

520th Convocation Address

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“Mean and Variance”

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Let me begin by congratulating the graduates, their families and friends, and my colleagues assembled here. For the graduates, congratulations for the hard work and accomplishments that brought you to this convocation; I identify with you today because I sat in this hall for multiple graduations during my own training here. Eventually, this university became my home. Even when I left for college and for medical residency, the University followed me – whether through the appreciation of open and discriminating inquiry I first learned at the Laboratory Schools – or through the powerful insights into economics and medical practice I learned as an MD/PhD student here that have informed and inspired my professional contributions. If the faculty has done its job, you too will take the University with you. I hope that your time here has not only exposed you to some great ideas, but honed your skill in separating great ideas from lesser ones. I also want to recognize and thank the family, friends and faculty who have supported you during your time here; none of us make it to days like this without the support of others.

Following the tradition of the University, my charge today is to tell you about my research. This tradition reflects this University's almost uniquely intense focus on the production of knowledge. This is a place where people love ideas, and sometimes, especially, their own ideas. As I have joked with friends from my graduate school years here – enough about me, let's talk about my research.

So let me turn to my chosen topic – mean and variance. As you have heard, I study the value of health care and how to improve it. When I was first drawn to this topic 25 years ago, health care was 10% of gross domestic product compared to over 18% today, and about 1/4th as large in terms of real spending. The growth of the sector since then has consumed 1 in 4 dollars of increased domestic product despite failing to provide coverage for 1 in 6 Americans.

In this context it is natural to ask if we are getting value for this spending. The answer is both yes and no. On average, the answer is yes. Economists, including Kevin Murphy and Robert Topel from the Booth School, have estimated the economic value of improvements in life expectancy over the past quarter century. To do so, they have valued improvements in life expectancy by comparing them to the costs people have shown themselves willing to bear to protect their health through decisions such as taking safer, but lower paying, jobs. Their estimates suggest that the increases in life expectancy over the past half century – a remarkable 2-3 months per year – have added just as much to our well-being as have increases in average earnings. As a back of the envelope calculation, then, we have spent ¼ of all the added income we have earned on health care, but gained increases in life expectancy equal in value to our increase in total earnings – a very respectable average return of \$4 in value per dollar spent on health care.

But the real story is not so simple. Health care is not the only reason life expectancy has risen. Other countries have achieved greater gains in life expectancy while spending much less than we do. It is clear we spend health care dollars in ways that dramatically decrease their value. Pap smears used to detect cervical cancer in women are my favorite example. Given every 3 years to women over their lifetimes, Pap smears add about 2 months to life expectancy. Every 3 years is often enough for most women because cervical cancer typically progresses slowly. But 80% of Pap smears given in the US are to women who get them every year or every other year where the added value is much smaller - biannual Pap smears add only 1 day to life expectancy and annual ones add just 8 hours – while costing close to 20 times their benefit. This illustrates the waste that burdens the US health care system.

Both this problem of inefficient use of technology and approaches to address it are well known. Formal evaluation of medical technologies to assess their value relative to costs is a normal part of health policy in most countries. In the US, efforts to systematically improve value in health care have often been squelched by calls of rationing and cookie-cutter medicine that ignores differences among individuals. The hidden voice behind these criticisms is often vested special interests, including sometimes physicians. Indeed, comparative effectiveness research remains so controversial that obtaining support for it within the Affordable Care Act required that it be renamed patient-centered outcomes research to suggest it would tailor recommendations for individuals. This research was prohibited from studying cost-effectiveness or seeking to inform coverage policy. This is politics.

But the problem raised by these critics, that people differ so that the right decision for one person may not be right for another, is very real. Proponents of the genetic revolution in medicine describe their approach as personalized medicine. But like many so-called revolutions, personalized medicine is not wholly new. Indeed, medical decisions have always been tailored, and not just by medical criteria. Patient preferences differ and change the value of health care for individuals – the arthritis that bothers one person enough to choose joint replacement does not bother another. In prostate cancer, where surgery, radiation, and radical prostatectomy are major options, my research has shown that the mean benefit of choosing one or the other treatment for all men with prostate cancer is tiny. In contrast, the benefit of choosing the right treatment for each man is 100 times larger. In this sense the critics are right – comparing the mean benefits of treatments may be highly misleading. The trick is to understand the variation and how to identify and respond to it.

So how do we do that? Surely some of the answer is in genetics and other biological factors. But if a man with prostate cancer benefits most from surgery, radiation or watchful waiting if he is most concerned about impotence, incontinence or anxiety, then the best choice for each patient is far more likely to be learned by talking to them to understand their preferences and beliefs than by any laboratory test. This is why advancing medicine requires not just understanding the biological sciences but also the humanities and social sciences. It is where a University such as ours, blessed with amazing strength across disciplines and an exceptional openness to and history of interdisciplinary research and teaching, can be at its greatest.

I see the power of this interdisciplinary approach acutely in my newest work, which is examining new ways to care for the sickest and most costly patients - the top 5-10% most costly patients who account for 80-90% of health care spending. Our hospital medicine group cares for these patients frequently but each of us sees a given patient only episodically. As a result, we often lack the relationship with our patients that could allow us to understand and relate to them ideally as individuals and give them the best care possible. It was not always that way. Until two decades ago, patients' primary care doctors cared for them in the hospital and in clinic. That began to change with the development of hospitalists who only care for patients in the hospital. Specializing in this way was supposed to be better – and in some ways we have found it to be – but in caring for the patient as a person it is clear something important has been lost. We've also found that the hospitalist model grew not because it was better for patients but because it was easier for primary care doctors to turn over their hospitalized patients to hospitalists rather than make a daily trip into the hospital to see just a few patients.

These are problems best understood through the lens of labor economics, a field whose central ideas were defined at this university and have generated three Nobel prizes among our faculty so far, including one received by my mentor Gary Becker. Gary passed away this year, and I cannot give this address without

acknowledging him, as a mentor, a friend, and a scholar for the ages. Gary was generous to me in many ways, but the most important gift I received from him was his ideas. So as I thought about this problem of how to improve care for frequently hospitalized patients I naturally turned to theoretical insights into the optimal division of labor that Gary had taught me. Indeed, with equations inspired by these theories literally in front of me, a potential solution emerged.

The idea was to define a new set of doctors – comprehensive care physicians – who would see patients at high risk of hospitalization both in clinic and the hospital like doctors used to. To make this possible they would only see patients at high risk of hospitalization and limit their panel to only 200 patients, compared to over 2,000 for traditional primary care physicians. This would allow them to have enough patients in the hospital each day justify their presence there, while having a small enough panel of patients that they could provide them with ongoing primary care, leveraging the power of the doctor-patient relationship in terms of knowledge, trust, interpersonal relationship, and communication. We were fortunate to have this work funded by Medicare and are now over half way through a 2,000 person randomized trial comparing our model to care by different doctors in the inpatient and outpatient setting. Our program cares for an amazing range of patients, from retired faculty, to young adults disabled by congenital illness living at the edge of poverty, to homebound patients of all ages who we care for in their homes throughout the South Side.

The lessons I have learned from this work are too numerous to detail, but I am very optimistic that the program will accomplish its goal of better care and better health at lower cost. My optimism stems both from our early results and from the weekly meetings we hold to address the challenges faced by these patients – whether biological, psychological, sociological or philosophical. As we discuss these patients' stories with their physician who knows them well and is deeply invested in them, we develop new ideas to address their needs as individuals. There is a theorem in economics that one needs as many policy tools as one has policy objectives. As we care for these patients we use modern molecular diagnostics, big data for predictive analytics, and cutting-edge organizational theories. But to address their diverse needs, there is still no intervention with the breadth and scope of human judgment and wisdom, especially when informed by a real relationship with the patient and an environment that understands and values humanistic concerns. Indeed many of our physicians have drawn on the university's resources in the humanities and social sciences to enrich their abilities to care for their patients as individuals, with tools from narrative analysis and ethnography to psychometrics. Our economic research that has taught us about the mean returns to different models of practice has given us the ability to address variation in our patients.

In closing, I will say that most everything we have done, we have done with students at our side and often ahead of us. I often think that the best part of this institution is its students, and by extension its graduates. I hope that you graduate feeling enriched and confident in your ability to share what you have learned with others. Like all of us, I am sure you will all have your ups and downs, some great ideas and some not so great ideas. That is fine. I have come to believe that with wisdom and some strength, it is not the mean quality of your ideas that matters but the variance. Hopefully you and the people around you will know how to let go of your lesser ideas and seize the better ones. I wish you more great ideas and great days than the opposite but most of all the wisdom and strength to separate them and enjoy the journey. Again, congratulations.