



## Promoting Scientific Integrity in Nursing Research, Part II: Strategies

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**In part II of this two-part series reporting on a survey of doctorate-granting schools of nursing on scientific integrity, the authors deal with publication and authorship practices, promotion/tenure policies, and suggested strategies to promote scientific integrity at institutional and broader levels, and the role of various agents in this regard. The findings suggest the importance of the role of senior faculty in socializing and serving as role models for junior colleagues and doctoral students. Professional journals and professional organizations were similarly seen to have a role in standard setting. At the institutional level, educational/facilitative functions, as well as leadership and monitoring activities, were highlighted. The essay presents recommendations for promoting scientific integrity in a proactive manner rather than focusing on procedures for dealing with misconduct. (Index words: Scientific integrity; Role of agents; Teaching of research integrity) *J Prof Nurs* 11:263-269, 1995. Copyright © 1995 by W.B. Saunders Company**

**I**N PART I of this series we described the nature of the survey of doctorate-granting schools of nursing, and reported approaches to instruction of doctoral students and faculty in scientific integrity, existence and use of any guidelines and norms, and the degree to which institutional oversight obtained. In this part we deal with publication and authorship practices, and suggested strategies at various levels, such as those of the parent institution, school of nursing, professional journals, and professional associations, to promote scientific integrity and the roles of various agents in this regard. We also report on promotion/tenure practices, including ways in which these currently might contribute to problematic sci-

entific practice, and whether a change in policies might allay some of the pressures.

Hackett (1993) has analyzed the reasons why scientific misconduct has received so much public attention and the interest of many parties for oversight and control. The reasons relate to the growing prominence of science in our society, with increased public investment and funding and, concomitantly, increased expectations from science and scientists. They include that science is seen as a resource for power, and a source of intellectual authority, and the societal tendency/expectation to forge a link between research and national goals (health, prestige, defense, etc.).

Peer review and replications have been historically viewed as the mechanisms for self-regulation by scientists. Yet, there is a general sense that these may not be working and have come under attack. The many cases of well-publicized scientific misconduct and fraud have pointed to the inadequacies of these approaches to self-regulation. Similarly, as competition for funds, recognition, and prestige have intensified, the historically evolved commitment to values beyond self-interest, to the pursuit of truth, and self-restraint appear to have declined (Weinstein, 1981).

It is generally held that a major purpose of publications is to make possible replications and to extend knowledge (Fields & Price, 1993). Yet it is ironic that in the competitive climate in which science is conducted, replications are less likely to occur, because funding agencies view such proposals less favorably, and also because of the lack of recognition from peers and others (Weinstein, 1981). In the same vein, in many institutions, if not all, doctoral dissertations are expected to be "original" efforts of the candidate, and thus replications are precluded. Interestingly, a number of master's programs in nursing encourage master's students to do replications for their master's theses, providing another evidence of the lack of value placed on replications. Such policies and norms communicate the message that it is a waste of an accomplished researcher's time to engage in replications.

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8755-7223/95/1105-0005\$03.00/0

Yet, without replications, it is impossible to have confidence in scientific findings, just as it is impossible to have confidence in science that has been carried out without integrity.

Authorship credit decisions are important both from a scientific standpoint and for the careers of the scientists. The reader takes the listing of authors as representing the persons who will take public responsibility for the content of the publication (Huth, 1982). This means being able to respond to queries and challenges, defending the content, being in a position to correct honest errors, and the like. From the scientists' standpoint, authorship helps advance careers in the academic and scientific communities. Supporting roles, therefore, need to be distinguished from significant roles in the conduct of the study and in the preparation of the manuscript itself.

Duplicate publications are generally believed to clog the system, take up space, and prevent new ideas from being published. Five levels of duplicate publications have been identified by Bailey (1989): identical content; similar articles with superficial differences; more than one article where one would do; sequential papers about work in progress; and similar papers for different disciplinary audiences. Unless authors notify journal editors of the duplicative nature of a manuscript, this practice is thought to be deceitful (Blancett, 1991).

Many journals have begun establishing policies and procedures in an effort to minimize fraudulent practices and to guide authors in decision making. Journals thus can serve a gatekeeping function; fraudulent practices and misconduct in publication "can compromise the profession, the safety of patients, the advancement of nursing knowledge, and the legitimacy of nursing science" (Blancett, 1991, p. 35).

Professional and scientific organizations have historically maintained an important standard-setting function. They have set forth the highest aspirations for the practice of members, and for the safety of the publics served. In nursing, for example, the American Nurses Association has set standards for nursing practice, for investigative function of nurses, for ethical practice, among others; the National League for Nursing and the American Association of Colleges of Nursing have set forth standards for nursing education. Yet, beyond guidelines regarding human subjects protection, nursing does not now have guidelines concerning research and publication. A number of professional and scientific organizations in other disciplines have developed guidelines to govern research practices; this type of standard-setting activity bene-

fits members in their own scientific work, as well as guides the teaching of appropriate habits to the next generation of scientists. Gunsalus (1993) argues that the single most important element in creating an institutional culture that supports scientific integrity is a leadership committed to ethical conduct—involving attention to mechanisms to promote integrity, prevent misconduct, as well as those to handle allegations, once misconduct is alleged to have occurred. Thus, a multilevel and multifaceted effort to promoting scientific integrity seems warranted.

## Methods

The methodology for the survey of schools of nursing with doctoral programs was described in Part I of this series. The results reflect responses from 38 schools.

## Results

Evidence in the literature suggests that authorship and publication are areas that are particularly problematic; we report on this issue here. In addition, in an effort to develop recommendations for strategies to promote scientific integrity within schools of nursing and the professional as a whole, we solicited views of respondents regarding various approaches. Findings related to each area are presented in a subheading below.

### *Publication and Authorship Credit Issues*

A question in the survey addressed what standards and norms were being followed in this regard. The most commonly mentioned were the publication standards of the American Psychological Association (APA); the standards in this manual were formally required in 20 institutions and were the preferred standard in 12 others. Some respondents specified that the use of APA standards were with regard to format rather than to authorship and publication practices. University or departmental guidelines were reportedly available in three institutions, whereas in others explicit standards were said to be nonexistent either because of the diversity of research methods and topics addressed or because it was left to research teams to negotiate their own arrangements.

In lieu of published policies, and sometimes in addition to those, some schools reported that informal norms about desirable publication practices were obtained. Examples included the following: (1) Authorship order should reflect effort expended (although there is variability here as to whether the effort ex-

pended is limited solely to the given manuscript or to the overall project). (2) There should be no gratuitous authorship; that is, every author named should have been involved. (3) At the outset of the project, all involved in the research negotiate issues of authorship credit, access to data, and order of authorship, and agreements are put in writing. (4) Other authors' work should be faithfully recognized so as to avoid inadvertent plagiarism. (5) All contributors should be acknowledged, and all major contributors invited to co-author. (6) Opportunity for first authorship should be rotated among members of the research group. (7) Redundant publications should be avoided when reporting a project through multiple manuscripts, making sure that each manuscript deals with a distinct area.

Examples were provided of norms that address work with students. Several respondents noted a commitment to doctoral students' authoring one or more publications before graduation. In most institutions where norms existed regarding publication of the dissertation, the student was expected to be sole or first author, with the faculty mentor serving as co-author. Timeliness of the student producing a manuscript based on the dissertation or other project may be a factor influencing authorship. In one case, policies explicitly give the mentor the right to produce publications based on a student's work if the student does not do so within a specified period, but with the student as first author. Another respondent indicated that after a time, the faculty member may publish the student's work with the faculty member as first author and the student as second author. Regarding work students perform on faculty projects, it was noted in several instances that students receive credit, and usually the contribution is sufficient to warrant co-authorship.

With respect to coauthorship involving peers, the range of norms varied from including as coauthor anyone who had any involvement whatsoever in the project, including a department chair who may have simply been aware of its existence, to including only those with direct involvement in a given manuscript. Regarding authorship order, the expectation for some is that the principal investigator (PI) is always first author; for others it is the person doing the primary writing on a manuscript. Variability was also noted in views of what constitutes plagiarism of ideas and the requirements for citing and duplicating instruments developed by others.

Different views about authorship were attributed, in part, to the research tradition in which the indi-

vidual researcher was socialized, with distinction made between those using biophysiological variables and methods, and those using behavioral approaches. Patterns modeled by mentors during doctoral study seem to exert an influence on subsequent behavior, as to institutional norms.

#### *Strategies at the Institutional Level*

At the level of the total institution, scientific integrity-promoting strategies indicated by some institutions suggested a more active role in standard development and standard setting than has heretofore been the case. Responses to this item yielded the most variation, with a total of 33 different suggestions, many of which were mentioned by only one respondent. The most frequently mentioned ideas were as follows: (1) Organize colloquia,  $n = 5$ ; (2) AACN should spearhead effort to develop disciplinary guidelines, from which schools can evolve their own, more specific guidelines,  $n = 3$ ; (3) Include content on sound research practices in all required courses,  $n = 3$ ; and (4) Emphasize faculty mentorship and role modeling,  $n = 3$ . For the remaining, we highlight a few of the ideas selectively. For example, institutional strategies suggested by one university include (1) adopting clear and explicit policies that not only specify what is meant by, and set forth fair procedures for handling alleged misconduct, but also foster openness in research; (2) encouraging the faculty to discuss research ethics, to heighten awareness and assure ongoing dialogue, analysis, and critique of existing norms; (3) identifying a clear locus of responsibility for the conduct of research and stipulating adequate supervision of research teams; (4) using quality as the basis for promotion; (5) developing authorship policies that assure that named authors have had a genuine role in the research and accept responsibility for the quality of the work being reported; (6) establishing policies on recording and retaining data; and (7) providing public announcement and publication of research findings. An active role by the institutional review board (IRB) was also advocated, to include offering regular workshops, programs, and announcements to update faculty and students about any changes in federal policies and regulations, orienting faculty and students to IRB procedures, and identifying and clarifying areas not well understood or subject to misinterpretation.

#### *Strategies at the School Level*

At the school level, suggested strategies centered around ways to educate and update faculty and stu-

dents about current issues, policies, and areas of concern. Suggestions most frequently cited were to do the following: (1) require students to work with faculty doing research and publishing,  $n = 18$ ; (2) expect faculty to serve as role models,  $n = 9$ ; (3) hold discussions in formal seminars,  $n = 8$ ; (4) include topic in all required courses/seminars,  $n = 5$ . Other, less frequently cited ideas were to conduct internal, informal, friendly peer review of manuscripts and grant applications before submission; encourage collaborative research; and develop means of stopping misconduct early.

The most consistent ideas (expressed by 18 respondents) addressed the importance of more senior faculty mentoring both less experienced faculty and students in appropriate scientific roles and practices and establishing an open climate in which good working relationships are fostered. The strategy within schools of assigning seasoned faculty to mentor new or junior faculty was seen as a parallel to senior law partners helping more junior lawyers to "make partner." This could be accomplished in part through involving those needing mentoring in research groups in which there is ongoing discussion and peer review of ideas. However, the constraints mentioned in this regard were that some senior faculty do not always adhere to the highest standards themselves and also, that mentoring is very costly of senior faculty time, a valuable resource.

For students, sustained working relationships with faculty role models who are doing good research and setting examples of integrity were viewed as the most effective means for inculcating desired expectations and values. In particular, spending time as part of research groups where there is open discussion of data management and methods and where collaboration and negotiation of rights and responsibilities are exemplified was seen as critical. To quote one respondent, "telling [students] about the process is an anemic substitute for involving them in it." In this regard, it is important to consider the related suggestion that it may be necessary to limit the number of students in a given doctoral program, as well as the number assigned to a given advisor, to a number that can be worked with closely and supervised adequately.

#### *Promotion Policies*

The most frequently suggested strategy related to promotion policies was to discourage evaluation of publication quantity and instead, focus on quality ( $n$

$= 10$ ). This strategy was expected to reduce some of the "publish or perish" pressure, which in turn may foster more careful research practices and more careful monitoring of research conducted by large teams, and may place an upper limit on the number of publications taken into account. Other ideas, mentioned by one or two respondents, were to change the research model from an individual investigator model to one that acknowledges the legitimacy of collaboration and multiple-authored publications as evidence for promotion; to increase the weight given to teaching in promotion decisions; to decrease pressure on faculty to obtain grant funding as a major criterion for promotion because of the high competitiveness in funding and publication; to consider separating tenure from promotion to relieve some of the pressure to cheat; and to expand our conception of scholarship (Boyer, 1991).\*

However, two points of view, expressed with impressive frequency, seemed to oppose the need to change promotion/tenure policies. Seven individuals expressed the view that nursing faculty must meet the same standards as all others, and six questioned whether "excessive" publication currently required was a problem, and thought that instead, these were rewarded within academic environments.

#### *The Role of Professional Journals*

It was suggested that professional journals "have tremendous responsibility for insisting on good research practice and scientific integrity." Specific suggestions were that journals (1) develop, promulgate, and enforce standards,  $n = 15$ ; (2) devote space to ethics topics, such as presenting cases, discussing accepted standards,  $n = 8$ ; (3) employ highly qualified reviewers so they can pick out problems in manuscripts,  $n = 7$ ; and (4) require all authors to sign statements affirming their direct involvement in and willingness to accept responsibility for the manuscript, verifying ethical treatment of subjects, accurate reporting of results, and their not having published the results elsewhere,  $n = 5$ . It was acknowledged that adherence to established standards is difficult to monitor unless violation is overt. Some concern was expressed that the current anonymous review procedure being used by professional journals

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\*The respondent specifically appeared to refer to Boyer's work (1991), where he proposed "enlarging the perspective," and advanced a conception of scholarship involving the scholarship of discovery, the scholarship of integration, the scholarship of application, and the scholarship of teaching.

may not permit sufficient accountability and is subject to possible abuses.

Journals were seen to be "especially well situated to keep the issue of integrity and good [scientific] practice before the nursing community." Examples of what journals might include were a column on scientific ethics, such as that currently included in many issues of *Science*; case material on difficult situations to which reactions could be solicited from experts or readers; proceedings of conferences in which ethical issues are debated; letters to the editor and rebuttals of claims of authorship; and more explicit inclusion in research reports of the steps taken to assure ethical treatment of subjects. It was also suggested that journals have a role in information dissemination; therefore, they should publish relevant guidelines and updates about changes on a regular basis. One respondent questioned the role of journals as "integrity monitors."

#### *The Role of Professional Organizations*

Professional organizations were viewed as having an important role in educating members about matters of scientific integrity, and in keeping these issues at the forefront of attention. Suggested strategies for doing so included: (1) educating members by holding seminars/conferences and creating opportunities for open discussion,  $n = 23$ ; (2) developing and promulgating standards for academic and scientific integrity, and updating periodically,  $n = 18$ ; (3) publishing materials on the subject,  $n = 5$ ; and (4) adhering to rigorous standards in selecting abstracts for conference presentations,  $n = 3$ . With regard to the standard-setting role, it was suggested that one of the comprehensive national organizations (AACN, ANA, and NLN were named) mount a standard-development effort, by appointing a task force to develop guidelines, seeking wide input and discussion, then revising and disseminating them widely. These guidelines would then be available for use within schools of nursing or as a basis for schools to develop their own policies. Procedures analogous to those used by AACN for developing and updating the Quality Indicators for Doctoral Programs and by the American Anthropological Association were suggested. In the case of the American Anthropological Association, the organizational newsletter published cases and comments over a period. Then one national meeting was devoted to developing consensus, putting forth resolutions, and ultimately setting standards, which were then published. A book of cases was generated, with resolutions and standards included; it is updated every

decade. As a cautionary note, three respondents expressed opposition to professionwide standards, and were concerned about stifling creativity, preferring a more local interpretation of integrity and negotiation of mutual understandings.

#### **Discussion**

The survey results reported here are a continuation of those reported in part I of this series. The specific insights pertained to publication practices and suggested strategies at various levels to promote scientific integrity. In some cases responses were too diverse to suggest patterns; in others, clear directions emerged.

There was consistency with regard to the need for senior faculty to provide mentorship and role modeling to students and junior colleagues, the avenues for which could be through membership of junior faculty and students on research teams, collaborative research and scholarly work, and informal dialogues among peers. With regard to the role of professional associations, respondents saw an active role in educating members through various means, and in the development and promulgation of standards. Professional journals were similarly seen as agents in a position to establish clear standards and in enforcing them, including relevant content in their pages, and taking care in the selection of peer reviewers. Suggested strategies at the larger institutional level, and whether promotion/tenure policies required changing, were equivocal. No clear patterns emerged, with many respondents favoring the current policies and maintaining that nurse faculties should meet the same criteria as others on campus. It should be noted, however, that concern about the deleterious effects of pressure to publish is currently being expressed in many disciplines and generalized to academe as a whole.

The area of scientific integrity has many complex facets. Perhaps in part because of this, varying norms were apparently operating, even within the same institution and nursing unit. Variability seemed particularly apparent regarding authorship guidelines and norms. This can be especially confusing to students, and doubly so as they assume positions after completion of the degree and find a different set of norms in use in the new setting.

Institutions need to clarify certain matters and promote general understanding. One such area is in regard to ownership of data and authorship issues. Fields and Price (1993) maintain that the matter of appropriate authorship status is fraught with difficulties, and many factors come into play, including the academic culture and politics, the status and roles of

people in the hierarchy, claims made by individuals who make specific contributions, and how they regard these. Fields and Price (1993) contend that as greater attention is given to written guidelines, and rational discussion and negotiation become a part of publication decisions, the less valid claims to authorship would not be made. Related to matters of authorship are claims to ownership of data. According to Fields and Price, the US Public Health Service explicitly views grants and data as belonging to the institution, which is responsible for fulfilling the intellectual and financial promise of a grant. The institution then designates an individual to direct the project (the principal investigator). All collaborators have an obligation to share data, because as co-authors of articles they will have the obligation to "evaluate and defend all aspects of a study" (National Institutes of Health, 1991, pp. 5-7). In this regard, designations such as co-investigator, or as co-principal investigator, are not recognized by the USPHS; for public presentations and all publications supported by such funds, principal investigators bear general responsibilities, regardless of whether they are listed as authors, as part of their role for assuring the "proper conduct" of the project (Fields & Price, 1993).

With pressure to publish, and with the trend toward multi-member research teams, authorship credit and multiple publications from a project have become compelling issues; yet there were formal guidelines regarding these in very few instances. Some disciplines and journals have developed policies. For example, Munir and Earls (1992) describe the practices of a number of medical journals that have some common features. These include a requirement that all authors certify that they have participated in the manuscript, approve the content, and will take public responsibility for the content and for its validity, that they will disclose any conflicts of interest in connection with a manuscript, and that the manuscript represents original material that has not been accepted elsewhere. These types of policies on the part of professional journals substantially help clarify some of the ambiguous issues, and should facilitate the development of professionwide and institutionwide guidelines to facilitate the work of scientists.

In nursing, a number of authors and editors have addressed publication ethics issues in recent writing (Blancett, 1991; Denham, 1993; Gay, Lavender and McCard, 1987; Hanson, 1988; Stevens, 1986). These, along with other available resources, such as the Institute of Medicine's report, "The Responsible Conduct of Research in the Health Sciences" (1989),

should enable us to develop guidelines that will help us in our teaching and in our own work as scientists.

Scientists have traditionally valued their independence in the conduct of their research. In the main, society and academic institutions have been willing to give certain freedoms and latitude to scientists; in return, increased accountability is now being demanded of them, and external efforts to control the scientific enterprise are being made. As society's stake in science has risen and science has become more visible as an important activity for its potential social benefits, external scrutiny of scientific conduct has increased. Therefore, it would be shortsighted to leave the proper conduct of science entirely in the hands of individual scientists. Codifying norms in the form of standards and guidelines should go a long way toward making explicit the expectations for scientists who constitute the community of scholars. It would appear that there is an appropriate role for the various agents in developing such formalized norms at different levels of specificity. For example, institutions can lay a broad framework for their expectations. Professional societies can similarly express the aspirations for their own members. Within these two frameworks, disciplinary faculties can develop specific guidance for their members; individual research teams could evolve their own rules at a more specific level, given the particular demands and nature of the project at hand. At each of these levels, when principles and rules conflict, they can be addressed through reasoned discussion, and the resolution laid forth for everyone to see. Evolution of such guidelines, if carried out appropriately, need not be restrictive of scientists.

Similarly, professional journals could use the codes and guidelines of their own professional societies in evolving specific policies and practices governing publication, authorship, multiple publications, author responsibilities, what is expected of peer reviewers, procedures for avoiding, or dealing with, conflict of interest, and the like. Journals need to address abuses that occur in the peer review system and conflicts of interest on the reviewers' part. The concept of "blind" review of manuscripts has a long tradition. Might there be advantages to nonblind reviews, where both author and reviewer are known to each other? Similarly, editorial practices need to be reexamined as well. With the obligation of scientist to allow a manuscript to be considered by one journal at a time, promptness of reviews and timely notification of author become critical for scientists, who are eager to share their work before the material becomes dated.

The scientific enterprise has become highly com-

plex, with many players, each exerting different kinds of pressures and demands on scientists. Yet, it is critical for all parties, scientists, administrators, sponsors, legislators, politicians, and the public, to keep in mind the ultimate ends of science and to protect these from being compromised. Demanding, fostering, and practicing science ethically promote the progress of

science as well as the advancement of the scientist. The advice of a noted scientist may be useful to keep in mind: "Everything that a scientist does is a function of what others have done before him; the past is embodied in every new conception and even in the possibility of its being conceived at all" (Medawar, 1979, p. 30).

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