QuickSTAT
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The Logistics of Cell & Gene Therapy – From Benchmarking to Standardization (Part 1)

Intro:
I'm Chris Riback. This is Logistics Live: Conversations & Insights on the Global Supply Chain.

Medical care and scientific research offer some of the most challenging – and developing – areas for global supply chain logistics. Within that broad area, few are more impactful in terms of potential for improving or saving human lives than Cell & Gene Therapy or CGT.

The world is seeing sharp increases in research, studies, and personalized care – connecting everything from research centers to medical offices to the homes of individuals who are part of trials and therapies. These CGT "medical miracles" bring logistics opportunities and challenges around timing, temperature, chain of identity, synchronization, integration, scale, backup planning, and more.

So what is required – logistically – to help ensure clinical trials and personalized care get handled safely, securely, and on time?

Mike Sweeney and Scott Ohanesian can explain.

Mike is QuickSTAT's Global Head of Strategy for CGT and direct-to-patient products. Scott is QuickSTAT's Senior VP of Commercial Operations. They join me now to discuss the Basics, Future, Benchmarking & Standardization of Cell & Gene Therapy and global supply chain logistics.

Chris Riback:
Today, we have a doubleheader podcast, two of QuickSTAT's logistics experts, Scott Ohanesian and Mike Sweeney. Gentlemen, welcome to the conversation. And though you both don't really need any introduction, of course, not in the worlds that you work and live in, let's do it anyhow. Scott, let's start with you. Tell us just a bit about yourself and your role at QuickSTAT, please.

Scott Ohanesian:
Chris, it's great to be back. Thanks for helping us with this podcast. So, at QuickSTAT, I'm the Senior VP of Commercial Operations. I've been with the organization for nine years now and in the industry for 20 years. I oversee our global commercial strategy, which has a lot to do with cell and gene therapy and the evolution of medicine into that space.

Chris Riback:
And Mike, of course, you and I have gotten to talk. I've had the great privilege of having a few conversations with you on these topics, but for anyone who hasn't heard those, give me the quick bio, please.

Mike Sweeney:
Thank you, Chris. Great to see you. Great to be here.
I'm the Global Head of Strategy for QuickSTAT, managing the cell and gene therapy and direct-to-patient product lines, and I'm really looking forward to the discussion today.

Chris Riback:
Thank you. I am, too. Cell and gene therapy, we're going to talk about the basics, the future, benchmarking, standardization. Mike, so much has changed and continues to change. Could you give us the high level, and then Scott, I know, will jump in? What are you seeing in the sector, one that has such complex high stakes and, importantly, labor-intensive supply chains?

Mike Sweeney:
Absolutely. I think, first and foremost, it's a transformative time for medicine. It's amazing what's happening. The hope and the cures and the treatments that we're offering to patients through cell and gene therapies is really. For me, I've been in this industry for over 30 years and I've never seen anything quite like where we are right now. The challenge on the logistics side is that, really from clinical to commercial, there isn't much that changes within the supply chain and the intensity of that. And we'll get into some of those specifics and some of those challenges. But I think the great thing is that up to this point, and it's been building and growing, we have over 2,500 therapy developers today and over 1,500 clinical trials. Several have been approved this year. We're really in a great place, but I think that there's a lot more to do in terms of really shoring up the space in terms of some of the standardization and maybe lack of tools out there technologically.

Chris Riback:
And Scott, I would be interested from your point of view because those numbers that Mike just talked about, about the over 1,500, might be even more than that, clinical trials, the 2,500 plus, might be more than that developers, that's an exponential increase even since just five years ago. What are you seeing out there?

Scott Ohanesian:
It is, it's exciting times within the space. And so, the same thing as Mike's seeing, I think the most important thing, number one, is the patient impact. You're talking about potentially curative treatments. So people that had extremely critical or life-threatening diseases that receive these treatments that are now years removed from treatment that are essentially cured. So, it really has been a game changer.

If you think about the industry, I've been in 20, as opposed to Mike's 30, so he's even seen more of that transition. But we really went from an evolution of small molecule, so tablets and capsules, to large molecule, which are the parenterals, injectable therapies, which also were a little bit more complex to move from a supply chain standpoint, now to personalized medicine and cell and gene therapies.

And I think, QuickSTAT within that space is, you have all this infrastructure that needs to grow around it. We're often the bridge and the connector between the sponsor organization that's developing the therapy and the clinical research organization that's supporting them in that journey if there's a contract manufacturer involved. And then what they actually need to do, which is really exciting, is then scale up or scale out depending on the type of therapy it is. We'll talk about that a little bit more later. And that's where you see the exponential growth in the actual therapies treating more patients, which is what we want to do is get these treatments to patients.

But going back to what you said about the possibility of cell and gene therapy, there's really interesting data showing that 72% of all oncology therapies have the potential to be personalized and 44% of all therapies. In a recent Times article that came out in the UK, the UK government supporting something called the cell and gene therapy catapult.

And what was interesting there is they talked about, okay, that the science is here, now for the logistics. And what they meant by that was all that infrastructure that underlines it. And that's where you've seen huge investments by private equity, by sponsors, and other companies into the manufacturing capabilities and the science and the knowledge behind that. How do you manufacture it? How do you move it? How do you set up these supply chains?

And I think which will be a real shift for the industry will be how do they actually now marry clinical with commercial because you need to have that joined. The one nice thing, and I know I don't want to mention the dreaded C word of COVID too much, but what COVID has taught us is if you look at the COVID-19 vaccine, is that you can expedite and speed up a trial. It happened, right? We saw it happen.

Chris Riback:
We did.

Scott Ohanesian:
And you saw people work together on the clinical and commercial, so that was joined up, and that's what we're going to look to do. So we can also talk a little bit about how QuickSTAT can be involved in that journey and how we see our clients and sponsors going in that journey to impact the patients quicker.

Chris Riback:
It's so interesting that you mentioned that Times article and the science and the logistics. That is literally the note that I have written down on my paper here in listening to you. You guys are in the science business, you're in the logistics business, you're also in the hope business, and that's the human personal side of what cell and gene therapy can do and what you guys are working with clients and patients and through the supply chain and helping bring to reality, but we hope in every case.

So, let's talk about those different types of therapies. Mike, we talked previously about autologous and allogeneic therapies, but I think we should revisit that, particularly for this conversation, and maybe even explore them just a little bit further, particularly with Scott here. Can you define each of them for me, Mike? What are the key differences? Why is it important to understand those key differences? And how do those key differences impact your approach or processes?

Mike Sweeney:
It's a great question. We've seen a lot of autologous therapy, which really starts with the patient's own cells basically being drawn and manufactured into a treatment. Like Scott said, some of these are curative, so it's-

Chris Riback:
So that's what autologous means? It is the patient's own cells, yes?

Mike Sweeney:
Absolutely.

Chris Riback:
Which is different than the allogeneic, which you'll get into in a moment.

Mike Sweeney:
Yes, well, the allogeneic is from donors, so it can be many patients that could be accepting of one donor's specimens. So it's really similar logistically in some ways, but obviously, that challenge of the turnaround time. I was visiting a cell therapy autologous manufacturer earlier this week and a lot of things really have stuck with me because I saw the manufacturing process happening.

And one of the things that's really fascinating about that is the turnaround times and the precision in which all of this has to happen. So the patient samples are drawn, and then it's delivered in temperature-controlled and very time-definitive constraints and then it's manufactured and then delivered back for implantation into the patient. So, it is a very quick turnaround. Some of these are one-shot, some of these are multiple-dose therapies, but the fact of the matter is that that really is intense in terms of the patient, just for that one treatment. There is the front end of the draw, which can be pretty difficult to go through physically, I'm sure beyond physically as well, and then that turnaround to the delivery. But the donor side of it is very appealing, obviously, from a scalability standpoint where if you could have healthy donors that are contributing to this process and that can feed into many patients, but the temperature and timing of those shipments still has a precision factor wrapped around it.

Chris Riback:
Before I turn to Scott, because I wanted to hear a little bit more about how the key differences between autologous and allogeneic affect your approach or your processes, Mike. Had you seen the manufacturing process before? I assume you probably had, just given your experience in the industry. Take me inside that manufacturing process. What was that like to see?

Mike Sweeney:
Well, I have seen it before, but I will say the one thing that always strikes me is the way that everybody is trained, and it is in a way like an assembly line, and the precision and even the movements, the air quality in these facilities has to be absolutely pristine or anything they're working on.

And again, you have patients that are going through kind of a tough draw process that their samples come in and have to be procured and then manufactured into that therapy. It's truly fascinating to see the dedication of the folks in the facility that are all doing their thing on specific timing. Everybody has timing and temperature, air quality, all of these different factors that have to be perfect, or they have to stop the process. I was surprised really, this time, in understanding how critical any little glitch in the process, including our swim lane in this, that can impact a patient's treatment, their ability to have that treatment.

Chris Riback:
Almost like they're in the logistics business, also, Mike?

Mike Sweeney:
I'll tell you, they have to be. Really, I mean, they have to be thinking about it. To Scott's point before, I think the interesting thing we've seen, COVID exacerbated all of it where everybody really needed to collaborate tightly and quickly and maybe do things in unorthodox ways. There was a lot of out-of-the-box thinking. But I think cell and gene therapy just, in general, there is a deep collaboration that's required because of the complexity and because of the high cost of failure. So everything that we do, we really have to be accountable for who's doing what and who will communicate if something is questionable or something has gone wrong. It's really, really critical.

Chris Riback:
Yes. It also has to be inspiring to see down to the individuals, as you were just describing it, how precise, how exact, and therefore how seriously they take it. Scott, the differences between the two, the autologous and allogeneic, tell me more about how those differences impact your approach or processes.

Scott Ohanesian:
So, with autologous, it's almost like you're bolting on a front end to it, so it just makes the supply chain a little bit more complex from that standpoint. You're always going to want to have chain of identity, chain of security throughout your entire supply chain, whether it's an autologous or allogeneic. Where if you look at the industry, and just to back up for a second, if you look at the industry, they're hoping, and they're betting, they're wanting allogeneic to be the science that comes forward and successful because it's easier to scale that, and generally easier to scale because it's something you're starting with.

Chris Riback:
If it's one to many?

Scott Ohanesian:
One to many. So it's more like the traditional model, even though the science might be a little different, there's other things. It's something that's more understood from a scalability standpoint. Autologous is going to scale out, meaning you're always going to have to be one-to-one. So you're going to need more capacity and more space to treat more patients, just by the definition of how it's set up. With an autologous therapy, there's a lot of things we're going to need to consider. We're going to need to consider what's the starter material; if it's apheresis, is it shipping fresh? Is it shipping cryo-frozen? And if it ships fresh, that means it's shipping refrigerated at two to eight degrees Celsius. And usually, we'll have less stability time if it's shipping cryo-frozen. That brings its own challenges because you're usually shipping in a liquid nitrogen shipper, which is larger, which makes it difficult to put onto narrow bodied aircraft.

So I don't want to get too much in the weeds, but all these variables have to be considered to create lane risk assessments to understand where can the manufacturing be to hit the timelines that you need to bring that material in, and then of course get the therapy back out after it's been manufactured. But usually in an autologous therapy, it's the starter material that's the most critical and poses the most challenges to how you set up your supply chain. And that will determine where you select your manufacturing to be and everything else.

Chris Riback:
What about for allogeneic?

Scott Ohanesian:
In an allogeneic, it doesn't always make it that much easier. One example I always think back to was a Japanese pharmaceutical company that had acquired a European-based pharmaceutical company that was creating an allogeneic therapy. To date, all of those trials had taken place within the European Union. And so again, you're talking about allogeneic. So, starter material was already there. You didn't have to worry about it coming in. It was just the therapy going out.

Initially, from the point of constitution of that therapy to dosing, you had 48 hours. That doesn't mean that we, as a courier, got 48 hours. That meant that's how much time from when it was manufactured to when it was dosed. The Japanese company wanted to treat patients in Japan. The cost of technology transfer to do the manufacturing in Japan was millions of dollars. And that's a pretty big investment to make.

Chris Riback:
That's a really significant investment.

Scott Ohanesian:
But it's not just the technology transfer, then you have to make sure that the science is right. You have the right expertise, you have the right capacity, all those things. So it's not as easy as just saying, "Yes, let's just pay the millions in transfer." There's other components that could fail on that.

Long story short, in order to ship this material out of Spain, where it's being manufactured, to Japan, Spain actually has very different regulations than many other EU countries. And the thing is, the science got ahead of the regulations. And so what happened was the Spanish regulations would treat the material in a certain way. And if you followed the current regulations, the export process would've delayed your ability to get that material out the same day.

Long story short, you wouldn't have had enough time if you followed the current regulations, to get the material to patients in secondary cities in Japan to treat them. And so that's where QuickSTAT worked with the sponsor. We worked with the Spanish Ministry of Health, we worked with the Japanese Ministry of Health, and we set up a supply chain that allowed them to say, "This material is exempt from those regulations. It's really not. These regulations are antiquated; they shouldn't apply to this type of therapy." And we were able to dose patients.

And we actually use Shinkansen, the speed trains, to do the final mile delivery in some of the more remote regions we went to. But the reason why I mentioned that story is I think it brings in a lot of things you need to think about. There's temperature involved, there's time involved, there's regulatory things involved. All those things have to come together to be successful, whether you're doing autologous or allogeneic.

Chris Riback:
That's an incredible series of events to manage.

Scott Ohanesian:
One other thing to mention, Chris, is that to make it even more complex, you have different therapies, not just an autologous, allogeneic, but you have a CAR T therapy. You could have an mRNA therapy. You could have a gene therapy. And all of those are somewhat treated differently.

And if you look at a traditional cell therapy, oftentimes, not always, but oftentimes, the final treatment is shipped cryo-frozen at the moment. If you look at a gene therapy, oftentimes, the final treatment is shipped deep-frozen at -80 Celsius. So, it just gives you different components of what you need to do. And again, none of these things are over or huge hurdles. They just need to be thought out of in advance. Supply chains need to be mapped out. And then, for us, that's how we've helped our companies launch in over 40 different countries with their personalized medicines.

Chris Riback:
The stress that you just identified that surely must be on regulators. I mean, we started by talking about the exponential growth of clinical trials and of developers, and that is incredible. It's fantastic because that growth means increased hope, we hope. And yet there are country regulators that have responsibilities, that have requirements for good reasons, public safety, and yet the pressure on them to get these trials moving must be intense.

You also made me think that I got it wrong earlier when I said, "So you are in the science business, you're in the logistics business, you're in the hope business." I think you're also in the weeds business, but it's an important place to be.

Scott Ohanesian:
Details matter. I think Mike, he'll definitely redefine the numbers. I think he knows them even better than I do, but I believe there was a presentation that Mike was doing at the ISPE. And I believe in 2022, there's roughly a half a dozen personalized medicines that were approved. And then, just in the first quarter of 2023... So in 2022, we had a half dozen, and then in just Q1 of 2023, we had a half dozen approved. If you think about that-

Chris Riback:
So 4X?

Scott Ohanesian:
Yes. And if you think about that when we're looking at the next 24 months out, or the next roughly 18 to 24 months, the expectations, there's another 25 potential personalized medicines that could be going commercial.

And when you talk about going commercial, you're going from depending on the patient populations. It depends if it's a rare disease. So, not every therapy is going to be treating the same patient population, but generally, what you're looking at is exponential growth, and you're going from dozens of sites and maybe hundreds of patients to hundreds of sites and tens of thousands of patients.

And so that's really, you need to get in the weeds, you need to educate the sites. And I think a lot of what Mike, I think, has done a really great job of is working with other partners within this space because you need really good partners to try to understand how do we take the burdens off the sites. Because as these new therapies come out, the most complex things are not going to just be the planes and the vehicles and the temperatures. It's how do we not put the sites in a challenging position to be able to treat patients? Because you want them to be able to treat them with compassion, treat them effectively and efficiently, and it's a challenge. And I think that's going to require us to hit certain universal standards as an industry, and we're going to need to do it and adopt those very quickly.

Chris Riback:
Mike, what are your thoughts on what Scott is saying? Did he get the numbers right? And could you give me a case study — bring it to life for me a little bit?

Mike Sweeney:
Sure. Well, Scott got the numbers right. The only difference is it was in Q2 of 2023 where we had a half dozen approved, which is an incredible feat. But I think the even more interesting thing that I found is of these six immunotherapies, they came from three different areas. They came from cell therapy, gene therapy, and RNA, and it was split two each, which to me just tells you how robust the research, the development, the science has really, really come so far and the regulators know it. And now we're…

Chris Riback:
It's incredible.

Mike Sweeney:
... getting these approvals. It is. And this last quarter of the year, just incredible. And there's so much hope for the future. I think really when I think about, and I'll go back a little bit to the regulatory piece because I've spent a lot of time in my career working on regulatory matters.

But I have to say that the one thing that's been consistent, even though it's not always easy, is the fact that the industry drives the regulations. Now, clearly, safety, patient safety in this case, in particular, is paramount, and everybody's interest is certainly really all pushing for that goal. However, the industry really does define what's possible. And I think a lot of times, in the absence of clear regulations, and I think Scott was kind of alluding to this, that cover something like a cell therapy or a gene therapy, there are other regulations that are often pulled in and applied by compliance folks that are trying to do the right thing and comply, right?

So they're looking for anything that can help them. How do I declare this? How do I process this? How is it going to be cleared through customs? And I think one of the keys is really thinking about this from the regulatory side. There's a lot of challenges with all these different things happening and all of this change.

I think fundamentally, there are some similarities to the development process before cell and gene therapy started to make such an impact. But you will see regulatory changes come over time, but I think that we've been in the middle of hopefully defining the best practices of where we're heading. That's not to say we're perfect. There's certainly a lot we can do better, but I think that we're in a very good place.

And to answer your question on case study, I think I'll go back to the developer that I was visiting earlier this week. And I think that it's something where when I think about the patient impact, right, and kind of in two different ways, one, this was a late stage cancer therapy that we were talking about and really looking at the process, the manufacturing process for, but it's also something that in discussion kind of through the tour of the manufacturing facility, one of the questions that came up was the patients and how much do you want your people to know about the patients or don't want to know?

And obviously, there's HIPAA compliance and privacy concerns, but at the same time, seeing the patients that came back and had their photos on the wall and kind of said, "This really saved so much time for me and my family." And it's heartbreaking to even think about those stories. But imagine going in there again and that precision mindset, you've gone through maybe a year of training just before you even really do the job, and then you're doing it for hours at a time. And I can't even imagine how much impact that individual must feel of actually creating something that could prolong somebody's life, save somebody's life, or cure somebody's disease. It's kind of incredible when you think about it. So that's the fresh example I'll give you, but there's many of them. And I think that's a purpose we all have to share that are involved in this supply chain.

Scott Ohanesian:
Mike, you mentioned the purpose we have to share. And Chris, I think it's important. Mike reminded me of a case study that I think is a really good one. It's a really good story. And there was a shipment we had, and we were looking at a client where again, they didn't do tech transfer to Asia Pac. It was extremely expensive, so they needed to... It was an autologous therapy. And so, they needed to move the starter material from Australia back to the US within a very tight timeline. It's a very short window that you had for the material that was being used to manufacture the autologous treatment into the therapy that you had to get it to the manufacturing facility to have it treated. And what had happened was the shipment was receiving delays coming out of Australia. What ended up happening was it had to get to a manufacturing facility in Philadelphia.

So, we were able to route the shipment into JFK Airport. The challenge we had was, this was months ago when there was an on-ramp collapse in the Philadelphia highway area. And so there's a lot of traffic delays, and it was a Friday night or Friday afternoon, and the concern was, "How are you going to get this from JFK to Philadelphia in the timeframe? You're going to cut it extremely close."

And what was really interesting because you're talking about all of us having to work together, Mike, and the impact people have. What I thought was really extraordinary, the executive VPs of QuickSTAT made a decision. We didn't have time to wait to go to the client. Normally, we'd engage the client on it, they weren't sure what they wanted to do. But we made a decision, "Regardless of who pays for this, we're going to do a charter from John F. Kennedy to Philadelphia. We're going to have somebody waiting on the tarmac, and we're going to try to get this down because we understand that this patient is critically sick, and if they don't get this treatment, they have no hope."

And our two EVPs made a decision to do it. You could see 20 people around this in operations working on this, making sure communication was held with the manufacturing site, with the pilots, with everybody. We were able to get the shipment clear wheels up when it landed into the US, get it on that charter flight, and it was delivered with an hour to spare. And we were ecstatic. The client was ecstatic, but the message that I think it sent to everybody, the drivers, the customer service team members, our regulatory team, everybody that saw that within their organization realized our DNA is positive patient impact.

Not every outcome is as great as that one, but it was outstanding to see that. And I think it really helped pull people together. And we see that a lot. At the end of a day, what differentiates us, we're all using the same planes and things like that, but what differentiates us is going to be your people, 100%, and then the next thing would be your IT systems. How can you leverage IT for speed to scale? But if you don't have the people that have compassion and willing to go the extra mile, that team is what changes things.

Chris Riback:
That is a remarkable story.

Outro:
That was the first part of my conversation with Mike Sweeney and Scott Ohanesian on the Basics, Future, Benchmarking & Standardization of Cell & Gene Therapy and global supply chain logistics. In part two, they discuss industry scale – how big it can get – and what that means for patients, scientists, and the logistics that help make it all happen. For more information on clinical trial logistics, visit our website at quickstat.com.