The Nurse as Principal Investigator in a Pharmaceutically Sponsored Drug Trial: Considerations and Challenges

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Purpose/Objectives: To discuss the process, considerations, benefits, and challenges of the nurse as principal investigator in a cancer care drug trial.

Data Sources: Published articles, anecdotal experience, and completed research studies.

Data Synthesis: The specific processes that must be considered are funding sources, protocol development, trial implementation, dissemination of results, and ethical implications involved in industry sponsorship. Specific protocols are designed for evaluating adverse events. Working with pharmaceutical companies to receive financial support offers advantages but poses additional issues for consideration.

Conclusions: Nurses can serve successfully as principal investigators in medication trials for cancer care. Regulatory bodies and specific procedures, as well as general considerations, mandate and guide investigator conduct when embarking on a pharmaceutical trial.

Implications for Nursing: Oncology nurse researchers can look to pharmaceutical companies for potential funding in the evaluation of medications used in cancer care.

Key Points . . .

- Pharmaceutical trials from concept to result dissemination can be difficult and complex, with unique considerations related to industrial sponsors.
- Doctorally prepared nurses are uniquely positioned to assume the role of principal investigator in pharmaceutical trials.
- Real-life examples of specific challenges faced by principal investigators in drug trials can help to guide nurses as they design, implement, and conduct pharmaceutical trials in the cancer clinical setting.

Historically, nurses have assumed the role of coordinator or research nurse rather than principal investigator (PI) in cancer pharmaceutical trials. Nurses who are appropriately prepared and partnered with a physician are permitted to assume leadership of clinical research involving medications (U.S. Food and Drug Administration [FDA], 2002). Current trends in health care, nursing, and the pharmaceutical industry are merging to maximize opportunities for oncology nurses to assume leadership in pharmaceutical clinical trials.

One important trend in health care is the increased interest in evidence-based practice. All healthcare providers are challenged to provide care based on evidence of efficacy rather than tradition or habit (Hewitt-Taylor, 2002). The need for evidence-based practice has resounded throughout the cancer care continuum. According to the National Institutes of Health (2002) *State-of-the-Science Statement on Symptom Management in Cancer: Pain, Depression, and Fatigue,* further research involving symptom management strategies should include the development and evaluation of new treatments for pain, depression, and fatigue. The symptom management statement called for clinicians to "conduct studies to investigate the effectiveness of combinations and sequencing of pharmacologic and nonpharmacologic treatments" and to "incorporate pharmacogenomic and pharmacogenetic studies into future randomized trials" (National Institutes of Health, 2002, p. 18).

Other trends include increased public demand for use of medications for symptom management, the increased attention to the need for postmarketing drug surveillance, and the number of advanced practice nurses in oncology with prescriptive authority. Direct-to-consumer pharmaceutical advertising results in more prescriptions for the most heavily advertised drugs (Murray, Lo, Pollack, Donelan, & Lee, 2004). Many of these direct-to-consumer claims have not been evaluated specifically in cancer populations. This allows a rich opportunity for pharmaceutical trials to use medications for symptom management specifically in a cancer population or within a subset of patients with cancer. Recent attention to drug safety and adverse events in widely used medications has alerted all clinicians to the need for continued drug monitoring and evaluation of medications used for symptom management in specific populations.

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In nursing, the preparation and use of advanced practice nurses with prescriptive authority place these nurses in key healthcare provider positions for the utilization and evaluation of pharmacologic interventions for cancer care. This is particularly true for symptom management interventions. A large (N = 368) descriptive study of advanced practice nurses in oncology revealed that 81% had state prescriptive authority (Lynch, Cope, & Murphy-Ende, 2001). An ideal partnership would be the pairing of doctorally prepared nurses with cancer care advanced practice nurses for clinical trials involving medication evaluation for symptom management in cancer care.

This article will discuss the process, considerations, and benefits of doctorally prepared nurses conducting pharmacologic clinical trials in cancer care. In addition, a case report briefly summarizes the results of a randomized clinical trial conducted for symptom management led by a nurse PI. The report will speak to the role of nurses as PIs on investigator-initiated pharmaceutical studies (i.e., studies conceived and written by investigators) as opposed to studies initiated by drug companies. The case report will review the adverse events that occurred during a clinical trial, adverse event reporting mechanisms, appropriate responses to the occurrence of adverse events, and issues encountered throughout this process. A second case report will detail the application process for an investigational new drug number through the FDA.

Idea Development and Funding

Research Question

The initial research question for a clinical trial of medication may come from bedside nurses, advanced practice nurses, a collaborating physician, or a pharmaceutical company. Research questions frequently are derived from clinical practice, anecdotal reports, or earlier research findings. Questions related to pharmaceutical intervention may relate to medication's effect on a tumor, effect on troubling side effects from a tumor, anticancer treatments or other medications, or the potential for medication to improve quality of life, functional outcomes, or performance status. Double effect (i.e., benefit on one symptom while treating another) is another area for potential investigation.

Funding

If a research question comes from a nurse researcher or a physician, funding must be sought to support the study. Studies evaluating pharmacologic therapies do not have to be funded by a pharmaceutical company. A clinical trial directed at symptom management in cancer care may be a pharmaceutical intervention funded through foundations, government agencies such as the National Institute of Nursing Research, or other traditional sources. In some cases, funding for clinical trial implementation and maintenance may be sought from a nonpharmacologic source, whereas the medication may be negotiated through a pharmaceutical company. Pharmaceutical companies may provide a matched placebo if the study is a placebo-controlled clinical trial.

When designing a randomized pharmaceutical trial, the cost for each patient's medication must be equal among the study groups. Without pharmaceutical support, the cost of the medication or the cost of the medication and placebo manufacturing can be extremely expensive and limiting in trial implementation. If a researcher wishes to pursue funding through a pharmaceutical source, the researcher should approach a pharmaceutical company representative for an initial meeting, which may lead to an idea submission or concept paper. An idea submission format is company specific but always provides a synopsis of the research idea, protocol, and budget. If the idea is approved, the PI is asked to submit a full proposal in a protocol format. A formal decision then is made regarding funding. A researcher will work with a pharmaceutical representative in the development of the full proposal; however, this representative will not be the sales representative or support personnel from the clinical area.

Protocol Development

Collaboration

According to the FDA, an appropriately prepared nurse can serve as a PI in a medication trial if a physician is listed as a coinvestigator. Collaboration with attending physicians and nurses in the clinical study sites ensures access to the desired patient population and increases understanding of relevant clinical logistics, which helps to formulate a protocol that is clinically realistic (Ellis et al., 2001; Pellino, 2002). These relationships are critical in the face of the 1996 Health Insurance Portability and Accountability Act guidelines, limiting researchers' access to clinical information for subject selection and recruitment.

Design and Methods

Protocol development for pharmacologic studies can be complex. The pragmatic aspects of medication administration, including route, frequency, and adherence, must be considered to ensure scientific rigor. The nurse PI can review the implementation of other clinical research interventions to model the pharmaceutical interventions. Conn, Rantz, Wipke-Tevis, and Maas (2001) suggested attributes for consideration in implementing interventional clinical research. These attributes can be applied easily to pharmacologic interventions and include a conceptual basis that delineates the desired effect of the (medication) intervention, review of previous descriptive and interventional (medication) literature, a consideration of the specific targeted population, a detailed time frame of the (medication) intervention including the schema, and a description of how the (medication) intervention will be delivered.

Institutional Review Board

The scientific review and institutional review board (IRB) evaluation of a clinical protocol ensure scientific rigor in biomedical research and protection of human subjects. IRB submission requires a full protocol and consent for review. The sponsoring company's involvement in protocol development for IRB submission will be limited. Any industry-desired additions, deletions, or changes in language must be negotiated between the pharmaceutical company and PI. The company can suggest, but not mandate, standard language regarding the mechanism of drug action and description of potential adverse events in the protocol and informed consent form. The informed consent form must include permission for the pharmaceutical company to review the study-related medical records of subjects enrolled in the trial. The sponsoring company will require final protocol approval before

submission to the IRB. Once the protocol is negotiated and accepted by both parties, a contract will be initiated. IRB approval must be assured for specific sites when numerous community and academic locations collaborate for protocol implementation.

Contract or Practice Agreement

The contract between the PI and pharmaceutical company outlines the responsibilities of both parties regarding financial disbursements, reporting of adverse events, progress reporting, and dissemination of results. The critical component of the contract is the right to publish all results. One large teaching hospital found that 30%–50% of all research contracts had to be renegotiated because of an unacceptable publishing clause (Bodenheimer, 2000). Two additional critical components of the research contract exist. One concerns wording of the responsibilities of each party should adverse events occur, and the second critical component is the reporting, through publication or presentation, of the clinical trial results. An individual or committee from each institution will be responsible for the review and negotiation of the research contract. The nurse PI should not sign any contract for research support from a pharmaceutical company without the guidance of appropriate personnel at the nurse's institution.

Data Safety Monitoring Board

In 1998, the National Institutes of Health required that a data safety monitoring board be named for all federally funded clinical trials involving multisite institutions and potential risk to the individual. Subsequently, many institutions have adopted their own guidelines for the creation of monitoring boards. Some institutions have requirements that are more rigorous than the federal guidelines. Individual institutions have specific requirements for the composition and meeting times for these boards, which were established to monitor trials for safety and the continuous conduct of rigorous scientific research (Artinian, Froelicher, & Vander Wal, 2004).

A data safety monitoring board usually is comprised of a biostatistician and clinical experts in the area under investigation. These boards may include a layperson or healthcare consumer. The PI must know the guidelines for his or her institution and select individuals with appropriate expertise. A new data safety review board is formed for each trial.

Investigational New Drug Application

An investigational new drug number is assigned by the FDA when new drugs are being studied for safety and efficacy or when previously approved drugs are investigated for new uses. Researchers studying the clinical investigation of a new drug may need to apply to the FDA for an investigational new drug number or an exemption from that requirement. In many cases, an exemption for an investigational new drug number can be issued. Figure 1 lists the FDA regulations regarding the research use of an approved drug that does not call for an investigational new drug number. This exemption requires submitting a cover letter and application, which is comprised of the PI's curriculum vitae, two forms (1571 and 1572), and the study protocol and informed consent, to the FDA. The FDA has an excellent Web site (www.fda.gov/cder) that lists its policies as well as guidance for the development and submission of the investigational new drug application. Copies of these forms are available through the FDA's Web site.

The research
1. Is not intended to be reported to the U.S. Food and Drug Administration in support of a new indication for use of the drug or to support a significant change in the drug's labeling
2. Is not intended to support a significant change in the drug's advertising
3. Does not involve a route of administration, dosage level, or other factor that significantly increases the risk of the product
4. Is conducted in compliance with the requirements for institutional review board review and informed consent.

Figure 1. U.S. Food and Drug Administration Regulations Regarding the Research Use of an Approved Drug Not Requiring Submission of an Investigational New Drug Number

Note. Based on information from U.S. Food and Drug Administration, 2001.

Protocol Implementation

The steps to protocol implementation involve coordination and thoughtful planning. Once the IRB has granted approval and the pharmaceutical contract is approved, the study drug will be released to the institutional pharmacy. Prior to subject recruitment, a procedure manual must be developed that outlines the recruitment procedures, specific interventions, and step-by-step procedures. Key personnel, including the project director, interventionists, recruitment nurses, and data managers, are hired and trained.

After the procedures are in place, an implementation meeting attended by research personnel and representatives from nursing and pharmacy is scheduled. The meeting details the recruitment, informed consent, randomization, and drug administration procedures of the protocol so that all aspects of recruitment and drug administration proceed smoothly. The pharmaceutical company is not involved in the institutional planning, implementation, or initial conduct of the study. Pellino (2002) outlined common pitfalls and strategies for avoiding those pitfalls in the implemention of clinical research (see Table 1). The pitfalls, which can be applied easily to a clinical drug trial, include poor communication with clinic staff, poor understanding of goals and procedures of the study, lack of pilot testing with instruments, unaccounted confounding variables, poor recruitment, poor understanding of the complexities of the consent process for human subject approval, and changes in clinical practice. Pellino stressed that effective communication, flexibility, thorough planning prior to the implementation of the study, and the inclusion of peers who are invested in the project are helpful in overcoming pitfalls. She also emphasized the value of rewards and expressions of gratitude for clinic staff, physicians, helpful colleagues, and subjects. In a pharmaceutical trial, because pharmacy personnel are key players, the communication and reward system should address them as well. Staff reward systems can include giving small gifts or cards expressing thanks, providing snacks or a light meal, or conducting an educational session. Expression of thanks to subjects must be approved through the IRB and may include small amounts of money or gift cards to local stores. Regardless of payment or gifts, all subjects as well as every colleague who assisted with the design, recruitment, or conduct of the trial should receive a personal thank-you note. Subjects should be thanked as they enter into the study and colleagues with the attainment of a study time point, recruitment goal, or at the

Table 1. Common Pitfalls and Ways to Avoid Those Pitfalls in a Pharmaceutical Trial

Common Pitfalls	Suggestions for Nurse Principal Investigator
Poor communication with clinic staff	Conduct written and verbal presentations outlining aims and goals of study with clear implications for nursing practice.
Poor understanding of goals and procedures	Explain clearly what the nurses may be asked to do. Provide incentives and rewards to helpful clinical staff.
Lack of instrument pilot testing	Pilot test instruments prior to implementation in a large trial to determine ease of administration and patient acceptance.
Confounding variables	Consider factors that may contribute to differences between groups.
Poor recruitment	Speak to established researchers in the clinical setting for successful clinical recruitment advice. Become familiar with clinical routines to maximize recruitment and lessen interruption.
Poor understanding of human subjects protection	Have clear understanding of Health Insurance Portability and Accountability Act (HIPAA) restrictions for recruitment. Speak to established researchers in the clinical setting for HIPAA-compliant methods of recruitment.
Changes in clinical practice	Meet with clinicians during idea submission and protocol development to prepare for possible new medications or changes in standards of care.

Note. Based on information from Pellino, 2002.

completion of the study. Nurse PIs can combine a thank-you breakfast or lunch with an educational in-service program to update staff on the topic under investigation. For nurse PIs with an academic appointment, involvement of the clinical staff in a clinical trial may lead to interest in further education. An in-service program regarding educational choices may be an appropriate thank you.

Adverse Event Reporting

Ongoing analysis of the collected data must be conducted. Any adverse event must be reported to the IRB and sponsoring company. The event must be characterized as (a) type of reaction, (b) relatedness to study drug, (c) severity, (d) action taken, and (e) outcome. These characterizations must be assigned and reported by the PI or designated study personnel.

The FDA specifies regulations for reporting adverse events. These regulations are implemented through the pharmaceutical company's adverse event reporting system. Adverse events must be reported to the PI's IRB and to the pharmaceutical company in a timely manner. A nurse PI must follow the established procedures for the clinical institution and sponsoring pharmaceutical company in the reporting and follow-up of adverse events.

Dissemination of Results

The dissemination plan for study results is developed with the rest of the protocol and put into place at a specific time point within the trial or at the completion of the trial. Most contract agreements ask that the pharmaceutical company reviews any manuscript or research abstract prior to submission. The company usually has 60–90 days to review the report and request changes. The nurse PI must consider carefully the changes requested by the pharmaceutical company but is not obligated to make any changes. The contract between the investigator's institution and the pharmaceutical company will outline the steps for mediation if the parties cannot agree on acceptable wording or interpretation of results. Legal counsel may become involved. If a potential conflict arises, the nurse PI should notify appropriate administration officials in his or her institution so that legal counsel is appraised and prepared to intercede in a timely manner.

The preparation and publication of a manuscript require strict adherence to ethical guidelines. Only authors who have contributed to the work should be listed. Authorship should be assigned in the order of contribution to the work. The development of a manuscript involving a pharmaceutical agent may involve the use of a scientific writer employed through the pharmaceutical company. If a scientific writer is used, the International Committee of Medical Journal Editors mandates his or her inclusion in the acknowledgement section of the manuscript.

In summary, the steps from protocol conception to dissemination of results can be delineated clearly, with the tasks of the PI and pharmaceutical company defined for each phase of the trial (see Table 2). Ongoing communication and flexibility are extremely important.

Case Study I: Experience With an Investigational New Drug Application

An application to the FDA for an investigational new drug number was deemed necessary by the collaborating pharmaceutical company for the study of antidepressant use in patients with melanoma. Interestingly, this advice was contrary to the experience of the staff in the research office who believed that the proposed use of the antidepressant in the study was not sufficiently different from the FDA-approved use. Nonetheless, based on the insistence of the pharmaceutical company, the researchers decided to prepare the application. At first glance, the application process seemed quite daunting. However, with the support of the research office, the researchers found that they had already amassed many of the materials necessary for the application. The researchers found that the FDA Web site (www.fda.gov/cder) also was very helpful in preparing the application. Three copies of the application were sent to the FDA, with a cover letter that briefly described the study and delineated the contents of the FDA application. The researchers clearly indicated that they would not begin the study before the FDA had the opportunity to review the application and without IRB approval. At the time of the investigational new drug application submission, IRB approval was pending because it can be requested prior to submission of an investigational new drug application. The researchers understood that the study could not be initiated until 30 days after receipt of the investigational new drug application by the FDA or until they received an earlier notification from the FDA that the study could begin. They received a letter from the FDA within 30 days that acknowledged receipt of the application and stipulated that the study met the requirements for investigational new drug exemption. The primary reason

Table 2. Protocol Conception to Dissemination of Results

Steps	Principal Investigator	Pharmaceutical Company
Idea conception	May initiate	May initiate
Literature review	Will provide full review of literature	May provide gold standard articles
Funding application	Will complete	Will approve
Protocol and consent development	Will complete	May provide assistance with template language
Negotiation of institution or pharmaceutical contract	Will work with institution	Will provide
Institutional review board approval	Will develop and submit in accordance with institutional standards	Will review
Study implementation (i.e., clinical coordination, developing a procedure manual, and training study staff)	Will complete	Not involved
Recruitment of subjects	Must update pharmaceutical company	Will request ongoing report
Data collection	Will complete	Not involved
Ongoing data maintenance	Will complete	Not involved
Analyzing results	Will complete	Not involved
Results dissemination	Will complete	Contract dependent, pharmaceutical company has right to review

for the exemption was that the results of the study would not lead to a substantially new use of the antidepressant being investigated and would not change the drug's labeling or advertising. The letter further indicated that the study results did not involve changes in the route of administration, dosage level, or patient population and did not significantly increase the risks associated with use of the drug. The researchers were able to begin the study soon after receipt of this letter.

Case Study II: A Trial Terminated Early Because of Adverse Events

A randomized clinical trial of erythropoietin versus usual care in anemic women with metastatic breast cancer (Rosenzweig, Bender, Lucke, Yasko, & Brufsky, 2004) was designed to determine optimal treatment for anemia and its impact on resultant fatigue in this specific population. The study was a dissertation project through the School of Nursing at the University of Pittsburgh in Pennsylvania. The manufacturer of epoetin alfa (Procrit®, Ortho Biotech Products, L.P., Raritan, NJ) agreed to provide erythropoietin for 50 subjects.

Protocol and Informed Consent Development

Although Procrit is approved for the management of chemotherapy-related anemia, the FDA indication did not include cancer-related anemia for patients who were not receiving active chemotherapy. Thus, an FDA-approved exemption was required to recruit women with metastatic breast cancer who were anemic and not necessarily receiving chemotherapy. The University of Pittsburgh Cancer Institute (UPCI) Regulatory Affairs and the pharmaceutical company assisted with drafting the investigational new drug application and provided standard language. The need for this application was unexpected, and concern arose that this would represent a potentially lengthy delay in trial initiation. However, notification of the exemption was received within 30 days. The protocol was approved by the appropriate IRB, and the sponsoring pharmaceutical company subsequently sent a practice agreement prior to releasing the drug for initiation of the clinical trial.

Methods

Fourteen subjects were randomized to the epoetin alfa plus usual care arm and 13 subjects to the usual care arm. Usual care included transfusions as necessary and subject education regarding energy maximization, sleep hygiene, and benefits of physical activity. Subjects in the epoetin alfa arm received usual care plus epoetin alfa at 40,000 units subcutaneously weekly.

Results

Twenty-seven anemic (hemoglobin < 12.0 g/dl) women with metastatic breast cancer were entered into the study over 20 weeks. No significant differences were found in demographic characteristics across randomization ($p > 0.05$). Contact with the sponsoring pharmaceutical company was minimal during the implementation of the clinical trial, although the company required monthly reports of study enrollment and all adverse events.

Adverse events: Four subjects in the erythropoietin arm developed thrombotic events. As these thrombotic events occurred, the nurse PI reported the adverse events to the pharmaceutical company and IRB via the respective appropriate adverse event forms. Women with metastatic breast cancer are at increased risk for thrombotic events, and the first two occurrences were not deemed to be drug related. Both patients experienced deep vein thrombosis and pulmonary emboli but recovered without serious sequalae. The third patient developed deep vein thrombosis of the lower extremity. Following the third occurrence in the treatment arm of the randomized trial, the nurse PI raised a safety concern to the physician coinvestigator. The physician recommended that the dissertation committee meet to discuss these events. A meeting was convened within the week, and the following plan of action was instituted: Continue recruitment of subjects, search the literature for the true incidence of thrombotic events within the metasatatic breast cancer population, search the established UPCI metastatic breast cancer database to determine the incidence of peer group thrombotic events, seek the consultation of the academic and clinical community and the pharmaceutical company's regulatory department regarding the appropriate course of action, and temporarily halt the clinical trial if another thrombotic event occurred.

During the implementation of these procedures, another thrombotic event occurred in the epoetin alfa group. Deep vein thrombosis developed in a subject's upper arm following a port infection and sepsis. The study immediately was placed on temporary hold. Approximately three working days after the temporary hold of the clinical trial, the dissertation committee met to review the available information and determine whether to terminate the study. The committee considered the following information in arriving at their decision.

Current trial: A 29% (n = 4 of 14) incidence of thrombotic (deep vein thrombosis and pulmonary emboli) events existed in the epoetin alfa plus usual care arm, with no (n = 0 of 13) thrombotic events in the usual care arm. The difference in adverse events between the groups was not significant.

Peer-group incidence: The historic incidence (January 1999–June 2001) of thrombotic events in women with metastatic breast cancer at UPCI was 6%. The historical series of 181 cases yielded 10 events.

Incidence in metastatic breast cancer: The incidence of venous and arterial thrombosis in eight studies of women with stages I, II, and III breast cancer receiving varied therapies was 2%–5% (Clahsen, van de Velde, Julien, Floiras, & Mignolet, 1994; Goodnough, Saito, Manni, Jones, & Pearson, 1983; Levine et al., 1994; Saphner, Tormey, & Gray, 1991). The dissertation committee extrapolated that the incidence cited in the literature was 3%–5% in the metatastic breast cancer population.

Regulatory agency advice: The hospital IRB reviewed the adverse events forms and said that the informed consent must be altered to reflect the incidence of thrombotic events within the study. No additional patients were permitted to be recruited to the study with the original consent. Subjects already enrolled in the clinical trial had to be notified of the thrombotic event occurrences and sign an additional informed consent indicating that they were aware of the adverse events and wished to remain in the study.

The dissertation committee was comprised of an experienced medical oncologist, oncology nurse researchers, and statisticians. However, no expert in coagulation was present on the committee. Thus, a hematologist with expertise in coagulation disorders was consulted as an ad hoc committee member. In her opinion, the thrombotic events could have resulted from the epoetin alfa in a mildly anemic population. Consequently, the dissertation committee became concerned that subjects were being placed at increased risk and recommended early termination of the study. The sample size was limited by the early termination of the study. The findings may have been different if a larger sample had been enrolled or if the groups were followed over a longer time interval.

Dissemination of Results

The practice contract with the sponsoring pharmaceutical company stipulated that the sponsoring company had the right to review all data prior to submission for publication or presentation. An audit of the adverse event medical records was conducted by the sponsoring company. No etiology for the thrombotic events was found. The pharmaceutical company did respond to abstract and publication submissions promptly. The company did not request major changes, elimination of data, or substantive alterations in the data analysis or interpretation.

Ethical Considerations

The nurse PI must maintain optimal ethical standards at all times. The procedures and research standards in place guide ethical behavior. If a conflict of interest or ethical issue arises during a pharmaceutical clinical trial, the nurse PI should seek advice from the IRB for guidance in the proper conduct of a clinical trial.

Although the occurrence of adverse events in a clinical trial was a challenging experience for a novice researcher, the safety and regulatory mechanisms in place ensured that appropriate consultation was available, regulations were upheld, and patient safety was not compromised. The decisions regarding procedures after the occurrence of the adverse events and the decision to close the trial were based on evidence and best clinical judgment. The strength of the randomized, controlled design was reinforced. The sponsorship of the trial by a pharmaceutical company was an additional consideration but did not conflict with the decision-making process.

Conclusions

The development and implementation of a pharmaceutical trial can be challenging. The use of clinical examples to illustrate potential problems and pitfalls of pharmaceutical research can prove to be invaluable to other nurse researchers as they begin to develop ideas and protocols for evaluation of pharmacologic therapies (Ebright, 2001). Nurses with appropriate preparation and relevant clinical expertise can assume the role of PI on clinical trials employing pharmaceutical agents. Nurse PIs can rely on institutional safeguards for support during the design and implementation of the trials and during the dissemination of results.

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