The History of the Subsection on Teaching of Statistics in the Health Sciences

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In reporting the results of a survey on biostatistics instruction in medical schools in the United States and Canada, published in the *Journal of Medical Education* in 1957 (Vol. 33, pp. 370–372), Carl Hopkins stated that "biostatistics is here to stay as an essential part of the medical school curriculum" (p. 370). This growing presence prompted a symposium at the 1967 annual meeting of the American Statistical Association (ASA) discussing ways to enhance the role of medical statistics in epidemiology in undergraduate medical education. One major outcome of the symposium, summarized and reported by Anita Bahn in the *Journal of Medical Education* in 1969 (Vol. 44, pp. 622–626), was the formation of an informal organization within the ASA Training Section (now the Section on Statistical Education) to promote communication among medical educators teaching statistics. Specific goals of the informal group were to (a) exchange ideas on content and methods of teaching, (b) collect resource problems suitable for teaching and articles from the current literature as examples of both good and poor research methods, (c) develop a roster of teachers of statistics in medical and nursing schools, and (d) organize formal meetings on topics relevant to the teaching of statistics.

Bahn followed through on the recommendations of the 1967 symposium by writing to her colleagues at other medical schools and proposing an informal meeting of interested teachers of statistics at the 1969 ASA annual meeting. A group of 40 medical-school representatives subsequently met at the annual meeting and, after discussing the objectives to be met by the formation of a permanent group, voted unanimously to seek establishment of a separate subsection within the ASA Training Section.

Bylaws were written, and the subsection came into official being in 1970. The subsection's spiritual and actual debt to Bahn's initial organizing efforts grew as she became the first chair of the subsection and the (albeit unofficial at that point in time) first editor of a newsletter that was to grow into an important communication tool, subsequently called the *Newsletter of the Subsection on Teaching of Statistics in the Health Sciences*. Paul Leaverton served as the subsection's first secretary. (A complete list of officers appears in Table 1.)

Several of the initial activities of the new subsection included some that continue today. Theodore (Ted) Colton and Jan Kuzma headed a survey group to learn how, when, and by whom statistics was being taught in medical schools, and the content of the courses and teaching resources. The findings, published by Colton in 1975 in the *Journal of Medical Education* (Vol. 50, pp. 596–604), indicated that statistics was being taught in approximately two-thirds of the U.S. and Canadian medical schools, an increase from the 60% reported by Hopkins in the 1958 survey, with a median of 14 hours devoted to statistics topics. Continuing in the tradition more recently, Beth Dawson-Saunders, Stanley Azen, Raymond Greenberg, and Allen Reed undertook a similar survey and found that the percentage of schools teaching statistics had risen to 90%. A summary of these survey results, published in 1987 in *The American Statistician* (Vol. 41, pp. 263–266), showed that most medical schools now require students to take a course covering statistical topics, and the statistical topics are with increasing frequency integrated within courses in epidemiology or public health/community medicine; however, the number of hours allotted to statistics is still often quite restricted.

In her letter inviting medical-school representatives to attend the informal meeting at the 1969 ASA meeting, Bahn stated, "As a new teacher of statistics in a medical school, I have been faced with a number of problems in attempting to develop a meaningful learning experience." Thus a second major undertaking of the fledgling subsection was to prepare a proposal for essential topics that should be included in a course on medical statistics. A committee chaired by Alvan Feinstein worked on this project. Its report, "Proposal for a Core Curriculum in Medical Statistics," was published in *Clinical Pharmacology and Therapeutics* in 1975 (pp. 127–131) and has been an invaluable aid to new teachers of statistics, medical students, and other students in the health sciences.

Table 1. Officers for the Subsection on Teaching of Statistics in the Health Sciences

Year	Chair	Secretary
1970	Anita Bahn	Paul Leaverton
1971	Anita Bahn	Paul Leaverton
1972	Paul Leaverton	Charles Federspiel
1973	Richard McHugh	Jan Kuzma
1974	Jan Kuzma	Gary Anderson
1975	Theodore Colton	Phil Archer
1976	Gary Anderson	Phil Archer
1977	Charles Federspiel	George Williams
1978	Charles Rohde	David Sylvester
1979	Paul Jones	Dennis Gillings
1980	Byron Brown	Gerald Van Belle
1981	James Boen	Gerald Van Belle
1982	Donna Brogan	Beth Dawson-Saunders
1983	Joseph Fleiss	Beth Dawson-Saunders
1984	Stanley Azen	Stanley Lemeshow
1985	Judith Goldberg	Stanley Lemeshow
1986	Beth Dawson-Saunders	Roberta Madison
1987	Stanley Lemeshow	Roberta Madison
1988	Ronald Marks	Marvin Lavenhar
1989	Elisa Lee	Marvin Lavenhar
1990	David Kleinbaum	Marvin Lavenhar

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The original 1958 survey by Hopkins found that many teachers of statistics were using locally prepared syllabi. The need for teaching resources led several of the subsection organizers to prepare textbooks—for example, Bahn's *Basic Medical Statistics* (Grune & Stratton, 1970), Colton's *Statistics in Medicine* (Little, Brown, 1974), and Feinstein's *Clinical Biostatistics* (C. V. Mosby, 1977). A closely related activity was the collection of resource problems for teachers of statistics. One outcome was the publication by a group of statisticians led by Feinstein in the subsection's 1978 newsletter of a set of practical examples for use in teaching statistics. This report included references on specific topics, such as clinical trials and observer variability; an outline for the critique of a medical report and the application of the outline to a published article; and a set of class exercises with answers.

An area of concern to organizing members of the subsection was the presence of valid questions on statistics on the examinations for medical certification (the National Board of Medical Examiners examinations). At that time there were no questions on statistics in part I (basic sciences) even though most medical schools teach statistics concurrently with the basic sciences. In addition, it was important to ensure that the questions included in part II (clinical sciences) of the examination be valid and representative of the material commonly taught to medical students. Lyon Hyams and Stanley Schor undertook the task of opening discussions with the National Board of Medical Examiners. They recommended that the subsection undertake the necessary steps to arrive at a consensus of what constitutes core material in statistics for medical students. Subsequently, the subsection recommended individuals to the national board to assist them in writing high-quality items for the examinations. These activities culminated in the establishment of a permanent slot for a biostatistician member of the part II national board test committee on preventive medicine and public health; Ronald Marks is the current member, and previous members have included Al Rimm, Feinstein, Colton, and Dawson-Saunders. In addition, a task force consisting of Azen, Dawson-Saunders, Greenberg, and Reed was established to write statistics items for part I of the national board examinations.

Throughout the existence of the subsection, two ongoing activities have promoted and enhanced communication among teachers of statistics. One was the establishment of the newsletter; the second was the organization of sessions for the ASA annual meetings.

The newsletter begun by Bahn continued under the editorship of Colton, Paul Jones, Dawson-Saunders, Martin Kotler, and the current editor, Steven Verhulst. The number of subscribers has varied from 300 to more than 700. The newsletter has emphasized a wider scope for the subsection, stressing that teaching statistics occurs in other areas, such as in nursing schools and pharmacy and veterinary medicine, and that statistics is taught to graduate students in schools of public health and elsewhere. One way in which these diverse audiences have been served is through the publication in the newsletter of summaries of conferences on teaching statistics and descriptions of courses or course activities that teachers have found successful. As an example of the former, the newsletter published the proceedings of the International Conference on Teaching Statistics to Medical Undergraduates held in Karachi, Pakistan, in March 1978. This conference, attended by more than 100 teachers of biostatistics, included Leaverton as vice chairman, and Calvin Zippin and Colton as representatives from the subsection. Descriptions of statistics curricula have been published in the newsletter by subsection members from many different countries; they typically describe the content of the course, resources used (including computer software), and novel or particularly successful instructional techniques that have been employed.

Each year the subsection sponsors an invited-paper session at the annual meeting. Originally, a program chairperson was appointed by the subsection chair; more recently, the chair-elect has taken the responsibility for organizing the annual sessions. Various topics have been the focus of the sessions, and suggestions for future topics are generally solicited at the annual business meeting. A discussion of the International Conference on Teaching Statistics to Medical Undergraduates organized by Chair-Elect Jones was the topic of the subsection invited session at the 1978 ASA annual meeting. In 1980 James Boen organized a program on new markets for statistics service teaching—for graduate students in the biomedical sciences and nonmedical students in the health sciences. The 1982 program was dedicated to the memory of Bahn; organized by Joseph Fleiss, it addressed the types of statistical training needed by persons who work in public agencies (such as state and local health departments) and by health administrators and managers.

Statisticians in the health field have increasingly been asked to provide statistical consultation to other researchers, in the health field and in other areas. They are also frequently asked by journal editors to referee articles, especially for manuscripts that appear to have design or analysis flaws. The subsection has explored ways of enhancing medical–statistical interactions. Some of the problems involved in optimizing such interactions were explored by Boen and Douglas Zahn in their entertaining book, *The Human Side of Statistical Consulting* (Lifetime Learning, 1982). Partly in response to the growing need for involvement of statisticians in collaborative studies, in 1984 Judith Goldberg organized the annual subsection program on training the statistician and health scientist for collaboration. Marks planned the 1986 program around a discussion by a panel of statistical editors of medical and nursing journals on ways to improve interactions between journal editors and statisticians. Participants included John Bailar, representing *The New England Journal of Medicine*; Bruce Dan, from the *Journal of the American Medical Association*; and Joyce Verran, from the *American Journal of Nursing*. Their advice was subsequently summarized in a 1988 article in *Statistics in Medicine* (Vol. 7, pp. 1002–1011).

To celebrate the ASA sesquicentennial in 1989, Reed organized a program to examine issues in teaching statistics from three perspectives—the past, the present, and the future. Richard Cornell provided a historical perspective of the development of biometry, epidemiology, and experimental design, and he discussed the teaching of statistics in graduate programs and medical schools. Dawson-Saunders

and Reed summarized the present status of statistics by presenting the results of a telephone survey of teachers of statistics in medical schools and reported on course organization, student assessment, and perceptions of statistics. Future trends in statistics teaching, including the role of computers in teaching statistics, were posed by Joyce Niland, Leslie Bernstein, and Azen. Colton provided comments on the three papers. All of the papers and comments were published in the *Proceedings of the ASA Sesquicentennial Invited Paper Sessions* (pp. 315–349).

The role of statistics in the health-science curriculum has been the major focus of the subsection since it was first established, and it continues to be an area of interest and concern. As long as there are new teachers called on to meet the challenge of providing relevant learning experiences to students in the health sciences, a forum to discuss problems and potential solutions is needed. Of critical concern for many biostatistics educators is the variability of the curriculum across schools of health-related sciences. In describing goals for ASA's *Challenges for the '90s*, Elisa Lee, the 1989 subsection chair, stated that the subsection should take the initiative to promote minimum standards for the biostatistics curriculum (p. 25). Perhaps it is time to take another look at the core curriculum posed by the 1975 report of the Feinstein committee, determine whether the recommendations are still valid, and, if they are, determine how they can best be promoted. Lee also called for the subsection to establish guidelines for the proper use of computers in the classroom, to develop recommendations for standard statistical terminology and notation, and to establish minimum standards for the format and content of information in published statistical reports. Thus subsection members can look forward to the next decade and beyond as an opportunity to continue to champion issues related to improving statistics teaching in the health sciences.

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The Chapters of the American Statistical Association

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American Statistical Association (ASA) chapters consist of statisticians who reside within a specific geographic area. Each chapter is chartered by ASA if it satisfies certain conditions, such as having objectives consistent with the association. This article presents a chronological record of ASA chapters from 1925 to 1989. It describes the activities and accomplishments of the chapters and explains their organizational structure. Some thoughts on the future of the chapters conclude the article.

KEY WORDS: History; Meetings; Organization; Services.

From its founding in 1839 until the late 1880s the American Statistical Association (ASA) was essentially a Boston organization. All of its meetings were held in Boston, and most of its members came from New England.

This changed with the election of Francis A. Walker as president of the association in 1883. Walker, with the able assistance of Davis R. Dewey, instituted a most successful drive to increase membership. Most of these new members were from all parts of the United States, and in 1896 the first ASA "scientific meeting" was held outside Boston, in Washington, D.C. But most groups of statisticians who resided outside Boston did not request ASA approval of their local meetings. They formed local statistical organizations that were not affiliated with ASA.

By the middle 1920s the association decided to charter local chapters of statisticians who resided within specific geographic areas (McKenzie 1989). The first chapter chartered was the original Los Angeles Chapter in 1925. By 1933 there were 11 chapters. Most of them were located in the large cities on the east coast or in the Midwest (see Table 1 for a complete chronology of all association chapters). One of these chapters was the Boston Chapter. There was a need for such a chapter because the ASA central office was moved from Boston to New York City in the early 1900s. In 1935 a charter was granted to the New York City Chapter for the same reason when the ASA headquarters was moved to Washington, D.C. The Washington Statistical Society was approved as an ASA chapter in 1935 even though it had been organized as a branch of ASA in 1925.

Conditions for charter approval during this period were similar to today's requirements. Each chapter had to have a constitution consistent with the objectives of the association, and it had to agree to hold regular meetings. In addition, it was expected that a portion of its membership (and definitely its officers) would be members of the association. In return, ASA provided chapter membership lists and collected chapter dues.

This arrangement was far from perfect. In 1928, 1933, and 1936 there were attempts to develop a more meaningful relationship between the association and its chapters. In 1939 ASA established a Committee on Chapters to improve the situation and to review the activity of the chapters. After reporting the need for a more formal interface between the association and its chapters and additional services for the chapters (such as a newsletter and regular lists of officers), the committee was discontinued in 1944. (It was not until the establishment of the Council of Chapters 40 years later that most of these recommendations were finally adopted.)

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Teaching Statistics in the Health Sciences - History

test statistic does not depend on the value of ρ, and thus this test cannot discriminate between different values of ρ. This means that the Bradley–Blackwood test by itself is not sufficient to determine whether the two labs are giving consistent results on the same specimen when "consistent" is given the usual interpretation.

It is interesting to note that, because the Bradley–Blackwood test is independent of ρ under H_0, this test can be used to test for identical distributions with either paired or unpaired data. As argued above, this test would be appropriate for paired data only if the value of ρ is not an issue. With unpaired data, the observations can be paired at random (assuming that the sample sizes from the two distributions are equal). In this case ρ would of course be zero.

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LETTER TO THE EDITOR

I would like to comment on the article appearing in the May 1990 issue of *The American Statistician*, 44, 101–103, titled "The History of the Subsection on Teaching of Statistics in the Health Sciences."

It seems it is just as easy to change history in the United States as it is in Russia. I was appalled at some of the statements made in that article. I will comment on only two, those that affect me most.

More than 10 years before the founding of the subsection on the teaching of statistics, I had been arguing with the National Board of Medical Examiners concerning the statistics questions that were being asked in Part II of the Preventive Medicine Examination. Finally in 1972, after 15 years of discussion, Dr. William Kennedy, who was then, I believe, executive director of the National Board of Medical Examiners, agreed that a statistician could be appointed to the Test Committee for Preventive Medicine, but he would only do this if I agreed to accept that role. I did and became the first statistician on the test committee. The committee, in addition to adding new questions to the examination, reviewed 25 percent of the pool of examination questions from the past every year. Thus, it took me four years to clean up the backlog of questions with wrong answers and questions which were not really very important as far as statistics in the medical field was concerned. I also sent letters to many prominent statisticians in the health sciences asking them for possible questions to be included in the exam. I made up a large pool of questions and answers for the National Board to call upon in the future.

At the end of my four-year tenure on this committee, I convinced Dr. Kennedy that it was still important to have a statistician succeed me. He said that he would do that only if I could guarantee that such a person would do the same kind of job that I did. I told him I was quite sure that Dr. Alfred Rimm of the Medical College of Wisconsin could do such a job, and Al was appointed to succeed me. When Al Rimm ended his stint both he and I agreed that Ted Colton should be the person to succeed Al, and he did.

This was certainly not a concern to the organizing members of the subsection nor did the subsection have anything to do with getting the National Board of Medical Examiners to accept a statistician on the test committee. However, the subsection finally did take over the role.

Lyon Hyams had nothing to do with opening the discussions with the National Board of Medical Examiners. Lyon and I started a committee called The Committee to Optimize Medical and Statistical Interaction and that became part of the subsection.

Since some of the people who were instrumental in organizing the subsection are still around, I think it would have been wise for the authors to have contacted them in order to get the history straight.

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REPLY TO SCHOR

It was surely not our intention to revise history when summarizing the events that led to the establishment of the Subsection on Teaching Statistics in the Health Sciences, nor did we intend to give less than ample credit to the early organizers. Dr. Schor played a large and important role in establishing liaison with the National Board and directing the early efforts to improve statistics questions on the examinations. We apologize if our history failed to recognize his or any other person's contributions as fully as they should have been.

In preparing the history, we worked as much as possible from published sources. The *Teaching of Statistics in the Medical Sciences, Newsletter No. 1* (Fall, 1969) referred to "a new group within the Training Section of the American Statistical Association." Page 3 of this publication described an area of mutual concern related to questions on statistics on the National Board Examinations (both their validity on Part I and their absence on Part II) and stated that "Lyon Hyams, M.D. (Rutgers) and Stan Schor (Temple) will head a committee focusing on this topic and will plan to meet with the staff of the Board of Examiners." *Newsletter No. 2* (Spring 1970) contained, on pages 2 and 3, a report from Hyams and Schor titled "Committee to Effect the Optimization of Medical Statistical Interactions (Formerly—Committee on National Board Questions)." In this report, Hyams and Schor stated, "We have begun discussions with the National Board of Medical Examiners toward reviewing these [biostatistical] questions and are pleased to report their interest and cooperation." Their committee suggested a plan to arrive at a consensus on what constituted core material in statistics, to present that information to the National Board, and to offer the services of several people to help develop questions.

Recent consultation with the National Board librarian established that Dr. William Kennedy was one of several Associate Directors at the National Board in 1972, as opposed to Executive Director, and that membership lists on the Part II Test Committee on Preventive Medicine and Public Health included Dr. Schor from 1972–1975, Dr. Rimm from 1976–1979, Dr. Colton from 1980–1983, Dr. Dawson-Saunders from 1984–1987, and Dr. Marks from 1988–1991. In the history of the subsection, we described Dr. Schor's key role in undertaking discussions with the National Board. We failed to make it clear that Dr. Schor had also been a member of the test committee, and, although we correctly included the remaining members listed above, we apparently were in error in listing Dr. Alvan Feinstein. However, based on published accounts of the early activities of organizers of the subsection, it would appear that our historical account was accurate in stating that the organizers were indeed concerned with issues that culminated in the establishment of a position for a statistician member on the National Board, and their efforts in this regard included both Drs. Hyams and Schor.

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