

# **Neurodevelopmental Disorders Associated with Prenatal Exposure to Alcohol (ND-PAE)**

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# Meharry Medical College

- Meharry Medical College - 1969, Dr. E. Perry Crump was the Chairman - Dept Pediatrics.
- Dr. Crump taught me that the low-income children of North Nashville had a high prevalence of “mild mental retardation.”
- Dr. Crump and Julius Richmond, M.D. (President’s Johnson’s and Carter’s Surgeon General) went on to form Head Start to address this national problem).

# The Critical Role of Self-Regulation

- Neuroscience and behavioral research are converging on the importance of self-regulation for successful development
- Children who do not develop the capacity to inhibit impulsive behavior, to plan, and to regulate their emotion are at high risk for behavioral and emotional difficulties

Bell CC & McBride DF. Affect Regulation and the Prevention of Risky Behaviors. Journal of the American Medical Association, Vol. 304, No. 5: 565 –566, August 4, 2010

# Social Determinants of Health

- Think about all the liquor stores in the African-American (ghettos) and Native American (reservations) communities all over the country.
- The plethora of liquor stores have a determination on the indigenous populations' health.

# Neurodevelopmental Disorders

- Autism and Autism Spectrum Disorders
  - ADHD
  - Intellectual Disability
  - Specific Learning Disorders
  - Communication Disorders
  - Motor Disorders
  - Newly defined DSM-5 ND - PAE
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# Prevalence of Drinking while Pregnant in the US

- 13% knowingly drink
- 1% drink heavily
- 3-4% binge drink (SAMHSA)
- 12% of pregnant women consume 5 or more drinks per month
- 50% of pregnancies are unplanned

# Prevalence of Fetal Alcohol Spectrum Disorders – U.S.

- May et al. Prevalence & Characteristics of Fetal Alcohol Spectrum Disorders. *Pediatrics*, 2014, 134: 855-866.
- Study in a 160,000 Midwestern community (Median income \$51,800, with 11% below poverty) surveyed 70% of 2,033 1<sup>st</sup> graders.
- They found between **2.4 to 4.8% had FASD.**

# Patients seen at Jackson Park Hospital's Family Medicine Clinic serving 143,000 Median income \$33,809 & 95% Public Assistance for Medical Care

<b>Total patients with Neurodevelopmental Disorders</b>	<b>297 (49%) 39% had FASD</b>
<b>Total Patients without Neurodevelopmental Disorders</b>	<b>314 (51%)</b>
<b>Total</b>	<b>611 (100%)</b>

**This is a rate of 338/1,000!!!!**



# Prevalence of Fetal Alcohol Spectrum Disorders – U.S.

## ➤ Chasnoff, et al

– 547 youth referred for severe behavioral disorders

- 50.6% African American
- 1.3% Asian
- 32.2% White
- 0.7% Native American
- 12.2% Biracial
- 3% Other/unknown

– **28.5%** of these youth had FASD (86.5% had never been diagnosed or were misdiagnosed; 26.4% of these youth were misdiagnosed as having ADHD )

# Prevalence of Fetal Alcohol Spectrum Disorders – South Africa

- In a low SES, highly rural of South Africa in the Western Cape Province, FASD occurs in **182 – 259 per 1,000 children or 18-26 percent**
  - May, et al “The continuum of fetal alcohol spectrum disorders in four rural communities in South Africa: Prevalence and characteristics.” *Drug and Alcohol Dependence* 159: 207 – 218

# Prevalence of Fetal Alcohol Spectrum Disorders - Australia

- In a remote Aboriginal community of the Fitzroy Valley in Western Australia, FASD occurs in **120 per 1,000 children or 12 percent**
  - Fitzpatrick et al, (2015) Prevalence of fetal alcohol syndrome in a population based sample of children living in remote Australia: The Lililwan\* Project. Journal of Paediatrics and Child Health 51: 450-457.

# Prevalence of Fetal Alcohol Spectrum Disorders - Russia

- The prevalence of FAS among adopted children from Eastern Europe/Russia) living in US 15 to 70/ 1,000
- Children Russian adoptees diagnosed ARND = 34%
- Records of alcohol-exposed pregnancy were significantly higher and constituted 19% to 41%
- Prospective adopting parents are concerned about the high risk of FASD among children adopted from Russia

– Popova et al 2014.

# Public Mental Health

## ➤ Biotechnical Prevention

- There is a biotechnical prevention/ intervention for Fetal Alcohol Spectrum Disorder – Choline 500mg BID.

## ➤ Psychosocial Prevention

# CHOLINE

- Precursor to acetylcholine, phosphatidyl choline
- Contributes to the integrity of the cell membrane



# CHOLINE

- The current recommended choline intake for pregnant women is 450 mg/day
  - IOM Standing Committee on the Scientific Evaluation of Dietary Reference Intakes and its Panel on Folate, Other B Vitamins, and Choline. (1998). Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B<sub>6</sub>, Folate, Vitamin B<sub>12</sub>, Pantothenic Acid, Biotin, and Choline. Washington, DC: National Academies Press.
- 90% of pregnant women do not meet the choline intake requirements - Jensen, H. H., Batres-Marquez, S. P., Carriquiry, A., & Schalinske, K. L. (2007). Choline in the diets of the US population: NHANES, 2003–2004. *FASEB J*, 21, 1b219

# CHOLINE in PRENATAL VITAMINS

- Only two of the 25 prenatal vitamins have 50mg of the 450mg of Choline required.
- Six of the 25 have 30mg or less of the 450mg of Choline required
- The rest have no choline at all

A biotechnical prevention strategy that might prevent FASD is to increase the Choline in prenatal vitamins.



