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Guidelines for Surveys of the American Pediatric Surgical Association

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For the 2010 APSA Outcomes and Clinical Trials Committee

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Abstract Pediatric surgery is defined by the rare performance of complex operations in children. As a consequence, pediatric surgeons have difficulty identifying high-level evidence to help guide management decisions. The American Pediatric Surgical Association (APSA) Outcomes and Clinical Trials Committee is dedicated to helping our membership identify best practices and appropriate standards for clinical management of pediatric surgical diseases. Often, the best available evidence will be the opinions and experience of our membership, and therefore, quantifying this experience and opinion correctly is of critical importance. The APSA Outcomes and Clinical Trials Committee has therefore developed guidelines for survey development and administration for use by the APSA membership.

With the exception of a handful of centers that attract higher volumes of surgical patients with uncommon anomalies, pediatric surgery is defined by rare performance of complex operations. Most of our literature is defined by case series within single institutions and usually include a

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small number of procedures performed over many years [1]. Within this context, research surveys are an effective tool for collecting data regarding the beliefs, practices, and knowledge of surgeons [2]. Surveys are used in many aspects of health care and can be used in pediatric surgery to improve specific aspects of surgical care. Information gathered from surgeons can be used to shape the future of the field by helping to establish recommendations for patient care, providing guidance in the design of clinical studies, and focusing efforts in policy change that will benefit the welfare of patients. In addition, identifying opinions and rationales regarding treatment options for specific diseases can help to establish clinical equipoise between treatment options that is ethically essential before enrolling patients in a randomized clinical trial. Understanding this principle, researchers are performing surveys of stakeholders involved in the care of specific patient populations with increasing frequency [3].

Although designing questions for a survey may seem straightforward and intuitive, in reality, survey instrument design, administration, and interpretation involve a sophisticated methodology [4,5]. One of the American Pediatric Surgical Association (APSA) Outcomes and Clinical Trials Committee's (OCTC) responsibilities as assigned by the APSA Board of Governors is to examine and approve surveys requested for distribution to the general membership. The purpose of this study is 2-fold: to provide general information to the APSA membership on how to recognize a well-designed survey and to inform the APSA membership of guidelines that should be adhered to for all surveys that are being submitted to the APSA OCTC for distribution to the APSA membership at large. Survey instruments that are submitted to the APSA OCTC for consideration should be accompanied by a supporting document addressing each of the elements that follow.

1. Survey design

There are 2 basic types of surveys: (1) descriptive, enumerative, or census type and (2) analytic or relational type. A descriptive survey generates *count data* based on a population sample that can be used to make inferences to the general population, and the results are also very useful for planning. For example, descriptive designs may be used in pediatric surgery studies to estimate the number of surgeons who favor a certain surgical technique or who have a certain characteristic and how often that characteristic occurs. They do *not* explain a relationship between variables such as preference of a surgical technique and subsequent patient outcomes. Descriptive surveys are not hypothesis driven. Analytic surveys, on the other hand, are designed to examine group/subgroup differences and *relationships* between variables. These surveys focus more on exploring associations and predictions. Analytic surveys are hypothesis driven. A survey designed to explore the practice patterns of surgeons based on number of years of experience, patient volume, and other relevant variables would be an example of an analytic survey. Choosing the appropriate survey design is therefore dependent on the aims of the study. Although descriptive surveys are useful for identifying current general opinion and practice, the APSA OCTC encourages the use of analytic/relational type surveys. Ideally, surveys of the membership should be a part of a larger series of investigations and should identify relationships between responses that can in turn be used for hypothesis generation of subsequent studies.

Survey results are most accurate when high response rates are achieved, thereby reducing response bias. This is primarily accomplished by identifying a research topic in which the respondents are interested and invested and by limiting the participant burden by keeping the survey clear and concise. Researchers therefore need to optimize the response rate from their target audience. The background, specific aims, sample size, survey mode, statistical methods for analyzing data, and the survey instrument itself need to be carefully planned.

1.1. Background

The survey should include clear and concise background information concerning the relevance of the study within the context of the topic and the literature published on the specific topic. The relevance of the survey to the target population should be addressed in the background. For descriptive surveys, the main objectives (eg, a needs assessment survey to define where further work or education is required) should be clearly stated up front. For analytic surveys, the author should clearly state the hypotheses to be tested. Upon reading the background, the reader should be able to understand clearly why a survey is needed to complete the proposed research. For example, a survey can generate essential data from a larger population on a specific topic uniquely relevant to pediatric surgery, may be used to identify variations in treatment options, or may be used to acquire pilot data to improve comprehensiveness of prospective study designs [6].

1.2. Specific aims

The reader should be able to understand clearly the objective(s) of the study, the target population, and the relevance of each specific aim. For analytic surveys, the specific aims should be hypothesis driven and focused on clarifying the main outcomes that will answer the research question. The study aims should be well articulated and succinct. Generally, the specific aims should also identify the type of survey that has been constructed. The 4 most common types include (1) epidemiologic surveys, (2) knowledge assessment surveys, (3) attitude surveys, and (4) practice preferences/behavior surveys. Epidemiologic surveys are used to describe the core elements of disease

occurrence in terms of frequency, morbidity and mortality rates, and the population at risk. Knowledge assessment surveys evaluate the practitioner's knowledge and familiarity with the various aspects of patient care such as the epidemiology of a disease, the differential diagnosis and workup of a disease, the variety of treatment options or preventative strategies, or even new or investigational therapies. Attitude surveys assess viewpoints and opinions regarding a specified topic. For example, a survey of surgeons may assess opinions and impressions of surgeons related to their clinical practice and/or general experience. Surveys of practice preferences/behavior may evaluate the preferences of all aspects of patient care in academic, private, or military practice.

Although most studies submitted to the APSA OCTC will be intended for APSA members, the committee is committed to sponsoring surveys to other populations as well if the specific aims are relevant to the practice of pediatric surgery.

1.3. Sample size/target population

A thorough discussion of sampling in study design is well beyond the scope of these guidelines. It is expected, however, that most surveys submitted to the APSA OCTC will be intended for the entire population of pediatric surgeons that are currently enrolled in the APSA membership, and a sampling design will therefore not be needed. When researchers intend to survey a sample of a larger population (eg, the study objectives require purposeful sampling of a specific subpopulation of the APSA membership), it is expected that the optimal sample size will be identified with appropriate statistical support and described for the OCTC.

A detailed strategy for maximizing response rate, however, will be required [6,7]. Identifying minimal response rates is critical and varies by mode of survey distribution. Forty-percent response is average for Internet studies, whereas response rates below 40% should be considered questionable [8]. Determining an acceptable response rate should be done at the outset of the study and stated in the proposal. A secondary plan for contacting nonresponders should be incorporated into the survey design and described for the OCTC in the supporting documents. This follow-up may include the number of times a survey reminder will be e-mailed or mailed to nonrespondents, and/or the number of times that direct follow-up by telephone will be attempted.

Accurate reporting of the characteristics of the respondents and nonrespondents is critical for appropriate interpretation of survey results. For example, there are several members that are retired but still actively participating in APSA activities who may have different responses to questions than practicing members. When reporting results of submitted surveys, the APSA OCTC encourages authors to describe the characteristics of both responders and nonresponders and to describe how the similarities or differences in these demographics reflect the APSA population at large. Undoubtedly, the demographics of the APSA membership will change over time. The committee will therefore provide de-identified background demographics of the APSA membership as reflective as possible of the population that is surveyed to facilitate interpretation and assessment of the generalizability of responses.

1.4. Selection of survey mode

Several modalities for survey administration are available. Researchers should clearly define the method for the proposed study, along with the reason for choosing that method and a discussion of its advantages and limitations specific to the aims of the study. In general, surveys can be (1) self-administered, (2) self-administered with supervision, or (3) interviewer-administered. Self-administered surveys can be administered via e-mail/Internet or United States Postal Service mail, or provided directly on paper or computer. Advantages of e-mail/Internet surveys include low expense and rapid acquisition of data. In addition, respondents to e-mail and Internet surveys may have less social influence because they are not directly sharing their responses in real time with an interviewer and additionally may feel less pressured in terms of time to formulate an answer. Disadvantages of e-mail/Internet surveys include selection bias against subjects without Internet access, lack of interviewer availability for question clarification, and the potential for decreased response rates when compared with mail surveys [8]. To improve respondent accrual, interviewer-administered surveys may be included as an alternative to e-mail/Internet surveys to potential participants who declined to take a mailed or electronic survey or to those who failed to respond altogether. In-person surveys are the least likely strategy to be used for practicing physicians given their time demands and geographic constraints. They may be used, however, in conference settings where pediatric surgeons congregate for annual meetings during which one-on-one interactions or anonymous electronic responses during group sessions may be possible. If the researcher plans to use a mailed survey mode, a personalized cover letter should accompany a printed and mailed survey as well as a self-addressed stamped envelope for the return of the responses [9]. Contact information in the form of telephone and written and electronic format should also be included.

It is assumed that surveys of the APSA membership will most commonly be performed via e-mail/Internet given the number of respondents and their ready access to the Internet [10].

1.5. Statistical methods for analyzing data

A statistical analysis plan should be completed not only before the survey is administered but actually before the questions are even designed. A well-designed survey should

easily convert responses into numbers or categories for statistical analysis. The primary goal of a survey is to collect data that are valid (actually measures what it is designed to measure), reliable (consistently or reproducibly measures what it is designed to measure), unbiased (measures what it is supposed to measure in a way that does not underestimate or overestimate the "true value" in a consistent way), and discriminating (can reliably distinguish between respondents for whom the measured response is different). The study variables to be measured should be identified and categorized as dependent variables, independent variables, and covariates. Appropriate statistical support should be obtained and described for this aspect of the design process.

For example, suppose that we were developing a survey in which the specific aim was to identify the odds ratio that an APSA member would prefer a laparoscopic approach to an open approach for appendectomy. We would identify the main outcome as an open vs a laparoscopic approach and use logistic regression as the statistical model. We may then identify a priori that years in practice from completion of fellowship may be the main predictor (independent variable evaluated categorically as <5 years or ≥5 years) and assume that gender and practice-type (academic, private, military) may be appropriate covariates to be considered. A clear statistical plan will facilitate preliminary question design.

1.6. Preliminary question design

The survey instrument—the set of questions that elicits responses from the intended target population—is the practical culmination of the specific aims, study design, and statistical analysis. To elicit responses that are valid, reliable, unbiased, discriminating, and fit into the statistical model, questions must be carefully written and revised. A thorough discussion of questionnaire design is beyond the scope of these guidelines. The following, however, is a brief introduction to developing valid questionnaires. Ideally, experts in qualitative research and survey design should be included in the development of any instrument submitted to the APSA OCTC for consideration. In addition, many validated surveys/questionnaires exist and are available for use [4]. Several online resources provide access to such tools and evaluate question content for new tool development (eg, http://mnemosyne.csl.psyc.memphis.edu/quaid/quaidindex.html—this Web site is for the Question Understanding Aid).

The first step in survey item development is to perform concept and item elicitation through focus groups composed of people from the study population [4]. If the intended population is the APSA membership, this focus group could be partners in your practice, a small random sample of APSA members, or the APSA OCTC. The general goal of the focus group is to clarify perceptions, feelings, and experiences related to that which is to be measured. Examples include defining commonly used and/or misused terms or identifying assumptions about the sample population's background knowledge. Through such groups, researchers can create questions that are less encumbered by bias and therefore more accurately measure the intended phenomenon. Researchers should describe the content of these focus group discussions.

Once the important concepts and terminology have been clarified through focus groups, researchers create an initial draft of an instrument. Each questionnaire item must be easily understood by the target audience to decrease ambiguity that would otherwise result in measurement error. The same participant in all survey modes should interpret the item stem with relative ease the first time it is read. The wording for the questions should be clear, contain minimal ambiguity, and yield consistent answers. Each item should be written in a way that allows for a narrow interpretation of the answers given to increase the consistency among respondents. For example, in Table 1, question a asks, "Where do you practice pediatric general surgery?" The number of potential responses to this question is innumerable including, "In a hospital setting, in the United States, at a university, etc." A less ambiguous option is, "In what state do you practice pediatric general

Table 1 Examples of survey item development

Poor content	Good content
a. Where do you practice pediatric general surgery?	a. In what state do you practice pediatric general surgery?
b. What kind of practice do you have?	b. Are you employed by a university? or During what percentage of operations do you teach residents or medical students? or Is there an expectation that you publish peer-reviewed papers on at least a yearly basis?
c. Please indicate the majority of patient types you see in an average week.	c. Please select which age group represents greater than 50% of your patient type seen in the office setting.
d. How long have you been in practice?	d. What year did you complete pediatric surgery fellowship training?
e. Do you always do a "time-out" before the incision?	e. Please indicate the percentage of time that a "time-out" is completed before your incision time in the operating room.
f. If a patient has a complication after a hernia repair, how many patients remained in the hospital longer than the planned length of stay?	f. In the past 6 mo, have you had an intraoperative complication from a hernia repair? If yes, please estimate the % of the patients with complications that remained in the hospital at least 1 d longer than the original planned length of stay.

surgery?" Questions written with a clear focus will yield responses that are informative, accurate, and reliable [11]. Questionnaire items should limit the outside information participants must rely on to give an accurate response [12]. All items should be free of leading words or phrases to minimize bias from the investigator. Keep in mind that item order can affect the responses that are given by participants [13]. Although a particular item may not contain suggestive phrasing, the information provided in questions given earlier in the survey may, in fact, lead a participant to particular responses for subsequent questions. To the extent possible, multiple choice answers or Likert scales should be used and free-text answers should be avoided because of difficulties in analyzing large volumes of free-text responses.

Several principles should be considered when putting together and wording a survey. The layout should be well organized with the questions ordered in a logical manner. Similar items may be grouped under subheadings. Demographic and sensitive questions should be placed at the end of the survey. The questions should be objective, simple, and specific. Each question should be aimed to eliminate bias. "Double questions" (eg, Should pediatric surgeons be involved in volunteering abroad or medical legislation?) should be avoided. Answer options must be exhaustive and mutually exclusive, with the options for "other" and "none" being included, if applicable. Likert responses should have a neutral point at the center of the scale (eg, strongly agree, somewhat agree, neutral, somewhat disagree, strongly disagree).

2. Pilot testing and cognitive interviews

Once the survey instrument has been created, researchers should pilot the instrument in a subset of the sample population (again, partners in a practice, random APSA members, or the APSA OCTC can be useful for this), conduct cognitive interviews on the questionnaire's clarity and completeness, and revise items according to feedback [4]. Using a heterogeneous pilot population may be useful in identifying weaknesses in the survey instrument. Researchers should describe this process, including the number of participants in the pilot sample, along with their descriptive characteristics. Researchers should readminister the revised tool to the pilot sample, with time estimates (mean with standard deviation) required to complete the survey. Often, this phase of instrument development can require several iterations until a quality instrument is completed. To measure the reliability of the survey, it should be tested on a group of subjects and then retested at a later date to ensure reproducible results.

The ideal survey length will vary according to the topic being studied. A researcher must consider the appropriate length of a survey that will yield the maximum information within an appropriate respondent burden. All surgeons are inundated with a variety of e-mails, telephone calls, pages, faxes, business notifications, and so on, throughout the day [13]. The researcher has a responsibility to design a questionnaire that will effectively allow the surgeon to complete the survey in one sitting and motivate the responder to complete the entire questionnaire. There is evidence to indicate that response rate for surveys administered to physicians is associated with the questionnaire length [14]. Although there are no standard lengths for physician surveys, in general, 1,000 words or 5 to 10 minutes is best.

3. Institutional review board approval

All surveys submitted to the APSA OCTC will require sponsorship by an APSA member. before conducting any survey; the appropriate approval through an institutional review board should be completed according to the standards of the human subjects division for the institution of the researcher. Institutional review board approval with appropriate sensitivity to current Health Insurance Portability and Accountability Act guidelines from any institution of the researcher or sponsoring member of APSA will be adequate for the purposes of the APSA OCTC.

4. Consent

All sponsored surveys will begin with a statement of consent. In electronic surveys, consent will be completed and collected online and will generally be the first page of the instrument. This form should include a statement of confidentiality and anonymity. A participant will then be invited to continue taking the survey upon the acknowledgment of consent that will be required to proceed to the questionnaire.

5. Ending the survey

It is customary to thank the participants and to leave a space for additional comments to be made at the closing of a survey. The end of the survey should also include specific contact information for correspondence.

6. Incentives

There is evidence that the use of incentive-based strategies increases response rates and, specifically, that prepayment (payment on offering the survey) increases response rates among participants [15-18]. Any such offers

will be the obligation of the researcher and sponsoring member to fulfill.

7. Conclusions

A survey that is specifically designed to target pediatric surgeons should incorporate the core scientific principles of established methods of quantitative and qualitative research. The criteria outlined above should serve as a guideline for investigators preparing to develop a survey to administer to APSA members. The purpose of establishing these guidelines is to provide a standard method of survey design and administration to pediatric surgeons via the APSA OCTC. The supporting materials and descriptions of the development process as outlined in the guidelines above should accompany survey instruments submitted to the APSA OCTC for consideration. Surveys distributed through the APSA OCTC will be accompanied by a cover letter from the committee stating that the survey has been designed according to the guidelines described above and approved by the committee. In addition, the committee will make the supporting documents for the survey design available to the APSA membership on the organization's Webs site, with a link to the page on the cover letter of the survey.

The APSA OCTC requires the researchers of any survey requested of the APSA membership to inform the respondents of the results of the survey. The APSA OCTC will facilitate the posting of the final results and conclusions of each survey on the APSA Web site. Submission of these data to the APSA OCTC will be required within 3 to 6 months of the conclusion of the study, or within a month after the results are published in a scientific journal. Published literature should be provided and referenced on the Web site posting.

The APSA OCTC welcomes questions and correspondence from individual investigators throughout the survey design process and would be happy to collaborate and function as a focus group.

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