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Puzzles

I met with Brian, a sixty-year-old cancer patient, in the hospital conference room, our faces covered by masks that had toothy smiles painted on the front. We spent hours together working on different jigsaw puzzles while talking about the new experimental treatments he wanted to receive and his efforts to coordinate care across providers. Brian expressed his frustration over the poorly understood pathology of his condition and the high price of the treatments offered to him. Working on these puzzles, we embraced what we termed “obstinate optimism,” a determined confidence that all the pieces would eventually fit together.

This optimism, I soon realized, was not isolated in that clinic but rather mirrored by the entire healthcare ecosystem working overtime to discover, engineer, and treat against often discouraging odds. Inspired by the breadth of this pipeline from bench to bedside, I have taken a multidisciplinary path toward becoming a physician-scientist, determined to innovate both the scientific and economic aspects of medicine.

I spent my undergraduate years combining diverse fields ranging from operations management and health policy to genomics and financial modeling for therapeutic development. As a student in the Vagelos Life Sciences and Management Program, I studied molecular and cellular biology at the University of Pennsylvania and earned a degree in business and statistics from The Wharton School. Often, I found myself the only person in a finance class with an interest in medicine or the only person in a biomedical research lab with an interest in marketing.

At the bench, this optimism translated to an energy and enthusiasm for conducting high-impact projects: moonshots in medicine. I fell in love with the notion that “probably not, but possibly maybe” was enough to roll out many months of experiments in a salient effort of “let’s see.” I realized that this tenacity was the same hopefulness that Brian and I had in the clinic. During late nights in the lab, every enlarged band in an immunoblot, change in gene expression pattern, or outlier in a lollipop plot was meaningful far beyond just the scientific narrative. They represented crucial insights needed to improve the future of care.

However, questions in medicine do not exist in silos, and neither do their answers. I recently designed a clinical study to investigate environmental impacts on metabolism. While our goal was to create a cohort that captured as much diversity as possible, initial volunteers were almost always healthy, young Caucasians. To better represent all groups of people, I modified our recruiting efforts to reach broader groups of patients from around Philadelphia by leveraging existing community networks, like churches or even barber shops, to make our study accessible. These aspects of ensuring diversity in medicine rely on behavioral economics and operations management, in addition to science, to address barriers to care.

Excited by this interdisciplinary solution, I started working at an oncology startup, developing a targeted therapy for gliomas. There, I regularly combined scientific decision-making with financial modeling. My analysis of sequencing data informed

choices about critical predictive biomarkers, which had implications for the scope and efficacy of clinical trials. Through this experience, I learned that for the full benefits of medical discoveries to be realized, it requires a deep understanding of the scientific and economic aspects of translation.

To further my multidimensional education, I opted to combine engineering and physics into my medical training. I enrolled in Harvard Medical School's Health Sciences and Technology program, jointly administered between Harvard and MIT, which offers a quantitative and mechanisms-based approach to understanding human physiology. Instead of reading traditional ECG graphs, I have learned to build my own ECG apparatus. In the lab, I spend endless hours modeling T cell behaviors after cancer treatments and during autoimmune flares. With every new insight gained, I think about the translational pipelines needed to quickly move discovery to the patients, like Brian, who need it most. This unique approach has allowed me to apply a powerful interdisciplinary lens to solving problems in healthcare.

I aim to become a physician capable of making critical connections in clinical medicine, research, and healthcare delivery to engineer a more inclusive, innovative, and sustainable future. I envision building a collaborative team across all these facets of research, policy, drug development, and engineering to address the most pressing challenges in biomedicine one day. Through all my experiences, from clinics to laboratories and biotechnology startups, I see a cohesive future where different silos can be put together to push forward what is possible, much like the pieces of our old jigsaw puzzles.