MISSION

The teaching mission of the Department of Biostatistics is to provide an excellent education in the theory and application of statistical methods in the health sciences. This mission covers an array of introductory courses tailored to students in other departments (“service courses”), and more technical courses for the training of biostatisticians at the MS and PhD levels. For the training of biostatisticians, our graduate programs prepare students to excel in a variety of occupations, including careers in universities; research institutions; pharmaceutical and other health-related industries; and government.

ADMISSION PROCESSES AND CRITERIA

Student Demand and Recruitment

There is a nationwide shortage of biostatisticians and a shortage of good applicants to biostatistics graduate programs. Many graduate programs in biostatistics compete for the same student applicants. Nevertheless, we receive dozens of applications every year, offer admission to only a small fraction of them, and enroll a high percentage of those we admit. For example, in 2009 we received 74 total applications for our MS and PhD programs; we admitted 23, and 13 are currently enrolled.

The Graduate College tables that show PhD applications, admissions, and enrollments do not accurately reflect the actual numbers in our PhD program. Most of our admissions are into our MS program, which some students pursue as a terminal degree, while others apply to our PhD program during their second year of study. However, the Graduate College tables do not include these internal applicants (they are considered “change of status” and not “applications”), so they do not count the majority of our students who enter our PhD program. As an example, the Graduate College tables show that in 2004 there were 49 PhD applicants, one admitted, and zero enrolled. What the tables do not show is that one was admitted to and enrolled in the MS program and that six of our MS students were admitted to the PhD program, of whom five enrolled. For the years 2007-2009, 18 of our MS students applied to our PhD program, 16 were admitted, and 15 enrolled.

Our recruitment efforts have two major aspects: 1) increasing the visibility of biostatistics as a potential field to diverse groups of undergraduate students in mathematics and biology, and 2) actively pursuing students who show interest in our program. To increase visibility, several of our faculty give seminars and hold informational meetings at undergraduate institutions to introduce the field of Biostatistics. In these visits, our faculty meet with current students and establish connections with faculty who may refer future students to our program. Several faculty also attend undergraduate conferences and symposia to meet potential students. We have also added a video to our departmental website that introduces the field and our program. Finally, we have established the Iowa Summer Institute in Biostatistics (ISIB) to provide biostatistical training and research opportunities to undergraduates. ISIB is supported by a grant from the National Institutes of Health (NIH).

We invite the top potential students to visit our department. For those who visit, we arrange an itinerary for them to meet current students and faculty, and to tour research and teaching facilities. Since many of the best candidates for our PhD program come from our own MS students, our efforts in teaching and mentoring our MS students are important recruitment activities, in that they help us retain most of our top internal candidates for the PhD program.

Criteria for Selection

Biostatistics is a field that is collaborative and cross-disciplinary by nature, requiring a breadth of quantitative and verbal skills. We consider several criteria when deciding on admission into our graduate programs: technical skills, communication skills, ability to perform as a research assistant and a teaching assistant, ability to take initiative, leadership skills, and, in the case of PhD applicants, the willingness and availability of faculty members to be the dissertation advisor. We use all portions of the student’s application (transcripts, résumé, personal statement, reference letters, GRE scores, and TOEFL scores when applicable) to judge these criteria.

Success in Enrolling the Highest Quality Students Admitted

We have had excellent success in enrolling our highest-ranked applicants. For example, in 2009, we enrolled nine students into our MS program, including five of the top eight applicants. These five students had an average undergraduate GPA of 3.72,
and an average verbal plus quantitative GRE score of 1,316. Also in 2009, we offered admission to six PhD students (including five of our own MS students), and all six enrolled. These six students had an average graduate GPA of 3.85 and an average verbal plus quantitative GRE score of 1,265.

Success in Enrolling a Diverse Student Cohort

We have been successful for many years in enrolling both international and domestic students (currently 16 and 23, respectively). We have had recent success in recruiting underrepresented minority students, increasing from zero to five from 2004 to 2009. This has come through recruitment efforts at specific universities, attendance at national conferences for minority undergraduates, and collaborative efforts with University of Iowa Department of Mathematics, which is home to the NSF National Alliance for Doctoral Studies in the Mathematical Sciences (the “Alliance”). The collaborations with the Alliance led to the NIH funding for the “Iowa Summer Institute in Biostatistics”, which will bring undergraduates to campus for a summer experience in Biostatistics, with priority given to minorities and disadvantaged students. Graduate College Dean’s Fellowships were also very helpful in recruiting and supporting two of our minority students. Our success in enrolling a diverse student cohort was recently recognized by the College of Public Health’s Board of Advisers, who honored our DEO, Dr. Kathryn Chaloner, with the 2009 Faculty Achievement Award in Community Engagement, for her leadership in the area of diversity.

Financial Aid Commitments

All of our full-time students receive financial aid: five of our students are currently supported as teaching assistants, six have NIH fellowships through our T32 training program (“Statistics in Microbiology, Infectious Diseases, and Bioinformatics”), one is on a CDC fellowship in “Environmental Epidemiology”, two are on dissertation fellowships provided by a Strategic Initiative Fund of the Graduate College, and the remaining are supported as 20 hr/week graduate research assistants. Several of our PhD students have been able to compete successfully for summer dissertation fellowships from the Graduate College.

PROGRAM OUTCOMES

Degree Completion and Time-to-Degree

Our programs have high completion rates, and the students finish their degrees in a timely manner. Our MS students generally graduate within two years, consistent with the design of our MS curriculum. Of the 74 students who began the MS program between the years 2001 and 2007, 70 (95%) have graduated, three left the program for family-related reasons, and one is a part-time student who is currently focusing on his full-time job. According to tables prepared by the Graduate College, our PhD program has a completion rate of 77% (vs. 55% university-wide), with a median time-to-degree of 5.3 years (vs. 5.8 years university-wide).

Graduate Student Fellowships, Awards, Honors, and/or Publications

In addition to the fellowships mentioned under “Financial Aid Commitments” above, for each of the past three years, one of our PhD students received a dissertation fellowship from Amgen Foundation, and several have completed summer internships at pharmaceutical companies. Our T32 award is in collaboration with the Department of Microbiology and the Department of Statistics & Actuarial Science, and provides fellowships for their students in addition to ours. The students collaborate on research in an interdisciplinary manner. Our students have won awards at local, regional, and national research conferences. One or two of our students are elected each year to Delta Omega, the national honor society in Public Health. Our students have published a wide variety of scientific papers; during 2008; they published at least 10 papers in collaboration with our faculty and at least 13 papers independent of our faculty (usually in collaboration with a faculty member in a different UI department).

Graduate Student Placements

Our students have had excellent success at finding good career opportunities after graduation. All nine of our PhD recipients from 2006-2008 have full-time employment: four at universities, two at research institutions, and three in the private sector. All 43 MS recipients from 2006-2008 are employed in the field or are furthering their education: nine are employed at universities, five work at research institutions, six work for private companies, 12 are in our PhD program, and 11 are in PhD programs in other departments or institutions.
PROGRAM CHARACTERISTICS

Appropriate Size

Overall, we believe that we have the appropriate number of students for a biostatistics department our size (14 primary tenure-track faculty, including the DEO, one Associate Dean, and one faculty who will retire soon and has already been replaced using temporary funds). Every year, we regretfully turn away many excellent student applicants. For several years our enrollment has generally been in the range of 30-40 full-time students, and currently 23 of 39 graduate students are PhD students. Our main limitation is the current number of faculty. If we had additional faculty to advise PhD students on their dissertations, we are confident that we could recruit additional excellent students.

The current size of our faculty limits the breadth of our curriculum, the choices for dissertation topics, and our course offerings. Specifically, we are only able to offer some courses that are required for the PhD program every other year, rather than every year. This can impede timely progress to degree and presents challenges in completing courses in the appropriate order. The external reviewers in our 2008 Departmental Review expressed this concern: “Because the teaching responsibilities of faculty are spread fairly thin to cover service courses, MS courses, and PhD courses, some of the required PhD courses…..are taught only in alternate years. This affects the teaching of other courses which ordinarily would require the alternating courses as prerequisites. E.g., it would be logical to take survival after having been introduced to likelihood methods and nonparametrics. The alternating-year configuration is dictated by practical considerations: the faculty are spread too thin to offer all the required courses every year”.

Comparison with Similar Programs

Our department was established only 10 years ago, previously being a division within the Department of Preventive Medicine and Environmental Health (PMEH) in the College of Medicine. Similarly our MS and PhD programs were built on the foundations of the Biometry/Biostatistics subtracks in PMEH. The external reviewers in the 2008 Departmental Review stated, “This is a strong Department, highly competitive with similar departments at other Universities, doing an excellent job in recruiting and training students, and in carrying out methodological and collaborative research.” The number of faculty in our program is small compared to our competitors (e.g., 21 at the University of Minnesota, 25 at the University of Michigan).

Summary of Strengths and Weaknesses

First, we have excellent collaborative ties to the Carver College of Medicine, the College of Dentistry, and other UI colleges, which provide excellent collaborative experience for students. Second, we have an excellent relationship with the Department of Statistics and Actuarial Science in the College of Liberal Arts and Sciences. We teach courses to each others’ students, we cross-list courses, we serve on dissertation committees together, we attend each others’ seminars, and we have coordinated faculty recruitment efforts. Third, our department has a history of quality teaching, as evidenced by our faculty winning the Faculty Teaching Award in the College of Public Health four times in the last nine years. Fourth, we are proactive in improving our degree programs, recently conducting a major overhaul of the PhD curriculum, as well as streamlining the MS program. Finally, we have excellent faculty and students who work together in a culture of mutual support and respect.

The greatest weakness is the size of our faculty compared to competitive programs elsewhere; this limits the breadth of our curriculum, restricts the frequency of course offerings, and leads to very large class sizes in our service courses. Another major current weakness is the geographic separation of our faculty members (in the General Hospital) and our graduate students (in the Westlawn Building). We look forward to solving this problem with the new College of Public Health Building.

Potential to Improve Excellence

Having a permanent academic home in the new College of Public Health Building will further strengthen the recruitment, teaching, and mentoring of future students. In the current economic climate, additional faculty lines are extremely scarce, but we plan to continue to explore opportunities for joint appointments with other groups.

CONCLUSIONS

Although the Department of Biostatistics is small in size and has only existed as a department for 10 years, we have been very successful in recruiting, enrolling, teaching, and graduating excellent students coming from diverse academic and cultural backgrounds. Our MS and PhD graduates consistently find excellent positions which utilize the education they have received in our programs.