

CPWR-The Center for Construction Research and Training
A Guide to Using the Delphi Method for Construction Safety and Health Research

The Delphi method was developed in the 1950s by a group of researchers in the fields of forecasting and planning at the RAND Corporation.¹ Since then, it has been used in numerous fields² to achieve a reliable consensus among a panel of experts for addressing a complex problem.³ It relies on an iterative process to reach consensus, typically through multiple rounds of feedback from panel participants. CPWR funded a literature review of the Delphi method to assess its current and potential use for construction safety and health research.⁴ The review and a related report⁵ concluded the method can be a robust tool for identifying, evaluating, and forecasting construction safety and health research priorities and putting research findings into practice.

This brief guide summarizes key questions to consider before using the Delphi method and what was learned through the literature review to answer them.

Questions	What we learned
Is the Delphi method an appropriate approach for answering the research question?	<p>The Delphi method may be a useful approach for construction safety and health research when:</p> <ul style="list-style-type: none"> • Objective data are not possible to collect or when empirical evidence is lacking.^{6,7} • “The problem does not lend itself to precise analytical techniques but can benefit from subjective judgments on a collective basis.”⁸ • Experts cannot be brought together in a face-to-face exchange because of time, cost, or other constraints.⁸
How are panel members selected?	<p>Researchers establish criteria for selecting “expert” panelists based on their research question. The selection criteria often include education, experience, size of organization, professional qualifications (e.g., certifications; members of national committees), and authorship of important papers. Researchers who did not list specific criteria in the studies reviewed tended to use purposive sampling techniques, noting panelists were qualified in their field and available to participate. When establishing criteria for selecting panel members for construction safety and health research, knowledge of the specific hazards or interventions under study and relevant job site characteristics may be equally or more important than criteria such as education or authorship.</p>
What is the ideal panel size?	<p>Delphi panels can range in size from less than ten to hundreds of members due to several factors, including the scope or nature of the problem being investigated, the number of experts who are available, the resources that researchers can devote to the panel, and the diversity of the target populations.^{3,9} While the literature review did not identify an ideal size for Delphi panels¹⁰, those with experience applying it to construction research recommend a minimum panel size between 8 and 12 individuals.⁶</p>
How will information be collected from the panel?	<p>Multiple rounds of surveys and/or interviews are typically used to collect information from Delphi panelists. The approach and time between each round (e.g., one week, a month) depends on the researchers’ time and resources and the approach that works best for the panelists.</p>
How many iterations (surveys/interviews) are needed to achieve consensus?	<p>Researchers use different numbers of surveys and/or interviews based on the criteria they establish for reaching consensus. In general, the literature review found that Delphi results are most accurate after two or three rounds and become less so with additional rounds. However, factors such as participant attrition and membership composition should be considered when determining how many rounds to conduct. The data collection and feedback procedures should be established and made clear to participants at the beginning of the project to ensure they are feasible and reduce attrition.</p>

Questions	What we learned
How are the results quantified?	Quantitative, qualitative or mixed methods are used for data collection and analysis. ^{7, 11} The literature review found that a Likert scale is commonly used to quantify panelists' opinions, with a five-point scale being the most common.
How is feedback provided to the panel?	Feedback is usually provided to panelists between rounds by summarizing the results from previous rounds without using personally identifiable information. This is important because it allows panelists to anonymously consider and compare their own opinions and experiences with those of other panel members.
How is consensus determined?	The literature review identified three techniques for measuring consensus – Standard Deviation, Kendall's coefficient of concordance, and Chi-square, with standard deviation being the most commonly used. ⁴ While this review did not recommend a particular technique, other studies have explored the strengths and weaknesses of different techniques. ^{12,13}

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