[MUSIC PLAYING]

JOON SUP LEE: You know, what I want to do today is share a little bit of my journey as I've left the cath lab and, if you will, gone to the dark side for some of you, and journeyed into some parts of the financing part of our health care system. And, of course, the first question I know that's in your mind is, what exactly are you doing here listening to an interventional cardiologist talk about payment reform? After all, aren't we the species that's trying to put health care out of business?

And I think that would be legitimate. And as Oscar, would say I'm a semi-reform interventionist. So that gives me some qualifications. But hopefully you'll allow me to go down that journey.

In terms of disclosures, I really don't have any financial disclosures, other than the fact that I obviously work for a very large health care system, whose financial health is an important part of my job security. So you need to take that into light. And for the young folks, trainees here, if you haven't figured out in six months, there tends to be an inverse correlation between the speaker's amount of time since training versus the amount of data that we show.

So I'm going to tell you a lot of stories. You'll have to forgive me for that. And please interrupt me if any of the stories don't really make any sense.

So as a cardiologist, I'm going to start with the first story. And this is a graph that comes out of a article from *The New England Journal of Medicine.* And it's really one of the most remarkable achievements in modern medicine, that's oftentimes ignored.

And if you would, if you start about 1960s, mid-1960s, over the ensuing 50 years, the cardiovascular death rate in our country actually decreased by 70%. There are very few diseases that we can say that about. And this is oftentimes ignored.

Dr. Millers would say we've done better with HIV. And I would say that's true because HIV was nearly fatal. But there are very few diseases that we can say this about. And I've been lucky to be practicing cardiology for a large chunk of that. You can tell that this is written by an academic cardiologist by the specific areas that we're claiming have made the difference. I think that's somewhat questionable, if you will. But some are more legitimate, HMG-CoA reductase inhibitors and what-not.

Well, with that in place, we all expect that as cardiovascular specialists that, especially if you look at what's happened, the decrease in the cardiovascular death rate was so rapid in our country it outpaced the increase in the population increase in our age. And look at the drop from 1980. This is the absolute number of deaths due to cardiovascular disease.

And most of us who follow it fully expected that it would no longer be the number one killer of Americans. That in, about this time, that cancer would have outpaced it. But then it had this inflection point. And 2011 was the lowest number of cardiovascular deaths. And the absolute number has actually increased since that time.

And who would venture to guess why that was the case? Did we stopped giving our Plavix? Did people stopped taking their statins? What exactly happened? Any guesses from the audience?

AUDIENCE: Obesity took over.

JOON SUP LEE: Yeah. So many people believe that it is the obesity epidemic. If you look at this editorial from Donald Lloyd-Jones, who is the head of prevention in Northwestern, he states that obesity is the epidemic. But to me, the whole issue is that no matter how much better we got in terms of treating the acute illness, as long as the only thing we focus on is treating the end-stage portion of the disease, in which case is myocardial infarction and coronary artery disease, that we were never going to win the war.

It's not just obesity. We don't take care of the preventive type of risk factor. It's the imbalance that we have in our system.

And I'll tell you a story that made this so clear to me. It was my typical, several years ago, 2:00 AM conversation with a 40-year-old who was having a MI. After our social function of saying hello, we-- the fellow and I, opened up his right coronary artery. And one of the big rewards of being an interventional cardiologist is that patients immediately feel better. And you get to start to have a conversation because patients are awake.

And we started our usual spiel of how you have to change. You're only 40. You had this. You're very early.

Number 1 through 5, you have to stop smoking. And I was flabbergasted because this gentleman, in total seriousness, looked up at me and said, why can't I just continue smoking and have you do this to me every few years?

[LAUGHTER]

And that was an epiphany to me, that maybe we're not really going about this the right way. That really is not the paradigm for health care I think that what we want.

Well, with that in mind, after that story, what I'd like to do over the next 30 minutes or so, to leave time for questioning, is give you my version of what the US health care system looks like. What are we, Integrated Delivery and Finance System, anyone who's been part of UPMC for more than a couple of days have seen and heard the terms, IDFS, what exactly is that, and some of our experiences and where we're trying to go.

The short story, what I'd like to convince you of, is that one of the major problems we have in this country in health care is a tremendous-- really not a lack of resources, but about distribution of resources in terms of where we put our money and efforts. And in order to get away from that, We're going to have to find other paradigms that's going to work better. And I would argue that the only way we're going to get better is to take advantage of analytics and data that's available to us in a totally different way than we do right now, in order to aim those resources in a different direction.

So what is the hallmark of US health care system? Like when I say US health care, just as a word association game, what word comes to your mind?

AUDIENCE: Expensive.

JOON SUP LEE: Expensive. Anything else?

AUDIENCE: Uneven.

JOON SUP LEE: Uneven. I think those are fair.

AUDIENCE: Fragmented.

JOON SUP LEE: Fragmented. I would agree with that. So I'm not going to play the game too long. But to me, the words that really come to mine, number one is excellence.

[LAUGHTER]

We often forget about that, OK. I say that because we forget about that when we talk about our health care system because it's not perfect. But look at this room. Mark mentioned that-- I didn't come to this country necessarily to study medicine, but many of you did. And there are people in this room who've come from far and wide to learn new things about medicine, right. Or research, how do you figure out what's going on nitric oxide, in Mark's lab, or how do we best ablate a lesion or a SVT? All of those are factors.

And obviously, we clearly have super pockets of excellence. And the United States is responsible for a large portion of discovery, as well as innovation in health care. But I agree, it is also very fragmented. And I would say that-- this is not an exhaustive list, but my personal list-- one of the things about US health care is it's full of unintended consequences.

When I look at the US health care system, I liken it to like a dream team, all-star team, that clearly has the best players in the world. But when you put them all together, our totality is way less than the sum of its parts. It's like an all-star team, that when it takes the court has trouble beating a well-organized college team.

And that is our problem. But the question is, how do we get out of that funk? And how do we get to a better place?

So I'm just going to go through some things that most of you are familiar with. US, we're proud to be a high expenditure state. And just seeing it in a graph like this, where we're spending 17.5% or 18% of our GDP versus the second place, only 12%, and the average of developed nations, if you will, spending only 9.5%, tells you that we're spending way more than others.

I actually don't know if 18% is too much, to be honest with you, from a societal standpoint, I don't think we've decided that. But suffice it to say, we are spending much more than almost anyone else.

In addition, you can see that in contrast to most developed countries where most of the expenditure comes from the government, we're about half and half between the government and the private sector, mostly employers. And in terms of our performance what you like to see is that if you spend more you live longer. That's a reasonable expectation, right. And USA falls way off that graph there. And we can talk ad nauseam about the reasons for that. But that's not a good statistic, obviously.

And thirdly, you guys have seen many graphs like this, where this is what's happened in the 21st century. And this is the inflation rate and the compensation increase for most of our workers. This is the increase in the premium. And that's the increase in the workers portion of that premium. I don't think any of us would think that those are great trends as owners of the US health care system.

So to me, one of the most depressing parts, and depressing and consistent story about the US health care system, is like headlines like this, that came in October of 2019. And it stemmed from this *JAMA* article, which was actually authored by University of Pittsburgh faculty members Dr. Parekh and Will Shrank, who preceded me at the Health Plan.

What it concluded was that about 25% of US health care spend can be termed waste, or avoidable, or not adding value. It's actually not a new finding. It's a meta-analysis, that once again confirms the finding of HHS Secretary at the time Burke several years back. But I'm going to leave this slide up for a minute because there are a couple things that to me is very telling about this.

Number one, the absolutely humongous number, right. It's nearly a trillion dollars that we're talking about that, that we are saying is not helping us very much. It is bucketed into administrative complexity, pricing-- some of these are obvious. Failure of care delivery, that's really talking about complications of treatment. Low value care, we know what that is, care coordination problems. We are all familiar with all of those.

But I want us to realize is that these markets are really interlinked. Low value care, what is low value care? Is that are unnecessary stress tests, unnecessary MRI, or one that could have been, if you will, avoided? We would all agree that that's low value care.

What is the typical insurance company, including our own, response to those low value care? We put very creative solutions, like health help, that some of you are suffering through. It's called utilization management. And it is onerous, unpleasant.

And think about what the impact of that is in these buckets. So it may me successful in decreasing this bucket. But what are we doing? In order to implement that we hire more people at the Health Plan.

We've just increased this bucket. Maybe the net is a little bit of a decrease. What we do is to shift from one to the other. This happens in the US health care system. And it happens within UPMC, where there are 450 business units competing even within the corporation for attention and dollars.

One of the most egregious example of that is, I think all of us would agree that the poster child for pricing failure in this country and the health care is really the pharma industry. And what is the one of the strongest reactions to the pricing failure of pharma industry? There's something called PBMs. How many of you have heard of what PBMs are?

They're pharmacy benefit managers. And they are a multi-billion dollar industry that go between organized process claims. And those people who work at PBMs may argue that it increases the efficiency of the marketplace. But it's reasonable to assume that those billions of dollars that go into that at the margins are not giving us a return. And it is making things much more complex.

The last thing I'll mention about this, because I think is critically important, is one of the reasons that it's so difficult to get rid of waste in American health care system is the fact that when you think about it, one person's waste is another person's business, margin, and most importantly job. And that's what we're competing against, because health care is 18% of the GDP.

So if you and I could really agree that 25% of health care is unnecessary-- and let's say that UPMC is a little more efficient, so 20% of UPMC product is unnecessary. And Dr. Gladwin is a very smart fellow. So if he could wave the wand and get rid of that waste over the next month, how many of you would elect to do that? OK. So we'd all like to do that.

But think about what that means. That means-- you know, it's that old medical school first day question. Look to the left and the right of you, look at all your co-workers. That means we'd have to shrink by 20% overnight. And what is the impact of that?

That's not a reason not to get rid of the waste. But it is something that we need to understand about the complexity. When we get rid of waste, we have to make sure we're aiming those resources other places that is going to do some good.

I'm just going to show you a couple of slides that demonstrate the complexity. So this is from 1970. And with apologies to all the administrators in the room, this is the increase in the physician workforce as a percentage over the last 45 years. And this is the increase in administrative workforce in health care in the United States during that time.

And if you compare US to Canada, we're about twice as high in terms of the administrative burden in terms of the cost. And this is from a study last year. How does pricing work in the US? Well, it's very high.

So if US is priced at 100%, compared to these economically developed countries and all these procedures, these are the prices. Many of the prices are 20% or even less than that of the US. In fact, unless you go to the backwoods of New Zealand, like Chris may do, and get a cataract surgery, that is the only item that you'd have to pay more than you would in the backyards Pittsburgh and Wexford.

So clearly, it's not a great system. And I think all of us agree that it needs to be fixed. How did we get here?

It's important to understand what our payment system exactly is. So this is a cartoon figure that we've modified. If you look at the left side, this is basically the US health care payment system from 1900 to really partly today, large part today, but certainly to 2000 or so.

We basically-- it was an a la carte system. We will pay for what we did. And it didn't matter. Volume is king. And it created the medical industrial complex.

And, yes, even my job was to maximize the medical industrial complex. And UPMC is an organization that's very efficient at maximizing volume and reimbursement. And hence, that is the reason that it's gotten to a large size.

Where do we want to go? We really want to deliver integrated care. What does that mean? That means that we have everyone in line. Instead of volume being king, we want the outcome to be king. We want to look at the whole spectrum of disease, not just the end-stage, and rebalance it. In reality, these years are artificial. We're somewhere in between.

If you think about the difference in the system, what was the relationship between the insurance company and the provider, whether you're the hospital, or whether you're a cardiologist, or an internist, or any other-- or an AP. In the acute care system, the job of the provider was to document what was done. And if I'm a cardiologist, I documented when I put a stent in. Sameer would document when he ablated someone with a electrocardiogram.

And the insurance company's job was to pay that. It didn't matter whether the patient in the olden days, which is not that long ago, whether the patient really needed it. And it certainly didn't matter whether the patient benefited from that or not. And, in fact, it didn't even matter whether I did a good job.

As you know, if I did a poor job, and had a complication, oftentimes I would get paid even more. So if you think about that, it's really a crazy way to pay for a whole industry. Yet, that was the predominant-- still is-- payment system until very recently, as things are starting to change.

Now, what do we want at end-stage in a fully aligned integrated system? I would argue that we want the incentives-- we want everyone going in the same direction. Who are the major parties? In this case, that's the patient; the facility where the care is given; clinicians, certainly; and even the insurance company.

How do we align all those incentives so we're not at cross-odds, that I don't benefit from you being deprived of care and vise versa? In order to do that, I would argue that we need to have a differential access to the data in terms of what's happening to our population and our patient. And we'll talk a little bit more about that. And I'll give an example of that.

So what's happening nationally? This is basically the same thing, looked at payment models. Category 1 is what we just described as fee for service. And this is probably the only time I'm going to go over those acronyms because I don't think they're so important. I think it's more important for us to understand the concepts of how do we want to organize ourselves to do a little bit better.

On the right side is population-based payment. And you can see in read, there's an integrated finance and delivery system-- the words are transposed-- that's the same as IDFS. So the concept on the right is that we're paid a lump sum. And we are responsible for figuring out how to best deliver care.

If you think about US health care system, as a chunk, that's kind of partly how the government does it. Certainly, that's what MHS does in UK. They set a budget. And the system is then integrated into a singular entity. And then figuring out how to best deliver care.

Most of the alternate payments, where it's value-based reimbursement or alternative payment models, sit in the category 2 and 3. That is, it's a little bit of mixture, but more left leaning than anything else. Mostly fee-for-service in category 2. You get some extra payment if you do some things that we ask you to do, that sounds like quality. That is, if you put any AICD in, you report it to the national database. Cardiology, you report it to a national database when you do TAVRs. So those are extra payments.

Category 3 is what's termed shared savings for the most part. That means that we contract with a group. And if they do a better job and there is economic efficiency, some of that saving is shared back to the clinicians, if you will. And we like to put quality metrics so that we're making sure that we're doing the right thing and a better thing.

If you look at the national trend in terms of the providers or the payers in this country-- and this is a summit for CMS, which is the Medicare-- and health care payment or insurance company, and basically you can see that the trend is, everyone believes that we're going to more of a value oriented in the payment system. Now, this is biased because this is the payers, right. On the other hand, it's the payers who are going to dictate what the system is that we are being paid when we are delivering care.

And where are we right now for years we've talked about value-based payment. And if you talk to a lot of people, there are a lot of people that think that fee-for-service is already dead. Unfortunately, that is not the reality. So orange here is sheer fee-for-service. That still accounts for about 40% of the reimbursement in this country. In terms of what you and I would really think is aggressive value-based payment, where the provider is at some risk for that outcome, either because it's population-based; totally capitated, which is this green model; or the provider has some upside and downside risk. If things don't go well, the provider is at risk for the payment. It's actually only about 15% of the payment.

The other two-- the other 44%, 46%-- is mildly related to quality and other metrics. So in essence, about 85% of the payment is largely fee-for-service in this country still. So we have a long ways to go. And I believe that we're going right in that graph, as do most other people that we just showed you, but we're far away from that.

This is very much a payers' perspective. But most people who are in the field very much believe that we're going to a much more value-based based, performance-based payment system. And it is interesting to note that during this summit, the participants were surveying what do they think is the major barrier for us really progressing along these lines. And not unexpectedly, the first three barriers have "provider" in the front, provider's unwillingness, lack of understanding, inability to operationalize.

You can argue about whether that's the entirety of the picture or not. But I think it's fair to say that is a significant part of the picture. And all you have to think about is, we are providers. How much do we learn about taking on risk?

And these alternative payments is part of the evil system. But my argument is, if we don't deal with it, it will be imposed upon us. So it's very important, especially the young providers, to think about how does it impact how we deliver care and what the health care system is that we have.

This is just a summary slide of the potential different payment models. It comes from the first edition of*The New England Catalyst, The New England Journal of Medicine Catalyst,* from Harvard medical economist Chernew. And it's been informative for a couple of things.

Like we talked about before, the fee for service is way on the left side. Population-based payment is way on the right side. And if you look at this role, what is believed to constrain the growth? As we talked, about fee-for-service is extremely poor because you're paid a la carte. You do more. You're paid more. So obviously that creates a growth industry for providers. On the other hand, if you're a provider your ability to sustain that line of business is very good.

The opposite is true for population-based medicine. Because if we're saying we're going to set the ceiling on what we're going to pay for health care, obviously then it's very easy to control the overall cost. What's not so easy is to make sure that all the providers you need, especially those safety net hospitals and those providers in the rural area, are going to survive this economic system.

But I point this out because they're two ends of the spectrum. We're wallowing somewhere in the middle. But neither of them actually guarantees what we're really interested in, which is high-quality care and access.

In order to do that, we have to make sure other parameters are part of the system. And that's going to be measures that make sure that the payment is not linked just to the number of people you take care of, or the population you're managing, but how well you manage that population.

So what is the UPMC's experience with alternative payment model? So UPMC has delved into these alternative payment models for a while. And I'm just going to quickly go through it. And many of the people in the audience have been part of it.

Shared savings, like we talked, about is a deal mostly with primary care groups, where the insurance company will identify a population the primary care group is taking care of. We measure quality parameters. And we also measure how much money is spent in taking care of those patient population.

And if there is efficiency, instead of the insurance company keeping all of it, which is what we like to do, we share some in terms of it comes as an incentive payment to the primary care physicians. Starting in 2011, in this region, for UPMC Health Plan, general internal medicine has participated, and so has CMI, as well as others.

And I'm just going to go through a couple of slides. And the point will be obvious. So the CMS, meaning the Medicare programs in this country are rated according to a five-star system, depending on how the people in that Medicare product does in terms of things like mammogram screening, colonoscopy screening, colon cancer screening, and other factors.

And the point is that those that have participated in the share saving that are UPMC, take care of the population better, at least in terms of these metrics compared to those outside of UPMC and rest of network. HEDIS is unfortunately named parameters that measure some of the other products also. And basically, our rate's higher, if you will, part of that same share savings program. These are the same things for Medicaid.

And the number that many insurance people are fixated on-- all those people in my home base, Florida now-- look at this number quite a bit, which is so-called the medical expense ratio. How much of the premium that's collected goes out to actually take care of the patients? It may seem odd, but the reality, if you're running a insurance company, the lower that is, the better it is because that creates the margin. And the share savings program actually decreases that significantly.

My point is, if this is not connected to the parameters of quality, then it's not clear where that's going. In order for us to get to where we want to go, we're going to have to have a differential financial system and a different relationship between the providers and the payers that carefully monitors quality.

Almost all of us agree that the shared savings program has been a good thing. It's improved the efficiency and the care in the region for those primary care practices. And right now, for a UPMC a health plan, over 50% of the covered lives are in share savings program. Unfortunately, it's really limited to our relationship with primary care. And we have almost no significant share savings program or other value-based programs to the specialists. And that'll be a topic that we'll try to cover at the latter half of the talk.

So to switch gears a little bit, I want to talk about UPMC as an integrated delivery and finance system. And I think everyone knows that means that we are a single corporation that is responsible for, as a payer or insurance, to pay for the services and then also provide the services. What other IDFS are we aware of?

AUDIENCE: Kaiser.

JOON SUP LEE: OK, so Kaiser is widely touted as the biggest IDFS in the United States. And at $70 billion, it's about three times the size of UPMC. And it's really the most famous. Any other IDFSs?

AUDIENCE: The VA.

JOON SUP LEE: The VA actually probably is the largest IDFS. We don't recognize it in the United States. Their total health care budget is about $100 billion. And probably one of the largest IDFS's in the world, it's probably the NHS. Their budget is like 140, 150 billion pounds. And they provide-- they're certainly an integrated delivery and finance system because they have a certain budget and they determine-- the NHS determines how that care is delivered.

AUDIENCE: How big is Intermountain?

JOON SUP LEE: So Intermountain as an entity is about $10 billion. So it's a little less than half of our size. And their DNA is somewhat different in terms of they're smaller hospitals. And a smaller proportion of their patients are members of their health plan. The health plan there is significantly smaller. And the other one that people are aware of is Geisinger is an IDFS, as you know.

So a couple words and little propaganda about UPMC. You've seen this slide. This is the growth of UPMC as a corporation, where we have gone from, if you will, a $2 billion corporation to $20 billion corporation as far as revenue goes. And now employs 90,000 people over the last 20 years.

As a provider system, it's about $12 billion, which would rank as probably in the top 20 amongst the provider system in this country, depending on how you rank it. Certainly, within academic medical centers, it's pretty much as large as it gets there. There are a couple-- you can argue whether something like Partners or Massachusetts Brigham is slightly larger or not. But it's as large as any other provider systems, just on the provider side alone.

But these are the hospitals. I'm ignoring the international part right now. And one of the things to note is that the hospital is spread really throughout Pennsylvania. But it would be unfair to think of it as a homogeneous system because it really isn't. Because southwestern Pennsylvania is really functioning as integrated delivery and finance system, or we should be. But the rest are not. And I'll show you that.

This is the insurance company analog, if you will. Insurance company was started in 1996. And it be a great story to say that that had something to do with me coming to Pittsburgh in 1996. I had no idea.

Dr. Mark Schmidhofer is in the audience. I think shortly soon after-- here's a trivia fact-- was the first chief medical officer of the UPMC Health Plan actually. But it, from a numbers standpoint, has undergone phenomenal growth, to its current size, as Mark alluded to, about 3 and 1/2 million lives-- I'll explain what that means-- and about $11 billion of revenue per year.

So one of the things that really shocked me when I went to the UPMC Health Plan was I thought it was a singular insurance company. There are 13 lines of business, most of which we're going ignore today. But the main thing that we're going to concentrate on is what you and I really consider health insurance. That's the Medicare product, commercial product, Medicaid product. Commercial product includes the ACA type of product.

And in that, what's happened over the last five years is that we actually insure about 1.2 million people. So the 3.5 million comes from some of the other products. But what you and I consider full insurance, that's about 1.2 million people. And in the Western Pennsylvania market, that becomes about one third of the population that we insure. And you can see the Nationals and the others that enter into it.

But what does that mean as IDFS? In terms of an IDFS-- so UPMC is actually like three businesses in one. That is, 40% of our population within our hospitals currently are UPMC Health Plan. So those, if you will, from a business standpoint, we've already collected the premiums as an organization. And just like an NHS hopefully, we're just trying to best take care of that population.

On the other hand, the hospitals here, as well as others-- I got to get my laser back here-- if you will, take care of many other patients that are paid for by other health plans. So there we're functioning much more like other providers. And the Health Plan has members that are outside of it. So it's three functioning as one. But it's tightly intertwined, which is important to understand.

And this is a data that's available every day from Dr. Oscar Marroquin's shop in terms of how we split. So this shows that in UPMC, we have 4,300 inpatients at this point, which was last week. And about 30-some percent, were the Health Plan, which is represented in purple.

For Presby-Shadyside, it's really about 40%. And just to kind of round that out, at Magee it's about 55%. So each of our hospitals differs a little bit. So I say that a large proportion is within the IDFS picture. I'll skip that.

So one of the questions that keeps coming up is as IDFS at what point, at what percentage point, should you really behave like a capitated provider? Is it at 10% of your patients being members of your health plan? Is it 50%, 70%? And those of you who are providing care know that this causes a consistent and sometimes distressing amount of conflict, even within our own provider system, about how we treat the economics, as well as the clinical decision-making.

So is an economic analysis looking at what the percentage of fixed costs is. We can go into the details. But the bottom line conclusion of multiple analysis done by multiple parties is that the threshold is somewhere between 25% to 30%. By that time, if you're above that, and as UPMC we're well above that in Western Pennsylvania, it is economically beneficial, let alone the right thing to do, and clinically beneficial to function much more like an integrated payer provider. My point there is I think we're well beyond that threshold.

So what is the unique opportunity of us as IDFS? Hopefully, if you would agree, that what we have is a legacy model that has a lot of conflicting agendas. That does not point us economically to the right model for best taking care of our patients. How are we going to get outside of that?

And I believe that our only way to get outside of it, we need to increase consistency, which is evidence-based pathways. But we're ultimately going to have to make ourselves smarter using the analytics, so that we can point the resources at the places where it's going to make the most difference, instead of where it's going to derive us the biggest dollar as a provider, which oftentimes happens.

It'll mean a system change in terms of how the funds flow, how the compensation models work. And it is incorrect to think that that means that we'll just shrink wrapping the care, right. Most often, the initial response is that you just want to decrease the cost, provide less care. In reality, I believe it's about probably providing more intense care to a certain number of patients.

And for some patients, we're going to provide more frequent, less intense care, and substitute that for a single-episode intense care. A classic example of that would be more primary care visits, hopefully to obviate an inpatient need. And for others, it will be eliminating some care that may not be adding value.

What are the things within our system that's unique, that allows us to do that? I'm going to give you two examples. And my hope here is that it will stir some thoughts about what are the things we can look at together to change the system of care.

This example comes from the clinical analytic shop, from Dr. Marroquin's shop, and Dr. Mahajan, who is the head of anesthesiology. So he has created and pushed the concept of a singular center for perioperative care for pre-op evaluation. It's more than that. But I'm going to concentrate on that.

And the slide is a little bit difficult to read, but Dr. Marroquin's shop has analyzed, I believe, more than a million patients who have undergone procedures within UPMC to create a risk model. So it's an agnostic risk model, to look at all the factors that are available on the EMR to see what the risk of surgery is.

I'm sorry it's a little bit hard to read. But if you look-- and then he applied this model to the Presby-Shadyside population for these two months, which turns out to be about 5,000 procedures. So we're doing about 30,000 procedures per year just on this campus.

And the green, he was able to then automatically, without seeing the patient, through the data that's available, identify approximately 30% of the patients who had a very low complication risk, basically a 0% mortality, and 0.3% in terms of morbidity or adverse outcome. On the other hand, he was able to identify approximately about 1,000 patients, so almost 20% of the patients who at a high risk. Mortality being from 1% to 3.5%. But in the highest risk, which was about the highest 3% to 4% of the patients, the morbidity in terms of a major complication was 48%.

So I think this is an important point. If you think about why we do so many surgeries and procedures on high-risk patients, most of us tend to, and I myself did, focus on the question that the patients ask, like what's my chance of surviving the procedure? 1% to 3% doesn't sound that bad if you're suffering from a major illness. But what we need to consider is that if you have a 50% chance of a major complication, some of which may be permanently disabling. that is not a question that we oftentimes address.

I say that because if you apply this algorithm-- obviously, you know where I'm going-- with the system, what we would like to do, and we've started to do, is have all of the patients in the Health Plan, if you will, start to go down this route. So the opportunities in the lowest risk, they probably don't need to see a cardiologist. Even though socially they may like to see a cardiologist because they're thought to have heart disease, they probably don't need to senior their specialist. They can go directly to the scheduled surgery.

On the other hand, if you're a very high risk, we should probably spend more resources. They probably should sit down with someone to really think about what's your morbidity, what are your chances for complication, and do you really understand what you're getting out of this surgery? I'm not saying that the procedure would shortchange the patient. But that's a difficult and long conversation to have.

Well, when this was implemented in a pilot phase of about 2,000 patients, this was the result. Actually, most interestingly about 10% of the patients elected not to have their scheduled surgery. And when they were followed, 25% of this 10% actually died within a year of an unrelated illness. So it's hard to know, say-- you know, I can't conclusively say that the surgery would not have helped them. But it's extremely unlikely it would have been a high-value procedure if you die of something else within that year.

In addition, the patients who undergo this type of evaluation and go to surgery actually do better. This is from Dr. Mahajan. In a case control manner, if you look, the mortality of non-CPC-screened patients versus those in the CPC-screened patients. Mortality is lower. Transfusions and length of stay, which is not represented here, are all lower.

The point is, this is the type of system we would want, where we want to take the highest risk patients and actually give them a longer time to sit down and talk with their physician. The lowest risk, we don't want them doing any testing. If you think about that economically from a provider standpoint, it's a money loser because what we've done is we've decreased the number of procedures that a hospital like this does, performs; decreased the revenue that comes from pre-testing. And also we've expended more money than we could recoup in terms of manpower in that our long evaluation by an anesthesiologist.

But if you think of it as a totality, I think all of us argue that this is the type of system we would like. I'll just show you one other example. So the pharmaceutical industry is what is going to bankrupt all of us in the US health care system. I think most of you would agree with that.

So UPMC as a health system, with $20 billion in revenue, spends 20% to 25%, or $4 billion for drugs. Most of it is in subspecialty drugs. It's a dangerous area for cardiologists to talk about immunomodulators and immunotherapy.

But PD-1 inhibitors is the poster child of specialty drugs. It was FDA-approved in 2014. And by this year, it's expected to be a $16 billion market. Health Plan alone spends $60 million. And for the patients getting it, it's about $10,000 to $15,000 a year.

It is a lifesaving drug. It is a life altering drug, right. It takes cancer that was end-stage, with a couple of months to live, to patients who are surviving for over a year. It is-- I'm not violating any HIPPA- it is the medication that is credited with letting Jimmy Carter survive metastatic melanoma at the age of 95, to go back to building houses for Habitat for Humanity.

The problem is that the pharmaceutical companies who financed the initial trial weren't all that interested in long-term trials. It's a miracle drug that lets me live, instead of two months with metastatic cancer, for a year and a half. But then, should I be on that medication forever?

The default is to keep it on forever. And if I'm a pharma industry, I would be relatively undermotivated to fund a trial, to figure out if I should actually decrease the profit margin for my medication. So you can see a little bit of the conflict there.

UPMC has a health system. And this is an example where we are not only a large health system, but also a learning health system-- has a unique type of opportunity to really look at this type of a problem. We are obviously on the right upper-hand side, a large clinical care system, with one of the largest population of cancer patients in the world. And utilizing the analytic shop, we can identify that we actually have hundreds of patients who have survived over a year in this class of checkpoint inhibitors, not all of my Health Plan, but clearly a large number of patients.

And Dr. Marroquin and his shop can identify those patients, after a lot of hard work and a lot of hard coding. And Dr. Ferris, cooperating with other physicians in the Cancer Center, have now created a protocol for randomizing those patients after one year. So hopefully, within a couple years, or maybe three years, we should be able to, in a much more inexpensive manner, perform this clinical trial in a single center of fashion. It's the type of clinical trial that never gets done, a question that keeps on recurring. And if we will, once that answer is known, then we should be able to complete the loop, if you will, of the circle of life or become a learning organization.

So where do we go, in the last three or four minutes, as IDFS? We have to learn to become more of an integrated unit. Like I said, we are at the top from a business standpoint, a true integrated delivery and finance system. But in order to function like it-- it's like going to a digital system, right. I think it is not fair to say that we can go from 0 to 100.

It took us years to really learn and collaborate with the primary care physicians. We have to learn the same skill set in order for this to work. The clinicians, the providers, and the Health Plan, insurance companies, have to share a lot of data and have a habit of looking at the same data, agreeing on the metrics and saying that this is what the finances are going to be based on.

We have a long history of saying that volume is what finance is going to be based on. But in order to get to that next step, we're going to have to learn new skills. So our task over the next few years is to learn those skills, to change our culture as fast as we can, so that we can actually become a risk-bearing entity from a provider side. And that's the technical jargon. But I believe that that's a very important component for providers to do a better job and also to survive in the changing environment.

So just to reiterate, what we want is a system where the incentives are aligned for all of the parties involved, most importantly for the member in the Health Plan, or a patient, clinician, facility, and the payer. But unless we share information, we're never going to get there. But we're not there yet. And how do we get there is one of our big challenges.

In the end, what we want to do is less of what's on the right side of the slide, and much more of what's on the left side of the slide. And in order to do that, we're going to have to change how we go about doing business. And we have a different opportunity within the UPMC system to do that.

So hopefully, in summary, I hope you agree with me that the current trajectory of the US health care system is really suboptimal at best. And most of us would argue that it's really unsustainable. It's not because we don't spend enough money. I think it's hard to argue against that when you look at us in comparison to the rest of the country and the world. But certainly, where we spend our money, how we spend our money, how do we aim our resources is very different, and I would argue relatively inefficient, compared to some of the other systems in the world. And certainly inefficient compared to where we need to be.

We're going to have to be smart. And if you look at other industries-- look at how Amazon, or Netflix, or every other industry that's transformed, has started to use analytics in terms of where they aim their resources. And compare that to how you and I operate on a day-to-day basis when we see a patient. We rely on our intuition and very long and expensive training. But shouldn't that be enhanced with other their analytic tools? And that would be the argument that I would make. And how do we get there, where we quickly incorporate that into our day-to-day decision making?

And lastly, I would argue that the combination of the large-size market share philosophy and the academic DNA that we have gives us a really unique opportunity to try to figure out the paradigm. And my plea, especially to the younger generation, it is critically important that overarching organizations are the ones that fix the paradigm.

One of the things that's happening in health care is that all the sharks are circling because there is so much dollars. Everyone's coming in. And whether that's the startups, venture capital, what they're really good at is extracting margin. They are really good at finding that slice of health care where they can make better in that area, and more efficient, and take that margin.

If you remember the slide, this is a zero-sum game. So when that comes out, that's where the unintended consequences come. I mean, just think about what's happened to the training programs. It was originally, and still is, largely funded by Medicare. That's threatened. As we become more fragmented, it's going to be harder and harder for us.

My hope is that-- it doesn't just have to be UPMC-- but more overarching organizations help to set the paradigm. And it's not a given that that's going to happen in our system. But that gives us a better chance of overall floating the boat a little bit higher.

So thanks for letting me rant on and for the attention. And I think we still have five minutes for questions, right.

[APPLAUSE]