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Overview and Tips for Successful Grant Writing for Infusion Nurses

ABSTRACT

Grant writing is an important step to building evidence for infusion nursing practice. This paper describes the role of the infusion nurse in developing a research proposal, identifying appropriate sources of funding, and preparing to write the grant application; identifies typical sections of a grant application and information necessary in each; and provides tips for writing an application that will contribute to a positive review.

Key words: funding, grant, infusion therapies, nursing, research

Expert infusion nurses drive science and evidence-based practice by asking important questions and carrying out studies to find the answers. Grant funding can facilitate this work by supporting the costs of the investigators' time, research equipment, materials, travel, incentives to participants, and other expenses necessary to complete the study.

BACKGROUND

The role of the infusion nurse in developing a grant application is multifaceted—from identifying the research question, to organizing a multidisciplinary research team and designing the study, to drafting the grant application. In the course of daily practice, the expert infusion nurse identifies issues and problems that limit progress in the specialty or that impede the provision of consistent, high-quality infusion care. For example, Baker and colleagues[1] questioned how much blood should be drawn off a saline-flushed intravenous catheter to avoid diluting blood drawn for lab analysis.

The next step is to review the literature to identify any evidence that might address the problem. The literature search can be framed using a "PICO" question to specify the population (P), intervention (I), comparison condition (C), if relevant, and specific outcome (O) of interest. An example might be, "In adults with saline-flushed catheters (P), what is the effect of 1-mL waste volume (I) versus 5-mL waste volume (C) on dilution of blood drawn for lab analysis (O)?" Baker and colleagues reviewed the literature and practice guidelines for an answer, but the existing research had flaws and did not indicate the minimum waste volume. When infusion nurses review the literature to answer a practice question, they may identify gaps in the current knowledge base—areas where there is no strong evidence to answer the question and where they can contribute by conducting further research.

When the general research question is formed, the infusion nurse organizes a research team to participate in designing and conducting the study. Designing a research study is never a 1-person job. A team that is highly qualified and well prepared to carry out the work includes experts who contribute to broad understanding of the problem.

First, the infusion nurse brings expertise in clinical infusion therapy, as well as an understanding of the physiologic and psychosocial response of patients and caregivers to alterations in health and wellness. He or she also brings knowledge of the clinical setting and equipment but may need to bolster that with input from key colleagues, such as a clinical nurse specialist with knowledge of the specific patient population to be studied or a pharmacist with knowledge of the safety profiles of particular drugs to be administered. Others with related expertise may include colleagues from social work, medicine, and nutrition and dietary services, among others.

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Second, the team needs at least 1 member with formal training in how to design and conduct research, preferably someone who has been successful in obtaining funding and completing his or her own research. This may be a director of nursing research in the health care system or a colleague from an affiliated school of nursing or university.

Third, the team will need a statistician to help develop data analysis plans and identify sample size requirements.

Finally, administrators or opinion leaders in the area—for example, a clinic director or influential staff members—may round out the team by ensuring that the developing research plans are feasible and will have support in the proposed setting. Each team member will have to participate in regular meetings to refine the research question(s) and specific aims, fully develop the research plan, and review drafts of the grant application.

At this point, the team should identify appropriate sources of funding. Berger and Moore[2] provide excellent guidance on identifying funding options for studies related to infusion nursing. Depending on the size of the study and the experience of the research team, investigators may look for internal funding from their own institution or external funding from professional organizations (eg, the Infusion Nurses Society, Sigma Theta Tau International), nonprofit foundations (eg, the Oncology Nursing Society Foundation, the American Nurses Foundation), private foundations, commercial and industry groups, or government agencies (eg, the National Institute of Nursing Research). An excellent resource for investigators is the Community of Science (www.cos.com), which allows users to receive regular e-mail notices of current grant opportunities that match selected key words. Some hospitals have a research development office or a librarian who may also provide expert assistance in identifying grant opportunities that match the investigators' interests.[3]

When exploring potential funding sources, investigators should review the qualifications for applicants to be sure the principal investigator (PI), research team, and their employing organization are eligible to receive the funding. Some grants target specific applicants, such as those early in their research careers or professionals in certain disciplines. Investigators should also ensure that the purpose and aims of their study match the goals and priorities of the funding agency. Some organizations will put out calls for proposals that ask for applications addressing a specific topic or areas of science. Others put out broad calls but maintain a list of research priorities. If the research team needs to complete the study on a specific schedule (eg, the PI is completing the work as a doctor of nursing practice capstone project), it should take special note of the application timetable and deadlines, the time required for review and scoring, and the earliest date that funding would be available.

Finally, the research team should decide who will be responsible for writing the grant application. As the PI, the infusion nurse may draft all sections of the application, or each team member may be assigned to draft specific sections. Berger and Moore[2] suggest obtaining approval from supervisors for time out of usual work activities, scheduling blocks of time each week to work on writing the grant application, and setting up regular meetings with team members to review drafts and provide feedback for revision. Having short deadlines for small sections of the application may help the team make continual progress while keeping the amount of work at a reasonable level.

SECTIONS OF THE GRANT APPLICATION

Each granting agency or organization will have its own instructions for the type of information to provide and where to place it in the application. Many organizations follow the general guidelines for content and formatting used by the National Institutes of Health (NIH, www.nih.gov). In general, such applications include an abstract; a description of facilities, resources, and equipment available; investigators' biosketches; a budget; a specific aims page and research plan; a description of human subjects protection; and a statement regarding inclusion of women, minorities, and children. The primary focus here will be the specific aims and research plan as they comprise the study proposal itself; they usually require the most skill and care in writing.

SPECIFIC AIMS

The specific aims page is one of the single most important pieces of the grant application. It is a 1-page executive summary of the proposed research. Walsh and Bowen[4] recommend writing the specific aims in 3 sections: (1) a "setup" paragraph describing the problem you plan to study and a succinct explanation of its importance; (2) the purpose of the study and 2 to 4 specific aims that will contribute to achieving the purpose; and (3) hypotheses for each aim.

A final "impact" paragraph should also be considered, summarizing the contribution the study will make. Reviewers will often go to the specific aims page of the application first to get a sense of the work proposed and to form an initial assessment of whether or not it is important and worth funding. Reviewers may give more attention to applications when the specific aims page is compelling. An outline and example of content for the specific aims page is provided in Table 1.

TABLE 1

Outline and Content of the Specific Aims Page

Sections	Sample Content
Setup paragraph • What is the problem to be studied? • What is the significance of the problem? • How many people are affected? • What are the negative consequences? • What are the major gaps or limitations that prevent resolving the problem? • How will the proposed research address these gaps/limitations?	Peripherally inserted central catheters (PICCs) have become the standard of care for long-term intravenous therapy in the home setting. However, maintaining a safely functioning PICC is problematic for some patients. Nearly 35% of patients experience complications such as bloodstream infections, catheter occlusion, or upper extremity deep vein thrombosis, resulting in delayed infusions, greater morbidity, and increased health care costs. Education materials have been developed to teach patients to recognize signs of PICC complications, but they rely on the assessment of minimally trained individuals and may result in unnecessary clinic or emergency room visits to evaluate suspected complications. The use of smartphone technology for daily in-home evaluation and visual inspection of PICCs by an expert infusion nurse could allow early detection and management of potential complications. The proposed research will advance science by evaluating the effect of distance-based monitoring of PICCs by registered nurses using smartphone technology.
Purpose paragraph • Overall purpose of the study • Brief description of methods (design, sample, outcomes)	The purpose of this study is to test the effect of the CathEval smartphone app on the identification and management of PICC complications in the home. A sample of 120 rural-dwelling adults receiving home IV therapy will be randomly assigned to receive usual care (standard patient education materials) or usual care plus use of the CathEval app. Patients assigned to the CathEval group will use the smartphone app to submit daily assessments of catheter appearance and function, including a photograph of the catheter site, for review by a trained infusion nurse. The number, severity, and management of PICC complications will be recorded across 3 weeks of home IV therapy.
Specific aims and hypotheses • Specific Aim 1 and hypothesis • Specific Aim 2 and hypothesis • Additional aims and hypotheses	Specific Aim 1: To determine the effect of CathEval on number and severity of PICC complications. Hypothesis: Patients using the CathEval app will report fewer and less severe catheter-associated bloodstream infections, catheter occlusions, and upper extremity DVTs than patients receiving usual care. Specific Aim 2: To determine the effect of CathEval on the management of PICC complications. Hypothesis: Patients using the CathEval app will have fewer clinic and ER visits and lower PICC-related costs than patients receiving usual care.
Impact paragraph • Contributions to be made if the study is successfully completed • Impact on patients, practice, and/or research	Findings from this study will add to our understanding of PICC complication detection and management among home IV therapy patients. If the CathEval app is effective, future patients receiving home IV therapy will receive more efficient care and experience fewer unexpected costs and delays in treatment related to PICC complications.

RESEARCH PLAN

Significance

The significance section should provide the background necessary for reviewers to understand the problem the investigators propose to study. It is helpful to begin this section with a clear statement of what the problem is, how many people are affected by it, and what its negative short- and long-term consequences are (eg, delayed treatment, lost work hours, additional medical costs, reductions in functional capacity, diminished quality of life). It's not enough for the research question simply to be interesting. This section of the application should convince reviewers that the research question, study purpose, and aims are important and that successfully carrying out the study will make a substantial contribution to improving the health and safety of many individuals.

A concise review and synthesis of literature is necessary to orient reviewers with the current state of the science. The literature review should synthesize what is known about the problem and where there are important gaps in knowledge that are preventing infusion nurses from providing high-quality care and ensuring better patient outcomes.

Part of the review of literature should be a description of the physiologic or conceptual framework that provides an explanation of the physiologic processes or behaviors under study. For example, an infusion nurse might explain the physiology of vasodilation if he or she is proposing to study the effect of topical heat on vein size and visibility. A psychological theory, such as self-efficacy theory,[5] might be used to guide a study testing how new nurses develop confidence in peripheral intravenous catheter insertion.

Having a framework to guide the study helps ensure that all relevant variables are included (eg, independent variable, dependent variable, covariates) and that important relationships are taken into account.

Innovation

Grant applications often ask for an explanation of how the proposed work is innovative—that is, what is new, original, or novel about the work. Innovation can be

explained in terms of a unique approach to the problem (eg, studying it using a different theory than has been applied previously), using a new methodology (eg, applying a unique study design or using emerging technology), testing an original intervention or alternative care delivery system, and bringing a revolutionary new understanding to the field that will change the way infusion nurses think and practice. The issue of innovation is challenging but important to consider. Cutting-edge technologies and radical changes in thinking can be exciting, but risky. And although some research questions are not particularly novel, they are still significant and important to answer to achieve the ultimate goals of quality patient-centered, evidence-based practice.

After establishing the importance and innovation of the project, investigators should provide a summary of any preliminary work the PI or team members have conducted relevant to the proposed study. Preliminary work may be a review of medical record data to establish the prevalence of the problem in the study setting, a feasibility test of questionnaires or other data collection procedures to be used in the proposed study, pilot testing of an experimental intervention, or an assessment of readiness for a planned practice change. A description of this groundwork can help substantiate the significance and innovation of the work and help refine plans described in the proposal. Most important, a description of preliminary work is useful to convince reviewers that the investigators will be able to carry out the proposed study successfully. It demonstrates that the investigators are well prepared for the work; have access to the necessary patient populations, records, and materials and can manage the data; and have anticipated challenges they may face in conducting the study.

A summary paragraph at the end of the innovation section can provide a helpful transition to the subsequent description of study methods. Skilled grant writers will summarize the key reasons that the proposed research is significant and innovative. They will emphasize how the preliminary work uniquely positions their team to take the next step. And they will briefly remind reviewers of the contribution the work will make to the state of the science and patient care.

Approach

The approach section describes the investigators' plans for how they will carry out the work. It is important for reviewers to clearly understand and be able to evaluate the rigor of proposed procedures, so grant writers often dedicate at least half of the maximum number of pages to this section.

The beginning of the approach section is a useful place to restate the purpose of the study. The design of the project should be specified. Will the study be cross-sectional or longitudinal? Is the study experimental, quasi-experimental, or nonexperimental? If the study is experimental, how many groups will there be, and are subjects randomly assigned? The specific design used does not influence whether or not funding is awarded, but the match between the research question or purpose and the design is critical. In evaluating the application, reviewers will ask themselves whether the investigators selected a design that is best able to answer the research question with the least doubt regarding validity of findings. Grant writers can help by explaining why the design was chosen and providing a rationale for specific aspects of the design (eg, comparison or control groups, blinding of research staff and/or participants).

The description of the sample should include specifics about the population of interest and the sampling procedure to be used (eg, convenience sample, random sample). The investigators should create a detailed list of the inclusion criteria, individuals who will be allowed to participate, and a list of exclusion criteria, or factors that would disqualify persons from participating. The size of the sample should be specified, including statistical justification demonstrating that the proposed sample size is reasonable and sufficient for the planned analyses. The sample size should be adjusted to take into account anticipated losses resulting from participant dropout. Sample sizes for feasibility or pilot studies may not need statistical justification; rather, investigators may provide a rationale based on convention, number of potential participants available in a given time frame, or effect size estimates cited in similar studies.

The procedure section should provide a detailed, step-by-step description of what happens to study participants from the time of identification for recruitment, to explanation of the study and obtaining informed consent, through any intervention delivery and follow-up collection of data. If an experimental intervention or practice changes will be implemented in the study, they should be described in detail in the procedure section, as well as any procedures to train research staff to deliver the intervention consistently and to monitor and evaluate the accuracy of intervention delivery or practice change. Similarly, if participants will be randomized to treatment groups, the investigators should be sure to describe how the allocation sequence will be determined, how group assignment will be revealed, and who—if anyone—will be blinded to the condition assigned.

Measures of all dependent (outcome) variables and covariates must be described. Bordage and Dawson[6] noted the importance of selecting measures not because they are easily available or well recognized but primarily because they precisely measure the specific variable the investigators are interested in. These may be self-report measures of psychosocial variables, such as stress, pain, or quality of life. They may also be

physiologic measures, such as assessments of blood pressure, oxygen saturation, or blood chemistries. In the case of self-report questionnaires, the investigators should describe the general item content of the measure, the scoring and interpretation instructions, and supporting evidence of the instrument's reliability and validity. For physiologic measures, the investigators should describe the equipment to be used and its manufacturer (if known), standard procedures followed to obtain the measurement, and how the equipment will be calibrated to ensure reliable and valid assessments.

The data analysis section should describe the plan for data management and statistical procedures used for each study aim. It is helpful to describe any general procedures that will be applied to the data first. For example, one might describe plans to assess for and replace missing data, or to manage nonnormal distributions, if required. Then the investigator can describe each analytic strategy by specific aim. It is helpful to reviewers to organize this section by restating the aim, followed by the hypothesis, and then a brief description of the data analysis strategy to be used to test the hypothesis prepared by the research team's statistician.

Many grant instructions will ask applicants to provide a timetable for the work. To save space, this is often done as a Gantt chart rather than a narrative, text description (Figure 1). Typical components include time for institutional review board (IRB) review and approval, hiring and training study staff, obtaining study materials, recruiting participants, collecting data, analyzing data, and preparing and presenting reports of study findings. Investigators should avoid being overly ambitious by developing a realistic timetable to ensure there is enough time to achieve all steps of the process within the funding period, even if an unexpected delay is encountered.

In concluding the research plan, it is important to acknowledge any limitations of the work and to anticipate challenges and identify alternative approaches should problems occur. Finally, the wise grant writer will summarize the key points of significance, innovation, and impact 1 last time. This is a useful way to leave grant reviewers with a clear sense of why the work is important and how knowledge will be transformed and practice will be improved if the application is funded. A comprehensive reference list of all works cited in the research plan is typically provided at the end of this section. Many grant applications do not count the reference list in page limitations, but investigators should review the application instructions to be sure.

OTHER SECTIONS

Abstract

An abstract of 1 page or less is often required and used to help the granting agency identify and assign reviewers. These abstracts may also be shared in publicizing awards after grants are made. Sections of the abstract are generally similar to the research plan, but specific instructions vary by granting agency.

Facilities and Environment

The application instructions may ask for a description of the research facilities and environment. In this section, the investigators should describe where they will conduct the work, including both their offices and clinical facilities, and the equipment and supplies available to them to carry out the study (eg, computers, software, monitoring devices).

Key Personnel

A description of key personnel typically includes the PI, coinvestigators, and other research team members who have a major role in designing and conducting the study. The instructions may ask for a biosketch, an abbreviated curriculum vitae, for all key personnel. Together, the biosketches provide evidence of the team members' qualifications, including their education, employment, representative publications, and current and recently completed research grants. The NIH biosketch form provides space for each team member to briefly describe her or his background knowledge and experiences related to the current grant application and provide a justification of why he or she is uniquely suited for the proposed work.

	Months 1-2	Months 3-4	Months 5-6	Months 7-8	Months 9-10	Months 11-12
IRB review						
Hire and train research staff						
Obtain study materials						
Recruit participants						
Collect data						
Analyze data						
Prepare reports of study results						

Figure 1 Study timetable prepared as a Gantt chart. *Abbreviation: IRB, institutional review board.*

Budget

All grant applications will ask for a detailed budget. Before drafting a budget, it is important to know if the PI's employer has fiscal or regulatory staff to help with this process and subsequent grant management if funding is awarded. Individuals in this department should be familiar with any institutional rules or restrictions about requesting grants and what the money can be used for. These individuals may also have access to lists of common costs (eg, salaries, fringe benefits, common equipment).

The research team should develop a list of all budget items, estimating a dollar amount for items that will need to be purchased or paid for by the grant. One way to do this is to think through what will happen with each subject, step-by-step, and what people, materials, and services will be needed to carry out the research plan. Budget items are commonly categorized as personnel (ie, salaries and fringe benefits), consultant fees for external experts who will participate outside of their usual employment, subcontracts for work performed by an outside agency, travel to collect data or to present findings, major equipment, supplies including items needed for day-to-day operations, patient care costs for research-related procedures or clinic visits, and other expenses.[7]

The investigators must write a budget justification that provides an explanation of what each requested item will be used for. This justification should note any time, materials, or supplies that are being provided by others (eg, through another grant, gift, or provided "in kind" [donated] by an employer). Some funding agencies allow for a percentage of the total direct expenses to be added to pay for "facilities and administrative" costs. These monies support institutional infrastructure provided for employees with research responsibilities such as accountants, lab or office space, human subjects review and protection, and more.

Human Subjects Protection

A section on human subjects protection should be prepared, providing detail on steps taken to protect participants' rights and well-being and to safeguard their privacy and confidentiality, and demonstrating that potential benefits outweigh risks of the study. This section should also address research team members' training in protection of human subjects and ensure that the local governing IRB will review and approve all study procedures.

The investigators should describe details of recruitment, including who will be involved, what information they will provide, and how informed consent will be obtained. It should explain how data collection forms and other study records will be labeled to protect confidentiality and where data will be securely stored. For studies involving an intervention or treatment, some funding agencies will require a data and safety monitoring plan that explains how emerging findings and safety concerns will be reviewed to determine if it is necessary to stop the study early. It is also useful to estimate recruitment by providing information about the number of patients seen in the setting, the number anticipated to meet eligibility criteria, and the percentage estimated to agree to participate.

This will help convince reviewers that the recruitment plan is feasible and that the investigators can achieve the desired sample size in the time specified and complete the project. Application instructions may also require that investigators provide specific information about the inclusion and expected representation of women, minorities, and children as participants in the research.

Appendix

Many grant applications will allow the investigators to include Appendix materials. The Appendix should include letters of support from anyone who has agreed to act as a consultant on the study (paid or unpaid), anyone who has agreed to provide resources or support for the work, and any administrative officials who must give permission for the work to occur (eg, a clinic director, a nurse manager). A letter of support from the PI's supervisor, indicating that time will be allowed out of usual work to complete the study activities, is quite helpful. Questionnaire and other study materials (such as consent forms, guidelines to be followed) can also be included in the Appendix and will help demonstrate that the investigators are well prepared and ready to carry out the work.

TIPS FOR SUCCESSFUL GRANT WRITING

Grant reviewers want to read applications that are clear, logical, and easy to follow, so that they can make a good case in summarizing the proposal and appropriately advocate for its funding.

The following are some tips for grant writing that may facilitate a positive review.

1. Allow sufficient time to prepare the application. Perceived lack of time has been described among the most common reasons for not submitting grant applications.[8] Reviewers will recognize the difference between an application that has been hastily put together and one that has been carefully thought out and crafted before submission. Chung and Shauver[9] recommend creating a checklist of all sections of the grant application,

indicating who is responsible for each section and deadlines for drafts and final versions. It is critical to allow time to write, revise, have the draft critiqued by experienced grant reviewers, and revise again before submission. Experienced investigators recommend allowing at least 12 months for the full process.[10,11]

2. If the PI is a new investigator, find a senior coinvestigator who has successfully competed for research funding and completed and published studies in a related area. One of the common reasons that grants are not funded is that the reviewers are not convinced that the investigator has the necessary experience to be successful. Walsh and Bowen[4] recommend that new investigators find opportunities to participate in others' research to gain protocol development, budgeting, and project management experience. Short of having such practice, including a senior mentor will provide evidence that the research team has the knowledge, skills, and experience to complete the work and will reassure the funding agency that the grant money is being invested wisely.
3. Read the instructions carefully, and follow all guidance precisely. Some agencies will return an application unscored if it does not adhere to the instructions. Follow all formatting requirements as specified (eg, margins and font size, headers or section titles, numbering, page limits, instructions for what to describe in each section of the application). Investigators who do not follow these instructions or who attempt to circumvent page limits by putting additional content in the wrong section run the risk of irritating reviewers and biasing them toward a negative evaluation of the proposal.
4. Write clearly and consistently. Reviewers should be able to understand the grant application without having to go back and reread sections or search for clarifying information. Some general suggestions are to write in short sentences, making 1 point per sentence. Translate technical terms that may be unfamiliar to reviewers, and limit the number of acronyms used.[12] Use consistent language throughout the application. Do not change terminology in an attempt to add variety or make the writing more interesting. Cut and paste important statements that appear in multiple sections, particularly the purpose and specific aims. They should be worded exactly the same in each section of the application. Finally, have someone with expertise critique and edit the grant application before submission.
5. Write a clear purpose statement and specific aims (Table 1). The purpose statement should summarize the specific topic and goals of the study in 1 sentence. The specific aims should list single steps of the overall purpose that are measurable and feasible to achieve in the funding time frame. Each specific aim should include a hypothesis, if reasonable. Also of importance, the aims should not be dependent on each other[9]; that is, investigators should be able to achieve each aim, even if one is not successful.
6. Write a thorough approach (methods) section. Investigators may find it useful to review documents that provide indicators of study quality, such as the CONSORT (Consolidated Standards of Reporting Trials) statement (www.consort-statement.org); the STROBE (Strengthening the Reporting of OBservational studies in Epidemiology) statement (www.strobe-statement.org); the International Committee of Medical Journal Editors recommendations for the conduct and reporting, editing, and publication of scholarly work in medical journals (www.icmje.org); or the EQUATOR network "planning and conducting your research" statement (www.equator-network.org).[13-16] These statements identify aspects of research that should be clearly described in manuscripts to help readers evaluate the rigor of the research process and validity of findings. Taking the items on the checklist into account when planning research can help in planning a stronger study and identifying details of the study design and procedures that should be explained in the grant application.
7. Be direct in addressing review criteria. Review criteria are the points reviewers will be asked to evaluate in scoring the application and writing their critiques. Do not expect reviewers to search for and read into the text to find these evaluation points. Write clear, simple headers or paragraph topic sentences that specifically address the review criteria. For example, if the reviewers will be asked to evaluate, "Does the study advance scientific knowledge?" write a topic sentence that reads, "This study will advance scientific knowledge by…." Then go on to write the rest of the paragraph supporting that statement. Explaining how the review criteria are met so that it is obvious to reviewers will help them write a favorable evaluation.
8. Organize the application so that it is visually pleasing. Use headings and subheadings to break up and clearly identify sections of content. Allow some white space on each page, with line breaks between paragraphs or sections of the content. Use figures to illustrate conceptual frameworks or study design schemas. When sizing these objects, be sure the text remains readable. Use tables to organize lengthy content, such as details of

measurement instruments and supporting evidence of their reliability and validity.

9. Be persistent. Grant applications are rarely funded on the first submission. Most funding agencies allow at least 1 submission of a revised grant application. This allows the investigators time to reflect on reviewers' comments and craft a stronger application and more rigorous study for the next submission deadline. In resubmitting the application, highlight all changes by using bold or italicized text, and write a 1-page summary indicating how you responded to each concern raised in the previous review.

In addition to the suggestions offered here, several experts have published guidelines and suggestions for writing strong grant applications. Bordage and Dawson[6] provide an excellent framework of 8 steps and 28 questions for writing grant applications that use an experimental study design. Many of their steps and questions apply to nonexperimental designs as well. Inouye and Fiellin[10] provide an excellent summary of common reviewer critiques by section of the grant application. They also provide helpful examples of specific aims, significance, and preliminary work sections.

CONCLUSIONS

Although writing a winning grant application is time-consuming and exacting work, it should also be exciting to the investigators who identified and are seeking to resolve the practice problem. The importance of answering relevant questions is well worth the effort. Developing a study and writing the grant application demonstrates passion and professional commitment on the part of the expert infusion nurse. The nurse's role in generating new knowledge for the benefit of future nurses and the many recipients of their care is the ultimate reward of successful grant writing.

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