Statement on Mentoring Philosophy and Practices

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I am grateful that my career involves a combination of research, teaching and mentoring and that the academic environment at the University of Pittsburgh creates numerous opportunities for mentoring doctoral students. I am a Professor of Epidemiology who designs, implements and analyzes data for clinical studies. Currently, I am the Principal Investigator of three NIH-funded studies and a co-investigator on five studies which focus on women's health, diabetes and cardiovascular disease, transfusion medicine, sickle cell disease and COVID-19. My research projects provide the resources for meaningful student dissertation research. As a result, I directly mentor a few doctoral students as their primary academic advisor / dissertation chair while investigating clinically relevant hypotheses. Through local team meetings and study-wide research collaborations, I informally mentor additional students who are working on dissertation research with other faculty advisors as well as graduate student researchers (GSR) who are financially supported by our research projects.

For the last 15 years, I have taught an Epidemiological Methods course in our core curriculum. Classroom teaching provides a venue for me to interact intellectually with most of the graduate students in our department. I provide doctoral students statistical tools that they can apply to their current research projects and in their future careers. In addition, students in the School of Public Health frequently ask me to serve as a member on their doctoral dissertation committee. In this role, the primary advisor typically directs their dissertation research while I serve as the "quantitative mentor" who guides the statistical aspects of their dissertation research.

Leadership and management are key features of my job in team science. In 1991, when I earned my doctorate in statistics at the University of North Carolina at Chapel Hill, there were no women faculty in my department. Four years later, I was hired as a statistician in the Epidemiology Data Center at the University of Pittsburgh and refined my research and project management skills under the guidance of Dr. Katherine Detre and Dr. Sheryl Kelsey. This experience made me recognize and appreciate the importance of strong female role models and professional mentorship.

Several themes have emerged as I have mentored doctoral students in epidemiology and biostatistics. The central tenets of my mentoring philosophy and practices are as follows.

A thorough understanding of the fundamental concepts of our field requires hard work. Few students have been trained in epidemiology and biostatistics when they begin graduate study in epidemiology. Intense effort is required to learn the basic and complex constructs of our field of research. Epidemiology involves mastery of quantitative skills, critical thinking, and clear communication, both verbal and written. I meet individually with my doctoral students several times per month and systematically review their work at these meetings. I always stress the underlying principles that are involved in the problems with which they are wrestling. I endeavor to present the concepts clearly and to suggest additional reading or other resources to support their learning. I expect students to struggle with difficult concepts. It is okay if they cannot immediately grasp a new concept, rather, it is important that they make a concerted effort to comprehend the complexities of the issue.

A large proportion of this generation of graduate students have never experienced academic failure, and they feel insecure when they don't succeed quickly. I reassure students that is acceptable to sit in on a course a second time in order to become proficient in a specific area. Moreover, it is no great shame to fail one of the three doctoral preliminary exams if it motivates the student to double down and vastly improve their understanding of the material. Indeed, the benefits are often impressive. Ultimately, I expect that my students will be able to explain the foundational principles of epidemiology and biostatistics and to articulate how these methods apply to their research using precise language; this enhances their own understanding of the topics and will facilitate their future collaborations with clinical researchers. I support students as they cultivate these skills by consistently guiding their educational development.

Real-world research projects provide optimal learning opportunities. As a mentor, I aim to involve my students in the research process to the greatest extent possible. A student might design part of a study protocol, develop data collection instruments, create analytic datasets, perform statistical analyses on complex datasets, create figures to enhance data visualization, communicate results to clinical colleagues, draft manuscripts and deliver presentations. Typically, the first year requires numerous tutorials about the standard operating procedures and the rationale for those procedures. Each year, the student gains experience and is able to participate in the research process more fully. The student obtains practical skills and valuable knowledge that can be transferred to other research settings. In particular, they learn about a particular content area such as the progression of cardiovascular risk factors or the reduction of bone mineral density during menopause or the potential treatments for persons with sickle cell disease. They also learn research methods such as how to best quantify clinical changes over time or how to evaluate treatment effectiveness. Finally, the students learn to interpret the results and communicate these findings using appropriate terminology for a research audience and for a lay audience.

One of my goals is to stay engaged in multiple research projects that provide students with resources used to conduct their dissertation work. The availability of these resources (e.g. data or specimens) allows our students to answer questions with public health significance. I consciously seek opportunities for students to simultaneously participate in multiple research projects so that they are exposed to a variety of experiences. For example, one of my current students is working on an on-going clinical trial. He is involved in the conduct of this trial and the data and safety monitoring; however, he is not allowed to present any data from the clinical trial until the trial is completed. As a result, I suggested that he help a colleague with the analysis of data from a different study. The three of us worked as a team and met twice a month as the student performed the statistical analysis and created data tables and figures. We discussed how to construct the regression models and the clinical importance of the findings. He drafted and submitted an abstract to the American Society of Hematology (ASH) Conference and prepared a manuscript based on this work. He was recently recognized with an ASH Abstract Achievement Award which is awarded to a trainee with an outstanding abstract! This award which will enhance his resume was possible due to the existing research infrastructure combined with strong clinical and statistical mentorship.

Effective collaborative science demands professionalism. One of my favorite parts of being an epidemiologist is that we collaborate with researchers in clinical medicine, basic science, psychology and behavioral science, and statistics. We work on multidisciplinary teams with colleagues across the university and from other institutions. However, it is not uncommon that an investigator is harsh or even rude and that a student feels hurt or insulted. I cannot count how many times I have counseled a student to not take things personally. I ask them to analyze

why they think that the investigator reacted the way that they did. I stress the importance of attempting to address the criticism as well as possible (is there something we could have done better?), and at the same time, recognize that another person's anger or frustration is often unrelated to our work. Most importantly, to excel in our field, the student must learn to maintain their composure and to sustain a pleasant demeanor.

I strive to be a role model of professionalism for my students and to create a positive work environment. Within our team meetings, I convey an optimistic attitude and frequently and effusively recognize the contributions of others. When mistakes are made, I minimize the criticism and focus on how we can learn from the experience to improve operations in the future. I work hard to instill confidence in my students and allow them to independently interact with others to develop management and collaboration skills. Beyond the professional growth, a number of my students have made valuable connections through our research collaborations. These connections have resulted in publications, post-doctoral fellowships and job offers.

There are many different paths to success. Many students worry about doing the right thing at each step of their academic career. I encourage students to try new things. It is acceptable to shift the direction of our careers based on what we like (or based on what is working well!). Each student has a unique background, set of skills, and desires. Over the years, I have had students who are Black, Hispanic, from rural Appalachia, or from foreign countries, students who are social butterflies, entering arranged marriages, single mothers, or isolated and lonely. Some students prefer individual computational work, and others seek team science, an educational role, or public service. I firmly believe that one can be professionally successful in a variety of ways. I try to understand what is important to a student and help them chart a course that aligns with their priorities and values. As we go through this process, I aim to treat each student with kindness and respect. I use all the information that I have at my disposal to help my students thrive at the University of Pittsburgh and as they launch their careers.

Mentoring is an art. I care deeply about my role as a mentor, and I try hard to do my best. I feel blessed that I have had the privilege of seeing my students flourish in their careers and in their lives. That is the greatest reward.