Drug Endangered Babies: The Impact of Prenatal Substance Abuse on Pregnancy & Beyond

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Alaska CARES & The Children’s Place
### AST Drug Enforcement Unit 2015 Report

<table>
<thead>
<tr>
<th></th>
<th>Arrests in 2013</th>
<th>Arrests in 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cocaine:</td>
<td>37</td>
<td>20</td>
</tr>
<tr>
<td>Heroin:</td>
<td>151</td>
<td>233</td>
</tr>
<tr>
<td>Methamphetamine:</td>
<td>187</td>
<td>225</td>
</tr>
<tr>
<td>Marijuana:</td>
<td>669</td>
<td>290</td>
</tr>
</tbody>
</table>
Alaska trends noted in report:

• Meth: 3 labs identified in 2015; most smuggled into state
• Controlled prescription medications: significant seizures of illicitly obtained medications; many have transitioned to heroin
• Heroin: increase in availability including rural areas
• Synthetic cannabinoids: 2015 significant increase in distress calls affecting homeless population in Anchorage
• Fentanyl: being mixed with heroin & cocaine; amplifies potency & dangers
Drug OD Deaths in Alaska

- Prescription drugs: 60
- Opioid pain relievers: 52
- Illicit drugs: 21
- Heroin: (7 in 2009)
- Total overdose deaths: 76

<table>
<thead>
<tr>
<th>2010</th>
<th>2015</th>
</tr>
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<tbody>
<tr>
<td>60</td>
<td>83</td>
</tr>
<tr>
<td>52</td>
<td>65</td>
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<tr>
<td>21</td>
<td>59</td>
</tr>
<tr>
<td>(7 in 2009)</td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>121</td>
</tr>
</tbody>
</table>

- Steady increase in heroin OD deaths since 2010: 50% higher than national rate
- RX opioid pain reliever OD death rate more than double national rate
## MSRMC UDS 2015

<table>
<thead>
<tr>
<th>Drug</th>
<th>% Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>THC</td>
<td>30%</td>
</tr>
<tr>
<td>Cocaine</td>
<td>2%</td>
</tr>
<tr>
<td>Meth</td>
<td>12%</td>
</tr>
<tr>
<td>Opioids</td>
<td>26%</td>
</tr>
<tr>
<td>Amphetamines</td>
<td>12%</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>19%</td>
</tr>
<tr>
<td>Methadone</td>
<td>4%</td>
</tr>
<tr>
<td>Barbiturates</td>
<td>2%</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>12%</td>
</tr>
<tr>
<td>Buprenorphine</td>
<td>4%</td>
</tr>
<tr>
<td>Negative</td>
<td>37%</td>
</tr>
</tbody>
</table>
“All children wake up in a world that is not of their own making, but children of alcoholics and other drug-addicted parents wake up in a world that doesn’t take care of them.”

(CWLA Children’s Voice Article Sept. 2001)
What is a drug-endangered child?

- Live in home where illegal drugs are used and/or manufactured
- Suffer physical harm or neglect from
  - Direct or indirect exposure to illegal drugs & alcohol
  - Toxic chemicals of home drug labs
  - Parent substance abuse
  - Includes infants exposed in utero
Substance Abuse and Child Maltreatment

- Substance abuse causes or exacerbates 7/10 cases of child abuse or neglect
- Children whose parents abuse drugs and alcohol are 3X likelier to be abused and 4X likelier to be neglected
- Children prenatally exposed to illicit drugs are 2 – 3X likelier to be abused or neglected
Infant physical abuse risk factors:

- Multiple gestation
- Low birth weight
- Young or less educated parents
- Unmarried
- Substance using mothers

  - Gessner et al, Child Abuse & Neglect 2004
Substance use in pregnancy is common
National Survey on Drug Use & Health 2012-13

- Cigarettes 15.4%
  - Highest in younger women: 21%
- Alcohol 9.4%
  - Binge drinking 2.3%
  - Heavy drinking 0.4%
- Illicit drugs 5.4%
  - 14.6% age 15-17
  - 8.6% age 18-25
  - 3.2% age 26-44

www.oas.samhsa.gov/nsduh
Prenatal marijuana use in AK

• SOA Epidemiology Bulletin #5 2/24/15
• 2002: 3.5% of pregnant women
• 2011: 7.8% of pregnant women
  • Higher in teens (13.2%)
  • Twice as high in Alaska Native women (11% vs 5.6%)
  • 3 times higher if on Medicaid (11.4% vs 3.2%)
<table>
<thead>
<tr>
<th>Drug</th>
<th>% Positive</th>
<th>(national)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphetamines</td>
<td>5.9%</td>
<td>(4%)</td>
</tr>
<tr>
<td>Opiates</td>
<td>12%</td>
<td>(9.5%)</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>12%</td>
<td>(4%)</td>
</tr>
<tr>
<td>Cannabinoids</td>
<td>35.3%</td>
<td>(21.6%)</td>
</tr>
<tr>
<td>Buprenorphine</td>
<td>23.5%</td>
<td>(9%)</td>
</tr>
<tr>
<td>Cotinine</td>
<td>76.5%</td>
<td>(47.4%)</td>
</tr>
</tbody>
</table>
Factors:

• If crosses the placenta
• If crosses blood-brain barrier
• Fat vs. water soluble
• Half life of drug
• If causes birth defects (teratogenic)
• If causes cancer (carcinogenic)
• If causes pregnancy complications
• Poly-substance use
• Specific substance effects
Equally important:

- What happens to child after they are born
Most common substance abused in pregnancy?
~ 17% pregnant women (SAMHSA) (more in some studies)
Cigarettes & Pregnancy

• Numerous adverse effects, including:
  • Pregnancy loss
  • Preterm labor/delivery
  • Low birth wt
  • Placenta problems
  • Increased neonatal mortality
  • Poss. congenital anomalies

PSESG study, Up To Date
Cigarettes & Pregnancy, cont

- Increased risk of use of other drugs
  - Marijuana 10 X
  - Cocaine 22 X
  - Amphetamines 21 X
Effects on children:

- Neonatal stress, withdrawal
- SIDS (2-4X)
- DMII (4X)
- Neurobehavioral
  - Learning problems
  - Behavioral problems
- Increased risk obesity
- Double risk of child becoming a smoker
Iq’Mik (“blackbull”)

• Tobacco + ash of tree fungus
  • Mixed in mouth with saliva, dried
  • Like “freebasing” tobacco

• Western Alaska pregnant women: 16% smoke, 57% chew

• Neurobehavioral effects similar to other tobacco products
Alcohol and Pregnancy
Fetal Alcohol Spectrum Disorders (FASD)

• Broad range of effects from mother drinking alcohol while pregnant
• May include physical, mental, behavioral, and/or learning disabilities with possible lifelong implications
• 100% preventable
• Leading known cause of preventable mental retardation
• Not caused on purpose
• Can occur anywhere and anytime pregnant women drink
• Not from father’s alcohol use
• Not new disorder
FAS Facts

• FAS prevalence in the U.S. = 0.3-3 per 1000 live births in general population
• Alaska 1.5 per 1000 live births
• Alaska Natives 4.8 per 1000 live births
  • Rate declining
• Lifetime cost of care: ~$3.1 million

State of Alaska Office of FAS & CDCFASD websites
FASD and Alcohol

• All alcoholic beverages are harmful.
• Binge drinking is especially harmful.
• There is no proven safe amount of alcohol use during pregnancy.
Drug Use & Pregnancy
Marijuana

- Most commonly used illicit substance in pregnancy
- ~50% of women who smoke MJ prior to pregnancy continue
- Self medication
- You can grow it yourself!!
HOWEVER:

• Not your mother’s pot
  • May be up to 20X more potent today
Pregnancy effects

• Can reduce fertility in men & women
• Occasional use:
  • No clear effects on:
    • Growth
    • Prematurity
    • Congenital anomalies
    • Perinatal mortality
Regular use (\(\geq 6X\) wk) effects:

- Transfers across placenta
  - Regular use = higher fetal levels

- Higher rates of:
  - Lower birth weight
  - Premature birth
  - Admission to neonatal intensive care unit
  - Possible anencephaly
Breast feeding

• Accumulates in breast milk in high concentrations – may result in:
  • Sedation
  • Growth delay
  • Decreased muscular tone
  • Poor sucking

• Animal studies:
  • Alteration of brain cell metabolism
Regular use effects on infants:

- Infant withdrawal-like symptoms:
  - Hyperexcitable, irritable, jittery
  - Increased arousal response
Impact on older children

• Newer research indicating:
  • ADHD
  • Learning disabilities & memory problems in toddlers & 10 year olds
  • Aggression, anxiety & depression in adolescents
Newest recommendations:

- American College of Obstetricians & Gynecologists (ACOG) discourages use of marijuana during pregnancy
- ACOG & Academy of Breastfeeding Medicine discourage marijuana use during breastfeeding
Opioids
Pregnancy complications

• Difficult to sort out what is specifically due to:
  • Drug
  • Drug withdrawal
  • Polysubstance effects
  • Co-existent maternal:
    • Medical problems
    • Poor nutrition
    • Psychological issues
    • Socioeconomic effects
Pregnancy complications seen with opiate dependence

- Placental abruption
- Fetal death & miscarriage
- Infection
- Poor growth
- Preeclampsia
- Prematurity
- Post-partum hemorrhage
- Septic thrombophlebitis
Heroin

• Opioid analgesic
• Injection increases risk of blood born infections
• Hard to sort out effects of other substances & lifestyle
Pregnancy effects

• Birth defects, other congenital problems
  • Seen in hamsters, rabbits, mice
  • Conflicting studies in humans

• Pregnancy complications in humans
  • Premature delivery
  • Premature rupture of membranes
  • Poor growth
  • Meconium stained fluid
  • Perinatal mortality
Neonatal effects

- Withdrawal syndrome
- Abnormal breathing patterns during sleep
- Increased risk SIDS/SUID
- Methadone considered safer alternative for babies
Childhood effects

• Impact of prematurity, other birth complications
• Behavioral abnormalities
  • Impaired organization & perception skills
  • Impaired motor inhibition
• Strabismus
  • May be up to 10X rate of general population
Prescription Opioids

- Natural & synthetic substances with morphine-like activity
- Opiates = subclass of drugs extracted from opium
- Examples:
  - Oxycodone
  - Hydrocodone
  - Morphine
  - Codeine
  - Methadone
Opioids, cont.

• 2\textsuperscript{nd} most abused drug by youth

• Sources:
  • RX methadone
  • Diversion of legal prescriptions
  • Illegal distribution
  • Prescription forgery
  • Pharmacy burglaries
  • Home robberies
Pregnancy risks:

• Methadone
  • Birth defects in large doses in animals
  • Maternal withdrawal during pregnancy
    • Fetal adrenal, nervous system effects including still birth

• Oxycodone, codeine
  • No known increase in birth defects
Subutex (buprenorphine)

• Used for opioid dependence PO; pain IV/IM
  • Also Suboxone (Subutex + Naloxone)

• Pregnancy Risk Factor C
  • No known congenital malformations

• Neonatal withdrawal day 1 – 8
  • Most early
    • Lower incidence than methadone

• Enters breast milk; nursing not recommended
Neonatal risks

- Primary risk is withdrawal
- Respiratory depression, sedating effects:
  - When used close to delivery
  - With breast feeding
- Methadone: low birth weight, jaundice, thrombocytosis, possible SIDS
Neonatal risks, cont.

• Otherwise primarily related to risks to mother:
  • Infection if injecting
    • Hepatitis
    • HIV
  • Overdose

*Most transfer into breast milk*

*Codeine metabolizes to morphine – certain women are ultrafast metabolizers leading to toxic levels in milk*
Neonatal Abstinence Syndrome

- Due to discontinuation of exposure to drug
- Usually appears within 48 – 72 hours
- Treated supportively
  - If needed, opioids
Symptoms include:

- Poor feeding
- Irritability
- Poor weight gain
- Inability to sleep
- Sweating
- High pitched cry
- Vomiting
- Diarrhea

- Fever
- Temperature instability
- Mottling
- Seizures
Childhood effects

- Methadone
  - Neurobehavioral effects through infancy
  - Dose related

- Subutex
  - No long term studies of exposed infants
  - Recent review article: pregnancy, infant outcomes appear slightly better than methadone

- Others – not reported
Cocaine

- Readily crosses placenta & fetal blood-brain barrier
- Constricts blood vessels
- Dose effect on infants
- Long half life
  - May be present in urine of babies up to 7 days
Pregnancy effects

• Increased risk:
  • Cocaine toxic effects on mother’s heart
  • Miscarriage & fetal demise
  • Premature labor & delivery
  • Poor growth
  • Placental problems (abruption)
  • Fetal stroke
Neonatal effects

- Neurobehavioral abnormalities
- Present between 48 – 72 hours
- Direct effect rather than withdrawal
  - Tremors
  - High pitched cry
  - Irritability
  - Excess suck
  - Hyperalertness
  - Apnea or tachypnea
Other neonatal effects

- Transient abnormal EEG changes
- Increased risk:
  - SIDS/SUID
  - Infection
    - Hepatitis
    - Syphilis
    - HIV
Childhood effects

• Subtle effects
  • Hard to sort out from other environmental effects
  • Reduced by good home environment

• Slower growth but mostly catch up

• Long term:
  • Learning disabilities – some studies
  • Attention problems
  • Behavior problems (aggression)
Amphetamines

• Centrally acting stimulants
• Cross the placenta
• RX for:
  • ADD/ADHD
  • Narcolepsy
  • Ineffective for obesity
Pregnancy effects

- Animals (high doses):
  - Various birth defects
  - Decreased weight & survival

- Humans: (RX amphetamines)
  - Lower birth weight
  - Premature delivery
  - Negative impact neurodevelopment
  - Maternal hypertension & postpartum hemorrhage
Neonatal effects

• Possible increase in:
  • Jitteriness
  • Drowsiness
  • Respiratory distress

• Excreted into breast milk

• “Human data insufficient”
Methamphetamine
Meth and Pregnancy Research

• Often also using cigarettes, cocaine, alcohol, marijuana, other drugs
• Poor nutrition
• Lack of prenatal care
• Difficulty telling prenatal vs. postnatal environmental effects
• Still clear effects controlling for co-founders
Meth and Pregnancy Effects

- **Maternal effects:**
  - Increases blood pressure & heart rate
    - Preeclampsia
  - Placental vasoconstriction
    - Reduction in oxygen/nutrition supply to fetus

- **Passes through placenta:**
  - Elevated fetal blood pressure
  - Fetal tachycardia, dysrhythmia
  - Fetal brain effects
Meth and Pregnancy, cont.

• Decreases in:
  • Infant weight, length, head size:
    • 3.5X more likely SGA

• Higher risk:
  • Fetal distress
  • Fetal/infant death
  • Premature delivery
  • Stroke
  • Clefting/heart defects, other malformations sporadically described
Infant effects:

• Increased risk SIDS, Hep B/C, HIV
• Withdrawal symptoms
• Effects on:
  • Sleep & arousal
  • Irritability/shrill cry
  • Attention span
  • Feeding difficulties
  • Motor development
  • Tremors, increased tone
Child effects:

• Reduced brain volume by MRI (Chang et al Addiction 2007 #102)
• Deficits in cognitive, language, behavioral functioning at age 3 – 6 years
• Poor performances on measures of sustained attention and delayed verbal memory at age 3 – 16 years
• Prenatal meth exposure “may be neurotoxic to the developing brain”
Prescription drugs: Sedatives

• Examples:
  • Valium
  • Xanax
  • Ambien

• Do cross placenta
Pregnancy Effects

• Some may have increased risk of congenital anomalies in lab animals
  • High doses
• Not identified in humans
Neonatal effects

• Possible reduced head size, transient gross motor development delays
• Withdrawal symptoms may occur after pregnancy or lactation exposure
  • Irritability, restlessness
  • Hypotonia (“floppy”)
  • Impaired temperature regulation
  • Decreased sucking
Neonatal effects, cont.

• Crosses into breast milk
  • Concentration low
  • Repeated use not recommended
    • May accumulate in exposed infants
    • Cause sleepiness, poor suckling
Prescription drugs: barbiturates

• RX for:
  • Seizures
  • Sedative-hypnotic

• Also used illicitly

• Examples: Phenobarbital, Seconal, Fiorinal, Amytal
Pregnancy effects

- Phenobarbital:
  - Up to 2 – 3X incidence birth defects in offspring reported (conflicting reports)
    - Congenital heart disease
    - Facial and genital abnormalities
    - Skeletal malformations
  - Folic acid supplementation may help
  - Possible reduced birth weight, head size
    - Most are term and normal weight
Neonatal effects of phenobarb

• May have withdrawal symptoms
  • Acute stage 2 – 14 days
    • Irritability, sleeplessness, tremors, hiccups, mouthing motions
  • Sub-acute stage 2 – 4 months
    • Voracious appetite, regurgitation, gagging, irritability, sweating, sleep disturbances, increased sensitivity to sound

• Crosses into breast milk
  • May cause sedation
Other barbiturates

• Few studies
• No definite links to congenital anomalies
• Withdrawal symptoms reported
• Excreted in breast milk
Other drugs
Club Drugs

• Ecstasy
• LSD
• GHB
• Ketamine
• PCP
Ecstasy/MDMA

• Structurally similar to amphetamines & mescaline
• Possible link with:
  • Birth defects:
    • Club foot
    • Congenital heart disease
    • Gastrochisis
  • Delays in motor function
  • Learning, memory problems
Effects: GHB

- Gamma hydroxybutyrate
- “Date rape” drug
- Crosses placenta, blood brain barrier
- Depression or agitation
- No overt fetal effects known
LSD

• Hallucinogen

• Possible increased risk:
  • Miscarriages
  • Defects of limbs, eyes, central nervous system
PCP (Angel Dust)

- Limited information
- Possible prematurity, poor intrauterine growth
- Neurobehavioral effects:
  - Jitteriness
  - Hypertonia
  - Vomiting
  - Diarrhea
- Concentrates in breast milk
Ketamine

- Tissue changes in animals (heart, liver, kidneys)
- Crosses placenta
- Reduced sucking, reflexes, alertness
The New Synthetics

• Synthetic cannabinoids (K2, Spice)
• Synthetic cathinones ("bath salts")
Pregnancy risks

• Chemically similar to meth, MDMA
• Similar effects:
  • HTN, tachycardia
  • Euphoria, agitation, hallucinations, paranoia, panic attacks, violence
  • Suicidal behavior (even after high worn off)
  • Dizziness, nausea
  • Anorectic
  • Vasoconstriction
Current research suggests:

- Synthetic & high potency cannabinoids linked to anencephaly
- Animal studies – increased risks:
  - Abnormal embryo development
  - Miscarriage
  - Tubal pregnancy
  - Premature birth
  - Impaired neurotransmitter synthesis
- Limited information on long term effects but highly concerning
Inhalants

• “Huffing”
• One of most common types substance abused by youth in rural Alaska
• Gas, propane, Magic Markers, Glue, perfume, hairspray, Lysol
• Can cause damage to brain, vision, hearing, kidneys, liver, heart, lung, bone marrow, death
Effects

- Increased risk:
  - Miscarriage
  - Poor fetal growth
  - Preterm birth
  - Birth defects (especially skeletal)

- May cause newborn withdrawal symptoms

- Some evidence of:
  - Poor weight gain
  - Neurodevelopmental impairment
Final thoughts

• The risks to children from substance abuse start before they are born
• Risks continue after birth
  • Ongoing parental substance abuse
  • Increased vulnerability of child
• Education & prevention are key