Can We Eliminate Cancer? The Medical Revolution - With Mike Milken, Chairman of the Milken Institute

Mike Milken
Five or six of the world's largest foundations today are all now medical foundations. The largest funder of medical research in the world are pharmaceutical and biotech companies, the second is government, but the third now is foundations.

Simon Brewer
Welcome to the Money Maze Podcast. I'm Simon Brewer. Will Campion and I have created this show to explore and unravel some of the mysteries surrounding the investment business. You can keep up to date by visiting moneymazepodcast.com, and please sign up to our newsletter to ensure you won't miss a release. If you enjoy this show, please subscribe and we'd love you to tell a friend or colleague about it. Thank you for listening.

Simon Brewer
What if clearing out early-stage cancers from your body could become as routine as going to your dentist, or a single vaccine could protect you against multiple viruses? Our guest today believes these and other advances are within reach. The former FDA Commissioner and Director of the US National Cancer Institute Andrew von Eschenbach has said about our guest today no one has done more than him to advance the fight against serious diseases. Fortune Magazine described him as the man who has changed medicine. Financier, innovator, investor, agent for change, immense philanthropist, and the bearer of hope, and now author of 'Faster Cures: Accelerating the Future of Health' and Chairman of the Milken Institute, Michael Milken, welcome to the Money Maze Podcast.

Mike Milken
Simon, it's great to be with you today.

Simon Brewer
I am going to extract three facts from your book, which is jammed full of insights and anecdotes. Number one, one-third of all US presidents have lost a child to a life-threatening disease. Number two, of 10,000 diseases identified worldwide, only 500 have effective treatments. And number three, if you ride the New York subway from Central Manhattan to The Bronx, a 20-minute ride, your life expectancy falls 10 years. That's six months off your life for every minute on the train. Your impact was brought home to me talking to my good friend Rob Rooney, the former Chief Executive of Morgan Stanley International, who said he contacted you over 20 years ago to seek your help for his father. Rob said, 'Mike called my dad personally and sent him to see Dr. Philip Kantoff. In the first meeting, Dr. Kantoff told my dad, we can help you not die from metastatic prostate cancer. You will die, but from something else.' It was true. He said, 'Dad lived for over 20 years with metastatic prostate cancer and died of something else. We owe those extra years to Mike Milken and his introduction to and support of Philip Kantoff.' So it's an immense pleasure to have you here today. And thank you for taking the time to join us and for Prosek communications for making the introductions. I just want to go back to frame this conversation to the early days, because I read as I researched you that your father was both an accountant and a lawyer, and I thought, what did you grasp first? A balance sheet or a legal contract?

Mike Milken

A balance sheet. As anyone that has a father that has a small firm, you learn to do balance sheets at a very young age, trial balances, etc. But I'd say what I did learn is facts, research, and it struck me at a very young age that very few people ever did research. Everyone had a strong opinion. What was that opinion based on? Was it based on reality? Was it based on facts or did someone tell them? Often in conversations when I was very young, I would ask a person, why did they come to that conclusion, and they'd say, someone told them. And as you followed the train, you didn't really understand where that information came from. We all know today with AI and the changes and social media, there are a lot of challenges on whether that information is accurate, whether those pictures are accurate or not. So at a very young age, preparing a trial balance, an income statement for a company, it had to be accurate. It had to be based on facts. You might have an individual telling you how great his company is, but the numbers told us the true story. So I think that has driven me from a very early age. When my father had polio as a young boy, as I wrote about, I really didn't notice he had polio. We were playing catch one day with a group of my friends and he told me your father has a limp. But my whole life, he had that way that he walked so I really never thought, and that night, he explained to me when he was a young boy had polio and one of his legs didn't fully develop. And I started to think back, I had never seen my father wear shorts at that time. And I began a study as it related to polio. When did it occur? Who got polio? Why was it declared an epidemic in America? What happened with the research? I also learned at a very young age, because you might have a medical solution doesn't mean people will take it. In that case, in the United States, a year and a half or so after there was a vaccine, less than 1% of teenagers in America had taken the polio vaccine. It took a very unusual event, a young man named Elvis Presley going on 'The Ed Sullivan Show', getting a polio vaccine to convince people that it was okay. If it was okay for Elvis, it was okay for the teenagers of America. Less than a year later, 80% of all teenagers in America had been vaccinated. This occurred to me in finance also when I was in college. I had met a young African-American man who told me he would never have access to capital because of the colour of his skin. He told me his father didn't. We had an event in the United States in Los Angeles called the Watts riots on August 11th, 1965, when I met this man. As a result of this meeting, I went back to Berkeley, changed my major to finance and began to study credit over the previous 200 years. As a 19-year-old, after reviewing the facts, it appeared to me that everything everyone said about credit was wrong. The worst credit was what was considered the best credit, sovereign debt, and the best credit was companies. Even during the Depression, non-investment grade companies, which make up 99% of all companies, the risk spread was greater than the risk. So it occurred to me the denial of access to capital to millions of companies worldwide because of this false belief of credit was incorrect. But this issue of medical always looked and lurked in the background for me. When my father was diagnosed with melanoma and my mother-in-law with breast cancer in the early '70s and our children had challenges with epilepsy, there was that phrase, you have a plan and life gets in the way. And like anyone else, these health challenges thrust me 50-plus years ago to focus on medical research. In many ways, I was no different than others, yourself. In the United States, one in two men get cancer in their lifetime, and one in three women. There is no family where you don't have health challenges, and so it gave me a couple of paths to follow. I wrote about that, as you know, Simon in the book, the three paths: education, medical research and health, and access to capital.

Simon Brewer

You've actually done my job for me, and you've set the stage perfectly because there are a number of those things we're going to explore. I want because I think it helps people understand your journey, and many of our listeners are in all sorts of parts of the world so they will be less familiar with you. You did go to Berkeley and Wharton. I'm told at the time, you had the highest grades ever recorded from Wharton, and then you go into finance. Now, it's particularly interesting you've just touched on credit because we've seen in the last 18 months a belated backup in rates as central banks get with the program. We're seeing some strains, but not necessarily very many. I see Howard Marks has put out quite an interesting piece recently about why he thinks it's opportune to start allocating to that space. But particularly as I went through your book, you made those points that what you learned about corporate bonds was that the theory was wrong, and you've touched on it. You said

credit is what counts, not leverage. Interest rates are not predictable. Ratings are a poor predictor of credit across industrial sectors. Risks in sovereign and government debt are underestimated and real estate loans seldom make for high-quality investments. Do they all hold true today, Michael, or would you change any?

Mike Milken
You left out the 6th point that debt markets underpin all financial markets. Today, we have a much different situation than we've had in different periods of time. Today, private equity controls tens of thousands of companies around the world. And a period of very low interest rates, coupled with increase in leverage ratios, and coupled third with lack of covenants, has allowed an enormous expansion of credit to occur. It allowed private equity firms to buy companies and link management and ownership. You spoke about the increase of rates driven by the United States government which have risen in the short end of the curve by almost 5%. This has a crowding out factor for many other parts of the world, many emerging countries. If you can get a rate of return of over 5% in US governance, then you're more likely to reduce risk and buy US government or other government securities. Europe and the UK have responded, but not to the same extent. And so for large corporations with pension funds or others that need to meet retirement goals, as interest rates go up, you're able to reach those goals by getting 5% or more on a US government or sovereign high-grade security in Europe or someplace else in the world. So this causes pressure. What's different this time is that thousands of companies that might be very good companies have the wrong capital structure at the wrong time. Whereas my credit work was at Berkeley, my capital structure and what was the right way to finance a company was at Wharton. So today, over the next three to four years, if interest rates don't drop substantially, many of the household name companies are going to have to refinance their debt and going to have to put more equity in order to keep the interest rates at a reasonable level. And so it is different. A number of years ago, there was a book written called, 'It's Different this Time'. It was a tongue-in-cheek book written by two noted economists talking about 800 years of folly, and that was the belief that emerging debt was not going to default. And the United States and other parts of the world, many people, including Paul Volcker, Head of the Federal Reserve, expressed the false feeling that countries never went bankrupt. That is true. They don't go bankrupt, they just default in the whole history of emerging debt. It was actually a man named Alexander Hamilton in the United States when the US debt traded between 15 and 25 cents on the dollar that did not ask for a concession or a recapitalisation but bet on westward expansion and entrepreneurs to build it. Eventually, the US paid off its debt at 100 cents on the dollar. In many ways, Europe, particularly the UK, financed the expansion of the railroads across the United States from the East Coast to the West Coast. At the end, many of these railroads had difficulties. A century later, the default rate on double A railroads was 100% higher than the default rate on low-rated single B industrials. That's why I talked about ratings. Once again, we have the challenge here on real estate where over the last decade or so as the interest rates are so low, people borrow the very low rates as those mortgages mature. Many of the owners of the real estate are handed the keys to the mortgage holders. These things were based on facts, not supposition. My decision to go to Wall Street was really to democratise capital. I was very focused on inverting the pyramid, as I called it. When I went to Wall Street in the late '60s, the highest-paid people were people in sales, salesmen, and in some cases, saleswomen. My view was the fundamental nature of investment was research, and so I wanted to invert the pyramid where research was the foundation of the financial business, then trading, then sales, rather than sales as the foundation, then trading and then research. And so over the period of time, I recruited some friends like Howard Marks who was doing equities in Citibank. He eventually joined me for Citibank on the West Coast, and thousands of others to do research in fixed income securities. It's interesting when I reflect, Simon, the very first speech I gave on Wall Street was the best investor was a social scientist, and understanding the dramatic changes that are occurring will allow you to be a better investor, get better advice. And so today, understanding the challenges of capital structures for organisations will allow you to be a better investor going forward.

Mid-Roll Ad Break 1

Simon Brewer
Thank you. That has set the scene really well in terms of economics and markets. It also allows us to turn to your book 'Faster Cures: Accelerating the Future of Medicine' with Geoffrey Moore, and we'll be featuring the details of the book with all our show notes. But one of the absolutely important messages, which is where I want to start on this chapter, is framing the centrality of medicine in economic terms. There's an old adage that the health of a society defines the wealth of a society, but maybe you could put in perspective how important health has been to economic growth.

Mike Milken
That old adage comes out of the UK.

Simon Brewer
As do a few good things.

Mike Milken
They saw that first. At the start of the 19th century and in the 1800s, there was only one country in the world where 50% of the people lived in an urban environment, and that was the UK. So they dealt with many of these health issues much earlier than other countries. Today, most of the countries in the world are now moving into urban environments. So we wanted to increase the investment that countries made and others made in medical research. Even today, the vast majority of the money spent is spent on care. If you had a defect in your manufacturing of a product, let's say a car, instead of fixing the defect, you're going to have it in the repair shop every week. So less than 10% of the money in healthcare, the world's largest industry, is spent on medical research or prevention and 90% on care. So to make the argument, an economic argument, I recruited Gary Becker, a Nobel Prize winner, Kevin Murphy and many others to work with us. And it became clear as we did this analysis that more than 50% of all the economic growth in the world in the 19th and 20th centuries came from public health and medical research, and quite possibly, the greatest achievement of humankind was the doubling of life expectancy on the planet in the 20th century. At the start of the 20th century, average life expectancy on planet Earth was 31 years of age. Today, 120 plus years later, it's mid-70s. Almost the entire growth in the world's population can be attributed to the extension of life, and not only the extension of life, but the quality of life.

Simon Brewer
Very particularly, I was intrigued in your book when you made the comparison with resource-rich countries, like Brazil and Nigeria, with those that are scarce resource countries like South Korea, Japan, and Singapore. What's the particular lesson you took from that?

Mike Milken
The lesson that you take as you study development countries over the years is it reinforces work done by Gary Becker out of the University of Chicago who won a Nobel Prize, that the main resource is human capital. In 1965, I wrote down this formula at Berkeley that prosperity, job creation, whatever goal you're trying to achieve, was on one side of the formula, but it was a byproduct of access to financial capital, financial technology, that served as a multiplier effect on human capital and its potential, social capital, and then what you find on a balance sheet, real assets, plants, equipment, accounts receivable, inventory, etc. But understanding the element of human capital. And if you needed to think about it vividly, I talked about Singapore versus Jamaica, two countries that separated in the 1960s from the UK and became independent countries. Lee Kuan Yew, who was to lead Singapore, who I developed a friendship over 40 years with, went to Jamaica and spoke to the future leader of Jamaica of what his goals and strategies were. Jamaica chose natural resource and tourism. Singapore chose education and human capital. Both of them had the same GDP per person in the ‘60s. Today, Singapore is 20

times Jamaica, and no one would confuse Singapore with Jamaica today. So what he did so uniquely is he attracted the best and brightest throughout the world, expats to come to Singapore, created a tax structure and incentive structure that brought them there. Many countries have done that, but what he did different is he made sure the citizens of Singapore were not second-class citizens and were educated to the level of the expats. And so education, a teacher, was a cherished job in Singapore. They focused on medical research in Singapore. And today, the National University of Singapore would be one of the 20 top biological universities in the world.

Simon Brewer
If we take a particular plague that we have, which is cancer, did I understand your book correctly that were we to eliminate cancer, we'd get an uplift of…was it $50 trillion to the US economy?

Mike Milken
In the 1990s, 1999 and '95, we did this analysis with a team of leading economists, and eliminating cancer as a cause of death and suffering just in the US would have been worth $50 trillion, multiples of the economy of the US. What we saw was this under-investment in research. Why you brought up cancer, we analysed many factors as to what was reducing the pace of medical research. One of them was not sharing data. Sometimes you waited a year or two for a discovery to come out in Cell or Nature. As I travelled the United States and people told me they couldn't share their research because they were waiting for it to be published, I told them that was okay because the financial capital we were providing was for those whose work was not as important, who weren't waiting for an article in Nature or Cell. And I would say within six months, everyone was willing to share their research and work as a team. But the understanding of why you were not able to increase the commitment to medical research led us to believe that it was too fragmented. Thousands of life-threatening diseases that you spoke about each appealing to government leaders for more funding individually had resulted in nothing being done rather than something being done. And after a few years, I travelled and asked the leaders of disease-specific organisations if they could stand down for a couple of years and we could just focus on cancer, the big C, because 30 years ago, people felt if you were diagnosed with cancer, that you were going to die. And so this fear and concern and by focusing as a laser, we put on a march in the United States to end cancer. And our promise to every other life-threatening disease, whatever it might be, from Parkinson's on down, stroke, heart disease, lung issues, was that if there was a doubling of the money for medical research, everyone would get a doubling. It would not just go to cancer. If the NIH in the United States, which is the largest public funder of medical research, doubled its budget, it would go to all forms of medical research. And two months or so after we put on the march in 1998 in Washington and around the US, half a million people, President Clinton signed into law the doubling of the NIH budget. We also discovered that we could accelerate medical research by giving birth to the disease-specific foundations. There was a lot of pushback. But by getting disease-specific groups philanthropically set up, they could accrue patients quicker into clinical trials. They had more knowledge of what was going on in specific diseases that patients could tie into. They could raise more funding than others could. And so these were many of the opportunities that were available.

Simon Brewer
Staying with cancer, Michael, you yourself were diagnosed over 30 years ago I believe with terminal cancer. As I read your book, and you made the observation about people generally, when they're diagnosed with cancer, initially, they do as little as possible, and later on, they do as much as possible, which as we know, is understandable but just the wrong way around. You started to envisage your own immunological approach to cancer. I wanted you to just explain what it was that you saw. I think you moved a doctor into your home and you started to think about the whole range of potential cures.

Mike Milken

So I've been funding cancer research for myself and my wife, for more than 20 years when I was diagnosed in '93. We knew a great deal about melanoma, we knew a great deal about breast cancer, other forms of cancer, I knew nothing really to speak of about prostate cancer. So like everything else I do, I began a crash course in research, and very little money was going in this area. It was the most diagnosed non-skin cancer. At that time, 1 in 8 men in America and other places around the world were diagnosed with prostate cancer. In Scandinavia, it was one of the leading causes of death, and they didn't really treat. There was an article in a newspaper in New York, the New York Times, that there was no evidence that any treatment for prostate cancer extended life, radiation, surgery, etc. And so as I went from doctor to doctor, my prognosis became worse. First, I thought I might be a candidate for something like surgery. But as I discovered that my cancer had spread into my lymph nodes and I had the most aggressive cancer, there's something called a Gleason score, that I had 10s and that my life expectancy based on charts and graphs I had looked at last appeared to be 18 months, I actually had to go lay down and rest for a little while to think about what we're going to do. One of the first things I concluded was I had lost 10 relatives to cancer at this time, no one had changed their diet. And so there was this significant anecdotal evidence that those on a plant-based diet had far less incidence of hormone-driven cancers, breast cancer, prostate cancer. If you looked at Asian countries, their incidence was maybe a tenth of the United States or other Western countries. And so I made the decision for a couple of years only to eat fruits and vegetables until I would see what would happen. Now, my view was anything that was reversible and I did not think would harm me, I would make that decision. As you pointed out, as I reflected over the 20 years of research, and particularly in cancer, I discovered that most people chose to do the least possible at the beginning and hope that it worked, whereas doing more at the beginning quite often did not allow your cancer to come back and gave you a better chance. Today, you'll have a woman often told who had breast cancer after surgery, if you have radiation, it will reduce your probability of reoccurrence by so much. If you take Herceptin for five years, it will reduce your probability of recurrence. If you have radiation, it'll reduce. At that time, it was a game based on perception. But one of the reasons I wrote this book and primary reason I wrote this book, Simon, was today, it's not necessarily a guessing game any longer. Today, we can sequence your own genome. We know who you are biologically. Why is sequencing the genome so important? Your gut, in Indian medicine, Ayurveda medicine, it's considered to be your second brain. Whereas CRISPR technology is available to us today that can change your genes, we are not deploying that technology. One of the reasons is, when I change your genes, I've created a new human race. Because if you have children, then your genes have been changed. They weren't just passed down from your parents and so on. We know for sure that your microbiome reflects at least four generations in your family today, in many ways. But if you can change your microbiome, you can change potentially the way your genes are expressed. And so by changing what you're eating, drinking, lifestyle, exercise, you can change it. Lastly, we can sequence your disease, and if we're talking about cancer, your cancer, and find out what type of mutation you have. So we're not just treating you for a breast cancer or a prostate cancer, we're treating you for the mutation you have. And so there's many different mutations. In the case of prostate cancer, you'll find similar mutations in more than 70 different cancers. In about 10 years or so, we will not refer that you have lung cancer. We will tell you, you have a certain type of mutation that's been expressed in your lung and we know that this form of treatment is the most effective for that mutation. And so over the years, technology has allowed us to approach medical research differently and treatment differently.

Simon Brewer
I found that section of the book on lifestyles and food chain very compelling. I'm going to just quote one particular statistic which I thought was extraordinary that diabetes in the US has only fallen twice in the last century and a half, and that was at each point in the First and Second World Wars when there was less sugar and fats available. But just tell us a little bit because you mentioned Asian countries. What's happened in China?

Mike Milken

The first real research came out of the UK. The UK saw a dramatic drop in diabetes like the United States only twice, World War One and World War Two in the studies. And there were ads run in the UK; 'Please sacrifice for our troops and eat only fruits and vegetables so we can send fat, carbohydrates, sugars, other forms of energy and protein to our troops'. I would say this approach which I suggested in '93 was not well received. The question was prove it. You could only prove it anecdotally as you saw in the UK or in the United States. You could only prove it anecdotally showing that in China, Japan and other Asian countries that were primarily plant-based with soy and tofu that they had much lower levels for example of hormone-driven cancers. So you asked the question today, what about China? Forty years ago in China, if you went to medical school, you did not even study diabetes. Diabetes is one of the most expensive diseases. We did a study put out in the first decade of the 21st century showing that just the change in weight, just the change in weight cost the United States $1.5 trillion in increased medical costs for seven chronic diseases. So let's look at China today, 20,000 fast food restaurants later, 5,400 McDonald's, substantial increases in carbohydrates, sugar, fats, etc. Today, China has the most people with diabetes in the world. There are estimates today that 40% of all adults in the major cities in the east of China are either diabetic or pre-diabetic. And so evolution would have taken centuries to adjust your diet so dramatically from a plant-based diet to a diet with high sugar, high fat and meat at this time. The same thing is happening in West Africa. If you go to the most populous country in West Africa, Nigeria, you will see an epidemic occurring of diabetes and of hormone-driven cancers. The same thing has occurred in China today as the incidence of hormone cancers, particularly prostate and breast, has doubled, tripled, and in some cases quadrupled as a percent. And so we now see the link. We have spent almost 30 years researching this today. Today, you can prove what the results are and we can start to analyse what the results are by changing your microbiome. In 2023, the FDA in the United States approved a cancer treatment of giving the microbiome of one person who's responded well to cancer treatment to another person, in this case, melanoma. And so we can see the difference. So what was anecdotal based on facts 30 years ago, today is based on data and is now been approved.

Simon Brewer
I'd like to touch on prevention. At the higher level, we have a mutual friend, Bob Bradway, the Chief Executive of Amgen, who worked as I did for many years at Morgan Stanley. He didn't say, by the way, Michael is terrific. He said by energising patient advocacy groups and channelling them, he has done extraordinary and transformative work. He said, but you do need to ask him, what are we going to do about prevention?

Mike Milken
There's a chapter in the book 'The new miracle discovery for disease prevention'. There's been many cartoons over the years. One that always struck me was a doctor talking to his patient and asked him, which works better into your schedule, exercising one hour a day or being dead 24 hours a day? Which one works best into your schedule? What Bob and Amgen had been working on, and they are the world's largest biotech company. I first visited Amgen 30 years ago in 1993. I had a friend, Gordon Binder, and I told Gordon, we need to increase the investment in cancer research. As a result, he told me, Mike, we would love to, we're a public company. Basic science had not moved fast enough for us to commit, which I asked, an incremental half a billion dollars a year to research. It was only two or three years later cancer-related that they did increase substantially their investment in cancer-related research due to the enormous advances, many of which we had pushed and developed in basic cancer research. So when you mention Bob and you mention prevention today, the most valuable medical company in the world today is a company called Eli Lilly. It's based in the United States. The second most valuable is a company called Novo Nordisk based in Denmark. Novo Nordisk today is the most valuable company in all of Europe. In fact, more than 80% of the increase in the GDP of Denmark this year can be attributed to biotech and bio research. What they have done is brought out products, drugs, treatments, that have an effect we can say on reducing your appetite or other factors, and therefore, are causing significant weight loss as a side effect. And with that comes a substantial reduction in those seven chronic diseases that I spoke to you about that have come on and increased dramatically. So by losing weight, just losing weight and changing, you can

reduce your probability of getting cancer by 20 to 30%. You substantially reduce your chance of getting diabetes. They've now shown, Novo Nordisk in studies, it substantially reduces the effect on your kidneys. And so when they announced that one of the side effects would be less kidney disease, the stocks of your two leading kidney dialysis companies DaVita and Fresenius both went down 10 to 20% in one week. And today, you have many consumer doughnut companies and others that have come under pressure with the idea that people might not be eating as much in the Western world because of this. So you can see that the financial markets are adjusting dramatically to the idea that by reducing weight and reducing the side effects and pressure on your body and all the corollary diseases such as diabetes. When you look at the people that die of heart attacks in the United States, the vast majority of them have diabetes. If you look at people that have had amputations, foot, legs, etc., not because of some accident, the vast majority are because they had diabetes. And so these drugs, which are quite expensive today, someday might be the solution for Africa as it changes its diet as we've seen in Western Africa today. For much of that continent, it was a plant-based diet over the centuries rather than an animal, carb, sugar-based diet that we are inserting today as it spreads throughout the world. This is not the first time that financial markets have adjusted to a change which is effectively changing the makeup of your microbiome and your body. If we go back a number of years, Simon, and I believe I wrote about it in the book, there were two companies, a company called Kraft Heinz in the United States, and a company called Nestle, which was the largest food company in the world. Nestle, I had a friend there that I thought was going to become the CEO of Nestle. But Nestle went outside and hired a CEO from a healthcare company to become its new CEO and they announced that they're going to become a health company. Now, they were attacked on social media. First, their chocolates and other things give you diabetes and then they're going to do things for you. So they are 360. First, they give you the wrong foods to eat, and you get sick, and now they're going to deal with that. At the end of the day, Nestle sold its ice cream business in the United States, it sold its chocolate business in the United States. It was no longer Nestle crunch bars, it was just crunch bars. And they went out and bought companies focused on plant-based diets, vitamins and other things, and the market rewarded Nestle by increasing the value of the company. On the other hand, Kraft Heinz, it was very hard to find any healthy product, and as people began the analysis, the stock dropped by more than two thirds. So Nestle stock went up as they described and changed the product mix to be more health-focused, and Kraft Heinz whose most of their products were not healthy or heavily laden with sugar or fat, stock went down dramatically. So the stock market and financial markets are reflecting what they see in the future. And whether it's kidney dialysis companies or whether it's Eli Lilly or whether it's Novo Nordisk, their promise, and we'll see what other companies like Amgen can bring to the marketplace in the future. But if we have the ability to prevent disease, we will dramatically increase the quality of life and reign in medical costs. And one of the greatest sources for this information to study that we've been involved with is the data banks in the UK, your system. As you noticed, the UK has come out with some interesting potential rulings. If your children are obese and you can't control it, maybe we'll have to find another guardian for your children from that standpoint. And so the UK has put out many provocative thoughts about how to change your own lifestyles to deal with this issue. The United States is the most obese developed nation in the world in terms of its weight, but the UK isn't far behind from that standpoint. And so what we're seeing here is that science and financial markets are serving to lead in these areas. A company like Pfizer today, it would take three Pfizers, which at one time was the most valuable healthcare company in the world, medical research company, to make one Eli Lilly. Simon, there is another side effect that I don't know if you or your viewers or listeners have been focused on. But if you look at the largest foundations in the world today, there has been dramatic change. The largest foundation in the world for a number of years has been the Gates Foundation, which has been very focused on healthcare in Africa. It led the way in getting the polio vaccinations throughout the world, has led the way in other, malaria, tuberculosis, in Africa, etc. But today, the largest foundation in the world is the Novo Nordisk Foundation, and it is now twice as large because of the current valuation of Novo Nordisk as the Gates Foundation. The third largest foundation in the world is headquartered in the UK. The Wellcome Foundation also has been a leader in medical research and other strategies related to health and wellness in the world. Eli Lilly Foundation is now one of the largest foundations in the world due to the growth in

the market cap of Eli Lilly. And the investment in human capital and young scientists has made the Howard Hughes Foundation, which invests in primarily the human capital of people going into medical research and healthcare, one of the largest foundations in the world. So five or six of the world's largest foundations today are all now medical foundations. The largest funder of medical research in the world are pharmaceutical and biotech companies, the second is government, but the third now is foundations.

Mid Roll Ad Break 2

Simon Brewer
I think when people read your book, they will be struck by how data-rich it is and how logical. I was amazed, and you're right, one sees it in the UK. You say Americans eat less than half the recommended daily amount of fruit and veg whilst consuming five times the recommended limit of sugar. Now, I want to Michael move to technology and AI. It was the late great Steve Jobs who said, I think the biggest innovation of the 21st century will be at the intersection of biology and technology. And I wonder whether you could just give us a sense of how tech, and as one part of that, AI, are being integrated into this research and delivery, and some illustrations will be really helpful.

Mike Milken
We began in our foundations and personally in the '70s and '80s funding research, but particularly focused on empowering individuals and talent, and so bringing financial capital to serve as a multiplier effect on human capital. In 1993, I met a young man named Francis Collins, and he had been picked by the United States government to begin the sequencing of the human genome project. We have been very focused on research, and as I mentioned earlier, this concept that your microbiome could change the way your genes are expressed and reduce the outcome and the severity of many diseases, particularly cancer. But you could not prove any of these ideas. Billions of dollars later, and a decade later, Francis completed the sequencing of the human genome. And so computers are a million times faster today. Data storage costs are one billion today. What we could have only dreamed of in '93 is a reality today. One of the reasons I wrote this book is that we are on the verge of a dramatic revolution due to technology and what we're capable of doing today. Normally, when you have a pandemic or a catastrophe and you all focus worldwide attention on it, as we did on COVID-19, you have a tendency then to leave it and go on to other things that are happening in society and there's plenty of problems. And so I wrote this book to say, it's not time to put your foot on the brake. It's time to put your foot on the accelerator. So what did technology allow us to do in 2020? As I was coming out of Johannesburg in one of our medical conferences we were holding there in one of our programs for future leaders of emerging countries, I could feel a dark cloud spreading throughout the world, and that was this COVID-19 that had started in China. When we had our conferences in the Middle East, the China delegation had cancelled, then the Italian delegations had cancelled. And so when I returned to the United States, I gathered all the centre heads of the Milken Institute and our leaders and the heads of all of our medical foundations and told them we would all be judged in history by what we're going to do in the next year or two. Where we, A, going to be able to reduce the burden of this potential pandemic, with the idea of reducing it by one day might save 10 to 25,000 lives. And what had we done in our careers and what we were focused on that we could do to quickly adjust and try to bring this pandemic to an end. Technology. The minute this virus was eventually released and sequenced, it was 9 weeks, 63 days before the very first vaccine went into a human being. Not a decade, not a year, 9 weeks, and the Moderna vaccine went in. Now, why did we have a Moderna vaccine? Since we had that March, we had incrementally invested in the US alone by that point $500 billion in basic and translational research. We had helped create a new centre called the National Centre for Advancing Translational Research. And a young woman researcher from Hungary refused to give up and her partner their work on RNA even though the University of Pennsylvania told her she was going to lose her position if she didn't go focus on something more practical. But this basic research was in place in Moderna 63 days. I made the decision similar to what you're doing today with

me; to do podcasts, one a day, two a day, so that the world would know if I'm talking to Francis Collins, who at that time had become the head of the NIH and what his strategy is. Why should just the two of us have a conversation? Why shouldn't the whole world know what we're thinking? And if I was going to try to convince Alex Gorsky, CEO of J&J, to accelerate their work instead of waiting a year or eight months to start it, why don't we start it today, why shouldn't the world listen to what his strategy was? Or if I'm talking to one of the largest employers, E&Y, Carmine Di Sibio, how is he dealing with 30,000 or so employees or contract workers in China? How is he dealing with it in Italy and other places around the world so that thousands or millions of other leaders or business owners could know how to deal with their own employees? We needed to do podcasts, video podcasts, audio podcasts, so that anyone who cared. Our Faster Cures group using technology made the commitment based in Washington that they would monitor every single antiviral, every single vaccine in the works that existed so anyone who wanted to know in the world could see. At the end of the day, it was up to 500 different vaccines and antivirals that were being pursued. All of this existed because of technology. You and I talking today and anyone who has a cell phone in the world should have the potential to come and access this podcast. And this, potentially, as Steve Jobs pointed out, the greatest beneficiary will be in biology and bioscience. The ability to understand the world's largest files going from a decade to sequence and billions of dollars - a human genome - to less than an hour and $100 in 20 years is an unbelievable thing. And so today, I envision someday you will walk into a convenience store, hand them a little chip and tell them while you're shopping in the convenience store, could you please sequence my human genome and put it on this chip so that I have it when I leave. And so what was not available to anyone, eventually the cost will be at a level that will be available to everyone in the world. Now, once we load this data, and I'll give you an example. There was a team in Silicon Valley at Stanford University that wanted to figure out could AI recognise the breed of a dog. And so they loaded pictures of every kind of dog on the planet. And I'm speaking to an individual who's in a country that loves dogs. Often, I know my employees would tell me that first there's their dog and then there's their kids and who they're taking care of.

Simon Brewer
Guilty as charged.

Mike Milken
So using AI, they got technology to be able to identify the breed of dog by loading them all in the computer, then you take a picture of that dog, and it tells you the breed of the dog. So where did this lead? If they could do it for dogs, what about melanoma? So they started loading melanomas, hundreds of thousands of pictures of melanoma, more than any doctor or any pathologist has ever seen. And so soon, you'll have access through an app on your phone, that at home, you just put it on your skin and it'll look at hundreds of thousands of melanomas, more than any doctor has ever seen, try to compare what it's seen on your skin to all those melanomas and try to identify it. Today, there is no human being who could look at your CAT scan or MRI in the same detail as a computer could look at it at a microscopic level and looking at judging it. And so it can analyse today the results. AI allows us today, and companies like Tempus and others have been built that have loaded your clinical data and your biological data, and let's stay with cancer, and the DNA, etc., of your cancer. They now can review thousands, hundreds of thousands, and some day millions of cases as to people who have this type of microbiome, this type of DNA, this type of mutations, and what is the best treatment for them. Who's had the best outcomes? Should you be getting this treatment or should you be getting that treatment? You had asked me earlier about the word immunology. It was 1997 when a young man at my wife's and my undergrad alma mater, University of California, Berkeley, Jim Allison, stood up and said, your immune system is smarter than the hundreds of the world's leading scientists and researchers in this room. It has been doing a great job your whole life and then something went wrong. What went wrong? One, your cancer wanted to live so it disguised itself and your immune system didn't recognise it as cancer. Two, you'd been sick or other things had occurred, significant inflammation in your body, and in 60% of cancers, you have evidence of inflammation, and therefore

your immune system has been weakened and was not able to fight it off. Or number three, the cancer wanted to survive and sent out a signal and turned off your immune system. I am sitting there in the audience, we had followed 15 or 16 other paths, apoptosis, nutrition, etc., and it struck me that we had not put enough emphasis on immunology, this one lecture. Now, I might have been biased and my wife might have been biased because he was at our alma mater, but we funded him and he won a Nobel Prize 20 years later. We funded the research in his field which was checkpoint inhibitors, essentially turning off the switch that turned off your immune system and when you flip that off overnight. Now, what we discovered was in 10 years of work in prostate cancer, it was not as effective. But it became extremely effective in one of our other medical foundations, the Melanoma Research Alliance, which is the largest funder, private funder, of Melanoma Research in the world. Today, the death rate has dropped by 50%. Simon, I finished the book with a chapter of one day in my life in 2022. And that day in my life, I started at going to a meeting and a breakfast we had in Boston for medical research. I went to a baseball game, which I've been going to American baseball games to raise awareness for cancer research and to raise money for cancer research for 27 years. But then I got a call that the CEO of the Melanoma Research Alliance had come down with COVID and would not be able to go to Leveraged Finance Fights Melanoma, an event that occurred in November, the first event in the UK for Leveraged Finance Fights Melanoma. So an industry that I helped give birth to has stepped forward today from Melanoma Research. And at that dinner, I spent time with three young men particularly. Each of them had melanoma metastasised in their brain, in their lungs, and their liver. Normal life expectancy at that time might have been 30 or 60 days. One of them told me his mother came to stay with him in New York because she knew his life was short, and she was crying too much morning, noon and night. He told her she needed to go home because if he's going to even try to get better, he can't have her crying morning, noon and night that he's going to die. All three of these individuals, because of immunology treatment, are in total remission today. So this concept that we were introduced to in '97 and back has changed the world of treatment for people with cancer, in this case, melanoma. What is going to be this year proved to be, in terms of revenue in sales, the largest drug sold in the United States is a drug called Keytruda. It is an immunology drug by Merck. And so the idea that we have now discovered that we can energise your own immune system one way or another, or turn off the things that were turning off your immune system, and your own immune system can deal with your disease. This isn't chemotherapy that kills all the good cells and the bad cells. This is your own immune system ridding you as it has your whole life from disease. You've had carcinogens that it's been fighting the whole time. We did all this study on broccoli and cauliflower and Brussels sprouts and showed people they were little Pac-Man in there absorbing carcinogens that are in your body every day. Using AI today, we can match the right treatment for the right drug for the right disease for you, not for someone else, but for you. And if it wasn't for technology, and computers might become a million times faster, and data storage, we could not load half a million or a million melanomas. We could not have a computer read our MRIs or CAT scans or other things with the same detail to identify. And today, what are the promises? New liquid biopsies. In 1986, I gave this talk that everything was in your blood. I couldn't prove I was right and you couldn't prove I was wrong, because you couldn't analyse anything. So today, companies like GRAIL, companies like Garden, which is public, they have blood tests. In the case of GRAIL, they can identify 50 cancers before you could have ever found them or anyone ever knew you had them floating around in your blood because cells leak DNA. So if you have a breast cancer cell, it's leaking DNA into your bloodstream. And before it's metastasised or you could ever even find that you had breast cancer, you can now diagnose it early and treat it early. So technology and AI is such a potential boom. It won't be long before a person in Uganda - at one time, there was one doctor for every 125,000 people in Uganda - if I can give you a drop of blood, somehow put it in your phone, your blood is digitised, it's sent at the speed of light someplace in the world, some computer algorithms are reading it, analysing what's happening to you and sending back what your situation is and telling someone there that this is the right treatment for a person that has this. This is the promise of AI and biotech.

Simon Brewer

Michael, that is just extraordinary and fantastic. Our listeners and viewers are hopefully going to be buying your book and as glued as I was. I'm going to mention a friend of the show who was also diagnosed with metastatic cancer melanoma and went to The Royal Marsden and went under one of those immunological programs. He survived, and that was five years ago. I've seen what is happening to a close friend of mine. Michael, I'm going to ask you no more questions about the book because our readers and listeners and watchers need to go and buy it. But I'm going to ask you three closing questions.

Mike Milken
Let me just comment because you mentioned the word The Royal Marsden. One of the most effective therapies for people with prostate cancer could never be used because of the side effects from treatment. When you give treatment, you need to know how often and what is the right dosage, and there was enormous side effects. It was The Royal Marsden, who we have dealt with for all these years there in the UK, that figured out how to deliver this drug in the right amount, in the right sequence that has saved hundreds of thousands or millions of lives. And today in the UK, you have five of the leading bioscience universities in the world: Imperial College, University College London, Oxford, Cambridge, and the University of Edinburgh. Their contributions to the world have been so significant. We've been honoured to fund over the years their work in bioscience, but they are treasures to the entire world. When you mention The Royal Marsden, it has a warm place in my heart for their ability. Those with cancer that go there to get treatment, as many of the other institutions in the UK, they have been a focal point for people from Africa, the Middle East, and others that have gravitated for treatment in the UK because of the advancements that have occurred.

Simon Brewer
I loved as I read about you and your wife the fact that your wife, Lori, defines wealth as being able to buy any books she wants. How do you think about wealth?

Mike Milken
I think of wealth with its positives and negatives. I have a friend who is a professor at one of the world's leading universities, and he's maybe the world's leading business historian. When the kids come into his class, he comes in and he thinks about which student got there because of their family or their family's wealth and what student got there because of their intellect and hard work and determination. And he says it only takes about two weeks for him to identify in his class which got there on which route, and then he always wonders how long will it be before the student who got there on their intellect, determination and ability, something that maybe became known the ideal of the American dream, upward mobility, not who your parents were, not where you were born, not your race, not your religion, but a chance to achieve based on your ability. And so one side of the coin, I think about the disadvantage of children born into wealth and how hard it is, and over time, whether they can ever achieve or feel they ever can achieve what their parents or ancestors had achieved. And so in many ways, wealth is a burden. You don't get to experience the same life, necessarily that struggle. Most people say, well, I would rather not have that struggle. I'd rather not have lived in a homeless shelter. I would have rather not done this. But it shapes many people and that's why often today when you look at who are the wealthiest people in the world, most of them did not inherit it. They created it. They were entrepreneurs or something. Lori and I think about that a great deal. When she grew up, they could not afford to buy any books. And her memories were going to the local library with her father, who loved to read and she loves to read and has her own publishing company today, Delphinium Books. But they couldn't afford, so they could check out books every week to read. So her idea was wealth allowed her to be able to buy that book that she wanted to own. And I feel in many ways, we've tried to instil that into our children. But when you look at businesses, Simon, you will find by the third or fourth generation, most businesses do not exist. And so it's hard to pass this drive, this entrepreneur feeling, unless you've had more sacrifices in some way as a young person or you've had to overcome more difficulties. There's a positive. I view wealth myself as a creator. The formula which I wrote down in '65 is that access to

capital allows you to make dreams a reality. So I have spent most of my life since the mid '60s identifying individuals to empower, whether it's in medical research, whether it's in public health, or whether they were entrepreneurs building what became the mobile phone industry. When I funded that, almost no one believed in it. To give you a feeling, the person that invented it, a company called AT&T, AT&T today is a different AT&T at Southwest Bell that bought AT&T, but they invented the mobile technology. They had a report done by McKinsey in 1979 that said there would be one million users by the year 2000, they would be paying $1,000 a year, that the whole industry worldwide would be a billion-dollar industry and it was too small for AT&T to go into. And so they invented it and did not go in it. They made a mistake. By the year 2000, you were selling 900,000 phones a day, and today, there's more than 8 billion on the planet. And so I made the decision heavily influenced by my interaction with Gary Becker that I would search out, and whether it was my own capital or others, I would serve as a conduit to empower people with ability that could change the world, and whether it was in telecommunications. When I was growing up, we could not afford to make a long-distance phone call. If I wanted to call Europe that cost $12 a minute when wages were $100 a week. If I got on the phone, in eight minutes, I could eat up a week's wages. So I made the decision to finance that industry. And as you know, today with technology, it's free on WhatsApp. So that has been the path that I have chosen. And I would say I have spent the last 30 years trying to recruit the best and brightest to work in the field of bioscience. I view bioscience not just as your health, but as agriculture, food environment, climate, energy, etc. To me is the deployment of that wealth. And today, as I pointed out, due to the success of individuals like Bill Gates, or Eli Lilly, or Novo Nordisk, or Howard Hughes, or the Wellcome Trust today, those that had accumulated wealth today, these are among the largest foundations funding the solutions to those thousands of diseases that we don't have solutions for. And so, to me, it's how you deploy that wealth. Carnegie wrote a paper in the late 1800s that a man who dies wealthy should not be admired, and that if you had the ability in your lifetime to create something, then you should use that ability to deploy that wealth in your lifetime, not just pass it on to someone else to do. That paper, which I've read many times, has had a major effect on my life.

Simon Brewer
I'm going to leave my other two questions because I think next year, we may need to ask you back, so I am going to conclude. You may have said in your book that soon after Roger Bannister broke the four-minute mile, 16 others beat it within the next year. And clearly, the power of technology is immense. You also observed that Margaret Mead, the revered anthropologist to have observed, 'Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that has ever done.' When I started on the research for our conversation today, I knew your name, I knew about your history having been in this business since I joined Citibank in '85. But as I built my understanding, your immense results, your impact became clear. Because I have to say congratulations, some people do make a difference in life, and you are one of them. So, Michael, it's been an absolute treat to have you here as a guest. Thank you so much.

Mike Milken
Thank you very much for those kind words, Simon. But when I was growing up, there was a company called TRW. They said getting an idea around was as good as getting the idea. And your podcasts get great ideas around. So thank you.

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