

**Biostatistics Departmental Retreat
Cross Keys Inn
Saturday, September 21, 1996
8:30 AM - 4:00 PM**

MINUTES

Present: Faculty: Scott Zeger, Karen Bandeen-Roche, Ron Brookmeyer, Marie Diener-West, Subhash Lele, Kung-Yee Liang, Larry Mayer, Richard Royall, Jim Tonascia, Mei-Cheng Wang.

Students: Jingyee Kou and Paul Rathouz

Staff: Mary Joy Argo, Christine Rice-Carter

1) Current Status

The retreat began with a one-hour overview of the Department's current status. Dr. Zeger presented the information summarized in the attached tables on both the academic and financial status, pointing out the following major trends:

- near doubling of credits earned by students in departmental courses in last decade;
- 30% reduction in the size of the faculty;
- 60% of enrollments are in the sequence 601-604; only 13% of students in these courses are seeking doctoral degrees;
- departmental general funds have substantially increased due to increased enrollments;
- departmental savings of approximately \$200,000 to be used to recruit new faculty.

2) Departmental Research

The Departmental faculty and students have been enormously productive in biostatistical research over the last five years. Attached is a bibliography for the Department, which includes more than 200 papers published since 1991. Faculty are contributing original research on statistical methodology in the areas:

- foundations of inferences;
- likelihood inference in the presence of nuisance parameters;
- statistical methods in genetics;
- multicenter randomized clinical trials;
- the design and implementation of information systems and quality control for

- clinical research;
- statistical methods in epidemiology;
- statistical methods for monitoring disease progression;
- community trials;
- analysis of recurrent event data;
- morphometrics;
- spatial time series;
- hierarchical models □ computing alternatives to Gibbs sampling;
- exposure modeling;
- multivariate survival analysis;
- medical imaging;
- longitudinal data analysis;
- latent variable models;
- meta-analysis.

These methods are being applied in a large number of substantive areas, including:

- aging;
- AIDS;
- Alzheimer's;
- schizophrenia;
- psychiatric epidemiology;
- pulmonary medicine;
- neurology;
- ophthalmology;
- ecology;
- environmental sciences.

The Department faculty have published three books (*Analysis of Longitudinal Data* by Diggle, Liang, and Zeger; *Quantitative AIDS Epidemiology* by Brookmeyer and Gail; and *The Effectiveness of Methadone Maintenance* by Ball and Ross), have another about to appear: *Statistical Evidence: A Likelihood Paradigm* (Royall), and three others which will appear within the next year or two (*Morphometrics* by Lele, *Sampling* by Ross, and *Sampling* by Royall with Valliant).

2) Strengths/Weaknesses/Opportunities/Threats (SWOT)

In an extended discussion, the faculty, staff, and student representatives considered the current strengths and weaknesses of the Department as listed below.

Strengths

- Faculty quality
- Collegial environment: no factions
- School's commitment to "one Department of Biostatistics"
- Johns Hopkins Health Institutions: breadth of expertise
- Proximity to Washington
- Physical space (coffee machine, library)
- Computing hardware/software
- Relations with faculty in other departments of the Health Institutions, e.g., Mental Hygiene
- Quality of students, graduates, applicants (100 per year)
- 7-8 NIH funded training slots
- Interest in biostatistics by students in other departments
- Faculty involved in national professional organizations

Weaknesses

- Small size
- Lack of breadth and sometimes rigor in PhD courses
- Computing skills of faculty, students: expertise in hardware/software
- Shorter-term consulting for the Health Institutions: don't meet current needs
- Perception that department inclines toward theory, not application
- Size of classes for 601-604
- Discontinuity in 601-604 and more advanced service courses
- Relationship to PhD statisticians in other departments at SPH and at Homewood
- Poor infrastructure to support sponsored projects: budgeting, computing
- Limited consulting skills of substantial fraction of students
- Organization of the graduate program
- Variability in student funding

The opportunities and threats, related to strengths and weaknesses, were identified as the following:

Opportunities

- Redesign statistical education for public health professionals and scientists
- Innovative distance education courses; short courses for industry; physician education
- Advanced PhD courses with more rigor
- Attract uniformly high-quality students
- Improve relationships with Homewood: joint BS/MHS in Biostatistics; joint PhD-Math Sci/MHS-Biostatistics
- Engage PhD statisticians outside our department to participate in our academic programs
- Promoting statistics as an integrated way of thinking, not a collection of methods
- Attracting methods grants for subgroups of faculty
- Strengthening information sciences: MSc computer scientist on staff
- Strengthening financial management
- Regular sabbaticals

Threats

- 3/4 funding from master's/professional students which are shifting from full-time to part-time (distance) education
- Extreme reliance on single source of general funds revenues: educational program
- Large size and generality of Biostatistics courses offered to Public Health professionals and scientists
- Proliferation of PhD biostatisticians in other departments, combined with our Department's small size
- Diversification of methodologists: econometricians, psychometricians, data miners, medical informaticians, outcomes researchers, ...
- Narrowly defining biostatistics, traditional methods for which have peaked
- Intellectual stagnation of statistics
- Lack of time for faculty to think more deeply about problems
- PhD graduates poorly trained in probability/real analysis □ invest too much time in inappropriate courses

The retreat discussion then turned to longer-term, "bigger" opportunities to be considered further. These included:

- Integrated, non-traditional educational program of short courses, targeted to professionals (who are unable to come full-time) at academic health centers, pharmaceutical companies, medical research organizations, government agencies, etc. We would create a modularized set of learning opportunities, with design analogous to that of object-oriented computer programs. One possibility would be to focus these courses for staff at NIH and to attract Mitch Gail, Barry Graubard, Ed Korn, and others as co-teachers.
- Reshape the paradigm for statistical sciences: Richard's work on statistical evidence has the potential to reshape the way health research is viewed. Further theoretical research, applications, and software are all needed to advance this approach. Departmental faculty and students could consider these ideas and determine the extent to which we have a special opportunity, then organize paper-writing, professional meetings, etc., to promote thinking about these ideas.
- Monitoring a population's health: Historically, the Department was engaged in vital statistics. Today, work by Brookmeyer, Zeger, Lele, Royall, and others directly relates to monitoring a population's health. The Department might take a co-leadership role in creating a health monitoring program with three phases: prospective follow-up of health status; testing of health interventions; developing programs to implement effective health promotion within the community. One obvious community is Baltimore City.
- Departmental focus in a substantive area -- e.g., the study of mental disorders: Faculty currently work in the areas of Alzheimer's disease, schizophrenia, and other mental disorders. We have a methods grant under consideration on statistical methods for mental health services research. We have strong relations to faculty in the Department of Mental Hygiene. One possibility is to take a co-leadership role in coordinating centers for large-scale Alzheimer's prevention studies.
- Broaden the definition of Biostatistics: Statistical methods for standard observational and experimental studies of health are reasonably well-developed. Analytic methods can always be improved but much of current methodologic research focuses on the second or third decimal place. Yet there are new, exciting fields to which our faculty can contribute, including:
 - Medical imaging: Royall, Lele, Zeger, Miglioretti, are beginning to work in this field; Bandeen-Roche works on neurologic damage from boxing, to which these ideas are important; Pearlson and Herskovits are valued colleagues; Lele is interested in geographic information systems where similar ideas will emerge.
 - Data mining for managed care organizations: Statistical methods for very large databases -- so-called "data mining" -- requires special computing skills and a tailoring of statistical ideas to a new arena. Managed care organizations are just beginning to develop automated information systems for patient records. The opportunities to partner with a Glaxo spin-off currently exist.

SLZ/mja