


Perspectives From Early Career Investigators Who Are “Staying in the Game” of Precision Public Health Research

 See also Fried and Baccarelli, p. 1188.

Recent high-profile conversations have situated precision medicine and population health in opposition.^{1–3} Although the dialogue about these two fields is varied, the polarizing features of debate suggest that the central question is whether precision approaches should have a place in advancing population health efforts (à la precision public health [PPH]). Skeptics of PPH indicate that there is potentially minimal benefit to integrating the two fields. They caution that precision-based approaches could overshadow the underlying drivers and structural determinants of health, diverting resources and attention away from public health’s longstanding mission to improve the health of society.¹ Although debate on the merits of research is fundamental to scholarship, we believe that the contentious tone could suggest that research programs integrating precision and public health applications are potentially misguided. This is a disheartening proposition, especially for early career investigators just establishing themselves in this line of research.

We, a small group of international early career

investigators, began developing our research interests alongside the completion of many precision medicine advances. Although the definition of precision-based approaches varies, we draw on the National Institutes of Health description, which states that precision medicine is “an emerging approach for disease treatment and prevention that takes into account individual variability in environment, lifestyle, and genes for each person.”⁴ Specific examples of advances that arose during our training include the completion of the human genome project, dramatic improvements in genomic technologies (including high-throughput sequencing), and decreasing sequencing costs. We believe these advances will allow improvement in population health. In our view, precision and population approaches are not in competition but rather provide opportunities for incoming generations of scholars to contribute novel, high-impact research and interventions to address population health issues.

We provide a voice for emerging researchers currently working at the intersection of precision medicine and population health. We discuss two primary motives compelling us to continue PPH research: opportunities to equitably implement precision-based approaches and the need to embrace the complexity inherent in PPH approaches.

IMPLEMENTING PRECISION MEDICINE INITIATIVES

Regardless of beliefs about the value of precision efforts to improve population health, most would agree that precision medicine is being embraced as the wave of the future

in health care. As the health landscape becomes more tailored to the individual, public health researchers must be responsive and engaged in promoting the equitable implementation of these approaches. We fear that considering precision medicine as something incompatible with population health will discourage the engagement of public health researchers. This may create a future in which lifesaving advances from precision medicine could foster disparities rather than support equity.

Examples of how precision medicine could have benefited from engaging public health researchers are already evident. Specifically, the current use of molecular biomarkers—a key aspect of precision medicine for assessing patients’ risk, prognosis, and therapeutic response—is limited because of the unequal representation of diverse populations in databases used to develop these tools.⁵ Such issues could be avoided by encouraging proactive engagement among population health

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researchers. For example, there have been recent efforts through the All of Us Research Program to restore trust among underserved and historically marginalized groups to participate in medical research by working with a cohort of citizen scientists.⁶ Public health's strong history of community engagement could be particularly useful in the implementation of precision medicine initiatives seeking to increase diversity and promote health equity. In our view, public health researchers should proactively collaborate to help ensure that population-level factors and social determinants are not lost so that all individuals will receive the benefits of precision medicine advances.

COMPLEXITY OF PUBLIC HEALTH PROBLEMS

As public health researchers, we know well that the macro-societal influences of the social environment shape the health of humans and are key determinants in efforts to improve population health; however, it is also necessary to embrace the complexity of interacting factors that influence health. Indeed, many landmark theories and guiding frameworks in public health support the complex and dynamic interactions across macro-, mezzo-, and microfactors over the lifespan that together influence health and disparities in health outcomes.⁷

A robust public health approach necessitates a multidimensional perspective. Similarly, precision medicine has embraced the complexities of individual health by investing in analytical tools with the capacity for

multidimensional methods, such as mobile health technology that collects both environmental and personal health information longitudinally. Early career investigators have typically been brought up in an era of big data, technology, and methods to tackle related research challenges. We are, thus, well positioned to ask challenging research questions that cross complex levels of influence simultaneously. In addition to being poised to conceptualize these questions, it is increasingly common for doctoral-level training in population health to focus on complex analytic techniques (e.g., network analyses, hierarchical modeling, machine learning), providing the tools to build and test multifaceted models and interactions. Other common skills of public health researchers are implementation science, monitoring and surveilling populations, health communication, community engagement, and health disparities. Thus, we have the skillset to study the impact of PPH on key outcomes.

Moving forward, we suggest refocusing criticisms about PPH as scientific questions. Reframing the debate about precision medicine's value into testable research questions with hypotheses would allow us to objectively investigate important, complex questions about PPH. Possible topics of study include overcoming historical and ethical concerns related to precision-based approaches, how to improve policies focused on return of genetic results, confidentiality, regulations, and best practices for addressing barriers in PPH implementation that span levels of the socioecological model (e.g., personal, communication, economics, and institutional).

Ultimately, the complexity of modern health issues further

supports the need for creative collaborations and trans-disciplinary research with the potential for high risk but also high reward. To achieve this aim, we must reframe the precision and population health debate and encourage participation across both sides of the aisle.

EMBRACING CHALLENGES

As emerging scholars engaged in precision-based approaches to health research and practice, we believe that rhetoric against the pursuit of research in PPH should be shifted toward an agenda that supports programs of research focused on PPH, especially among early career investigators. We are choosing to stay in the game and engage with these challenging questions of balancing and harmonizing precision and population health. The numerous precision medicine initiatives (e.g., All of Us, Million Veteran Project, the UK National Health Service Genomic Medicine Service, and the Australian Genomics Health Alliance) are ripe for engagement with public health researchers. Indeed, it is possible to work toward a resolution that simultaneously embraces the complexity of health and fosters collaboration. Opportunities to engage in PPH emphasize the mutually reinforcing aspects of precision and population health, allowing us to find common features of both approaches and consider ways to work together, rather than in opposition.

We see PPH as a much needed conduit between traditional public health and precision medicine, and we offer our experience to leaders of both fields to help bridge this gap. Let us advance both precision and

population efforts, working inside and across disciplines to foster the mutually reinforcing aspects of the two approaches. **AJPH**

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

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