Fall 2002 Section of the American Statistical Association

TEACHING OF STATISTICS IN THE HEALTH SCIENCES

TODD NICK

From the Section Chair

It's hard to believe, but it's already that time, again! The abstract submission form for the San Francisco Meetings in 2003 was made available December 1st, 2002 and the deadline is February 1st, 2003. Please consider submitting an abstract to our section. The more presentations made in our section, the greater visibility we have. If you only have some ideas on a presentation at this point, please feel free to discuss them with our 2003 Program Chair, Cyndy Long, or any of our officers.

If you haven't seen our web site lately, go to http://www.bio.ri.ccf.org/ASA_TSHS. And, if you know of a good link or two that would aid our members in their teaching of statistics, or if you would like to contribute your own course syllabi, notes, example exams, or other, please send those to the site's email address at ASA_TSHS@bio.ri.ccf.org or directly to me.

I would like to thank you for the opportunity to serve you as Chair this year. I would also like to thank all of the officers that serve our section and make it a success. I would especially like to recognize the efforts of Ruth Mickey and Walter Ambrosius. Their terms are ending in December and we'll miss them. I welcome any ideas and/or suggestions for the Section and I look forward to seeing many of you at the meeting next year. James Leeper, from the University of Alabama, will be our Section's Chair for 2003. I wish him the best as well as all of our other officers.

FEATURE ARTICLE

THE BIOSTATISTICAL CONSULTANT'S ROLE AS AN EDUCATOR

Reena Deutsch, Ph.D.
Department of Family and Preventive Medicine and General Clinical Research Center, University of California San Diego

BACKGROUND

The need for biostatistical support in clinical research has been firmly established[1]. Investigators seeking assistance with study design and statistical analysis issues include medical students, residents, postdoctoral fellows, and faculty. The specific needs that must be addressed during a biostatistical consultation preceding a research study can relate to the methodological design of the study, development of data collection instruments, a plan for statistical analysis, and scheduling randomized assignments to treatment arm. Also, a justification for the planned sample size or power analysis may be sought. During the enrollment and follow-up phase of a clinical study, there may be problems associated with recruitment, retention, or adherence that need to be addressed with respect to its potential impact on subsequent outcomes and data analysis.

Upon the completion of data collection, a medical student or physician conducting research may require aid with data analysis, incorporating covariates or confounders into the analyses, or interpretation and reporting of results. Further, presentation of findings in the form of tabular and graphical summaries, writing analysis or results sections for a grant application or a manuscript, or crafting responses to questions raised by grant review panels or journal reviewers may require the input and assistance of a biostatistical resource.

Clinical investigators who seek biostatistical support have a personal and professional stake in the quality of their completed research project. While it is frequently a deficiency in background knowledge of some aspect of study design or data analysis that motivates academic researchers to seek biostatistical help, they are characteristically eager and receptive to improve their skills and acquire new tools to help them achieve their research objectives.

The establishment of a teaching role during biostatistical consultation has been asserted recently by Nick *et al.*,[2] Tobi *et al.*,[3] and Deutsch[4]. An educational experience is not always expected by consultees, but this often occurs. How instruction takes place and in what settings, as well as a proposed model for plausible connections

between biostatistical consulting and educational activities, are described below.

RESEARCHER EXPECTATIONS

Finch[5] reported findings from the perspective of the statistical consultee. He listed client expectations of both the consultant and the consulting process based on results from a semi-structured interview of a sample of graduate student clients of a statistical consulting lab at a research university. According to Finch, a researcher expects at least one of the following to result from a biostatistical consultation session:

1. *Knowledge leading to independence*
   The client expects to acquire information about statistical analysis for use in the future without the aid of a statistician.
2. *Critical knowledge*
   The client seeks understanding about why a procedure is used and what problems might be associated with it.
3. *Answers to specific questions*
   The consultee anticipates receiving only the answer to a specific statistical problem and not necessarily wanting more than that.
4. *Affective and logistical concerns*
   The client demands quick feedback to meet a deadline or keep research momentum. With this expectation, timing is important, and patience is required by the consultant. The tone of this expectation may be loosely reflected by the memorable homily attributed to police Sergeant Joe Friday from the classic television show Dragnet[6], "Just the facts, ma'am."

Finch[5] further characterizes the researcher's expectation with respect to the role that the consultant plays to be one of the following:

5. *Guide*
   The client expects that the consultant will be one who provides assistance in deciding on a statistical strategy to analyze data and answer research questions.
6. *Teacher*
   The consultee anticipates that the statistical expert will be an instructor of why an analytical procedure is appropriate for a given scenario and how the procedure works
7. *Data analyst*
   Number-cruncher and manipulator of data are the only roles demanded of the statistical advisor by the researcher.
8. *Quality assessor*
   The investigator requires the statistician to be a checker of accuracy and integrity and one who will point out errors or problems in the research project.

LINKING RESEARCHER EXPECTATIONS WITH BIOSTATISTICAL TRAINING VIA CONSULTATION

A simple paradigm is proposed that asserts that researchers who seek out biostatistical advice fall within one of three mutually exclusive categories:

- The researcher has sufficient knowledge to understand and apply the statistical information or results provided by the consultation. Therefore, no supplemental education is necessary.
- The researcher lacks the necessary knowledge and is aware of his or her insufficiency. In this setting, education is a critical component of consultation.
- The researcher lacks the necessary knowledge but is not aware of this gap in background. Here, too, biostatistical training becomes a vital part of the consulting process.

While anecdotal evidence seems to support this model's comformance to the distribution of researchers seeking advice about biostatistics or study design, the paradigm has not been tested. However, the medical student or practicing physician who is lacking in at least one area of research design or analysis commonly obtains assistance by seeking out biostatistical support. Consequently, there is some evidence that the theory is viable.

The pattern that is proposed to reflect the relationships between client expectations reported by Finch[5] and the role of a biostatistical consultant as an educator is illustrated in Figure 1. In it, Finch's four expectations that a researcher has for the consultation session (#1-4) are listed along the top third of Figure 1 within rectangular boxes. The lower third shows the four expectations for the consultant's role (#5-8) within rectangular boxes. The ellipse in the middle, which represents the biostatistical consultant's function as an educator, displays one- or two-directional arrows connected between it and each of the eight expectations. Arrows pointing towards the ellipse in the center of the Figure correspond to expectations that automatically seek training as an inherent part of the designated expectation. Arrows pointing away from the center portray a response to a request for advice that includes training as a byproduct of the consultation arising out of the indicated expectation. Question marks are placed where training occurs some of the time but is not necessarily inevitable.

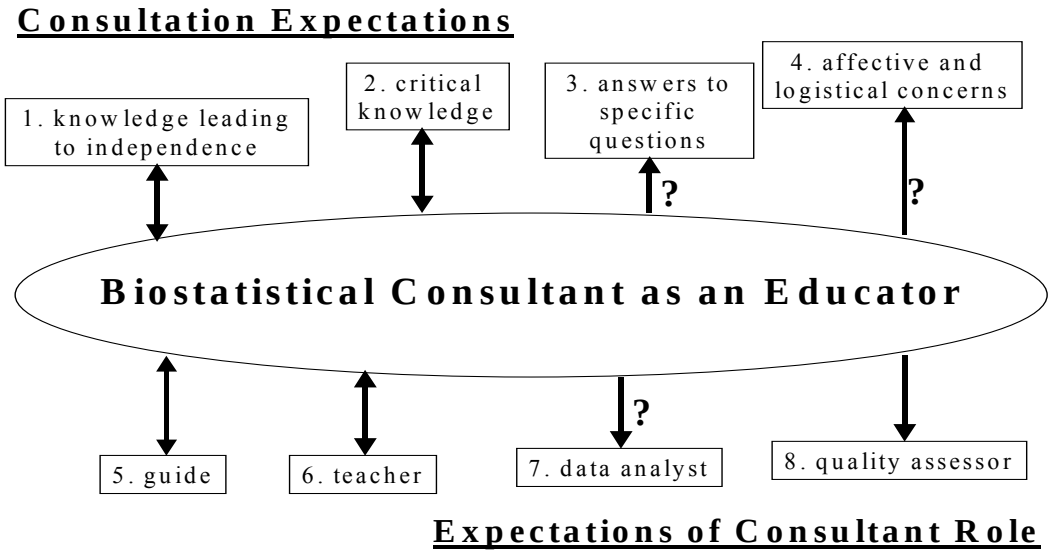

Figure 1. Link between researcher expectations of biostatistical consultation (box #1-4) and consultant's role (box #5-8) with the biostatistical consultant's position as an educator (ellipse).

By definition, the first two client expectations for both the consultation and the consultant, that is, expecting to receive knowledge leading to independence (#1) and critical knowledge (#2), and viewing the consultant as a guide (#5) and teacher (#6), will lead to some degree of training as a predictable outcome of the consultation. Corresponding arrows in Figure 1 are directed towards the educative role of the consultant, reflecting that training is intrinsically connected to these expectations. Arrows directed away from the central ellipse towards each of these four expectations correspond to the natural flow of training from the consultant towards the researcher resulting from the designated expectations.

The researcher's last two expectations for the consultation, answers to specific questions (#3) and affective and logistical concerns (#4), and the third for the consultant's role, data analyst (#7), do not inherently necessitate any educational component for the consultation session. This lack of expectation for training is reflected by the absence of arrows pointing towards the central ellipse in Figure 1. However, it is possible, but not certain, that education about biostatistical issues or study design will flow from the conference. This uncertainty is exhibited by the figure's question marks adjacent to arrows pointing away from the center.

For instance, by responding to someone seeking only an answer to a question (#3), it may be necessary or desirable to provide additional information about a procedure, interpretation, or any number of other technical points that are relevant to the understanding of the response. Investigators are likely to be receptive to additional information that will augment their understanding of matters related to their current project.

Researchers only seeking someone to analyze their data (#7) may not need any additional information about the analysis or the results after being presented with that all-important p-value. However, often in clinical research, there are alternative approaches to analysis and subtle shades of interpretation. Decisions need to be made based on various assumptions, objectives, and other criteria that require a level of understanding about study design or biostatistical concepts beyond what the researcher may possess. It is the duty of the biostatistician to ensure that as much information as possible is available to make these decisions[3], leading to the education of the consultee in areas where comprehension is lacking. In addition, a rather sophisticated awareness of how the data

are analyzed may be required to correctly interpret the results. It is vital that the proper level of training is offered to allow the researcher full understanding of the implications of the results.

The fourth expectation for consultation, affective and logistical concerns (#4) (i.e., "Just the facts, ma'am"), is probably the least likely to reflect an obvious desire by the medical student or academic physician to obtain a session involving education about any topic whatsoever. The author's own experience reflects this by the many anxious investigators wanting to know nothing more than how large a sample is required when a grant application budget deadline is fast approaching. Surprisingly, on occasion, these consultees may be most receptive to a training opportunity, in spite of the great pressure to produce a product that is their sole focus at the time. When exposed to a new concept, interesting explanation or question, or alternative way to look at issues they want addressed, they can be unexpectedly distracted from the narrow focus of their immediate attention by being directed towards viewing their study from a different perspective. Potentially, this switch in direction of focus will lead them back to the wider view of their project which motivates personal interest during which they can become receptive to offers of educational support related to their research project.

Finally, the last client expectation for the role of a biostatistical consultant is that of a quality assessor (#8). In this case, consultees approach the statistical expert to validate the correctness of their work. This reflects, at some level, a lack of confidence in their own abilities to sufficiently determine if the design, analysis, or interpretation of results is correct. Consequently, the consultant can use this opportunity to teach the researcher why the completed work is correct, if it is, or why it is incorrect, if it is faulty. In the latter case, academic researchers will likely be interested in knowing the acceptable approach since they have already demonstrated their desire to perform such tasks on their own and a strong interest in being certain they do so correctly. Thus, enhancing the investigator's level of knowledge about study design or biostatistics is certain to be a natural consequence of this type of consult. Hence, the arrows in Figure 1 are solidly directed outward from the educative role towards expectation #8.

CASE STUDIES

Two statistical consultations initiated by clinical investigators who had straightforward requests for statistical analysis assistance are described below as case studies. They illustrate transformations of consultations into educational encounters. The activities that unfolded were fairly representative of similar processes occurring commonly during many such consultations.

Case Study #1

Dr. X, a young investigator applying for her first grant, was preparing her proposal. Her research objective was to test if the mean blood pressure is equal for each of 3 population groups. She needed to know if the number of subjects she planned for her study provided high enough power. The precise question she wanted an answer for was, "Is a sample size of 300 big enough?" With respect to Finch's expectations[5], it appeared that she wanted an answer to a specific question from the consultation (#3) and expected that the role of the biostatistician was that of a number-crunching data analyst (#7).

After explaining that power is based on corresponding statistical methodology, it was established that no statistical analysis plan existed. Prior to our creating one, we needed to identify the hypotheses that motivated the research, outcome variables, and an approach for the design of the study. This was all discussed with the researcher.

One by one, the sequence of steps to establish a research plan were considered, determined, and reviewed. Design details not thoroughly addressed at first were resolved. It was not until the lengthy process of identifying the hypotheses, study design, outcome measures, and necessary comparisons was completed that an analysis plan was drafted.

After navigating through each step of the research plan with the investigator, it was determined that 300 subjects were excessive and that the study was overpowered. A more appropriate sample size was estimated, and the postgraduate physician received not only the answer to her original question but a rather in-depth review of the sequential phases of a research plan and how each step interacts and influences subsequent steps in the process.

Additionally, Dr. X gained an appreciation for the distinction between the concepts of clinical significance versus statistical significance as well as a deeper understanding of the issues related to power analyses. No doubt, Dr. X now has a more solid foundation for understanding the scientific method to assist her with not only her own future research projects but also in critically interpreting published findings.

Case Study #2

Dr. Y, a postdoctoral investigator, was conducting a study to determine if an

experimental intervention was effective in the treatment of depression. She was directed by the principal investigator to use *intent-to-treat analysis*. Her main question was, "How do I perform intent-to-treat analysis?" In accordance with Finch[5], she expected knowledge leading to independence from the session (#1) and clearly viewed the consultant in the role of teacher (#6).

The project at hand was completed and data had already been collected when the consultee was first offered management of this project. The study was designed to consist of three treatment arms, with each subject receiving each treatment in sequence after a suitable washout period between treatments. One depression change score was planned for each subject for each treatment. A substantial portion of the subjects missed one or two treatments. Criteria for assignment to treatment was unknown. Treatment was the main effect to be tested.

The researcher was instructed by her supervisor to analyze existing data using intent-to-treat analysis (ITT). During the initial biostatistical consultation session, it was explained to the investigator that the study appeared to have been intended as a crossover study, designed to obtain just one measurement per treatment (a change score). With that design, all subjects were intended to receive each of the three treatments.

The session included a lesson on crossover designs, clarifications of why ITT was not relevant here, and discussion of when intent-to-treat analysis is appropriate. Dr. Y was instructed on why randomization is important, and why, for her study, it was vital that each subject was assigned to a sequence of treatments rather than to an individual treatment as is done with ITT designs.

After establishing that the omission of subjects from analysis if they had missed treatments was not acceptable, it was elucidated to the researcher that the real data analytic issue she faced was the handling of missing values. We then proceeded with a lesson on alternative methods to address missing values when analyzing data, and we examined the pros and cons of each method. Drawbacks and issues associated with the potential lack of nonrandomization of the study were also discussed.

This training process continued until Dr. Y expressed comfort with her ability to explain to the senior investigator why ITT was inappropriate and about the complicated aspects of missing data and lack of randomization. She departed the session with not only an understanding of intent-to-treat analysis and crossover studies, but also a new awareness of the substantial impact of study design on subsequent analysis and results, and how vital it is to incorporate proper features, such as randomization, into an initial research plan. A subsequent session was devoted to showing her how to analyze the data using regression to impute missing values.

DISCUSSION

One study reported that 70% of all biostatistical consultations over a seven-month period at an active university clinical research center included an educational component in study design or biostatistics[7]. Education was defined as providing technical background information or supplemental details about a topic in study design or biostatistics beyond that which is needed for defining a term or reporting a result and where the investigator needed to understand the topic of instruction to fully utilize the material provided in response to the researcher's request for assistance. The amount of instruction and intensity of the teaching varied from short explanations to lengthy tutorials. Evidence supports that, in an environment where it is available, informal teaching comprises an integral part of the consultative process.

While Finch[5] delineated expectations by academic researchers who sought advice at a university statistical consulting lab not confined to a medical school, these same expectations are likely to reflect those of clinical investigators in a medical school or research center as well. The depicted pattern of linking each expectation to an instructional outcome, either as a natural definition of the expectation or potentially resulting from the natural flow emanating from the response to the expectation, illustrates the overwhelming need and opportunities for biostatistical education within the context of a consultation initiated by academic researchers.

Both case studies that were presented reflect initial contacts by clinical investigators who requested specific information yet who obtained a great deal more in response to their requests. These cases are closer to the rule than the exception. Often, the lack of familiarity with relevant biostatistical topics and study design issues prompt a detailed tutorial to fill in the gaps.

Undergraduate and graduate physicians tend be highly interested in receiving further supplementation of their statistical background if it will enhance their ability to improve their research projects. When following their chosen research or clinical career path, and when fully aware of the

relevance and application of biostatistical topics to their current real-life area of interest, it appears that this is when the true worth of narrowly focused one-on-one teaching about specific topics in study design and biostatistics can be most fully appreciated and grasped.

Acknowledgements

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This report was based on a presentation given at the Joint Statistical Meetings (invited session sponsored by the Teaching Statistics in the Health Sciences section of the American Statistical Association) in New York City, New York in August 2002.

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BOOK REVIEW

Publishing Your Medical Research Paper: What They Don't Teach You In Medical School

Daniel W. Byrne
Lippincott Williams & Wilkins
1998

Reviewer: Robert A. Oster, Ph.D.
University of Alabama at Birmingham

This book is one that should be of great interest to many TSHS members, particularly those who teach clinical trainees and medical researchers, and also those who consult with medical investigators on research projects (including serving as the statistician on the research team). The book title appears to indicate that the book would only be of interest to those who attended medical school. However, there is material in the book that should be of interest to graduate students, medical students, residents, fellows, medical investigators, and biostatisticians.

The main premise of the book is to provide practical and technical information on how to write a medical research paper and on how to get the paper accepted for publication in a peer-reviewed journal. Included in this information are many expert tips on how to get a paper published successfully; instruction on experimental design, statistics, and writing; and an internet directory of medical research web sites.

The book begins with a chapter containing an overview of 10 key principles necessary for the successful publication of a research paper. After this, the book is comprised of five primary sections corresponding to the five sequential phases essential to the publication process: Planning, Observing, Writing, Editing, and Revising (forming the acronym POWER). This material is clearly the heart of the book. The book concludes with five helpful appendixes and a comprehensive bibliography.

The Planning section contains 11 chapters (chapters 2-12) covering the following topics: laying the groundwork to carry out the study methods (choosing a topic, conducting a literature search, and forming a research team); the methodology itself (stating the problem, formulating the hypotheses, and designing the study); minimizing bias; the data collection form; eligibility (of potential participants); randomization, blinding, and confidentiality; end points and outcome (unit of analysis, confounding factors, classification of variables, and preparing for data entry); sample size (estimating sample size and statistical power); preparing for statistical analysis (planning the analysis and planning the follow-up); avoiding common criticisms (peer reviewers' responses and editors' responses); and preparing to write a publishable paper (organizing material into a manuscript, choosing a journal, guidelines for authors, planning the length of a manuscript, and working with reviewers and editors).

The Observing section contains seven chapters (chapters 13-19) covering the following topics: collecting data (making observations, keeping careful records, and detecting potential problems); analyzing data – statistical analysis (laying the groundwork for statistical analysis, preparing the data, and avoiding common problems); interpreting the data (preparing for data analysis and avoiding common problems); univariate analysis (the most common univariate tests used in medical research, using the chi-square test, statistical software, histograms, and using the student's t test); nonparametric tests; matching; and multivariate analysis.

The Writing section consists of eight chapters (chapters 20-27) covering the following topics: title; abstract (writing the abstract, and editing and revising the abstract); introduction (capturing the reader's attention and providing adequate background information); methods (purpose of the methods section, the study design, eligibility, randomization and blinding, intervention and compliance, end points and outcome, sample size, and statistical analysis); results (organizing the results, presenting statistical information, anticipating pitfalls in the results, tables, and figures); discussion (focusing the discussion, anticipating pitfalls in the discussion, discussing implications, discussing limitations, and conclusions); references (creating a high-quality reference section, referencing systems, referencing statistical software, and polishing the references); and special situations (abstracts for conference competitions and electronic publishing).

The Editing section consists of four chapters (chapters 28-31) covering the following topics: preparing your manuscript for submission (seeking internal peer review and editing for brevity and clarity); small, but significant points to consider; improving your writing (learning from the experts and editing your paper for a medical journal); and problematic terms.

The Revising section consists of three chapters (chapters 32-34) covering the following topics: revising the final draft; the cover letter; and responding to peer reviewers' comments.

Finally, there are five appendixes (A-E) providing the following useful information: uniform requirements for manuscripts submitted to biomedical journals, and separate statements from the ICMJE (International Committee of Medical Journal Editors); peer review and medical journal questionnaire; sample data collection form; medical researcher's directory; and the World Medical Association Declaration of Helsinki. Information obtained through the use of the peer review and medical journal questionnaires appears in the book in various places.

As can be seen above, the Planning and Observing sections (chapters 2-19) are primarily about study planning, study design, and biostatistics. In addition, how to present statistical information in a paper is discussed in parts of the Writing section, particularly in the methods and results chapters (chapters 23-24).

There are some especially useful charts and tables that appear in the book, including a flowchart of common inferential statistical methods on p. 78, and a list of questions associated with this flowchart on p. 79. This material will be very useful for medical researchers and clinical trainees as they attempt to learn more about statistical tests. On p. 80 is an easy-to-understand table of terms related to the diagnostic accuracy of tests (sensitivity, specificity, etc.). Tables on pp. 48-50 contain reviewers' and editors' most common criticisms of manuscripts. Criticisms in these tables fall into one of the following categories: design of the study, interpretation of the findings, importance of the topic, and presentation of the results. These tables should be useful for all authors as they prepare their manuscripts. Another helpful table consisting of a checklist to be used by authors when preparing, or by readers when analyzing, a report of a randomized controlled trial is on pp. 18-19. Tables on pp. 60-61 and 62-63 are also useful; the first of these is entitled "How to Avoid Annoying a Reviewer" while the second one is entitled "How to Avoid Annoying an Editor". Both tables contain advice in the following categories: methods, results, presentation, statistical analysis, discussion, originality, conclusions, and adherence to journal's instructions. Finally, a table on pp. 120-121 contains commonly used statistical symbols and abbreviations. This table will definitely be helpful for all non-statisticians, especially for medical researchers.

The book is very readable and presents information in a direct and informative style. My only criticism of the book is that the discussion of the statistical methods, which appears in chapters 16-19, is overly simplistic at times. However, this book is not meant to take the place of a graduate-level introductory biostatistics text. In addition, a simplified discussion of statistics is often sufficient for medical researchers, especially when these researchers already have a statistician on their research team.

I have already referred to this book when preparing a presentation that I gave to clinical

trainees in my school's Clinical Research Training Program; the title of my lecture was "Data Analysis I: Univariate Analysis". Dan Byrne, the author of the book, indicated to me that he used the book, along with two statistics books, for a course entitled "Introduction to Biostatistics" and for a course entitled "Medical Writing for Clinical Investigators". After examining the book myself, I think that it would serve as an excellent primary text for a lecture series or course on medical writing, as well as an excellent supplementary text in a graduate-level introductory biostatistics course.

When I received this book, it was still in print and available from the publisher and other booksellers. Unfortunately, it has very recently gone out of print. The author has indicated to me that he is currently speaking with the publisher about writing a second edition. It may still possible to purchase a used copy through the Internet or at a store that sells used books. In addition, some university libraries may have this book available to borrow.

In conclusion, I highly recommend "Publishing Your Medical Research Paper". I believe that it will be greatly appreciated by medical researchers, fellows, and health science graduate students who are planning for a career in research. I also believe that biostatisticians will enjoy using material from this book for teaching and consulting purposes. ■

2003 JSM IN SAN FRANCISCO

From the 2003 Program Chair: Cynthia R. Long

We Need You!

Please consider making a contributed paper or poster presentation, or organizing a topic contributed panel or paper session, for the next Joint Statistical Meetings (JSM), to be held August 3-7, 2003 in San Francisco! As we have done previously, TSHS will be making one or more awards for Best Contributed Paper. This is a great opportunity for you to present and discuss your work regarding teaching statistical methods and consulting within the health sciences.

The invited program is almost complete. Our invited session includes Chuck McCulloch, Dalene Stangl, Bob Stephenson and Skip Woolson discussing ways to incorporate modern methods, such as Bayesian approaches, resampling techniques, and sophisticated regression, into the courses we teach for healthcare professionals. If you have been including modern statistical methods in teaching or consulting, you may want to consider sharing your experiences through a contributed presentation of your own.

Abstract submissions can be made online beginning on December 1, 2002 at http://www.amstat.org/meetings/jsm/2003/, with a deadline of February 1, 2003. If you have any questions about which presentation format would be best for you, or if you want assistance in organizing a topic contributed session, please feel free to contact me at Long_C@palmer.edu or (563) 884-5157. It is likely that a topic that you are interested in will also be of interest to other TSHS members. I look forward to hearing from you. ■

2002 JSM IN NEW YORK

From the 2002 Program Chair: Walter Ambrosius

JSM 2002 Recap

The Teaching Statistics in the Health Sciences program at the 2002 Joint Statistical Meetings a tremendous success. There was more TSHS activity at this meeting than at any past meeting. We continued with the TSHS luncheons and had more than 30 people attending six luncheons. We had three invited papers, 12 contributed papers, and five contributed posters. One submission in each of these three categories was selected as the best paper or poster. The recipients received a plaque and a check for $100. Reena Deutsch (University of California at San Diego) won the best invited paper award with her paper "`What sample size do I need?' ... or ... A biostatistical consultant's roles as an educator." Mike Wright Colopy (GlaxoSmithKlein) won the Best Contributed paper award with his paper "Don't Tell Me About Your Seed!" The best poster was presented by Daniel Byrne, Patrick Arbogast, Shiva Gautam, and Robert Dittus (Vanderbilt University Medical Center) for "Improving the Quality of an Introductory Biostatistics Course for Physicians." ■

2002 JSM IN NEW YORK

From the 2003 Program Chair: Cynthia R. Long

TSHS Roundtables at JSM 2002

As Walter mentioned in the previous article, over 30 people participated in 6 TSHS-sponsored roundtable luncheon sessions in New York. There were 3 sessions on both Tuesday and Wednesday.

On Tuesday, **Ralph O'Brien**, Cleveland Clinic, led a discussion of the components of the statistical considerations section of a research proposal and strategies to employ in producing something that ties in seamlessly with the rest of the proposal and supports the feasibility of the design and methods to answer the research question. Much discussion, as well as materials provided by Ralph, focused on the idea that this section must demonstrate to potential reviewers that a highly-qualified professional statistician is a collaborating member of the research team and that he/she was fully involved in planning the study. **James Leeper**, the TSHS chair-elect, led a roundtable of individuals who had experience in teaching statistics to a variety of graduate students. Valuable discussion ensued on the value of students writing a statistical paper as part of their class experience as well as the difficulty of and various approaches to evaluating student performance. These roundtable participants also recommended that our Section continue to develop the "Teaching Materials" webpages on the TSHS Section website. **Bob Hirsch**, of The George Washington University, led a session on teaching statistical decision making to health scientists.

On Wednesday, **Dalene Stangl**, Duke University, led a discussion of case studies for teaching Bayesian methods to applied statisticians and non-quantitative health-care professionals. She talked about her experiences with professionals such as doctors, nurses and pharmaceutical personnel and provided articles and book chapters that she has found useful. We will all get the opportunity to hear Dalene talk on this topic as part of next year's invited session!

Wayne Taylor, Taylor Enterprises, led an excellent discussion among participants from industry and academia that focused on the training needs of statisticians in industry and how the universities could help fill these needs. **Emmanuel Lazaridis**, International Agency for Research on Cancer, led a full table of participants in a discussion of issues related to providing statistical education to genomic scientists. One recommendation coming out of this discussion was for ASA outreach to the ISMB and other molecular biology organizations. The participants developed some very good suggestions for future JSM sessions and also discussed the need to attract bioinformatics software vendors to have booths at the JSM.

The only negative comment I heard regarding the TSHS roundtable luncheons was one that was commonly heard at all the sections' roundtables: lunch was expensive. This year's program committee is working hard in an attempt to have a reasonably priced lunch to accompany the generally excellent roundtable discussions. Next year's roundtable sessions are already being planned. If you have ideas, please contact the JSM 2004 Program Chair, Brent Shelton (bshelton@ms.soph.uab.edu). Thanks again to this year's roundtable luncheon discussion leaders! ■

2002 Section Officers for TSHS

Chair	Todd Nick	(601) 984-6313	tnick@shrp.umsmed.edu
Past-Chair	Ruth Mickey	(802) 656-2526	Ruth.Mickey@uvm.edu
Chair-Elect	James Leeper	(205) 348-1355	jleeper@cchs.ua.edu
Program Chair	Walter Ambrosius	(336) 716-6281	wambrosi@wfubmc.edu
Program Chair-Elect	Cynthia Long	(319) 884-5157	long_c@palmer.edu
Publications Officer	Richard Ittenbach	(215) 590-5943	ittenbach@email.chop.edu
Newsletter Editor	Stephen Looney	(502) 852-6376	Stephen.Looney@louisville.edu
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ASA Staff Liaison	Madge Haven	(703) 684-1221	madge@amstat.org
	William B. Smith	(703) 684-1221	williambsmith@amstat.org

Congratulations!

A BIG pat on the back for these deserving statisticians . . .

TSHS Presentation Award winners at the 2002 JSM in New York City:

Best Invited Paper: Reena Deutsch, University of California at San Diego

Best Regular Contributed Paper: Mike Wright Colopy, GlaxoSmithKlein

Best Regular Contributed Poster: Daniel Byrne, Patrick Arbogast, Shiva Gautam, and Robert Dittus, Vanderbilt University Medical Center

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Stephen W. Looney, Ph.D., editor
1429 Duke Street
Alexandria, VA 22314-3415
USA