

## **MCHB/DHSPS August, 2008 Webcast**

### **FASD: Identification of Children at Risk**

August 20, 2008

JOHANNIE ESCARNE: Good afternoon, my name is Johannie Escarne in the Maternal and Child Health Bureau. On behalf I would like to welcome our presenter and the audience to the webcast titled "FASD: Identification of Children at Risk". Before I introduce our presenter today I would like to make some technical comments.

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Now I would like to welcome our presenter, Dr. Ira Chasnoff. He's the president of the children's research triangle. At the conclusion of this webcast participants should be able to cite the latest relevant data. List three characterize of Children with Fetal Alcohol Syndrome.

DR. IRA CHASNOFF: Good afternoon, everyone. We're going to start out this afternoon talking about a system of care in which we can integrate screening for alcohol use during pregnancy into primary prenatal care which is a goal that many of our Healthy Start sites are seeking. We call this if we start with slide number two, we call this is SART system. It stands for screening assessment, referral and treatment. The goal of screening is to identify women at risk for substance use. In the primary prenatal care setting we aren't concerned with making diagnosis of alcoholism, alcohol abuse, all misuse but identify the woman at risk. If we find indeed she is at risk for using alcohol, we want to conduct an assessment. We call this the field assessment right inside the primary prenatal care setting so if we find she actually is using alcohol during the pregnancy, we can then move

to a referral process. And an integral part of the referral process is the brief intervention. Finally, assuring the woman does have access to treatment if appropriate. Now, the system is based on a screening instrument we call the four Ps plus.

If you go to the next slide. The four Ps plus is a number of screening instruments to identify women in. There is the TASE which is used to screen for alcohol. There is the audit C, there is the tweak. There are several other instruments. We prefer the four P's plus because it's a validated instrument specifically for pregnant women and screens for not only alcohol but other substances as well. Now, this is based on five simple questions. The first P is for parents, did either of your parents ever have a problem with alcohol or drugs? The second P is for partner, does your partner have a problem with alcohol or drugs? And the third P is for past. Have you ever had any alcohol? Now, it's key to recognize here that for brevity's sake I have put alcohol on this slide. But actually you can't say alcohol to most people. You have to say have you ever had any beer, wine or liquor, because most people do not recognize beer or wine to be a form of alcohol. These first three questions under parents, partner and past have no statistical validity. They have no ability to tell you if the woman is at risk or not. Merely introductory. In the month before you knew you were pregnant how many cigarettes did you smoke in the month before you were pregnant how much beer, within or liquor did you drink? If a woman had cigarette or any type of alcohol use in the month before she knew she was pregnant that's a positive screen. That means that she is at risk. This has significant predictive validity. Now, these two questions have to be phrased exactly as they're written. If you say in the month before you were pregnant, how many cigarettes did you smoke, you get a different answer than if

you say in the month before you knew you were pregnant. That's call normalizing the question. And so we ask both questions that way. The other important thing to note is that we don't say did you smoke cigarettes, you say how many cigarettes did you smoke? That's the difference between a closed ended and an open-ended question. And from our research, we have found that normalizing the question and phrasing it as an open-ended question significantly improves the validity of the questions and in data we recently published, the four Ps plus have a negative predictive validity of 50% and a positive -- I said take wrong. It has a positive predictive validity of 50% and a negative predictive validity of 97%. That means 97% of the women will be telling you the truth. We go to the next slide .

You can see this is a sample of the four Ps plus instrument. You can see how the questions are represented graphically in the top half. Those are the four Ps plus questions and then if a woman has any alcohol or any tobacco use, you can see that you go to the bottom half of the questions, those are the field assessment. And if the woman has an answer that falls into any of the gray area on the bottom half of the form, that means she is using alcohol, tobacco or illegal drugs and that woman gets a brief intervention. So this has been a successful model that we've tried and that we're using in multiple state.

The next slide shows you the various states in which programs are using the four Ps plus. I'll present to you now very briefly some data from a recent study we completed in California.

Next slide. And on this map of California you can see the various counties that are involved.

We go to the next slide, the sample population, these are 16 counties which are 17 health jurisdictions in the State of California. We had a total number of 113,000 screens on 78,951 women. So the data I'm going to present to you are from the first screens on these close to 79,000 women.

Next slide. The screening results, what we find is in this sample from California, about 13% of women are using alcohol in the month before they knew they were pregnant so that means in the earliest part of pregnancy. I'm sorry, they're using tobacco 13% in the month before they knew they were pregnant. 16% are using alcohol and 7% are using marijuana. So if we combine those and account for women who are probably drug user so we only count them once, overall we get a 23% positive screening rate. Now, I should mention in the State of California, we do include a question in the screen in the month before you knew you were pregnant, how much marijuana did you smoke because we've found that marijuana smoking is so prevalent that it's almost considered a legal drug in the way that people think about it. So this instrument can be tweaked for any particular region of the country. But in summary, 23% of the 78,951 women had a positive screen.

Next slide. Now, on the assessment what we find is what we find in most communities, which is although the women are using prior to knowledge of pregnancy, once they find out they're pregnant, on average about 50% of the women will stop using. So you can see

here that the tobacco use rates went from 13% down to about 7 1/2%. Alcohol use rates went from about 16% down to about 6 1/2%. Marijuana went from 5% down to 3%. And the other illicit drugs such as cocaine, methamphetamine also went down. What you see overall if you do not include tobacco, we've eliminated tobacco from this count, 19% of women were using alcohol or illegal drugs before they knew they were pregnant and that drops to about close to 9% after they find out they're pregnant. So about a 50% drop. The 19% use rate that we found in California is fairly similar to our other larger populations that we've study nationally. So this is fairly consistent. Now, the next question is who is using? So because we have a large enough dataset, we were able to look at some special populations.

Next slide. We're going to look at 20,500 women on whom age was collected. And you can see we had 2,600 women who were ages -- these are all pregnant women. But one of them was 8 years old so it goes down to 8 years through 18 years of age. The majority of the women are 19 to 35. And then we had a sample of almost 1,300 women who were 36 years and older.

Next slide. Now, although what most people assume is that adolescents are going to have the highest rates of substance use, what we find here is for tobacco and alcohol and overall positive screening rates, women in their prime childbearing years, 19 to 35, have the highest rates. The only drug for which adolescents had the highest rate was marijuana. And you can see about 7% of adolescents were using marijuana.

Next slide. When we look at race and ethnicity, we had race and ethnicity data collected on close to 36,000 women. And you can see that we have Caucasian, Hispanic, African-American, Asian Pacific islander and Native American women. These women are all in California.

Next slide. When we look at the rates of substance use among the various racial and ethnic populations, we find something that most people would find quite surprising, which is the highest rates consistently of substance use occur in the Caucasian population. The other thing that you will note is that Hispanic women have the lowest rates of substance use. And I should mention that where you see an asterisk by each of the drugs or categories that means it is a statistically significant difference in rates among the different race and ethnicity groups. The other thing that is of note here is that the African-American population, along with the Caucasian population, has a high rate of marijuana and alcohol use also. And the Native American population has elevated rates, so the only population that has a relatively lower rate is the Hispanic but you can see that even the Hispanic population has a rate of about 14%. Overall positive screens.

On the next slide we divided the women according to payer source. We had a population of private pay. Another group in Medicaid and women who had no insurance or were self-pay. When we look at these populations, we find that the lowest tobacco rates are among the private pay population but significantly higher rates of alcohol use in the private pay population. So high that if you look at overall positive screens you see that the private pay population has the highest rate of positive screens. Now, because of time I'm not going to

go into the other finding from this study but in summary what we found is when we did regression analyses and we began looking at the various risk factors, what we found was that the women who were most likely to drink alcohol during pregnancy were Caucasian private pay women who were well educated and who lived in counties in California that produced wine. As you know, California is a big wine-producing state and counties that are wine-producing counties have the highest rates of alcohol use. Now, this was just an introduction to give you an overall -- an overview. In this study 19% of women, around 20%, were using alcohol during pregnancy. This is a significant number. In our other states these rates go even higher. In our other states that we're working with we find rates of 20 to 25% of pregnant women drinking alcohol during the pregnancy. Which then it is no surprise that fetal alcohol syndrome is a concern among the populations we serve. What we do now is talk about fetal alcohol syndrome. Recognition, diagnosis and the implications long term for the child who has been exposed to alcohol.

Now, this next slide gives you the definition of fetal alcohol syndrome. In a newborn, fetal alcohol syndrome, the first is low birth weight, which -- I'm not sure of everybody who is on the call so I want to make sure we define all of these very carefully. Low birth weight is defined as any baby weighing less than 2500 grams, about 5 pounds 8 ounces. The second is central nervous system affects which in the newborn is often defined as small head circumference. Average head circumference of a newborn infant at term is 35 centimeters. Anything less than 33 centimeters is a small head circumference. Now, this is significant because the way the head grows is by the brain pushing out on the skull so when you're saying a child has a small head circumference what you're actually saying is

he has a small brain size and this has obvious implications for long-term development. The third component is the facial dysmorphology. Changes in the facial structure.

On the next slide we see criteria for fetal alcohol syndrome. They tend to be short and thin. The central nervous system effects is mental retardation. It's the most common cause of diagnosable mental retardation in the United States. The average I.Q. is about 68. The third component is the facial dysmorphology. The changes in the facial structure do not go away. They may seem to fade a little bit as genetics takes over as the child gets older but the facial features do not go completely away. So these three criteria, if a child meets these three criteria, that child has fetal alcohol syndrome. The problem is that most children who are exposed to alcohol do not have fetal alcohol syndrome. The majority of the children we see with alcohol exposure have normal growth and do not have failure to thrive. Central nervous system effects they have normal I.Q.s so that the great majority of alcohol exposed children have I.Q.s that range from 85 to 100. So it's not the mental retardation. What we see is the neurocognitive or neural behavioral changes in the children and that has significant implications for learning and behavior long term. And we'll talk a lot more about that in a moment. Then the third component, as I said, the facial features don't go away but many children do not have any facial changes. In fact, the timing for the alcohol exposure is very specific and in animal models, in a rat model, the pregnant rat has to be given alcohol exactly on day seven or eight for the fetus, for the child to have any clear facial dysmorphology so you can see how narrow the window is for alcohol exposure and facial changes. So let's talk about each of these criteria for a moment and we'll start with the facial dysmorphology.

On the next slide -- this summarizes what we were talking about just now. And this is the diagnostic terminology that is currently in use in the United States. If a child meets all three criteria for fetal alcohol syndrome, growth retardation, the facial malformation and neurodevelopmental disorders, whether you can confirm the prenatal alcohol exposure or not, that child has fetal alcohol syndrome. However, if the child looks normal. Has normal growth, he does not have any of the facial features or he doesn't meet criteria for the facial features, but he has the neurodevelopmental problems and you can confirm that the child was exposed to alcohol, that child is said to have alcohol-related neurodevelopmental disorder, ARND. It replaced the previous term fetal alcohol effects, this is ARND and these are the two diagnostic criteria that are most commonly used. FAS or ARND.

Now, to help broaden the definition and to put children who are exposed to alcohol into a broader perspective, on the next slide you can see that the CDC developed new terminology which they call fetal alcohol spectrum disorders, FASD is an umbrella term and its purpose is to include all children whose mothers drank during pregnancy that have been affected either physically, mentally, behaviorally or from a learning perspective. And so the broadest terminology is FASD but you have to be very careful. FASD is not a diagnostic term. And if you're going to use diagnostic terms, you should use FAS, ARND or any of the variations of those two.

Now, on the next slide this is a drawing of a child with FAS features. The thing to remember is that children -- that alcohol is a mid-line -- it effects everything in the mid-line

of the body. That's why children with alcohol exposure have higher rates of heart deformities, renal deformities, genital deformities and it's the mid face that is affected so we call this mid-face hypoplasia. Undergrowth of the mid-face. If you look closely at this drawing you can see this child has a flattened mid-face. The eyes are short, short fissures with epicanthal nose a flattened nose. If you're sitting in a room. Look at the groove that runs down this area of the face. It's called the philtrum, you can feel it if you feel above your lip you'll feel that groove. Children exposed to alcohol, this groove is absent. There is a thin upper lip, small mouth and receding jaw. These are the classic features of FAS. Now, in this presentation I'll be showing you now some pictures of children from our program. However, if you're using the handout and following the handout, I cannot include children's pictures in the handouts because of HIPAA and confidentiality regulations. So you will not in a handout have the following pictures I'm getting ready to show you.

On this next slide, this first child, this is a newborn with fetal alcohol syndrome. Now, his eyes are covered but you can see the flat nasal bridge, the upturned nose, the philtrum that's very flat and you can see it's elongated. There is no groove there. The thin upper lip. The receding jaw.

Also notice that the ears are low set and you can appreciate that on the next slide looking at the child from the side. You can see that the ears are down well below the level of the eyes and rotated posteriorly. That's something we frequently find are low set posteriorly rotated ears. These are all features of fetal alcohol syndrome.

On the next slide is another newborn demonstrating the facial abnormalities and again now this baby is crying so it's hard in a newborn to say much about the eyes but look at the flat nasal bridge, the upturned nose, the flat, elongated philtrum and the thin upper lip.

On the next slide, this is a child who was first sent to our clinic at six months of age. Now, she was sent to us because of developmental delays and at six months she was functioning at about a six week level. If you look closely at her, you can see especially her left eye the fold that comes down over the middle of the eye, the flat nasal bridge, the upturned nose, the flat philtrum from the bottom of the nose to the top of the lip, the philtrum is flat with no groove and a thin upper lip. This is a classic feature -- these are the classic features of fetal alcohol syndrome.

On the next slide you see two children. On your left is a six week old with FAS. Again, the flat nasal bridge, the thin upper lip. The flat nose. The same child on your right at two years of age and what this shows is that the facial features really do not go away. You can see the rounded eyes, the epicanthal folds. Look at the long, flat philtrum, the thin upper lip and also the ears are quite low set and stick out.

The next slide, this is a child who came to our clinic at eight months of age and she was significantly delayed functioning at 18 months had the developmental capabilities of 8 to 10 month old. She had delays in speech, language and motor development. If you look at when her facial features you can see very easily the epicanthal folds over the eyes. The flattened philtrum and the thin upper lip. This is another child. Just another example. You

can see the rounded eyes, the flat nasal bridge, the flat philtrum and thin upper lip. Those of you that are clinicians also know this child had chicken pox when we saw her. These two girls, there is the older sister and her non-biological younger sister. Both these girls were adopted.

The baby, if you look at the picture of the baby, is named Brittany, and you can see in this picture of about three months of age, you can see how rounded the eyes are with the epicanthal folds, the thin upper lip, the on the next slide this is Brittany at nine months. The facial features do not go away and you can very easily see the features here.

Next slide, this is Brittany at 15 months. On the next slide, two years. On the next slide, three years. And again I'm not pointing out all the features. I think you can see them at this point but I want you to be very aware on the next slide that the features are not going away.

Next slide. Next slide. And our final slide on Brittany -- I'm sorry, this one and then the next slide, here is our final slide on Brittany at 12 years of age. And what you can see is she looks much younger than 12. She is a nice looking little girl but you can see the facial features. Look at the epicanthal folds, the flat philtrum, the thin upper lip. These are classic features of fetal alcohol syndrome accompanied by significant behavioral and learning problems for Brittany.

The next slide is Lucas. I show you Lucas because as an African-American child, he has a fuller mid face so it's sometimes more difficult to recognize African-American children who have been affected by alcohol exposure. You can see his eyes look perfectly normal. But he does have a flat philtrum, a thin upper lip and most especially look at his right front middle incisor and you can see the large cavity in that tooth. Alcohol, because the teeth are a mid-line structure, alcohol exposure during pregnancy will affect the develop of the enamel of the teeth. Some children have enamel dysplasia. The children have a high rate of dental caries. Now the question comes up how much is too much alcohol?

We go to the next slide on risk factors. The first thing we'll talk about is dosage. Everyone wants to know how much is safe to drink. It's very clear from what we know about the current science that no amount of alcohol is safe to drink during pregnancy.

Just as an example of this on the next slide, this is a study out of Detroit in which the investigators there followed women during pregnancy and followed the children. And what they found was that if a woman was a light drinker, that is drinking one drink or less per week, the children had hyperactive and aggressive behaviors. If the women were a positive -- were a moderate to heavy drinker, meaning more than one drink per week, the children had delinquent behavior and overall problem behaviors. But most importantly in this study, what they found was that any alcohol use at all during pregnancy produces a three times increased risk for delinquent behavior in the child. Any alcohol use at all. Animal studies that are now supporting this and I'm going to give you our website address and you can go into our website. We have a Power Point -- narrated Power Point

presentations on the website that you can go to. It's free of charge and there is one in particular that is labeled research basis of the no use in alcohol during pregnancy. We've reviewed all the literature that supports this statement that no amount of alcohol is safe. As a sideline, I might mention to you that part of the work we're doing through an MCHB-funded grant is we have been working with the public and with professionals on communication patterns. How best to communicate this message of no alcohol use. And we present it to large focus groups with all ages people, all genders, some of the focus groups were in Spanish. So we worked with many groups of people to find out how to communicate this message. What we found is when you say there is no known safe amount of alcohol to drink during pregnancy, or if you say there is no safe amount of alcohol to drink during pregnancy, people take this to imply that there is some amount that they can still drink. When we change the message, when we inverted it and said no amount of alcohol is safe, then the focus group participants understood the message, you can't drink anything during pregnancy. And from a public health perspective, that is the message that we are communicating. That no alcohol is safe.

On the next slide I've listed some of the other risk factors and this is where it becomes important. This explains why dosage is not the only criterion. It is not just how much you drink but it's also the pattern of exposure. Binge drinking every once in a while is much more dangerous than chronic drinking because the woman passes higher blood alcohol levels to the fetus when she binges. Timing of the exposure we'll talk about a little bit in a moment. Genetic variation.

On this next slide are twins that we see here in our program. We have several twin sets in which one twin has fetal alcohol syndrome, the twin on your right, and the other twin is normal. This is called discordant. What that means is that both fetuses were exposed to the same amount of alcohol at the same point during pregnancy in the same pattern but one twin is affected and the other twin is not. What we think this is probably due to is the difference in vulnerability. The genetic vulnerability of each fetus so that the fetus on your right simply had a higher level of vulnerability on a genetic basis, vulnerable to the effects of alcohol. Whereas the fetus on your left had genetic protective factors. That's why we can't turn to any one woman and tell her how much alcohol is safe for her to drink because we don't know anything about the genetics or vulnerability of her fetus.

Next slide, we also know there are maternal characteristics, racial and ethnic differences in the metabolism of alcohol as well as age. And as a woman ages, her risk -- the risk for her fetus from exposure to alcohol increases. Alcohol interacts with other -- with nutritional variables as well as with other drugs the woman may be taking.

And the next slide with the three brothers, these are three biological brothers. They had the same mother and father but they demonstrate one of the maternal risk factors we were talking about. If a woman continues to drink with each pregnancy, the resulting baby will be more severely affected by the alcohol exposure. So these three brothers, the middle brother is 11 years old in this picture and you can see he has minor changes in the facial structure. And he is doing quite well academically his I.Q. is in the normal range and he needs a little help at school with tutoring and structuring but he's doing fine. To your left,

the second son is 8 years old in this picture. You can see clearly that his face demonstrates significantly more changes in the facial structure. And his I.Q. is in the low 80s. And then if you swing to your far right, the youngest child, he's 6 years old in this picture. He has the full facial dysmorphology of fetal alcohol syndrome and his I.Q. is well down below the level that is mental retardation. So this is a demonstration that with each succeeding pregnancy if no interventions occur the woman's subsequent children will be more severely affected.

On the next slide, this is a demonstration of exactly where the damage from prenatal alcohol exposure occurs. It's all about the brains. These are two brains. On your right is a 6 week old who died of sudden infant death syndrome. That's a normal-looking brain. On your left is a brain of a child who died with fetal alcohol syndrome. What you see the difference here, of course, is size but more importantly, look at the texture or the surface of the brain. And what you see on the brain on the right, the normal brain, there are more folds and contours in the surface of the brain. Those contours have a name.

If you go to the next slide, this demonstrates what happens during the third trimester of pregnancy. The last three months of gestation, as through the first year of life, that is the most rapid period of brain growth in all of human development. In fact, during third trimester the fetal brain grows so fast it won't fit inside the skull. In order to fit inside the skull the cortex of the brain starts folding in on itself and you develop these folds in the brain that we call this name. What if that doesn't happen because the woman is drinking alcohol?

If you go back a slide to the slide with the two brains, the brain on your left, you can see it's much smaller but look at how smooth it is. And what happens in third trimester if a woman is drinking, then the folds in the brain don't occur. Alcohol disrupts brain cell migration. Instead of getting the folds in the brain you get a flat surface to it. It's called smooth brain. The reason this is important is as the folds in the brain develop during third trimester, you are increasing the surface area of the brain and there is a direct correlation between brain surface area and I.Q. So what you're looking at on the left here is a small brain with -- this is the mental retardation of fetal alcohol syndrome. This is a third trimester effect. If you identify using pregnant woman and get her off the alcohol before the third trimester there is a better outcome for the child. We can identify pregnant, alcohol-using women, give them a brief intervention, get them off their alcohol by third trimester and you improve the outcome of the child.

We go forward two slides, we now have a drawing of the brain. This is just to get you oriented because now we're going to talk about what happens if a woman drinks during the first trimester of pregnancy. Now, as you look at this drawing, the person is facing to your left so you can see the frontal lobe with the pre-frontal cortex, the parietal lobe toward the back. The occipital lobe in the very back of the brain and the temporal lobe on the sides.

Next slide. Now, the reason this is important is because the way you take information into your brain is through multiple pathways. So as you are listening to this teleconference, the

auditory information is entering your brain, traveling along the eighth nerve, which is the acoustic nerve and inserting on the mid-line of the brain. Now, we're also giving you pictures, so as you see these pictures, the visual information enters your eye and travels along the optic nerve that goes to the back of the brain in the occipital lobe. You see with the back of your brain. That's where visual information enters. And then taste, touch and smell enter through the parietal lobe. This is the path information takes as it moves into the brain. The job of the brain is to take that information and integrate it. So many of you have heard of sensory integration, this is what it's referring to. You integrate the information and store it in the back of the brain as perceptions and memories.

Next slide. Perceptions and memories are stored in the back of the brain and when it's time to use the information you move it forward to the front of the brain to the pre-frontal cortex. That is the area that is the regulatory center of the brain where Dopamine fires off and tells you how to respond to the information you've taken in.

The reason this is important for our discussion today, next slide, is that the part of the brain that helps or guides integration as well as transmission of information from the back of the brain to the front of the brain is called the limbic system. This is a simplified drawing of the sub structure of the brain. You see the entire sub structure. It's called the limbic system. If you look at the top of that sub structure you see that arch. That arch is called the corpus callosum. We're looking laterally across the brain from left to right. There are two areas for our discussion I want to point out. First it's that outer shell of the brain that's called the cortex. And look at the cortex and you see all the folds. You can see all the

lines. Those are the folds in the brain we talked about before. And then you can see the corpus callosum going from the front to the back of the brain. Now, the corpus callosum is responsible for two major functions. Number one it sits in the mid-line of the brain so the corpus callosum is responsible for moving information between the right and left hemispheres of the brain and the other important function is that the corpus callosum regulates emotions. It's how you control your emotions is through the function of the corpus callosum. Let me introduce you to a few of our children. You have this drawing -- this MRI of the normal. The MRIs you're about to see on the screen are not included in your handout because we cannot hand out -- we have permission only to use this in presentations but we cannot hand out MRIs of the children.

So the next slide now you see in the upper left-hand corner the normal MRI and in the larger MRI is one of our children. And you can see right away that his mother obviously used alcohol in the third trimester because look at the disruption of the cortical structures. And you can see the decreased number of folds in the cortex as well as the smooth surface of the brain. This is a classic picture with significant mental retardation. This man's I.Q. is in the low 40s.

Now, this next slide is that child's younger brother, remember what we said about each child if the mother continues to drink, each child gets worse? This is a good example of that. This child again has significant, if you folds in the brain and his I.Q. was in the low 40s.

Next slide. This in the upper left-hand corner is the MRI of a child we saw when he was about eight years of age. His parents had gotten an MRI as well as a speck scan. Now, look at the upper left-hand corner, which is the MRI. You see where the arrow is pointing at the corpus callosum it's flattened in a good number of children. It affects especially verbal regulation. We have found a lot of these kids have verbal learning disabilities. Now, the parents, we do not do speck scans but the parents had already gotten one and the brightly colored pictures are the speck scans. They don't show anything besides the same problem, that flattening of the corpus callosum that you can see on the MRI.

On the next slide, you see the upper left-hand corner is the normal and then two children, both of whom had mothers who drank alcohol heavily. The child on the bottom left has significant disruption of the cortex as well as you can see -- look at the corpus callosum and see how it's distorted and follow it back from the front. As you get a little past midway toward the back you can see thinning of the corpus callosum. The child on your right, if you look for the corpus callosum, you'll see it's barely there.

On the next slide, the bottom left, this is a child with a Genesis of the corpus callosum. Genesis from the Bible means beginning. AGenesis means no beginning. This is a child whose mother drank heavily before she knew she was pregnant. This child then has aGenesis of the corpus callosum. On the far right on the bottom this is another child, her mother was a bartender at 24 years of age. She was, to quote her, the mother has been 17 years clean and sober, but talking with her now she tells you about when she was pregnant she was a bartender, putting down shots of alcohol all night long every night,

and using methamphetamine. This is what you see here, the cortex. A Genesis of the corpus callosum and a destruction of part of the brain probably from the methamphetamine exposure. This is what alcohol can do many times even in the earliest part of pregnancy before women realize they're pregnant. Now, what are the implications? If we look at the top left picture which is the normal MRI, most of our children have normal MRIs. You're not going to pick up anything. Even a child like this, even if they have only minimal changes in the corpus callosum can have difficulties. Another part of the brain that's affected is the hippocampus. It's located right below the corpus callosum. We had a little girl named Suzy. 8 years old at the time we were seeing her for this. The mother's complaint is that she was running into street. She would see cars coming and she would say I would see the car but she'd run out anyway. She was very impulsive. What we found is she had 20% reduction in the size of her hippocampus. Now, the hippocampus happens to be the juncture point between visual input, that is she saw the truck coming, and motor output, that is, being able to link that visual image formed in the occipital lobe, to be able to link it forward to the front of the brain, the prefrontal cortex where Dopamine would fire off and say there is a truck coming, stop running. Susie is a child who was not able to get that information up to the prefrontal cortex because the damage to the hippocampus. So you can look at all the various parts of the brain and each of those areas will give you different findings in behavioral neurobehavioral difficulties. In sum, what we see in older children exposed to alcohol is they have a lack of behavioral -- they're very impulsive, poor attention, very distractible and highly active. If you think about those first five components, that's a classic picture of attention deficit, hyperactivity disorder. And 73% of our studies -- in our studies here at children's research triangle, 73% of our alcohol-exposed children

meet DSM-IV criteria for ADHD. What differentiates the alcohol and drug-exposed children from other children with plain old classic ADHD is that our children also have emotional dysregulation because the effect of the corpus callosum. They can't regulate their emotions and regulate their affect and have poor executive functioning. Now, what is executive functioning?

Next slide. Executive functioning is not measured by I.Q. Executive functioning is a type of intelligence that's required to carry out goal-directed behavior. That is you can think about and plan and complete a task. That's executive functioning. And it's been shown that children who have been exposed to alcohol have significant difficulties with executive functioning and this has major implications for long-term development and learning.

So what it comes back to is prevention, prevention, prevention, if you go to the next slide this is a website we have developed for our MCHB grant. If you go to this website, we have all sorts of free materials available. We have curricula available as well as narrated Power Point presentations on the impact of fetal alcohol syndrome and alcohol-related neurodevelopmental disorders on children of all ages from birth to three through adolescents. There are a wealth of materials available to you. I hope this information has been helpful to you and Johannie, if you have any questions we can take questions now.

>> Thank you, Dr. Chasnoff. Right now we only have one question but I think you may have just answered it. That question was what was the web address for obtaining the

Power Point on the research basis of no alcohol during pregnancy. Is this the same site to receive the information on the focus groups on marketing this information?

>> Yes. You can go to this website and if there is something you need that you can't find specifically, all you have to do is email us and we'll be glad to send you out whatever we have. Now, the information on the focus groups is not yet published but we have put it together for our reports that we have made back to MCHB and we'll be glad to make that available to you.

>> Thank you, Dr. Chasnoff. If there any other questions, you can go ahead and email them to me now and I'll see if there are any questions in the room. The next question is given that over 50% of pregnancies are unplanned, how can one help women to prevent?

>> I think that -- I know in working with a lot of the Healthy Start sites, one of the important components of all of our work is interconceptional counseling. We have, in addition to the information I told you about, we have developed for our MCHB project brochures that can be put out in waiting rooms or that you can use in your clinical setting and again, we will be happy to make that information as long as the supplies last. We can send you copies of those brochures for your -- for your clinical programs. And so we have to get the message out. I think in any -- we've done a lot of public health campaigns and have developed posters and other materials, so all of that is on the website and if you see something you would like, certainly all you have to do is email us and as long as our supplies last, we'll be happy to send you supplies of prevention materials. The other thing is, I think that screening, however you're going to do screening, whatever screening instrument you're

going to use, screening should be done with every pregnant woman. I know that in the general world, people think oh, they can define high risk populations and when people talk about high risk they're talking about poverty and women on Medicaid, women of certain racial or ethnic groups. And I think what our studies have shown and what other studies have shown is that all pregnant women are at risk for alcohol use and we have to make this a routine part of interconceptional care as well as a routine part of all prenatal care. We have to talk to women and educate them about the dangers of any alcohol use during pregnancy.

>> Thank you, Dr. Chasnoff. The next question is, is this disorder genetic and what is the probability that a mother will pass it on?

>> Well, actually I've been doing this for 32 years now and so I have lots of cases of children that I followed for many years who have FAS and ARND and have now had children. This is not a genetic problem. The only way a child can develop ARND or FAS is if the mother drinks during the pregnancy. The father's alcohol use at the time of conception does not produce fetal alcohol syndrome nor is a mother genetically able to pass this on. I would caution you though in our study of children with FAS in general we find from various populations we worked with, 31% of women who have children with FAS themselves have FAS. That is, they were exposed to alcohol prenatally also. It's not genetic but it is certainly a, you know, alcoholism occurs in family clusters and I think that's -- that is a risk. If you see an adult woman with FAS, you have to counsel her and make sure that she realizes she cannot drink during pregnancy.

>> Thank you, Dr. Chasnoff. Another question about linkages in the community. Has any contacts been established with the wine and liquor industries to publicize the importance of prevention?

>> Yeah, this is some very exciting work we're doing. In fact, in one of our counties that we're working with, we developed a poster campaign that we got the three wineries in the county to sponsor and now when you go to the movies in that county, when you go to the movies and they show all the advertisements ahead of time while you're sitting waiting for the previews to come on, there is a big poster that comes on. It has pictures of the owners of the three major wineries in that county and the caption says, we don't want you to drink during pregnancy. We have done quite a bit with -- in some counties I'll tell you, another county we worked with we went to them and showed them the data in their county. The high rates of alcohol use during pregnancy and asked the winery owners to participate in a campaign and their response was that wine should be one of the major food groups. And it has no implications for pregnancy. You're going to get all sorts of different responses but we are working in various counties trying to bring the liquor industry into the prevention component. They should be helping pay for prevention campaigns.

>> I agree. Thank you, Dr. Chasnoff.

>> A little aside there.

>> Yes. I don't think we have any more questions. If you have anything that you -- any closing remarks you would like to make, just to give the audience just another minute or so to see if any last-minute questions come in.

>> We've been very lucky over this last two years to have been funded to develop these materials. We're waiting to find out if the project will continue. We're hoping we'll have another year coming up. Certainly watch the website and please, we want to get this information out. There would be no charge to you at all as long as our grant is still going. So we can get any of the materials you see sent out to you that are, you know, on this website that you have the address in front of you now. So please use the information. If you have questions or want further information, contact us. We are happy to do anything we can especially with all the Healthy Start and MCH sites.

>> Thank you, Dr. Chasnoff. There is another question. If there is no genetic basis for FASD why do the symptoms worsen with each subsequent pregnancy unless the woman's alcohol consumption increases?

>> That's a great question and unfortunately the answer is, we don't know. There have been some studies trying to look at is it that with age the woman just keeps drinking more, but those studies haven't really panned out. So we don't really know the reason. I can give you my theory and please understand this is not based in research because we haven't done this study. I don't know of anybody that does. But what I think is probably the issue that as a woman continues to drink, there is more damage to the liver. And the liver is

what metabolizes alcohol. So I think the answer might lie in the fact that as a woman continues to drink, she damages her liver she's not able to metabolize alcohol on as well so she passes a higher blood alcohol level to the fetus. That's my theory, unproven.

>> Thank you for at least trying to present a theory.

>> We're trying to understand. It's a great question and it will take somebody younger than me to do a long-term study.

>> One of our participants wanted to know -- stated that they could email you but wanted the know what your email address was.

>> You can contact me either through this website you see here or my personal email is I Chasnoff @ CR-triangle.org. So it's I Chasnoff @ CR-triangle.org.

>> Thank you so much. I think that we are concluding now our question and answer session. If you weren't able to send in a question, please know that if we get it after the closing of this webcast that we will email you afterwards. Well, on behalf of the Division of Healthy Start and perinatal service I would like to thank our presenter and the audience for participating in the webcast and our contractor the Center for Advancement of Distance Education at the University of Illinois at Chicago School of Public Health for making this technology work. Today's webcast will be archived and available in a few days on the

website [mchcom.com](http://mchcom.com). We encourage you to let your colleagues know about the website.

Thank you and we look forward to your participation in future webcasts.