Summer 2007 **Section of the American Statistical Association**

TEACHING of STATISTICS in the HEALTH SCIENCES

Marlene Egger

From the Section Chair

It is my great pleasure to welcome you to the JSM at the Salt Lake Conference Center in 2007. The work of many in our section has created an outstanding program to nurture and uplift all of us who teach statistics in the health sciences.

Current TSHS Program Chair, Patrick Tarwater, and Program Chair-Elect Jodi Lapidus have arranged a very tasty program! I want to make particular note of our section's invited sessions concerning the Summer Institute for Training in Biostatistics (SIBS), on Monday, 7/30 in the 2:00 PM - 3:50pm time slot and the session on variable selection on Wednesday 8/1 from 8:30-10:30am, both at the Convention Center. We are also sponsoring contributed papers and have many co-sponsored sessions.

"Please join us at the Section Business Meeting and Mixer on Monday, July 30 from 5:30-7:00 pm at the Grand America Hotel Venice Room…"

Late summer is hot in Salt Lake, but the mornings are beautiful. For the early birds among us, Jodi Lapidus has arranged some excellent wake-up 'roundtables with coffee' each morning from 7:00-8:15 am in the Convention Center ballroom .

Details of the program are in the May issue, elsewhere in this issue, and at:
http://www.amstat.org/meetings/jsm/2007/onlineprogram/index.cfm?fuseaction=main

Also, please join us at the Section Business Meeting and Mixer on Monday, July 30 from 5:30-7:00 pm at the Grand America Hotel Venice Room, where we will have invigorating discussion, announcements of awards, and food and drink for all.

Congratulations to election winners Patrick Arbogast, Vanderbilt University, and Lynn Ackerson, Kaiser Foundation Research Institute, who will be the 2008 Section Chair-Elect and Secretary/Treasurer! We were also thrilled to hear that section member Mary Gray, at American University, has been named a Fellow of ASA!

"Congratulations to election winners Patrick Arbogast and Lynn Ackerson who will be the 2008 Section Chair-Elect and Secretary/Treasurer!"

We are looking forward to seeing everyone, sharing successes, and brainstorming to overcome challenges this coming July in Salt Lake.

BOOK REVIEW

Fundamentals of Biostatistics

Author: Bernard Rosner
Publisher: Thomson Brooks/Cole, 2006 Sixth ed.
Number of Pages: 868 + xx
ISBN 0-534-41820-1 $133.95 (list price on the publisher's website)

Review by Robert A. Oster, Ph.D., University of Alabama at Birmingham

The main purpose of this book is to serve as the primary text for an introductory biostatistics course. The intended audience for this book is upper-level undergraduate students and graduate students in medicine or other health-related areas. Potential users of this text are assumed to have knowledge of algebra. No previous background in statistics is assumed. This text reflects the author's 30 years of teaching experience in biostatistics courses and also in biostatistical consulting with investigators. It may be of interest to TSHS members who teach health science students or clinical researchers, and also to those who consult with medical investigators that have had some statistical training.

The book contains 14 chapters, one appendix, a flowchart for methods of statistical inference, an index of datasets, and an index for terms used in the text. The first 12 chapters contain most of the content for an introductory-level biostatistics course. Chapter 1 is an introduction, and covers the development of an actual medical study that the author was involved with. Chapter 2 covers descriptive statistics, including measures of location (central tendency) and measures of spread (variation). Chapters 3 through 5 discuss the concepts of probability. In particular, Chapter 3 defines probability, covers the multiplication and addition laws of probability, and describes conditional probability, Bayes' rule, concepts of Bayesian inference, and ROC curves. Chapter 4 covers discrete probability distributions, and includes extensive discussion of the binomial and Poisson distributions. Chapter 5 covers continuous probability distributions, and focuses on the normal distribution; normal approximations to the binomial and Poisson distributions are also discussed. Chapters 6 through 10 describe basic methods of statistical inference. Chapter 6 covers point estimation and confidence intervals for the normal, binomial, and Poisson distributions. Chapters 7 and 8 describe one- and two-sample hypothesis testing procedures, respectively; most of the statistical tests covered assume normally distributed data. Chapter 9 covers three nonparametric methods (the sign test, the Wilcoxon signed-rank test, and the Wilcoxon rank-sum test). Chapter 10 covers widely used hypothesis testing procedures for categorical data, including the chi-square test, Fisher's exact test, McNemar's test, and the kappa statistic. Chapter 11 describes the principles of regression and correlation methods, including simple and multiple regression, and simple, partial, multiple, and rank (Spearman) correlation. Chapter 12 covers multi-sample inference, including one-way and two-way analysis of variance and analysis of covariance, fixed and random effects models, and the Kruskal-Wallis test. Chapter 13 describes design and analysis techniques for epidemiologic studies, such as prospective, retrospective (case-control), cross-sectional, and cross-over designs. Also covered in this chapter are measures of effect (risk difference, risk ratio, and odds ratio), confounding and standardization, the Matnel-Haenszel test, multiple logistic regression analysis, meta-analysis, equivalence studies, analysis of clustered binary data, measurement error methods, and approaches to dealing with missing data (including multiple imputation). Finally, Chapter 14 covers methods for hypothesis testing procedures for person-time data. This includes a description of analysis techniques for incidence-rate data (one-sample and two-sample), as well as methods that are widely used in survival analysis, such as the Kaplan-Meier estimator, the log-rank test, and the Cox proportional-hazards model. The appendix contains 15 separate statistical tables.

The text itself contains a huge number of exercises (1371) even more than the prior edition (1166). Most of these exercises and examples provided in the text are taken from actual studies in the biomedical sciences. References that are cited in a particular chapter appear in a list at the end of that chapter.

This edition includes a CD-ROM which contains 28 datasets used in examples in the chapters and 17 PDF files (the "Student Study Guide") that provide a review of important statistical concepts. The datasets are available in Excel, SAS, JMP, SPSS, Minitab, ASCII tab delimited, and ASCII comma delimited formats. For each dataset, there is a corresponding Word file that provides a description of the contents of that dataset. The PDF files provide a review of key statistical concepts for each chapter, homework problems (approximately 600) that are not included in the text, and complete solutions for these problems. One of these files is an appendix containing a description of the statistical functions in Excel, another contains miscellaneous problems (approximately 100) that are not tied to specific chapters in the book (complete solutions for these problems are also provided), and a final one contains a table of contents for the text of all of the PDF files.

A number of items about this text set it apart from most other introductory texts. First, the text provides reasonably complete explanations of the important statistical concepts while minimizing the amount of mathematical formulation. This contrasts with texts that use a nonmathematical, cookbook approach and those that develop the material using a rigorous, sophisticated mathematical framework. Second, the sheer number of exercises will give students plenty of opportunities to practice what they learn (and will also give course instructors numerous examples to use in the classroom as well as a lot of potential homework problems to choose from). Third, since most of the exercises are taken from actual studies, they will retain the interest of the students and perhaps may even motivate them to learn more about statistics. Fourth, output from several statistical packages, including SAS, SPSS, and Minitab, is provided for many of the examples. Students can see what the results actually look like when they are produced by software packages. Many of these students will eventually need to develop basic knowledge of the use of a statistical package, including an understanding of the results that are produced.

One of the key factors in determining whether or not to adopt this book for a course is the quantitative background and interests of the students. I adopted a prior version of this text a few years ago for a course entitled "Fundamentals of Biostatistics" (I taught this course every year for six years). The majority of the students in these courses were M.P.H. students, with the remainder being Ph.D. students (in the basic sciences) and M.D. trainees (clinicians). Most of the students in my courses had limited quantitative training. They thought that the material was difficult to understand and that the exercises were too challenging. The few students with more quantitative training (most of which had already taken an undergraduate course in statistics) did not report any difficulty and actually enjoyed the text and the exercises. While completing the Ph.D. as a graduate student, I served as a teaching assistant for a course with the same title. Rosner's book was the one that was adopted for the course. When answering questions that the students had, I made similar observations to the ones given above. Back to the time when teaching the course as a faculty member (after completing the Ph.D.), I eventually switched from Rosner's text to Daniel's text [Daniel 1995, 1999]. This appeared to help the students who were less skilled quantitatively. Unbeknownst to the students, I continued to use Rosner's notation in my notes, and used a few of his examples in my notes as well. I ended up developing my own set of course notes, drawing material from both texts in the process. My students appeared to have a greater understanding of the material and exercises in Daniel's text than they did of those in Rosner's text. A review of Daniel's text is not provided here, but this text did not completely meet the needs for my course, either. A comprehensive review of Daniel's text appears in a prior issue of this newsletter (Hamer 1999).

A more appropriate text for M.P.H., medical, and most M.S. and Ph.D. students may be one written by Kirkwood and Sterne (Kirkwood and Sterne, 2003). This text has been reviewed favorably in a prior issue of this newsletter (Byrne 2004) and I have heard positive comments about it from other biostatisticians.

The material contained in Chapters 13 and 14 will likely be beyond the scope of a one-semester, introductory biostatistics course. This material is also beyond the scope of most of introductory biostatistics texts. The inclusion of these topics in the text, however, will make it even more valuable to students as a reference. This material provides valuable knowledge and guidelines for those who need to use or understand the topics covered in Chapters 13 and 14.

In conclusion, Rosner's book is an excellent biostatistics text. This text is recommended as the primary text in an introductory biostatistics course for biostatistics students and for students in the basic sciences who are skilled quantitatively. This text is also recommended as a reference text for anyone who needs to use biostatistical methods extensively as part of their work. This text cannot be recommended as the primary text in introductory biostatistics courses for M.P.H., medical, and most M.S. and Ph.D. students; however, this text can certainly serve as a supplementary text in these courses.

REFERENCES

Byrne, DW. (2004), Review of "Essential Medical Statistics". Teaching of Statistics in the Health Sciences Newsletter, Spring 2004, 2-3.

Daniel, WW. (1995), *Biostatistics: A Foundation for Analysis in the Health Sciences* (6th ed.), New York: Wiley.

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Kirkwood BR, Sterne JAC. (2003), *Essential Medical Statistics*, Boston: Blackwell Publishing Ltd.

FROM THE PUBLICATIONS OFFICER

Update on TSHS Publications

Bob Oster

Two of my unwritten responsibilities as the Section Publications Officer are to encourage TSHS members to write articles on teaching or consulting in the health sciences for TSHS publications and non-TSHS-sponsored publications, and also to oversee (in a broad sense) all TSHS-sponsored publications. As a section, I think that we have been doing a reasonably good job of publishing these types of articles.

Table 1 lists the yearly numbers of TSHS newsletter articles that specifically cover teaching and consulting methods in the health sciences (one of these articles can also be applied to teaching in general), the yearly numbers of JSM Proceedings papers that TSHS has had (all of which are based on oral or poster presentations given in TSHS-sponsored sessions), and the yearly numbers of book reviews that have appeared in the TSHS newsletter. These counts do not include the many fine columns and other types of articles that have appeared in our newsletter, and also do not include JSM Proceedings papers that are based on presentations given in TSHS co-sponsored sessions where TSHS was not the primary sponsor. I begin with the year 2000 since that is the first year that we had three issues of our newsletter, and also since that is the first year for which I can locate TSHS proceedings papers.

As is seen in the table, the number of newsletter articles that specifically cover teaching and consulting methods in the health sciences has been small during recent years. However, this has been counterbalanced by the number of papers that have been published in the JSM proceedings. For a section of our size (we are one of the smaller ASA sections), I believe that we have done quite well with encouraging our members who presented at the JSM to publish in the JSM proceedings. Some of the newsletter articles were not based on presentations, but were initial versions of articles that were later published in peer-reviewed journals or were articles discussing timely topics regarding teaching or consulting methods in the health sciences.

In addition, the number of book reviews appearing in our newsletter has increased during the past three years. Dan Byrne, our Book Review Editor, deserves the credit for encouraging our members to write these reviews. These reviews have been of good quality, and have made for interesting reading. Many of the reviewers have actually taught from the books that they are reviewing; thus, they are able to provide a unique perspective on how effective the texts are as instructional tools.

By now, you are probably wondering where I am going with all of this. First, I believe that we are doing a good job as a section with regard to publishing articles and manuscripts on teaching and consulting in the health sciences. Second, Ed Gracely, our Newsletter Editor, is always looking for newsletter articles written by section members, particularly those that describe innovative methods used for teaching and consulting in the health sciences. Third, Dan Byrne, our Book Review Editor, is always looking for section members to write book reviews, especially if they have used those books for teaching or for consulting with those in the health sciences. Fourth, if you present in a TSHS-sponsored session at the JSM, please consider publishing your work in the JSM proceedings. By doing so, you will be sharing your teaching experiences with others. Fifth, if you present in a TSHS-sponsored or co-sponsored session at other statistical conferences, such as the ENAR meeting, you are eligible to publish your work in the JSM proceedings. Please consider doing so. Finally, publishing an article or manuscript in the TSHS newsletter or JSM Proceedings does not preclude you from publishing this work in a peer-reviewed journal. The copyright on the article is retained by you.

That is all for this issue's column. I hope to see many of you at the 2007 JSM in Salt Lake City!

Table 1. Number of Selected Articles in TSHS-Sponsored Publications from 2000-2006

Year	Newsletter Articles	Book Reviews in Newsletter	JSM Proceedings Papers
2000	3	5	2
2001	2	2	0
2002	2	5	2
2003	1	10	2
2004	1	5	5
2005	1	7	4
2006	0	4	3
Total	10	38	18

TSHS Coffee Roundtables at JSM 2007

Jodi Lapidus

Earlier this fall/winter the TSHS solicited your ideas for topics of interest that would make worthy roundtable discussions among those interested in teaching statistics in the health sciences. Several of you suggested very interesting and unique ideas. As a result, TSHS is sponsoring a total of five coffee roundtable sessions at the JSM 2007 meetings in Salt Lake City. We have opted for coffee sessions rather than lunch this year with the goal of maximizing attendance. Coffee roundtables are early morning events, held from 7:00 – 8:15am, and thus, do not conflict with most other JSM activities. The fee to attend is $12.

There is one session scheduled on Monday and two each on Tuesday and Wednesday. The topics and session leaders are listed below. Please plan on attending one or more of these roundtables, as they promise to provide stimulating discussion, as well as important networking opportunities. Of course, please forward this information to your other colleagues, who may not even be members of TSHS, as they are encouraged to attend as well! If you wish more information, such as session abstracts, please feel free to contact me at lapidusj@ohsu.edu.

"TSHS is sponsoring a total of five coffee roundtable sessions at the JSM 2007 meetings in Salt Lake City. .. Coffee roundtables are early morning events, held from 7:00 – 8:15am, and thus, do not conflict with most other JSM activities. The fee to attend is $12. … Please plan on attending one or more …"

79	**Mon, 7/30/07, 7:00 AM - 8:15 AM**	**CC-Ballroom D**
Section on Teaching Statistics in the Health Sciences Roundtable with Coffee (fee event) - Roundtables - with Coffee		
Section on Teaching Statistics in the Health Sciences		
Organizer(s): Jodi Lapidus, Oregon Health & Science University		
ML08:	Teaching Community Collaborators To Understand Health Research Methods and Results — Katrina Ramsey, Northwest Portland Area Indian Health Board	

218	**Tue, 7/31/07, 7:00 AM - 8:15 AM**	**CC-Ballroom D**
Section on Teaching Statistics in the Health Sciences Roundtables with Coffee (fee event) - Roundtables - with Coffee		
Section on Teaching Statistics in the Health Sciences		
Organizer(s): Jodi Lapidus, Oregon Health & Science University		
TL07:	Ideas for Improving Appreciation and Understanding of Cluster Sampling — Winston A. Richards, The Pennsylvania State University, Harrisburg	
TL08:	Interpreting Statistical Results from Medical Literature in the Classroom — Kirk Anderson, Grand Valley State University	

352	**Wed, 8/1/07, 7:00 AM - 8:15 AM**	**CC-Ballroom D**
Section on Teaching Statistics in the Health Sciences Roundtables with Coffee (fee event) - Roundtables - with Coffee		
Section on Teaching Statistics in the Health Sciences		
Organizer(s): Jodi Lapidus, Oregon Health & Science University		
WL07:	Biostatistics Curriculum for National Institutes of Health (NIH) Training Grants: Training, Expectation, and Outcome — Madhu Mazumdar, Cornell University	
WL08:	Balancing Teaching and Research: Statistics in the Health Sciences — Novie Younger, The University of the West Indies at Mona, Jamaica	

JSM 2007 – Sessions Sponsored and Co-Sponsored by TSHS

Patrick Tarwater
2007 TSHS Program Chair

Here are some (there are many more than these) of the highlights for JSM 2007 TSHS Sponsored and Co-sponsored sessions. Hope to see you there!

Pat

Invited Sessions:

183	Summer Institutes for Training in Biostatistics(SIBS): Addressing the Biostatistician Shortage	Section on Teaching Statistics in the Health Sciences, ENAR, Biometrics Section, Section on Statistical Education	Invited Panel	Mon, 7/30 2:00 PM to 3:50 PM
406	The 20/20 of Statistical Education-Where We've Been and Where We're Going	Section on Statistical Education, Section on Teaching Statistics in the Health Sciences	Invited Panel	Wed, 8/1 10:30 AM to 12:20 PM
523	National Sciene Foundation Funded Projects in Undergraduate Education	Section on Statistical Education, Section on Teaching Statistics in the Health Sciences	Invited Papers	Thu, 8/2 10:30 AM to 12:20 PM
50	Issues in Conducting Experiments in Statistical Education	Section on Statistical Education, Section on Teaching Statistics in the Health Sciences	Invited Panel	Sun, 7/29 4:00 PM to 5:50 PM
86	* ! Exploring Models Interactively	Section on Statistical Graphics, Section on Teaching Statistics in the Health Sciences, Section on Statistical Consulting	Invited Papers	Mon, 7/30 8:30 AM to 10:20 AM

Roundtables:

79	Section on Teaching Statistics in the Health Sciences Roundtable with Coffee (fee event)	Section on Teaching Statistics in the Health Sciences	Roundtables with Coffee	Mon, 7/30 7:00 AM to 8:15 AM
218	Section on Teaching Statistics in the Health Sciences Roundtables with Coffee (fee event)	Section on Teaching Statistics in the Health Sciences	Roundtables with Coffee	Tue, 7/31 7:00 AM to 8:15 AM
352	Section on Teaching Statistics in the Health Sciences Roundtables with Coffee (fee event)	Section on Teaching Statistics in the Health Sciences	Roundtables with Coffee	Wed, 8/1 7:00 AM to 8:15 AM

Topic Contributed:

21	Identifying and Overcoming Barriers to Teaching a Reformed Introductory Course	Section on Statistical Education, Section on Teaching Statistics in the Health Sciences	Topic Contributed Panel	Sun, 7/29 2:00 PM to 3:50 PM
140	Statistical Literacy 2007	Section on Statistical Education, Section on Teaching Statistics in the Health Sciences	Topic Contributed Papers	Mon, 7/30 10:30 AM to 12:20 PM
240	Alternative Approaches to the Introductory Applied Statistics Course	Section on Statistical Education, Section on Teaching Statistics in the Health Sciences	Topic Contributed Papers	Tue, 7/31 8:30 AM to 10:20 AM
465	Innovative Ideas for Teaching Statistics	Section on Statistical Education, ENAR, Section on Teaching Statistics in the Health Sciences	Topic Contributed Papers	Wed, 8/1 2:00 PM to 3:50 PM
500	Creating Materials for an Online Course	Section on Statistical Education, Section on Teaching Statistics in the Health Sciences, WNAR	Topic Contributed Papers	Thu, 8/2 8:30 AM to 10:20 AM

Contributed:

254	Teaching Statistics in the Health Sciences	Section on Teaching Statistics in the Health Sciences, Section on Statistical Education	Contributed Papers	Tue, 7/31 8:30 AM to 10:20 AM
290	Helpful Teaching Techniques	Section on Statistical Education, Section on Teaching Statistics in the Health Sciences	Contributed Papers	Tue, 7/31 10:30 AM to 12:20 PM
536	* ! Issues Related to Power and Sample Size Calculation	Biometrics Section, Section on Teaching Statistics in the Health Sciences	Contributed Papers	Thu, 8/2 10:30 AM to 12:20 PM
544	* Data Analysis and Variable Selection	Section on Physical and Engineering Sciences, Section on Statistics and Marketing, Section on Teaching Statistics in the Health Sciences, Section on Quality and Productivity	Contributed Papers	Thu, 8/2 10:30 AM to 12:20 PM
549	Statistical Methods in Health Science Research	Section on Statistics in Epidemiology, Section on Teaching Statistics in the Health Sciences	Contributed Papers	Thu, 8/2 10:30 AM to 12:20 PM
34	* Modeling and estimation of disease prevalence, incidence, and spread	Section on Statistics in Epidemiology, Section on Health Policy Statistics, Section on Teaching Statistics in the Health Sciences	Contributed Papers	Sun, 7/29 2:00 PM to 3:50 PM
292	* Statistical issues in case-control and combined study designs	Section on Statistics in Epidemiology, Section on Teaching Statistics in the Health Sciences	Contributed Papers	Tue, 7/31 10:30 AM to 12:20 PM

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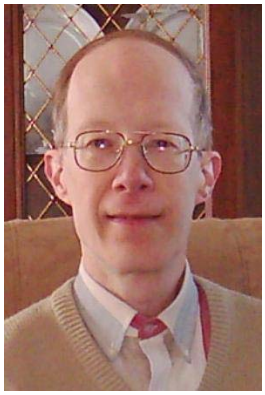
FROM THE EDITOR



This issue shows some of the sessions to put on your calendar for JSM! Plus a thorough review of a useful text, and comments on TSHS publications, both by Bob Oster. Thanks Bob!

Enjoy this issue.

As always, if you have something to contribute, send it along!

Ed