Joe Chaffin: Hello everyone! Welcome to Blood Bank Guy Essentials episode 014. My name is Joe Chaffin, I am your host. I am very, very happy today to have Dr. Emily Volk with me from Baptist Health System and Tenet Health System for our discussion today on "Patient Blood Management." Emily, welcome!

Emily Volk: Thank you so much! It's great to be here, Joe.

Joe: I really appreciate you taking the time out to do this. I want to let everyone know a little bit about you. Dr. Volk is board certified in both anatomic and clinical pathology. She trained for her medical degree at the University of Missouri, Kansas City and did her pathology residency at Cleveland Clinic. Now, the rest of what I'm going to tell you is going to seem a little strange because just about everyone I interview on this podcast is a specific blood bank transfusion medicine doc. But Dr. Volk actually trained in surgical pathology of the GI tract, as well as cytopathology, but her involvement in blood transfusion and transfusion medicine actually is quite extensive. She has worked for sometime at Baptist Health System in San Antonio, TX. She's the chief quality officer for that health system, but as well as that, where I actually met Emily was in her role as medical advisor to Tenet Health System for their evidence-based blood utilization initiative. Emily, my understanding is that you work with basically all the Tenet hospitals or nearly all the Tenet hospitals on their patient blood management initiative, is that right?

Emily: I sure do, yeah.

Joe: That's awesome! Tell me a little bit about that role. Was the program there before you started or did you come in and help them establish it? How did that work?

Emily: You know it's funny, when I came to San Antonio about 6 1/2 years ago, I came on as a contractor with Clinical Pathology Associates, who is the group that holds the pathology contract at the Baptist Health System. When I first came on I was promised I would not have to do the blood bank!

Joe: (laughs)

Emily: I was pretty excited about that having run the blood bank for the previous 7 years at Beaumont Hospital up in Troy, Michigan. Although, I enjoyed it, it's certainly not an easy thing to do! So when I came to Baptist about 6 1/2 years ago, I was promised I would not be running the blood bank. That turned out not to be the case and addition to being the medical director for the five hospital laboratories, I also was the transfusion medical director.

Joe: Surprise! (laughs)

Emily: Right! And we had a couple of safety issues that needed to be addressed right out of the gate. In fact, my very first day at Baptist, I was in front of a brand new chief medical officer and he was telling me, "We've got some issues. Fix them." So, it was one of those things where we found that there were holes in the swiss cheese, you know it's with a lot of safety issues. One of the holes in the swiss cheese was the potential for better utilization of blood products. So this initiative started, it was totally patient safety-focused to look at evidence based blood utilization in our five hospitals. Suddenly, after about six months of this, the accountant started to take notice of what we were doing and so did the blood center. South Texas Blood & Tissue Center, who provides the blood for San Antonio, actually sent us an email about 10 or 11 months into our program saying, "You're using quite a bit less blood, is everything okay?" We really didn't realize we had had that kind of impact on utilization.

So go forward a few more years and Vanguard, who owned the San Antonio Baptist hospitals, was bought by Tenet. So when Vanguard acquired Tenet, Dr. Mark Montonay, who was part of the Vanguard leadership team, he came over to Tenet and he asked me to work with Dr. Christine Hale, who was with Tenet, to spread the word and share the knowledge that we had had and the experience we had at Baptist with the other Tenet hospitals. With all fairness, before I came on board with Tenet as a consultant, the Tenet hospitals had started a blood utilization initiative and had had some success with it, so I don't want to disregard or discount the good work that they had already started. But they had taken a little bit more of a…well, they hadn't taken the same approach as we had taken in San Antonio. Theirs was more of, in the beginning, a resource utilization initiative rather than a safety initiative.

Joe: Ahhh, I see. Well, from our interaction, I can definitely tell you that the work that you are doing and have done is definitely making a difference. I work with a couple of the Tenet hospitals in Southern California and I've seen the impact of the program that you guys have put together. So congratulations on that!

Emily: Oh gosh, thank you! It certainly has been a team effort!

Joe: Understand. Well, so we've kind of started to touch already and I've given folks a clue on where we're going with this. Today we are talking about "Patient Blood Management." Boy, that's about…can you call it a "buzz phrase?" I don't know. I think if there is such a thing as a "buzz phrase" as opposed to just a "buzz word," PBM or "Patient Blood Management" is definitely something that people are hearing about everywhere, for good reason. But what I wanted to do with you today, Emily, if you will with me, is just kind of start from a "big picture perspective." Considering the audience that I have, people that listen to me that may be not necessarily as advanced along in their careers or may be in places where patient blood management programs are not that well established yet. Maybe we can start just by talking about the generalities and then we'll get into the specific elements of a Patient Blood Management program, further on in our discussion.

Why don't we start first with just this. Let me just ask you this question: Patient Blood Management sounds like, a big, big deal and it sounds like something that maybe a

facility would have to hire consultants and you know, invest a whole bunch of money to get ready to do one of these BIG HAIRY programs! And I personally think that it's a misconception, and I'm guessing that you probably do as well, but can you just take us through that? What does that mean in terms of, if a facility is looking to establish a "Patient Blood Management Program," what's the big picture on how they should be approaching it?

Emily: So I think, certainly, you can use a consultant if you want to and they're certainly out there and there's some fine, very well-educated, very intelligent folks, great communicators who do this work. I can tell you that we engaged a consultant at the beginning of our blood journey in San Antonio. However, I found that it was really the staff at the hospitals, the pathologists, myself who ended up doing the lions share of that work, did the heavy lifting. I don't think it's really necessary to engage a group of consultants to get a blood management program off the ground.

SABM, the Society for the Advancement of Blood Management, divides PBM into three basic categories. I think if you look at those three categories, you can break this down and really get something going in a small community hospital or a big complex system of hospitals, either private or for profit/non-for-profit university based, what have you. They can be very effective and not have a tremendous amount of front-end cost. And those three elements are driving home **appropriate transfusion practice**. The second one is **anemia management**. The third one is **blood conservation**. We can talk about how to implement various parts of those three elements and build a blood program around that. But it really does not require, I think in most cases, the engagement of a big consultant team. I feel like we gave a lot of money away, that we really didn't need to give away.

Joe: Interesting, yeah. And I do want to get into all three of those a little further down the line, but before we get there let's even take a step back from where we've gone already. Let me ask you this question (it probably should have been the first question that I asked you, but let me do it now). Why? What's the point of doing a patient blood management program? That answer might differ somewhat, depending whether or not I'm asking a hospital administrator vs whether I'm asking you, but let's put the rubber to the road here. What's the whole point behind it?

Emily: Well, for me and what really drove our journey in San Antonio was patient safety. And I think that may be the real core of our success. This was a *patient safety initiative around the utilization of a not insignificant intervention*. Essentially, the liquid transplant of another person's blood product into a patient with significant side effects and making sure that we're not getting too much of that product or too little of that product and that we're getting the right product. It kind of goes to that whole concept "the right product, at the right dose, at the right time." When we manage the utilization of our blood products with that in mind, we find in most cases folks will save some money from their previous utilization, and they will improve their safety profile, which is sort of a win-win. And of course, the administrators love it because that does result in decreased expense of resource utilization.

Joe: But hang on a second, Emily! Hang on a second. You're talking *heresy* here, my goodness! Are you telling me that what we've believed about blood, ever since we got a pretty good handle on the HIV epidemic and we test our blood seven ways from Sunday and we've got incredible ways to prevent infectious disease transmission through blood transfusion, are you telling me that blood is actually NOT safe? Help me here!

Emily: Right! I love it! When I think of, when I do in my talk that I give around the country, is I talk about how there's been a huge paradigm shift in how we think about blood. I cringe a little bit using the phrase, "paradigm shift," bear with me. When I was in medical school back in the late 80's and early 90's, we were on the tail-end of the, well, what I would call, "the tail-end of the beginning of the HIV epidemic." We found that folks got real comfortable again with blood, after we got past that initial scare with HIV. They got comfortable around even Hepatitis C, as a potential infectious disease that came out of blood transfusion. When I was in medical school and when I was in my early residency, really, blood was considered pretty safe! Kind of part of the clinical wallpaper. As long as that infectious disease screening was effective, everybody was pretty happy to just go on doing what they always did, which was never give one unit of blood. We always transfused two units of blood. And in fact, if you transfused one unit of blood, you were either going to get a "dressing down" by your chief resident or your attending, or you were going to the transfusion committee.

Joe: That's true! (lughs)

Emily: Right? I mean people got their hands slapped for transfusing one unit of blood!

Joe: Absolutely!

Emily: So again, fast forward to 2016 and we're now telling folks, "Hey, you know what? This stuff that we gave so freely for so long, actually has a significant side effect profile!" There are things about the way we deal with blood, you know the stored blood lesion is somewhat controversial, but we know that what is in the bag, in the refrigerator, for over thirty days, potentially, is not the same stuff that's coursing through your veins right now. I think it's fair to say that if I were to take a bag of blood up to the FDA and say, "Hey guys! I got this great new product that's going to increase end-organ oxygenation. Let's get this thing licensed up." I think they would laugh me out of the place!

Joe: (laughs)

Emily: So we are now telling folks, "Less is more." The challenge around that really is that for so long we told them, "More is better." And you know, frankly, doctors are kind of wired that way. We really have to work with them to reset their thinking around how to dose blood products.

Joe: That is very, very true! I well remember those days sitting on transfusion committees, in fact, chairing transfusion committees, when one of our quality measures was the proportion of single unit red cell transfusions and that being a *bad* thing.

Emily: Right right! And you know frankly, we **still** see people using the cross-matched to transfusion ratio. If you go to the trouble of cross-matching something that you didn't transfuse it but somehow that's a bad thing. And in fact, we're really encouraging folks to get away from using that metric because it actually isn't such a bad thing to not use a unit of blood, even though it might be set up for a patient.

Joe: Wow. I have to tell you, having just been at a transfusion committee meeting on Friday, at one of the hospitals I work with, and seeing them go over those numbers, the cross-match to transfusion ratio; and just so those of you who aren't familiar with that, it's just simply taking the number of units cross-matched, dividing that by the number of units transfused, just kind of as a predictor that clinicians are ordering accurately. Meaning they are ordering the appropriate number of red cells. Basically, the lower the cross-match to transfusion ratio the better, right? That's a real interesting thought for a lot of people. That number, while we've always said keep it under 2 or keep it under 1.5 or whatever, that's not necessarily the right idea. That's a new one for me, Emily.

Emily: Well, I'm glad to offer you something that you don't already know. I can tell you that!

Joe: (laughs) It won't be the first time during this podcast or the last time, I should say! Anyway, so obviously the safety part of it. That's what really rings our bells as doctors, right? I mean that's really what we're trying to do. I think it's really important what you said, in terms of, yes, there are some financial benefits, potentially there. But realistically, we're trying to do it to get the patients the right products and appropriately done.

I do want to just push back a little bit on one thing, Emily, and forgive me for that. Sometimes when I hear people talking about the inherently injurious nature of blood which I don't have any argument with. I agree that is absolutely something that is under appreciated and has been for decades. But I also worry that sometimes we might try to shift the pendulum too far the other way, I mean, is it fair to say that a transfusion decision should, just like any decision, should be weighing of risks and benefits, but understanding the risks maybe more than what we thought before? Or am I pushing too hard with that?

Emily: No no! I think you've got it exactly right! I think that frankly, what we were doing before, when we were so comfortable just giving, "If one was good two was better," that really reflected a comfort with blood transfusion as a sort of panacea to a lot of different conditions, not just symptomatic anemia. If we're talking about a red blood cell transfusion but also a way to help an elderly patient feel stronger, feel more "pink them up," for crying out loud, we still hear people say that. I think we were just frankly just too casual with understanding the risk profile not just the benefits. So yes, I think your point is exactly right on. I know that there is a controversy about the significance of the stored blood lesion, the shift in the 2,3-DPG ratio and the change and the micro-skeletal structure of the red blood cell, from lovely biconcave disc to this "blobby" sticky, procoagulant element that's in the bag of blood in the refrigerator in the blood bank. That probably overstates the case a little bit. I think clearly we know for patients who

have hemoglobins under 6 that even a unit of red cells stored to the very end of its life span in a blood bank, is potentially beneficial to that patient. I think the question is, “At what point are we doing more harm than good?” And I think we’re really exploring those areas in our patient blood management programs in ways that we didn’t before.

Joe: Yep, I agree. And for everyone listening, the controversy that Emily was just referring to, there have been competing articles coming out in the last few years, and I’ll try to be real brief with this, Emily, just so that my audience can kind of get a handle on this. Competing articles, most of which the ones that were retrospective showed some potentially significant effects of getting “older blood.” Several randomized studies came out recently that some people say have answered the question (I personally don’t believe they’ve answered the question). Basically, what those randomized articles showed and I covered this in a previous podcast, was that at least in terms of the way we normally manage our inventories, it doesn’t seem to have incredible damage to patients, but what has not yet been answered (and please, feel free to disagree with me, Emily), what has not yet been answered is what about the transfusions at the very, very end of shelf life. The 42, 41 day red cells, how much harm would those do to individual patients? That to me is a question that’s still out there.

Emily: I agree. I think it is still out there. I will tell you that one of the can of worms that you open when you have these discussions with clinicians is, they want ONLY fresh blood, and of course, we can’t really offer that to everybody. So we try to offer that primarily to our youngest and sickest patients and then triage from there. Certainly if we change the out-date of blood significantly, it will have a dramatic impact on our inventory.

Joe: Yes.

Emily: And it may have a dramatic impact on access to blood. So, I think all those questions need to be taken into very careful consideration before any changes are made.

Joe: You bet. I agree. Well Emily, before we start talking about those 3 main components, “Three Main Elements of a Patient Blood Management Program,” is there anything else you’d like to say, just in terms of general approach and anyone in a community hospital, for example, that maybe doesn’t have the level of logistical support that other places do? Where should they start? What kind of things should they be thinking about to get started?

Emily: Well, I think really just making sure that laboratorians and pathologists are at the table for the development of all kinds of different service lines. There’s a real opportunity for the folks who work in a clinical lab, both the blood bankers and the pathologists and the lab manager, all have an opportunity to show their value, right? In this new world of value-based purchasing, with administration, and be part of the planning process for new service lines. For instance, you’re bringing on a new spine surgeon or a new joint surgeon who is going to bring in gobs of revenue and wonderful patients into the hospital. Having the laboratory team at the table to make sure that all of the appropriate

elements of pre-admission testing are in place and having colleagues who can help with potentially tracking patients who are identified as anemic before they go into the operating room. They have a place to go to get that managed, so we don't create emergencies that are simply bad planning. I can get into the details of all that, if you'd like. But ultimately, it's really just having a voice at the table for good clinical pathology and laboratory management.

Joe: Yep. Well I think that maybe we better move on to the other stuff simply because I want to make sure that we give it as much time as we need to get through these three elements. If you don't mind, why don't we do that? Let's move on, talking about the "Three Main Elements of a Patient Blood Management Program," Emily, and you've already mentioned the three. I'll just mention them again, and we'll go over all three of them. The first is, again, this is according to the "Society For the Advancement of Blood Management," but I think everyone pretty much agrees with this:

1) Appropriate transfusion practices
2) Anemia and hemostasis management
3) Blood conservation

I think we're going to spend the majority of our time on the first one because that really hits laboratorians in a bigger way than the others do, primarily. Let's talk about that, "Appropriate Transfusion Practices." How does that look in a hospital setting? How does a hospital go about trying to ensure appropriate transfusion practices?

Emily: Well, so for us, in San Antonio where I could tell you, we did have some consultants come in but we didn't hire a bunch of new staff to run the blood management program. This really fell on the shoulders of the pathology group and the laboratory managers. We found that what we needed to do was to **develop a blood order set** that we could encourage nursing to employ with physicians, especially not just for orders that the physicians wrote, but for the vast majority of orders that we had were done by telephone. So getting our nurses to actually have a blood order form in hand, so when they were taking telephone orders from a physician, they could ask them those important questions about the indications for the blood product that they were giving, and provide really some just-in-time learning at the time of ordering, for what was available and what they needed to be thinking about. I can tell you this came in very handy with making sure we had correct orders for platelets. We *still* have docs who want to order platelets in "six packs!" I think its because it's fun to say, "I wanna six-pack."

Joe: It is fun to say! (laughs)

Emily: In fact, we created a poster! Went to our print shop, which is essentially the hospital's version of Kinko's (I know I'm dating myself!) and have them print up some posters for us that said, "Platelets come in doses, beer comes in six-packs." You know, it was funny! So it caught people's attention, and we put these little posters all around the doctors lounges and so forth; I actually asked them to put them in the restrooms, so

it would catch people's attention when they had a few minutes…to spend…And so we….

Joe: (laughs) That took a second! I'm still adjusting to what you just said! That's awesome!

Emily: (laughs) But you know? It was important to get their attention around this because we did have a couple of real close calls! And frankly, a couple of places where more than what was necessary was accidentally ordered for patients because the nurse wrote down, "six doses" rather than a "six-pack." So our order form made that very clear that one dose was the equivalent of the old "six-pack" or "ten-pack" or "super-pack" there's all these different lingo and language around how to order platelets and it did create some confusion. It helped clear up the communication and so that was helpful. And then asking the docs what the indication was important, I think, because again, just stopping and pausing and thinking for a moment about what it was that they were trying to address. So, that we found very, very helpful. We have incorporated some of this into our electronic medical record. Tenet uses Cerner. This has been widely implemented. We are not yet on the Cerner platform in San Antonio and still have a hybrid paper electronic medical record situation which hopefully will be corrected come October. But again, that just in time learning, that clinical decision support, you can have pop ups that say, "Okay doc. You've ordered two units of blood, but your patient's hemoglobin is 8. What's going on?"

Joe: Right.

Emily: It's a little bit like "Clippy," popping up when you're doing a Word document in the late 90's.

Joe: Oh you are dating yourself! That's awesome! (laughs)

Emily: I know! I really am, I really am! But it did probably cause some annoyance like "Clippy" did, but it also had people stop and think. We found that to be very helpful.

The other thing that we've done is we have created **two ordering pathways**. One, for the hemodynamically stable patient who's anemic and the hemodynamically unstable patient, because those are two very different clinical situations. I think separating those out helped us gain some comfort with the medical staff. We were not interested in having lengthy conversations about what they could and couldn't have during an emergency bleeding situation. In fact, what I will tell you is that by having more communication between the pathologist and the blood bank around high blood ordering situations, which usually turned out to be massive transfusions or obstetrical hemorrhages and so forth, it gave the pathologist the opportunity to talk directly to the clinicians. During those events, such that we were able to guide transfusion. A lot of times when red is coming out, folks put red back in. I consider myself a "ham and egger blood banker," but I know you got to have some yellow in there, and just reminding them to check a fibrinogen, to add some platelets or plasma or CRYO, depending on what's

going on clinically, really prevented over-utilization of red cells and underutilization of the plasma based products.

Joe: That's awesome. So, going back to the basics of the blood order set, because you covered a lot there and that's excellent information. I want to touch on two things that you talked about. First, the elements in the blood order set. Just for those that might be listening that are not exactly current on what you mean, are you referring to, for example, specific indications, thresholds, triggers, etc. for red cells, platelets, plasma, CRYO, listed individually? Is that what you're referring to on a blood order set?

Emily: That is correct. Our physicians are getting more and more used to having order sets that are sort of "clinical situation-based" order sets. So sepsis order sets, for instance, so they make sure that they hit all the different elements of the sepsis protocol, such that patients receive evidence-based care. We wanted to create something similar for blood component transfusion, and so we created an order set. Ours is certainly no better probably than anybody else's, but essentially just asking some significant questions of the docs. How many units do you want? What special needs do you need? What's the reason? If it's significant active bleeding? Is the hemoglobin <7 or is the hemoglobin <8 with some kind of coronary ischemic disease? (which is somewhat controversial) But again, we didn't want to be too limiting. In fact, I will tell you that during our whole blood conservation, if you will, program; I kind of hate to use the term "blood conservation" because I think the patient blood management is the right way to say it. You want to give the right amount, not anymore but not any less than a patient might need. During that whole thing, we never told a doctor that they couldn't have blood that they felt like they needed for the patient. So, if I called up a doc and said, "Hey, we have an order here. You're telling us the hemoglobin is 8.5 and you're not telling us there is significant active bleeding or any coronary symptoms, and so forth. Tell me what's going on with your patient?" If they insisted that their patient had symptomatic anemia and they "by God wanted it," we certainly didn't get in the way of them having that blood.

The other thing we found around appropriate transfusion practice was **critical values are really, really important.** When I started at Baptist, the critical value for hemoglobin was 8, so we were expecting doctors to transfuse patients with hemoglobins <7, but we were waking them up in the middle of the night saying, "Oh my gosh, doc! Your patient's hemoglobin is 7.9. Do something!" And wondering why they were transfusing over 7! So getting that critical value down to, first we got it to 7 and eventually we got it to 6.5 gm/dl was really, really important.

Joe: Hold on a second with that, Emily. Just for my audience, can you just step back for a second and tell me what is a critical value practically mean to the laboratory and to the doctor?

Emily: Oh absolutely! Critical value is a concept that the Joint Commission, I believe came up with. It essentially identifies those values that require, those laboratory values, those radiology findings, or so forth, that requires immediate intervention by a independent licensed provider or doctor. If something doesn't happen within an hour,

that there will be significant morbidity or mortality. So, you have critical values of potassium that if potassium is too low and you don't replenish the potassium, the patient will have significant cardiac arrhythmia and potentially die. It's funny with hemoglobin and hematocrit, you know we tend to have those values set significantly higher than really a value one would consider ripe for imminent morbidity or mortality. Arguably, 6.5 is not a hemoglobin one would consider particularly life threatening for a patient with sickle cell anemia. On the other hand, a hemoglobin of 10, if the last hemoglobin for a patient was 10 but they have three buckets of blood on the floor, that may not at all represent what's going on with that patient clinically. So, the critical value is one piece of information, but it's only one piece of information. It can be very important but it always has to be taken into clinical context.

Joe: That's an excellent point. I think a lot of facilities miss the idea that those values are not pre-set. Each facility sets those values, obviously in concert with the medical staff. It's not something a laboratory can change by themselves without any discussion, but if you have good reasons for it and have that discussion with your medical staff, resetting those critical values to a place that makes more sense is, well, you've used the word with me in our discussions before, "low hanging fruit." That seems to me to be a really easy step that you can take to decrease some of these transfusions at higher levels.

Emily: Absolutely! I think that's why it's so important to use more objective clinical tools like an order set and like having an appropriate critical value that does not put the blood banker or the pathologist in the position of being the "blood police." Because appropriate transfusion practice can not be driven in a sustainable way by having the laboratory or the medical director of the laboratory placed in a position of being the inventory manager only. Frankly, it sort of short changes the expertise that the blood banker and the pathologist bring to the table. Pathologists get more formal training than blood transfusion in a clinical pathology residency than all other specialties, by far. So, I think we are really a largely untapped resource. I think that one of the advantages of making proactive calls, based on blood order sheets, blood order forms that maybe don't fall into line, provides the pathologist an opportunity to build a rapport with the clinical team, with their colleagues as a consultant for transfusions.

As long as you're not calling and saying, "What's wrong with you? Why are you transfusing so much?" But rather calling and saying, "Hi. I'm your friendly, local pathologist. I'm here to help you transfuse," just like a clinical pharmacist might do on ICU rounds. The medical staff eventually grows to trust that pathologist as an important member of the team, and so when that pathologist then takes something like a revised critical value to the medical executive committee of the hospital where it has to be approved, they know they have that credibility they need. I always tell folks, I cannot to claim credit for this idea, but communications are really successful when there is already a relationship between the two people that are communicating.

Joe: So important.

Emily: Right, it's so important! If the pathologist has been in an engaged part of the medical staff, and is visible, and you know, not doing that unfortunate negative stereotype of "hiding out in the basement and not coming out until its dark." I think they really do patients a good service. I hate it when laboratories and pathologists and laboratorians are referred to under the umbrella of "ancillary services."

Joe: (laughs) Me too.

Emily: You know? I've tried to talk to my administrative colleagues about coming up with a different term for the so-called "ancillary services," when they are quite *central* to taking care of patients.

Joe: Right. No, that is so true. I've often in my years of training pathology residents, when I talk to them about being a resource for blood, the thing I always say to them is that, "The more the clinician thinks that you are sitting there with your feet on your desks playing Monday morning quarterback, the less they're going to listen to you. Where as, the more that you are out there actually when they are having trouble in the OR, they are having trouble with the patient on the floor and you're THERE, and you're talking to them and you're seeing it, and you're providing real time discussion, THAT's when you start making a difference." It's what you said, it's relationship.

Emily: Truly! I can't tell you the amount of clinical credibility I got when I'd put on scrubs and get in the OR and be right there, while they had a patient who the surgical team was having a difficult bleeding problem.

Joe: Absolutely! Preach it, Emily. Preach it! I love it! (laughs)

Emily: Yeah!

Joe: So going back to we were discussing the blood order set and I got a little distracted because you hit that "critical value thing" and that set me off! So, you had mentioned, you have general aspects of what they're looking for, how many units they need, and some of the why behind red cells, platelets, plasma and CRYO, for example. I should tell everyone, I'm not going to go into the specific numbers for those. I mean, Dr. Volk mentioned the 7 and 8 kind of general range with red cells, and the reason I'm not going into the specifics of that is that each facility has to make those decisions on their own. I think that if you look in the literature and there will be some links on the show page for this episode, there are some general guidelines, but each facility has to decide what works for them. I don't want to make anyone think that Dr. Volk and I are trying to put a mandate down. So, that's that.

The other thing that you talked about, Emily, that I think is really *so* important for people to understand is that you look at stable and unstable patients differently. I think that's one thing that people freak out a lot about a little bit, in any discussion of patient blood management that, "Oh, it's going to keep me from getting my patient the product that they need at the appropriate times." So, I know you already discussed it a little bit, but

just hit me again with your philosophy of how you feel differently about stable vs. unstable patients.

Emily: Well for one thing, I think with a stable patient, folks are a little bit more willing to take a "let's try one product and let's try one dose. If you still need the second dose, we've got it for you, doc. But could you check a level in between? Could you check a hemoglobin in between and or if it's a platelet dose, could you check a platelet count in between your two unit or three unit order?" That has been very successful for us. Letting the doc know, "Look, we've got it if you need it." A lot of transfusion I have found, at least in my practice anecdotally has been that folks do preemptive transfusions because they have had one experience, of course doctors are very anecdotally driven. It's a one time, one thing goes wrong, that sticks with them forever. And so, if they've ever had a difficulty getting a unit of blood or getting platelets when they felt like they needed it, they tend to over-prepare and potentially over-transfuse in a preemptive way. I have been able to work with surgeons who were preemptive transfusers, taking someone up before surgery and really convincing them, "Look, that's not necessary. I've got those units ready to go, in the blood bank. The minute you need them, we can get them to you." Once they start to feel comfortable with that and trust that that's the case, you really will see them back off that preemptive transfusions. So that has also been a "win" for us.

Joe: Okay, excellent. I love that. I think that's a very important approach. We already mentioned briefly the "one at a time vs. two at a time" as a standard dose thing. So I don't want to beat that to death, but I just wanted to come back around to that discussion for just a second. As I've said, we've discussed already in this podcast how it use to be a quality measure that there shouldn't be any less than two. I guess what I'm wondering is, just practically speaking, when you're dealing with clinicians that are used to that idea, and as the newer generations are coming up we're seeing that less and less, how practically do you convince people that it's okay to give one unit and assess the effect before you move on to automatically giving two units of red cells, for example?

Emily: Well, okay. So again, in the hemodynamically stable patient, so the non-active bleeder, I would call the doc and say, "Look, I see that you've ordered a two unit transfusion. Hemoglobin is 6.9. Let's start with that first one and see where we are and see how your patient feels." And they'll say, "Well, that will take forever. This is going to delay discharge, increase length of stay and all that." When we found out that **we could retest the hemoglobin in between units within about 15 minutes of completing the first blood transfusion**, a lot of the docs were really surprised to learn about that. There's a really elegant article that we can post with the annotated bibliography that we'll have on your website, that they looked at patients who were transfused and then measured their post transfusion hemoglobin at different intervals, their post transfusion CBC at different intervals, and see what happened to those values. And really at 15 minutes, folks have a pretty reliable value, assuming they are not actively bleeding or consuming product internally. And so, for the stable anemia patient or the stable thrombocytopenic patient, you could check that blood, check that CBC pretty quickly in between units such that it didn't really slow down the transfusion process which was

mostly folks' concern. It was a through-put concern. So when we got that across, that helped a lot. What we did was we created a second order set for patients that who were hemodynamically stable, that actually, I don't want to say forced, but encouraged folks, when they ordered more than one unit, to go ahead and automatically to get that check in between. So the nursing staff was ready to get that sample or the phlebotomists were ready to get that sample, right after that transfusion was completed.

Joe: That "15 minute thing" I agree is something widely, I don't know if its misunderstood, but under appreciated I think, that is a really important point. I know we could go on about this for a while, Emily, but we better move on to the others. I think clearly, the appropriate transfusion practice is where the laboratory is involved most in patient blood management programs. But I do want to discuss at least briefly, the other two aspects. First, let's do anemia and hemostasis management. What are we talking about there with anemia and hemostasis management?

Emily: Well, for me that really means, and for us it really meant making sure that we had pre-admission testing protocols in place for patients we knew were coming to surgery. It's just crazy, you know, we send patients to "joint clubs" who are having hip replacements or knee replacements, and we go through all kinds of machinations to make sure that they have pain control expectations and that they are set up with physical therapy, and home health and durable medical equipment, and all that good stuff. We forget to take into account the identification of preoperative, pre-elective surgery anemia in a population, an older population that is probably prone to iron deficiency anemia or anemia of chronic disease.

So it really offers us an opportunity, as they're going through their pre-admission process to identify patients who are anemic for whatever reason, and then getting them into an internist to get that taken care of. You know, and treat the anemia at its root, some patients if they show up for elective hip replacement, for instance, and we've identified that they have iron deficiency anemia, and further work-up reveals that they have metastatic colon cancer, they may not want to go through with that elective joint replacement. They may want to make different decisions. Frankly, I just think that's just good patient care. So, to me and again, in having the lab plugged into that pre-admission testing process is helpful.

That also helps with through-put on the day of surgery. We know that a certain small percentage of patients are going to have positive antibody screens. It's crazy that folks will show up on the day of surgery again, a surgery that they planned for weeks, and suddenly we have a biological emergency that was really just a result of bad planning, and we don't have cross-matched products available with taken into account, an "unexpected" and I put that in quotations, antibody. We've gotten a lot of "buy-in" on that, and we've done some work with the scripting with our PAT nurses, our pre-admission testing nurses such that they can explain to the patient why it's a benefit to get their blood drawn before surgery and come in a day before surgery if they have a positive antibody screen and make sure we have blood available to them. Anyway, that's a little off topic with anemia management. It's all frankly linked to coordinative care.

Joe: I think you make such an important point. The earlier the better in terms of managing pre-operative patients' anemia. As a blood donor center doc, nowadays, I used to see this when I was in hospitals, too, but as a blood donor center doc, when I see someone coming in (I mean it doesn't happen very often anymore because autologous donation doesn't happen nearly as much as it used to), but I see someone coming in to donate blood prior to a hip/knee surgery, or whatever, and they've got hematocrits of 34-35%, I'm going, "Man! First, the last thing you should be doing is donating your own blood right now! But second, my goodness, why isn't someone taking care of this?" It just seems, well again, back to the "low-hanging fruit," it really seems obvious and it gets missed way too much.

Emily: Right, right. And I think that largely is a great example of what the government is trying to drive with value-based care and coordinated care. The **other part of the big three elements of blood management, is blood conservation**. We've learned a lot from our Jehovah's Witness patients. For a long time, I always got a kick out of it, as the blood bank medical director, whenever there was a Jehovah Witness patient who would come through, they would call me and want to have a big discussion about what were we going to do for them. I always kind of laughed and said, "We are the last thing that they want." So, I'm not sure why we are having this conversation. But I digress.

We have learned a lot from the Jehovah Witnesses about how conservative you *can* be, up to avoid transfusion. Some of the techniques that have been developed surgically for Jehovah's Witness patients, certainly have been helpful, such as **normovolemic hemodilution** techniques in cardio-pulmonary bypass. Obviously, that takes a partnership, that's primarily driven by anesthesia. The perfusionist, but again, the pathologist can be the one who encourages the department of anesthesia to explore that. That was the case at Baptist. They were happy to explore it, for not only our Jehovah's Witness patients, but for all of our patients who were at risk for blood loss during a bypass surgery.

The other big thing from a laboratory perspective, is the *iatrogenic blood loss*. They say that over the course of a week in the ICU in the United States, you'll donate, if you will, a whole a unit of blood to the laboratory in the form of CBCs and comprehensive metabolic panels, just through the blood draws. So, we have a tendency to bleed down patients, and waste blood when we draw out of lines and so forth, unnecessarily. I think that can be a real opportunity to potentially minimize iatrogenic blood loss and really look at the nursing techniques are and what the lab testing techniques are. That being said, I do realize laboratorians are somewhat hindered by the number of pediatric tubes they can use and how that may not be always practical.

Joe: Right. That's deeper and longer discussion, probably, but I think that's about all the time we have today to do that, Emily. I think that this has been great! We're pretty much out of time, but I just want to summarize what we've talked about and you correct me if I go astray anywhere. We've talked about the general overriding philosophy of patient blood management and it's really important for everyone to remember that this really is about patient safety. That's the whole goal; to get better outcomes for our patients. Yes,

there are some other benefits as well, there's some potential financial benefits, that's awesome, wonderful and great, but we're doing this to keep people safe and that's why it should be done. There are many different aspects and things to think about, in terms of a patient blood management program. Generally, the three main areas are:

1) Appropriate transfusion practices
2) Anemia and hemostasis management
3) Blood conservation

But it's really important to understand that this is a multi-disciplinary process and it is NOT just the pathologist standing at the door of the blood bank with a flaming sword in hand saying, "By God, you cannot have this blood!" Though that would be fun, wouldn't it be, Emily? For a little bit?

Emily: Maybe for a day.

Joe: Maybe for a day! (laughs) That's about right! Alright, Emily. Like I said, this has been just a fantastic look at this and I think that we're going to help a lot of people with this discussion. So, is there anything else you'd like to say before we close?

Emily: I would just say that I would be happy to help anybody who wants to discuss this further. I'd be happy to offer my contact information on the website, Joe, for email, questions, and so forth. I really appreciate the opportunity to be here today. Thank you!

Joe: It is my pleasure! Thank you so very much, Emily.

Emily: Alright. Take care.