Dr. Stukus: Hello and welcome to "Conversations from the World of Allergy," a podcast produced by the American Academy of Allergy, Asthma & Immunology. I'm your host, Dave Stukus. I'm a board-certified allergist and immunologist and serve as the social media medical editor for the academy. Our podcast series will use different formats to interview thought leaders from the world of allergy and immunology. This podcast is not intended to provide any individual medical advice to our listeners. We do hope that our conversations provide evidence-based information. Any questions pertaining to one's own health should always be discussed with their personal physician. The Find an Allergist http://allergist.aaaai.org/find/ search engine on the academy website is a useful tool to locate a listing of board certified allergists in your area. Finally, use of this audio program is subject to the American Academy of Allergy, Asthma & Immunology terms of use agreement which you can find at www.aaaai.org. Today's edition of our Conversations from the World of Allergy podcast series has been accredited for continuing medical education credit. The American Academy of Allergy, Asthma & Immunology is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. Information about credit claiming for this and other episodes can be found at https://education.aaaai.org/podcasts/podcasts. Credit claiming will be available for one year from the episode's original release date. Today we are pleased to welcome Dr. Drew Bird, who is an associate professor of pediatrics and internal medicine in the Division of Allergy and Immunology at UT's Southwestern Medical Center in Dallas, Texas, and director of the Food Allergy Center at Children's Health. Dr. Bird has extensive research experience investigating food allergy immunotherapy and has the distinction of being the initial recipient of the academy's Howard Gittis Memorial Award. Drew Bird is the first author on the recently published update on conducting oral food challenges, which was published in the January 2020 issue of JACI *In Practice* and will be the topic of today's conversation. Neither Dr. Bird nor I have any disclosures relevant to today's discussion. Dr. Bird, thank you so much for joining us, and welcome to the show.

Dr. Bird: Thank you so much, Dave. It's good to be here.

Dr. Stukus: All right, well, I know that this is gonna be a very interesting conversation and I'm sure will benefit a lot of folks who are listening, but let's start with some basics. So can you define what an oral food challenge is for us and kind of walk us through what that involves?

Dr. Bird: Sure. I think oral food challenge is something that allergists are very familiar with. It just really refers to that procedure we do in the office where we have a patient who we believe in most cases is not likely allergic to a food or has outgrown an allergy to a food, and we take a serving of that food, divide that into small portions and give that serving over about an hour timeframe and then watch the patient for a successive period when we're looking to see if they still have an allergic reactivity to the food.

Dr. Stukus: So basically you're just having somebody hang out and eat in the office setting.

Dr. Bird: That's pretty much it. Yeah, we have them hang out and eat and do it very carefully and in a measured way and of course have safety parameters in place to make sure it's done appropriately and if the patient has an allergic reaction that we are prepared and ready to treat it.

Dr. Stukus: Yeah, and you mentioned that allergists are well-versed in this, but do we have any sense of what percentage of practicing allergists currently offer oral food challenges? And along those lines, is this something that is really only to be done in academic centers, or can it be done anywhere?

Dr. Bird: Yeah, so they're not only done, number one, in academic centers. We hope that they're being done in practices that give allergy immunotherapy or that any allergist's office can do that, so if you can recognize allergic reaction and treat it appropriately then you should be well-prepared to do a food challenge. We do think that it's best handled in the hands of a board-certified allergist, someone who's really experienced and comfortable with recognizing early signs of anaphylaxis and treating those appropriately. And, yeah, so as far as how often they're done, there hasn't been a recent survey conducted that's been published. There was one in 2009 that was conducted through the academy that showed that the majority of allergists do conduct oral food challenges but that a minority conduct a large volume, so it seemed to be less than 10 percent did more than 10 per month, and I think that we get the sense that they're being done more and more frequently, and we have some unpublished surveys that suggest that this is the case, but ultimately they probably need to be done even more often that [sic] they are being done, and that was one of our goals with this update to the workgroup report, was to really provide more information to allergists and provide more materials and tools they could use in their practice to feel more comfortable and to feel more confident in doing the food challenges in the office.

Dr. Stukus: Mmm. And you mentioned that this really is best-suited for board-certified allergists and those who are specially trained to recognize and treat anaphylaxis, and I know this is a big part of the document that was just published. Help us better understand what type of preparedness is necessary for anyone, especially allergists, who are conducting oral food challenges in their office setting.

Dr. Bird: Yeah, so certainly safety being the thing that we're trying to really make it abundantly clear that you need to be prepared from a safety perspective for doing the food challenge, number one, making sure the patient is optimally healthy for the food challenge. So what does that mean? Well, we might postpone the challenge if the kid is either sick recently or has a fever or has been wheezing recently. If they've had albuterol use or short-acting beta agonists in the last 48 hours you might want to reschedule. If any of their allergic disease is not well-controlled we'd reschedule. And then with our adult population we think more about things like pregnancy or unstable cardiovascular disease or concomitant beta-blocker use, those being reasons we might postpone. So, number one, it's making sure that patient is ready, and then when we look at safety we're really talking about office set-up, how can we make the staff aware that a challenge is being done, how can we make sure that they are prepared to recognize the reaction, so keeping the patient, number one, in a well-monitored location, somewhere close to a nurses station or somewhere where someone can really see the patient in case the signs of an allergic reaction develop and then having the clinic prepared in terms of having emergency medications available, having monitoring equipment available, having a physician readily available to be able to recognize and treat the reactions should that be necessary.

Dr. Stukus: Mmm. And is it necessary for the actual office space to be directly next to an emergency department, or does that seem like overkill?

Dr. Bird: I certainly don't think it's overkill. I mean, optimally someone would have emergency services nearby, but you don't have to be next to a hospital to do a food challenge. So doing that patient assessment, number one, and making sure that the patient is someone who is safe to conduct a food challenge is the first priority, and then if you think it's safe to do a food challenge and you're giving allergy shots then hopefully you have a plan in place in your office where you have access to emergency services, so whether it's quick access to an emergency department or just having EMS nearby that you have a plan in place where they can be there and transport a patient to a hospital if necessary is really part of that preparedness that's important.

Dr. Stukus: So now that you've really talked about all the things that can kind of go wrong and being prepared just in case, are oral food challenges safe to do?

Dr. Bird: Yeah, they really are safe. So I think that there have been some recent incidents around the world that have shown that they are not free of any possibility of fatality. It has happened. It's extremely rare, but really the important thing is that if they are being done they're being done in a carefully monitored situation. And, like I say, when we do food challenges we think of kids having food challenges especially or adults in practice primarily when we think it's likely they're not going to react, so we're looking at patients who either have a history that doesn't suggest reactivity or they have serum IgE testing or skin test results that suggest it's most likely they're gonna be tolerant, and so the majority of times these are gonna be low-risk oral food challenges in patients who are likely to do just fine. When there is more concern that a patient may have a reaction these could either be with baked food challenges, because we know most of these patients are still allergic to either milk or egg that the baked product-- we don't have really good tests that will indicate who will or will not react, so baked food challenges within patients who have borderline results that you think may react, those are the ones we need to be perhaps a little more cautious and a little more intentional about how we administer the challenges and how we observe the patients.

Dr. Stukus: Mmm. So you started to get into this a little bit, but help us better understand. What are some of the indications for pursuing an oral food challenge in the first place?

Dr. Bird: So one of the first questions we have when doing a food challenge is "Is the patient likely allergic or not based on testing?" And so you want to look at the serum test and the skin testing, and especially if those are not consistent with the patient's history or if the value are highly suggestive of the patient being able to tolerate a challenge then we do a challenge, because, as I mentioned, most of these challenges are low-risk challenges, so we're looking at kids who are likely to pass. And so if there's any disagreement in the testing, in the history or if the values are very low and you think they're likely to have outgrown the allergy then you really want to offer the challenge. Another time when you might take a little more risk is if the child has multiple food allergies. So a lot of times these kids are on highly restrictive diets, and you might consider for that patient that the benefit of adding-in additional foods would outweigh the risk of having a reaction during the procedure, so in other words maybe their egg IgE, for instance, is

closer to three or four instead of two or less, so if the IgE of egg white is two or less we consider the patient to have a 50 percent chance of reacting or better, so if this patient is five years old the egg value is a little bit higher. Then if the patient has an overly restrictive diet and some of these test results have, for instance, fallen over time then you may have a benefit of adding that to their diet, and there may be a chance they could pass the challenge, so you'd want to give a little more consideration to possibly doing a challenge that otherwise you might not do. We also oftentimes see patients with atopic dermatitis or eosinophilic esophagitis who are avoiding multiple foods, and that might be a number of reasons, so those patients are either possibly avoiding the food for atopic dermatitis because there was a perception that the food was triggering their disease or the eosinophilic esophagitis the same thing, and so they've avoided the food for a prolonged period of time. In most of these patients there is some evidence of sensitization, so either IgE levels are detectable or a skin test is positive, perhaps moderately positive, and the patient importantly has this history of previous tolerance. And so we know if there's previous tolerance with a prolonged period of avoidance there's a chance then of allergic reactivity with reintroduction, and so those are patients that we would perhaps bring in for an observed food challenge. We also look at food challenges when we're looking at tolerance to cross-reactive foods. So the example that comes to mind for this would be, for instance, you have a birch pollen-allergic patient who has a positive test to peanut and has been avoiding peanut for a prolonged period of time. Maybe they tolerated it in the past or maybe they've never had it, but they're now birch pollen-allergic, and when you do additional testing perhaps looking at component testing you see that the IgE is specifically elevated to ARH [ph?] eight, and so that would indicate that the patient is not at high risk for anaphylaxis with ingestion of peanut, and so they might be someone that you would bring in for a challenge to peanut. And then another scenario where we will do a food challenge is for patients who have pollen food allergy syndrome, and patients with pollen food allergy syndrome typically are not at risk for systemic reactions. They're typically local reactions, but certainly with these patients there is often tolerance of food when it's processed, so, for instance, if they react to a fresh apple, if the apple is then placed perhaps in a microwave for 15 to 30 seconds that may be sufficient contact with heat to denature the proteins so that they don't have any lip swelling or oral tingling with ingestion, and perhaps they're afraid to try that at home, and so those patients may be brought back into clinic to perform a challenge.

Dr. Stukus: So it sounds like there's an array of indications both at the time of diagnosis, especially if that's questionable, and also once people have established food allergy. Does that sound correct?

Dr. Bird: Yeah, that's correct.

Dr. Stukus: Yeah. Now, you briefly mentioned about the skin prick or blood IgE testing isn't always helpful or may need some clarification. What kinds of problems can arise when these tests are overused for the evaluation of food allergy?

Dr. Bird: Yeah, you know, Dave, I think this has been a soapbox for both you and me for a long time, right? We've both experienced that in our practice of just seeing a lot of patients who have been misdiagnosed because of the use of what I call food panels, just these broad array of tests that are often done. And oftentimes and I know in your experience as well we see patients who have a history that may or may not have anything to do with food allergy, so you see patients who have things like chronic rhinitis

or have had some idiopathic urticaria or have even just had something like headaches and have gotten tests done, and oftentimes these individuals have a number of tests on the food panels that are positive, and so the food panel testing or the food IgE testing is useful when you have a patient who comes in and they say "I, for example, ingested a peanut, and I had some lip swelling within 30 minutes of ingestion. Do you think I'm allergic to peanut?" Well, you can order that test, and it confirms that history, but if you take the patient who says "I have headaches every day" or "I have abdominal pain that comes and goes" and you order this test, especially in someone who's pollen-allergic, you're likely to get a number of positive results that really have no useful predictability in the patient, so in other words, yeah, the wheat IgE is positive, but the patient had a sandwich with wheat in the bread for lunch today, so clearly they don't have immediate reactivity to that food. So I think part of the thing that we try to get across especially is judicious use of testing, so being very selective in patients who have IgE testing and making sure that history supports that reactivity. And then oftentimes, as you've experienced, with patients who have been misdiagnosed and oftentimes what happens-- especially in our tertiary referral center it may take a while to get the appointment, and so while they were eating peanut butter, for instance, now they've been avoiding peanut over the past year or two years, and they have an elevated IgE test, and you wonder because in some circumstances certainly allergic reactivity can return after periods of avoidance, and so these are patients that we then say "Why don't you come back in, and let's do an observed challenge to see if you are able to tolerate the food or if you are in fact now allergic."

Dr. Stukus: Yeah, that's great. That's a great explanation, and I like to say that allergists, quote-unquote, "cure" food allergies all the time just by basically having people eat the food that they were eating before without any problems but then stopped eating because of some silly test that was done, so... <laughs>

Dr. Bird: Right, right. No, that's exactly right.

Dr. Stukus: Yeah. Now, does the patient need to have completely negative allergy testing before you consider an oral food challenge?

Dr. Bird: No, absolutely not, and so what we're looking at when we look especially at serum IgE testing or even skin testing is just that likelihood that they're not allergic. So we know our testing isn't perfect, and certainly there are some centers or circumstances where you might be a little more aggressive with testing, but for the majority of allergists in practice we're looking at these patients who though the testing isn't completely negative, let's say, for milk or egg, for instance, the IgE when the child was younger was well over two. Maybe the IgE was five or even 15, but now they've gotten older. The IgE has dropped to what we consider a 50 percent predictive value, so about two or less. The IgE is two or less for milk, egg or peanut for a patient who has a history that suggested they were previously allergic. Then they have a high likelihood of passing a challenge, and in addition if the skin prick test has begun diminishing in size then we may consider even though it's not completely negative it's in that intermediate interpretability range where the only way we can say for sure whether or not they will tolerate the food is to then proceed with a food challenge.

Dr. Stukus: Okay. Now, you mentioned this before, but I think it merits just a reiteration just so everybody understands, and now as we sort of get through the nitty-gritty details of conducting the oral food

challenge say somebody goes through and they have an oral food challenge scheduled. What kind of assessment needs to be done that day in order to consider whether you can proceed or whether you need to postpone for safety considerations?

Dr. Bird: Yeah, so as soon as the patient gets in you want to ask that history of, number one, have they been ill recently, have they had fever, have they had any wheezing or coughing. And so why do we ask that? Well, if you have fever or illness if there is a person who's allergic it can lower that threshold of reactivity and perhaps potentiate a worse reaction rather than if they were well, so make sure that they're well, number one. If they have active respiratory symptoms not only can that again potentiate a worse reaction, but it'll also confound the ability to interpret the food challenge, meaning that if your patient's already coughing when they come in how are you going to know if they continue coughing during the challenge if that is because they are reacting to the food or it's because it's the baseline illness that's already present? The other thing we ask is that we make sure the medications that can be stopped have been stopped appropriately, so, number one, antihistamines. And this is one of the things in the workgroup report I'm really proud of. There's a very extensive table of antihistamines and other medications that may have antihistamine-like properties and gives a detailed list of how long those antihistamine-like properties may last. Ultimately we do make a caveat that if you're concerned or think the patient may or may not still be reactive do a histamine skin test. If the histamine skin test is negative-- or positive, rather, so in other words the histamine is reactive, then that would suggest the antihistamine is no longer suppressing any early signs of reactivity during a food challenge. So make sure you're off the antihistamines, make sure you're off of the short-acting beta agonists again to not inadvertently suppress any early signs of reactivity, so if the patient has coughing or other respiratory symptoms we certainly want to be able to stop the challenge immediately and treat it appropriately. If their atopic dermatitis or other allergic diseases are poorly controlled reconsider. So this comes up oftentimes in our patients who are pollen-allergic, and we want to challenge them during the springtime when the tree pollen counts are really high, and that can be really difficult, because they come in with runny noses, they've had to be off of antihistamines, and they're really struggling, so again during those times it just might be best to postpone the food challenge. I do want to underscore that patients could continue inhaled nasal steroids. That is not gonna interfere with your challenge assessment, but antihistamines need to be stopped. And then when we think about adults that adds a whole other level of difficulty for food challenges. Number one, if they're pregnant there's no need to do a food challenge during pregnancy. Just wait till after the child is delivered to proceed with a food challenge. If there's unstable cardiovascular disease or beta-blocker therapy or anything that might interfere with your ability to treat anaphylaxis it's probably best to postpone that or to reconsider the necessity of the food challenge.

Dr. Stukus: Mmm. And are there any absolute contraindications to performing an oral food challenge?

Dr. Bird: I think it's a discussion to be had between the patient and the physician as far as outlining the risks, but I think that as long as there is a really reasonable reason to do the food challenge and you think it's safe in that patient then I wouldn't consider an absolute contraindication. I would think, however, if the patient is unstable medically for any reason that there would have to be a really compelling reason to do the food challenge, and off the top of my head I can't think of what that would be. I would certainly lean towards being much more conservative and making sure my patient is in optimal health as much as

possible and that the food challenge is necessary before proceeding and especially if I'm in a community setting and access to emergency services might be a little more delayed.

Dr. Stukus: Mmm, sure, so situational, absolutely. Now, what about somebody who has known anaphylaxis to a food but it's been years and years and recent testing indicates that they may no longer be allergic? Is that a contraindication?

Dr. Bird: Not at all. So, I mean, these are patients that we absolutely consider great candidates for challenge. Even though they've had a reaction in the past, if the serum IgE testing and the skin testing are showing signs that natural tolerance is developing I think these are great patients for food challenges.

Dr. Stukus: Mmm, okay, great. Now, what about age restrictions? Can this be done-- you mentioned adults, but what about babies and infants and toddlers?

Dr. Bird: Yeah, that's great. I mean, any age can do a food challenge. So we've seen certainly since the National Institutes of Allergy and Infectious Disease recommendations for early peanut introduction several years ago that there's been this increased awareness of doing a food challenge in an infant, and so, yeah, we absolutely want practices to be doing food challenges in children under a year of age. You just have to-- especially if you aren't pediatric-trained have to adjust your comfort level I guess a bit for challenging infants and understanding that they aren't gonna be able to verbalize symptoms as well, so paying closer attention to the physical exam is really important during those food challenges.

Dr. Stukus: Mmm. Now, walking through when you have a patient or a family in front of you and you're discussing an oral food challenge, what are some of the discussion points that should take place between the patient and the allergist or provider prior to considering an oral food challenge?

Dr. Bird: Yeah, so especially with children and even adolescents and adults it's important to, number one, be cognizant of the anxiety that the food challenge itself or the food allergy brings on the family, and so I think we do need a little bit of heightened awareness of how we present the food challenge, of what our ultimate goal is of doing the food challenge and just being aware of being really prepared for the challenge and to be expecting some of the anxiety that may come along with the food challenge. So, number one, we make a very open conversation about what the food challenge is, especially with kids who can understand age-appropriately what we're doing. We just try to make it very clear how we do it, that it's a safe environment and then really communicating to the family that we have safety precautions in place that will allow us to treat a reaction should one occur and that our ultimate goal is really to see if it's necessary to continue avoiding the food or not. Some of the things that we also do-- when possible if there are mental health professionals available for some of our more anxious patients we have our psychologist talk to them or have them meet with a psychologist outside of clinic before coming. We've had that for several patients, and that's been very helpful. We're really making sure we're being just aware of the anxiety that can compound the sensation of allergic reaction that might unfortunately stop a food challenge early because of either fear or because of a feeling of reacting without seeing objective signs. We also want to talk to the family a lot about what will we do after the challenge, so in other words if I challenge you to a food are you gonna reincorporate that food into your diet? And if the family says

"You know, we never eat soy products, and I'm not going to start eating soy products" then I may question whether or not it's worth the time on my part in my clinical practice and also on the effort it takes for the family to come in whether or not it's worthwhile to proceed with the challenge, and in some cases it is, but there may be cases when especially if the food is gonna be incorporated it won't be helpful. And I think of that often with some of our younger kids who are trying to look to see if they are allergic to certain tree nuts, for instance, and they've passed a challenge, they come back in a year, and the family says "Oh, I passed the hazelnut challenge, but we haven't given hazelnut again since the challenge." Well, as we all know, there is a chance of allergy developing when you have avoidance of a food, especially if there's evidence of sensitization in the past, and so if the patient is not going to reincorporate the food into the diet moving forward you really have to consider whether or not they may have become reactive with avoidance. So those are things we talk about upfront, just being prepared of what to expect after the challenge and then what to expect during the challenge itself.

Dr. Stukus: Mmm. And what about any practical tips you can offer us that you tell either families or patients to bring like-- they're gonna be there for a while, so do you have them bring things to keep them occupied, or should they bring their own epinephrine autoinjector, for instance?

Dr. Bird: So we don't have them bring their own autoinjector. I suppose some practices may do that. We actually draw up our own epinephrine, but certainly having an autoinjector either brought in by the family or having one provided by the clinic is really important, and that's a necessary thing to have during the challenge. As far as preparedness during that length of time, we do tell families to expect to be there for a while, and to expect to need to entertain the child. So whether that is bringing some sort of iPad or there's capability of watching movies or bringing toys or puzzles or coloring books, etc., we do ask them to be sure to bring things to pacify the child during that period of time while they're going to be in clinic.

Dr. Stukus: You mentioned before about the medications, such as antihistamines that need to be discontinued. What about their asthma controller medications, if they're on a daily medicine for asthma? Do they have to stop those?

Dr. Bird: No. So we want them on their controller medications. Certainly we want them to stay on any inhaled steroids, not to stop those. We really want the asthma to be optimally controlled throughout the time when they're being challenged.

Dr. Stukus: And what about if they're on a medicine like Montelukast, which is the trade name, Singulair, as you know, do they have to stop that?

Dr. Bird: Not at all. So we want them to stay on Montelukast. I have not stopped that for a challenge.

Dr. Stukus: Okay, great. Those are just some of the questions that I hear from time to time. Okay, so now the day of the challenge has arrived. I know that there's all kinds of different foods you can challenge for, based upon the history and testing and so on and so forth. Walk us through some of the more common foods that we would challenge somebody to. For instance, if you have somebody in your office that's there for a challenge to egg or peanut or milk, what types of food do you actually use?

Dr. Bird: This is another thing with the workgroup report I'm really excited about. We have done for several years at the academy a world food challenge training station. The attendance for that has been really fantastic. Every year, we have a number of physicians come to the training station. We're having it again this year at the academy meeting and we get great questions. It seems the number one question I get from physicians who come by the table is asking about what food to bring and how much of the food to prepare. Thankfully, we had a really fantastic response from two dieticians, Marion Groesch at Mount Sinai and April Clark who is our dietician here at Children's in Dallas, prepare a challenge table that goes over not only multiple types of foods that can be used for a challenge, but also age-specific serving size recommendations that will allow for a complete challenge. So the workgroup report has an excellent table. I encourage everyone to look at that. Now good examples of foods that I think oftentimes, especially with children, we can have a challenge getting them to eat in a clinic, number one, egg. So egg has a really strong flavor. Some kids love it, and a lot of kids don't. So how do we get that in? One of the things we've found to be most helpful for egg is using French toast. We have the family prepare the French toast at home. Pre-prepared or frozen French toast should not be used. But if you use fresh French toast, where you take one egg per one slice of bread and make that, that should be adequate to do the challenge. Often, with syrup or with powdered sugar, that should be able to make it a little more palatable. For milk, we'll often use things like yogurt, or we'll use regular milk. We suggest using a 2 percent or less fat content of the milk for a food challenge. But using those might be helpful for milk, and ice cream, for instance, could also be used, and something that kids typically will like and will eat. Then with tree nuts, one of the things I want to point out, oftentimes individuals want to use Nutella or hazelnut spread for the hazelnut challenge, but there actually isn't that much hazelnut protein in those products. Those are primarily milk based, and there's less nuts. So for the nuts in general, we ask parents to bring them in, in the shell, or from a facility that guarantees they aren't processed with other nuts. If they can't find those types of nuts, then we wash them in clinic, just through a colander and serve those, which should be fine. A lot of the nut butters can be used, again, assuring that they're not cross-contaminated. But with hazelnut itself, again, we would suggest using just the actual hazelnut itself.

Dr. Stukus: Can you mask the taste for some of these foods? Is it okay to use things like chocolate syrup or jelly or things along those lines?

Dr. Bird: Absolutely. So we have a section in the workgroup report on using masking agents. There are flavorings, things like chocolate flavoring or peppermint or orange flavoring, for instance, can be used to mask some of the stronger flavors. Of course, if you're doing a blinded challenge, that becomes really important, but even if you're not doing a blinded challenge and the flavor is just really strong. One of the things you can also do, especially with some children, smaller children, is use sauces. So ketchup, for instance, could be used to dip the food in, if it is egg, would be a good example of something they would be able to then perhaps tolerate better, because of the flavor.

Dr. Stukus: What if somebody gets through, let's say, half of a challenge, or three-quarters of the way, and they haven't quite reached the amount of protein you want to see them ingest, especially a young child. They're just done for the day and they refuse to eat anymore. How do you handle those circumstances? And say, they haven't had a reaction.

Dr. Bird: Yeah, there isn't a set rule for what everyone should be doing on this. In the workgroup report, we talk to the authors and to some others in the academy who are real experienced with food challenges to find what the general consensus was. In general, we felt that if the patient ingested at least half of the whole serving, that in circumstances especially where it was unlikely the child would react, it might be reasonable to continue ingesting half and then gradually increase at home till they got to a full serving. If a child, though, refuses to eat more than a bite, or has less than half of the total serving, we would say it was an indeterminate challenge and try to bring them back another day to do again.

Dr. Stukus: Got you. Let's talk about some of the key areas included in the recently published update. You mentioned this before, but I'd like to hear more of your thoughts regarding the section on psychosocial considerations. Why is this so important and what does this new section address?

Dr. Bird: I think the psychosocial considerations aspect of this is something that we actually added in after we'd already gotten started. There has been more awareness over the psychosocial aspects of allergy in general, but certainly in food allergy, that unfortunately don't seem to have been well addressed for years, and are getting more attention now. So we had the fortune of having the input from a psychologist who is at Children's National, it's Linda Herbert, and she's fantastic. She focuses her work on food allergy and she actually helped alter that section. What we're really trying to think of and bring awareness, was just bringing again that attention to the aspect that these food challenges can be anxiety-provoking for our patients. So we really want to, number one, be aware of the anxiety, talk about it. If there is significant anxiety, at baseline or related to foods, to employ the expertise of psychologist who are either in our clinic setting, and most of us don't have those in our clinic setting. So looking within the community to find psychologists who are comfortable with food allergy and aware of what a food challenge is, and how to really inform these patients, so that they feel confident and prepared to really put the anxiety associated with the procedure itself at bay, and help them to proceed to the food challenge, again to allow us to suppress subjective symptoms that might be more anxiety-provoked. As far as preparedness during that length of time, we do tell families to expect to be there for a while, and to expect to need to entertain the child. So whether that is bringing some sort of iPad or there's capability of watching movies or bringing toys or puzzles or coloring books, etc., we do ask them to be sure to bring things to pacify the child during that period of time while they're going to be in clinic.

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Dr. Bird: Not at all. So we want them to stay on Montelukast. I have not stopped that for a challenge.

Dr. Stukus: What are some of the common subjective complaints that people have if they have anxiety surrounding their food challenge?

Dr. Bird: So they immediately say, "Oh, my mouth itches," or "My stomach hurts" or they may just have completely food refusal, where they just refuse to eat altogether. Sometimes you can see patients, especially it seems more commonly in adolescence or adults, a lot of subjective throat symptoms. So, "My throat feels like it's closing," or, "My throat is swelling," or "I can't breathe." Things that might make you think it's more a vocal cord dysfunction type of symptoms, can often be similar to what we see in some individuals who've been avoiding the food for a long time. This is often the case we see in some of our adults, the history might be, "I just walked into a room and I saw across the room that there was a bowl of nuts, and I all of a sudden felt my throat closing." But if you saw the patient, even though they're in significant distress, you don't see physical signs of reactivity. So when you start to see those sorts of signs or symptoms, you really want to make sure we're getting our psychologists involved to help us to differentiate for the patient, giving some biofeedback and trying to understand, what is an objective reaction to the food and what is not. In some clinics, they have the capability of doing laryngoscopy and nasal-- rhinolaryngoscopy and taking a look to see if there is either any sort of vocal cord dysfunction, or abnormal vocal cord movement, or objective swelling. That can certainly be helpful. We don't have that in my clinic on our adult side. Dave Khan does have that capability and often does that for many of the patients who have more subjective complaints without objective findings for any allergen.

Dr. Stukus: Do you ever address this ahead of time? I know you have this discussion with families, or with patients, I should say, about the psychosocial part of it, but do you actually specifically say, "A normal subjective response is throat tingling or itching," or things along those lines?

Dr. Bird: For sure. So usually, the discussion is often with adolescents. I personally do not see adults, so the adults in our practice are seen by our internal medicine colleges, Dave Khan and Becky Gruchalla, and Chris Wysocki. But they're seen primarily in the outpatient adult clinics. I do see some adults on the inpatient side, but not as often with food allergy. For the adolescents, what we tend to see is that those adolescents report oftentimes a subjective throat swelling experience whenever they come into contact with the allergen. So it might be the patient is just, whenever they're around the allergen or when they see the allergen, they feel like they're going to have a reaction. So I approach this, first of all by normalizing their experience and letting them know that this type of complaint is common. Certainly we often see it, especially in adolescents who may have had a bad reaction in the past, or who have a fear of having had a bad reaction. They may not even remember their reaction, but it was so long ago, that they really have this significant fear of having anaphylaxis. And the experience that I normalize with them is that it's not uncommon too, when being around the allergen, to experience a feeling of throat closure or difficulty breathing, without having any other objective signs. Really, our job is to help the child experience as normal of a life as possible, and to be able to interact in the environment normally, without having that sensation of a reaction. Fortunately, the way we address this in our clinic is to be giving a psychological assessment. We have a psychologist. I know that's not available everywhere, but we have a really excellent psychologist in our practice who, number one, works really well with adolescents and children, and also is very well versed and experienced in dealing with food allergy. So she offers counseling for these families, really does a really thorough assessment. She offers tools for helping to manage anxiety

and to prepare for just that sensation of anxiety the patients may be having. She does some biofeedback with the patients being near the allergen, and then also some exposure challenges. What I mean by that is, that oftentimes the patients will have the allergen brought into proximity with them. Then she'll kind of walk them through that experience and what they're feeling, and help them understand the feelings they're having. For some of those patients, we do then progress to oral food challenges if necessary, but that's often not the end goal for the patients. Oftentimes, the patients really don't even want to eat the food in question. It comes to mind, I had a patient very recently who had this experience with an orange. The patient had no desire to eat an orange. She felt that the oranges could be easily avoided in terms of eating. But the problem was that the smell of anything citrus triggered what she perceived as an allergic reaction. Unfortunately, this often resulted in epinephrine being given, and a trip to the emergency room and this had happened on multiple occasions, and it was really impairing her ability to go to school or to perform her normal activities. So she was able to work with our psychologist, who was able to bring her around an orange. She was able to even smell an orange and even hold an orange with it being cut. Just as this experience, working over time, it took months, but being with our psychologist was incredibly beneficial for the child and the family. Again, the child never really wanted to eat the orange, but having the psychologist available who was able to help her and her family, very importantly, interact in their environment normally and safely, that can be tremendously helpful for the family and really improves the quality of life.

Dr. Stukus: That's fantastic. That's great. Another updated section discusses something you mentioned earlier. These are issues that are unique to baked milk and baked egg challenges. Tell us what the term baked means, and why is this different from other food challenges?

Dr. Bird: So when we're looking at baked challenges, typically we're talking about a milk or egg product in particular that is cooked in a wheat matrix, meaning something like a muffin or a cake or a cookie. The reason that's important is that a large percentage of milk and egg allergic patients, even though they're reactive to lesser cooked forms-- so they react to cheese or to liquid milk, or they may react to scrambled egg or boiled egg or fried egg-- but if that milk or egg is then cooked in combination in a wheat matrix, so into a cake or cookie, at a high temperature for a period of time, that often changes the conformation of the protein in the food and then will in turn change the ability of IGE to bind and the food may be tolerated. So why is that important? Well, we have seen in several studies the patients, number one, who can get those foods into their diet tend to develop tolerance to the native form of the food more quickly. So if you can eat baked milk or baked egg often, then maybe you'll be able to ingest cheese or milk or yogurt or scrambled eggs more quickly than kids who don't have those foods in their diet, so it's beneficial. Also beneficial for their quality of life. If you can eat a muffin or a cupcake at a party, that certainly makes your life a lot easier for those kids and for the families, interacting socially. So if we can get those foods into the diet, we really want to be able to offer that option to these families.

Dr. Stukus: Logistically speaking, do they need to eat more of it during the challenge then, than if they were to eat scrambled eggs or something like that?

Dr. Bird: By more of it, do you mean, a larger quantity than you would have? Like if you were offering a liquid milk challenge, you might offer a few ounces, compared to an entire muffin if it was a baked?

Dr. Stukus: Yes, exactly.

Dr. Bird: I think one of the question that I have before we do these challenges is, number one, I don't often do baked milk challenges, especially in kids under a year of age, just because it's not a common part of their diet. So while theoretically yes, you would want the child to have a certain amount, I don't think it's possible to make a child, especially an infant, eat a larger amount than they're going to eat. So I think you kind of run into a problem where you don't really have any benefit from doing the challenge if you start too young. That being said, in general, we feel like if we can get a patient to eat what we consider a regular serving of the food, so if it's a cupcake and the child is 18 to 24 months, it might be half of the cupcake, or maybe the full cupcake. But we want in general to try to approximate what that standard serving would be for the child. When you look at the protein amounts in those in general, especially with the Mount Sinai studies, most food challenges in general, we say 3 grams of protein or more to declare a challenge as conclusive. But the big challenge is, you can't get that much protein in. They aren't that protein-dense, so you're looking at around-- I think the Mount Sinai studies were like 1.3 grams of milk protein or 2 grams of egg protein per serving. So in general, you're getting a little bit less protein exposure than you would on a non-baked challenge.

Dr. Stukus: Okay. Something I hear quite frequently, especially from parents, is this conception that infants and toddlers are at an increased risk to have severe food allergy reactions, since they're tiny and they have smaller airways and they can't really communicate very well. Is that true?

Dr. Bird: That's not the experience I've seen, or the experience that's been reported. Typically, we'll see with children, especially when food challenges are done carefully and done in a very intentional manner, if the food is given slowly over time, we often see reactivity with most kids, which you're going to see the first sign being a cutaneous reaction, so seeing urticaria, hives or flushing. Not always the case, but you tend to see in kids more often a first sign being a skin reaction. Of course, again, as you see the objection reactions when you really want to call the challenge and not push, to make the reaction worse by giving large amounts. But in general, they can be done very safely.

Dr. Stukus: On the flip side, are there unique aspects pertaining to adults other than pregnancy, which you mentioned before, that would need to be considered before doing an oral food challenge?

Dr. Bird: Yeah, so I think the anxiety component for adults, we expect to be more common. So being aware of the anxiety or the sensation of throat closure, having a laryngoscopy available if possible is certainly very helpful, or spirometry may be helpful, especially if you think there's some paradoxical vocal fold motion, that may be helpful. With adults, we're more likely to do challenges for pollen, food allergy syndrome or oral allergy syndrome, so that's just subjective sensation of oral-pharyngeal itching, will be something that's really important. We tend to see other types of food allergy in adults more commonly or adolescents, things like food-dependent exercise-induced anaphylaxis. So you may have to rethink how you do the food challenge for those patients. For food-dependent exercise-induced anaphylaxis, there is not a standard protocol which is commonly, widely endorsed or accepted, but in general, these are patients that we suggest they have evidence of specific IGE for the food, that they eat the food without having any symptoms outside of exercise. Then if you exercise challenge the patient, within an hour of

exercise, for instance, that they will then have an allergic reaction, so we have to do an exercise challenge in clinic to see the reaction for those patients. The other thing to be aware of, again, are the concomitant medications they may be on. So cardiovascular disease being something that can really interfere with the ability to treat a reaction, or may worsen or potentiate an allergic reaction, making sure those things are stable. And then other medications, if they're absolutely necessary, just making sure that they're paid attention to before the challenge begins.

Dr. Stukus: You mentioned this before about the blinded challenge. What is a blinded challenge and when should that be used, as opposed to just feeding somebody the food?

Dr. Bird: Yeah, so if we think about blinded challenge, we think about it pretty broadly in terms of, the first thing people usually think of is the double blinded challenge. So a double blinded challenge is when the physician doesn't know and the patient doesn't know if they're actually getting the food or if they're eating a placebo. Those are not commonly done in practice. Usually those are done for research settings and they're typically a two day process. One day you're giving placebo, one day you're giving the actual food. More commonly done in practice, especially as you've alluded to, for adults would be a single blinded challenge, which is again, where a placebo is given and the food allergen is given separately, but the patient is blinded to whether they're getting the food or not. Again, we often do that when there may be a strong anxiety component and the patient is really influenced by the thought of even taking the food. So in that circumstance, we prepare food, mask the flavor and give the food in that manner, to see if we can kind of help to eliminate that subjective sensation of anxiety associated with eating the food. When it's really helpful, again, what the workgroup report adds to this is that we had excellent tips from a dietician, who's done a lot of work on blinding, invalidating recipes. So we have a very extensive recipe addendum on the online information from Jackie in practice that goes over different types of blinding recipes for a number of different foods that might be used for a challenge.

Dr. Stukus: I can imagine how difficult that would be for something like tuna.

Dr. Bird: Right, yeah. Things with really strong smells. It certainly takes someone very experienced in that sort of thing to help figure out how to mask those foods.

Dr. Stukus: Yeah, okay. Great. All right, so somebody comes hangs out with you for a few hours and they go through all the different steps and the protocol and you observe them and they have no symptoms at all and they've completed their challenge. Now what? What happens after that?

Dr. Bird: So once they've completed the challenge, we really want to go over again, if they've tolerated the food, then we want them to not eat the food for the rest of the day, just in case there's a delayed reaction to the food, which might rarely occur. But then after, the following day, so we observe them in clinic typically two hours after the last ingestion of the food, or later if it's a FY challenge. Then we tell them to reintroduce the food into the diet, and just to let us know if they see any concerning signs or symptoms. We don't expect that to happen, but certainly we want them to continue keeping the food in the diet, to maintain it in the diet, and to reincorporate it, just in a regular basis. As I mentioned earlier, if the food is removed from the diet for an extended period of time, there have been reports that these same

foods may trigger an acute reaction on re-exposure. So to minimize that, we just encourage the patients to put the food back into the diet, keep it there on a regular basis. We want to update any emergency treatment plans. So for instance, if this is a school age child who has a food allergy action plan, then we want to modify that and give them one that's accurate, help to allow them to liberalize their diet at school and to give any school paperwork that might be unnecessary. Any concerns that are there at the end, we make sure we set aside time to talk to the family and just make sure that they're comfortable with what's happened, and if they're understanding of what the future looks like. Now for a positive food challenge, if the kid reacts to the food, then we again reinforce avoidance. We observe them for a longer period of time. Typically, we observe them for about two hours after resolution of the symptoms, and maybe longer. If it's longer and they have to go to the emergency room, rarely that has happened, but we have sent them over there for longer monitoring. Then we touch base with them again to talk about any anxiety that may have been elicited from the reaction, or from the procedure itself. If we need to make a referral to any mental health professionals, we're again, very aware of that need and we discuss that with the families and ask them to help us stay aware if they notice any signs or symptoms that the child has developed new anxiety, or is having any problems after the food challenge.

Dr. Stukus: I think for obvious reasons, people are disappointed when symptoms occur during oral food challenge. Nobody wants that, of course, but what are some of the benefits though, when symptoms do occur? Is this something we can spin in a positive light?

Dr. Bird: Yes, you know, it's a really good point. There have been surveys looking at outcomes of food challenges, and it's typically very positive. I think that in our experience, that supports that as well. The majority of times, what a family will tell me after a food challenge, even if there was a reaction, is they'll say, "Now I feel more comfortable, seeing what a reaction looks like. I feel more confident, seeing how you guys treated the reaction and what you all did and what symptoms you were looking for." In general, they feel a little more confident about just being able to recognize the reaction. If it's an older adolescent, for instance, oftentimes these are kids who hadn't had a reaction since they were very young. So having that reaction in our setting, older, gives a little more feeling of what it's like to have an allergic reaction and to know how to treat it. You're right, it can actually be a positive experience for the family in the end.

Dr. Stukus: Yeah, as you mentioned, the anxiety part of this is so strong for many families. Even if symptoms do occur, it at least gives them some sense of control over a condition which they often feel like they have no control over.

Dr. Bird: Right.

Dr. Stukus: Any other key points to the updated oral food challenge guidelines that you'd like to discuss?

Dr. Bird: No. one thing that we didn't really mention. You did mention the asthma medications. I didn't bring up the fact that patients who are on long acting beta agonists, the question we often get is what to do for those. You don't want to stop those, because we don't want patients to have poorly controlled asthma. But if you can discontinue the long acting beta agonists at least eight hours before the food challenge, then that again should be sufficient. But you don't want to stop that medication for a long

period of time. We just say to stay on the lowest dose possible on a fixed schedule. We don't want exacerbation to play a role here, but if you can limit the long acting beta agonist aspect for at least eight hours, that might be helpful.

Dr. Stukus: Okay. Well, Dr. Bird, I can't thank you enough for being with us today, and walking us through some of the key points of this important guideline. I think this is very helpful, and I'm sure our listeners will find benefit as well. Is there anything else you'd like to add?

Dr. Bird: I don't think so. Thanks for having me. I appreciate it.

Dr. Stukus: Yeah, well thank you. We hope you enjoyed to today's episode. Information about credit claiming for this and other episodes can be found at https://education.aaaai.org/podcasts/podcasts. Credit claiming will be available for one year from the episode's original release date. Please visit http://www.AAAAI.org for show notes and any pertinent links from today's conversation. If you like the show please take a moment to subscribe to our podcasts through iTunes, Spotify, or Google Play so you can receive new episodes in the future. Thank you again for listening.