The Impact of Maternal Substance Abuse on Child Development

PCA GA GA September 2015

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Since 1980 the focus of the Center for MSACD, under the direction of Claire D. Coles, PhD, has been on the effects of prenatal exposure to alcohol and drugs (both legal and prescription) as well as associated factors in understanding child, adolescent and adult development. Our Mission includes Developmental and Intervention Research and Prevention Services as well as Diagnosis and Treatment.
Prevention and Community Activities

- Website (www.emory.edu/MSACD)
- Emory Neurodevelopmental Exposures Clinic
- Training professionals and public
- Consultation with community groups
- Prevention material and curriculums
- Teratology Information Services (TIS):
  Mother to Baby Georgia

Supported by Georgia DBHDD, 1980-2016
Longitudinal Research to establish effects of Teratogenic Exposure on Development

- Fetal Alcohol Syndrome (FAS) and Fetal Alcohol Spectrum Disorders (FASD) (1980-2015) (NIAAA)
- Prenatal Exposure to Cocaine (1988-2007) (NIDA)
- Moderate Alcohol exposure and Social Class (1992-1999) (CDC)
- Prenatal exposure to Tobacco (2002-2007) (NICHD)
- Alcohol exposure and nutrition in the Ukraine (2003-2015) (NIAAA-CIFASD)
Intervention and Intervention research: Children 3 to 10 years

- Virtual Reality Safety Games (SBIR-NIAAA)
- Math Interactive Learning Experience (MILE) (2000-2011: CDC)
- Go-FAR: Behavior Regulation (2009-2014: NIAAA)
Why the Concern for Prenatal Exposure?

- 60 - 80% of DFCS referrals in GA involve substance abuse; 78% nationwide

- Estimates range from 0.6 to 32% prenatally exposed

- FAS: 1 – 3 per 1000 but 10-15 per 1000 in higher risk groups such as foster care
ALCOHOL
Alcohol use during pregnancy (PRAMS)

Georgia, 2004-2011

Percent

<table>
<thead>
<tr>
<th>Year</th>
<th>Percent</th>
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<tbody>
<tr>
<td>2004</td>
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Note: Vertical lines in graph represent 95% confidence intervals.
U.S. Estimated New Cases in 2014

- SIDS
- Down Syndrome
- Cerebral Palsy
- FASD
- Autism

Source: CDC, SAMHSA
156 children and adolescents who met criteria for a diagnosis within the fetal alcohol spectrum:
- 125 had never been diagnosed as affected by prenatal alcohol exposure, a missed diagnosis rate of 80.1%
- 31 who had been recognized before referral as affected by prenatal alcohol exposure, 10 children’s FASD diagnoses were changed within the spectrum, representing a misdiagnosis rate of 6.4%
- 21 (13.5%) children’s diagnoses stayed the same

Within this clinical sample, 86.5% of youth with FASD had never been previously diagnosed or had been misdiagnosed.
“More Kids Harmed in Pregnancy Than Expected, Study Reports”

- November, 2014: *Pediatrics*
  - 32 schools, 2,000 first graders
  - 2.4 – 4.8% on spectrum
    - 6-9 per 1,000 had FAS
    - 11-17 per 1,000 had pFAS
  - Predictors: *longer* it took mother to learn she was pregnant, how frequently she drank *three months before* pregnancy, and the more alcohol *the father* drank
Wide Range of Effects of Prenatal Alcohol

- Fetal Alcohol Spectrum Disorders (IOM, CDC)
  - Fetal Alcohol Syndrome (FAS)
  - Partial FAS
  - Alcohol Related Neurodevelopmental Disorder (ARND)
  - Neurodevelopmental Disorder-Prenatal Alcohol Exposure (ND-PAE) *

*Source: ND-PAE-DSM-V, 2013
## TYPE OF DRUG EXPOSURE: Critical Periods of Development

<table>
<thead>
<tr>
<th>Embryonic period (in weeks)</th>
<th>Fetal period (in weeks)</th>
<th>Full Term</th>
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<td>3</td>
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<td>16</td>
<td>20-36</td>
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- **Central Nervous System**
- **Heart**
- **Eyes**
- **Limbs**
- **Digestive System**
- **Palate**
- **External Genitalia**
- **Ears**
- **Development and Descent of Thyroid**

### Major morphological abnormalities
- Physiological defects and minor morphological abnormalities

Adapted from *The Developing Human* by K. L. Moore, 1993
What are Fetal Alcohol Syndrome (FAS) and Fetal Alcohol Spectrum Disorders (FASD)?

- Facial Malformations
- Growth Retardation
- Brain Damage
- Life long Intellectual Disability
Dysmorphology

- Facial Features
- Other Physical Characteristics
Alcohol-Related Growth Retardation

- May affect weight, length (height) and head circumference (<10th percentile) either at birth or later in development
- May be persistent or gradually resolve
- Most evident in neonatal period
Growth Percentiles in FAS Clinic Clients

- Weight
- Height
- Head Circumference

Legend:
- NORMS
- NONE
- ETOH
- pFAS
- FAS
FASD Results From CNS Damage

- Reduction in overall brain volume
- Malformations and reduction of volume of grey and white matter
- Thin or missing corpus callosum
- Reduction in volume of cerebellum
- Reductions in size of basal ganglia
- Alteration in brain activation
- Alterations in functional connectivity
Children with FASD may have problems in the following areas throughout their lives:

- Physical/Health/Motor
- Developmental/Cognitive
- Behavioral/Social
- Academic/Vocational
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**Major morphological abnormalities**

**Physiological defects and minor morphological abnormalities**

Adapted from The Developing Human by K. L. Moore, 1993
NICOTINE
Smoking/ Nicotine

- 27-33% of women of childbearing age
- 20-25% of expectant mothers continue use
- 27% were able to immediately quit use when told that they were pregnant
- An additional 12% were able to quit by the third trimester of pregnancy
Physiological Effects: Tobacco

- Increased risk for spontaneous abortion
- Risk of LBW or SGA infant is two to four times higher for smokers
- Sudden Infant Death Syndrome (SIDS)
- Congenital heart disease
- Increased rates of bronchitis and pneumonia
- Increased rates of asthma
- Increased severity of asthmatic symptoms
Smoking and Other Drug Use

- Use of illicit drugs and alcohol was more common among current cigarette smokers than among nonsmokers in 2012.
- 23.0 percent of past month cigarette smokers reported current use of an illicit drug compared with 5.2 percent of persons who were not current cigarette smokers.
MARIJUANA
Marijuana is the most commonly used illicit drug and, after alcohol and tobacco, the most commonly used drug during pregnancy.

- 2.5% of pregnant women worldwide report some use of marijuana during pregnancy.
- 2012 NSDUH = 11% in pregnancy.
- Chasnoff: 9% of >200,000 pregnant women.
Marijuana: Epidemiology

- Marijuana use in pregnancy is frequently accompanied by other forms of drug use:
  - 12% concurrently identified as using opioids
  - 10% as using stimulants
  - 4% have alcohol related dx during pregnancy
  - 50% smoke >10 cigarettes per day
  - So, need prompt investigation into exposure to other substances
Marijuana: Prenatal Exposure

- No firm link between gestational cannabis use and congenital malformations but…
- Few studies have found link with anencephaly/1st month neural tube closure
- 2x risk of stillbirth
- Found to increase the risk of neonatal intensive care unit admissions, predominantly for prematurity
Marijuana: Growth Effects

- Use during pregnancy was found to be associated with growth restriction in mid-pregnancy and late pregnancy.
- Effects on low birth weight most pronounced if use continued throughout pregnancy.
- Growth effects remained significant even after adjustment for potential confounds such as smoking.
Marijuana: Prenatal Exposure

- Great concern, because of cannabis’ lipophilic nature
- Readily crosses many types of cell barriers, including blood/brain and transplacental membranes
- Cannabis metabolites easily detectable in placenta, amniotic fluid and the fetus
Marijuana: Social and Environmental Considerations

- Difficult to isolate the effects of marijuana exposure from its correlates and from environmental risk factors such as maternal mental health, exposure to violence, limited access to medical and social services, absence of a male figure in the household, and fewer social support networks; many are associated with maternal marijuana use.
OPIATES
Increase in Opiate Prescriptions in US

Total Number of Opioid Prescriptions Dispensed by U.S. Retail Pharmacies, 1991–2010

Source: SDI’s Vector One®: National (VONA)

National Institute on Drug Abuse
Opiates: Epidemiology

- Very problematic issue of polysubstance abuse, as often includes exposure to alcohol, tobacco, other drugs of abuse such as marijuana, heroin, methadone or both

- Prevalence rates during pregnancy range from <1-2% to as high as 21% but...

- Let’s look at West Virginia
Pregnant Women: Prescription and/or Illegal Drugs

- West Virginia: 1st prenatal visit
  - 706 tested, 227 (32%) positive for one or more illegal and/or prescription drugs
    - 74% marijuana
    - 23% opiates/6% methadone
    - 12% benzodiazepines and hypnotics (Xanax, Lunesta, Ambien)
    - 4% cocaine
    - Alcohol? Nicotine?
Effects of Opiates on the Fetus: Growth & Physiological Effects

Most consistently reported effect of prenatal opiate exposure is associated with fetal growth retardation and neonatal abstinence syndrome.
Abuse of prescription painkillers by pregnant women can put an infant at risk. Cases of neonatal abstinence syndrome (NAS) or neonatal withdrawal grew by almost 300% in the US between 2000 and 2009.
Inpatient hospitalizations with any diagnosis of Neonatal Abstinence Syndrome, Georgia, 2010 - 2012

N=641, charges=$47,990 per Baby

Statewide Rate: 1.6/1,000

Data source: Georgia Department of Public Health; Office of Health Indicators for Planning.

Numerator is number of inpatient hospitalizations where age < 1 year and any diagnosis (principal or otherwise) of neonatal abstinence syndrome(ICD9-CM 779.5). Data are of discharges and not unique patients. Denominator is total live births. Data are by county of residence.
Neonatal Abstinence Syndrome - Signs

- Gastrointestinal: vomiting, diarrhea, stomach cramps, poor feeding
- Vasomotor: heart rate, sweating, fever, mottling
- Central Nervous System: hypertonicity, agitation, sleeplessness, tremors, high pitched crying, hiccupping, startling, back arching, hyperactive reflexes
- Excoriation: reddened finger tips, toes, knees
- Respiratory: respiratory distress syndrome
Treatment of NAS

- 60-80% of infants exposed in utero to opiates develop NAS
- Average = 16 days hospitalization
- Use oral opiate medication, e.g. methadone or morphine
- In difficult cases, phenobarbital, benzo such as clonazapam or anti-adrenergic such as clonidine
- Very few controlled clinical trials
OPIATES: Summary

- Growth effects, neonatal abstinence
- Opiate use is associated with late and inadequate prenatal care, poverty, poor nutrition, domestic and stranger violence, and other severe threats to maternal and infant health
- Outcomes of opiate exposure strongly related to parenting/environmental variables
Elephants in the Living Room.....

- Inadequate Social Services
- Poverty
- Familial Genetics
- Mental Health

- Educational Inequality
- Polydrug Exposure
- Parental Substance Abuse
- Environment
Why Do Women Abuse Alcohol or Other Drugs?

- Partner Substance Use - a relationship between a woman’s alcohol/drug use and that of her sexual partner has been identified.
- Partner drinking is an **important predictor** of a woman’s drinking/drug use behavior.
- So, for many reasons: we ask about bio dad and type/nature of her relationship with him.
- Provides important information for us and family regarding mom’s current status.
Maternal High Risk Behaviors: Dual Diagnosis

- Dual diagnosis - substance abuse and mental health problems often coexist
- 65 percent of female alcoholics had within lifetime mental disorder
- 73 percent of female cocaine abusers had within lifetime mental disorder
- Argues for a comprehensive approach or RELAPSE
Psychiatric Conditions Often Comorbid:

- Depression
- Conduct Disorder
- Personality Disorders: Antisocial Personality, Borderline Personality
- Anxiety Disorders
- Posttraumatic Stress Disorder:
  - E.g., meth sample:
    - 64% physically abused
    - 29% sexually abused
    - 84% emotionally abused
- Psychotic Conditions
- Sexual Dysfunction
ACOG: Red Flags

- Maternal chaotic lifestyle:
  - psychosocial stresses
  - spouse/partner of an alcoholic or drug abuser
  - domestic violence, physical and sexual

- Psychiatric diagnosis:
  - depressions, psychosis, anxiety, PTSD
  - lack of functional coping skills
  - unexplained mood swings, personality changes

- Late or no prenatal care:
  - missed appointments and compliance problems
  - STDs, sexual promiscuity
MSACD Project: Red Flags

- > 30 years old
- Drink more than 2 liters beer/day
- Smokes more than pack of cigarettes/day
- Drinks more than 5 cups coffee/day
- High parity (>5 births)
- No birth control
- Unmarried
“Risk Accumulation”

- General principle of human development: rarely, if ever, does one single risk factor (such as familial substance abuse or FAS) tell the whole story or determine a child’s future.
- Rather, it is the buildup of negative influences and experiences that accounts for differences in how children turn out.
“Risk Accumulation”
or, REMEMBER THE ELEPHANTS!!

Let’s begin with mom/dad’s genetic makeup, and then add prenatal exposure to alcohol/other drugs. Then, add:

- No prenatal care and poor nutrition during pregnancy
- Neglect/Abandonment
- Physical and/or sexual abuse
- Inconsistent and/or negative caregiving/parenting
- Failure of attachment
- Failure to use social or medical services
- Parental mental illness
- Incarceration of parent
- Death of parent
- Loss of custody = enter foster care
Universal Protective Factors

- Stable, nurturing home
- Staying in “good” home > 2.8 years
- Having basic needs met > 13% of life
- Never having experienced violence
- Diagnosis before age 6 years
- Found eligible for DDD services
Needed Interventions

- Early diagnosis
- Department of Developmental Disabilities services
- Freedom from violence, sexual abuse
- Help with parenting
Department of Community Health
Division of Public Health

E.g., “Babies Can’t Wait”
ENEC: Emory Neurodevelopmental Exposure Clinic

- Location: Center for MSACD, Executive Park Building 12
- Staff: Pediatric Genetics, Neuropsychology, Social Work, Educational Specialist, Child Psychiatry
- Age range: 0 to adult, many toddlers/preschoolers (70%)
- Number seen:
  - Prior to 2006 = 1,000
  - Since 2006 = 2,000 (approximately 250/year)
Emory Neurodevelopmental Exposure Clinic

ABOUT US

In the U.S., about one out of every 1,000 children is born with Fetal Alcohol Syndrome, with more than 1,000 Georgia children affected every year. About 10 times that many are affected with Fetal Alcohol Spectrum Disorders (FASD), which may not be as severe as Fetal Alcohol Syndrome (FAS) but still affect learning and development. Thousands of children in Georgia are exposed to drugs through maternal use during pregnancy.

ENEC is the only multidisciplinary pediatric center of its kind in the southeast, treating children exposed to alcohol and other drugs. At this clinic, specialists in many different fields serve children from birth to 21 years of age.

WHAT ARE FETAL ALCOHOL SPECTRUM DISORDERS (FASD)?

When a child is exposed to alcohol, illegal drugs or prescription medications, the child’s physical and intellectual development can be affected. Children affected by FASD require expert diagnosis and intervention to overcome pervasive developmental disorders. If you believe a patient has FASD, consider these symptoms:

- Characteristic facial features (e.g., thin upper lip, decreased eye distance, smooth philtrum)
- Below average height, weight, and head circumference
- Developmental delays, learning and behavioral problems

SERVICES

ENEC offers many diagnostic and support services for families seeking care for an affected child, including:

- Differential diagnosis of FASD
- Educational consultation and testing
- Math interactive Learning Experience (MILE) program
- Medical and genetic evaluations
- Neurodevelopmental and psychological testing
- Parent coaching and behavior management
- Parent workshops and Web-based educational interventions
- Psychotherapy

THE TEAM

The multidisciplinary nature of this program ensures parents only have to travel to one location for all their child’s treatment needs. Our team members include:

- Neurodevelopmental and clinical psychologists
- Clinic Coordinator
- Pediatric Geneticist
- Special Educators

As every member of the team collaborates to develop each child’s treatment plan, this results in more consistent, quality care guided by the entire team.

REFERRAL

Contact 404.772.6800 or email neec@emory.edu for more information or refer a patient for treatment at ENEC.
Are You The Parent Of A Child Facing Issues Related To Fetal Alcohol Spectrum Disorder?

YOU ARE NOT ALONE!

Please Join Us For Support, Friendship, And Social Events.

WE ARE ALL IN THIS TOGETHER!

For more information please call or contact:
Tammie Hernandez 470-891-2507
Tammie12Hernandez@gmail.com

Alison Hulett 404-725-4015
AlisonHulett@comcast.net

LIKE our Page at: www.facebook.com/nofasga

JOIN our Parent Support Group Online at:
www.facebook.com/groups/617260071664223/
"We are continually working with alcohol- and other drug-affected children & adults to describe the long-term effects of exposure."
"This project was supported in part by the Georgia Division of Family and Children Services through the U.S. Department of Health and Human Services, Administration for Children and Families, Community Based Child Abuse Prevention and Treatment Act (CFDA 93.590). Points of view or opinions stated in this document are those of the author(s) and do not necessarily represent the official position or policies of the Georgia Division of Family and Children Services or the U.S. Department of Health and Human Services, Administration for Children and Families, Community Based Child Abuse Prevention and Treatment Act (CFDA 93.590)."