

Design Principles for Questionnaire Development

A number of CERTAIN projects collect information from patients and other healthcare stakeholders using questionnaires. In some cases, both paper and web-based questionnaires are administered. When designing questionnaires, it is critical to employ strategies that limit nonresponse and measurement error while ensuring a user-friendly format. Below are some general best practices to consider when developing a questionnaire.

Keep Your Target Audience in Mind:

- **Make sure the questionnaire works seamlessly on multiple platforms.** Consider not only whether your target audience accesses the internet, but also how they do so. People often use a variety of platforms (e.g., smartphone, iPad, desktop, etc.).
- **Present questions in clear formats.** Make sure items are numbered appropriately, spaced adequately, and written clearly, and that answers are clearly aligned with the corresponding questions.
- **Consider font.** Using larger, sans-serif fonts may be preferable, especially when targeting older adults. Black font on white background is easiest to read. For paper versions, avoid formatting where questions span across page breaks.

Things to Include:

- **Welcome page or cover letter.** Summarize important information for respondents at the start. Include instructions, the purpose for requesting information, how responses will be used, and anticipated time to complete.
- **Contact information.** Provide a mechanism for feedback by including an email and/or contact person and a telephone number at both the start and end of the questionnaire.
- **How provided information will be used.** Explain to respondents how their responses will be accessed, by whom, and for what purpose. If answers involve clinical information that will **NOT** be reviewed by a clinician, make that clear.
- **Security information.** Explain to respondents how their responses will be secured and protected, especially those with sensitive information.
- **Progress bar or page numbers.** Use graphical symbols that convey to the respondent where they are in the questionnaire process (e.g., progress bars showing how close a person is to completion). For paper questionnaires, include both the page number and number of pages (e.g., “1 of 3”).
- **Computer operation and questionnaire instructions.** Make it clear how to start, move to the next question/page, close the questionnaire or submit responses, if the back button can be used, and if the questionnaire can be saved and accessed later. Consider providing this on each individual page, not just on the welcome page.
- **Summary page for electronic questionnaires.** For short questionnaires or key items, consider including a summary page to allow respondents to review responses and then go back and change answers as needed. (It's more difficult to go back and check answers in an online questionnaire than on paper.)
- **Thank you.** End with a note of appreciation for respondents' contributions.

Web-based Programming Considerations:

- **Keep the design clean.** Make it as straightforward as possible. Using graphics or extensive design may make it more difficult to complete the questionnaire and reduce participation or retention. Such design features may also slow the download speed of the questionnaire.
- **Minimize advanced programming.** The interface should accommodate a wide variety of browsers and computers. For example, JavaScript is not compatible with all platforms (e.g., smartphone, iPad, etc.) Pop-up blockers may restrict accessibility for questions or content.
- **Avoid logic discrepancies.** When using multi-modal approaches (e.g., paper-based and web-based), consider how the use of skip logic or adaptive questioning translates across both modes so data collection efforts are not affected.
- **Aim for the same look and feel as a paper-based questionnaire.** Make sure questions are fully visible on the page. Avoid electronic versions that require respondents to scroll up and down or left and right on a page. In paper versions, avoid formatting where questions span across page breaks. Include a clear header and footer marking where the page begins and ends.
- **Use data validation tools and error prompts.** They can be very powerful when used well. With error prompts, be as specific as possible about the location and type of error and how to fix it.
 - To help prevent errors with data validation, make sure it is clearly stated what type of data is expected. For example, a text box that is a validated date field should have a label indicating that “DD/MM/YYYY” is the expected entry. A box for a person’s height in feet should have an error prompt that explains this value should be a number between four and six.
 - Consider asking respondents to re-enter critical variables that often can be mistyped (e.g., entering a name twice with a validation check to confirm the two entries match).

Content Guidelines:

In some instances, previously developed and validated questionnaires (e.g., patient-reported outcome measures) may be used. Altering content, order, wording or instructions will affect the ability to interpret results. While the process of questionnaire development and validation requires specific methodology and is not within the scope of this document, the following outlines some general recommendations to keep in mind when developing new content.

In General:

- **Keep it simple.** Use short sentences. Define jargon. Limit length.
- **Use non-judgmental and unbiased language and tone.** Avoid leading or directing respondents to a particular response.
- **Limit length.** Long questions and questionnaires place a larger burden on respondents and are, therefore, less likely to be completed.

Questions:

- **Put the bulk of the text in the question.** The answers can be as brief and straightforward as possible (e.g., response choices like “bus,” “car,” or “bike” rather than “I typically commute to work by bus”).
- **Limit open-ended questions.** They frequently are not completely answered and the information within is challenging to evaluate, especially for large sample sizes. Instead, use “yes/no” or “select one” questions.

- When using opened-ended questions, avoid leading phrases (e.g., asking “What did you think of the class?” may give the respondent plenty of leeway to express themselves, but it may not provide reliable feedback about the length, location, content, etc. You can always include an “Other comments” box at the end).
- **Include a free text box.** If the content may trigger strong opinions or reactions, it is helpful to include at least one free text box. On a paper questionnaire, the respondent would be able to scribble notes in the margins or write on the back of the last page. Even if the data is not used in the analysis, it can help the respondent feel heard.

Responses:

- **Avoid requiring answers in electronically administered surveys, unless it is vital information.** While making questions required can help with completeness, respondents would be able to skip questions on paper with which they are uncomfortable or to which they do not know the answer. Requiring an answer electronically may increase the number of incomplete questionnaires as respondents become frustrated and close the questionnaire before completion.
- **Make options easily distinguishable.** The guideline of including the bulk of the text in the question ties in here, as “bus,” “car,” and “bike” are much easier to distinguish than “I typically commute to work by bus,” “I typically commute to work by car,” etc. The respondent should not have to read the options several times to decipher the difference.
- **Make options similarly formatted.** By using the same number of response options and placing the point of difference in the same place, respondents will be able to accurately and easily select answers.
- **Avoid vague quantifiers.** Words like “often,” “somewhat often,” and “sometimes” leave room for misunderstanding or misinterpretation. For example, “daily, weekly, monthly” would be better answer options for “How often do you do the following?” than “often, somewhat often, sometimes.”
- **Arrange response options logically.** If a logical internal order to responses exists (e.g., never, sometimes, always; city, state, country; when I was in elementary, when I was in high school, when I was in college), using it will help respondents to accurately and easily select answers.
- **Use check-all-that-apply options sparingly.** People are not likely to read through all responses. If a response to each of the options is important, consider having a “yes/no” question for each one.

Pilot Testing:

- **Confirm final content.** If the questionnaire is for a research study, ensure the final version matches what was approved by the Institutional Review Board (IRB).
- **Run through the questionnaire in all formats.** Once the questionnaire is developed, allow time for others to run through the questionnaire in all formats to ensure clarity and functionality and to identify any additional challenges and barriers to completion.
- **Gather feedback.** Fresh eyes help identify typos and errors in the formatting of the text or questionnaire content.
- **Test.** Identify a small group of people (5-10) who are familiar with the questionnaire content to complete a test run. Request pointed feedback on length, question wording, and flow.

- **Additional quality assurance for questionnaires with logic.** Steps for quality assurance testing for questionnaires with logic (skip logic or adaptive design) include:
 - Be creative and respond every way you can think of to respond. Move back and forth to change answers and see what happens.
 - Try leaving everything blank (this checks for required questions and for how the questionnaire logic will play out with no responses).
 - If there are multiple factors going in to a logic step, try all of the different variations (e.g., BMI<19, loss of appetite, AND difficulty eating; BMI<19 AND difficulty eating; loss of appetite AND difficulty eating, etc.).
 - Make sure the questions and explanatory text flow properly. If there are two ways the questionnaire could go, make sure to include the appropriate “for this section, we are asking about...” lead in.
 - For summaries that can include several components (e.g., scores on different aspects of health), make sure the different combinations go together. The lead-in text may need to be a separate component so that it is not duplicated, or it may need to be tied to the result so that it is not shown if a particular result does not apply.

Invitations and Outreach:

- **Personalize outreach.** When possible, include the individual’s name in the salutation, the sponsoring organization logo, and an e-signature from the principal investigator or the individual’s clinician.
- **Importance.** Include the importance and benefit of the questionnaire to both the respondent and society. People are more likely to respond to a questionnaire if they believe their participation is important and may help others.
- **Estimate the time commitment.** Remind invitees approximately how long the questionnaire will take.
- **Include the deadline for responding.** Include any reminders for completion that might occur prior to the deadline.
- **Space out reminders.** Allow at least a day between reminders. Depending on the target audience and the length of time it takes to complete the questionnaire, most people will be aware of the request and may be planning to get around to it when they have some free time. A week’s grace period avoids pestering them unnecessarily, particularly if the previous reminder was sent by mail. If it is a very brief questionnaire or the audience is busy professionals, more frequent reminders may be appropriate and needed.
- **Contact information.** An email address and/or telephone number should be included for additional questions, concerns, or assistance with completing the questionnaire.

Email Tips:

- **Subject line.** Make the subject as short as possible while also clearly stating the context.
- **Get to the point.** Keep the body of the email short.
- **Time it right.** Send the email on a weekday during the afternoon or early evening (Mon-Thurs). Emails, particularly those to work addresses, that come in over the weekend are likely to get lost and/or dismissed in the wave of emails to be addressed Monday morning.

Additional Online References for Questionnaire Design:

- Dillman DA, Tortora RD, Bowker D. Principles for Constructing Web Surveys. Available at: http://www.websm.org/uploadi/editor/Dillman_1998_Principles_for%20Constructing.pdf
- Don Dillman's Guiding Principles for Mail and Internet Surveys. Available at: https://www.une.edu/sites/default/files/Microsoft-Word-Guiding-Principles-for-Mail-and-Internet-Surveys_8-3.pdf
- REDCap Surveys 101: A Guide to Writing and Designing Effective Surveys. Available at: <https://www.iths.org/blog/news/redcap-surveys-101-guide-writing-designing-effective-surveys/>
- Smart Survey Design: Survey Monkey. Available at: <http://s3.amazonaws.com/SurveyMonkeyFiles/SmartSurvey.pdf>
- University of Wisconsin Office of Quality Improvement. Survey Fundamentals: A guide to designing and implementing surveys. Available at: <http://oqi.wisc.edu/resourcelibrary/uploads/resources/Survey%20Guide%20v%202.0.pdf>