

Glen DeVries

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Marianne O'Hare: Welcome to Conversations on Health Care with Mark Masselli and Margaret Flinter, a show where we speak to the top thought leaders in health innovation, health policy, care delivery, and the great minds who are shaping the healthcare of the future.

This week, Mark and Margaret have a special guest who just returned from space Glen DeVries, Founder of Medidata just acquired by Dassault Systemes, who went up into space on a Blue Origin's rocket with Captain Kirk and sadly died in a plane crash this week, just days after our interview.

Glen DeVries: We're doing stuff in biology, mRNA based vaccine, they are treating rare diseases, cancers that we never thought we could treat. We're seeing what was kind of science fiction, from a medical perspective become science.

Marianne O'Hare: Please tune in for this powerful interview with an innovator in health care who fulfilled a dream by going into space and we'll hear some of his final thoughts about the future of health care and the transformation underway. Now stay tuned for our interview with Blue Origin Astronaut Glen DeVries here on Conversations on Health Care.

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Mark Masselli: We're speaking today with Glen DeVries, Co-Founder of Medidata Solutions, the leading cloud platform for clinical research. He's Vice Chair of Health and Life Sciences at Dassault Systemes which recently acquired Medidata. He recently launched into space on board Jeff Bezos Blue Origin's rocket with William Shatner of Star Trek fame.

Margaret Flinter: Mr. DeVries is a trustee of Carnegie Mellon University and the author of the recent book, The Patient Equation: The Data Driven Future of Precision Medicine in the Age of COVID-19 and Beyond. Glen, welcome to Conversations on Health Care.

Glen DeVries: Thank you for having me.

Mark Masselli: Should we start off with Astronaut Glenn or just, you know, so exciting, and welcome back to earth. You've gone where Spock and Scotty haven't gone, you've gone into space with Captain Kirk launched aboard as we said earlier, the Blue Origin rocket but we -- I think our audience would love to hear a little bit about that journey, and how are you doing?

Glen DeVries: Yeah, so I'm doing great, I thought I would feel certain ways and get to experience certain things. I think I was kind of mentally prepared for the fact that being at the top of the arc of this journey would be really incredible in terms of seeing the earth. It's more beautiful than I

can describe. I'm not sure the human brain is really prepared to see something like that. But another incredible part was kind of being in the middle of what went from human scale and looking out the window and seeing a cactus and lines painted on a road to patterns that you might see if you're in an airplane to patterns that I just have never seen before as the earth is kind of rushing away from you, and then experiencing all that reverse it was absolutely incredible. Truly the experience of a lifetime.

Margaret Flinter: Well, to say it sounds amazing is an understatement. But you know there's always people ready to bring it back down to earth, metaphorically speaking. Certainly, the space race among some of the world's most successful business people generated some degree of pushback from people who would say, no we should be focusing on the problems here on earth. But you take a different view that many of the advances that made it possible to have a remote controlled rocket safely sending you and a 90 year old Captain Kirk into space has real implications for how we can improve so many other systems here on earth that impact life and health for people. Tell us what you're thinking about when you say that?

Glen DeVries: Yeah, absolutely. I think, especially people working in life sciences, health care, you begin to appreciate how emerging things happen as technologies get developed. At Medidata, we do a lot of things with decentralized research. We put sensors on people so we can figure out what the behavioral relationship is with different diseases and treatments, etc, all that technology piece of electric sensors that were used in the Apollo program and before to look at the attitude of spaceships. Literally, what we use in telemedicine today has come out of the space industry.

I think if you think about the problems that we have on Earth around the environment, around -- I'm a huge supporter of Water.org how we need to purify and find and conserve and reclaim things that are just the most basic requirements for human life, water and food. There are no faucets in space. I went for 10 minutes. But as we think about humanity continuing to reach outside of the atmosphere, we're going to be solving those problems. I feel like we've got this framework and in health we live with every day and maybe take for granted. I know it doesn't always work perfectly. But we've got regulators who protect the public health and academic and publicly funded organizations, the FDA, the NIH, the NCI, and then industry, the Pfizer's the Moderna's, the Johnson & Johnson's of the world that create this innovative cycle. Now we're seeing that in space, you've got the FAA, you've got NASA in the United States and other agencies around the world, and now Blue Origin, and SpaceX and Virgin Galactic and Boeing and we're going to see these cycles, and they're going to affect life on earth and help us solve problems here in a more

impactful way than I think just the idea of getting people and getting manufacturing into space. I'm actually just as privileged to be able to fuel that as honestly I was to be able to see this all myself.

Mark Masselli: Well, that's great. You're not only privileged, but you're very excited about it. In your book, *The Patient Equation*, you say we're in this midst of this biological and tech revolution, and that we are in a race really for the holy grail of precision medicine, and congratulations on building the first significant cloud based system to advance clinical trials, really expanding research capacity digitally. Share with our listeners what lessons you gain from that success, and how do we apply those lessons across the broader health ecosystem?

Glen DeVries: I really think of life sciences as the heart of science and medicine that creates new tools for health care, right. When you have a patient who's being treated, there's certain things in the toolkit medicines and medical devices, and now digital therapies that whether it's a physician or a nurse, or a person taking care of themselves can use. Those of us who are lucky enough to kind of work in the workshop level of life sciences, help create this environment that creates those new tools. That's what I mean by this being such an exciting time from a technical revolution perspective. We're doing stuff in biology mRNA based vaccine, treating rare diseases, cancers that we never thought we could treat. We're seeing what was kind of science fiction, from, from a medical perspective become science.

Meanwhile, we've got everybody on the planet connected with things in their pocket, and with sensors that can look at things like their behavior and their cognition, not just their blood chemistry. Science fiction is becoming science is a parallel to sending the person who played an iconic character for 55 years, and that actor has actually gone to space, all these things are happening. I think that is going to become the norm. We're just going to see this continued cycle of innovation, the more people get excited about that, the more fuel we put in that rocket, making a bad metaphor. But I think that that's what really creates benefit for everybody.

Margaret Flinter: Well, we need some wins in this difficult period of time. Certainly one of them, I think the wins was the rapid rise of vaccine development. You talked about the mRNA technology, just kind of astonishing how relatively quickly that became available. I want to make the tie from that to, I think, one of your achievements, building a platform that really facilitates clinical trials, makes them more widely available, maybe really transforms our ability to do research that's based on large numbers of people wherever they live. Tell us what kind of transformation you're anticipating in clinical trials that what is this going to mean for people around the globe?

Glen DeVries: One of the reasons that the vaccines were developed so quickly is

frankly, we were standing on the shoulders of giant amounts of research and development that had been done around vaccines, both mRNA and others. But then we were able to generate evidence very quickly, because we connected with people in new ways in their homes with apps with things that could get the data that was needed to generate that evidence that these vaccines were safe and effective and valuable. The fact that we did that remotely means that we're creating tools for health care, not just the evidence generation, but actually these vaccines that could be deployed in ways that means there's more equity and more access in how the tools are used.

I actually see this world of decentralized research and of telemedicine as actually creating yet another kind of era in health care where we don't have to worry about getting the doctor and the patient in the same room. That means that we can treat people regardless of geographic location, regardless of socioeconomic status in a much more scalable, equitable way. That's also something that really excites me.

Mark Masselli: We're speaking today with Glen DeVries, Co-Founder of Medidata Solutions, and now a division of Dassault Systemes. He recently went to space on the Blue Origin New Shepard rocket and is author of The Patient Equation. You know, Glen, you helped facilitate clinical trials for more than 1500 drugs and compounds, but it takes so long it's from bench to bedside. When you look at something like the mRNA platform, the ability to move so quickly, where do you see a cross walking? I know there are clinical trials on cancer and a whole range of other activities, will you be playing a role providing this back end support for it?

Glen DeVries: Yeah, so at my company Medidata Solutions and Dassault Systemes, we think about every kind of therapeutic from their design all the way through to provisioning it to patients. I do think that we -- if you have these really exciting platforms, messenger RNA based vaccines is very much one of them, where we can now make our body be part of the manufacturing process of a therapeutic. It's hugely impactful.

Again, think about the ability to give people access to a molecule anywhere on the planet, well, we can now send the instructions for how to make that molecule vaccine or treatment for a rare disease in a syringe to those people. That to me, again, is about access. But it's also about just using this idea to explode the number of different kinds of compounds that we can deliver, and we'll see that in almost every therapeutic area.

These are platforms that are going to begin to come up whether it's biological or technological around this idea of taking what was inconceivable, building something on our own bodies, and making it commonplace. We're seeing it in cancer in terms of cell therapies that

use our own immune systems to fight our cancers. Again, it's a huge paradigm shift. We can now not just manufacture things in our bodies, but we can get the systems in our bodies to actively help fight diseases. Again, this was pie in the sky ideas 25 years ago when I was first going into the industry, and now they're becoming commonplace. Again, that's reason for optimism

Mark Masselli: Are there any other mRNA like platforms for the non-science health care folks that we should be keeping an eye on?

Glen DeVries: Well, so the ones I mentioned, this idea of cell therapies and getting our immune systems to fight cancers is a really exciting one. I think people think of the immune system as something that's very good at fighting foreign invaders. But it's also very good at identifying what's going wrong in our body and eliminating that. Sometimes that can go a mock and we have to worry about autoimmune diseases. We can use that to fight things that are emerging out of our own cells, when cancer is our own body, you know, that is gone haywire in a way that that can spread and attack throughout our bodies.

Well, what better ally could we possibly have than the one that most of us are lucky enough to be born with. The life sciences industry being able to turn our bodies into a tool to keep ourselves healthy, that's an amazing new platform in that context.

Margaret Flinter: Well, in this phase that we're in right now, I think there's a lot of looking back we're seeing a lot of books and articles coming out about what happened with the COVID pandemic, you know, where did we do well, and where did we really fall way short. One of the big ones was around managing the global data around the pandemic, not getting out in front because we were using maybe legacy data and legacy processes that didn't give us the kind of forecasting that we needed. From where you sit, what are the data systems that might hold the greatest potential going forward, for really improving our surveillance and disease management as other viral pathogens might take hold, and maybe giving us a much better shot at prevention.

Glen DeVries: Yeah, well, I think you're right to label things kind of a legacy styles of data and systems. But frankly there's a lot of newer systems and connectivity and data. I think I use the words in The Patient Equation, kind of like we blew it. I feel like as it's the thinking that we need to change around the world. We still think in single diseases in small populations. If we had just taken all of the research data around the world for new drugs, new medical devices that were being developed at the start of the pandemic, right, these are people who have things like diabetes that they were maintaining, heart disease they were trying to prevent, cancers that they were trying to cure.

We would have looked through that and seeing throughout the world

people getting fevers, people taking analgesics. We could have looked at that data beyond the little scope of looking at the one disease that we were researching in that one volunteer patient and realize, oh there's something else happening to them, and maybe really understood a lot more a lot sooner about what the factors are, which we still don't know, that result in bad cases of COVID 19, what the factors are that might protect somebody.

I think if we think about whether it's antibiotic resistance, or some other pathogen that's spreading around the world, or even just thinking about diagnostic and in treating disease, thinking about data and bigger datasets, making things connect together that could be connected together, but we're just not used to connecting, I think that's the key to really getting to better population medicine, as we've been saying. For an individual having a big denominator like you're thinking of a fraction that allows us to make sure the right patient gets the right treatment at the right time, that's precision medicine.

Margaret Flinter: Yeah.

Mark Masselli: Well, I want to pull the thread on the right patient getting the right treatment and talk a little bit about health equity. Our organization, which provides primary care to those who live in poverty was an early participant in the All of Us Precision Medicine Program, and subsequently have been enrolling people in this campaign that Francis Collins put together a really brilliant one at NIH, which really is trying to seek more inclusion in research. Minority representation and clinical trials, as you know, has been a persistent challenge. How do we leverage the power of digital medicine of the patient equation to close so many of these equity gaps in clinical trial research which leads to access into better health outcomes?

Glen DeVries: Yeah, let's just start with the science of it. If you have a bias in the population that you're enrolling in a clinical trial, that bias is going to extend into your analysis. You are going to, by definition, not have a good representative sample of what the rest of the population looks like. If you're doing a traditional research project, the distance that somebody lives to an academic medical center where that clinical trial is running is a factor for who winds up in that trial. The ability of somebody to take their time and not go to work, deal with child care, whatever it is, and participate in that trial is a factor in terms of enrollment.

When we use these distributed technologies, it means we can use people who are in any part of the globe, we can make it much easier for people to participate and lessen the amount of time required even to get the therapy. Maybe even in some cases, like in the example of a messenger RNA based therapeutic where we can get somebody's body to do some of the manufacturing, just as an example, we can

start to get make it that much easier to just get the therapies to people and have it available. All these things I think help create the best data sample of a broad set of people, and again, are setting us up for success in terms of being able to then provision that therapy, once we've proven that it's valuable once we prove it, it's safe and effective. We've discovered because of that good sample, the right people to get it in a precision sense, then we can give it to them at scale. That's a virtuous cycle that I think we've now unlocked unfortunately because of the pandemic. But maybe in the future we can really create a ton of benefit because we've unlocked this new way of thinking.

Margaret Flinter: Glen, I wonder if I could ask you to comment again, you spoke movingly about the view from space really changing your view of the world. One of our world views is that climate change and pollution are now leading causes of disease and early death around the planet. We know our world leaders have been meeting on this, but you've spoken to this very eloquently. We see it right in our communities already with heat indexes that vary so much by the neighborhood's people living in health consequences of that. Can you talk about your passion for this intersection of the environment and health and how that is motivating some of the work that you're doing?

Glen DeVries: Yeah, look the environment is an incredibly important part of what turns us into biologically what we are. You're born and it's not perfectly medically true, there are certain things where your cells will mutate. But we're born with a set of genes, and we have those genes our whole life. It's the influence of the environment around us and how we behave because of that environment that puts us on the trajectory of genotype and phenotype of our full phenotype. The environment is critical in defining our health.

I will tell you in a way that I'm still honestly having trouble articulating, you just -- you can't have a way to talk about this perspective that is so unique, I think, honestly, unless you've seen it at least I'll I hope to try to share it. But when you see earth in the middle of nothingness, you realize how small it is. You get this incredible sense of that visceral sense of home, I kind of get goosebumps, just thinking about in that way that hopefully you feel when you're coming back from a trip or you really miss somebody and you see them, and it looks fragile. The atmosphere that we all live in, looks thin.

It's one of these things where I think I had a lot of conviction around we have to solve problems around the environment, we have to make sure that everybody on the planet has access to clean, easily accessible water. You see it from up there, and I can tell you, at least for me, I came down with a level of conviction of how important that is that I didn't think I could have before I went

Glen DeVries

Mark Masselli: Buckminster Fuller call it spaceship earth, we're a fragile ship cruising throughout the -- through the universe. I'm wondering about your thoughts just very quickly on what might be down the road for us, we were somewhat fortunate that the lethality and the transmissibility, wasn't that bad, could have been 10 times more. Are we prepared? Is our scientific community prepared to address that issue? What do we need to do to be thinking about the next pandemic which will come, and what preparation do we need to take?

Glen DeVries: Yeah, so I think we are prepared in terms of having a lot of the tools that would be required, we were talking about data platforms. We've got infrastructure. We've got tremendous assets, for lack of a better term in terms of what we can do from a medical perspective, from a molecular perspective, from a mechanical perspective around treating things. But I do think that we've now learned a lesson that we are not that well prepared to act on having those things.

Rebecca Dowers (PH) is a wonderful friend of mine, dean of the science school at my alma mater, Carnegie Mellon, sent me a paper from a journal about how it would take years, maybe decades to know how to respond to the pandemic, and what it really was all about. It was actually a paper from the Spanish flu from 100 years ago, right. I think you kind of copy and paste COVID and it wouldn't feel that different from a scientific perspective. We have a lot to learn in terms of our own behavior as a civilization. The tools are there, though.

Margaret Flinter: We've been speaking today with Glenn DeVries, the Co-Founder of Medidata solutions, now a division of Dassault Systemes among the first commercial customers to launch into space and co-author of The Patient Equation: The Data Driven Future of Precision Medicine in the Age of COVID-19 and Beyond. Follow his groundbreaking work at Medidata.com Or follow him on Twitter @CaptainClinical. Glen we really want to thank you for sharing your passion for science, for healthcare transformation, for your recent space travel and the perspective that followed and for joining us today on Conversations on Health Care,

Glen DeVries: Thank you so much. It was great to be with you.

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Mark Masselli: At Conversations on Health Care we want our audience to be truly in the know when it comes to the facts about health care reform and policy. Lori Robertson is an award winning journalist and Managing Editor of FactCheck.org, a nonpartisan, nonprofit consumer advocate for voters that aim to reduce the level of deception in US politics. Lori, what have you got for us this week?

Lori Robertson: Epidemiologist and biostatistics experts have been cautioning that as more and more of a population gets vaccinated, we'll likely see more deaths from COVID-19 among the vaccinated, it's simply math. The vaccines aren't 100% effective, no vaccine is, so some deaths are expected. If there are relatively few people still unvaccinated, the raw numbers of deaths are likely to show more deaths among the vaccinated.

Two statistics experts in the United Kingdom wrote about this issue in late June in the London based Guardian. The headline on the story was "Why most people who now die with COVID in England have had a vaccination?" The experts said this wasn't a bad sign. Instead, it was exactly what was expected from vaccines that are effective, but not perfect. Yet, months later, misleading social media posts are highlighting data from the UK suggesting the number of deaths shows something is wrong.

The post highlight the fact that a UK government report showed that 70% of COVID-19 deaths from August 23rd through September 19th were individuals who had been fully vaccinated. But as the experts have warned, it's not surprising in a highly vaccinated population. The same government report shows vaccination rates approaching or exceeding 90% for age groups 60 and older, and that group accounts for 87% of all deaths in that time period. The report also shows the death rates are higher among the unvaccinated than the vaccinated.

The death rates for the unvaccinated are three to five times higher than the rates for the vaccinated among the 60 and over age groups. It doesn't mean the vaccines aren't working well against deaths, they are, but just that the vast majority of vulnerable adults in the UK have been vaccinated. A greater proportion of the vaccinated group may be sicker individuals are those at greater risk of severe illness who had a strong motivation to get vaccinated.

Effectiveness against hospitalization and death was more than 90% for the vaccines in use in the UK, including Pfizer, Moderna and AstraZeneca vaccines. That's my fact check for this week. I'm Lori Robertson managing editor of FactCheck.org.

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Margaret Flinter: FactCheck.org is committed to factual accuracy from the country's major political players and is a project of the Annenberg Public Policy Center at the University of Pennsylvania. If you have a fact that you'd like checked e-mail us at www.chcradio.com, we'll have FactCheck.org's Lori Robertson check it out for you here on Conversations on Health Care.

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Margaret Flinter: Each week Conversations highlights a bright idea about how to make wellness a part of our communities and everyday lives. When venture capitalist and Shark Tank co-host Mark Cuban decides to sink a couple of \$100,000 into your business idea, you're probably onto something. That's what happened. Olivier Noel, a medical student and young geneticist at the University of Pennsylvania, through his research and studies, no matter how many resources the clinical study has, there are many barriers to getting a good cross-section of study participants, especially ethnic diversity. He thought what if you could eliminate the barriers to research participation and build up a rich DNA database for future research all at the same time. He created DNAsimple.

Olivier Noel: I was actually working out of the Institute of Personalized Medicine in Hershey. One of the key problems that I saw there is that, you know, there was the proper infrastructure, there was in a funding for a really amazing research projects, but ended up being a little bit of a chasing game where we couldn't build strong enough cohorts at first to be able to do some of the studies we wanted, some of the patients were looking for, it was taking a very long time. Every day, it would be going down and talking to the counselors and asked, you know, did we have patients with this background today.

I ended up going to genetics conference at Penn, actually, and the keynote speaker there was alluding to a similar problem. One of the ways they were able to contact patients was through Facebook. Facebook, they were able to connect with a number of patients all the way in India and organize the logistics to be able to get the sample. The joke at the time was that Facebook is the new way of doing genetics, and really that sort of the light bulb went on. I wanted to sort of leverage the Internet and particularly leverage social media to be able to build a national database where somebody did not need to be a patient, or be in the same region to be able to participate in this research study.

Margaret Flinter: All the participants have to do is to take a simple swab of the inside of the mouth, send it in and wait to see if your specific DNA is of interest to researchers. Noel says that the company will make their DNA and disease data available to researchers studying specific diseases, offering those researchers a much broader spectrum of study participants.

Olivier Noel: One of the things we really wanted to do is to allow for the possibility of doing longitudinal study, so that you could continue keeping contact anonymously, obviously, with a particular donor. If you're doing a study, for example, and you have the ability to collect samples now, collect samples in three months, collect samples in six months, and see how that varies, which is very difficult to do if you are going

to be in contact with the patient once

Margaret Flinter: The study participants themselves receive an extra something for choosing to participate.

Olivier Noel: We ultimately provide a minimum of \$50 every time somebody provides a saliva sample

Margaret Flinter: DNAsimple Avetta database linking researchers with a broad array of participants to enhance lab research by eliminating the barriers to finding participants, now that's a bright idea.

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Mark Masselli: You've been listening to Conversations on Health Care. I'm Mark Masselli.

Margaret Flinter: And I'm Margaret Flinter.

Mark Masselli: Peace and Health.

Marianne O'Hare: Conversations on Health Care is recorded at WESU at Wesleyan University, streaming live at www.chcradio.com, iTunes, or wherever you listen to podcasts. If you have comments, please e-mail us at www.chcradio@chc1.com or find us on Facebook or Twitter. We love hearing from you. This show is brought to you by the Community Health Center.