

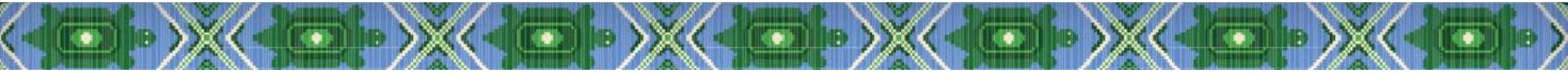
# INDIAN HEALTH SERVICE 2015 NATIONAL BEHAVIORAL HEALTH CONFERENCE

Behavioral Health Integration with Primary Care



## Presentation 1: Fetal Alcohol Syndrome Update

*Elise Leonard, MD  
Chief of Mental Health,  
Phoenix Indian Medical Center  
Indian Health Service*



# Fetal Alcohol Syndrome Update

## Part I: Timing of Exposure

- Elise Leonard, MD
- Phoenix Area IHS

# Objectives

- become an effective ***teacher*** about risk of alcohol toxicity to a developing fetus
- understand the indirect harms of alcohol use in pregnancy
- be able to correlate stages of pregnancy with harms of alcohol exposure

# Introduction

- a mother's alcohol use endangers the fetus in many ways
- until recently, focus was directed mainly on children with **facial** characteristics of alcohol exposure
- ***but very few alcohol exposed children will show ANY visible signs***

# Historical view

- in **1865** a French physician named Lancelaux observed that a child born to alcoholic **parents**:
  - *“bears the special characteristics: the head is small... his physiognomy vacant, a nervous susceptibility more or less accentuated, a state of nervousness bordering on hysteria, convulsions, epilepsy... the sorrowful inheritance a great number of individuals given to drink bequeath their children.”*

# Current terminology

- all fetal alcohol problems fall under the ‘umbrella’ of Fetal Alcohol Spectrum Disorders (**FASD’s**)
  - Fetal Alcohol Syndrome (**FAS**)
  - Alcohol-Related Neuro-developmental Disorder (**ARND**)
  - Alcohol-Related Birth Defect (**ARBD**)

# Effects of alcohol exposure

Alcohol damage varies by different stages of pregnancy:

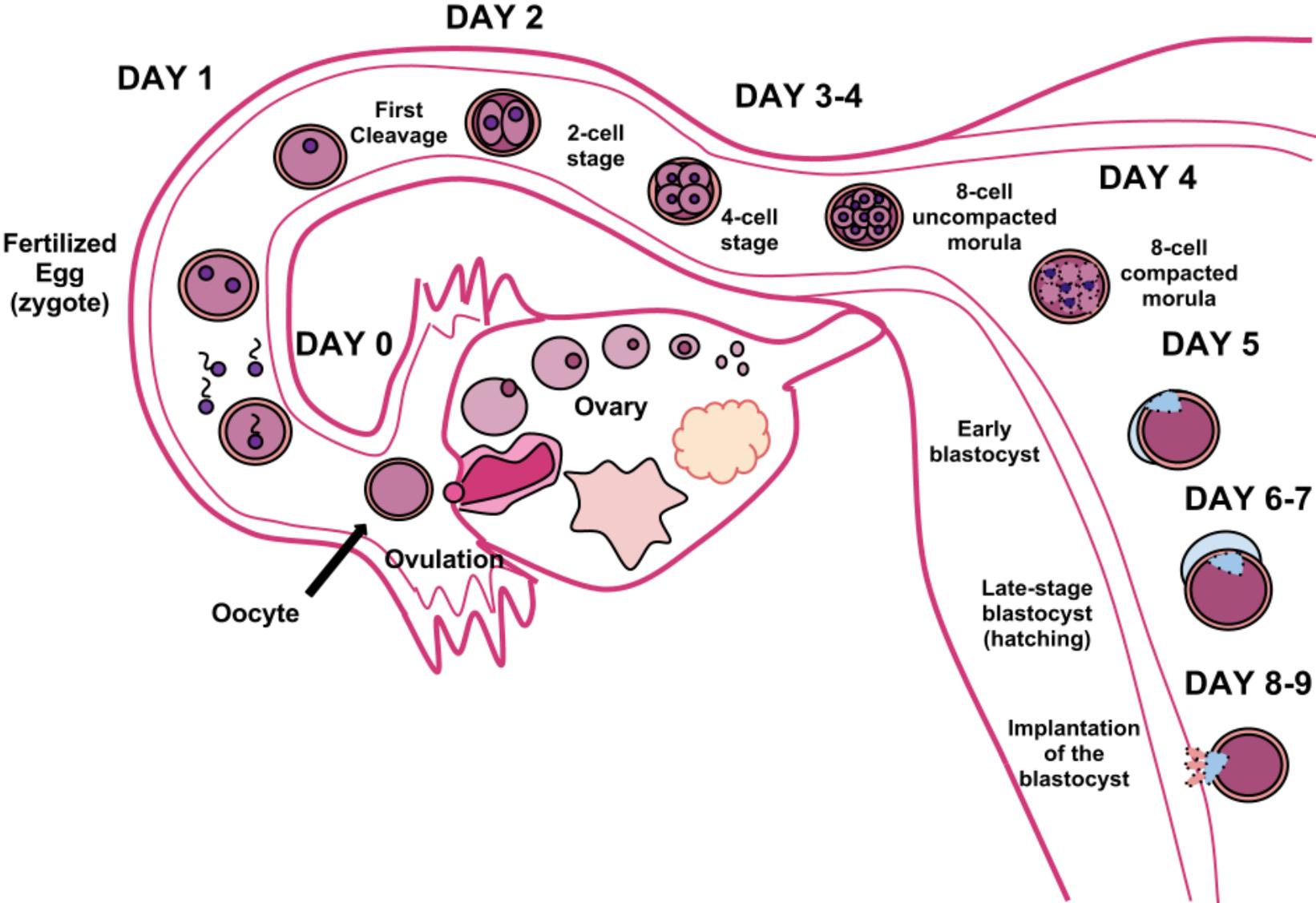
- before implantation
- during **major organ** and structure development
  - heart, kidneys, eyes
  - head, face, hands
- during **brain** growth, interconnection, and specialization

... ladies and gentlemen, it's  
embryology time !



*Carnegie Institution of Washington Department of Embryology, founded in 1914*

# Conception to implantation : 9-10 days



# Alcohol exposure from conception to 10 days

- alcohol can interfere with ***implantation*** of the early embryo (blastocyst) in uterine wall
  - ***this pregnancy would never be detected***
- but if implantation does occur, damage from alcohol in this stage appears to be slight
  - at this early stage, all cells still have the potential to become anything

# question

- **Leanne had been a binge-drinker, but she broke up with her boyfriend and stopped drinking about a week after conception. What effect might this have on her pregnancy?**
  - a. the fertilized egg might not implant, so Leanne would never realize she had been pregnant
  - b. if the fertilized egg does implant, the embryo is likely to do well because its cells are not yet differentiated
  - c. both

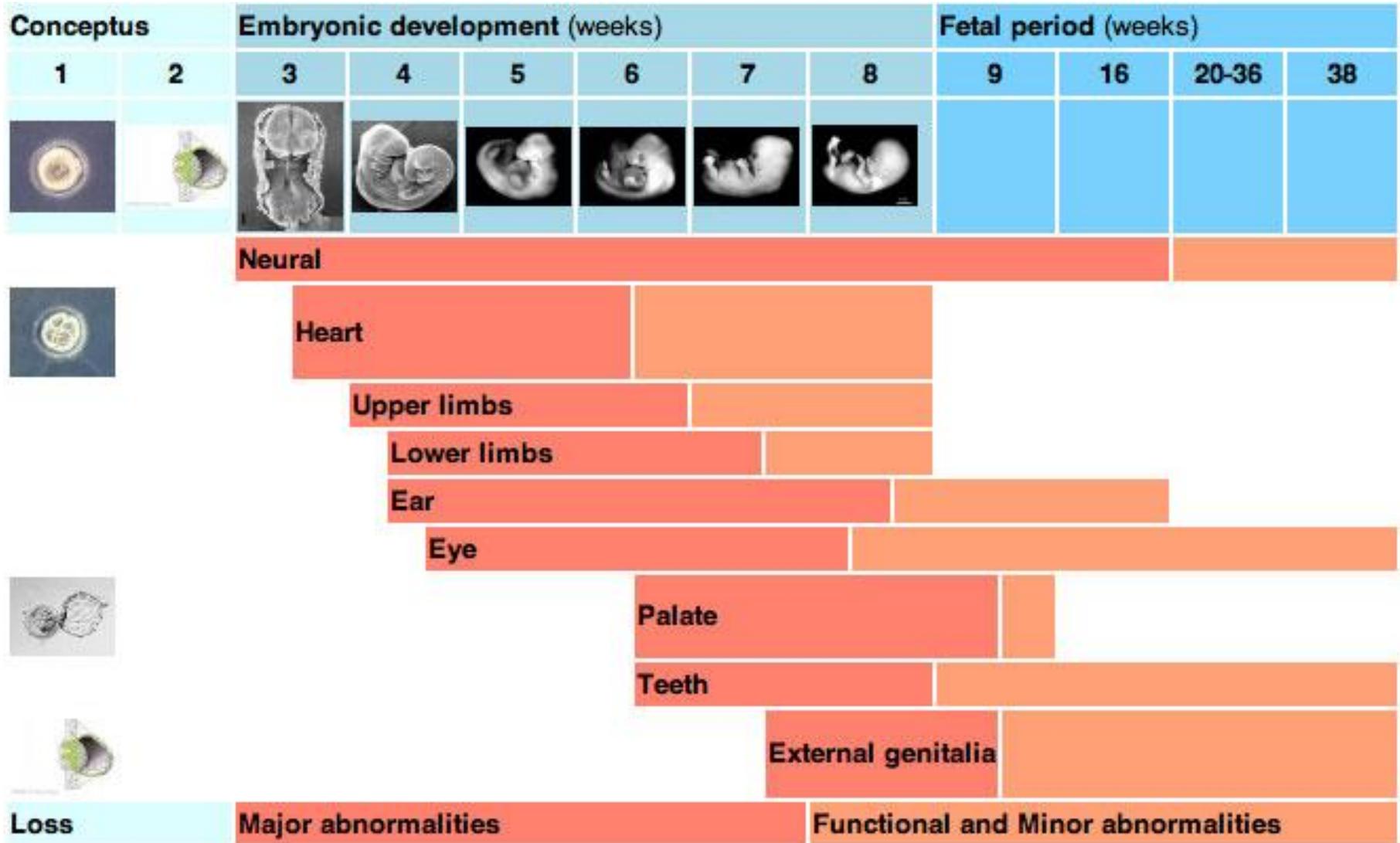
# From two to eight weeks

- in the 3<sup>rd</sup> week, cells begin **differentiating** into one of 3 “**germ layers**”
  - **ectoderm:** brain, spinal cord, eyes, hair, nails, tooth enamel
  - **mesoderm:** muscle (heart), circulatory system, bone, genitourinary system
    - heart starts beating at 22-23 days, divides into chambers by 5 weeks
  - **endoderm:** stomach, bowel, liver, lungs

From two to  
eight weeks

- these specialized cells **migrate** to the proper location where they will **differentiate** into organs/structures
- alcohol interferes with healthy cell migration

# CRITICAL DEVELOPMENTAL PERIODS



# From two to eight weeks

- organ development involves rapid cell division and gene expression with critical timing
- if proper nutrients are not available at critical moments, irreversible harm to that organ can result
  - *folic acid* is crucial for normal cell division
  - *alcohol blocks folate absorption*

# From two to eight weeks

- this is when the embryo is at highest risk for major physical abnormalities
  - heart (weeks 3 - 5)
  - facial features (weeks 3 - 6)
  - eye (weeks 3 - 8)

# By 8 weeks, all basic structures are present



The embryo is now a *fetus*, a little over half an inch in size. Eyelids and ears are forming, and you can see the tip of the nose. The arms and legs are well-formed. The fingers and toes grow longer and more distinct.

By 8 weeks,  
all basic structures are present

- if a mother begins alcohol use *after* 8 weeks, her baby is likely to have
  - normal facial features
  - grossly normal major organs
- but: ***the brain stays vulnerable through the entire pregnancy***

when most women learn they are pregnant



# CRITICAL DEVELOPMENTAL PERIODS

Conceptus		Embryonic development (weeks)						Fetal period (weeks)				
1	2	3	4	5	6	7	8	9	16	20-36	38	
		<b>Neural</b>										
		<b>Heart</b>										
		<b>Upper limbs</b>										
		<b>Lower limbs</b>										
		<b>Ear</b>										
		<b>Eye</b>										
				<b>Palate</b>								
				<b>Teeth</b>								
						<b>External genitalia</b>						
<b>Loss</b>		<b>Major abnormalities</b>					<b>Functional and Minor abnormalities</b>					

# question

- **Rachel was a frequent binge drinker from weeks 3 to 7 of pregnancy. What is her baby at increased risk for?**
  - a. failure of implantation
  - b. major organ problems or visible abnormalities
  - c. both

# Second and third trimester

- established organs grow in size and complexity
- why does the brain stay so vulnerable throughout pregnancy?
  - cell migration and specialization continue
  - connections are forming, requiring constant gene expression and nutrient availability

# Most alcohol exposure problems are **INVISIBLE**

- prospective cohort study of 9,628 women in Chile
- 101 women were drinking 4 or more drinks per day at time of first visit
  - matched with 101 non-drinking controls
  - children evaluated up to age 8.5

Kuehn D et al. *A prospective cohort study of the prevalence of growth, facial, and central nervous system abnormalities in children with heavy prenatal alcohol exposure.* Alcohol Clin Exp Res. 2012 Oct;36(10):1811-9.

# Most alcohol exposure problems are **INVISIBLE**

- 73 alcohol-exposed children and 75 unexposed children were evaluated by geneticists
- **NOT ONE ALCOHOL-EXPOSED CHILD** met criteria for full FAS facial phenotype
  - one child met criteria for “moderate” FAS features

.....*take-home message slide*

# Most alcohol exposure problems are **INVISIBLE**

- though none of the alcohol-exposed children had the full FAS phenotype appearance)
- **44%** of the alcohol-exposed children had brain abnormalities which impaired function

.....*take-home message slide*

# Most alcohol exposure problems are **INVISIBLE**

- what were the functional problems?
  - **26.8%** had *hyperactivity* (1.5%)\* (p< 0.0001)
  - **35.3%** had *IQ < 80* (6.3%) (p= 0.0004)
  - **14.3%** had *attention problems* (4.6%) (p= 0.11)
  - **42.0%** had *language delay* (23.8%) (p= 0.0223)

\* lower than US or world prevalence data

# question

- **Olivia, a heavy binge drinker, learns she is pregnant 3 weeks after her missed period. She stops drinking immediately. What is true of her pregnancy?**
  - a. the baby should be safe from facial or organ abnormalities
  - b. if she stops now, it's too late to prevent mental retardation and learning problems
  - c. neither

# It's never too late to stop

- if alcohol exposure was lower, and/or stopped early in pregnancy, small size at birth normalized more with age
- but when mothers drank throughout pregnancy, and/or binge drank (>4 drinks at a time), growth restriction persisted up to/ into adulthood
  - especially if mother is small (higher BAC ?)

# US alcohol use

- of all U.S. females **12 and older,\***
  - 47.5% have used alcohol in the past month
  - 16.0% binge alcohol use in last month
  - 3.3% heavy alcohol use in last month

# Question

- when do most women find out they are pregnant?
  - 2 weeks after conception
  - 5 to 6 weeks
  - 7 weeks to 2 months
  - more than 2 months
- women with SA problems find out ***even later***

# question

- **on average, U.S. women who are pregnant drink less than their non-pregnant peers**
  - true
  - false
- **on average, U.S. adolescents who are pregnant drink less than their non-pregnant peers**
  - true
  - false



# Fetal Alcohol Exposure Update

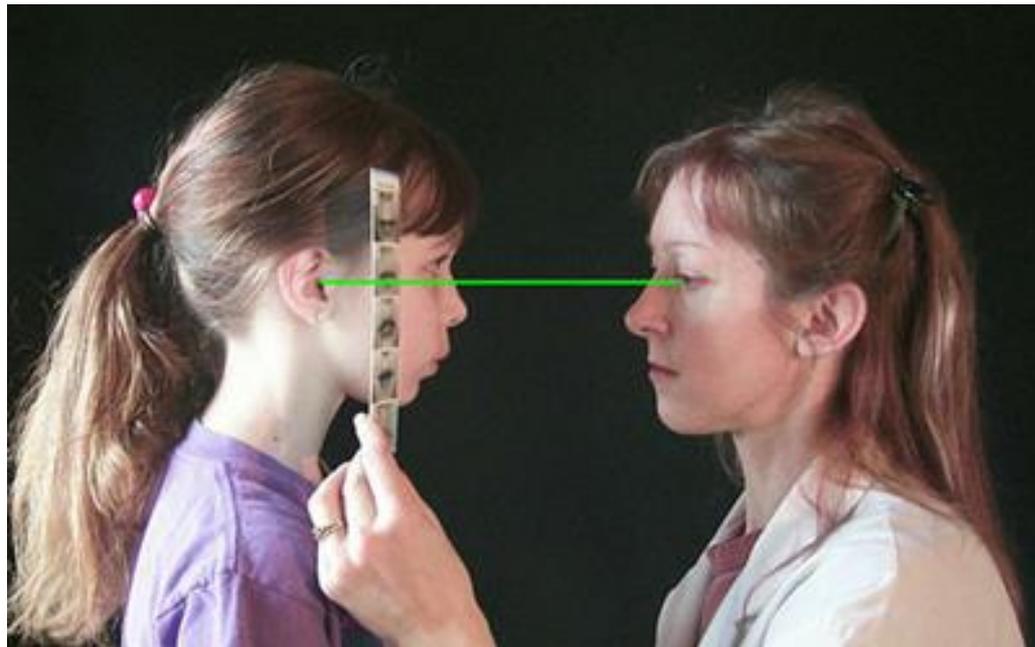
## Part II: working with mothers and children

- Elise Leonard, MD
- Phoenix Area IHS

# Fetal Alcohol Syndrome criteria

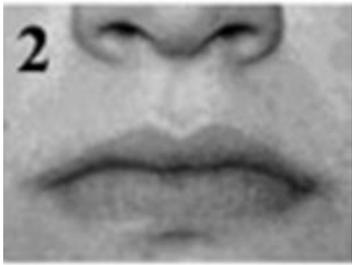
- all three facial abnormalities (smooth philtrum, thin vermilion border, and small palpebral fissures);
- growth deficits
- CNS (brain) abnormality

# Facial assessment



- observe the patient in the “Frankfort horizontal plane”, a line defined by:
  - your eye
  - patient’s cheekbone
  - patient’s tragus
- use Lip-Philtrum Guide

# Lip-Philtrum Guide



- 5: No visible folds\*, thin/flat upper lip
- 4: Suggestion of folds\*
- 3: Mild definition
- 2: Well-defined folds from lip to nose
- 1: Extremely well-defined, raised folds

*\*FAS criteria include a facial phenotype rank of 4 or 5*

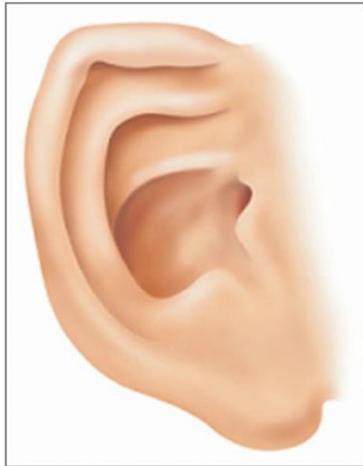
# Eye openings

- Palpebral Fissure: width of the eye opening  
> 2 SD below mean
- Epicanthal Fold: skin fold over the tear duct area  
(a normal finding in some ethnic groups)



# Other clues

“railroad track” ear



“hockey stick” palmar crease  
curved, short 5<sup>th</sup> finger

(clinodactyly)



# Brain abnormalities in FAS

- structural
  - head circumference < 10<sup>th</sup> percentile
  - significant abnormalities on CT, MRI
- neurological
- functional
  - IQ < 3<sup>rd</sup> percentile, or
  - below 16<sup>th</sup> percentile in 3 of the following:  
developmental delays, executive function, motor delay, inattention or hyperactivity, social skills, language problems, memory problems

# Alcohol as an indirect toxin

- lifestyle - irregular eating, poor hydration, other drug use, STD's, poor or no prenatal care
- environment - domestic violence, sexual assault, fall injuries, MVA's
- spiritual – disconnection from community, culture, support

# FAS: risk amplifiers

- age > 25
- having 3 or more pregnancies
  - placental factors?
- longer drinking history
  - nutritional effects
  - cumulative stress

# FAS: risk amplifiers

- drinking outside of meal time
- poor diet
- skipping meals during binges
- cigarette smoking
  - low birth weight, other problems

# FAS: risk amplifiers

- short stature, low birth weight, low BMI
  - mother may have alcohol exposure
- higher blood alcohol levels
  - smaller mothers get there on fewer drinks
- genetics
  - alcohol dehydrogenase polymorphisms

# FAS: risk amplifiers

- having a partner who is a heavy drinker
  - father's alcohol use up to conception may have an effect
- low socioeconomic status
  - multifactorial stresses
- infrequent practice of spirituality

# Mothers of children with FAS

- study of 80 mothers of FAS children
- **96%** had at least one psychiatric diagnosis
  - **93%** had **2 or more** lifetime diagnoses
  - mean # diagnoses = **4.7**
- **86.4% had a mental health problem which started before age 18**

# Mothers of children with FAS

- 79% reported having a birth parent with an alcohol problem
- **95% had been physically or sexually abused during their lifetime**

# FAS Surveillance Network data from 4 states

- Arizona, New York, Alaska, and Colorado
- In Arizona, **59%** of FAS mothers were AI/AN (7% of population is AI/AN) - **8 times** expected rate
- In Alaska, **86%** of FAS mothers were AI/AN (24% of population is AI/AN)- **3 times** expected rate

# Working with children

- *ask* about alcohol use in pregnancy
- be alert for *clues*
  - out of home placement
  - speech delay, hearing or vision problems
  - small size
  - learning problems
  - mood dysregulation, poor judgement, **ADHD**

# Working with children

- early assessment and intervention
  - vision, audiology, genetics if appropriate
  - AZEIP up to 36 months
  - school system from 3 years up

# question

- **what is the leading cause of mental retardation in the US today?**
  - a. Down's Syndrome
  - b. Fragile X Syndrome
  - c. Fetal Alcohol Spectrum Disorders (FASD)

# Working with children

- watch for children who show unexpectedly poor judgment for their level of maturity and intelligence
  - stealing to impress peers
  - impulsive sexual behavior
- remember that behavioral interventions work, but ***more slowly*** in children with FAS/ARND

# Working with children

- watch for children who are failing but being promoted
- ask if children with '504' accommodations are comprehending grade level work
- listen for, “he can do it, but he just doesn't want to”

# question

- **heavy alcohol exposure in the second half of pregnancy causes damage to which of these?**
  - a. learning
  - b. emotional control
  - c. memory
  - d. judgment

# Working with children

- know your **IDEA** !!
- Individuals with **Disabilities Education Act**
- public schools must respond within 60 days to a **written** request from parent/guardian **or public agency** for a formal evaluation for learning problems

# Working with children

- the school may have refused parent or guardian's verbal request for evaluation (sometimes for years)
  - it is very helpful to have a letter ready which you both can sign
- *school may not demand medical information unless student is seeking services under the “OHI” (other health impaired) designation*



DEPARTMENT OF HEALTH & HUMAN SERVICES



INDIAN HEALTH SERVICE

Phoenix Indian Medical Center  
Behavioral Health Department  
4212 North Sixteenth Street  
Phoenix, Arizona 85016  
(602) 263-1200 x 1518

4 August 2015

To Whom It May Concern:

Joe Student (dob: \_\_\_\_\_ ) is receiving treatment for ADHD and mood problems. He has a long history of struggling with mathematics. It is likely that Joe has a learning problem in the area of math.

Please initiate a psychoeducational evaluation to determine if Joe would benefit from special educational services.

Sincerely,

\_\_\_\_\_  
Jane Student  
Mother

\_\_\_\_\_  
Elise Leonard, MD  
Child and Adolescent Psychiatrist  
Chief of Mental Health

# Working with children

- the school must either complete the evaluation or send “prior written notice” to parent/guardian explaining why they feel an evaluation is not indicated
- parent can appeal
- <http://www.parentcenterhub.org/repository/evaluation/>

# Working with children

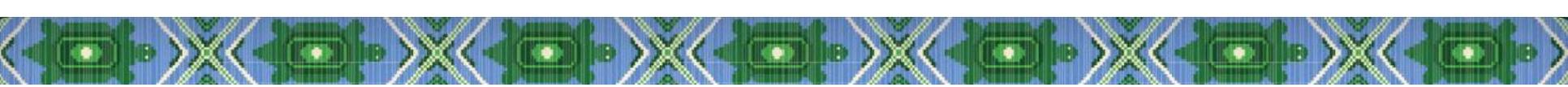
- an individual **education plan (IEP)**, once implemented, is **transferable**
- when a child moves to another school or district, the new school **must** provide those services
  - “we’ll do our own evaluation”... **not !!!**

# Summing it up

- alcohol exposure has different effects during different stages of pregnancy
- by the time most women are aware they are pregnant, major organs and structures are established (exception?)
- it is ***never too late*** for a pregnant woman to stop drinking and improve nutrition

# Summing it up

- the vast majority of alcohol-exposed children will show no **visible** signs
- many children diagnosed with ADHD, mood disorders, learning problems are showing **invisible** effects of alcohol exposure
  - look for and **document** known or suspected alcohol exposure



Break and Transition  
to Sessions:  
PC1, PC2, PC3

