

Biostatistics Masters Program Proposal

Response to Questions and Issues raised at APC 2/24/10

This memo provides responses to the issues that were raised at the APC meeting on February 24, as outlined by Dr. Buckley in an email. We note that the Committee appeared supportive of the content of our curriculum, but had questions pertaining to arrangements and logistics rather than program content.

English skills: How will we assess / screen? What will we do for marginal candidates (e.g., reject / remediate)? What University resources are available?

As general background, we understand that programs in the Graduate School have access to courses for English as a second language, and that students who score poorly on a test of English proficiency usually take these courses during the summer preceding their first-year fall courses. We understand these courses have a marginal cost for each additional student, and that covering the cost of English remediation should be a line item in our budget whether or not we use the Graduate School courses. It is generally appreciated that it is inefficient to reconstruct courses in English as a second language outside the Graduate School, but it is also the case that a comprehensive agreement has not yet been obtained to allow students from outside the Graduate School to take these courses. We appreciate Provost Lange's comments during the last meeting that these negotiations need not delay our program's approval. Moreover, as a relatively small program (10-20 incoming students per year) our presence should not decisively influence whatever negotiations eventually take place.

As background more specific to biostatistics, some top-flight students do not speak English as a first language. Indian students typically have excellent skills. Chinese, Korean, Japanese and other East Asian students have English language skills that range from outstanding to rudimentary. The need for excellent language skills is particularly strong in a program such as ours that focuses on communication. We believe that one of our tasks is to limit the amount of required remediation by screening applicants as carefully as possible, including having interviews by videoconference. These interviews can be graded for English communication using standard rubrics (as statisticians, dealing with this sort of measurement issue is the kind of thing that we do well), and we have had some preliminary discussions with the Economics Department about precisely how to go about setting up the interviews, how to pose questions that challenge the student's communication skills, and how to grade the results.

In part because of the pool of students from which we will draw, we anticipate that the above efforts are likely to reduce the magnitude of the problem rather than eliminate it. Accordingly, we are increasing tuition by \$4,000 per student to an annual \$32,960 (in AY2011-12) to cover the cost of English instruction,

additional recruiting costs, and university services discussed below. More precisely, based on a communication with Dr. Bell, the marginal cost for a registration slot for English as a second language is \$1,030. Those who place into these registration slots occupy 1.5 slots on average, so the estimated cost per individual student is \$1,545.

Moreover, we are exploring additional options for obtaining instruction that would be more specifically targeted toward the needs of our program. For example, we have already started discussions with a colleague at the DCRI's communications group who presents seminars on techniques for scientific writing. We are considering how we might modify such seminars to fit the needs of our program. Presumably, such seminars might be taught at multiple levels – remedial for those students who require remediation and at a more advanced level for those who do not. The same idea could also be applied to the more immediately urgent topic of verbal communications skills. Additional options for teaching such courses are hiring professional consultants, and hiring a PhD in English as an adjunct faculty member.

In summary, our approach to remediation of English skills is to (a) minimize the problem by careful interviewing; (b) budget an extra \$1,550 per student to account for the marginal cost of this instruction, recognizing that the venue for that instruction has not been finalized; (c) without creating unnecessary duplication, explore whether English remediation can be integrated into some dedicated modules on communication that would be of benefit to all of our students; and (d) await a University-wide policy regarding these issues.

Utilization of University support resources: What resources are needed? To what resources will your program have access? How will University support resources be built into the tuition model? (There is a bigger discussion coming about SOM in general but you will need to have a plan for your small numbers).

Courses in English as a second language, discussed above, represent just one of the resources that we will need. Among various other examples are career counseling and information technology.

Our general response to this issue will be similar to that of English remediation. In particular, while awaiting a University-wide policy on these issues, we will explore solutions within our Department and within the School of Medicine. Moreover, we will place line items in our budget to reflect these costs, and base these estimates on the marginal per-student costs charged by the Graduate School.

This solution should be particularly successful for career counseling. Even in the absence of a formal agreement, Dr. Wright-Swadel has graciously offered to respond to any questions that we might have about setting up a career

counseling program, and more generally to informally provide us with the benefit of his extensive experience. Duke has a pressing need for high-functioning masters-level biostatisticians, and we anticipate that some of our graduates would be offered positions within Duke. Faculty members have numerous ties with industry, and are often solicited for their recommendations in hiring. The American Statistical Association also has a placement service for which our graduates would be eligible. Indeed, because the biostatistical community is relatively small, and because biostatistics is a relatively specialized field, it is quite possible that we would be very successful in placing our graduates without the need for additional services.

Regarding services such as information technology required to support the day-to-day operation of a program, we will rely heavily on our experience in administering the Clinical Research Training Program, not only for pragmatic solutions (e.g., the CRTP has access to an excellent developer of web-accessible admission forms) but also to ensure that we have budgeted our line items realistically.

Course access: We need to formalize arrangements for sharing courses with other campus programs. This would include financial agreements, access, prerequisites, etc.

We agree, and plan to negotiate these agreements during the next few months. With relatively few students involved in sharing courses, we anticipate that negotiations should be straightforward.

In order to demonstrate proof of concept, we have recently negotiated such an agreement with Dr. Gelfand in the Department of Statistical Sciences (email attached). For the next 3 years our students can take classes at DSS without charge, and similarly for DSS students taking courses within our program. Such an agreement is particularly important as we anticipate that DSS will be the entity with which we would share the greatest number of students.

This agreement reflects the natural synergy between our departments. For example, incoming students that place out of some of our first year courses would be those with advanced backgrounds in mathematical statistics and might eventually be natural candidates for doctoral work at DSS. DSS has a class in statistical consulting that would be a natural match with some of our program content, and would also benefit from connections with the various applied research projects which many of our faculty members support.

Program marketing: What is our plan? Who are our customers? Where will our students go? What is the expected job market, salary? We need a plan for both recruitment and career placement.

Although our pre-program needs assessment was informal rather than formal, it was quite extensive. In particular, our Director of Graduate Studies interviewed over 20 highly skilled masters-level biostatisticians (those recommended by principal investigators and supervisors) about what distinguishes them from their less well-performing colleagues, and also interviewed various biostatisticians about desired curriculum features. Moreover, members of our faculty have had numerous discussions about these issues with employers of biostatisticians. The results have been extraordinarily consistent – 1) what distinguishes highly valued and productive biostatisticians from the rest is a combination of analytical, biological and (in particular) communication competencies, and 2) the graduates of a program that simultaneously focuses on these competencies would be in high demand.

It is important to note that the demand for biostatisticians is most fundamentally caused by the explosion in the size and complexity of biomedical (e.g., genomic, administrative) data bases, that this demand was present before the current recession began, and that this demand should remain present after the recession ends. Moreover, biostatistics is a field in which demand is increasing significantly more rapidly than supply. Thus, our program should retain its viability over time.

Our recruitment plan will be substantially similar to that used by the new program in Clinical Research Informatics and, indeed, this program has proposed that it might be efficient for us to cooperate in recruitment. The sources of students – primarily undergraduates (including undergraduates at Duke concerned about their marketability given the current economy) and current workers desiring greater responsibilities and more rapid advancement – are described in our proposal.

We will attract these students through both pushes (dedicated recruiting efforts) and pulls (general recruiting tools). Our primary pulling tool will be the departmental website, and one of the line items for program development in our budget involves immediate expenditures to facilitate its upgrading. The experience of other programs suggests that a strong web presence is perhaps the most effective recruiting tool available. Another pulling tool will be the publication of articles in applied statistical literature (e.g., The American Statistician) describing our program development. Pushing efforts will include letters from our Chair to key international educators and thought leaders, announcements at statistical meetings, advertisements in statistical journals (national and international), information sessions at the largest NC state universities with comparable undergraduate programs, and letters to Chairs of selected undergraduate departments at Duke.

We will additionally publicize our program through contacts in industry, as discussed above. We anticipate that our recruiting plan will evolve over time, and expect to continue to learn from the experience of similar programs. A resource that can be particularly helpful in our recruiting efforts are our faculty,

who are strongly supportive of having a degree program and can be counted on to support recruitment in various informal ways.

Career placement has been discussed above. Briefly, even in the absence of a formal career placement methodology (which will be developed over time as we gain experience in administering this program), our faculty members have sufficient connections to help place our graduates, often within Duke.

Our graduates will be placed in industry, academia and government, most typically in the first two. During our last meeting Dr. Mela described an approach – with which we agree – that would allow us to increasingly formalize relationships with employers over time. For example, at present faculty members working on randomized trials (or other studies) sponsored by major pharmaceutical companies might be queried (typically, through contacts developed during the trial) about potential hires. This process could be formalized by including high-level scientific investigators at these pharmaceutical companies as well as their human resources departments in an explicit process to better match graduates and slots. Moreover, our plans already include contacting students at regular intervals post-graduation to solicit suggestions for improving their educational experience. These plans could certainly be expanded to include employers as well, in order to ensure that our educational experience is maximally valuable.

Tuition: We should reconsider hidden costs and our market assessment – in particular, are we recovering all our expenses and are we adequately monetizing Duke’s brand?

Our budget now reflects the cost of various intra-institutional transfers such as language remediation. We are also prepared to present spreadsheets that illustrate not just profitability during steady-state, but also various time frames for recovering our developmental costs. Here, we briefly discuss (a) selection of tuition level; (b) budgetary drivers; and (c) backstop.

Our proposed tuition for AY2011-12, \$32,960, is based on tuition at other top-tier institutions (i.e., under the assumption that their tuition levels were consistent with such an analysis). Tuition at other top-tier institutions can range as high as \$35,000-\$40,000. On the one hand, we believe that we are offering an innovative program that should command similar tuition rates. On the other hand, we do have a very low-cost competitor in UNC (particularly for in-state students), and some previous review committees had expressed reservations about our ability to recruit in-state students if the tuition differential between our institutions were too high. We had not considered the issue discussed last week – that is, the need to keep our tuition sufficiently high so as to be consistent with the Duke brand. An alternative approach to tuition would be for us to charge a

higher nominal tuition rate (e.g., \$35,000 per year) but to heavily discount this tuition during the early years of the program through scholarships. (It is possible that various pharmaceutical companies would be willing to offer such scholarships.)

In the steady state, the primary driver of our budget is faculty salaries. Faculty salaries are estimated by matching percent effort to estimated time required to teach, thus allowing us to remain consistent with the principles of effort reporting. We envision relatively little flexibility here. As long as class sizes remain as anticipated, the marginal cost of adding an additional student is minimal, so we treat faculty salaries as a fixed cost. As long as we do not expand beyond the capacity of our facilities, space is similarly treated as a fixed cost. Even with the previously proposed tuition of \$28,000 per year we would be profitable in the steady state with 15-20 students per incoming class, and note that were we to expand the program our additional tuition revenues would far exceed the marginal costs associated with those students.

Our start-up costs include the administration and staff time required to launch the program, and the faculty salaries devoted to course development. In addition to start-up costs, we are now projecting a much more conservative financial plan which assumes 10 new students in the first year, 10 in the second, and 15 in each subsequent year, achieving a steady state of 30 enrolled students in year four. This scenario would require a backstop of \$429K total over FY11 – FY13. In FY14, the program would generate a positive variance and the \$429K could be restored to reserves by mid-FY16.

Backstopping funds are available in department reserves. This plan has been reviewed by the School of Medicine Office of Finance and Administration. We will assess the program annually, including its financial viability and will make modifications to our financial model as necessary (for example, reducing the salary coverage, reducing the administrative costs, increasing tuition).