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Novus Biostat

Volume I, number 1
June 2000

Biostatistics

Welcome!

Looking ahead . . .

As part of our goals of collaboration in experimental design and analysis, conducting statistical research and teaching statistical methodology, the Department of Biostatistics is focusing on several initiatives.

Statistical analysts will begin a consultation clinic within the hospital two days per week by appointment or for a drop-in session. Online request forms for brief or long-term statistical consultation will be available to the institution's scientists and physicians. The focus of the clinic and the online site will be to answer statistical questions and to facilitate long-term collaboration with a biostatistician. Our purpose is to make it easier for clinical and basic science researchers to interact with biostatisticians.

Here's the Juice from Don Berry

Another initiative is to provide research support in cancer genetics through the formation of the Section of Bioinformatics. This has been undertaken through a cooperative effort with the Department of Biomathematics.

In addition, through the UT Graduate School of Biomedical Sciences we are developing a joint doctoral program in biostatistics with the Statistics Department at Rice University. Parts of the program will be up and running by Fall 2000. (Look for updates in future newsletters.)

As an intra- and inter-institutional initiative, we are creating a center for innovation in clinical research. Specialists from academia, private industry, regulatory agencies, and patient advocacy will combine their knowledge to improve test methods used in the development of pharmaceutical products and medical devices. Our Department is the foundation for this effort. An advisory board has been established and a working agenda has been put into motion. The initial goals for the center will include hosting consensus conferences and educational workshops and short courses.

If I have seen farther than others,
it is because I have stood
on the shoulders of giants.
Isaac Newton

Florence Nightingale (1820 - 1910) — a pioneer in statistical analysis

Florence Nightingale received a thorough classical education and was given additional tutoring in mathematics under the guidance of her father, William Nightingale, a Unitarian, anti-slavery reformer and Whig in Derbyshire, England. She spent a number of years tutoring young children in mathematics, then developed a particular interest in public health issues and hospital sanitation, and sought additional training in Egypt and Germany. In 1853, she took an unpaid position as superintendent of a woman's hospital in London. The Crimean War began in 1854, and thousands of soldiers died from illness, exposure and malnutrition at the British barracks-hospital in Turkey. Sir Sidney Herbert, Secretary of War, requested the services of Florence Nightingale.

Upon arrival at the army hospital barracks in Turkey with a staff of 38 nursing volunteers, Florence Nightingale quickly realized that she could make substantial improvements in sanitation, hygiene and nursing practices. Facing opposition from the local military leaders, she collected morbidity and mortality data on the soldiers, plotting her findings as a "polar-area diagram" (predecessor of the pie chart) to illustrate the needless deaths and morbidity resulting from poor conditions at the hospital. During the winter of 1854-55, the number of deaths from disease was four times that attributable to enemy action. Through the application of nursing services, Florence Nightingale and her staff were able to significantly reduce the mortality among the soldiers, and her methods were then also implemented at the army hospital in the Crimea.

Florence Nightingale developed a standard system for hospitals to use in the collection of consistent data. Her pioneer work in applied statistics was used to demonstrate the need for hospital reform to military leaders, Parliament and Queen Victoria. In 1858, Ms. Nightingale became a Fellow of the Royal Statistical Society. In 1860, she founded the first school of professional education in nursing in London, and published a nursing text that was utilized in many countries. She continued to work in areas of public health reform and education, publishing pamphlets to educate rural citizens on matters of sanitation and hygiene. The U. S. government sought her consultation during the Civil War, and she was made an honorary member of the American Statistical Association in 1874. In 1907, she became the first woman to receive the Brisish Order of Merit. The Crimean Monument in Waterloo Place, London was erected in 1915 to the memory of Florence Nightingale.

References:

Cohen IB. Florence Nightingale. Scientific American 1984;250:128-137.

Stinnett S. Women in statistics: sesquicentennial activities. Am Statistician 1990;44(2):74-80.

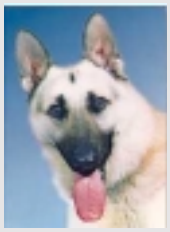
We remember this remarkable woman today as a pioneer in professional nursing, public health, hospital administration, and in the use of applied statistics in the field of medicine.

Higgin's Law:

The prevalence of any condition is inversely proportional to the number of experts whose agreement is required to establish its presence.

~ B S Everitt. Cambridge Dictionary of Statistics, Cambridge University Press, 1998.

The Canine Review



by Rex the Wonderdog

Dogs in Biostatistics

Our new graduate program is moving ahead full steam, with five frisky pups enrolled in the program now offered jointly by our own MDACC Biostatistics Department and the Rice University Statistics Department. First year students must learn to fetch, speak, and fit linear models.

The Don's Latest

Of course, The Don is still publishing his 20 papers a year. For those who wish to be dazzled, take a peek at Iverson et al., JASA 2000;95:28-42. They provide a Bayesian analysis of a population-based study of over 4000 breast cancer cases to investigate the effects of the genes BRCA1 and BRCA2 on survival after developing breast or ovarian cancer. Monte Carlo Monkey Chains and latent variables abound therein, and the reader is served up a feast of modern Bayesian statistical methodology.

Multiple this, multiple that. We now have a method for the design and conduct of clinical trials in which patients receive multiple courses of therapy, with the treatment in each course after the first chosen adaptively based on the patient's outcome or outcomes in earlier courses (Thall, Millikan and Sung, Statistics in Medicine 2000;19:1011-1028). Actually, Randy Millikan had the original idea, then Rex cooked up a probability model, Sung wrote the code, et voilà! We have designed not one but two trials at MDACC using this methodology, one in prostate and one in bladder cancer, both currently being conducted by Randy M. So now we have trial design that actually reflects clinical practice. What a concept! Now all we need is a brave programmer to write a general menu-driven program that does simulation and trial conduct, for worldwide export. By the by, at the behest of Eli (Quickdraw) Estey, a new multi-course design that deals with both response and death in AML is almost ready, after a mere year of work.

Is our new "Approximate Bayesian" method . . . "Off Bayes"?!!! When I spoke on this (Thall, Simon and Shen, Biometrics 2000;56:213-219) at the Harvard Biostatistics Department recently, the illustrious J. Ibrahim himself (famous, yes, but basically a regular guy) observed that our approximation might be highly variable! So, the competing approach seems to be specifying a full likelihood and full prior on its parameters and computing the posterior probabilities of the partition sets, rather than treating the estimate of θ like data. Of course, the former (more classical Bayesian) approach would require high dimensional numerical integration, which has its own problems. Anybody want to do a study comparing the numerical properties of the two approaches? Fame and fortune await the brave volunteer.

Paying Attention. But enough about me. Let's talk about . . . Dr. Do (pronounced like "dough," not "dew"). Yes, that Australian wonderkind has done it again. Do and Kirk (Biometrics 1999;55:174-181) combine principal component analysis, smoothing, and discriminant analysis to make a delicious statistical stew that determines whether adolescents with attention deficit hyperactive disorder (ADHD) will respond to long-term medication. Did you follow all that? Are you still paying attention? Maybe you need some anti-ADHD drugs.

The mighty Yu is likewise at it again. In her latest collaboration with Marvelous Marvin Zelen (Shen and Zelen, Biometrika 1999;86:503-515), new methods for estimating parameters in disease screening programs are given under different sets of conditions. They deal with both stable and nonstable disease models, and provide numerical illustrations in the form of simulations and analysis of not one but two data sets from breast cancer screening studies.

Scientific breakthrough. A big advance in scientific method has been made by a Famous Laboratory Researcher, who will go unnamed. It seems (continued, page 4)

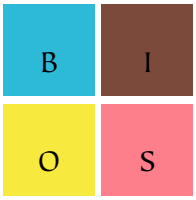
Scientific Breakthrough (from page 3) that, according to this FLR, if one simply discards statistical analyses that contradict knowledge established in the laboratory, where, as we all know, real science takes place, a great deal of time and money can be saved. Hopefully, in the future, FLRs everywhere may be able to do away with statistics entirely, and never again have to look at all those pesky little numbers and confusing formulas, not to mention suffer the indignity of listening to some statistician tell them that their most beloved theory is "not supported by the data." That will be a happy day, indeed.

Two Little Guys Can Always Beat One Big Guy

I know, I know. You may ask, "Does that Dog ever think about anything besides statistics?" Yes, to wit: We now have empirical evidence that if an NBA team can (a) double down on Shaq, (b) successfully defend the perimeter and (c) make their own offense generate points, then the phrase, "Beat LA" can become a reality. But (as of May 9, one game into round 2) the Kings were watching round 2 of the playoffs the same way the rest of us were. On TV. So, the question then became whether anybody could do it for four games.

Oyster Beef a La Rex

Of course, no review is complete without one of Rex's famous recipes: Slice a pound of beef (flank steak or chuck or even stew beef chunks will do) intro strips about 1/8 to 1/4 inch thick. Cut two red or green bell peppers into squares, and slice an onion into thin strips. Heat about three tablespoons of peanut oil in a wok (you can use sesame oil, if you are a real psycho), and toss in minced garlic (a LOT, otherwise, why bother?), and maybe some crushed red pepper or your favorite hot spice, and maybe even some sliced ginger root. Make sure the wok is very hot. Stir fry the beef until it is no longer red. Remove it from the wok with a slotted spoon, and put in the vegetables. Stir them around until the onions start to go clear, then put the beef back in and add some dark soy sauce and a lot of oyster sauce. Stir quickly but, in the immortal words of Martin Yan, "Don't overcook!" The vegetables cook fast, so once they hit the heat you need to move like lightning. Don't be a wimp! The oyster sauce should just get hot. Add some corn starch dissolved in water or saki, and stir in quickly. Get the wok off the heat and pour the contents onto a big plate or into a bowl. Serve with a nice Zinfandel or Cabernet that was opened and decanted, to breathe, before you started to cook. If this is done properly, grown men and women will weep with childlike joy once they start to eat.



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