Child Development: Understanding How Genes and Environment Interact

Participant Handouts
## SESSION 1

### SECTION A and D

**K-W-L Table**

<table>
<thead>
<tr>
<th>K: What I Know</th>
<th>W: What I Want to know</th>
<th>L: What I have Learned</th>
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SECTION B

Figures

Session 1

Figure 1. Cell illustration.
Figure 2. DNA illustration

Base pairs

Sugar phosphate backbone

Adenine  Thymine
Guanine  Cytosine

U.S. National Library of Medicine
### SESSION 2

**Section B**

*Figure 3. Milestone of prenatal development*

<table>
<thead>
<tr>
<th>Critical Periods in Human Development</th>
<th>Full Term</th>
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</thead>
<tbody>
<tr>
<td>Age of Embryo (in weeks)</td>
<td>Fetal Period (in weeks)</td>
</tr>
<tr>
<td>Period of dividing zygote, implantation &amp; bilaminar embryo</td>
<td>1-2</td>
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<tr>
<td>CNS, heart</td>
<td>3-5</td>
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<tr>
<td>Eye, ear</td>
<td>6-7</td>
</tr>
<tr>
<td>Limbs</td>
<td>8-9</td>
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<tr>
<td>Palate</td>
<td>10-11</td>
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<tr>
<td>External genitalia</td>
<td>12-13</td>
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<tr>
<td>Major congenital anomalies (red)</td>
<td>14-16</td>
</tr>
<tr>
<td>Functional defects &amp; minor congenital anomalies (yellow)</td>
<td>17-38</td>
</tr>
</tbody>
</table>

*Red indicates highly sensitive periods when teratogens may induce major anomalies.*
Fetal Alcohol Spectrum Disorders (FASD) in Minnesota

- Approximately 57% of women of childbearing age in Minnesota are "current drinkers" (drank alcohol in the last 30 days) and of these, about 19% of women of childbearing age in Minnesota binge-drink (more than three drinks in one sitting, at a single point in time). (CDC)

- Up to 50% of women who become pregnant will not realize they are pregnant until after their 6th week of pregnancy. Unplanned pregnancy is a contributing factor to FASD because mothers who drink alcohol on a regular basis may not be aware they are pregnant until birth defects have already occurred. (MDH)

- The number of women who drink alcohol while pregnant is not decreasing. According to a 15 year study by the CDC, approximately 1 in 8 women drank any amount of alcohol while pregnant.

- In Minnesota, about 12% of pregnant women consume five or more drinks per month, and 6% of pregnant women binge-drink. (MDH) These women are most likely: Single College educated Employed Middle to upper income

- Alcohol use is much more prevalent in pregnancy than use of other substances; of the pregnant women who use substances, 80% use alcohol during pregnancy, while only about 8% to 23% use illicit drugs, and 33% or less smoke during pregnancy. (Jr. of Reproductive

- According to a mid-1990 study, one-third of women say their health care providers did not mention alcohol at all during their pregnancies, about one-fifth were advised to drink lightly or in moderation and about one-third were advised not to drink at all. (Wider Foundation)

- Women who are told by their health care providers not to drink at all during pregnancy are most likely to abstain or reduce their consumption of alcohol. Those women who are told to drink lightly or in moderation are least likely to abstain or reduce their consumption of alcohol while pregnant.

FASD Impacts Us All

FASD is common.

Each year, as many as 8,500 babies are born in Minnesota with perinatal alcohol exposure.

Nationally, FASD affects one out of every 100 live births. That’s more than Autism and Down Syndrome combined.

FASD is costly.

The cost of FASD to society is high. According to the CDC, the lifetime cost for one individual with FAS in 2002 was estimated to be $2 million for medical, educational and residential care.

It is estimated to cost Minnesotans $230,030 per day for FASD.

Fetal Alcohol Spectrum Disorders (FASD) can only be caused by drinking alcohol during pregnancy.

There is no cure, but FASD is 100% preventable.
Fetal Alcohol Spectrum Disorders (FASD) in Minnesota

Won't ...or Can't?
Without an understanding of the physical, behavioral and cognitive challenges faced by people with Fetal Alcohol Spectrum Disorders (FASD), typical misbehaviors can be misinterpreted as willful misconduct or deliberate disobedience, when it is often just the opposite.

Information Processing Differences.
Due to the brain damage caused by prenatal alcohol exposure, people with FASD have difficulty with the following:
- Input or taking in information
- Integration of new information with previous learning
- Output, or ability to use information

Individuals prenatally exposed to alcohol have difficulty with:
- Abstract Reasoning - Abstract concepts are the invisible foundation that structures our world.
- Cause and Effect Reasoning - Consequences often do not shape future behavior. People with FASD often don’t use past experiences to help make future decisions.
- Generalization - They don’t have moveable parts in the thinking process; so, when you change a piece of the routine for the individual, you have created an entirely new routine.
- Time - Telling time, feeling the passage of time, associating specific activities to numbers on a clock, cyclical nature of events.
- Memory - Especially short-term and auditory.
- Behavior - Difficulty with socialization and skills of independence.

Secondary Characteristics.
FASD is a lifelong disability, but often "secondary characteristics" occur, which are the result of living with the struggles of the primary disability:
- Fatigue, tantrums
- Irritability, frustration, anger, aggression
- Fear, anxiety, avoidance, withdrawal, shutdown, lying, running away
- Trouble at home and/or school
- Legal trouble, drug/alcohol abuse
- Mental health problems

The impact of these secondary conditions can be reduced when parents and professionals understand the intellectual challenges associated with an individual’s history of prenatal exposure to alcohol.

Caregivers should adjust their expectations of the person with FASD to the developmental stage they are at. Expect variability.

Behavioral Expectations

Typical 5 year-olds...
- Go to school
- Follow 3-part instructions
- Cooperatively play
- Share and take turns

5 year-old with FASD, developmentally 2 years...
- Take naps
- Follow one instruction
- Sit still for 5-10 minutes
- Parallel play
- "My way or no way"

Typical 10 year olds...
- Answer abstract questions
- Get along with others, solve problems
- Learn inerentially
- Physical stamina

10 year-old with FASD, developmentally 6 years...
- Learn by doing, experientially
- Mirror and echo words, behaviors
- Supervised play, structured play
- Easily fatigued by mental work

Typical 18 year-olds...
- On the verge of independence
- Maintain a job and graduate from school
- Have a plan for life
- Budget own money

18 year-old with FASD, developmentally 10 years...
- Need structure and guidance
- Limited choices of activities
- In the "here and how," little future focus
- Giggles, curiosity, frustration
- Get an allowance
- Gets organized with help of adults

Minnesota Organization on Fetal Alcohol Syndrome • www.mofas.org • 1-866-90-MOFAS (66327)
Figure 4: FASD Facial Abnormalities
SESSION 3

Section B

Figure 5 Neuron illustration
Figure 6 Areas of the brain and basic function

Section C

Figure 7 Milestones of human brain development
Figure 8 Adverse childhood experiences