Webinar transcript: Asthma versus Reactive Airways Disease (RAD)

Dr. Zacharisen: It looks like it's a good day to be inside doing a webinar if it's as smoky in other places as it is here in Bozeman. This is actually a very challenging subject because sometimes it raises more questions than answers, but what we'll be talking about today is reactive airway disease or asthma, so is it asthma or is it not asthma. So, let's go ahead and get started. I specifically designed this so we'll have plenty of time for questions at the end, so we won't go right up till one o'clock.

Let me start with, I do have two conflicts of interests that I just need to make note of, so I do speak for TEVA Respiratory. That's the company that makes ProAir and QVAR, so I won't be talking specifically about medications today but that's important, and then Thermofisher Scientific, that is the company that does the immuno IgE allergy tests.

Okay let's go to the next one, all right, so kind of my plan for the next 20-25 minutes is really to look at definitions like what is reactive airway disease, what is reactive airways dysfunction syndrome, and how is that similar and different to reactive airways, and how do both of these compare to asthma, and then we'll look at some of the diagnoses as far as clinical diagnosis versus coding and as far as ICD-9 coding or the upcoming ICD-10 codes. And then finally we'll talk a little bit about treatment and does it matter, does it matter what words we use. Alright, so I like to start things with a clinical case. It may bring things into perspective for a lot of people.

So, let's start with this, this is a mom, she brings in her two-year-old son and he was doing just fine, full-term, healthy, no problems, and then he was put into daycare and since being placed in a larger daycare he has experienced recurrent upper respiratory infections with coughs, wheezing, difficulty breathing to the point that he's had to go to his doctor or Urgent Care, and he's received three courses, short courses, of oral steroids and albuterol. He gets better, and now in between the colds he is just fine. He has no nighttime symptoms, no exercise or exertion symptoms, and you wouldn't know if anything's wrong at all. In his past medical history, he's a healthy little guy, no eczema, no food allergies, no other nasal symptoms suggestive of allergic rhinitis. Now, mom has allergies and asthma, and his examination is completely normal, so the question is does he have reactive airway disease or asthma? Now that's kind of a rhetorical question because I'll answer it at the end of the talk I hope but this is a question that comes up all too often and this is kind of how it plays out, I think, sometimes.

So, this is the mom over on the left side of the screen and she says, now my little guy doesn't have asthma, does he? And then here's the healthcare provider, well, what he says is he has reactive airway disease, but what he's thinking is well, he has an airway problem, it's likely asthma, it sounds like asthma, but it's hard to prove in a two-year-old. I'm going to treat it like asthma, but if I call it asthma
he's going to be labeled and all these other issues. So, does that sound familiar to anybody? I would say anybody who takes care of children would say, oh yeah. Okay, so really what we're talking about is some medical terminology and let's go through this.

So, infants and toddlers. It's very common for them to have an episode of wheezing, in fact 50% of all infants and toddlers will wheeze at least once. Some of them go on to have recurrent wheezing, and a lot of different terms have been labeled for this, including reactive airway disease. Another one is called transient early wheezers, happy wheezers, recurrent bronchiolitis, and even wheezy bronchitis, so what we end up at the bottom is well, is reactive airway disease, is it equal to asthma. There's some people who use it interchangeably, or is reactive airway disease not really asthma, asthma suspected but it's not confirmed, and so I went to one of my trusty old medical dictionaries, you know Steadman's has been around forever, and it does not have reactive airway disease in that early edition, and in fact the definitions are really hard to come by.

But where do we go when we want to find a definition? We go to Wikipedia. So, this is what Wikipedia says: reactive airway disease is a group of conditions that includes reversible airway narrowing due to an external stimulation and results in wheezing. So, they include in this group asthma, COPD, viral respiratory infections, and others, even pneumonia. Reactive airway disease sometimes is misused as a synonym for asthma and especially in Pediatrics, so the current medical use of the term reactive airway disease is used in Pediatrics to describe an asthma-like syndrome in infants, okay, but it may later be confirmed to be asthma when they're old enough to participate in diagnostic tests like a bronchial challenge.

Well, then I ask myself well, how often are these young children doing a bronchial challenge and I think most people would say we don't do bronchial challenges on children so that's a little challenging itself right there for Wikipedia. So, how do we compare that? If you look up reactive airway disease in the asthma textbooks, the allergy textbooks, the pediatric textbooks, they really gloss over it.

So, what's the definition of asthma? Let's switch gears, okay, because this is from the 2007 National Heart Lung and Blood Institute guidelines, the expert panel report, and asthma is a common chronic disorder of the medium and small airways. It's complex, it's characterized by variable and recurring symptoms of coughing, wheezing, and chest tightness, so the key words here are chronic, recurring, and the three main things that make up asthma are airflow obstruction, and when that happens that's when wheezing occurs, bronchial hyperresponsiveness, and that's the twitchiness of the airways, and then this is all thought to be triggered by underlying inflammation, whether that inflammation is allergic or non-allergic, etc. Now, just as a reminder, there is no age requirement for the diagnosis of asthma, so it doesn't say you have to be over two or over three, so age is not required to make that diagnosis.

Okay, so the last one I want to talk about is the reactive airway dysfunction syndrome. Now, this was described back in 1985 and it's an asthma-like syndrome, usually occurs in adults who have no previous history of asthma or breathing problems, and they develop these asthma-like symptoms after a single
high dose level exposure to some irritating vapor, fumes, or smoke but they have symptoms after that that are just like asthma, coughing, wheezing, shortness of breath. In adults, after high exposure levels to chlorine, ammonia, acid, sulfur dioxide, lots of triggers, they're probably the most, the best example would be after 9/11 and when the Twin Towers in New York came down. The first responders and a lot of people right there in New York, they inhaled all that dust from the twin towers and the explosions and the fires and they, many, many of them, developed RADS, reactivation airway dysfunction syndrome. Again, the symptoms can vary from very mild to even fatal. What happens is, inhaling these fumes, it damages the lining of the airway and it takes time for that to heal, alright, and most people think that it should be resolved within two years, it's what they call the healing plateau. Now, some people classify it as an occupational asthma or a type of asthma, other people say it's not exactly but it's treated like asthma, so the medication treatments are really identical.

Okay, so the question, next question is well, what does our government think? I mean, they have, you know, we can classify things, we need to put them under billing and coding issues, so how do how do people, if they're going to code reactive airway disease, what's used? So, I found a couple of the ICD-9 codes here that are commonly used for people who are trying to describe reactive airway disease without using an asthma code, and you can see there's the 508.8 and 519.8. Both of them describe kind of that respiratory problem not elsewhere classified or due to an external agent. Interestingly, coming up in October when we switch over to ICD-10, there actually is a code for reactive airway disease and you can see it there as you list down, so apparently that will be available for those people who want to use that code.

Okay, now this I thought was one of the most interesting articles as I was trying to find some research on this, and there's two pulmonologists, Dr. Paula Byrne and John Fahey, and their article is published in the American Journal of Respiratory Critical Care Medicine, so a really prestigious journal, and this was again almost 15 years ago, and I think the title is most interesting: reactive airway disease, a lazy term of uncertain meaning that should be abandoned now. That's pretty strong language! They really feel that this is not helpful, in fact they think that it's so nonspecific it really has no clinical meaning, is not only not helpful but it's potentially harmful, and again because people will use this word in the context of various clinical presentations, whether it's bronchitis or bronchiolitis or pneumonia or asthma and not trying to sort through those multiple diagnoses, instead of just using kind of a catch-all word.

So, most times that label of reactive airway disease is used in pediatrics and, as a pediatrician I have probably to admit that I've used it in the past when I'm not sure but especially in the very young children. And, the diagnosis of asthma can be challenging in the pediatric population, one, because sometimes the history is difficult to obtain, you're always getting it secondhand from adult observers, second of all, it's hard to do good quality pulmonary function tests on infants. PFTs which are available are still not perfect, it's hard to determine airway inflammation. You know, you can do a bronchodilator response and see if they get better, but also because pediatricians and those who care for children, they feel that asthma, the diagnosis of asthma may carry a negative connotation and affect all sorts of things for the child down the road, including military service.
Okay, so I think when we think of reactive airway disease, it's kind of synonymous with wheezing, and we have to realize and remember that there's so many different causes of wheezing that the more specific we can be the better. This is not an extensive list but probably the most common causes of wheezing, and you can see asthma is the most common, certainly you can be wheezing as part of an anaphylactic reaction, wheezing can be with bronchiectasis, and bronchiectasis is that permanent airway damage from especially with fungus for example or a foreign body that got in there and that can cause wheezing, the respiratory syncytial virus, RSV, causes a bronchiolitis with wheezing. You could wheeze with bronchitis, you could wheeze with COPD, emphysema, if you have an airway foreign body or even a foreign body in the esophagus, that can lead to a wheezing sound. I've had the experience of picking up a lung cancer patient who presents it with wheezing. People with allergic reactions to aspirin, they can present with wheezing, pneumonia and other respiratory tract infections. Wheezing can be a symptom, now, we don't see epiglottitis too much anymore, that's an inflammation or infection of the epiglottis, because of the vaccines that we have now, but that was an issue, vocal cord dysfunction, so that's a problem in the upper airway at the level of the vocal cords and those people can have wheezing and stridor. It's always important to remember that heart failure can present with wheezing, and also acid reflux. So, wheezing is probably also not the best word to use as a diagnosis because there are so many underlying causes.

Okay, this is just a quick reminder of how we make the diagnosis of asthma. It's based on several things. A history, and that history includes symptoms, when the symptoms occur, what's the timing, what're the triggers, and especially for the pediatric population what's their response to medications. The family history is important. The examination can be helpful, but frequently when they're seen in the clinic the exam can be completely normal, and then we have testing to try to help us determine and rule out other things and confirm asthma. So, lung function, of course it's not really possible to do that in an easy way in children less than 5, but we do spirometry and then you can do a before and after albuterol, so a pre- and post-bronchodilator response, that's probably the most helpful. Chest x-ray, really designed to rule out other causes of wheezing, the implementation of the exhaled nitric oxide, the fraction of exhaled nitric oxide can directly measure inflammation, still not easy to do in children and still considered experimental by many. Then finally, you can look for eosinophils which is more common in children and adults with allergic asthma, and then on this the response to short-acting beta agonists even if you don't do spirometry can give another good helpful piece of information.

Okay, so this next part I want to talk about, is really the discussion that the doctor has with the family, and this was a very interesting study talking about communicating the diagnosis of asthma. The parents say what does he have and the doctor may think one thing and say one thing but it's also important to know what did the parents hear, because it can be confusing, and it can be even more confusing when we use euphemistic synonyms. So, we say reactive airway disease but we're really thinking asthma. So, what they did, this is kind of clever, to compare what the doctors thought and said with what the parents of wheezy children heard they took 34 doctors and 21 practices and they enrolled over 600 patients who were between the ages of one and five with recurrent wheezing. The parents completed a
pre-visit survey and then parents and the doctor completed post-visit surveys, and what they recorded was their diagnosis that they considered the most likely, what they told the parents, and they compared that to what the parents said they heard.

Okay, so what they found was that the agreement between doctors and parents with each diagnosis was modest and I think that was a kind word. They found for wheezy bronchitis it correlated about 25%, for reactive airway disease it was only 8%, and those that were told they had asthma and the parents heard the word asthma it was it was over 50%, so with this what they concluded or what it boils down to is that sometimes health care providers, they fail to tell parents what they suspect or when they suspect asthma. The parents may not hear the diagnosis that the doctor is telling them, but when they received the word asthma compared to the other words they didn't receive it any differently or negatively. So, their conclusion was you know, if you think it's asthma to call it asthma, alright, and that was through the American Academy of Pediatrics.

Okay, now the reason this is so challenging, especially in childhood asthma, is because there are many different phenotypes, so it's not just one type of asthma. As you can see here there are various phenotypes. We know that 50% of children will wheeze but only 30% of infants who wheeze will go on to develop asthma. This is data taken from Fernando, Martinez, and others who studied a large, large cohort, thousands of kids in Tucson, Arizona, and they enrolled them when they were still unborn, they enrolled the pregnant moms and they followed these kids into their teenage years. So, let's look at this, this little table together, so this is the Tucson Children's respiratory study and that first bar there it says never wheezed, so half of children will never wheeze, but half will, and of those 50 percent who wheeze about 20% are considered transient early wheezers, those are wheezing up until age three but they stopped wheezing after age three. Now, these kids actually don't go on to develop asthma. It's thought to be due to anatomically small airways, and as they grow their airways grow and they're fine. They do put a little caveat about a theoretical increased risk of COPD but that's, again, still theoretical.

Ok, so we go to the next, kind of the pink pinkish bars there, and those are the persistent wheezers, okay, now the persistent wheezers, this group is about 14% and these were kids who wheezed when they were less than three and they were still wheezing at six. We break this group up into two: the 40% who were non-allergic or non-atopic, these were kids that had RSV, so RSV, pneumonia, especially if it's severe enough to lead to a hospitalization, is a risk factor for ongoing wheezing or asthma, it's called persistent wheezers, and RSV if you're less than three has been associated with wheezing up to when you're 11, but as you get older, so by the time you're 13, it seems the risk goes away. Now also in that group is the 60% who do have allergies, or atopic, so allergic rhinitis, food allergies, those kids as well as you see at the bottom the late onset wheezers, these are kids who didn't wheeze at all until they were over 6 or at 6, so that atopic group or allergic group that is the highest risk for asthma. 70% will have asthma at age 22, 50% with a history of asthma, the diagnosed or recurrent wheeze, by age 22 and a third will still have active asthma at 22. So that breaks it down to say, so what are these different groups and who's at risk? I think you can see the allergic group is definitely the risky group.
Okay, now this just gives you the same information in a graph form, so the prevalence is on the vertical axis and the age is on the horizontal axis and you can see that one that goes up and right down, that's the transient early wheezers, so they wheeze, about 20% of them, between one and three and then they don't wheeze anymore. You look at the non-atopic group, they wheeze, that kind of peaks around 20% by age three and then it gradually goes down. You look at the atopic group and they start out low but it gradually increases, so total wheezing, that persistent wheeze, goes up to about 30%. So, if you run a line up and down right about age three that's kind of the turning point, are these kids going to continue wheezing or are they not? So, your three-year-olds are where the money is.

Okay so, the next question is what about treatment issues? Are we going to treat children who carry the diagnosis of reactive airways, are we going to treat them different than we treat children with asthma? I think one of the issues that's come, I could not find a really good study on this, but the concern that was pointed out in many articles is that if you label somebody as reactive airway disease then people may not go on to do a thorough evaluation and find the cause, in other words, are we overlooking something that maybe is not asthma, and needs to be treated?

The other problem is medications, sometimes there may be over treatment, other times there may be under treatments, are they receiving medications that are inappropriate, that they don't need? Or, are they not receiving appropriate medication? So, from my standpoint I probably see more kids that come in with a label of reactive airway disease and it turns out they very likely have asthma and they've been under treated, but the over treatment issue can still be an issue.

The other problem is that using the words RAD, it really doesn't address the role of underlying inflammation, so you think of reactive airways you think of wheezing, people think of a bronchodilator, but then they forget about the inflammatory parts that can go along with asthma.

The other problem is we have treatment guidelines for asthma but there is no treatment guideline for RAD.

So, when we see these little ones the question is well, how do we know who is going to go on? I think I said at age three we can use this asthma predictive index, we can use it before three, if you haven't heard of this check it out, it can be really helpful, so the modified asthma predictive index is what I have here, it's the better one I think, and this gives us kind of a cookie cutter look at how to help parents understand if their child either has asthma or is likely to have ongoing asthma. So, you can see the criteria here, a history of at least four episodes of wheezing, only at least one has to be confirmed by a physician in a child with at least one major or two minor criteria. The major criteria are the parent has physician-diagnosed asthma, the child has eczema, or the child is allergic to one or more aero-allergens. The minor criteria, see if you have two of those three, is, one, do they wheeze apart from colds, two, do they have eosinophilia on their CBC, or three, are they allergic to the major food allergens (milk, egg, or peanut). A nice little tool that can be used. What they did, they looked at over a thousand children through 13 years of age and it turned out that the wheezy child with a positive asthma predictive index
at around 2 to 3 years old had about an 80% chance that they would go on to have a definite diagnosis of asthma when they started first grade. I think that's our tool that we can help parents, you know we don't have a crystal ball, but that is our tool.

Ok, this next slide really looks at again the treatment aspect and according to the National Heart Lung and Blood Institute, our asthma guidelines, in infants it was determined that if they have at least three episodes of wheezing in the past year and these episodes last more than a day, it affects their sleep, and these are the risk factors for developing asthma like I just talked about, a parent with asthma or eczema or two of the following, the same things, you see their wheezing apart from colds, diagnosis of allergic rhinitis, or the eosinophilia, that's when a daily controller medicine should be started. So, basically, they're saying these children probably have asthma with an underlying inflammation to start a daily control, whether it's an inhaled corticosteroid or a leukotriene modifier.

Okay, alright, let's change gears just a little bit. One of the reasons that some people don't like to use the word asthma in children as they are concerned that the label will carry through and impact their ability to join the military, and it has in the past but that has changed, so this is information from the 2014 compendium of federal medicine from the Department of Defense, and what the new guidelines say now is that they will accept recruits who had childhood asthma but have not been symptomatic since age 13. So, you could have all sorts of problems until age 13 but after that if you're not having any troubles you should be fine and the reason they did this is because asthma is so common, like I said 50% of children will wheeze, so that really made it challenging for people who wanted to join the military, so the new policy, and they described it as a success, is a great majority of service members with waivers for childhood asthma stay in the military once they get past basic training, I'm not sure if that's because of asthma or just getting past basic training but it looks like it has not backfired and these people aren't redeveloping asthma, if you will, so my answer to "will asthma keep me out of the military?" or, as you see here, will reactive airway disease or exercise induced asthma or asthmatic bronchitis or whatever you want to call it, the new standards will not exclude those young adults if they are asymptomatic after age 13.

Okay, let's wrap this up, I want to use some time at the end so that we can go through some questions and answers or concerns and give everybody a chance, this would be a nice one if we could be face to face but we'll do our best on the webinar. Okay, so here we are, we're back to our little two-year-old and he's the one that had all these recurrent colds and wheezing, and he got better with treatment for asthma, albuterol and steroids, but he was fine in between. If we use our asthma predictive index, he will have an 80% chance of developing asthma. Mom has asthma and allergies, but he's very happy as you can see, working on that drink.

Ok, so let's summarize. Fifty percent of infants will wheeze but only thirty percent of them will go on to have asthma, and of those it's even less that we're going to have persistent asthma as adults. As we know it's about seven percent in the general population and I would say that reactive airway disease is not the same as asthma and that asthma is a form of reactive airway disease but with hyperreactivity to
substances, pollens, dander, cold air, exercise, but reactive airway disease is a very nonspecific term and I think in medicine we try to be as specific as possible.

RADS, the reactive airway dysfunction syndrome, is a specific type of irritant-induced asthma or whether it's occupational or not, again some pulmonologist may say no that's not exactly right, but you probably will not see a lot of RADS. And then finally when it comes to asthma don't be afraid to use the A word. Some parents are likely to know what are we dealing with here and dancing around the word asthma is maybe as frustrating rather than just saying okay, this is what I really think it's going to be, and then finally asthma or RAD or whatever you call it before age 13 will not impact military service.

I think we're going to stop right there, that's the last of my prepared comments, but I am more than happy to try to take some questions and answers and see if there's anything else we can do.

Montana Asthma Control Program (MACP): Dr. Zach, that was really informative, I hope everybody else feels the same way and if anybody would like to ask a question you can feel free to use the chat box or if you want you can also unmute yourself.

Participant 1: I do have a question. So, if a child under three, it's okay to use reactive airway disease unless they meet those criteria, like the parent has allergy, I mean, asthma or the child has allergies, it's invoked by that so if they're just like, getting a bad cold and they start to wheeze, we give them albuterol, we can call it reactive airway disease until they're about three when we can start testing them that's correct?

Dr. Zacharisen: Right, I think that's correct, and I think the other, and sometimes what I do is I call it recurrent wheezing with respiratory infection, so it's very specific, so again it may be coded under reactive airway disease but in the note if you can even be more specific, some people would use the word and I use this, intermittent asthma triggered by respiratory infections, so I think again being most specific and just trying to avoid the big catch word, I think it will be helpful as time progresses when you are able to do that asthma predictive index.

MACP: Okay, we've got one down here from Carrie, we'd like to know is RAD more commonly used for children under three?

Dr. Zacharisen: Yes, I would say definitely. Like Marie mentioned, I think it's harder to make that diagnosis of asthma in less than three, so I would say the reactive airway label would be used most commonly by those taking care of young children, especially less than three, yes.

MACP: Are there any other questions for Dr. Zach? today? Oh, here's one—

Participant 2: So, I have a one-year-old who has been in the ER - like three times and being given albuterol for wheezing with RSV and other respiratory illnesses and they gave her a nebulizer treatment in the ER and the mother thought that that worked better. She does have on the little mask with the spacer and I did the office and it worked fine on her but the mother wanted a nebulizer and a price right
tells me for durable medical equipment that Medicaid will not pay for a nebulizer unless you have a diagnosis of RSV or acute bronchitis and that actually seems odd to me because those are things that are going to go away, unlike if you have asthma or reactive airway disease can you speak to that?

Dr. Zacharisen: Well yeah, well I'm not sure I can speak to price right or the durable medical equipment, I'm not sure who makes those decisions, but it's probably not healthcare providers but more administrators, but that's kind of a whole different ballgame, so I don't know why I think that, you know, I still use nebulizers especially in young children when those problems with coordination or keeping a tight mask on their face for delivery because blow-by really is very, very ineffective, but I don't understand why they would have limitations on that nebulizer, I have not run across that, but I probably don't see that same group that you're seeing.

MACP: We've got another question down here in the chat box, it says the vast majority of patients I've seen recently are middle-aged to geriatric presenting with upper respiratory infection and a history of asthma and or COPD. How do we differentiate and treat the acute problems and then adjust if necessary the maintenance regimen?

Dr. Zacharisen: That's a good question, so I think the one thing we have to remember about asthma if it's early asthma is the chronic respiratory disorder, so those patients may have ongoing airway inflammation and you can also think of it as a volcano. So, asthma can go dormant during some of those adult years and then it can erupt like a volcano under circumstances like influenza, other viral respiratory infections, so what I generally do is treat them as like they're having a usual flare or exacerbation of asthma when they present with those asthma symptoms, whether it's triggered by an infection or other trigger.

Now, the adjustment of their daily controller medicines, I think that's the key. The thought is that infection can induce inflammation and that inflammation can take weeks to go away, so while a short course of an oral steroid may be helpful and indicated I would generally increase their daily controller medicine like an inhaled corticosteroid and the question is how long, and you know the guidelines aren't always clear but I would say at least several weeks, and then the nice part about those adults, you could when you see them and follow-up, you can check their spirometry, so at least we have better tools like spirometry for those adults, but I think the key is treat the inflammation, be aggressive because if it's under treated or untreated it can linger on and that will lead to more hyperreactivity, more symptoms, and less quality of life and less control.

Did I get all those points?

MACP: The person who asked it said thank you in the chat box, so it sounds like you answered it! And we have another, a clarification about providers being reluctant to use a diagnosis of asthma for children under three, could you talk about that just a little bit more, Dr. Zach?
Dr. Zacharisen: Sure, I will, so you know providers, it used to be that if you got the asthma diagnosis you were labeled and all of a sudden you weren't able to participate in sports, you weren't able to participate in other activities, you may have been excluded from, oh all sorts of things, but especially the military, and so people would try to use words, you know, wheezing or reactive airway disease, so that there wouldn't be a label. I think that the hesitancy is probably less in the parents than it is in the physicians because once you say the word then we have protocols, we know what to do, but there's a hesitancy, and especially if the child has only wheezed once or twice, so wheezing once is bronchiolitis wheezing twice is not sure, wheezing three to four times okay now you can start to feel more confident that you're dealing with something of childhood asthma phenotype. I also think the hesitancy comes with parents just knowing that asthma can be dangerous and it can be life-threatening and sometimes they're afraid of that word and then that makes the caretakers afraid to use that word.

MACP: Great, thank you! That looks like it was our last question, so we’ll wrap up for today. Thank you everyone for your time!