



**JULIUS PODCAST  
THE MARYLAND ZOO  
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Narrator: The following podcast is a production of the Maryland Zoo.

Timm Baldwin: It's been way too long. But we're back with more episodes of Off Exhibit. We hope you're as excited as we are for new in-depth conversations with animal professionals and wildlife experts from behind the scenes, here at the Maryland Zoo. I'm Timm Baldwin, your host for these wild chats. I know that I'm excited to be with you today for more podcasting and I suspect you'll be excited too for our first discussion back from a few months of podcasting pause.

Why do I think you'll be so interested? Well, because today we're talking giraffes. And not just any giraffe. We're talking about Julius. If you follow the zoo online, on social or via email, you're likely already very familiar with the story of Julius. His birth in mid-June was both exciting and concerning. As the animal care team and veterinary staff were thrilled to welcome the second calf born in less than a few months. But from the very beginning, this calf struggled and required almost immediate intervention as it became very clear, early on, that his health, his growth and his nutrition were suffering.

The animal professionals at the zoo quickly went into action as all animals born here have extensive birth plans. And although we always hope for healthy and positive outcomes, the team here was ready to act no matter what this calf's needs were. It turns out, over the course of his very short life, Julius' needs were significant. His intensive care involved everything from supplemental nutrition, including things like tube feeding and bottle feeding, to more involved interventions like plasma transfusions, intravenous fluids and specialized procedures to help stabilize him.

Along the way, the team exhausted every effort to save Julius. Utilizing their expertise, they also welcomed help from zoos, animal experts, even human doctors from around the nation, including places like Columbus Zoo, Cheyenne Mountain Zoo and even Mount Washington Pediatric Hospital, right here in Baltimore. It was a phenomenal team effort, both here inside the Maryland Zoo and also incorporating the knowledge of professionals from far beyond.

Today we're welcoming back Erin Cantwell, the zoo's mammal collection and conservation manager to share some behind the scene story of Julius, first time mother Kesi and all the care that happened inside the zoo's giraffe house in the course of four very busy weeks. The loss of Julius has been felt deeply here. We know many of you have felt that loss deeply too. In the end, while it was disappointing that he couldn't be saved, his story, his care and the knowledge gained helping him are likely to benefit future giraffe calves, both here and across the country who may experience similar health hurdles, which unfortunately, are not that uncommon for giraffes species that's both very valuable and very vulnerable.

Thanks for joining us for this first conversation back from a very long break. We hope you'll enjoy hearing more about the amazing story of Julius and his care

with Erin Cantwell, Maryland Zoo mammal collection and conservation manager, now on Off Exhibit.

Erin Cantwell. Yeah, thanks so much for showing up and talking with us on Off Exhibit. It's great to see you.

Erin Cantwell: Yeah, absolutely. You too.

Timm Baldwin: This is the first podcast that we have done in many moons and I know that it's going to be one that people are really going to want to listen to because there has been such a flurry of interest around what has happened in the giraffe house in the last few months. I'm so happy that you're here to talk to us about it and to really share all the efforts and the time that was spent on behalf of Julius. Let's get right into it.

Erin Cantwell: Alright.

Timm Baldwin: There's been a lot of activity in the giraffe house, I should say prior to Julius' arrival. We welcomed a calf back in February and that was a first for the zoo in many, many years. Talk a little bit about that.

Erin Cantwell: It was the first calf that we had born here in over 20 years. That was very exciting for us. I think it was definitely a different process for us too because it's such a long pregnancy. I feel like I've been waiting for giraffe babies for the last five years.

Timm Baldwin: How long is the giraffe pregnancy?

Erin Cantwell: 14 to 15 months, so 460 days, which is a very long time. From when we see breeding and are hopeful to when we get a calf on the ground, it's a very long wait. Obviously with Juma having her calf in February, that was really exciting for us. We actually learned a lot through that 'cause we hadn't seen a calf. Most of us in the building hadn't been around baby giraffe before. That was a very eye opening and awesome learning experience for us and I think really put us in a better place to be able to then be aware and know the things that we were looking for and being able to monitor when Julius was on the ground.

Timm Baldwin: You mentioned Juma. Juma obviously gave birth to Willow, who eventually got named by the public and that was her first calf. Then Kesi is pregnant as well. This is Kesi's first calf too.

Erin Cantwell: Yes. We do have a very young herd. Kesi's actually our oldest. I do believe she's about seven. Juma and Endley are I think almost five now probably. My time frame in the zoo always moves at a different pace, everything is always the age that they come in at. I have to add years to it. We are still hopeful that we will also get a newly bred. Every time you have a first-time mom, it's always a little

more tricky. You're not sure how their body is going to do. They don't really know what's happening. It's pretty interesting to watch.

Timm Baldwin: What kind of preparation goes into this? You have an idea that a giraffe is pregnant. You don't really know for sure until you get really close and you see some really obvious signs. What does the team do to prepare for something like this?

Erin Cantwell: We actually have a whole system in place. We have a birth management plan that every animal that could potentially be pregnant gets. It's a huge binder of information. We reach out to other facilities and use their protocols as a basis to start with ours. Reach out to some of the experts and get some extra information. And then tweak their processes to what we think is going to work best for ours.

There are also living documents. After Juma had her calf, we actually went back into the birth management plan and looked at what worked, what didn't work, what we wanted to change for the next time to be able to better make observations and better record the information so that when we go back to look at stuff. We actually are getting useful data. When you start this process, you're not exactly sure what you're looking for. Once you've gone through it you have a much better idea.

We have logs that we keep. The keepers are always checking on the animals and recording data that they're seeing. Giraffe are pretty particular about the settings in which they want to have their calf. A lot of times, and we saw it firsthand with Juma, that if you disrupt the process, they literally shut everything down. If you go to look at them and see what's going on, they literally stop the process. The more we could be hands-off with it and still get all the information and be able to watch and know that everything was okay.

Timm Baldwin: Do you feel like ... It sounds like that's really the nature of giraffe, in terms of the type of animals that they are.

Erin Cantwell: Absolutely. That's what they do in the wild. They move away from the herd that they've been hanging out with. They go find a quiet, secluded corner. Also, they want to try to hide as much as they can from predators, 'cause it does take a while for the calves to get up on their feet. They're pretty quick, I think Willow was on her feet in about two hours. Julius was on his feet in about an hour. Pretty impressive for an animal that's been in a very tight container, basically, for 14 months.

Timm Baldwin: Yeah. It's really fascinating, that adaptation to be able to do that. Talk a little bit about, these giraffe that are born here. I think sometimes when I came into the zoo community, I had this perception that maybe births that happened in these populations were rather random. Right? That animals would be on exhibit and

they would procreate and that would just happen. But it's not like that at all, is it? It's very planned.

Erin Cantwell: No. Everything is very planned. The giraffe do have a species survival plan through AZA, which is a group of people that are looking at the genetics and the population and making decisions with what's going to be the best for the long term genetics of the population. Cesar was brought in specifically to be a breeding bull here. Then we actually ended up bringing in the younger two females to increase our herd and to be able to help the population along.

Timm Baldwin: I should also mention, you have a role that you play in that process. What is that role? And how do you work to fit that in with everything else that you do?

Erin Cantwell: It does definitely keep me busy. I am the giraffe sub-book keeper, which basically means I keep all the data on all the giraffe that are in any of the AZA institutions.

Timm Baldwin: Which is about 200, or more.

Erin Cantwell: It's about 500 giraffe in the populations at a little over 100 institutions. It is a giant task of keeping all that information. Thankfully, giraffe do take a while to procreate and put more animals on the ground. It's not so bad. But they are long lived so they do move quite a bit and it's a unique adventure to track all that. But it has actually been really interesting to watch that side of the population and then to be able to see the changes and all of that work that we're doing with the SSP actually come to life in our own population. It's pretty neat to watch [crosstalk 00:09:59]

Timm Baldwin: We should mention, giraffe are not exactly animals that don't face some kind of a threat in the wild.

Erin Cantwell: Right, absolutely. They just got up listed to vulnerable, which is really important for the population. They're starting to do some more genetic research to try to figure out really the subspecies or species that we actually have of giraffe. I thought it was really interesting coming into this position when I first started working at the Maryland Zoo. 'Cause I didn't have a ton of giraffe background before then, so I had been learning a lot more obviously, working with these animals. It's pretty fascinating to me that we don't know a lot about giraffes. Which, if you think about Africa, giraffe are the second thing you think of behind elephants that are out there and doing their thing. Anyone who has been on safari in Africa has seen giraffe.

Timm Baldwin: They're pretty iconic.

Erin Cantwell: Everyone just assumes that the giraffe population is doing fine 'cause everyone sees them. You aren't seeing the decline in the population. But when they really

started looking at numbers, it's pretty drastic, the loss that we've had in the last 20 years or so with the population.

Timm Baldwin: Then these births that are happening in facilities like the Maryland Zoo and others, become even more important.

Erin Cantwell: Absolutely. We're one of the few populations that AZA has designated as green. Which means we do have enough genetic diversity and enough individuals in the population to be able to hold our genetic diversity for over 100 years. Which is pretty awesome to be able to have that variation and diversity in the population, which is pretty important to be able to hold on to that when we don't know what the long-term fate of giraffe in the wild is going to be.

Timm Baldwin: You learn a lot with Willow. She's obviously thriving and doing well. And then, along comes another giraffe calf. Talk a little bit about what led up to that birth and what you and the rest of the team were noticing and how that went.

Erin Cantwell: Obviously every giraffe is different. The science and stuff that we see with each female are going to be a little bit different. We were expecting the same mile markers in Kesi that we saw in Juma. We didn't quite get to that. But we had definitely been watching this animal closely enough for the last almost two years-

Timm Baldwin: That's a lot of anticipation.

Erin Cantwell: Yeah. That we knew we were getting close. We started night checks and on one of the night checks, keepers came in at 11 and were like, "I think we're getting close. I think we're definitely there." Which is pretty unique too, because normal birth time for a giraffe is late afternoon. It was surprising that we came in. She actually had Julius in the early hours of the morning, I think somewhere between two and three in the morning. Which is not super typical for giraffe. But our area manager Syd came in and watched everything and kept a close eye on her and made sure we were good. And we had a calf on the ground in the morning.

It was a very smooth birth. It took her very little time. Which is excellent, 'cause in giraffe you don't want it to take ... Typical from water breaking to animal on the ground is less than three hours. If your birth goes more than five hours, you probably have hours and you should start to worry.

Timm Baldwin: I know a lot of people who are going to listen to this are going to have questions about what leads up to a birth with giraffe. Because some guests along the way, with Kesi, noticed she physically looked a little different. There were a lot of questions. The zoo and the team here made a pretty deliberate choice not to necessarily talk too openly about that pregnancy prior to her delivery.

Erin Cantwell: Yeah.

Timm Baldwin: Talk a little bit about why that decision was made and what goes behind it.

Erin Cantwell: I think for us, just because we had really only had one giraffe calf that we had been through with the process. We just didn't want to talk about stuff that we still weren't quite sure with. Until you get to the very late stages, it's not really visible in the giraffe that you definitely have a pregnancy. A giraffe can get fat. We actually, I guess in the zoo's history, we actually put two of our giraffes on The Biggest Loser 'cause they were very fat. Some of that, until you know for sure, you just don't want to talk about it. I think some of it is just old school juju too.

Timm Baldwin: You don't want to necessarily jinx it.

Erin Cantwell: You don't jinx things. You don't want to talk about it until it's on the ground. Obviously things are much different. I feel like back in the day you didn't talk about an animal until it was alive for 30 days. Animals didn't even get numbers and get counted as part of the population until they were living for 30 days. I think some of that too is because our success rates weren't so good. Obviously, over the years we've learned much more and have much better expertise and medicine has improved so we can definitely get them through things more so they're-

Timm Baldwin: It's obviously top of mind, I think, for people because around the time that Willow was born, a giraffe by the name of April became an internet sensation. That was something that, again, much like you're describing. You don't really know it's going to happen until it happens. That was an anticipation that probably went in excess of two months, I think, people waited. While you see some signs and while you think there might be something happening. Until that giraffe actually goes through the process, you don't really know.

Erin Cantwell: That was kind of the thing too. We just didn't want to talk about it until we knew for sure. We were open with it too. People asked if we were breeding and we don't hide any of that at all. They're breeding in the top of the hill and usually do a lovely display of it. If you've been to the zoo enough, you definitely will catch those and see it. We're always hopeful. That's what our goal is with the population is to be able to make more giraffes.

Timm Baldwin: When Julius arrives, it seems fairly normal. It seems as though like everything's gone really well at first.

Erin Cantwell: Yeah. He did look pretty good. We didn't see quite the nursing that we were hoping. But I feel like also when we first had Willow on the ground we didn't see quite as much nursing as I think in our minds we wanted to see. Protocol is that you give them 24 hours with mom to make sure everything looks good and okay.

And then you get vets to come down and we take blood. Because when you look at the blood you can see whether they've had the passive transfer of the antibodies from the colostrum, which is your first sign that the baby is doing well. You're really looking for that 'cause then you know that at least the animal has nursed some and has gotten some of those. And getting that passive transfer of the antibodies is super important for their long-term health and for them to be able to start building an immune system.

Unfortunately, when we did Julius' blood work, that's the first thing that we saw that we knew that we weren't in this super great place because he didn't have any of those antibodies.

Timm Baldwin: So that happened around 24 hours, you're saying, after birth. That's that first sign of really knowing, okay, wait a minute, we've got something that isn't quite right.

Erin Cantwell: Something is different. Yep. And it happens. We try to bank as much plasma from all of the animals that we have on grounds to be able to do that. We're prepared for it in as many species as we can be. But as it is just something that happens. And sometimes they're just, the baby's a little bit delayed, the calf is quite ready to nurse so it's not moving as fast as you would like it too. A lot of times you can help them along and then they will pick up and do what they're supposed to.

Timm Baldwin: It sounds like it's not all together then, uncommon for a giraffe in particular, to experience this in the first few days.

Erin Cantwell: Right. It's not completely uncommon. We were not super excited that, that's what we were seeing. It does make you start to worry a little bit. But we didn't know that it would turn into from that minute, to what it did. Sometimes they just need a little bit of help. Just like human babies, sometimes they need a little more oxygen and they have to be in an incubator. They work through their little things. They're a little bit early or a little bit late and they're just not quite ready for the new world experience.

Timm Baldwin: The team was a pretty extensive team. It's both the giraffe house team that you manage along with the area manager Sydney Larson. And also the veterinary staff, which is quite extensive here, I should mention that the zoo is very fortunate to have three full-time vets on staff, which is not something that every institution is lucky enough to have. And all of the vets here are very well certified. A very extensive team of people and vet techs and other folks that were involved. But once you got that first sign. Both teams looked and said, "Okay. We've got something that's not quite where we need it to be." What was the plan at that point? And what started to happen?

Erin Cantwell: Once you see that you don't have the passive transfer that you're looking for, it is very important to be able to get those antibodies in. Your options for that



basically are to do a plasma transfusion. Unfortunately with our giraffe we don't have the ability to get blood on them yet. We're still working on it. We have high hopes to-

Timm Baldwin: [crosstalk 00:18:36] might be because they're somewhat of a skittish animal.

Erin Cantwell: Yeah, a little bit. We're definitely still working on those behaviors and trying to get that into part of our program. This has become enough of a giraffe issue in the population that I think maybe three weeks before Julius was born there actually was an email that was sent out about places banking giraffe plasma for this very specific reason and who your resources were and where you could go and who you could talk to to see if you could get plasma. Cheyenne Mountain Zoo and Columbus Zoo were two of the big participants in that program that normally have plasma banked.

Timm Baldwin: And very large giraffe herds at both of those institutions.

Erin Cantwell: Right. Definitely numbers helps to be able to get that. To be able to get the amount of plasma that you need, it's a lot of blood so the process does take quite a while. Your animals do have to be very well-trained, 'cause it takes pretty significant time to be able to get enough blood from an individual to be able to spin it down.

Timm Baldwin: So interesting to me that that is fortuitously timed. But that there is this ... I think it does really speak to the effort that's going into not just giraffes in the AZA institutions that partner with each other, but also, all sorts of animals, mammals, reptiles, you name it, around trying to make sure that these populations have the best chance to survive no matter what the situation is.

The fact that an institution like Columbus or like Cheyenne Mountain out in Colorado can really work to then take the time and say, "We're going to collect some much needed blood from a really healthy animal that is going to be somewhat life-saving for another animal." That, to me really just speaks to the level of effort and care that goes into not just giraffes but all sort of animals.

Erin Cantwell: It is pretty impressive what the medical field has figured out is really important to have and that they can key in on some of those unique things and be able to put their time and effort into that since it is so critical. It's basically your only option, to be able to get those antibodies into an animal. The same thing too, if something happens and the mom dies, you need to be able to get those antibodies in. It's pretty critical. Sometimes colostrum just isn't enough.

Timm Baldwin: That first plasma transfusion, when did that happen? Where did the plasma come from? How did it go?

Erin Cantwell: The plasma came from the Columbus Zoo. They were the ones that had available plasma. They were amazing. We reached out to them and they were

willing to meet us halfway, 'cause we knew we were in a pretty tight spot and we needed to get the plasma pretty quickly for him. We actually sent one of our hospital keepers, I think to somewhere in West Virginia, I'm not exactly sure where, but I'm pretty sure West Virginia was the meeting point. I think someone from Columbus' hospital staff also came out and met them. That's pretty amazing too, that one, they're going to let us have this resource that at some point they might need and understands the critical time that we were facing with Julius and being able to get us that resource. And they were willing to drive I think it was four or five hours one direction.

Timm Baldwin: Yeah, in the middle of the night.

Erin Cantwell: Yes, absolutely 'cause we sorted all this in late afternoon. I think it was two or three o'clock in the morning that they met up and got the stuff and got back to us.

Timm Baldwin: Again, that to me is-

Erin Cantwell: It's pretty amazing.

Timm Baldwin: It really is. When I heard that story and knew that that was what was going on behind the scenes, it just really reinforced for me just how much effort was going into making sure that this calf was given the best chance of survival.

Erin Cantwell: I think it's a great story and example of how awesome the zoo community. We're not very big. There are not a lot of us. Everybody that's in this field has the same passion and wants the best for the animals. So everyone is willing to do slightly crazy things like that, like driving to West Virginia in the middle of the night to pass off a couple bags of plasma to us. It's pretty awesome to see the larger community working. You always just hope somewhere down the road that you can help somebody else out like that too and pay it forward.

Timm Baldwin: The procedure goes how?

Erin Cantwell: It actually went really well. It was very long. You can't push the plasma into the animal quickly, 'cause obviously you're putting unknown stuff into somebody's body and they can have allergic reactions and react pretty badly to it.

Timm Baldwin: So it's not without risks?

Erin Cantwell: Correct. Just like if someone gets a bone marrow transplant or something like that. The body can overreact and have a bad reaction. It did take us a while. Giraffe are pretty tricky 'cause their skin is very, very, very thick because it's so tight to keep all the blood pressure and stuff as it needs to be in them. They're not the easiest animals to put things like catheters in and get to the veins and stuff. The hospital team was amazing to be able to get us the access that we

needed to be able to run the plasma and get all the blood and all those kinds of things.

Timm Baldwin: I'm also curious and I'm sure a lot of people listening will be too. Obviously when you do something like this, Julius has to be separated from Kesi. Talk a little bit about how that works and what the planning and the procedures are around that and why that's so important.

Erin Cantwell: It is a tough balance, especially for us looking at it from an animal management side. You're always trying to find a balance between doing what you know what you need to do medically, but also trying to balance and foster the relationship between calf and mom since that is so critical.

We didn't want to have to hand-raise this animal. Almost always we don't want to have to hand-raise them. Definitely mom's going to provide the best care and allow that animal to grow up as it should and learn all those social cues that it should. We were concerned in having to separate him from Kesi. Kesi's never had a calf. We weren't sure how she was going to do.

Sometimes if you separate an animal from its mom for any period of time, they can abandon it and just walk away and be like, "Oh. You took that. That's yours now." She was really great. She was definitely very attentive and very concerned about what we were doing. But I think over time also understood that we weren't doing anything that was going to hurt her calf. She did settle pretty quickly and would just stand and watch us and pay attention and see what was going on.

Timm Baldwin: Throughout this, it sounds like that was pretty common for her. That the team had to intervene almost, in some cases on a daily basis or several times a day. And being able to do that intensive medical care that was happening. And then hope that every time Kesi was just was interested, attentive and-

Erin Cantwell: Willing to come back and take care of it.

Timm Baldwin: Yeah, it sounds like she did.

Erin Cantwell: She was amazing. She absolutely was, which was really great and I think speaks to the success that we will have with her if we breed her again and she has another calf. We're still not sure exactly where the disconnect was, whether it was Julius or whether it was Kesi not making milk. That's a very cause and effect process that happens. The calf has to nurse. The calf has to interact and get the hormones stimulated for the mom, for the mom to be able to make the milk. So if the calf doesn't do it or the mom's not ... The whole cycle just ... If both things aren't working you're not quite sure where the disconnect actually is.

Timm Baldwin: He comes through the plasma transfusion and then what happens? What was that next few days like in terms of assessing his health and where he was headed?

Erin Cantwell: It was stressful, for all of us obviously. We were still trying to watch and see, I do believe we saw some signs that he was trying to nurse and starting to get there. And then, I think a day or two later though, we ran into some more medical issues. His metabolic levels weren't quite where they needed to be. 'Cause obviously through this whole process we were getting blood on him every day to be able to track and see where he was, what was going on, what our current status was.

He got pretty sick on us pretty quick after we had seen some improvement from the plasma transfusion. That was pretty nerve racking, 'cause that took us a while to sort what was actually happening and what we needed to correct. We got him through that.

Through all of this we were trying to weigh putting a bottle in front of him versus not putting a bottle in front of him. A lot of times you end up with confusion. If you want an animal to nurse on mom, if you put a bottle in front of it you can turn them off then, understanding that milk comes from a teat on mom. Definitely a nerve racking and very stressful time for us, trying to sort exactly what we needed to do and what he was doing. You know, you can't absolutely know for sure with some of it.

Timm Baldwin: Yeah. I will say, on the marketing side, we were really starting to communicate very early with the public via social media, via web and via email, what the team was starting to see, which was some concerning signs around his health. I do remember very clearly that it was such a day-to-day thing.

One day there was some enthusiasm around, okay his blood levels are a little bit better and he's looking a little bit more alert. This is really great. He's still with Kesi and Kesi is very attentive. And the next day it's, wow, oh my gosh we're seeing something that we didn't see yesterday. He's not getting fluids any longer. We're pretty sure he's starting to dehydrate a little bit. We need to help him. That was such a fluid situation.

I remember, just from watching it externally knowing that there was such a roller coaster of thinking, okay, we're up but maybe we're not up to where we need to be. Then the next day there's a little bit more of a concern because now this has popped up and there's a new issue that we didn't see yesterday.

Erin Cantwell: That was the main push for us every day. To be able to separate him from Kesi and to be able to get blood on him and really watch. Because we don't always have that option with the animal care and being able to handle things, 'cause obviously you're always weighing getting hands on an animal and how that's going to stress them versus being able to sit back and watch. Obviously, none of

these animals can tell us what's going on. So it's sometimes an educated guess game that you have to play.

Being able to get the blood every day with him was really great, 'cause it really did steer the direction of treatment for him. We knew exactly, metabolically what was going on with him. It was a matter of providing the support that he needed to be able to get through it. And then giving us more information so we could be better prepared in making the decisions with whether we could not give him fluids that day and not have to tube him with colostrum and be able to feel more confident that we had a little more time to let him try to nurse on Kesi.

In the middle of all of this we actually did see him pretty significantly start to try to nurse. We were very hopeful for multiple days that he was figuring it out and latching on. Kesi was standing really well for him. It was, I think the first time that we felt pretty good about things and that we were moving in the right direction.

Unfortunately, as we were tracking his blood and his weight, he wasn't actually getting, either enough or anything from her. We're still not quite sure. But his weight started dropping. His blood work was showing that he was more dehydrated. We knew that, that wasn't exactly what we wanted him to be doing, obviously.

Timm Baldwin: This is a very labor intensive medical situation.

Erin Cantwell: Absolutely.

Timm Baldwin: It took a lot of time, obviously for your team, for the giraffe team, but also for the vet staff here. Talk a little bit about what the vets did and how they worked through all of these procedures. Because, I should say that the vets here obviously were very involved with helping Julius, but also, at the same time were doing multiple other procedures with other animals that were also in need of some care, at the hospital or in their exhibit space. They really had their hands full.

Erin Cantwell: Definitely. One of the challenges of working in the zoo field is that you always have to balance, because everything needs your attention at the same time. You can't tell the warthog, "Oh. Hold on. I'll deal with you later. We're going to go deal with this." It's like when people are surprised that we work on the holidays. You're like, "Well you can't tell the animal that, I'm sorry, it's a holiday. I'll feed you tomorrow." Everything always keeps going. It definitely was, even for the giraffe house team. They're responsible for over 70 animals.

Timm Baldwin: In addition to giraffe, obviously?

Erin Cantwell: Correct. They were having to still do their same responsibilities and their same job. And get all the animals out on exhibit and be paying attention and monitoring the health of all those other animals. Doing their keeper chats. All of those, nothing stops. You just have to figure out how you add in this time and it was the same for the vets. We're very lucky that we do have three vets. That makes it a little bit easier. We do have three techs also, so they have a little bit more flexibility.

Everybody was involved and everybody figured out the ropes of stuff and had to keep moving. But it is definitely a challenge. It makes everything else harder, 'cause you're so worried about the calf. That's your immediate worry. But everything keeps moving.

Timm Baldwin: You mentioned a few things while we've been chatting about Julius and his care. You mentioned that there was a plasma transfusion done. But there were some other procedures along the way that were also done. You mentioned tube feeding. The team obviously tried bottle feeding routinely. Talk a little bit about that and some of the other things that were effected on behalf of his health in the first few weeks there.

Erin Cantwell: We had a lot of concerns with his ability to nurse. I think we felt pretty strongly that it was him and not so much Kesi. That he wasn't latching on right. Obviously the tube feedings were very important for us because it was the only way that we were getting calories into him and keeping him hydrated and all of those things that we needed to keep him stable so that we could then experiment with some of the other things.

Giraffe are notoriously challenging to get onto a bottle. It can take you quite a while to get them on. We knew that going in, reached out to a lot of institutions. There were many places that have raised a lot of giraffe that had some awesome suggestions that we definitely tried and worked in. We did find a couple that worked decently for him. I can't say well, 'cause obviously we never really got him on a bottle.

Timm Baldwin: An ongoing challenge.

Erin Cantwell: Absolutely. From day one. I think for him too, because he was so medically critical that it was a huge challenge for us to try to balance his medical needs and his behavioral needs. Most animals don't like having to be handled or restrained for whatever reasons you need to. For him, obviously to get blood and to tube feed him, it does require a lot of restraint. He handled all of that like a champ. But then to go back in and offer him a bottle. Those two things kind of work against each other. It was always in the back of our mind with what we needed to do and how we needed to balance it.

Timm Baldwin: Talk a little bit about the collaborative nature and what happened around Julius and where some of these additional pieces of assistance were coming from.

Erin Cantwell:

We did reach out. I initially started with the SSP, 'cause obviously that's the easiest thing for me and Sherry, who's the giraffe coordinator basically connecting us with people who she knew had, had either challenging giraffe calves or had, had a lot of giraffe calves. Definitely Sacramento had some good information for us.

Cheyenne Mountain was very helpful as well. They were the ones that ended up bringing us the second round of plasma. 'Cause we weren't excited with where his blood levels were and felt that another plasma transfusion was going to be important. That was also fortuitous as to when it happened and when we decided that because one of their head vets was actually flying to Philly at that time. Because obviously it's hard to get the plasma. It needs to be frozen. You need to overnight it. Cheyenne Mountain is way out in Colorado.

I think the Columbus stuff, when we were looking for that it was Friday afternoon. So to be able to overnight it, you couldn't get it until Tuesday the following week. Which is why they ended up driving it to us.

Mike LeFleur, our creator actually drove the hour, hour and a half out to the Philly airport to meet Dr. Levitt and just happened to bring along the giraffe plasma for us. It was very eye-opening to see how awesome the community was.

Not that you're surprised 'cause you know that we're all in this for the same thing. But how willing people were to give advice and help and answer emails. You know everyone is busy. They have as many things to do on their plate. This is not their problem. But they will take the time out to have some phone conversations with you and email and check up on you. Everybody was following up and asking and giving more advice and trying to help us out as much as they could.

Timm Baldwin:

I would say that we got that even on social, right? Even folks who were not necessarily well-versed in giraffe care had all sorts of suggestions for the team around, have you tried this, I saw this on the internet, or maybe, I noticed a YouTube video where this was done for a particular calf. People, I think were generally excited to be able to help in any way that they could.

We got a lot of private messages from folks and some of those things were things that the team had already worked through and tried. Some of them were very non-traditional kinds of suggestions. But the public, not just awareness of his situation but also the interest in helping was so great.

Erin Cantwell:

Absolutely. In a situation like this, the more information you can get and the more ideas and things that you can try when all the traditional things are not working, are always helpful. Sometimes they just make us, even if it's something that we don't use, it makes us think out of the box and puts those ideas and thoughts into our head for the next time. 'Cause we do hope to continue to

breed giraffe and hopefully we won't have another case as dramatic as Julius. But you never know. Giraffe are definitely a species that do have a tendency to need to be hand-raised. So it's not out of the question that down the road we'll be doing that.

Timm Baldwin: I know from my knowledge of the story that you mentioned that point in time when there seemed to be a little bit of hope around Julius and there was some confirmation, finally that he looked like he was actually nursing or at least trying to nurse. That was a very, I just remember that being a very breakthrough kind of thing here, internally and that feeling of, oh my gosh, maybe he's going to figure this out and maybe she'll be able to provide him the right amount of nutrition and maybe this will all just click. Even though the chances of that at that point were still very slim. He was facing some really serious challenges.

Erin Cantwell: Definitely.

Timm Baldwin: But I remember very vividly after that point, there was a pretty dramatic turn in terms of his health. That was probably about halfway through the month. Just noticing that, wait a minute, things weren't steadily improving, they were starting to steadily decline. Talk a little bit about that last two weeks and how critical his situation was and how much of an intensive care type of situation developed.

Erin Cantwell: That definitely was when we knew we had to hand raise him. We knew we were going to have to be the ones that were going to get the nutrition into him. That he wasn't going to be able to nurse on his own and get what he needed from his mom. We did continue to try to foster that relationship between them, 'cause we wanted to be able to keep him with the herd as much as possible.

We also had the advantage that Juma had a calf that was nursing. We did try a couple of times to put Julius in with those guys. 'Cause maybe it has happened on occasion that someone will allow another calf to nurse. We had to wait a little bit 'cause we needed to make sure he was strong enough. Juma's not always the most-

Timm Baldwin: Accommodating?

Erin Cantwell: Yes, thank you. Juma is not always the most accommodating when it comes to a calf wanting to nurse. Willow has to be pretty pushy a lot of the times to be able to get access and get the milk that she wants. I think she wants more than she actually needs, which is why Juma gets annoyed and wants to go eat and not have a baby nursing. It did take us a little bit before we felt comfortable being able to give him access. We did try that since there was a chance that, that could help.

Other than that, it was every hour hanging out with him and trying to get him on a bottle and trying different things and seeing what he liked and trying



different formulas and trying different temperatures. Just everything and anything that we thought we could do to increase our chances.

Timm Baldwin: There was literally a kitchen sink, I think that was thrown in terms of the effort that went into that last few weeks. I remember the pan feeding. There was some hope there with him being able to get something out of a pan versus naturally through mom or through a bottle. There was a little bit of hope with that. And then that didn't really work out.

Erin Cantwell: We got him drinking some of that. We had some pretty good signs. We were pretty excited about that. And then, metabolically and blood work wise, he just didn't have enough. That's when we knew that we were in pretty critical care. He got pretty bad pretty quickly on us.

Timm Baldwin: Near the last week there that you were working even more critically with him. I know there were some other things that were tried. We even consulted with, along the way, many experts, but also some human doctors got involved. There was a procedure that was done to aid him in the last few days there called a TPN. Talk a little bit about that and how that worked out.

Erin Cantwell: That's intravenous, nutrients basically that you can give. It is a pretty invasive process. It had always been in the back of our mind that we knew that that was a possibility and an option but it-

Timm Baldwin: It wasn't something that sounds like that you wanted to do.

Erin Cantwell: Correct. It was not something that we really wanted to do. We didn't want to have to get to that point. It's pretty serious at that point to ... They have to be hooked up to, I think it was three bags of lipids and then all the other nutrients and fluids and that kind of thing.

Timm Baldwin: This is much more invasive or intensive than, for instance, the plasma transfusions that were done?

Erin Cantwell: Right, 'cause this is, you're attached to it 24/7. It did mean that somebody had to be in with him all the time. The lines were long enough that he could move about the stall as he wanted and lay down as he wanted. But he was connected to the TPN.

Timm Baldwin: That procedure was something that was helped by Mount Washington Pediatric, is that right?

Erin Cantwell: Yes, they were awesome and were really helpful for us and definitely were willing to provide us with the TPN, 'cause that's not something you normally use in the animal field. It's definitely more a human thing.

Timm Baldwin: Sure. It's a procedure that normally assists neo-natal care.

Erin Cantwell: Right. It is pretty critical for them. It's much easier when a baby that can't walk, that's laying in a incubator than it is to hook it up to a six foot tall, 150 pound giraffe calf.

Timm Baldwin: Obviously, everyone who's listening to this podcast knows how this story ends. It was a very difficult decision, I imagine. Talk a little bit about the decision to euthanize and when the team knew that that was the right thing to do.

Erin Cantwell: Anytime we get into situations like this where the animal is not just good to go, you'll always have that in the back of your mind. It is the hardest thing that we have to do in this field is trying to decide when you need to make that decision and going through that process.

For him, I feel like we knew that we had just gotten to a point that, could the TPN sustain him? Sure. But we had then unfortunately really lost the behavior of him being able to take in any milk on his own. He wouldn't drink for us. Just nothing we were doing was working. We just couldn't get him to take in the nutrients on his own. That's not a quality of life that we were okay with. While you can sustain him on the TPN and get us somewhere, we just felt that we weren't making the progress on the drinking side of it that would get him anywhere in the long run.

It was just that every time we made any type of significant improvement, within a day we had slid a couple of steps back. So our forward momentum throughout this whole thing was teeny tiny baby steps. The sliding backwards was pretty astronomical a couple of times in this process. We just felt we weren't gaining enough ground to continue to strive to keep him alive because we felt that our long term outcome was still not going to be successful.

Timm Baldwin: Correct me if I'm wrong, but it sounded too from the information that we were working with from the team that his weight was still a major issue. He had not really gained much at all since birth, is that correct?

Erin Cantwell: Right, yeah. Our inability to get the nutrition into him that he needed to be able to sustain himself was the critical decision making point that we weren't ... TPN will never put weight on you. It will just keep you alive. For us, we felt that we just didn't have more options to be able to try to get weight on him and that it wasn't fair to anybody. That's when we decided to make that decision.

Timm Baldwin: A lot of people who are following this story had questions. Maybe we can address some of them. One of the questions that came up was, how much the team knew around his health beyond the nursing. Obviously there was such a focus on understanding that nutritionally he wasn't getting the nutrients that he needed. He wasn't thriving and he wasn't growing and he wasn't healthy. But obviously along the way there starts to be this question of, well is there something else going on? For the team, was there any thought behind other

things that could have been complicating the situation? Was there any other clear sign that maybe something else was affecting his health?

Erin Cantwell: I think for us, once we started losing ground when we thought he was nursing, I feel that the animal care staff for sure felt that there was something not right with this individual. Most of the time, the way it works in the animal world is that they're pre-programmed with all of the things that they need to do. They have evolved to be able to nurse. They've evolved ... That's why giraffe calves are six feet tall.

Survival of the fittest, absolutely a real thing. That is why they are the way that they are. Anytime that you know you have to get into super aggressive, super invasive, super intensive situations, usually there is some underlying cause that has made this particular individual just not quite right.

We felt pretty strongly that he was not a premature baby. We didn't have any of those factors, we didn't think. Just based on breeding and when he was born. He was pretty much smack dab in the middle of the window that we were expecting a giraffe calf in. We didn't feel that he had any of those complications.

In looking at the way that he would use his tongue and the head tilt that he had also when he was first born were also concerning things. We felt that maybe there was some type of neurologic thing happening. It's very hard, obviously to be able to diagnose those things and to be able to understand. I think the vets were absolutely on the same page with us as well. In looking at him within the first couple of days, we kind of felt that he wasn't quite right. We were hopeful that there were things that he would grow out of, 'cause a lot of times they do. But unfortunately with him that was not the case. We just never-

Timm Baldwin: You never got confirmation then of those kinds of things. I should say that a necropsy was done after he passed. That may offer some information that could fill in some of those gaps. Or it may not, is that correct?

Erin Cantwell: Absolutely. On all of the animals that pass away here at the zoo, we do have necropsy done on them and try to learn as much as we can 'cause obviously the more information we can get the better we can treat an animal in the future going through.

A lot of times, if something is neurologic, it's not always physiological thing, and that it's more the way things are connected in the brain. I think those are very hard things to see. I know we very specifically asked them to take a look at his brain because we were suspicious that it was something neurologic. But sometimes those things are hard to see and find.

Timm Baldwin: We've had a lot of questions from folks who had been following Julius around his necropsy results and what, if anything has been gleaned. I should mention that that particular set of results is still pending. There's a lot of work that goes

into that. We're actually more than a month out from his passing. There still is work that's being done to try to investigate. But that we have no conclusive answers yet.

Erin Cantwell: Right. We do have the great ability to have the help of the John Hopkins pathology department. They do almost all of our necropsies. Obviously, that's an amazing resource for us. Sometimes it just takes that long. Especially if it's something in the brain. The processes you have to go through to be able to tease some of those things out are very tedious and time consuming. Unfortunately with a lot of the cases you just never get those answers. And a lot of times it's probably many small things that add up to something big.

Timm Baldwin: That is part of the hope obviously is that everything that the team went through. All of the 24/7 care and the veterinary intervention and all of the medical procedures and everything that was tried on behalf of Julius to really give him a chance to survive and to make it through the hurdles that he was facing. That all of that does become, now knowledge that benefits a future calf, whether that's here or at another facility. Because now, that knowledge is part of the bank that then can be used to assess a situation for another calf that may be in a very similar type of situation, correct?

Erin Cantwell: Absolutely. We learned so much from him. I think our ability now, to evaluate and assess and understand a giraffe calf is obviously that much greater than it was before we went into this process. I think too, the medical side of things, I think they learned a lot as well in what to be looking for at the blood work and what things were important for us to fix and how we went about fixing those things. I think it also helped to solidify in us how important it is for us to be able to get blood from our giraffes to be able to get plasma because that is such a critical part and such an important resource. It's given us some new goals to move forward with in the building.

Timm Baldwin: Fantastic. There's a philosophy here around animal care whereby these animals are not like some people imagine, they're not pets of the keepers. That people don't interact with these animals in that kind of way. These are really wild animals that are just being cared for in the most natural way possible with the best healthcare possible. But even withstanding that, it's hard not to get emotionally connected to these animals and to have the team, really it's been such an effort. Such a 24/7 type of response. I know that that had to be disappointing.

Erin Cantwell: It's never the outcome that we want. You always want things to live and thrive and go on and go to other institutions and make their own babies and those kinds of things. But unfortunately that's not the way that it works in this field. It's very much real life and we want every animal to live and thrive but that's not what would happen in the wild. It's not what happens with people. It's not what you can realistically expect from our population in zoos either.

The circle of life, that's the way that it works. Not everything is meant to live forever. But the information that you can learn and the lessons that you can take away from a situation like this are what you have to keep in perspective and understand that it was important and it was critical. He played an awesome role for us in such an amazing learning experience.

Timm Baldwin: He became such a great ambassador for giraffe.

Erin Cantwell: Absolutely.

Timm Baldwin: Obviously the public interest and the public concern for him was really great. Really there was such an outpouring of support. I can't really explain in words how much support there had been coming in from all over the world, which was really fantastic. It's interesting that it was around a giraffe calf, but this kind of care and this kind of effort happens here all the time with all sorts of species.

Erin Cantwell: Yeah, definitely. I think that was the most eye opening thing for us with all the social media stuff that we were doing and how much we were showing to people and how, I guess impressed maybe the community seemed to be and supportive. Because for us, this obviously more extreme than a normal day-to-day for us, but this is what we do. We didn't do anything different for him that we wouldn't do for any other species. From the Panamanian golden frogs to the sifaka to the elephants.

Every day we put every ounce that we have into the collection that we have. We want everything to be as healthy ... It was kind of interesting to see how amazed people were, because for us we didn't, those thoughts didn't cross our minds. We didn't pay attention to the fact that people thought this was so amazing until after the fact. Because for us it was, this is just what you do.

This is a field that you get into because you're passionate about it. You come to work every day for the animals that you're responsible for. You want all of them to thrive and live and be as natural as they can be. It was very interesting to realize that the general public hasn't quite seen that and hasn't quite grasped that, that's really what we do here and how unique and awesome it is.

Timm Baldwin: It is unfortunately part of that is because it is such a behind the scenes type of scenario. Obviously the care that happens for these animals is not as visually public as when they are healthy on exhibit. Sometimes you'll walk by an exhibit and you'll say, "Oh there's a sign that says that animal is receiving medial care." That doesn't really give you that much information around all of the effort that's going into that particular species. But certainly, like you said, that happens for small birds, small reptiles, tiny turtles.

Erin Cantwell: Everything. Everything that comes into our collection gets the same amount of attention and the same dedication and-

Timm Baldwin: In the end, it's disappointing I know, for me it was even disappointing to see the story end the way it did. But one of the things it has really spoken to is not just for the Maryland Zoo, I think, but for other institutions, the level of concern and care that goes into these animals. Whether they are vulnerable or endangered or not threatened at all, that makes no difference. It really is about giving every animal the best chance of survival possible and to really see all of these species thrive both here in this institution but also in the wild.

Erin Cantwell: Yeah, absolutely. It has been really interesting. I think learning more about the expertise that our community has about the species that we have in our care has also been very impressive. Knowing that you have people that you can reach out to that have probably seen something similar to this and or have gone through this situation is definitely helpful for us going through it and really just amazing to see how much knowledge we really do have. But also, how much is still needed to be learned that we keep moving forward and try to learn as much as we can.

Timm Baldwin: For Julius, there has been some knowledge gained. Erin Cantwell, thank you so much for taking such an enormous chunk of time out of your day, 'cause I know how busy you are and how many things are going on to talk to us about Julius. I know that many people are going to find that what you have to share really interesting. Because it is a really fascinating story and one that many zoos will be talking about for a long time in terms of the knowledge that's been gained.

Erin Cantwell: Absolutely. Thank you for having me. It's a unique experience to be able to go through and to share our passion and to show people what an amazing crew we have here at the Maryland Zoo and how dedicated everyone is to their job.

Timm Baldwin: Thanks so much, Erin.

Erin Cantwell: Thanks.

Narrator: Thank you for taking time to listen to Off Exhibit. Julius' story is one that's been especially impactful for a lot of people. The zoo has received such an amazing outpouring of support and interest about his brief but very significant life.

A lot of you have asked how you can help. If you'd like to support the zoo, the best way is through a donation. As a non-profit, the care that Julius and all the other animals here receive is made possible through visits, memberships and generous gifts from friends like you. You can make a tax-deductible donation to the Maryland Zoo anytime by visiting [MarylandZoo.org/donate](https://MarylandZoo.org/donate) There, you can choose to make a single or recurring gift of any amount. And every amount makes a real difference in supporting animal care and conservation of species here and in the wild.

We can't thank you enough for your thoughts, kind words and the amazing show of concern on Julius' behalf. The animal care team, the veterinary team

and the rest of our staff have been humbled by all of your support. We hope you'll continue to listen to Off Exhibit, you can subscribe via iTunes, Android or your favorite podcasting platform. Check out our library of existing episodes or look for new episodes coming soon, from the Maryland Zoo.