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The Role of the Statistician: Scientist or Shoe Clerk*

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The point of my deliberately provocative title is to bring out into the open an issue which at some time or another is likely to confront any statistician associated with collaborative clinical trials or, indeed, other areas with immediate public health implications. Sometimes the issue that raises questions about the nature and extent of a statistician's professional responsibility or forces a painful personal decision will surface as a technical matter. However, because of the broader implications of the issue or possibly because of outside pressures, the statistician finds himself or herself in a confrontation with others and must face up to the question: Am I a scientist or a shoe clerk?

Underlying this question is another question: What is the primary responsibility of the statistician in a collaborative study? Is his primary concern to look after number one? Is he primarily responsible to his discipline and to the canons of good statistical practice? Is his responsibility to the collaborative group or to the chairman of the group? Is he responsible to the Federal or other granting agency which is supporting the study? Or is his first and foremost responsibility to the general public whose taxes or contributions are likely to be supplying the funds?

These different and sometimes conflicting responsibilities have to be resolved by each individual for himself or herself. These are personal responsibilities. Their priorities depend on how widely or how narrowly a statistician views his role in a study. As a scientist in health research, a statistician has broad responsibilities. As a shoe clerk his responsibilities are very narrow and limited. One view of the shoe clerk's job is to please the customer well enough to earn his commission. He must find some item in the store's stock which will fit the customer or which will be so fashionable that the customer will buy a misfit. The aim is to please the customer in the short term. What happens in the long run is somebody else's worry.

While I am certainly not advocating the role of a shoe clerk, there are some advantages to this role. It is the easiest role to play in the very difficult study situation that exists in a collaborative study. A collaborative study is likely to include a gallery of personalities ranging from promoters and politicians to prima donnas. A statistician can avoid trouble by playing a neutral and passive role. This modest and unassuming role comes naturally to many statisticians because they are painfully aware of their own limitations—particularly when it comes to background in the biological and medical issues. It seems only natural to defer to other persons who can speak authoritatively on such matters. Even if the statistician may privately have his doubts about some of the statements which are being made, he may prefer to stay out of the argument and to concentrate on keeping his customers satisfied. Often they really don't want his advice—they only want his official blessing for decisions which they have already made. A few phrases in mysterious statistical jargon concerning the number of patients or the power of the tests will keep everyone happy—at least in the short term.

In the short-term, I would concede, a policy of minimizing the extent and degree of the responsibility of a statistician is the easiest policy and has the greatest immediate advantage. In the long-term, however, there are some unpleasant consequences all around—not only to the statistician but to the collaborative group and to the general public who is the ultimate consumer of the biomedical research. Most of these consequences are not easily foreseen but they are not hard to distinguish if we have the advantage of 20-20 hindsight. I can speak from this vantage point because it is now more than 20 years ago that I was asked to prepare a statistical summary of the data from various independent groups who were studying the drug 6-MP in the treatment of childhood leukemia and who were meeting at the Sloan Kettering Institute (SKI).

After struggling to make sense of the diverse data without much success, I finally decided frankly to admit my failure. I went on to point out that, unless plans for combining data from different institutions were worked out in advance, there would be the same inconclusive results if there was another meeting in 2 years or 5 years. To my amazement, I found that the doctors were in agreement with my criticisms and comments. Out of this SKI meeting was to come the first of the collaborative studies in the cancer area (1). Since then some good things and some bad things have happened and I think we can learn some useful lessons from both.

The first lesson is: Anyone who acts like a shoe clerk will end up being treated like a shoe clerk.

The relationships between medical and paramedical personnel are a complicated issue but, in a nutshell, this relationship is exemplified by the Doctor-Nurse relationship. At its best this is a very close working relationship with mutual esteem and respect. At its worst it is more like a master-slave relationship. Some of the less desirable features of the doctor-nurse relationships occur also in other

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medical-paramedical relationships. It occurs with statisticians if they get into the shoe clerk pattern.

If a statistician doesn't want to be treated as a shoe clerk, he has to show that he isn't one. If he wants to be treated as a professional he has got to act like a scientist and accept both the responsibilities and the hazards of a scientist in the public health area.

I spoke of some examples of both responsibilities and hazards from my personal experience with collaborative studies at the oral presentation of this paper. This cannot be covered in the pages allotted here. Suffice it to say that a statistician who is seriously concerned with the scientific and public health aspects of a study can run into serious conflicts, particularly with administrative types whose credo is "Don't make waves." In the planning stages such administrators are far more concerned with keeping all of the collaborators happy than with doing studies which will benefit the public. The statistician who wants to be more than a shoe clerk must, therefore, be willing to risk unpopularity and even unemployment to achieve a study with a good scientific plan. As examples of critical reports that pointed up the futility of specific study designs and which produced a backlash, the reader might take a look at two recent papers (2, 3) on research design.

In the publication phases, administrators are likely to be delighted with positive findings that can be used in budgetary hearings but they are distinctly unhappy about negative results or findings that will generate antagonism or controversy among professionals. Our finding that postoperative radiotherapy in addition to radical surgery was useless and possibly harmful did not sit well with radiotherapists (4). Other findings about effects of delay (5) and prophylactic bilateral mastectomy (6) also created a furor. The public has the right to know the truth on these matters and, since my department has multiple sources of support, we were in a position to go ahead and publish the facts. But telling the truth can be very hazardous when it contradicts an administrator's view of things. A paper which contradicted the then prevailing dogmas of chemotherapy (7) was so infuriating to one top National Cancer Institute administrator that he cancelled our contract in this area. As he told me at the time, "We know what the results will be, we don't need statisticians to tell us."

At present a statistician who is determined to function as a scientist is likely to be in a vulnerable position. Part of this vulnerability is due to what, for lack of better words, might be called a failure to "professionalize". Although collaborative studies involve thousands of medical and paramedical participants and many millions of federal research dollars, the persons in this area have failed to develop a sense of identity and purpose. Research areas which have less than one percent of the personnel or dollars have nevertheless developed fairly distinct subspecialties. The people in the area have their own journals. They have their own subspecialty organizations. They have formal recognition from parent or allied professional societies. We lack a sense of professional identity and of purpose.

Biostatisticians or others involved in collaborative studies or, indeed, with biomedical research have no organization, no journal of their own, no specific channels of communication. Although we may outnumber other subgroups in, say, statistical societies, we have less say in what goes on than small elitist groups in these societies. In view of the proliferation of journals devoted to odd and unimportant topics, the absence of a CLINICOMETRICS or other journal devoted to biomedical statisticians is really surprising. Even more important is the absence of a professional superstructure that could protect the statistician who wants to function as a scientist from the pressures of this role. One of the main purposes of any profession is to protect the professional. A formal superstructure can provide some assurance that a statistician can count on the support of his fellow professionals if he gets into difficulties while doing his proper job. Moreover, when paramedical personnel have strong professional organizations there is a distinct improvement in their position in the medical world.

It might seem that I have strayed from my theme—the statistician's choice between the role of scientist or of shoe clerk. However, if there is to be a real choice it must be feasible to play either role. Whether there will be a viable option to be scientist—particularly for those who are just starting out—will depend on the statistician's status as a professional. In the past, this subject has not been discussed at meetings or in the journals but the time has come when this matter should be publicly discussed.

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