

Reflections on the Future of Epidemiology: How Students Can Inform Our Vision

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As a professional epidemiologist for over 25 years and as a departmental chair for the last 11 years, I have come to appreciate a bit of the long view. That perspective gained from a multitude of experiences in research, training, and service. For decades, there has been much discussion on what's most important in epidemiology, what is the future of epidemiology, for example, debates on the underlying theories of epidemiology and disease causation, epidemiology methods, contrasting the importance of biologic and social factors, and the call for “consequential” epidemiology [1–3]. These discussions continue to play out at national meetings and in print and represent a healthy and expected debate in any discipline, especially one with both core principles and a history of integrating methods and approaches from other disciplines. Intertwined with these discussions has been consideration of the future of epidemiology and how student training should be crafted [4, 5].

The basis for such futuring has been driven by a personal perspective of the author(s), their training, experiences, biases, and acquired wisdom. There is tremendous value in hearing the collective wisdom of the leaders in the field. As a complementary approach, there is also much to be learned from our students. One prominent reason is that they will be the future! So understanding their emerging perspectives and goals at even an early stage already impacts our training programs and in turn what future epidemiologists will value. In this commentary, I will provide an overview of several key elements that warrant consideration for additional discussion,

review, and potential implementation. These are derived with my conversations with students here at the University of North Carolina as well as students across the country. In general, these have been in the context of doctoral training but certainly apply to master's students as well.

Policy and Public Health Practice Relevant to Epidemiology

Students appreciate the theory, the methods, and the background knowledge, but want to feel that they will have an impact (be consequential). Our training programs provide ample opportunities to provide the long view that epidemiology is largely incremental. However, students want a sense that their work will affect change, even in the more distant future. Other students desire enhanced training in applied epidemiology and public health practice so they can impact change in other ways and levels. They desire to be qualified for a role at the CDC, health departments, and related sectors. Additionally, more recently, students have embraced epidemiology that's based on community engagement—working closely with community members to design, implement, and report community-based studies. These projects can be in the context of examining issues related to social justice and a wide range of community issues. These viewpoints resonate with many years of discussion about the importance of “consequential” epidemiology.

Team Building and Interdisciplinary Training

Our training programs tend to empathize group projects, often among students who are in the same cohort and same classes since beginning their training. They value their peers for the

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exchange of ideas, knowledge, and support. Students have come to realize the emergent emphasis of “team science” and inter- and trans-disciplinary research and education. They desire exposure to how to build a team, how to maintain it, and the tricky nature of inter-disciplinary science as a cross-cultural effort.

Diversity and Inclusion

Recent political and societal events have sharpened students’ motivation to seek a diverse and inclusive environment among their peers, faculty, and leadership. Students not only view greater diversity and inclusiveness as essential for an improved and relevant institutional and national climate but also to ensure that epidemiology is best positioned to address important public health issues that impact a diverse population.

A Robust and Relevant Methods Curriculum

Students expect a comprehensive and current methods training. While some students desire introduction to the latest in the most cutting-edge methods, students have been asking for more training in specialized methods and associated tools. For example, methods in genetic epidemiology, geospatial analysis, social networks, and molecular biology have emerged as areas of interest. Some students have also asked for more applied epidemiology—“shoe leather epidemiology” training in topics such as outbreak investigation and remediation.

Modern Modes of Communication

It is increasingly common that students anticipate that multiple modes of communication will be employed in training, research, and general exchanges among their peers, faculty, staff, and others. Social media and online courses and interactive media are becoming more popular and mainstream in some areas. Research conduct based on m- or e-health has stimulated discussion about the application of these methods for a broader range of epidemiologic studies. Students are asking for more training in these approaches.

Future Careers

Students have increasingly sought employment in non-academic positions. They have asked for a greater diversity of professional development activities and mentoring for a broader range of job sectors including industry, health departments, federal agencies, and non-profits.

What’s Next?

These areas provide guidance to areas for strengthening the training of epidemiologists. They also point to what the foundational knowledge and activities in epidemiology might look like down the road. Some of these topics are consistent with a recent report on future training provided by a group of senior epidemiologists [4]. This is reassuring that there is some convergence between student views and that of leaders in the field. Nonetheless, many areas of technology, science, and society are moving at a rapid pace and current students have evolving perspectives and needs that will drive future training.

Training programs have begun to or have already implemented formal and informal approaches to address some of these topics. However, educational program leaders within academic training programs need to more proactively survey their students, have discussions with faculty and students, and engage national thought leaders. The use of social media, online courses, and more flexible modular courses would help discussions and transfer information more effectively. Other changes are more structural including cross-disciplinary training and experiences across typically siloed departments, schools, and interactions with other organizations and disciplines. There needs to be a more active conversation at many levels. Our major professional societies (SER, ACE, and others) should have a more prominent forum for the topic, engaging students and professionals. Hopefully, past papers on this topic and this commentary will stimulate discussion.

Compliance with Ethical Standards

Conflict of Interest The author declares that he has no conflict of interest.

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Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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- Of importance
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