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bar, garnering worldwide attention to preventing FASD. He assisted the University of Alaska, Anchorage in a \$400,000 yearlong study using dispensers in bars. He was a keynote speaker at the First International Conference on Preventing FASD in Edmonton, Alberta, CA. He currently is the Founder and CEO of Crotega Safety Solutions.

FETAL ALCOHOL SPECTRUM DISORDER

A call to action

te·rat·o·gen stems from the Greek word *teras*, meaning 'monster' - a drug or other substance capable of interfering with the development of a fetus, causing birth defects.

Jody Allen Crowe, M. S. Prepared for:

The Office of Pete Kelly

2/21/14



Dear Alaskans,

You are changing the world! Never before has a governmental body with the stature of the Alaska State Legislature, taken on the task of eradicating Fetal Alcohol Spectrum Disorder (FASD). Your commitment to this task will take you on a journey impacting not only your next generation of children, but also the children of the world.

A journey has a starting point and you are at that starting point. Throughout the course of the upcoming years, we will have more accurate information on the teratogenic effects of alcohol, on what works and what doesn't in the field of prevention, who is most at risk, and what this epidemic is doing to our schools, communities, and nation. This document attempts to bring you the most current information possible to give us a common understanding of the task ahead.

The science is compelling. Alcohol is the most powerful teratogen consumed by pregnant women today. It does more damage to the developing fetus than crack, cocaine, or heroin. The damage is lifelong. The brain is particularly effected. FASD, in effect, is an acquired brain damage, occurring before the baby is born and impacting, and in many cases, disabling the individual for the rest of his or her life. Prenatal exposure to alcohol is the leading cause of lowered academic ability and increased social/behavioral issues, overwhelming our schools and communities.

There is very little research on effective strategies for preventing FASD. In the past forty years since Dr. Ken Jones and Dr. David Smith named Fetal Alcohol Syndrome (FAS), the main focus on prevention has been awareness. Studies are finding the rates of drinking when pregnant have not significantly decreased in the past 20 years. The rates of binge drinking by women have increased significantly, now matching rates found in men. Binge drinking and unplanned pregnancies go hand in hand. Binge drinking is particularly dangerous to the developing fetus. Many women, who would never drink when pregnant, expose their developing fetus to alcohol unknowingly before they find out they are pregnant.

We all need to share responsibility in this effort. Men engage in partnership drinking, encouraging their significant other to drink to justify their own drinking, drinking in front of their partner, and, in some cases, forcing the mother-to-be to drink with them. Studies have shown in most cases, when the man was drinking, the woman was drinking. Any effort of prevention needs to include and focus on men, as well as women.

Our systems are overwhelmed with 'multi-million dollar babies', brought on by prenatal exposure to alcohol. Premature FASD babies can cost millions in the first year of life, sadly, in some cases, with the baby dying due to failure of the damaged organs. Ones who live continue to require ongoing medical care, many times for the rest of their lives.

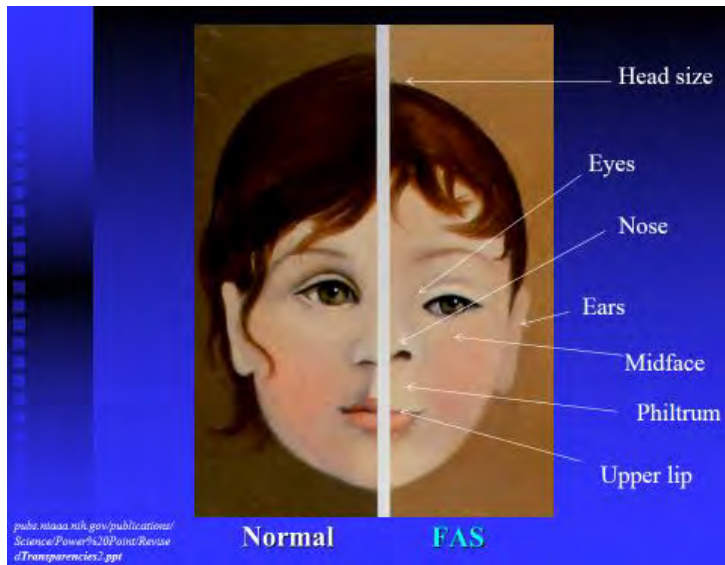
Any discussion about FASD is incomplete without looking at the impact on our criminal system and communities. Emerging research is showing high percentages of prison inmates having been prenatally exposed to alcohol, with the crimes ranging from fraudulent check writing to murder. Juvenile crime is rampant among FASD adolescents. Crimes have victims. Our communities suffer without knowing the root cause is prenatal exposure to alcohol.

I leave you with this parable. There was a village by the river. The river was the lifeblood of the village. It was the source of food, travel, and integral to their spiritual life. All day the villagers expended their energy making a living from the river. One day, a villager saw a baby floating down the river. She pulled the baby out of the river. Soon, more and more babies floated down the river. The villagers were spending most of their time saving and raising the babies that floated down the river. One day, when more babies were sighted in the river, a wise elder was standing on the river bank while others were overwhelmed by the flood of babies. "Help us," the others yelled. "No," the wise one said, "I am going to go up stream and stop the babies from being thrown into the river."

You are going upstream. It is the right thing to do.

Jody Allen Crowe

Fetal Alcohol Spectrum Disorder



Prenatal exposure to alcohol can cause damage exhibited by:

- Smaller head size,
- Anomalies with the eyes,
- Anomalies with the nose,
- Misshapen ears,
- Flat midface
- Indistinct philtrum
- Thin vermilion of the upper lip

as well as up to 61 different physical and psychological disorders⁽¹⁾

Fetal Alcohol Syndrome is a little used medical diagnosis that requires observable deformity around the eyes, philtrum and upper lip, as well as a psychological assessment, and documented evidence of alcohol consumption by the mother.

- “FAS represents the largest environmental cause of behavioral teratogenesis (causing malformations of an embryo or fetus) yet discovered and, perhaps, the largest single environmental cause that will ever be discovered.” Ed Riley, PhD ⁽¹⁾
- “Prenatal Exposure to Alcohol is described as “the most frequently known teratogenic cause of **mental deficiency** in the western world” Sterling Clarren, MD ⁽²⁾

Fetal Alcohol Spectrum Disorder is a non-medical description of a constellation of conditions related to damage to the brain and body as a result of prenatal exposure to alcohol, without requiring the observable physical features of FAS.

- “Children with and without physical features of fetal alcohol syndrome display qualitatively similar deficits.” Ed Riley, PhD ⁽¹⁾

Other terms related to prenatal exposure to alcohol:

Fetal Alcohol Effects, Alcohol Related Neurobehavioral Disorder and Alcohol Related Birth Defects. In 2013, the Diagnostic and Statistical Manual IV introduced Neurobehavioral Disorder Associated with Prenatal Alcohol Exposure as a condition in need of more research. .

When does a woman know she is pregnant?

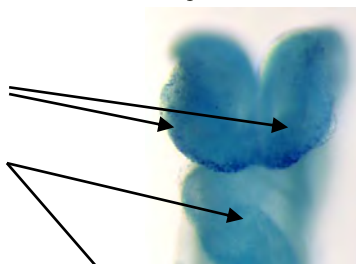
The human embryo attaches to the uterus at twelve days following conception. At eighteen days following conception, the embryo begins to receive all the nutrition needed for development through the placenta. From this point on, any alcohol in the bloodstream crosses through the placenta and is shared directly with the developing fetus.

The damage starts early!

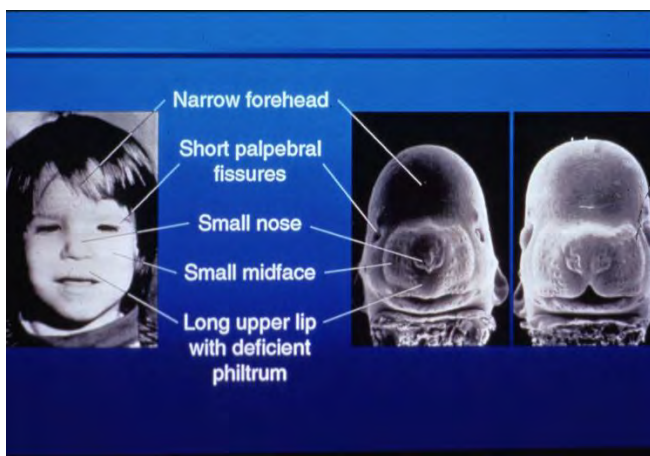
A mouse embryo, at a stage corresponding to a 22-23 day old human embryo, shows dead cells (dark blue) in the developing heart, face and brain 8-12 hours after one exposure to alcohol. ⁽³⁾

Developing brain and face

Heart



- Central Nervous System (CNS) damage can occur starting around the third week (21 days) of the pregnancy. ⁽³⁾
- Classic FAS facial features are a result of heavy alcohol use in a very short window of time between three and six weeks of the pregnancy. ⁽⁴⁾



This rat pup (center) was prenatally exposed with one dose of alcohol, resulting in all the FAS characteristics shown on the child on the left. Ed Riley ⁽²⁾⁽³¹⁾



Alcohol is a 'midline teratogen'. Shown are the midline points of the mouse embryo that merge to make the face and brain. This is similar to the stage of a human embryo at 22-28 days.

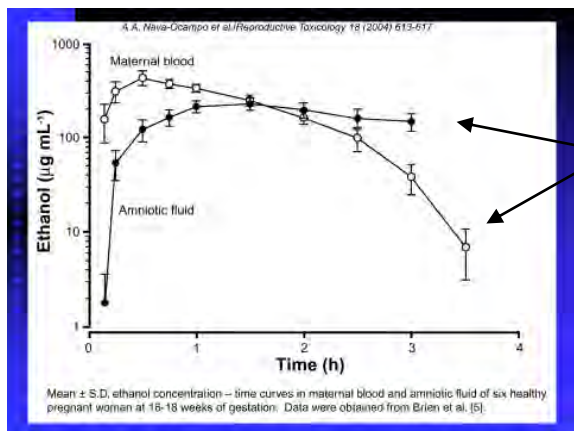


The arrows point to the midline of the embryo that makes up the face and brain.

Prenatal alcohol exposure damage is dose related.

- How much alcohol is in the bloodstream?
- When during the pregnancy is alcohol in the bloodstream?
- For how long is alcohol in the fetus?

“My baby sleeps all week when I get drunk on the weekends.” This statement was reported to a teacher by a student who overheard her pregnant aunt laughing about her unborn baby hardly moving during the week after she was drunk on the weekends. ⁽⁴⁾



The blood alcohol level of the pregnant mother rises quickly after one drink and starts to decline in 45 minutes, while the amniotic fluid surrounding the fetus rises and stays constant. The fetus expels the alcohol through urine into the amniotic fluid, then drinks the alcohol-laced amniotic fluid. Studies have shown alcohol can remain in the amniotic fluid for up to twice as long as in the bloodstream of the mother. ⁽⁶⁾

Alcohol can cause damage at any time during the pregnancy.

First Trimester exposure could result in, but is not limited to: ⁽³⁾⁽⁵⁾

- Structural damage to the face, body, and brain.
- Damage that results in FAS facial features
- Dis-organization of brain cells and migration of cells to the wrong locations
- Internal organ damage

Second Trimester exposure could result in, but is not limited to:

- Brain damage
- Internal organ damage
- Smaller body and head size

Third Trimester exposure could result in, but is not limited to:

- Lowered IQ (the human brain grows at its greatest rate during the third trimester.)
- Brain cell death due to neural cell damage
- Internal organ damage
- Smaller body and head size.

Prenatal exposure to alcohol significantly increases the risk for: ⁽⁶⁾⁽⁷⁾

- Miscarriage
- Stillborn
- Pre-term delivery
- Sudden Infant Death Syndrome

Prenatal exposure to alcohol significantly increases the risk for:

- Cerebral palsy ⁽⁸⁾
- Epilepsy ⁽⁹⁾
- Suicide ⁽¹⁰⁾
- Altered heart function ⁽¹¹⁾
- 61 medical diagnoses or psychological diagnoses ⁽¹²⁾



Cleft palate or cleft lip in 7% of FAS children.

Of all the substances of abuse (including cocaine, heroin, and marijuana), alcohol produces by far the most serious neurobehavioral effects in the fetus.”

IOM Report to Congress, 1996

Who is Drinking When Pregnant?

Quick facts ⁽¹³⁾⁽¹⁴⁾⁽¹⁵⁾⁽¹⁶⁾⁽¹⁷⁾⁽¹⁸⁾⁽¹⁹⁾⁽²⁰⁾

- 59% of women in the United States 18-44 report drinking alcohol.
- 50% of all pregnancies are unplanned.
- Over 78% of teenage pregnancies are unplanned.
- There is a correlation between teenage drinking and teenage pregnancies.
- 54% of births during the age 22-29 are a result of unplanned pregnancies.
- 31% of births to married women are a result of unplanned pregnancies.
- Binge drinkers have a much higher rate of unplanned pregnancies.
- Unplanned pregnancies are at a high risk for prenatal exposure to alcohol.
- Binge drinking by women is more prevalent in cold climates.
- 60% of women who reported alcohol consumption also reported that they did not learn they were pregnant until after the fourth week of gestation.
- Binge drinking by college-aged women have risen 40% in the past 20 years.
- Up to 40% or more of pregnancies have been exposed to alcohol.
- Canada reports up to 79% of children have been prenatally exposed to alcohol.
 - 79.17% of babies exposed to alcohol
 - 37.20 % of babies exposed to binges in first trimester
 - 15% to 18% continue drinking through the pregnancy
 - 4% heavy drinking throughout the pregnancy
- Self-reporting by the mother is highly unreliable.⁽²¹⁾
- Drinking during pregnancy is under-reported by 300% according to a study done in Sweden.⁽²¹⁾
- The woman most likely to not tell the truth about drinking during pregnancy is the woman who is the heaviest drinker.⁽²¹⁾

The demographics of women most likely to drink during pregnancy in the following order:⁽²²⁾

- White, single professional female, making more than \$50,000 a year in an urban setting
- Low income, blue collar female working in an environment with a majority of men.
- Foster teenagers
- Indigenous women



Men tend to be partnership drinkers, many times putting pressure on their significant other to drink when she is pregnant.

Multi-Million Dollar Babies

This could be happening in your community! Brady, Rory and Ari tell us the story of the devastation of prenatal exposure to alcohol.



Rory, on the left, lived for 18 months. During that time, she had eleven heart surgeries. Ari, the smaller of the two on the right, is under constant medical care.



Brady's surgeries



Brady is a non-verbal 15 year old who will need adult care for the rest of his life. His diagnoses are FASD, Autism, Seizure Disorder, Scoliosis, and Severe Mental Retardation with the intellect of a one year-old. He has had five surgeries in the past two years on his back, knee, hips, toes, and left leg. His adoptive parents estimate he is already a 2 million dollar baby. ⁽⁴⁾

A 20 year study in Germany of hundreds of FAS children revealed: (23)

- 89% had Mental and Motor Retardation
 - 80% had speech impediments
 - 20% had hearing problems
 - 72% were hyperactive
- 20% has Autism/Aggressive/Social Problems
 - 29% had heart defects
 - 10% had kidney defects
 - 46% had genital deformities
- 37% had either a Concave or Pigeon Chest
 - 7% had a cleft palate
 - 44% had a spinal dimple

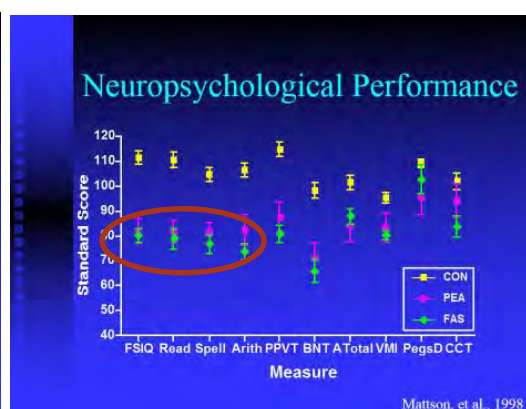
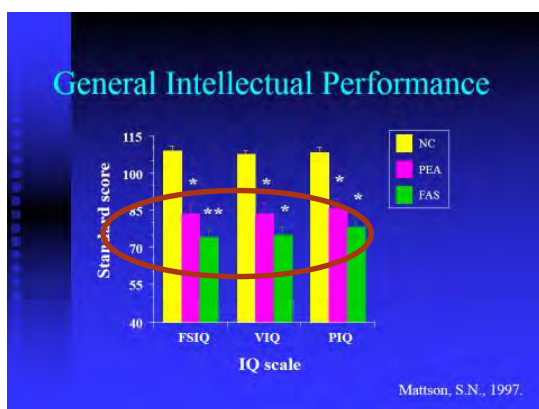
A psychologist in Isanti, MN, with four adopted FASD children, reported over \$1,000,000 health cost alone in 2006. (24)

Educational Implications

- Low levels of alcohol consumption during pregnancy can result in mental health issues with adolescents. ⁽²⁵⁾
- Children exposed to prenatal alcohol experience significantly more mental health problems, including hyperactivity/inattention, and behavioral, emotional and peer relationship problems. ⁽²⁶⁾
- Math abilities are particularly damaged by prenatal exposure to alcohol. ⁽²⁷⁾
- Prenatal exposure to alcohol is linked to Autism Spectrum Disorder ^{(28) (29)}

.....“Some of the children with FASD also meet the diagnostic criteria for an autism spectrum disorder..... It is true, wealthy families are more likely to seek developmental/behavioral evaluation for their children who have neurodevelopmental disorder. Therefore, there are undoubtedly children of wealthy parents who share an autism spectrum disorder diagnosis, who actually have an FASD, based on the reluctance of some medical providers to make an FASD diagnosis...” (see full quote in bibliograhpy)
Dr. Eugene Hoyme, Medical Genetics and Pediatrics, Sanford Health, Rapid City, S.D. ⁽³⁰⁾

- Autism and FASD have twenty common characteristics. ⁽³¹⁾
- Academic performance and information processing is diminished in prenatally exposed children. ⁽³²⁾
- FASD children have lowered ability to coordinate, plan, and execute appropriate responses and to modify behavior flexibly in response to feedback. ⁽³³⁾⁽³⁴⁾
- Less than one drink a day during the pregnancy can lower language skills. ⁽³⁵⁾
- IQ, as well as Math, Spelling, and Reading in both FASD (shown on chart as PEA, prenatal exposure to alcohol) and FAS are significantly below normal. ⁽³⁶⁾



- An estimated 75% or more of Special Education costs are linked to disabilities caused by prenatal exposure to alcohol. ⁽¹²⁾

Crime and FASD



Four out of five adolescent school shooters in Minnesota and Wisconsin were heavily prenatally exposed to alcohol. The fifth shooter fit the profile, but the mother denied drinking even when confronted by evidence to the contrary. ⁽³⁷⁾

- In a macro study of school shooters across the United States, 88% fit the profile of prenatal exposure to alcohol. ⁽³⁷⁾
- The mother of 1997 school shooter in Bethel, Alaska, lost her parental rights because of her drinking. ⁽³⁷⁾
- In one study, 93% of the inmates in one county jail at the time of the study had mothers who drank alcohol. ⁽³⁷⁾
- Jail administrators in Minnesota estimate over 90% of their jail population serve more than one sentence and fit the profile of prenatal exposure to alcohol. ⁽⁴⁾
- In one county in Minnesota, over the period of 18 months, seven murders were committed by young male adults who were fit the profile of FASD and were either adopted or had mothers who were heavy drinkers. ⁽³⁷⁾
- Two police officers in Rapid City, South Dakota were gunned down by a heavily prenatally exposed adult male. ⁽⁴⁾
- Adolescents with FASD tend to get into trouble with the law early and often. ⁽³⁸⁾
- An estimated 35% of individuals with FASD have been in jail at one time or another. ⁽³⁹⁾
- In Canada, over 60% of people with FASD, over the age of 12, have been charged or convicted of a crime. ⁽³⁹⁾
- More than 70% of people with FASD have been a victim of crime. ⁽³⁹⁾
- Depression and suicide tendencies are prevalent in FASD individuals. ⁽⁹⁾⁽⁴⁰⁾⁽⁴¹⁾

Emerging Research

Diffusion Tensor Imaging allows the researcher to see damage not seen before using MRI scans of the brain.

Epigenetics is the study alterations in a cell's genetic information that result in changes in gene expression due to prenatal exposure to alcohol but do not involve changes in the underlying DNA sequence. ⁽⁴²⁾⁽⁴³⁾

Prevention is the Answer

Prevention strategies over the past 40 years include, but is not limited to:

- Awareness campaigns
- Labeling alcoholic beverages
- Warning signs posted in establishments that sell alcohol
- Intervention legislation in some jurisdictions
- Training medical personnel on identifying FAS and FASD
- Advocating for inclusion of FASD in the DSM V
- Counseling of women who are at risk for multiple FASD births
- Providing contraceptive counseling for women at risk for FASD births

Emerging prevention strategies:

- The First International Convention on Preventing FASD was held in 2013 Edmonton, Alberta. Representatives from 35 countries attended, with leaders from around the world gathering together to discuss prevention as never before.
- Alaska's initiative, the first of its kind, will lead the world in prevention.
- Do the PT (Do the Pregnancy Test) – campaign to add PT to responsible drinking along with DD (Designated Driver) for women who are sexually active and drinking alcohol, suggesting the woman take a pregnancy test before partying to protect the unexpected pregnancy. ⁽⁴⁴⁾
- Pregnancy test dispensers in women's restrooms in bars, convenience stores, schools, universities, and any place a woman can discretely test for a pregnancy before drinking alcohol. ⁽⁴⁴⁾
- Monitored cell phone breathalyzers for monitoring alcohol-involved teenage pregnancies and other alcohol-involved pregnancies with the need determined by parents, caregivers or local social workers within the guidelines of each jurisdiction. ⁽⁴⁵⁾

To the Point

- Alaska's Empowering Hope is the first-of-its-kind state-wide comprehensive prevention initiative.
- According to the Centers for Disease Control and Prevention (CDC), as well as the U.S. Surgeon General, "There is no known safe amount of alcohol to drink while pregnant. There is also no safe time during pregnancy to drink and no safe kind of alcohol."
- Alcohol is more damaging to the fetus than any other recreational drug.
- Up to 40% or more of our children are prenatally exposed to alcohol. (Canada reports 73%)
- Very few doctors diagnose individuals with FAS and even fewer with FASD.
- FASD is vastly under reported.
- Up to 40% or more of our children have been prenatally exposed to alcohol, many in the critical early pregnancy before the mother knew she was pregnant.
- Even light drinking when pregnant can result in lower math and reading ability and mental illness.
- Every drink a pregnant woman holds in her hand has the potential to take potential from her child.
- Over 60% of the FASD population have been in trouble with the law.
- FASD babies can be multi-million dollar babies with lifelong devastating disabilities.
- The cost to our society for a heavily prenatally exposed individual can reach \$1.5 million or more.
- Over 60 medical and mental illnesses can be linked to prenatal exposure to alcohol.
- Over 70% of individual with FASD are victims of crimes.
- An estimated 75% or more of Special Education costs are linked to prenatal exposure to alcohol.

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<http://www.startribune.com/local/244566631.html>

Stages of Prenatal Exposure to Alcohol Crowe, 2010

Many times, after I have spoken at an event or did training with professionals, I have been approached by people who tell of someone they know who was prenatally exposed to alcohol, but are “all right.” Those examples of “all right” seem to, in their mind, justify drinking while pregnant. Also, too often, the acronyms of FAS, FASD, ARND, ARBD are lost on the uneducated or unknowing layperson. After considerable thought, I decided to present a new way of looking at prenatal exposure to alcohol. Most people are aware of stages of cancer. I propose using Stages of Prenatal Exposure to Alcohol. I believe using a common terminology strategy provides an easier way of defining the impact of prenatal exposure to alcohol on our society, a strategy that does not leave any prenatally exposed person out of the picture. In this model, every person fits one of the five stages:

Stages of Prenatal Exposure to Alcohol

<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>No prenatal exposure to alcohol</u>	<u>Prenatal exposure to alcohol with loss of potential not observable with current tools</u>	<u>Prenatal exposure to alcohol resulting in detectable lowered academic, social and emotional intelligence.</u>	<u>Prenatal exposure to alcohol resulting in observable exhibitions of brain damage behaviors, which result in academic failure, psychological diagnoses, criminal behaviors, depression</u>	<u>Prenatal exposure to alcohol resulting in physical manifestation and observable exhibitions of Stage 3 academic and social brain damage behaviors</u>	<u>Prenatal exposure to alcohol resulting in miscarriage, stillborn, Sudden Infant Death Syndrome, death due to organ failure damage from prenatal exposure to alcohol.</u>

Stage O -

No prenatal exposure to alcohol.

Depending on geographical area and demographics, an estimated 40% of children have been prenatally exposed to alcohol at some level at one or more occasion during the fetal development.

Each of the 40% of the prenatally exposed children fit one of the four remaining stages of prenatal exposure to alcohol. Research has established that the ethanol in alcohol is a teratogen. The Surgeon General of the United States declared there is no safe level of alcohol during a pregnancy. The following stages provide a category for every child/person exposed to alcohol in their fetal development. The author understands other drugs are involved in a percentage of pregnancies, but in most drug related cases, there is co-occurring drug and alcohol involvement. With the exception of meth, alcohol is, by far, the most damaging of teratogens. Meth, in some cases, causes strokes in the brain of the fetus, which can cause brain damage above and beyond the damage caused by co-occurring alcohol damage.

Stage 1

The child or person has been exposed to alcohol during the fetal development and there are no observable brain damage behaviors or physical anomalies linked to prenatal exposure to alcohol. Current tools are not finite enough to measure any loss of potential due to brain damage from prenatal exposure to alcohol. Unobservable loss of potential may occur in lower reading and math ability and higher levels of social difficulties, but not enough to cause concern for parents or teachers. Other loss of potential may exhibit in the inability to effectively utilize a high IQ because of white brain cell damage that limits the ability of the brain to send messages quickly and efficiently. Stage 1 prenatal exposure to alcohol may be exhibited by higher levels of anxiety and depression linked to minimal amounts of alcohol during pregnancy.

Stage 2

Stage 2 is prenatal exposure to alcohol resulting in detectible lowered academic, social and emotional intelligence. This loss of potential is realized in the school setting with exhibitions of lower reading and math skills and increased social behavior indicator, including ADHD and ADD, that cause concern in the school setting. Assessments used to identify this loss of potential include statewide testing, standardized testing, norm referenced assessments, reading assessments and math assessments, and a litany of academic assessments by school professionals including school psychologists. Loss of potential in social behaviors is assessed by teacher observations, behavioral assessments, Rtl (Response to Intervention) data, and assessments by school professionals including school psychologists. Prenatal damage that affects hearing and vision can

impact the child's ability to read and write, as well as the inability to maintain focus due to central nervous system damage. Children with Stage 2 prenatal exposure to alcohol are typically placed in Title I programs, Special Education program, and other remedial programs within the school. Many Stage 2 children do not qualify for Special Education because of an IQ over 70 or there is not enough discrepancy between their IQ and achievement,

Stage 3

Stage 3 prenatal exposure to alcohol is evident through observable exhibitions of brain damage, including clearly identified reading and math deficits, abnormal behaviors, and emotional immaturity, which result in academic failure, psychological diagnoses, low regulation of emotions and sexual behaviors, criminal behaviors, and/or depression. Stage 3 prenatal exposure to alcohol may have none to minimal anomalies to the eyes and mid-face, unrecognizable to all but the highly experienced, but may have normal head circumference and normal body size. Stage 3 prenatally exposed children usually are identified as Special Education students. If not identified as Special Education, these students may fall between the cracks in schools because their IQ scores are considered too high for Special Education, even though they can't perform at the level indicated by their IQ.

Stage 4

Stage 4 prenatal exposure to alcohol is evidenced through physical manifestation and observable exhibitions of Stage 3 academic and social brain damage behaviors, with increasingly lower levels of each. The physical manifestations could include facial anomalies, skeletal anomalies, and damage to the eyes, ears, heart, lungs, sternum, arms, fingers, legs, toes, genitals, rectum, and other organs of the body.

Stage 5

Stage 5 prenatal exposure to alcohol can result in miscarriage, death of the fetus, stillborn, Sudden Infant Death Syndrome, or death due to damage to organs of the body from prenatal exposure to alcohol.

Does Nikolas Cruz fit the prenatal alcohol exposure profile?

Dr. Carl C. Bell interviews an expert in childhood brain development and comes up with a theory that might explain the Florida shooter's possible vulnerability.

BY CARL C. BELL, MD

Does Nikolas Cruz fit the prenatal alcohol exposure (PAE) profile?

A few years ago, I wrote an [article](#) tying together the phenomenon of contagion, mass shootings, and fetal alcohol exposure. Since another school shooting tragedy has occurred – and individuals who have been exposed to PAE have poor judgment, affect dysregulation, and are vulnerable to contagion from the media's coverage of school shootings – I felt compelled to revisit the topic. I enlisted the aid of Jody Allen Crowe, a lifelong educator who has studied many school shootings and founded an organization dedicated to “preventing prenatal exposure to alcohol” called [Health Brains for Children](#). He agreed to consult with me on whether the 19-year-old man who has [confessed](#) to killing 17 people at a Florida high school might have been exposed to alcohol prenatally.

Jody Allen Crowe's analysis, based on court documents and countless reports in the public domain about Nikolas Cruz, are below:

After every school shooting, I am asked if the shooter fits the “profile.” I am a former educator who worked in high-risk schools for 25 years on and off reservations. In 2008, I authored, “The Fatal Link,” (Denver: Outskirts Press) looking at the connection between school shooters and PAE. In research for the book, I determined over 80% of school shooters from 1966 to 2008 fit the profile of PAE. As far as I know, I am the only person who has talked to mothers of school shooters, asking if they drank alcohol when pregnant. It is important to note, in no way do I diagnose ND-PAE, fetal alcohol syndrome or fetal alcohol spectrum disorder. I only ask if there is a connection to PAE. This profile is designed to urge our society to learn and understand the prevalence and impact of prenatal exposure to alcohol.

I used five factors, based on years of PAE research by others in the field, when determining if the shooters fit the profile. I interpret statements in court documents and news articles using my experience and perspective as an educator to construct what I refer to as a “factor table.” Here's the factor table that I constructed for Nikolas Cruz:

1. Mother and family

- *Adopted. This would indicate either a death of the mother or removal of parental rights. Adopted children have a high rate of PAE and drug exposure, and these exposures often are missed or misdiagnosed ([Pediatrics. 2015 Feb;135\[2\]:264-70](#)). On a related*

note, according to [news reports](#), the younger brother of Nikolas Cruz was involuntarily committed to a mental facility.

2. Behaviors of subject (academic/social behaviors that fit research-based indicators)

- [Self-harm](#)
- [Tormenting animals “Loner with a temper”](#)
- [“Trouble with impulse control” Perseverative behaviors](#) (stalking girlfriend, fascination with guns)
- [Erratic behavior; social emotional issues; odd, bizarre behavior](#)
- [Developmental and learning disability](#)
- [Weird, random outbursts, swearing at teachers](#)
- [Banging head against walls](#)

3. Previously established diagnoses

Police reports indicate [“mental illness, emotionally handicapped, on medication”](#)

- The [mother had told police](#) that her son was “increasingly irate” and suffered from [attention-deficit/hyperactivity disorder] [Client use of mental health facilities](#)
- [On medication to deal with mental health issues](#)

4. Secondary disabilities (as defined by [Ann Streissguth, PhD](#))

- [Multiple police interactions](#) at home of subject for violent outbursts, threats, and self-destructive behaviors
- [Expelled from school](#) for disciplinary reasons
- Kicked out of two private schools; held back from a grade twice
- Abusive behaviors toward girlfriend)
- Talked about killing animals

5. Physical characteristics

- Small in stature, slight in built – both characteristics of PAE.

I also would note “other indicators,” including lack of empathy. Nikolas Cruz [reportedly](#) visited a Subway and a McDonald’s after the rampage. In addition, [public defenders](#) representing the young man argued that he had “brain development issues, as well as mental illness.” The combination of all five factors and other indicators establishes that Nikolas Cruz fits the profile of having a high probability of suffering brain damage from prenatal exposure to alcohol.

In Jody Allen Crowe’s opinion, the tragedy at Marjory Stoneman Douglas High School in Parkland, Fla., is an exhibition of the worst-case scenario of what can happen with a person with possible brain damage tied to prenatal alcohol exposure. I agree with him that Nikolas Cruz certainly fits the profile that Crowe has developed.

However, advancing this theory requires caution. First, it is clear that not all individuals who have been exposed to alcohol prenatally will become school shooters. In fact, such cases are extremely rare. Second, no one can or should diagnose people long-distance. Nevertheless, scientists are able to develop profiles that might suggest risk if children with ND-PAE are not raised in protective environments and are not supported by social programs aimed at helping them succeed in life.

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president/CEO of Community Mental Health Council; and former director of the Institute for Juvenile Research (birthplace of child psychiatry), also in Chicago.