and stratified sampling.

- Random sampling - To select a random sample, you need a list of every person in your study population. This could be a list of elderly people living in your community or a list of every day of stay in an ICU bed in your district's acute care facilities. You can draw your sample by lot (e.g., pull names from a hat), by using the tables of random numbers found in most statistics books, or with computer programs such as EXCEL and SPSS. The laws of chance alone determine which units will be selected. (1)
- Systematic sampling is the most widely used method of sampling and the easiest for people with little training in methodology. It usually requires a list, not necessarily numbered, of all people in the population. This list is called the sampling frame.

Once you have determined how big your sample needs to be, you can then calculate the sampling interval. If, for example, you have 1,250 separations and want a sample size of 125, your sampling interval will be 10. To draw your sample, select every 10th item on your list—starting with a randomly selected item from the first 10 on your list (i.e. within the sampling interval).

Example: start at # 4 (randomly selected between 1 and 10), the second selection is 14 (4+10), the next selections are 24, 34, 44.....1,234, 1,244.

If your sample size does not divide neatly into the population, as in the example above. Make a simple calculation for the sampling interval. Divide the sample into the population and take the next highest whole number (not the nearest whole number!) For example, you have 1,250 separations and want a sample size of 149, divide 1,250 by 149 = 8.38. Your sampling interval is 9 (the next highest whole number). Start your sample selection randomly from anywhere in the population list. When you reach the end of the list start back at the beginning to continue drawing names.

Example start at 1,214 (number selected at random). The second person in the sample is # 1,223 (1,214 + 9), the next selections are 1,231, 1,240, 1,249, 8, 17, 26, etc.

You can use systematic sampling even when you don't have a list. For example you could select every third admission.

- Stratified sampling - If you are concerned about overlooking subgroups in a population, you can stratify your sample. In stratified sampling, you divide your population into distinct groups or strata, e.g. medical staff, volunteers, managers, staff, students. Allocate your sample size according to the percentage of people in each strata, calculate the sampling interval then select a random or stratified sample from each strata.

Example

All staff (Population) = 5,000. Variability 0.5. Confidence level 95%

Margin of error $\pm 5\%$

Sample size = 357 sampling interval = (5,000/357) 14

groups	# in strata	percent of population	sample size (357) x %
medical staff	200	(4%)	15
volunteers	150	(3%)	11
managers	350	(7%)	26
staff	4000	(80%)	296
students	300	(6%)	22
Totals	5000	(100%)	370

Remember - sample size is governed by:

- desired precision
 - population size
 - variability in the population
 - estimated non-response rate
 - cost and time
 - operational constraints
-

Ethical issues

If surveys are conducted as part of research, Research Ethics must be contacted.

A District wide satisfaction process centrally conducted by the Performance Excellence Program measures patient satisfaction. If a service wishes to conduct quality improvement surveys, or have more focussed satisfaction information, contact:

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