Preventing a Common Teratogen Exposure in Pregnancy

WHAT YOU DON’T KNOW ABOUT FETAL ALCOHOL SPECTRUM DISORDERS
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- Owner/Medical Manager of FASDx Services LLC (multidisciplinary FASDs diagnosis)
- Founder and Board of Directors Member, Alaska Center for FASDs
- Consultant and affiliate faculty for the University of Alaska, Anchorage FASD Practice and Implementation Center (supported by CDC)
By the end of this session the learner will be able to:

1. Discuss the complexities of addressing alcohol as a physical and behavioral teratogen in a society where its use is a common part of our culture.

2. Describe prevalence, terminology, and signs and symptoms of the impairments that can result from alcohol exposure during pregnancy.

3. Apply best practices for preventing alcohol-exposed pregnancies by combining creative, motivational alcohol screening and brief intervention (aSBI) techniques with effective contraception and/or cycle awareness.
Alcohol SBI and SBIRT: Key differences

- SBI originally referred to screening and brief intervention research
  - Recommended by the U.S. Preventive Services Task Force
- Late 2003: SAMHSA grantees began SBI implementation
  - “and referral to treatment” added to program title
  - SBIRT acronym emphasized treatment service agency roles
- “RT” can be mistaken as every person who screens positive is referred
Meet Heather

- 30 year-old, single, white, works as an accountant
- She goes out to ‘party’ most Friday nights after work and often entertains & drinks with friends on Saturday
- Her typical consumption level is 3 or 4 of the newest martinis being featured at the bar she frequents or that she makes at home
- Is proud that she does not drive after drinking (bar is near her apt. so she can walk)
- Reports that she often has sex with her boyfriend on these nights
- Is in your office for emergency contraception because she forgot to use a condom the last time they had sex and is worried
- Her score from the AUDIT 1-3 Questionnaire is in the 7-8 score range*
Alcohol is a large part of American (& world) culture!

- Significant role in American history
- It is the ‘social glue’ we use for:
  - Celebrations
  - Sports & social events
  - Memorials
  - “Nights out” to relax & socialize with our friends
  - Teen ‘rites of passage’
  - Self-medication when it is too difficult or expensive to access mental health services
Binge Drinking Patterns Among U.S. Adults, 2015

Prevalence

Intensity

www.cdc.gov/alcohol/data-stats.htm
Women’s alcohol use is increasing, especially among white women.

Kerr, Mulia & Zemore, 2014
Concerning trends

High unintended pregnancy rates

High numbers of binge drinking and continued drinking in pregnancy

Providers missing opportunities to discuss risks

= 

Increased risk of rising numbers of fetal alcohol spectrum disorders (FASDs) in the U.S.
8 year old male, adopted, referred for FASD evaluation

Diagnoses on referral: ADHD, Oppositional Defiant Disorder, Anxiety, Learning Disorder

Birth record review: 30 yo G 1 P 0, prenatal care onset late first trimester, mom at ‘social risk’ - no details but she intended relinquishment, term, routine delivery & NB exam, home with adoptive mom on day two of life

Medical record review
- Slightly delayed developmental milestones beginning around 9 months, communication delays at 15 months
- Evidence of hyperactivity, attention, emotional regulation difficulties since age 2-3
- ADHD diagnosis age 5, stimulant meds have not worked very well

Transitioned poorly to kindergarten - suspensions for aggressive behaviors toward other children & staff
- Sleeps poorly, picky eater
- Cannot maintain friendships
- Has an IEP for Early Childhood Developmental Delay - goals & supports for behavior, social skills, math, reading, writing
- Many families turn to medication but that may not be the best option for these kids - occupational therapy/speech services often important therapies

**Bottom line for families of children with this disability?**
- Family is exhausted parenting & seeking services for him…
- Child can be very frustrated that things are harder for him and that the adults in his life do not ‘get’ him…
A recurring theme in my practice…

Recent parent quote:

“It still blows my mind that of all the professionals we went to for help with our son, starting at age 6, no one mentioned FASDs as something to consider until a school psychologist sat in on a meeting about his behavior in 7th grade. I’d love to help others avoid that type of delay in recognition and intervention…”

REPRODUCTIVE HEALTHCARE PROVIDERS CAN BE LEADERS TO HELP CHANGE THIS STORY!
Fetal Alcohol Spectrum Disorders (FASDs)

Alcohol is a potent physical and behavioral teratogen that is influenced by many variables that cannot be reliably predicted for any given mother/baby pair…
FASD: 1 in 20

FASDs present along a continuum

- Behavioral, cognitive, neurological, and physical symptoms
  - Fetal alcohol syndrome (FAS)
  - Partial fetal alcohol syndrome (pFAS)
  - Alcohol related neurodevelopmental disorder (ARND)
  - Alcohol related birth defects (ARBD)
  - Neurobehavioral disorder associated with prenatal alcohol exposure (ND-PAE)
Effects of alcohol are highly individualized

- Genetic differences
- Windows of development
- Timing of exposure
- Dose
- Co-factors
Studies show alcohol mainly targets the brain

- Alters neurogenesis and migration of neurons
- Increases neuronal cell death and/or apoptosis
- Alters dendritic growth, resulting in loss of functionality
- Alters microvascular development and induces hypoxia and/or ischemia
- Decreases protein synthesis
- Enhances free radical toxicity, resulting in premature cell death
- Impairs DNA methylation
- Causes vasoconstriction within the placenta, umbilical arteries/vein
July 2017 UC Riverside study:

Previous animal model work shows prenatal ethanol exposure impacts anatomy of neocortex and leads to abnormal motor behavior with increased anxiety in offspring.

Pregnant mice dosed with ethanol - as expected the first generation showed atypical gene expression, abnormal development of neural network in neocortex & behavioral deficits.

HOWEVER all three generations evaluated had body weight and brain size significantly reduced.

AND the unexposed 2nd and 3rd generations had the same brain impact even without the direct ethanol exposure.
So what is epigenetics???

- DNA modifications that do not change the DNA sequence can affect gene activity

- Chemical compounds that are added to single genes can regulate their activity; these modifications are known as **epigenetic** changes

What about Dad?

- Research is exploring paternal influences via epigenetic mechanisms such as DNA methylation, histone medication & miRNA expression.
- Interplay between maternal and paternal effects needs to be studied.

**BOTTOM LINE**

- His heavy alcohol may produce *FASD-like symptoms* in his offspring, as well as, may cause deficiencies in organ weights in his children.

Day et al., 2016
How much alcohol is ‘safe’?

- Fetus has little to no ability to metabolize alcohol
  - Placenta is a ‘sieve’ & fetal level may be higher than mother’s
  - Relies on mother to remove alcohol from system
  - Accumulates in amniotic fluid (where fetus is re-exposed)

- Binge pattern known to be the worst
  - Unpredictable outcome with ‘light to moderate drinking’ patterns
  - May not follow a simple linear dose/response pattern

Chasnoff, 2010; Feldman et al., 2012
Common ‘domains’ of impairment

- **Communication**: expressive, receptive, articulation, social/pragmatic language
- **Sensory** integration
- **Visual** perception/motor integration
- **Fine or gross motor**
- **Attention/Hyperactivity**
- **Learning & Memory**

- **Executive function** challenges in planning/prioritizing, organizing, task initiating, shifting, impulse control, emotional control, flexible thinking, working memory, self-monitoring

- **Adaptive Living** difficulties with functional academics, self-direction, social skills, community use, health & safety, self-care routines
Pediatric professionals have limited access to the maternal prenatal alcohol exposure (PAE) information.

Many individuals get *multiple diagnoses* but NOT the one for the underlying organic brain damage from PAE.

Obstetrical providers can help by using **ICD-10 codes** in *prenatal problem risk lists* and by supporting the process to have this risk information transferred to newborn records.

**ICD-10 Codes - Maternal Record**

- 099.310 Alcohol use complicating pregnancy, unspecified trimester
- 099.311 Alcohol use complicating pregnancy, first trimester
- 099.312 Alcohol use complicating pregnancy, second trimester
- 099.313 Alcohol use complicating pregnancy, third trimester
- 099.314 Alcohol use complicating childbirth

**ICD-10 Codes - Newborn Record**

- P04.3 Newborn affected by maternal use of alcohol
- Q86.0 Fetal alcohol syndrome (dysmorphic)
Correct diagnosis makes a difference…

Recent Parent Quote:

“Things are going reasonably well with my son who was diagnosed with static encephalopathy (ARND) a few years ago. He will be a senior in high school next year and is hoping to attend a community college (and play baseball) after he graduates. I honestly believe that getting the diagnosis made a big difference in our figuring out how to parent him and in his being successful in high school.”
Having the conversation

WHAT DO I SAY?!?!
Health providers can play a major role in preventing alcohol exposed pregnancies

- Routinely **screen all women** in your practice for alcohol use
- Develop & practice key phrases for brief interventions
- Help **all women** understand that **alcohol is a teratogen**...we don’t know **any safe amount of a teratogen** during pregnancy
- Explore the importance of alcohol in her social/personal life to gain insight & ideas for your brief intervention
Standard drink sizes

- **12 oz.**
  - 12 oz. of beer or cooler

- **8.5 oz.**
  - 8-9 oz. of malt liquor
  - 8.5 oz. shown in a 12-oz. glass that, if full, would hold about 1.5 standard drinks of malt liquor

- **5 oz.**
  - 5 oz. of table wine

- **3.5 oz.**
  - 3-4 oz. of fortified wine such as sherry or port
  - 3.5 oz. shown

- **2.5 oz.**
  - 2-3 oz. of cordial, liqueur, or aperitif
  - 2.5 oz. shown

- **1.5 oz.**
  - 1.5 oz. of brandy
  - a single jigger
  - A single jigger of 80-proof gin, vodka, whiskey, etc.
  - Shown straight and in a highball glass with ice to show level before adding mixer

CDC, 2014
### Recommended alcohol consumption limits

<table>
<thead>
<tr>
<th></th>
<th>Single Occasion*</th>
<th>Single Day</th>
<th>Single Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy women</td>
<td>No more than 3 drinks AND No more than 1 drink AND No more than 7 drinks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ages 21+ years, no medication)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Women who are pregnant or may become pregnant</td>
<td>No amount or type is considered safe to consume at any time</td>
<td></td>
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</tbody>
</table>

Alcohol limits can be affected by prescriptions, over-the-counter medications, and some existing medical conditions.

*A single occasion is estimated as a 2 hour period.

USDA, 2015
Validated screening tool: AUDIT (U.S.)

- Global “gold standard” of alcohol screening instruments
- 10 questions (initial screen uses only 3 of them)
  - Items 1-3 measure quantity
  - 4-10 measure alcohol-related harm and dependency symptoms
- 2-3 minute administration
- Sensitive to a broad spectrum of alcohol problems across multiple populations
- Validated for age 12 and above
<table>
<thead>
<tr>
<th>Questions</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How often do you have a drink containing alcohol?</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>2-3 times a week</td>
<td>4-6 times a week</td>
<td>Daily</td>
<td></td>
</tr>
<tr>
<td>2. How many drinks containing alcohol do you have on a typical day when you are drinking?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5-6</td>
<td>7-9</td>
<td>10 or more</td>
<td></td>
</tr>
<tr>
<td>3. How often do you have X or more drinks on one occasion? (5 for men under age 65; 4 men aged 65 or older and all women)</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>2-3 times a week</td>
<td>4-6 times a week</td>
<td>Daily</td>
<td></td>
</tr>
<tr>
<td>4. How often during the last year have you found that you were not able to stop drinking once you started?</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
<td>Daily or almost daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. How often during the last year have you failed to do what was normally expected of you because of drinking?</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
<td>Daily or almost daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
<td>Daily or almost daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. How often during the last year have you had a feeling of guilt or remorse after drinking?</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
<td>Daily or almost daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. How often during the last year have you been unable to remember what happened the night before because of your drinking?</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
<td>Daily or almost daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Have you or someone else been injured because of your drinking?</td>
<td>No</td>
<td>Yes, but not in the last year</td>
<td>Yes, during the last year</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>10. Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down?</td>
<td>No</td>
<td>Yes, but not in the last year</td>
<td>Yes, during the last year</td>
<td></td>
<td></td>
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</table>

TOTAL (1-3) | TOTAL (1-10)
## AUDIT (U.S.) cutoff scores

<table>
<thead>
<tr>
<th>Score</th>
<th>Zone</th>
<th>Definition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-7</td>
<td>I</td>
<td>Low Risk Abstainer, or drinking below guidelines</td>
<td>Positive reinforcement including alcohol education</td>
</tr>
<tr>
<td>8-15</td>
<td>II</td>
<td>At Risk May be drinking in excess of guidelines</td>
<td>Brief intervention including alcohol education</td>
</tr>
<tr>
<td>16-19</td>
<td>III</td>
<td>High Risk May be drinking above guidelines and have experienced alcohol-related harm</td>
<td>Brief intervention; continued monitoring or follow-up</td>
</tr>
<tr>
<td>20-40</td>
<td>IV</td>
<td>Possible Alcohol Use Disorder May need specialized assessment or treatment</td>
<td>Brief intervention; referral to specialist for diagnostic evaluation and care</td>
</tr>
</tbody>
</table>
Reasons women/girls may drink during pregnancy

- **Unaware** they are pregnant
- **In denial** because they do not want to be pregnant
- **Uninformed about the risks** for an embryo/fetus
- **Underestimate the risk** because they know someone who drank during pregnancy and “their children are fine”
- **Alcohol use is the norm in their social group** & **abstaining may be difficult**
- **Using it to cope** with violence, depression, poverty, or isolation
- **May be struggling with addiction**

https://fasdprevention.wordpress.com/2014/07/14/fasd-awareness-campaigns-creating-effective-messages/
Stigma contributes to decisions about discussing alcohol use, especially during pregnancy.

Stigma increases patient fears of being judged or devalued by others, especially a healthcare provider.
Intervention Considerations:
One Key Question

The One Key Question® initiative (OKQ) is the Oregon Foundation for Reproductive Health's groundbreaking, yet simple, solution to making Oregon women and families healthier and ensure that more pregnancies are wanted, planned, and as healthy as possible. OKQ encourages all primary care providers to routinely ask women about their reproductive health needs and has been endorsed by 30 professional organizations and associations across Oregon and the country.

By asking women “Would you like to become pregnant in the next year?” primary care clinicians can more fully support women’s preventive reproductive health needs, such as preventing an unintended pregnancy or preparing for a healthy pregnancy.

Contact us for more information: info@onekeyquestion.org
She is currently pregnant.... How to respond?

- “I am continuing to have a glass of wine a few nights a week, that’s okay right?”

- “I want to drink champagne at my best friend’s wedding … that should not be a problem since I’ll be in the third trimester.”

- “I really miss going out with my friends for our ‘end of the work week’ drinks. Can I go just once a month or so?”
Remind women who might want to drink during pregnancy…

- **No type is safe** - beer, wine, liquor, wine coolers, homebrew, etc.

- **No way to predict** if she would be the mother/baby pair with more or less impact from the alcohol…

- **Fetal brain is the main target** - for the entire nine months

- Potential for multigenerational impacts due to **epigenetic influence**
What can we tell women to do?

- If she screened ‘at-risk’: explore ideas to reduce volume when drinking
- If she is attempting to get pregnant, not using birth control and does not choose to stop drinking: track her cycle & time her alcohol use
- If she is pregnant and wants to drink: suggest alternatives
Rochelle’s story

- 21 year old pregnant with her 4\textsuperscript{th} child
- Child protective services had removed all of her previous children
- Different fathers for each child, none involved with her long term
- Short stature, + facial features, evidence of brain-based differences in her behaviors (poor memory, poor executive function, adaptive living skills marginal) + ‘survivor mode living’ pattern
- Trauma history – her mother had alcoholism & was abusive (emotional, physical, sexual), displacement
- Disrupted educational experiences
- Self-medicating with tobacco, alcohol, occasional substances
Tips for working with women/girls who may have an FASD...

- Try to ‘reach them where they are at’… i.e. figure out what they might ‘know’/believe
- Be **concrete and concise** in verbal messages
- Check for understanding (have them tell you what they heard)
- Provide **visual cues** to help them understand and remember what you said
- **Limit choices** - they cannot manage ‘load’
- Use ‘**external brain cues**’ to help them stay on track…help them put appointments in their phone with reminder cues, etc.
- Be non-judgmental (even when they mess up)
- **Repeat, repeat, repeat**…They may need repetition to master and/or remember things
- Encourage her to use a user-independent contraceptive method (due to executive function deficits)
Be a champion for preventing AEPs

- NPs are on the front lines of FASD prevention (and can help with early recognition/intervention)

- We have an obligation to share this important information and to be honest with those we care for

- Abstinence message is getting resistance…let’s continue no safe time, type, amount of alcohol but let’s also share there is no safe teratogen in pregnancy and that alcohol is a powerful physical and behavioral teratogen…it is an environmental ‘pollutant’

- In our homes, our exam rooms, and in our communities…we have an opportunity to make an important contribution that can change lives long term
Training and resources

- Collaborative for Alcohol-Free Pregnancy: Partnering for Practice Change
  www.cdc.gov/FASDtraining - online courses for nurses & other professionals

- NPWH short webinars - *Optimizing Preconception Health: Preventing Unintended Teratogen Exposure in Reproductive Age Women*
  www.npwh.org/courses/curriculum/details/903

- National Organization on Fetal Alcohol Syndrome (NOFAS)
  www.nofas.org - birth mother support, great information re: individuals living with FASD
References


