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>> Can you guys see my slides okay?

>> Yes.
>> That's the first time I've shared myself. On a desktop.

This is weird. I'm trying to get all the chats and stuff.

Okay. We're going to go ahead and get started.

Welcome, everyone.

Let me...

So, today I wanted to present some of the research I have done in the past...

Definitely a decade, which makes me feel very old right now. Plus ways that we've just recently started to look at that work. And then we're going to talk about that kind of process a little more as we go. And I would love your thoughts on it.

Since I'm presenting, I can't see the Chat, so if you can, feel free to do a Chat. But, also, at any point in time, interrupt me for clarification, to ask me questions. That's completely fine with me as we go.

So, just to introduce myself in my previous life, pre-CED, as a developmental psychologist, I examined -- I looked at parental influences on children and adolescent behavior. So that can range from adolescent risk behaviors, you know, why do they engage in risky behaviors, and how can parents influence those decisions, to other unhealthy behaviors, such as unhealthy eating, sedentary activity. And this was even prior to me being a parent, which as you can

imagine, once I became a parent, then my whole perspective on parental influences changed considerably, and I think my research did too.

So, I've had the opportunity to work with a couple of pediatric cardiologists being in the Department of Pediatrics, and that's when I started to branch off into this childhood obesity area. So, I want to give you a little bit of background on that program. And some of the wonderful things that project did. And then every now and then pepper in kind of what I was looking at in terms of parental influences. Basically the good, the bad, the ugly, that we can do as parents that shape our children's decisions to do healthy behaviors.

So, with that being said, the objectives of this presentation... let me make sure...

The objectives of this presentation are to kind of talk about cardiovascular risk factors in children. And that seems kind of a very new thing to people. Oftentimes we talk about it as an adult issue, and so why are we talking about it with kids? We also are going to talk about this project known as the CARDIAC Project, what it was about, why was it developed, what did it do while it was in place. And then the last thing is we're going to talk about how we can take some things that have been in place for a long time in West Virginia or nationally that may have not been intended to better understand the same things among children with disabilities.

How can we utilize those opportunities, and with a slight change of focus learn more within our target area for the CED?

And everyone can see the slides okay?

They're not too small?

Okay.

So, cardiovascular risk factors, what are we talking about there? Basically often related to heart disease, risk factors that increase our chance of, as adults, having strokes, heart attacks early, things of that sort. And, unfortunately, they are now being seen in our kids. Not just West Virginia but internationally.

So, those particular risk factors that are common include overweight and obesity, and that distinction we're going to get into in a little bit, but basically, for kids, they assess overweight and obesity differently than adults. So we often get this body mass index or BMI number. In kids it's based on age and gender, those height and weight charts that we see as parents in well child checks. It's based on age and gender. So their BMIs are percentiles. Overweight is anything 85th percentile and above. Obesity is anything 95th percentile and above.

Other risk factors include high triglyceride levels, decreased HDL cholesterol, high blood pressure or hypertension, and then elevated blood glucose. This is starting to get us into the Type II diabetes and the metabolic syndrome that we're seeing in more and more of our kids, but more on the glucose and insulin side.

So, really, any program that sets out to look at cardiovascular risk factors and try to prevent stroke and heart attack early would look at these factors.

So what do we know about overweight and obesity in kids? Now, there's a slight term difference between my two slides here that I want to note. There for a while we used the overweight and obese distinction in kids. That's what we use in adults. But just recently we started to just term it all overweight, because there's a huge stigma, as you can imagine, about using the word "obese" with kids, and so in this slide we're going to talk about overweight and obese all together as an overweight risk.

So, we know that we assess overweight and obesity based on percentiles, and it's important to look at that. Many parents ask about, okay, is BMI -- if my doctor gives me a BMI percentile for my child, is that the best type? Probably not. It's the easiest to assess and the most accurate based on the Es, but it doesn't take into account muscle mass. So other things, DEXA scans cost a lot and take a lot of time, so BMI is pretty accurate give or take a few percentiles for the purpose.

You know, in terms of overweight and obesity, it is an epidemic. So it leads to about $127 million in hospital costs annually and just continues to increase over time. And we also know that overweight or obese children tend to become overweight and obese adults.

And part of that, if you think of... and we're going to talk about some of the reasons why someone becomes overweight or obese. Those patterns of behavior or genetics stay with us into adulthood, so there's risks without an intervention stay with us.

So in terms of some stats outside of West Virginia, so 17 -- a little over 17% of kids 2-19 years are overweight. These trends, as I mentioned, have continued to increase over the past 15 years by about 12%. Triple the numbers since 1980s, and that's kind of why we're starting to see and talk about these cardiovascular risks, these adult -- typically adult-type concerns in kids, because kids are having these issues. Kids have hypertension. Kids have high cholesterol. And so we want to increase awareness.

I'm sure many of you have seen this. This is kind of how we've progressed since those '80s. You can see it's a busy slide, but, you know, the white didn't have data. We weren't even assessing that statewide. The light blues had less than 10% of kids who were overweight and obese, with the darker reds being the most, greater than or equal to 30%, a third of them. So over time we start getting into the blues, then we get into the yellows, whereas now and even in 2017 data, primarily, except for maybe one state, all reds, and we've stayed dark red since the early 2000s.

So like I said, an epidemic.

So, with overweight and obesity increasingly becoming a problem, so have these other risk factors, and triglyceride levels -- as a developmental psychologist, before I started with the CARDIAC Project, never would have asked me -- it would have been dangerous to ask me about lipid values or anything like that. But, triglyceride levels are really directly influenced by our diet. So you're going to see elevations in triglyceride levels perhaps before HDL and LDL levels change. Those are with over time.

So, healthy eating or unhealthy eating is going to affect triglyceride levels. Portion sizes... here are a few things that physicians would talk to parents about, and their kids. Because really, interestingly, I argued a lot that kids -- our kids are change agents, and so if they want to implement healthy things in their household, they will push us to do that, where we might be a little lazy at doing that.

Marketers know this more than us. I mean, if you've gone to the grocery store, where are the Sweet Puffs or Cocoa Puffs? They're at the bottom so kids can see them, versus the healthy parts. So we can focus on the food availability, you know, candy drawer, how do you look at sweets and how they're divvied out at home. Portion sizes. If anyone has seen a portion size plate, we have gone way past that no matter what type of food you're talking about.

And then counteracting messages. My kids knew the golden arches before -- I don't know, they just knew those. And, again, marketing is very powerful and they can sell things, and that can go from like Tyson chicken and, you know, different types of meat that may or may not be good for you.

Instituting family meals we've learned recently that if you sit down and have a meal without the TV or phones going on, you realize how much you're eating and when you're full.

Whereas if you're not, you're distracted and you might eat more than you would.

And then, of course, role models. We can serve as role models for our kids. And that's going to affect triglyceride levels.

When we talk about, in a little bit, about HDL and LDL and insulin and glucose, getting into the realm of diabetes, there for a while you only heard of Type I diabetes, people diagnosed with this when they were very young.

Now it's nothing to have several kids in a classroom who have Type II diabetes. And, so screening for diabetes is becoming more common among kids than it ever has before. And you can see kind of down here the ADA, American Diabetes Association, is now saying pretty much a child, the 85th percentile or above, overweight or obese, have a family history, a lot of people in West Virginia, a lot of people talk about sugar, they have a history of diabetes. And then certain ethnic groups are more at risk than others.

So based on other risk factors, definitely recommend screening, but some people implement that, some physicians do that regularly.

Okay. Hyperlipidemia is basically anything abnormal in your lipids, HDL, LDL. And this was changed partly because of this project I'm going to talk about. There for a while it was selective screening. And now they have gone toward a more universal screening, if possible. But those require resources. So definitely overweight children should be screened between 2-10 years. Again, more and more kids are having high cholesterol, and whether that needs to have statins or other pharmacological treatment depends, but you need to look at that. It's important.

We're not going to get into the physiology of it, but kind of why this is all coming into place, and why would a surveillance program need to look at this?

So, we're going to be talking about insulin, glucose values. We're not going to talk about VLDL. But they did look at that, they did a full panel on the kids.

So basically, you know, at an early age you are just putting a burden on the system in the body. Whether it's through diet or sedentary or a combination of both.

Hypertension. The CARDIAC Project started to look at blood pressures in the schools. Again, late in the '90s, and from that realized that our medical students really weren't getting a lot in terms of training of getting blood pressures. And nursing students were but not our medical students. And so you have two numbers on your blood pressure, your systolic is the top and your diastolic is the bottom. Diastolic can be hard to hear. If you're in a loud school, you've got to be really good at picking up that diastolic.

And so this turned into, you know, how to do it effectively, and now our med students get it on a regular basis.

So here are some of the recommendations. Screening started at 3 years, has been a recommendation of the AAP, particularly in our local chapter in West Virginia. Part of the issues that people -- or the errors people make is they use an adult cuff on a child. And you can't get an accurate reading. Some new cuffs have been developed for overweight or obese children because they're bigger than a child cuff but not an adult cuff, so it's right in the middle. So companies have started to make different cuffs for accuracy.

And then if you pick it up in a child, more than likely it is hypertension. So you want to follow it.

And this is just kind of one of the many low charts that people can use. Of course, a high systolic, high diastolic, and then what level are you in based on this. And then what recommendations should you provide based on your systolic and diastolic.

And, again, a lot of these are modifiable lifestyle behaviors. So using less salt, being more physically active. For adults and adolescents, less alcohol consumption, if the adolescent is drinking, you want to assess that. Weight loss might resolve this. And then the DASH eating plan is fruits and vegetables, low on dairy, that kind of thing.

All right. So, again, I don't have Chat up, but let me know -- interrupt me if you have any questions.

So the coronary -- and I'm never good at naming things and I always felt this was a fantastic title.

So Coronary Artery Risk Detection in Appalachian Communities, or the CARDIAC Project. Just fantastic.

So the project started -- a pediatric cardiologist by the name of William Neal met a nurse, Valerie Minor, at some conference, and they were saying, we need to start this. They started -- he's now a senator in collaboration with Ron Stallings from Boone County. They started in three counties, Boone being one of them. And at the time -- unfortunately, it's kind of changed -- fifth grade was right before puberty. Puberty can change all of this in terms of lipids and blood pressure and all of this. So getting the kids before they hit puberty. Fifth grade was the perfect option.

Over the years they added kindergarten, and that's where I started when I started with CARDIAC. We added eighth grade and ninth, and second grade came on when the governor wanted BMI assessments on most kids.

And that was about the same time that all states were assessing childhood obesity among all students.

So, I'm going to focus more on the fifth grade. Because fifth grade they're older. And the new thing -- no one ever thought this would happen. Dr. Neal and Valerie said, we're going to do fasting lipid profiles on these kids, which is a blood draw, in the school. Right? So you get parent consent to draw blood, phlebotomists were volunteering time to do it. You're never going to do it. And they did it. They got it. And the kids and the parents ended up using it a lot for -- in the place of well child follow-up. Because it was a lipid, it was a blood draw, it needed to be fasting. So they did that in the mornings and they would give kids breakfast after the screening.

Did some kids faint? Yep. It tended to be particularly -- a lot of eighth-grade and ninth-graders. The little ones did fine. And particularly the big guys would faint. But they had nurses there. The medical students, phlebotomists, people were there and followed up easily.

So what was involved on a screening day?

So about a week before the screening took place, you got this packet, this nice consent packet that ran through everything. And in there it had a parent consent, and it was -- parental consent was required by one parent's signature. Family history was listed on there. Whether you had diabetes in your family history, whether someone has had a heart attack before the age of -- let's see, 55 for men and 65 for women is the risk. And then a couple other risk factors.

They would sign that and bring that back to the school with the teacher's help. They would bring the fifth grades into the cafeteria, and then they would go through the screening day, which is height -- which was all done in privacy, because even now in fifth grade, they're wanting to know their weight. So actually we fixed that by converting the scale to kilograms. No one knows kilograms and they wouldn't know how much they weighed, particularly the girls. Height. Weight. Blood pressure. Then they take the fasting lipid blood draw. And acanthosis nigricans, AN for short, it's on the base of your neck or collar area, or it can be here in the elbow, the creases, and it's really dark. And sometimes if it's higher levels, it can be raised, a raised skin. And that's an AN marker particularly. And then they would note the level of it. It's really dark, pigmented, and sometimes raised.

So they would look through, they would double check, because, you know, we're talking about kids. They run their finger through just in case it was dirt and make sure it wasn't a mark. And then note if it was.

Because that's a pre-marker or can be a pre-marker of diabetes. So you want to look at that.

Then the results came back from Lab Corps to the parent, and if the parent gave consent it would go to the primary care provider as well for follow-up.

So what did they find? Again, this was just on fifth grade.

Well, I gave numbers. So this project was so impressive to me. So 19 years, just finished recently and they're trying to get it back in a different way, but 19 years, after the third year, it was on the state line budget. It was a line item on the budget for the state.

More than 20,000 kindergarten students, 99,000 fifth grade, a little over 1,000 ninth grade. 91,000 second-graders and 444 eighth graders were screened. That's incredible.

We did not have a state surveillance, and this was in the late '90s when no one was doing this for kids, particularly fasting lipids, so no one knew what was going on with kids, but West Virginia had it. I'm very proud of that piece, that this project gave us that.

In terms of the overall stats, 18.7 of our kids were overweight. That's over the 19 years. Of course, that increased, but overall an average.

28.4 were obese. If you combine that, which I should have done, what is it... 46%, a lot of children are either overweight or obese on average.

In terms of having any abnormal lipid, whether it was HDL, LDL, any of that, insulin, glucose, a quarter of our kids had some abnormal lipid. That was amazing and worrisome, but amazing.

And then for the AN marker, 5% of our kids had AN.

If you look at this by risk, by county... okay, you can see -- and these are very busy, but pick a county that you're interested in, of course. So the red, similar to the BMI charts, the red is the most prevalent.

Of course, you know, near my hometown, you know, this is the belt that always has the high risk factors. So it was great that they were in Boone County from the start and stayed the whole 19 years. Raleigh County is my home county, but look at all the purple. And 25 to 29% were obese. And even the lowest are at least 20% of our kids.

For hypertension, some similarities in counties, in having a higher -- like a third or more kids with hypertension. Again, the purple, 20 to a quarter overall had hypertension. Some counties had far lower. Based on the screening.

So this is AN, the pre-diabetes marker. A lot more purple here, but a couple reds that had more than 10% of kids having a pre-marker for diabetes. And then any abnormal lipid. Again, more oranges and reds in the southern part, but still northern as well.

And a lot of purple.

So this was a statewide issue. It quickly went from a surveillance project, which is "let's see what we have" to "okay, what are we going to do about it, this is obviously an issue." We can, I would propose, as a center be in a similar situation where we don't know a lot of the answers, we don't have the prevalence rate for Picket, you know, disability or risk factors for certain things or service utilization, and once we know that information, the next question is going to be "what are we going to do about it?"

So we need to be ready. That hit the CARDIAC Project and became an important element from its I'd say fifth year on to the 19th and started a new intervention component.

So when I started, of course, a data geek and I want to know a little bit more. And, of course, what I shared with you is I wanted to know more about parental influences and what was going on in the home and what was the school environment like. If we wanted to intervene, what are we looking at?

And so we started this additional survey that would go home after the screening took place. They had to consent again, because it was an option. They didn't have to fill out an additional survey as part of it. So, it's a lifestyle survey. Not everyone wanted to. And we're going to talk about that. But it went on from 2004 to 2010. And in that we asked more questions about medical limitations. That's where we get information about children with disabilities. But I'll state right now that we didn't look at that as close as we should. Physical activity, family efforts being done, family efforts to live healthy and parental influences. So that was a bigger thing as part of this survey.

So, the deeper look is now looking at that-you know, still looking at all 19 years. Let's look at fifth grade students for that particular time period. Okay?

And if we look at our numbers screened, so this is all -- proportion of fifth grade students in the whole state that were screened for cardiac. We were slightly less than half throughout this period. And we did comparisons that... was that half maybe worse off in terms of risk factors than the other half? And there were no differences. So it was just kind of a thing to work out that way.

The orange is overweight. Over that period, this is for all fifth grade. And then obese kind of creeped up to the third and then went down. But no big increase.

For lipids and AN, the yellow is HDL. So abnormal HDL, less than 40 is the percentage screened who had abnormal.

Green is AN, and it shoots up to 27.5 that last year. I think that might be a mistake, but I'm checking on that.

And then LDL kind of stays around 6.3, 7% of the population screened.

HOMA, which is kind of a diabetes measure, and insulin, these are the percentages -- or proportion of those screened who had it. Again, in that 2008-2009, we tended to have a peak in HOMA, which is insulin and glucose combined for that. But a lot of kids have abnormal HOMA levels.

So, from our deeper dive or our questionnaire, we have a much smaller sample. So from the 20,000+ kids screened -- actually, in fifth grade it's about 70,000. We had 457 who completed the survey. Know that. That is a limitation.

Of that 457, the percent who noted at least one disability was about 11.4 or about 52 students.

So, much smaller. But the intent was, remember, at that point in time when we did this, thankfully we asked the question, but the intent was not to separate and compare these at all. We're doing these now, but definitely wasn't the intent.

So if we compare the kids whose parents completed the survey who had disabilities, that's in the orange, with those who did not report at least one disability, look at how the risk factors change, okay?

This is very similar to what we know from the adult literature, that adults with disabilities have greater risk for cardiovascular risk factors.

And sometimes they're fivefold. But it's very hard to find anything on kids and comparisons. So similar to adults, we see increased percentages of the kids with disabilities, 25 versus 18.7,

for instance, were overweight. A third versus 28 of kids without disabilities were obese. And a third were hypertensive versus 25% of those kids without disabilities.

Similarly, any abnormal lipids, while it wasn't as significant, 28% versus 25% of kids with abnormal lipids, and then AN with higher prevalence.

Okay, so what does this tell us?

So, I'm speaking the praises of CARDIAC, right? West Virginia was one of the first ones to look at cardiovascular risk in kids and many people thought that was crazy, but it wasn't too crazy when the results started coming in.

CARDIAC started looking at the fact of why we need to look at these things in kids. And what could happen if not prevented. So, what do we do next? They started all of these new programs for kids with cardiovascular risk factors of any age, okay?

Problems. While CARDIAC was established for all kids, it really, in practice, did not get as many kids with disabilities, right? And I'll give you some examples. Does everyone know how to get an accurate weight on a child in a wheelchair?

Does everyone know how to get an accurate height on a child with a disability, depending on that disability? Those things were not incorporated in the education like the blood pressure were, and could be even now. It is the first time we looked at it.

So while it wasn't excluded, it wasn't included consciously either.

And same thing for the interventions. The interventions were focusing on increased physical activity at home, increased physical activity in schools. And I don't know if you've ever seen this, but you see the kids in wheelchairs. You see the kids who might need adaptive physical activity over on the side of the gym while everyone else is doing the program.

So, we can do a little bit better with that and raise awareness.

Okay, what our findings show is that if we don't -- you know, if we can only do one thing, we need to do -- provide more interventions for kids with disabilities, because they have greater risk factors. And, again, that includes educating providers, educating families, and educating schools and communities on what would be needed.

In terms of some of the treatment options, some of those might be the same. An example, one of the big barriers for parents, a barrier can be saying the common statement of, "Well, he has a lot of meat on his bones, he'll grow out of it," if it's a child. And that doesn't tend to happen. Some of it does, but not for -- when you're talking about obese and some of the things like that.

Some people will say, "Well, that's genetics." And have this fatalistic piece of "what am I going to do about it?"

Some of it is genetics based. So some of the things I included here were some of the cool things that came out of it. And are we doing this for kids with disabilities as well? So some kids -- I'll give an example. It was a fifth grade -- and she's now graduated and married. She was a student here. But fifth grade student who ran cross country, healthy weight, wouldn't know anything was up, had a cholesterol of 260. So, that -- if you have cholesterol levels, HDL, LDL, at certain levels, then you start thinking, this might be genetic. Because they have really high levels. So then you also start to think, okay, which parent has it?

Now, these parents, their kids are fifth grade. They're young. They're probably not even screening themselves for high cholesterol. Again, because the societal piece is older. That's later.

So this reverse screening option came about where then you screened the parents and you figured out the parent was probably not getting treatment for an extremely high cholesterol level. And so lipid clinics were started to kind of refer those families, family counseling, things of that sort. Sometimes now in the literature you're seeing these questions of statins are excellent for some kids in terms of particularly the genetic predisposition. But what kind of effect do you get on being on statins for so long, since childhood? You know, so that's what we're looking at.

And there's another interesting fact that I always love the hear the story, was, you know, our heritage in West Virginia came a lot from Scotch Irish heritage with the mines. Where we see similar patterns of cholesterol issues is in Scotland and Ireland. They had the similar rate. So you can't -- you can directly map it back to our heritage in many ways of these genetic predispositions.

But that doesn't overtake our lifestyle modification. And so multidisciplinary weight loss approaches, and, of course, doing it in the right way so that you don't develop or support an eating disorder, particularly in older kids.

For kids with disabilities, teaching -- asking our teachers to go through these workshops they have were now an activity plans and talking to people about adaptive physical opportunities and continuing to be healthy role models is important.

This is another one that we could do that I think is definitely pertinent to kids with disabilities and kids in general. So, you know, there's so much -- there's just so much time in the school day, and we're looking at schools to do everything. And so PE class was one of the ways that kids would get physical activity, but now, you know, high school, you get it -- well, it depends. Sometimes you get it in ninth grade and then you don't get it at all. And ninth grade, it's like one term of it. We know girls tend to decrease physical activity in middle school and that's when we start to see PE opportunities.

So one way to combat that is that the teachers are learning more about these active academics. So you can learn math while standing up.

Really what we should be doing instead of sitting down and talking about this is to do, you know, standing up, moving around, learning about math, jumping up and down. So they have different activities that they can do. You don't have to -- you can be in a wheelchair, you can work on upper body. You can move around and get that aerobic capacity going without, doing like shuttles and stuff that used to happen in PE.

And we know from other research that the more aerobic capacity or activity you can do during school, the more oxygen to the brain and the better kids do on standardized test taking and tests in general, and behavioral in the classroom.

Behavioral issues reduced.

So, incorporating that will help.

I included these resources, and this will be available on there with the active links. This is for kids in general, and then there's some adaptive pieces through here that talk about physical activity as well as dietary guidelines to do it the right way.

And then I wanted to give a shout-out to our own Nutrition Services Program in particular. We have a website, a web page that talks -- it's really good. I was double checking it and making sure that it's referencing it the right way. It's very thorough. And I think it would be a really good resource for people, as well as tips on how to measure height and weight, wheelchair accessible scales, things of that sort.

And then if you don't know, the Center, we do have health and wellness as an area of emphasis and we will be providing over the next few years more resources on healthy eating and physical activity, as well as stress reduction for people and kids.

So with that, does anyone have any questions?

And let me...

Switch it back.

It's very quiet.

>> Hey, I've got a question.

>> Lesley Cottrell: Yeah, Jenn?
>> In the beginning you were talking about assessing children and not based on BMI but based on their -- where they are in percentile for weight and height. How does that account for muscle? I'm just thinking about my daughter who is very tall for her age, and she is -- you

know, she falls above -- in the height part at least, in the weight as well, she's always right on the tippy-top of the line for the normalized curve. So...

>> Lesley Cottrell: And it doesn't account for muscle. So things like -- some people say that waist circumference is actually a better measure of risk for weight -- you know, because the most at risk is if you're the -- what is that? -- the pear shaped, if you're carrying most of the weight in middle.

So waist circumference is increasing, you kind of want to watch that, and then they have criteria. But, yeah, BMI percentile, particularly the weight percentile does not factor in muscle. You would have more weight, because you are more muscular, more weight would be registered. And then it's a ratio kind of deal. So that would always kind of tip you over a little bit.

Yeah, so you want to... go ahead.
>> And would you advise, you know, as children enter middle school, should they be having a complete CBC and fasting glucose like once during that time frame in middle school?

>> Lesley Cottrell: I think if you have a family history... and, again, parents are young, right? So we are -- our grandparents often don't talk about it. We talk about sugar more than cholesterol in families in general. But if you know that there is a family history of premature heart attack or stroke or cholesterol, I would. I would recommend that.
>> Thank you.

>> Lesley Cottrell: You're welcome.

Any other questions?

All right. Well, with that...

Thank you, Anastasia. We'll be sharing this more. This is something we proposed for AUCD. So we'll share this, and I think Roger was on here... yeah, Roger is on here. So, we have the libraries, and we have access to families who might want more information about this. So, we're going to build up our resources so that people can give recommended information out.

So, more on this later.

But thank you very much. And have a good day!

>> Thanks, Lesley.
>> Bye, thanks, Lesley.
>> Lesley Cottrell: Thank you!
>> Bye!
>> See ya!