Bridging Academia and Industry in Healthcare: 
An Interview with Dr. Michael Rosenblatt

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Michael Rosenblatt, M.D., is the Chief Medical Officer at Flagship Pioneering, where he leads global clinical development and medical affairs. Dr. Rosenblatt previously served as Executive Vice President and Chief Medical Officer at Merck from 2009 to 2016. He has had a distinguished career, with prior appointments as Dean of Tufts University School of Medicine; Robert H. Ebert Professor of Molecular Medicine and George R. Minot Professor of Medicine at Harvard Medical School; President, Harvard Faculty Dean, and Senior Vice President for Academic Programs of Beth Israel Deaconess Medical Center; and Director of the Harvard-MIT Division of Health Sciences and Technology. He holds 19 patents and has authored over 180 peer-reviewed papers and commentaries.

Nishu Uppal (NU): In medical school, we have been learning that figuring out how we can create value in healthcare outside of daily clinical practice involves choosing a path (i.e., choosing an area of research, pursuing another degree, etc.) early on in training. While we were trying to learn more about your background before today, we noticed that you have pivoted between several sectors, including clinical practice and academia as well the pharmaceutical industry. To start off, we’d like to hear more about your journey since completing your clinical training and about how you have evaluated new opportunities as you've made some of those career decisions.

Michael Rosenblatt (MR): Getting good clinical training is very helpful preparation no matter what you choose to pursue with your MD degree. It's applicable in almost everything, including research, policy, and administration, because it teaches a way of thinking and understanding what problems need to be solved.
MR: I never planned much of my own career, so I wouldn’t advise people to sit down and plan it because who knows what you’ll be interested in a few years from now. People change and fields change, so be careful not to over-plan. I’m an endocrinologist, which means I’m interested in receptors. Once you go through your training, it’s important to keep displaying your receptors, see what binds to them, and understand what activates and interests you. I think that’s the best career advice that I can give. If you keep an open mind, you will have insight and can be sensitive to what actually interests and motivates you based on your own experience, not on the advice or biases that others hold about certain areas.

When I was in medical school, I thought that I would have a career exclusively in academic medicine. I love academic medicine, and I spent half of my career in that. But early on in my career I had an opportunity to go to industry, and rather than rejecting it outright, as a number of people advised me to do, I saw the opportunity differently. Once I made that first decision to deviate from a prescribed career path, I became open to options that I would have dismissed outright in the past. That allowed me to evaluate each subsequent opportunity on its own terms, and I wound up making a number of career changes over the course of time.

NU: Your emphasis on remaining open-minded during training echoes sentiments expressed by other faculty who ventured outside of academia or clinical medicine. Were there aspects of the first opportunity in industry that seemed particularly compelling or interesting to you?

MR: Firstly, I consider clinical practice to be very rewarding, and I’ve tried to keep a frontline connection to patients throughout most of my career. However, opportunities in industry and elsewhere can offer the chance to influence healthcare and even transform disease for many more people than you can do by seeing patients one-by-one in your office. If you’re involved in inventing an important drug and bringing it from the laboratory to clinical practice, you can have an impact on a tremendous number of patients. That’s a different kind of way of approaching health for people. Since I really like basic science, especially the science that’s fundamental to medicine, I came to believe that translation into products that can be clinically applied is really only possible from an industry platform. Academia generates many of the fundamental insights that industry relies on. However, it’s rare that an academic can take a discovery and go all the way to something that other doctors are actually able to prescribe. That’s what you do in industry, and that’s what really captured my imagination.

On a personal level, I learned firsthand from my mother about the kinds of challenges that one has in an industry. My dad died early when I was just a kid, and my mother took over his business. At the dinner table, she would discuss with my sister and me the challenges she faced. Since I found them interesting and I didn’t share the biases that many of my colleagues held about industry, it helped me make that first leap into industry. In short, I would say it was science that captured my imagination and that I wasn’t hindered by a set of biases that precluded my trying industry out.

NU: It sounds like you’re illustrating the dichotomy between the groundedness that one can find at a patient-facing level in the clinic and the ability to scale one’s efforts by going into industry. Do you think that your current position at Flagship Partnering is another opportunity for you to scale your own efforts and seek ways to transform healthcare?

MR: Flagship is a venture firm that I believe is unique. It’s not like other firms that look to invest in the ideas of others and then set out to build companies. This is a fine and effective model. But we actually have our own laboratories and scientists, so we create new companies based on our ideas or ideas that emerge through collaborating with others. We won’t start a project unless we believe it has the potential to transform some part of medicine. We only work on technology or biology platforms that can move into several therapeutic areas where there are many opportunities to have impact. That’s in contrast to relying on a single lead com-
pound that might eventually become a drug. It's kind of a “reverse discovery.” We begin with a problem and then figure out what's needed to address that problem.

For example, I'm involved with one Flagship company called Rubius, which focuses on using red blood cells to transport biologically important molecules around the body everywhere that blood goes. These cells could carry enzymes to treat phenylketonuria or immuno-oncology drugs, among many other possibilities. This is different than my initial experience in biopharmaceuticals where the focus was more singular, where single compounds were developed into drugs based on which enzyme could be inhibited or which receptor could be antagonized. Ideas like the one Rubius is developing start from a different place. I'm excited to be back on the learning curve and what I enjoy most is being able to contribute while also learning at the same time.

**NU:** Your description of Flagship makes it sound like an innovation lab in addition to a venture capital firm. Could you speak about the fit between you and Flagship, and how you apply things you learned from previous roles in Flagship's design process?

**MR:** Flagship now is almost 20 years old, and since I've only been with the firm for 2 years, I take very little credit for the achievements that they've had. However, a couple of years ago they consciously began to think about what they needed in terms of expertise and resources to do the best job of creating companies based on novel approaches to addressing disease. The core of Flagship is a talented group of scientist-entrepreneurs, people who can examine emerging science and figure out how it can be applied to be a commercial success. Surrounding that core of scientist-entrepreneurs is a ring of people who are seasoned in sectors that interface with biotechnology. I was hired as somebody who had considerable experience in clinical trials and in taking discovery from the lab and bringing it across the chasm into the clinic and eventually getting drugs approved in the United States and globally. At the same time, they hired David Epstein who ran Novartis and has real expertise in big pharma. We also brought in Steve Berenson, a previous vice chairman at J.P. Morgan who understands what’s required to capitalize these companies adequately and what the sources of capital are. We brought in Jim Gilbert, whose expertise derives from experience with Boston Scientific and Bain & Company. These new additions to the Flagship team are helping the firm to move to a new level, which is especially important when you're making long-term commitments to companies.

When I started in this role, I entered thinking that I would mostly be involved during the design of clinical trials and looking at the results of the trials to remediate any issues. But since the early companies at Flagship can move in multiple directions, I wind up spending a lot of time, in addition, helping early stage companies decide which specialties in medicine are the best to apply their technology with the highest probability of success, as well as which therapeutic areas to avoid—diseases where pharmaceutical companies have been unsuccessful in the past. I'm spending time both at the earliest stage when these companies are being conceived and at the later stages once the technology that they are developing has made its way into the clinic.

**NU:** It's clear that you play a longitudinal and strategic role in the development of these ventures, especially when it comes to figuring out the medical niche that's most appropriate for these ideas. In doing this, it sounds like you're tapping into some of your previous work in industry and experience with academic medicine. In addition to employing these aspects of your background at Flagship, we've also seen you use them to comment on partnerships between sectors, especially on issues such as the reproducibility crisis in translational research and its impact on industry partners who are looking to commercialize drugs based on academic data that can't be replicated very easily. In a call to action that you issued previously, you mentioned that universities could invest in replicating research results. What is the importance of partnership between academia and industry, and how can such collaboration help address the reproducibility crisis?
**MR:** I think that collaboration between academia and industry is absolutely critical if we are to advance scientific and medical knowledge into new therapies. There is plenty of unmet medical need in many areas that can’t be addressed by any single component of the health care ecosystem. We desperately need innovation in how we deliver care and in who delivers care. There’s a special kind of innovation, which I call invention, which comes from biopharmaceutical companies that are absolutely reliant on academia, so we have to find a way to work together. Invention has to be done based on rigorous science that will hold up because you’re going to be putting agents into human beings, which is potentially very dangerous. The database for starting a drug invention program should include data of high integrity. It’s in every stakeholder’s interest to ensure this high quality, not only because academia-industry collaboration can provide funding to a lab. Initiating an invention program with incorrect data can not only waste time and money but also create a big opportunity cost because that time and money could have been spent working on something that had a much higher probability of success. Data that can’t be reproduced impacts the reputation of the NIH, which sponsors much of the research that produces this data, as well as the entire scientific enterprise. It is for these reasons that much has been written about this issue of irreproducibility of data, and people have offered many potential remedies.

I don’t know if the remedy entails training graduate students in statistics, honor pledges, or courses on evaluating data. Rather than solving the problem, I hoped to offer a potential way to get data that’s worthy of further investigation at the interface of academia and industry. One way to do it would be to offer incentives for “guaranteed” data. A university could guarantee that their data—the basis of their collaboration with a company—is reproducible. That would save time and money and prevent the loss of opportunities, as well as offer greater market value. In exchange, industry would pay more for guaranteed data than for data of unknown reliability, especially because industry is currently paying twice as much for all of its collaborations as it would pay if the data were reliable because roughly half the data is not reproducible. It doesn’t necessarily require more investments by the university. The university could choose not to reproduce the data (if they have a very high level of confidence in the data before forming industry collaboration). But in order to obtain higher payments from industry, they must risk giving the money back if the data can’t be reproduced. This hasn’t been done yet, so this is still a “thought experiment.” If one reputable university and one reputable biopharmaceutical company decided to try it as an experiment, we could have a better idea about whether it works in practice.

**NU:** Why do you think that no one has tried to pioneer this idea yet?

**MR:** I think that the impetus has to come from the university. It’s hard for any one university to admit that this problem exists within its walls, despite knowing that the problem is widespread across many different fields and kinds of research institutions. Much of the irreproducibility problem is not because of the falsification of data or because of variability in techniques, but perhaps because of issues with statistical power, such as a study that should be powered with 20 animals is done with only eight animals. There could also be pressure added on faculty by the university that stands to gain twice as much money if the faculty can replicate their data. It can be complicated inside the university to make this kind of guarantee, but I could also argue that you should have that high level of confidence in your data or you have no right to be “selling” it into a collaboration.

**NU:** Along the lines of academia and industry trying to work together, we’ve also seen you talk about partnerships that allow for the sharing of electronic clinical data, such as the Merck-Regenstrief partnership. When it comes to the sharing of this type of data, how can guidelines be developed to address the conflicts of interest that critics believe unduly influence these relationships?
MR: I think these kinds of collaboration hold great promise. There are institutions and health care delivery systems like Regenstrief that have had high-quality clinical datasets for 30–40 years, and these contain information on the natural history of disease and the impact of various therapies on disease. These are uniquely valuable data for guiding a new drug discovery program and are also a natural basis for collaboration. Those health systems can not invent new medicines on their own, and pharmaceutical companies could never have access to this kind of data without collaborating with organizations like Regenstrief. Merck had a small number of these partnerships in other parts of the world. For instance, we partnered with a health system called Maccabi in Israel that has electronic, high-quality medical records spanning nearly a lifetime for certain patients.

In general, conflicts of interest in these areas aren’t the biggest challenges because electronic record sharing won’t influence prescribing patterns. The biggest challenges surround the protection of privacy and confidentiality of patient records. Hacking frequently affects banks and retailers and can certainly affect health systems. There is a lot of personal data that can hurt people if it enters into the public domain. This problem will only increase in importance as genetic data gets entered into clinical records because a person’s genome is uniquely identifying and can even be used to identify relatives in the same database. Conflict of interest is still an important consideration, which is why I think it is time to settle on a satisfactory, stable, and workable set of conflict of interest principles. We’re never going to make them perfect, but we can make them good enough to enable academia and industry to interact productively. As long as we have uncertainty about the rules governing the interface, we will inhibit these kinds of collaborations.

NU: Some might think that sharing electronic clinical data from health records may be similar to sharing electronic clinical trial data. We were wondering if you could discuss the similarities and differences between those two kinds of data sharing arrangements. Do you think that partnerships between researchers and companies can be developed to share clinical trial data in the same way that partnerships like the Merck-Regenstrief collaboration share health record data?

MR: Clinical trial data is different. When looking at clinical data in the health system, you can make observations about patients in the “real world.” On the other hand, a clinical trial involves the testing of a new therapy in which a biopharmaceutical company or a device company has invested a lot of money. There’s no question that this trial data should be made available at some point, but the question is when. If you make all of this data available too early, then you make it very easy for competitors to take advantage of the situation, which has a chilling effect on innovation. If you wait too long, you don’t have the potential benefits of sharing clinical data. I think the most compelling case for the sharing of data from clinical trials is around the issue of safety. For example, if you are looking at a new potential drug in clinical trials that displays unexpected adverse effects or toxicity, it’s hard to argue that such data on safety shouldn’t be made widely available.

Proving efficacy is different. I don’t think the argument is as compelling for making that urgently available. Although there’s a lot of talk regarding the sharing of clinical trial data, it’s actually hard to point to many examples where the sharing of clinical trial data has made new discoveries happen faster or revealed some new insight that wasn’t known before. That’s another reason that I think that clinical trial data sharing has a slower time point than sharing clinical data from health systems. I remember hearing that from the point of view of journal editors, the inquiries to journals to see the clinical trial data behind publications comes mostly from competitors and from lawyers, rather than from investigators in academia. Ten years ago, when we at Merck started making clinical trial data sets available, we noticed that few people asked for them. These considerations and trends make sharing clinical trial data different from sharing electronic health record data. When we start seeing benefits to sharing this type of data more readily, then sharing may
become more prominent, but for now, with the exception of safety data, trial data can be shared, but less urgently.

**NU:** To close, we were wondering if there are other insights or wisdom you’d like to impart to our readership in the medical community?

**MR:** I imagine that the people who attend Harvard Medical School are pluripotential, in that they’re talented in many areas. Many people spend a lot of time thinking about juggling everything at once because they don’t want to close any options. They want to do as many things as they can for as long as they can. It’s important to remember that life and one’s career are hopefully long, and that you don’t have to do everything simultaneously. Instead, you can do things serially. You can spend part of your career as a laboratory researcher or clinician and spend another part of your career in clinical care delivery. That’s another formula for keeping options open: doing things serially instead of in parallel.