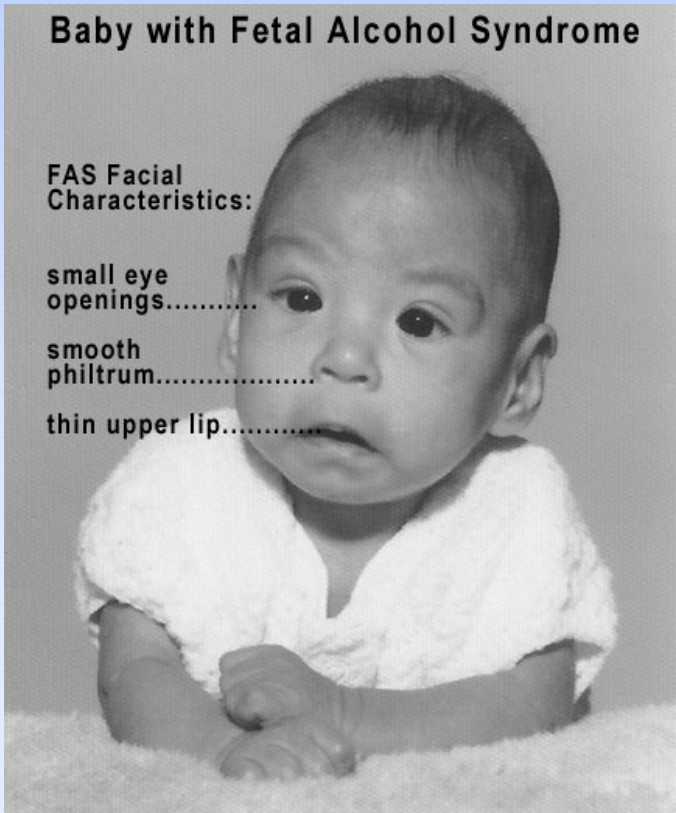
Fetal Alcohol Syndrome
Fetal Alcohol Effects
Alcohol-Related Birth Defects

Articles:

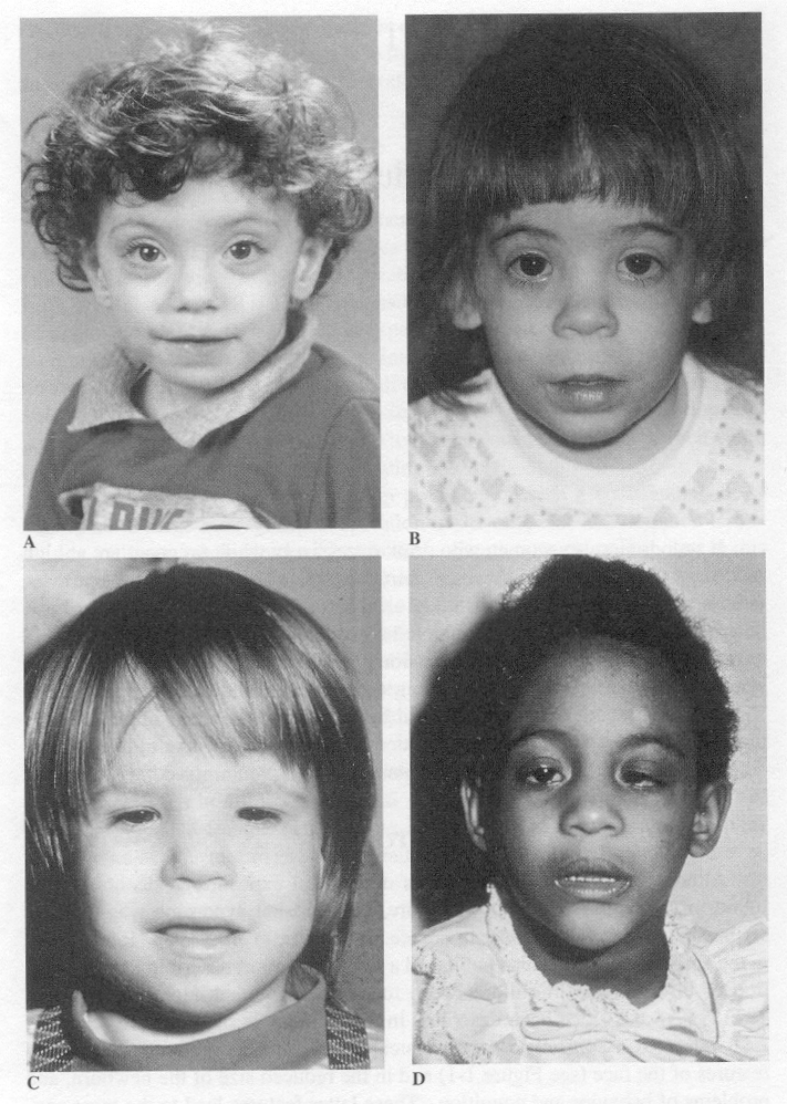
- Warren, et al, “Fetal Alcohol Spectrum Disorders: Research Challenges and Opportunities” Alcohol Research and Health, 34, 4-14 (2011)
- May, et al. “Maternal Risk Factors for Fetal Alcohol Spectrum Disorders,” Alcohol Research and Health, 34, 15-26 (2011)

Diagnosis (1973)

- Prenatal and Postnatal growth retardation
- Neurological Abnormalities
  - developmental delays
  - behavioral dysfunction
  - intellectual impairment
  - skull or brain malformations
- Characteristic Facial Features
  - Skin folds at eye corner
  - Small head circumference
  - Small eye opening
  - Thin upper lip
  - Indistinct philtrum



Children with FAS



Epidemiology

- Problems diagnosing infants and under reporting
- General population estimates range from 0.5 to 7 FAS cases per 1000 births.
- General population estimates of FASD are 100 cases per 1000 births (10%!) (FASD=fetal alcohol spectrum disorders)
- Much higher FAS in particular groups
  - 10/1000 in some native American communities
  - 120/1000 in some Canadian Indians

Risk Factors

- Only seen in mothers that drink!
- Increased risk with age and parity
- Genetic factors suggested in twins
- While from ‘85-’88 there was decline in mothers that drank (32% - 20%), there was no decline in
  - less well educated, smokers, unmarried, <25 age
- >=2 drinks/day considered at substantial risk
- >=3 drinks/day prior to recognition imparts significant FAS risk
- >=1.6 drinks/day lead to neurobehavioral symptoms
- >=18 drinks/day give 30-33% chance of a child with FAS
- Heavy drinking more harmful than moderate more frequent drinking at particular times

Risk Factors – Timing of Drinking during Pregnancy

- Facial abnormalities develop 6 through 9 weeks into gestation.
- Brain development occurs throughout gestation.

Table 3 Average Drinks per Drinking Day, Estimated Peak BAC Levels,**** and Body Mass Index (BMI) Data from Interviews with South African Women (n = 175)

	Drinking Mothers of Children with FAS	Drinking Mothers of Children with pFAS	Drinking Mothers of Children without FAS or pFAS†
1st trimester			
D.D.D.*** (SD)	5.7 (3.8)	3.9 (1.4)	3.8 (3.4)*
BAC [mean (SD)]	0.197 (.17)	0.155 (.07)	0.122 (.11)
2nd trimester			
D.D.D. (SD)	5.7 (3.7)	3.2 (1.9)	3.7 (3.4)*
BAC (SD)	0.200 (.17)	0.124 (.09)	0.084* (.09)
3rd trimester			
D.D.D. (SD)	5.5 (3.9)	2.7 (2.0)	3.7 (3.5)*
BAC (SD)	0.191 (.17)	0.102 (.12)	0.076 (.09)
Body Mass Index (SD)	22.5 (5.6)	23.5 (5.6)	27.4 (6.9)**

NOTES:
* $p < .05$.
** $p < .001$.
*** D.D.D. = avg. drinks per drinking day.
**** BAC estimated by the BACCuS technique (accounts for mother's weight, quantity consumed, and duration of drinking).
† This group was selected from mothers of randomly selected non-FASD children in a community study of first-graders. Specifically, this sample represents the 24 percent of mothers in this group who reported drinking during pregnancy.
SD = Standard deviation.
SOURCE: May et al. 2008.

Development of Syndrome

- Physical characteristics become less prominent with maturity (eye & lip abnormality remains)
- Cognitive Impairment endures with age
  - reduced IQ(avg68), hyperactive, distractible, impulsive, short attention spans (very similar to ADD)
  - Reading, spelling, and particularly arithmetic were common skill difficulties

Effects of Alcohol on fetus (animal and human studies)

- .085 BAC reduces fetal movement
- alters generation, proliferation, and migrations of cerebral cortical neurons
- neuronal cell death –
- inhibits nerve growth factor
- neurotransmitter functions altered
- Neuroendocrine impairment
- Immune impairment (sympathetic nerv system regulation)

Mechanisms of Action

- Acetaldehyde toxicity (and EtOH)
- Placental dysfunction and nutrition def. resulting in Accelerated apoptosis
- Alters DNA methylation and affects gene expression (influence on S-adenosyl methionine)
- fetal hypoxia?
- elevated prostaglandins