

#397: Insulin, Type 2 Diabetes, Fanny Packs, and Hypoglycemia with Dr. Jeff Colburn

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Matt: Hey, Paul.

Paul: [laughs] Yeah, Matt.

Matt: My son's insulin delivery kit just came in the mail.

Paul: Great.

Matt: He's pumped.

Paul: [laughs] Hey, Matt, I could use either hand to put sugar in my tea. I'm ambidextrous.

Matt: [laughs] That's right, audience. Paul's saying puns now.

[Disclaimer]

[The Curbsiders theme]

Matt: Welcome back to The Curbsiders. I'm Dr. Matthew Frank Watto, here with my great friend, Dr. Paul Nelson Williams. Paul, how are you doing?

Paul: I'm good, Matt. We just got back from a conference where we spent a whole lot of time together. So, it's great to spend just a little bit longer with you. Sometimes, I just can't get enough, and this is one of those times.

Matt: Get used to it, Paul, [Paul laughs] because we're traveling again two weeks in a row, two more weeks. Yet on today's episode, we're talking about insulin in type 2 diabetes with everyone's favorite returning guests, one of our favorites, not Paul's, because he's Paul's fake arch nemesis, but Dr. Jeff Colburn. He's a fantastic medical educator and a chronologist who talked to us all about how to use insulin, how to start insulin in type 2 diabetes. Tried to get all our most common questions about this out there. And Paul, before I tell them a little bit more about Dr. Colburn, can you tell me what is it that we do on The Curbsiders.

Paul: Sure. As a reminder to our audience, we are *the* Internal Medicine Podcast. We use expert interviews to bring you clinical pearls and practice changing knowledge. And as you mentioned, we are joined by the fantastic, Jeff Colburn, The Curbsiders' favorite other than me, who taught us a lot, but I'll let you tell our listeners about who he is just in case they've forgotten.

Matt: Our guest on the show today is Dr. Jeff Colburn, MD, FACP, FACE. He's a board-certified endocrinologist and clinician educator. He works at an academic medical center. Actually, as we were talking to him tonight, Paul, he is like you. He's moving from one job to another job. So, very congratulations to the place where he's moving, because he is fantastic. He's been on the show many times. We've talked about like DKA type 1 versus type 2. We've done some updates on diabetes with him. Paul, he's one of our go-to educators, certainly for anything endocrinology. He's been a key faculty member at The Internal Medicine programs where he's worked. He's been an Internal Medicine Clerkship Director. He says he enjoys listening to the show, Paul. I don't know if that's true or not,-

Paul: I don't believe that.

Matt: -but without further ado, let's get to our friend and Paul's nemesis, Dr. Jeff Colburn. And one last reminder that this and most episodes are available for CME Credit through VCU Health at curbsiders.vcuhealth.org.

Jeff, my great friend, Paul's nemesis, welcome back to the show.

Paul: [laughs]

Jeff: Thank you so much.

Matt: Paul, if you want to keep up this charade, you should just embrace Jeff as for the wonderful guy and educator he is, and maybe one day, he'll take your job. What's the big deal?

Paul: Off air, I've been begging him to replace me, like, "Please [Matt laughs] just unshackle me from this burden, from this rock that I dragged behind me. I beg of you."

Jeff: Well, I heard that you're moving your job and I'm moving my job. So, I'm inching closer to physical location, and you're maybe inching a little further away. So, we are making the move. I am moving in on your territory, man.

Paul: As long as I can pick up just some of your expertise, I will consider it an even trade.

Jeff: I'll try.

Matt: So, Jeff, to prompt you for like a hobby or interest, you were just telling me that you're playing some sports. Tell us about your athletic activities that you're doing with your family, because it sounded like a good thing to recommend to the audience, do some sports with your family.

Jeff: Yeah. So, we definitely have a gym that we go to, which is great, because a lot of gyms have a way that they'll take care of your kids while you work out. So, I definitely take advantage of that. The kids love it because they're socializing with other kids and being active. We do pickleball here, we do some rock climbing here, and then we also swim quite a bit. So, it's been a lot of fun, the gym that we go to, and yeah, it's great to be active and spend our free time together doing it.

Matt: The rock-climbing thing, you know, I'm afraid of heights or at least I used to be. I try to avoid them. So, I don't know how afraid of heights I am anymore. But how's the rock climbing with that?

Jeff: Probably a negating factor for getting--

Matt: [laughs]

Jeff: But my wife and I met in medical school through doing lots of rock climbing, basically on the weekends. I'd like to say, we studied at every minute of the day, but no, we did a lot of rock climbing up in the Shawangunk Mountains in New York, and that's actually how we really met and bonded. We still rock climb today, not as adventurous as we used to out of self-preservation and having kids, but it's a safe sport. But you do have to know what you're doing. So, yeah.

Matt: Yeah. Paul, will you be [crosstalk]

Paul: You could find like a short wall where you can do a lot of lateral work that might be good for you, Matt?

Matt: [laughs] Yeah, they you go.

Jeff: They call that bouldering. [crosstalk] Yeah, so there is that too. But yeah, they have the short bouldering walls that you can do.

Matt: All right. Well, we have a big script and it took us a little while to get started tonight. So, we should probably go to a case from Kashlak. Obviously, I'm going to ask the great, Dr. Paul Nelson Williams to start us off with a case and ask the first question here.

Paul: Chuck is a 42-year-old gentleman who's living with type 2 diabetes, high blood pressure, hyperlipidemia with hypertriglyceridemia, obesity with a BMI of about 46, and obstructive sleep apnea. He's been lost to follow up for about a year when he lost his job in insurance. He returns today, he wants the full checkup. Since his gap in care, he has continued to take his metformin ER 500 mg two tabs twice daily, he takes glimepiride 4 mg daily, olmesartan 40 mg, but he has also run out of his amlodipine 10 mg. On examination, his vitals are 135/92. His weight is 270 pounds, BMI remains 46. Oh, we have access to a point-of-care hemoglobin A1c at Kashlak primarily administration blinks and then we got pansy pants machine.

Matt: [laughs]

Paul: But anyways, his point-of-care A1c is 13.5%. So, we start to sweat a little bit. We have this young patient with uncontrolled diabetes with severe hyperglycemia. We talked in a previous episode, really, there's no wrong time for patients like this to start a GLP-1, but unfortunately, this medication is probably too costly for Chuck. We go look through his plan. It doesn't seem to get a lot of good options initially, so we decide after shared decision making to try insulin therapy for this patient, just given how high his A1c is. I think before we get there, I would just love to hear your general thoughts about how we should think about this case and how you might start thinking about initiating insulin in a patient like this.

Jeff: Yeah. So, the first question that you really think of when you're addressing any patient with diabetes is, what type do you think they have. There are clues. So, the age of the patient is a clue. Type 1 diabetes, beta cell failure, we used to call juvenile diabetes because it does tend to happen more in young people, although can happen at any age. You can have autoimmune destruction of the beta cells at any time. And then type 2 diabetes, which is more so, the insulin resistance. However, type 2 diabetes, when diagnosed, about half of the beta cells have lost their function. And so, usually with type 2, you can treat with other medication options before you have to replace insulin. So, you have that opportunity. But the successive loss of beta cells eventually with type 2 diabetes typically leads to the requirement to use insulin therapy.

This patient who is 42, so average age of type 2 diabetes is about 50. So, he's a little bit young, however, has obesity, has hypertriglyceridemia, has hypertension. So, I'm thinking type 2 diabetes. The A1c target for this patient, you would probably try to get less than 1, if you can, but 7 to 8 would be a nationally recognized reasonable target to prevent microvascular disease. He's pretty far from that at 13.5. So, like you mentioned, some of the strong options that we have available, like, a GLP-1 or an SGLT2 inhibitor might be a bit expensive. Insulin can be too. However, most guidelines would suggest he starts insulin because of how high that A1c is. Usually when it's above 10, you want to start thinking about insulin as a powerful agent to start treating this process. So, that's where I would begin.

Matt: I know we've talked with you about this on other shows that if this guy wasn't on anything and his A1c is 13, and he has lots of room in lifestyle and he's not on any orals yet, we might be able to get him down with very temporary insulin or without any insulin at all. In this case, we're giving you that he's been faithfully taking metformin and glimepiride and despite that, this A1c is double digit. So, that's a big issue.

Jeff: Yeah, agreed. Definitely.

Matt: So, I thought this was interesting in some of the guidelines, and I think this was the ADA Standards of Care. They mentioned that, you shouldn't use insulin as like a threat to a patient like, "If you don't do this, we're going to need to start insulin." Can you talk a little bit

about that aspect of things, like, how you talk to patients about insulin? Because I feel like there's certain stigma attached to it or certain beliefs around it that make it hard to initiate.

Jeff: Yeah. So, a lot of people have a family member that they can remember or tell you a story about that they recall having started insulin. And then shortly after they start insulin, they have a complication of diabetes, like, an amputation or dialysis or something really scary. The relationship between the timing of the insulin and those bad events is probably because the person's diabetes had progressed to the point that they need insulin therapy and then also progressed to the point that the damages to their blood vessels and organs had accrued enough to cause a big event. However, in the mind of the patient, they see the insulin as the thing that got started and then bad things came about. So, that's a bit of the tangle that I've frequently seen in the story of people. You have to try to tease that out sometimes by asking about family members and experience with insulin and hypoglycemia, which we can talk about more.

The second thing I'd like to say in that realm is that I had a great mentor who told me that starting insulin is not because the patient failed to do what they're supposed to, it's because their beta cells are failing to do what they're supposed to. As type 2 diabetes progresses, those beta cells which are being attacked by fat that's invested in the pancreas are losing function. As they lose function, you can't support them with all the other noninsulin medicines. And at some point, you'll reach a threshold where insulin will be the only thing that you can use to help that patient. I feel like that can help a person realize that their beta cell function or pancreas has failed them and that this is a needed therapy. And sometimes that you can work into your conversation. It's not a failure of the person.

Matt: Paul, I don't know about you, but for me, it's not always obvious when the person reaches that point with type 2 diabetes that we need that insulin is the main option. I'm not sure if you have a better way of teasing that out.

Paul: If I do? No. [laughs]

Matt: Obviously, we're going to ask Jeff, but I'm just wondering if you also find this difficult to the point where I'm like, "Have I tried everything or are we really at that point now where I have to start this person on insulin?"

Paul: I think you have to at least assess it here. And so, you do hit that sort of wall where you're like, "Okay, I've done all I know how to do pre-insulin and we still have not moved the needle at all," so to speak. But is it worth readdressing insulin, readdressing diet adherence? I think my threshold is the point where I've tried the other things and just haven't really got more. Or, if they're clearly catabolic or the numbers sky high, then sure, but otherwise, once I've used all the mortality affecting medications that I know how to use, then I start having the conversation. Jeff, I don't know if you have a different approach or not.

Jeff: No, Paul, you're exactly right. You mentioned catabolism. So, if the patient is unable to access their sugar supply as a fuel source, they will have glycosuria. So, urine, glucose, that's super high. They can develop ketosis, so type 1 can develop DKA. So, type 2s can move along that spectrum as well. So, if you're seeing evidence of that you'd mentioned catabolism. Insulin is the only thing that will bring that back to restore the patient and to fix the sugar.

I agree with you. Also, you both had mentioned that you've tried everything else. And so, usually the everything else in the guidelines right now is supporting using metformin as a first line for type 2 diabetes still in the guidelines. And then your next medications, as long as you have insurance coverage, it would be a GLP-1 agonist and/or an SGLT2 inhibitor. Those are

in the guidelines because of the mortality benefit, organ benefit, and weight loss potential. So, you're trying to seek those. They help the patient more than the sugar improvements. They do other things metabolically to help the patient.

So, if you're doing all of that, yeah, then insulin becomes the next treatment. Or, if you can't afford one of those agents, then insulin can be more affordable for patients. And so, those are the signs. Usually, also, I'd already mentioned that the A1c above 10 is often an indicator that you might need insulin. Again, you all mentioned, if you don't have any treatments on and A1c is above 10, you might get that to a better level with just starting the metformin GLP-1 agonist or an SGLT2 inhibitor.

Matt: So, with our guy here, we're pretty sure he's been adherent. He's been doing his best with what he's eating, but still A1c's above 13.5% we gave you. So, talk to us a little bit about which insulin you might go to as a first line? because I know it's confusing now. There's intermediate insulin, there's basal insulin, there're multiple types of basal insulin. And I think hopefully, people aren't still doing this with type 2, but some people think everyone needs basal bolus insulin. How do you approach this?

Jeff: Yeah. So, for type 2 diabetes, you want to start basal insulin first. Our body produces insulin really in a basal fashion during our fasting period overnight to match the liver's sugar output. We also, during the day, make a basal rate. Our body makes about, for people that are not insulin resistant, approximately a unit per hour. And then when we eat, of course, we make more insulin to cover food intakes. So, for individuals, when we're going to start them on basal insulin, if you look at the American Diabetes Association guidelines, they'll usually start a basal insulin at 0.1 or 0.2 units per kilogram per day. Or, they also mentioned you could just start 10 units a day. And then you need to titrate the insulin. So, you need to go up.

Usually, every two to three days, we're checking the fasting sugar, which is your first of the morning. I just woke up, check that sugar. That's the number that we're looking for treating. The target for most people, like this patient would be 90-130 mg/dL. And so, you'll start that initial dose, and then you'll, every two to three days, increase the dose by about two units until you seek the fasting target. And so, yeah, basal insulin to start, seek the fasting sugar treated, and it will help with the other sugars through the day. It's like a suppressive effect throughout the day as well.

Matt: Yeah, the basal insulin, I like this formula, 0.1 to 0.2 units per kilogram per day. So, Paul, for our standard 100-kg person, which I feel like when we were in med school, it was a 75-kg person. [Paul laughs] Now, it's a standard 100 kilogram. The math is easier, Paul. That's what I'm happy about. So, it's 10 to 20 units or just 10 units for most people should be okay.

Jeff: I should specify, so that's using a once-a-day insulin. A common one people use is glargine, which there are some biosimilars of, which might be cheaper on the formulary. But that's a common insulin that's used, which is a once a day. There is another basal that's a twice a day. It's a 12-hour. And so, I'm alluding to the duration of action for insulin, which is important to know about each insulin, like, what the onset is and what their duration of action is. And so, I would say most in the audience should google or look up a graphic of the pharmacokinetic profile for insulins and just be familiar with what that looks like. And so, for glargine, the onset is about 2 hours, and then the duration of action is 24 hours, which is why it's once a day. There are basal insulins which are twice a day. The common one there is Levemir or detemir, which a lot have on formulary, and that one is dosed twice a day just based on the fact that it works for 12 hours. And so, those are common ones people use.

Another basal which is less commonly used, because it's a bit older and it has a bit of a peak to it. It's not a flat action is NPH insulin. NPH has a peak effect at about 6 hours and it lasts for 12 hours. Because it has a peak effect, it can cause some hypoglycemia more than other basal insulin products.

Matt: Yeah, and that one's probably the one that sometimes, you're forced to use it depending on where you're practicing. Sometimes that will be cheaper or sometimes the 70-30 insulin, which may be a mix of NPH and regular insulin is the choice you have. So, how do you dose that when you're timing it or how do you time those twice-a-day injections of NPH whether it's in the mix or just given by itself?

Jeff: Yeah. NPH is a bit of a hidden tool because most people are a little bit unfamiliar with it. It's not as commonly used. However, it is much more inexpensive than other basal insulins. And so, it is something I think people should know about. Because of its peak effect, more of the basal insulin dose should be delivered in the morning time, because as it peaks, the person can ingest food, and have some of the insulin, and carb being matched from that during the daytime. And so, usually, two-thirds of the basal dose for NPH is given in the morning and one-third of the basal dose is given before a dinner meal. And so, it's a twice-a-day delivery with, again, two-thirds of the dose in the morning and a third in the evening. So, for example, if we're doing 0.2 units/kg, that would be something like 15 units in the morning and 5 units in the evening and that would cover us pretty decently.

I think the other thing to know with like you'd mentioned a premixed insulin. There are insulins that are like you'd mentioned a 70-30 mix. So, the 70 in that is NPH. 70% of that premixed insulin is a basal and 30% is regular insulin, so fast acting to cover a meal. It is an option you can use for people that need mealtime insulin, but are not good at checking sugar often or giving frequent injections. Again, it's delivered twice a day. So, the 70-30 insulin is given in the morning, two-thirds of the dose is delivered there, and then an evening dose, one-third of the dose is delivered there.

A key with this therapy is that even though it's a twice-a-day insulin therapy, the patient has to eat lunch, they must, because the peak effect of the NPH is at six hours. So, if you do it in the morning, you're going to have a peak at lunchtime. And if they're not eating, they are going to get low.

Matt: Yeah, and it seems like the nocturnal would be an issue too. I know they're getting a third of the dose at dinnertime, but if they eat dinner at 6 o'clock is peaking around 12:00, do you tell them to eat some sort of like evening snack too?

Jeff: We don't because the dinner oftentimes being a bigger meal of the day and including things more like fats and things that are slower to digest and absorb, often that is fine. You're going to absorb and digest those foods and it matches okay. So, usually, I don't have to require them to eat a later snack. I agree, it is a more risk to have some lows overnight and so you want to be wary of that, and maybe have the patient testing kind of randomly on some nights to see how they're doing.

Paul: Jeff, I want to ask about the Levemir, which I feel like I see all the time dosed once daily or at least that's how patients are being told to dose.

Matt: Same.

Paul: I think a lot of times that happens where pharmacy changes that kind of thing. So, someone's on glargine, you get the call like, "Oh, they can't take glargine anymore, but they

can take Levemir." So, you just make a one-to-one conversion. So, I'm hearing that is wrong. So, would you just split that dose into twice daily instead?

Jeff: That is a twice-a-day insulin. If you do it once a day, they're definitely going to run out of insulin effect at the tail of that. It's only a 12-hour insulin. I guess, the idea that someone's trying to use is that most of the difficult sugars are when they're eating food during the day and maybe that's how they're dosing it. But it's meant to be twice a day and the same dose for both of those administrations to cover the basal effect that you want with that insulin. But no, that's a twice a day insulin.

Paul: So, if someone was on glargine 10 mg, the conversion be 5 mg of Levemir twice daily. Is that the correct way to do that then?

Jeff: You are correct. Yeah, that's right.

Matt: Yeah. And then Jeff, just to back to the NPH, because I'll say, I've definitely been guilty of this and this is what I commonly see. I haven't seen it used by itself really. So, it seems like, if our first move for a guy like Chuck is to go to a basal insulin, if he couldn't get glargine or detemir, Levemir, or whatever, then maybe we're going to put him an NPH two-thirds at breakfast, one-third at dinner. He doesn't necessarily need to be on a 70-30 premix. He doesn't need the mealtime part of the premix. So, he could just be on plain NPH, which I commonly see people either they're on glargine or they just get put on 70-30 and maybe that's just a lack of teaching. Paul, I think that goes back to our training, like, this is multiple places. It's not just like one person I've seen do that.

Paul: [laughs] It's us. We're perpetuating that information.

Matt: [laughs]

Jeff: Yeah. I would start with basal because mealtime insulin comes with a little bit more risk for lows. You have to have that paired a little bit with the food. You don't necessarily have to do carb counting for type 2s, although advanced type 2s, people that really lost their beta cell function or type 1s do need to match their mealtime insulin with the carbs they eat to have a closer pairing of that. That's complicated to do, a bit to walk through for most people and needs diabetes education, and support and training to do right. Basal to start for most patients, it's the way to begin for type 2.

Matt: This is great. I've already learned something that's going to be definitely practice changing. We talked a little bit about this. I think this would be a good time to just put in that the NPH insulin or if someone needed Regular insulin, you said is available. There's a \$25. One of the big box retailers has it. People can google search \$25 insulin, and that's something they could potentially get there for whatever reason they couldn't get NPH with an insurance.

Jeff: You're definitely right. We've heard Congress is trying to work with pharmacy industry to make insulin more affordable for people in the United States. You're right. As of current, if you google search, there is a big box retailer with a \$25 Regular and \$25 NPH available.

Matt: Yeah.

Paul: The other fancy insulin hasn't made it there yet. That's why I say, it's important, I think, to know those insulins for people that don't have insurance.

Matt: Yeah. I think Medicare, it's not all types of insulin, but some insulin is capped at \$35 now. That was a new thing. I think it's not all types, not all the fancy new insulins, but some

of them are. So, I think we're getting there a little bit, but it's been very expensive for a lot of patients to get insulin.

Jeff: I agree. Yeah.

Matt: The insulin degludec, I don't think that's a brand name. I think that's the generic.. Degludec is that which I believe comes in a couple of different concentrations? But I think that is a little bit longer acting than the glargine or the detemir. Can you speak to that a little bit?

Jeff: It is. So, all insulin has to fit in the insulin receptor. And so, the duration of action of insulins is either due to additives or changes to the insulin molecule. In degludec's instance, they've PEGylated it. So, it floats around a lot longer. It has a 72-hour duration of function. And so, you still have to administrate it daily, it's still injected daily, but it has a very protracted duration of function. So, it allows you to inject, instead of right on the button, exactly the same time every day. If you miss that window by a little bit, it's a little more forgiving. Also, because it has such a long duration of action, it is a very, very flat profile insulin. So, there's no peaking at all.

How much does that clinically translate to improvements for the patient on the ground? I will say that the on the ground evidence is not as exciting. I think it's an interesting product. People that very, very sensitive patients, like, a type 1 who's very sensitive to any peaking of insulin potentially benefits from this if that's being demonstrated, like, if they're on glargine and having some lows from that, the degludec might come in. But otherwise, there's not a strong case in type 2 diabetes other than those nuances I mentioned which are selling points. I don't know that's an overriding factor to say. You have to select that. It's an option that's available, maybe more for type 1s, better for type 1s.

Matt: All right. So, we've talked about a couple of different types of the basal insulin now. I want to get back to our case. We're going to come back to insulin again, of course, but let's say that we're going to be starting him on glargine once a day. What would you tell him about the metformin and the glimepiride that he was already taking?

Jeff: Yeah, metformin should definitely be continued. That's a standard guideline-based therapy. The sulfonylurea, the glimepiride, it should be used at mealtimes. Sulfonylurea cause an instant release of insulin from the beta cells. And so, you'll get a surge of insulin that peaks from the patient's own biology. If the person is progressing in failure of the beta cells, that medicine might not work very well, and it can actually cause some lows. He may have to reduce the dose of that. So, you might cut that in half. When you begin the basal, start the basal insulin, see how his sugars respond, and see if you might need to actually go back up on. If the mealtime sugars are remaining high, you might need to go back up on the sulfonylurea or replace it with mealtime insulin.

Sulfonylureas are less exciting in the current age of diabetes care, because they don't have other than sugar improvement benefit for patients. So, for example, SGLT2 inhibitors and GLP-1 agonists fix mealtime sugars, but also have organ benefit. Sulfonylureas don't. They just fix sugars. There's a higher risk of hypoglycemia from them. I'm not excited about them. They are cheaper. They do work at mealtimes. I might half the dose as I begin the basal for him and then see if he needs it at the mealtimes further or replace it with mealtime insulin.

Matt: Yeah.

Paul: This, Jeff, kind of begs a question, because we have a patient who ostensibly may not have even been checking his blood sugars at home. He was on two oral agents and sure

one has a potential for hypoglycemia, but may not have even had a glucometer say. So, I would wonder if you wouldn't mind just at least talking briefly. I feel like oftentimes, the discussion about initiating insulin is coming by the discussion of insulating checking blood sugars at home. So, how do you recommend someone who's just insulin naive to start checking how often, that kind of thing?

Jeff: Yeah, truly, if you're on metformin, SGLT2 inhibitor or GLP-1 agonist, you don't need to be doing any daily sugar checking. Often, we have people checking just to see what the effect of different foods has on their sugars. So, they can do, what we call, just observational sugar checking any time they're feeling low. Once you start talking about insulin or sulfonylureas, then we need to start really checking our blood sugar because we're using that number to now do treatment response. So, that's where it really becomes important. The most important sugar of the day to check is that, first, when I wake up that fasting sugar before I've had any breakfast or anything, what is my blood sugar? That's the number that we're titrating or changing the basal insulin against. We're trying to seek 80 to 130 for most patients and that's that number that's most important.

If the person is on the sulfonylurea, the glimepiride, you are going to need to have them checking before and after meal sugars. I think this person was on it twice a day, if that's correct, you're going to need to be doing before and after the meal, and before and after the meal when they're taking that. If they are stable with that medication, not having lows, and it seems to have a reliable effect, you might be able to tell the person, "Okay. You don't need to do before and after." Every time with the glimepiride, it seems to be affecting it reliably consistently the same. But if we go to mealtime insulin, usually, we're going to have to be doing at least a before mealtime sugar check. If I'm coming into that meal with a blood sugar of 70, I'm going to need to bring down that mealtime insulin dose, so we don't get too aggressive and have a low occur or to the contrary, if we're coming into that meal very high, we might need to add correctional insulin.

So, really, we talk about insulin being in three flavors. We talk about basal, which we've been talking about most right now, which is that long throughout the day insulin that the person will begin with, there's the mealtime or I should say pre-meal insulin, and then this third one, which I'm now talking about, which is correctional insulin, which is, if the person checks the sugar and sees a high number, we can give them a correction scale to be adding more units of insulin to their pre-meal insulin.

Matt: So, what do you usually tell people, if they happen to be checking--? Usually, when I'm starting someone on therapy for diabetes and they're uncontrolled and we're trying to figure out where their highs are, because sometimes they'll be like, "Oh yeah, my mornings are fine. They're 130 or less," but their A1c is 10%. So, you know there's some high sugars in there. What do you tell them the numbers should be before and then like an hour or two after their meal?

Jeff: Yeah. So, before the meal, ideally, we should be seeking the less than 150 range and after the meal it should be less than 200. And so, those are the general ranges that we're going to be seeking for the patient. If you think of an A1c target of seven to eight which for most people with type 2 is reasonable, that's going to be an average sugar of 150 to 180. That's a seven to eight. Less than seven would be a blood sugar generally less than 150. So, you can think about that. When you think about your fasting sugar, again, we'd already mentioned 90 to 130, your pre-meal less than 150 and your post-meal less than 200, generally. Those are your targets. I think most people would try to say maybe less than 180 post meal. But again, there's a little bit of wiggle room there, because the insulin and the meal need to match, but that's usually where I'm targeting.

Matt: So, what we've talked about so far, we started our guy on basal insulin. He's 122 kgs, let's just say we started him on somewhere between 0.1 and 0.2 units/kg/ day. So, we start him on 15 units. How would you tell him to titrate that up now that he's on it? He's continuing his metformin, he's continuing the glimepiride, but we're really going to keep a close eye on his pre-meal and post-meal, make sure that we're not causing any lows, and does he need that, do we need to decrease it or increase it?

Jeff: Yeah. So, for my patients on basal insulin, they should be checking their fasting sugar in the morning every single day. That is an ongoing thing they should do. I usually tell them for the two to three days before they come to my visit, I want them to be checking, of course, the fasting sugar every day should be continued. But a before and after a breakfast on one day, maybe a Monday, on a Tuesday before and after lunch, on a Wednesday, before and after dinner, and then maybe a bedtime. So, they don't need to do it every day. But I just want to get a sense of how those numbers are doing in general in relation to their lifestyle. And so, again, we're really focused on that morning sugar to begin with. Again, 80 to 130 is the target.

If the person is above that target for two to three days, they should go up by 2 units. You can write that out to self-direct the patient. Every three days, if that morning number is above your target of 130, you're going to go up by 2 units. Again, after three days, if you're still above 130, you're going to go up by 2 units and keep going up. The ceiling at which they need to stop is going to be once they get to 0.5 units/kg-- I try to simplify that for patients and for my learners. I just say once they get to 50 units per day of a basal, then we need to regroup and start talking about, do we need mealtime insulin? So, I just try to make it easy there. But that's how you would proceed with that treatment.

Matt: This term overbasalization has appeared in the ADA Standards of Care this year. It's a term that I believe you've taught me in the past and Tom [unintelligible [00:35:49]] way back in the day teaching me about insulin. But can you talk a little bit about overbasalization and how we might recognize that? I was surprised to see it in the guidelines. I didn't know how important it was, but it seems like it's getting a lot more press now.

Jeff: Yeah. So, when you look at blood sugars, you're actually doing something that we call pattern management. So, you're trying to look at the sugars. I often use a highlighter or if their computer can do it for you. A lot of people's programs do this automatically. They highlight the lows in a certain color and the highs in a certain color. And then the good numbers, generally 90 up to 180 are reasonable range numbers and will be black. So, above 180 maybe red and below 90 could be blue saying like, "Hey, that's low." It helps your eyes see what's going on.

The first thing that you want to look at is lows. That's the first thing in pattern management you need to look for is lows. If the person is having lows overnight or you see lows occurring frequently during the day or at any time, we need to address that first because let's say, for example, they're having lows every night at 01:00 AM and they're eating a bunch of carbs to fix it, and then their fasting number at 08:00 AM is always high, you're like, "Oh, we got to go up on their basal insulin. Wait a second. Were they eating a whole bunch of carb to fix a bad low that was occurring earlier in the evening?" So, lows are always fixed first before we start piling on any kind of therapy. Once you address the why of the lows and what happened, maybe they forgot to eat a meal, they skipped a meal, or they were moving boxes for hours, doing a house move or something.

You want to investigate the why as much as they can remember and try to address what happened. If you really don't know, the right answer is to try to start reducing insulin,

because lows are harmful. I think we talk about highs being bad and hurting the body. Lows are very harmful to patients as well. That's number one in the pattern management. Number two is hyperglycemia. You want to see where those highs are. If the fasting sugar is high in the morning, you can go up on the basal. If the fasting sugar in the morning is looking great, 80 to 130, but those numbers during the day, before and after those meals are starting to be high, then you need to start doing mealtime insulin. Or if you have the insurance or money, adding an SGLT2 inhibitor, a GLP-1 agonist to cover the daytime mealtime, so just to go back and bring that back, those can be added to basal insulin. They work well together.

Matt: So, with the overbasalization, you said, one way to recognize that is if they're on more than 0.5 unit/kg/day, which to simplify say 50 units or more, because as we talked about, everyone's 100 kg nowadays, so 50 units or more or if they're having frequent lows, that would be another way to recognize it and thinking about, "Do I need to back off on the basal and do I need to add a mealtime?" Okay.

Jeff: You said it right. Yep.

Matt: All right. So, I think we're in a good spot to give you the next part of this case here. Let's just say that with Chuck, we gave him the option. He could either go down on the glimepiride or try to stop it. He wants to try to get off any medicine he can, especially if he's starting insulin. So, he just decided to just stop it. We're going to closely follow what's happening before and after meals. So, he's on 20 of glargine. He goes up by 2 units every couple of days like we told him to, every three days and he's working with a fantastic clinical pharmacist in our clinic, and he gets all the way up to glargine 50 units nightly over the next three months. So, we would say at this point, he's adequately basal by guess.

His morning glucose is 130 give or take, pre-meal glucose 150 to 160 or so. He hasn't been checking any postprandial glucose, and his next A1c is 8.2%. He still has some dietary changes to make, hasn't really increased his physical activity yet. Anything else you would do at this point, Jeff? He's pretty close to that, like, acceptable range, but not ideal. What might you do with a patient like this as a next step?

Jeff: Yeah, like you mentioned, he's getting pretty close. There's definitely a lot of variety. People feel like there's one right answer with diabetes care, and it depends a lot on patient preference, and what they're able to do, and want to do, and just mixtures of meds and your formulary. So, there're a lot of right answers here. I think you could give him some trial of working on his lifestyle. If he has an ability to change some dietary habits, that 8.2 could get brought down into goal without adding more insulin, because there is going to be a burden of adding mealtime insulin with complexity, and potential for lows, and things that might bother the patient. If you can do again GLP-1 agonist, SGLT2 inhibitor, there's always a fair game to add.

If the person worsens, if these sugars become a little bit more difficult for them and the numbers drift up, I probably would start some mealtime insulin. Generally, when you do that, you don't start three times a day. You look for what the biggest meal of the day is for the patient and you just add a couple of units. So, usually about 4 units give or take per the guidelines. And then, you actually are going to need to shave a little off the basal as you add to the mealtime. So, you could add 4 to 6 units to a meal, taking away about 4 units from the basal and monitoring the biggest meal to see if that has an impact. For right now, maybe try and work on some lifestyle.

Paul: So, he gets Cadillac insurance or some sort of change where he can get the GLP-1, because this is a patient whose BMI as a reminder is 46. It sounds like he's relatively close. If you opted to start the GLP-1 agonist, what might that look like for this patient? Would you

back off his insulin a little bit or with his A1c being where it is, would you leave all things right, like, how would you approach that in this particular patient?

Jeff: Yeah, there's one once-a-day GLP-1 agonist, but all the others are a once-a-week injection. They take about four weeks to reach their steady state. So, they actually take a while to get up to speed. And so, you're not going to see strong impact of those injectables until a couple of weeks. But you do need to make a drop of the basal. They will become hypoglycemic if you don't give room. Generally, I will drop the dose by about 20%. So, let's say the patient's on 20 units-- Sorry, we said they were on 50 units and so that would be 10. So, they would go from 50 down to 40 units of their basal, start their GLP-1 agonist. Then I would want to see them back sooner than later. The guidelines recommend three months, but if you can do it sooner than that that would be very good. Or, if you have clinical pharmacists or other helpers that can check in and titrate things, that would be great.

Matt: You mentioned an SGLT2 would be another potential thing you could start. I don't think we pushed you too much one way or another with giving him kidney disease. I know those are less potent. Do you have to make room for them as well or do you drop it as much like 20% or do you just start it in addition to the insulin?

Jeff: The nice thing with those medications is that they do most of their work when the sugar is above 180. So, when you have a significant hyperglycemia, they really are more functional. And then as the sugar is more normal glycemic, they actually have less function. So, they're nice in that way that they're less risky for lows. I would probably still make a little room. Again, this is the art of medicine. I would maybe drop their basal by 10%. Part of what you're trying to do also is that, insulin is great. Insulin has, what I would say is, infinite potential. As long as the person needs more, you can go up on the dose, have more function, and get the sugars improved.

A problem of insulin is that, it doesn't match biology perfectly because it's subcutaneous. You and I make it in our intra-arterial, we turn it on and off instantly. When it's subcutaneous, it lags. The lag of insulin always leads to basically a state of over insulin, a slight physiologic over insulin state, and that state causes a slight gain of weight constantly. And so, patients, although they're appropriately treated, they're not hypoglycemic, they will generally have some weight gain on insulin. It just comes with it.

Our goal with these other medicines is to get weight loss to occur. If you don't start shaving the insulin as you add on these other therapies, you're not going to give the room for hyperglycemia-- for the SGLT2 inhibitor to kick in to then have its effect and also have weight loss. So I hope that makes sense. Of course, we don't want hypoglycemia, but you're trying to let it be at a point where the SGLT2 has a function, and over time remove some of the basal across time allowing the patient to get to lower weight and lower insulin use.

Matt: Oh, that's great. That's a great point.

Jeff: Yeah.

Matt: Maybe this is a good time to mention the fact that some of the-- Paul, I think you gave him a Cadillac insurance in that scenario, because there are two, I believe, premix fixed dose combinations of a basal insulin and a GLP-1 agonist. Can you talk a little bit about those? I guess, at some point, they'll be generic and we might be able to use them.

Jeff: Yeah, there's some good, like you'd mentioned, GLP-1 and glargine products that are available that are mixed in a pen. And basically, there's a chart that the patient follows, and you start them at the starting point of the chart and they dial it up until their fasting sugars

are at goal. It's cookie cutter. They follow the little package insert on the chart. They need very little hands on from the doctor's office. You just allow them to bring it up until their fasting numbers are looking great. It's a great product because you're getting the benefit of both medicines, they're getting good insulin action to fix the sugars right now, and also the GLP-1 to prevent the weight gain of the insulin. I think they're wonderful. Could you do the same by prescribing them separately? I think you can, although you've got the complexity of doing basal insulin, and also GLP-1 injections, and educating on how both of them work, and the timing of both. So, it just depends. If you've got insurance to cover one of the combos, I think they're fantastic, if you don't try to prescribe a GLP-1 and basal insulin if you need them. But yeah, I think they're great products.

One thing I would say is that, I think sometimes we forget that the GLP-1s at higher dosing, you can have the side effect of nausea, and GI upset, and that we forget to counsel for that. We're just so excited that the dose is going up and the sugars are looking great, but forget that the higher GLP-1 dose might cause side effects that limit that therapy from going higher.

Matt: Yeah, I've had a couple of patients now on them for weight loss. Well, probably a combination, weight loss and diabetes, but that have had really bad constipation on those medications to the point where they thought they were going to have to go to the ER. Or, some patients just not eating at all. So, they're very potent as far as what they're doing to the GI tract, I will say, in my experience, even at the lowish doses.

Jeff: Yeah, that can be hard for some patients.

Matt: All right. Well, I think, Chuck, let's say that we actually just kept him on the basal insulin, the metformin. He really changed up his lifestyle and didn't end up needing another agent, at least not just yet. Paul, we fixed our first case, but let's not let Jeff off the hook that easy. Let's give him another case from Kashlak.

Paul: So, we have Mrs. DD. She's a 73-year-old female with insulin-requiring type 2 diabetes. She has high blood pressure, history of CVA, chronic kidney disease stage 4 with her last eGFR at 22. She's presenting to you for follow up after a visit to the ER, where she was actually treated for a second fall that was maybe related to hypoglycemia. Her fasting blood sugar at home was 68 mg/dL when the paramedics arrived. The patient's daughter mentions that because Mrs. DD wakes up late in the morning, she usually eats only once per day and maybe she has a snack before bedtime sometimes.

She has been using 30 units of detemir every night for about a year and then 5 to 10 units of lispro with meals depending on how high her sugars have been before she eats. In the office, her vitals are 142/61, her BMI is 24.6. And again, we have a point-of-care A1c machine. I'm assuming it's a machine. I've never actually seen one in real life. [Matt laughs] That gives us a point-of-care A1c of 6.3%. I guess that was done in the ER. So, a lot going on with Mrs. DD obviously has great glycemic control. So, that's not the concern. But [laughs] how should we back off, how do we back off, what kind of things are you thinking about when you see this patient in follow up?

Jeff: Yeah. So, we always begin with thinking, is a person type 1 or type 2? You'd mentioned she's a type 2. The reality is that, she's pretty progressed, it looks like. So, she's already on a basal insulin plus mealtime insulin with each meal and she has progressed kidney failure. So, it's very likely that her beta cell function is nil. She probably functions like a type 1. You'd mention insulin-dependent diabetes. It's an older term, but it relates the idea that she requires insulin as the therapy. Other therapies are going to be contraindicated by the low GFR or just won't be functional, because she's not making insulin and needs injections of insulin. And so, the case here, Mrs. DD appears to be hypoglycemia, which as patients age,

they eat less often, and so their insulin needs might drop. Oftentimes, they may lose body weight as we get older due to sarcopenia, which is muscle loss or other things, and their insulin dose drops.

Then also, insulin is primarily cleared by the kidneys. And so, as kidney failure progresses, the insulin that is injected lingers. It hangs around longer and so the effective dose is exaggerated, causing a risk of hypoglycemia to be more. And so, all those things might be affecting our patient. You want to try to figure out-- There's a lot. Is she having problems chewing? Is she edentulous? Are her dentures fitting? Is she eating calories well? Has she lost her appetite? Does she have depression, which can happen with diabetes frequently, and CKD can reduce appetite? So, there's a lot to look at for calorie intake and just what I like to call constitutional health, like, just how is the person's function, what's their overall wellness, what's the home environment? It's like that geriatric assessment.

Once we've looked at those factors, which are very important, really, overall, since she's having the lows and having emergency lows, we really need to de-intensify, we need to drop some insulin. Certainly, the basal insulin that detemir can get dropped. I usually like to do 10% or 20% changes with regimens just to keep it relative to what's going on. She's older, she's having bad lows, I'd probably do a 20% drop. So, from 30, 20% of that would be 6. So, drop it to 24. That'd be reasonable. And then the mealtime, you'd really have to look at the sugars, the patterns a little bit, 5 to 10, fast acting is what she'd mentioned. That might be reasonable. Usually, that pairs up pretty good, those doses.

So, if you take all of the mealtime insulin added together, it should be about half of the regimen compared to the basal. So, for example, if she did at the top of her regimen, 10 units, 10 units, and 10 units breakfast, lunch, dinner with the fast acting, total going to be 30, and we'd mentioned that her detemir is 30. So, her regimen on the face of it is reasonable. It's 50% mealtime, 50% basal. So, that's a good balance. But again, overall, we need to be dropping things because of the lows. So, detemir goes to 24, and then maybe instead of 5 to 10 on meals, maybe we do like 4 to 8, and then we have her check her sugars and see how she's doing.

Matt: I have come into this before where the patient's family is excited. They're like, "Oh, their A1c is great." And I'm like, "I'm worried that we're missing some major lows here." In this case, we've caught it because the patient had an event. But sometimes, you get the patient hasn't had anything bad happen yet and they're like, their A1c is really low. I was reading the ADA Standards of Care that we keep referencing. They actually have a section, I think it's Chapter 13 on caring for older adults and one of the suggestions they have for simplifying regimens is, if the person is taking it at night, just move it to the morning. I guess, a lot of people fall asleep and forget to take it. I'm not sure. Is that something you find helpful that you would recommend to the audience?

Jeff: Yeah, it could. I actually like that a lot. We've learned basal insulins at night, take glargine largin at night. That doesn't come from anywhere. That's been a standard that just got set for some reason. But I like to begin glargine in the morning. For me, that would be the way to go. Wake up, and brush the teeth, get the day started, have coffee, and take basal insulin. You have to know your patient. Some people, they've been doing it this way forever, that's their thing, if it's working. So, you just have to know your patient.

Matt: Sure.

Jeff: I think that's good for you to think about understanding it doesn't have to be stuck to nighttime.

Paul: What about GLP-1 for this patient? I don't see that on our list. She has advanced CKD, but not so much that would even be a concern with that. Would you ever consider making a swap? I think part of the point of this case is patients become very married to their regimens and are hesitant to make changes. But if there's someone who is all in and you have her confidence, would you ever consider making that change to maybe something less hypoglycemia prone that would still have some benefit?

Jeff: Yeah. So, it's going to be an off label for some of the GLP-1s based on her GFR being, I think it was 22. So, you're getting down into the lower. I do think you could try a lower dose, something small to see if you could get some mealtime coverage. I don't know, if you can totally get away from mealtime insulin only, because if she has long-standing diabetes and is kind of beta cell failed out, you might not get a lot of bang for that. But I don't think it's off the table. You just have to realize GLP-1 agonist can stick around longer. If she's an older patient losing weight that's going to worsen that process. If she's got CKD, does she have gastroparesis as a complication of her diabetes too? So, it gets tricky.

I think you'd really have to investigate and be careful with that. I would be really cautious to try to go that route. It's tempting because you're like, "Oh, my gosh, I really just want to make it easier for this person," because that's what we're told to do. But it can also lead to some of those problems. I like the intent. And if you get to know the patient, this is complex, it might be possible.

Matt: The other thing that and we talked about this already, the kind of the older impetus, I guess, earlier in my medical career, I would see-- It seemed like everyone was either on no insulin or basal bolus insulin. And now, for type 2, we push the basal only with some other agents to supplement that. And then now, there's this concept of basal plus one or basal plus two, which you've talked to us about on the show before. So, I would say to the audience, ask your patients how many meals a day they eat too. Because a lot of the older patients, they might eat like a meal on a snack. And in those cases, they probably wouldn't need three injections of the lispro in this case.

Jeff: Yeah, you're right. You might get away with not doing a bolus for something smaller in the day, because we're not seeking perfection. Once you have things like advanced CKD, the horse is out of the stable, you're not going to improve them. You actually will harm them. The A1c target for this patient, which there's this amazing podcast out there called The Curbsiders has a great episode on A1c target. But it should be 8 to 9 for this patient. And so, we're not seeking perfection. You can decide not to cover certain things.

I think that a lot of clinicians, we're trying to do it right. We want to fix it, make it normal. That's the thing we are thinking about. But in this patient, helping the patient is not "normalizing the numbers." It's seeking safe, rational targets, simplification, if you can take away a dosing in the day that's a smaller intake of food, try it. They might not become very hyperglycemic. You can tolerate a number of 200, 220. That's not going to harm our patient. That's okay. I think retraining the eyes of the patient and many times the family to say, "Hey, 150 to 220, we're doing fine, 150 to 230, we're probably still we're doing fine. Let's try to make it safer for them and easier."

Matt: We're probably running down to the last question or two here. Paul, did you have any other comments on this? I think we should maybe talk a little bit about what to do with hypoglycemia, just because it's so-- [crosstalk]

Paul: That was it. Yeah, took the comment out of my mouth. Just [unintelligible [00:57:55] counseling around hypoglycemic, how to recognize it, what to do when you actually

experience it, when to watch for it, I think those would all be helpful, scripts to hear how you talk about patients.

Jeff: Yeah, this is a perfect cap to the insulin show because when you start insulin, you must pair it with talking about detecting hypoglycemia and how to treat it. Patients should know the symptoms of hypoglycemia. So, there's usually hunger, nervousness, feelings of anxiousness. That's all of the autonomic nervous system kind of kicking. You don't need to use those words with the patient. You just need to tell them, "You're going to feel hungry and anxious and sweaty. If you're feeling those symptoms, you need to check your blood sugar immediately." So, you should, as a good habit, carry your glucose meter with you, fanny pack, that's kind of in vogue.

Paul: [laughs]

Jeff: My trainees tell me, "A fanny P is the way to go."

Matt: [laughs]

Paul: Your trainees are messing with you, Jeff. I'm sorry. [laughs]

Jeff: I don't know. Maybe. I'm a super geek. I'm probably walking around with my fanny pack. [Paul laughs] They're like, "Oh, Colburn [crosstalk]"

Matt: They are like, "Dr. Colburn, all the rock climbers wear fanny packs nowadays."

Jeff: Get one over off me. But you got to get people to carry probably testing equipment. If it is low, so less than 70 for someone with diabetes is considered low. If they're approaching that I would consider that it's going to be low. They're going to treat with 15. So, that's 15 g of carbohydrate usually best to be glucose tablets. So, if you buy those at a supermarket or a pharmacy, they're over the counter. Usually, you have to eat three or four of those to get 15 g. It's good because they're rapid. It's glucose only. A lot of candies have sucrose and it takes a bit for that to get broken into glucose. Glucose actually doesn't taste that sweet, but glucose tablets are more readily, quickly available.

They also make glucose gel. I like that as an option to have on the patient because if they're becoming unconscious and someone around them knows how to do it, if you just squirt it in their cheek, they don't even have to swallow it. It'll absorb on, what we call, the buccal mucosa inside of the cheek there or under the tongue. So, once you dose that you wait 15 minutes. We call it the rule of 15. You take 15 g of carb, you wait 15 minutes, you recheck the sugar, and hopefully, it's better than 70. It's out of the low range. If it isn't, then you retreat, and then you wait 15 minutes and check again and if not, you retreat. If you're doing this several times, you should be calling for emergency service and medical services if that's occurred.

The other thing that people that are getting insulin, you might consider giving them is glucagon. And so, if a person has had bad lows, or frequent lows, or something like unconsciousness or a seizure or something severe, where they don't have the ability to treat with eating something, glucagon, you have to constitute it. So, it's not like an EpiPen instant go. It takes a bit to get it ready, but you have to train the family members to inject them IM with that or now there's intranasal powder that you can puff right up into the nose. There's a couple of manufacturers that make intranasal glucagon which are ready to go. So, those are options you can prescribe to patients and patient families to have available.

Glucagon works by having your liver dump out all of its glycogen reserve. And so, once you've used that, within about five minutes, your blood sugar will whoa, get right up, be

good. Here's the problem though. If you become low again after doing that within the same day, glucagon will not have an effect, because you've already used up all of your glycogen. So, if you've used your glucagon treatment, you have to get back on your normal schedule of eating and using insulin, so that you can build back normal reserves of glycogen on your liver, the normal stores on the liver. So, yeah, you can only use glucagon once in a day. You can't do it again. But that's how you treat. That's called the rule of 15. And for people at more risk, you can prescribe glucagon.

That's not something that an endocrinologist, I think specifically needs to be doing. I think primary care should be prescribing that. It's the safe medicine. The main side effect is nausea. The other counseling that should be given is, once they get glucagon, the person might throw up. So, if they're unconscious when you're giving it to them, put them in what we call the recovery position, which is on their side, head facing down or tilted downward. Not face on the floor, but head facing downward, so if they do vomit, they don't aspirate it.

Matt: Ah, just such great advice, Jeff, as always. This has been fantastic. Paul, did we do it?

Paul: I feel like I can now start insulin on a patient. I'm pretty excited. So, thank you, Dr. Colburn. Good.

Matt: [laughs] Yeah, definitely. So, Jeff, let's get maybe one or two take-home points on insulin therapy. And again, we talk type 2 diabetes, insulin therapy for type 2 diabetes today. What do you want the audience to remember if it's just one or two things?

Jeff: So, remember, insulin is needed for patients when their beta cells fail. 50% of them have failed at the time you diagnose them with type 2. They progressively lose function across the time with the patient. All of the other medicines can help, potentially stall that or provide weight loss. So, we do like those other metformin, SGLT2 inhibitor, GLP-1. So, if you can access those, the guidelines say do those first. However, insulin is not a failure of the person and it's not an evil medicine. It has basically unlimited potential. We start with basal. We start at 0.1 to 0.2 units/kg/day, seeking a sugar of 90 to 130 fasting in the morning, and giving them 2 extra units every three days if they're not within that target.

We always want to pair starting insulin with hypoglycemia teaching with the rule of 15. You should not be afraid of insulin. I will just say this. I don't want to make you cavalier. It is hard to make a person hypoglycemic with starting just basal insulin, because they have a 24-hour period, the insulin is acting. They would have a long period of time where the lowering of blood sugar leading to unsafe blood sugars is going to cause symptoms, and the person is going to be seeking and eating and doing other things. It's pretty hard to get really dangerously bad with basal insulin. Do not be afraid of it. It's useful, powerful, good medicine. And yeah, I hope our provider team out there, everyone has an opportunity to help someone with this.

Matt: Anything, any resources that you'd like to plug before we let you get back to the family?

Jeff: I think the ADA Standards of Care app for the various smartphones is fantastic and really easy to follow, particularly for insulin. So, if you take away anything from today, if you just download that app, it's very algorithmic and point-of-care grade. The American Association of Clinical Endocrinology, AACE, A-A-C-E also has a similar app which works well. I just promote the ADA, because they're the diabetes association, but I would point people to use those.

Matt: Yeah, When I was kicking around their website, it looks like they're updating their diabetes stuff sometime this year, maybe since its pending.

Jeff: Yep.

Matt: All right. Jeff, always great to have an excuse to hang out with you. Tell your wife that I said hello.

Jeff: Yeah, she makes this happen. Otherwise, I can get corralled. [chuckles]

Matt: [crosstalk]

Jeff: Isabelle knows I'm constant trouble. But yeah, Paul, I'm telling you, man, your job is--

Matt: [laughs]

Jeff: I'm going to be right up there, dude. I'm seeking you. You better be watching.

Paul: It's here to you for the taking, Jeff.

Matt: Paul, we should go down and visit Jeff once he gets into his new digs down there.

Paul: I thought it'd be fantastic.

Matt: We should go down and visit again.

Paul: We should find-- [crosstalk]

Matt: I think we should make that happen, Jeff. We know the same people, so we should come down and do something there.

Jeff: And as I've been watching, you have a very nice cat. If you don't lock that place up, [Paul laughs] I'm going to steal your cat, dude. I'm just going to take on over here.

Matt: He has two cats.

Jeff: Oh, yeah.

Paul: [crosstalk] -crime is now. This is all recorded.

[laughter]

Paul: This has been another episode of The Curbsiders bringing you a little knowledge food for your brain hole.

Matt: Yummy.

Paul: [laughs] Little pause for that one. Still hungry for more? Join our Patreon and get all episodes ad free, plus twice monthly bonus episodes at patreon.com/curbsiders. You can find show notes at thecurbsiders.com, and while you're there, sign up for our mailing list to get our weekly show notes in your inbox including our Curbsiders Digest, which recaps the latest practice changing articles, guidelines, and news in Internal Medicine.

Matt: We're committed to high value practice-changing knowledge. We want your feedback. You can subscribe, rate, and review the show on YouTube, Spotify, or Apple Podcasts. You can also send an email to askcurbsiders@gmail.com. A reminder that this and most episodes are available through VCU Health for CME at curbsiders.vcuhealth.org. A special thanks to our writer and producer for this episode, Isabel Valdez, and to our whole Curbsiders team who does all this work behind the scenes. Our technical production is done by the team at Pod Paste. Elizabeth Proto runs our social media. Chris "The Chiu Man" Chiu

is the moderator on our discord. Stuart Brigham composed our theme music. And with all that, Paul, until next time, I am a tired Dr. Matthew Frank Watto.

Paul: And as always, I remain Dr. Paul Nelson Williams. Thank you and goodbye.

[music]

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