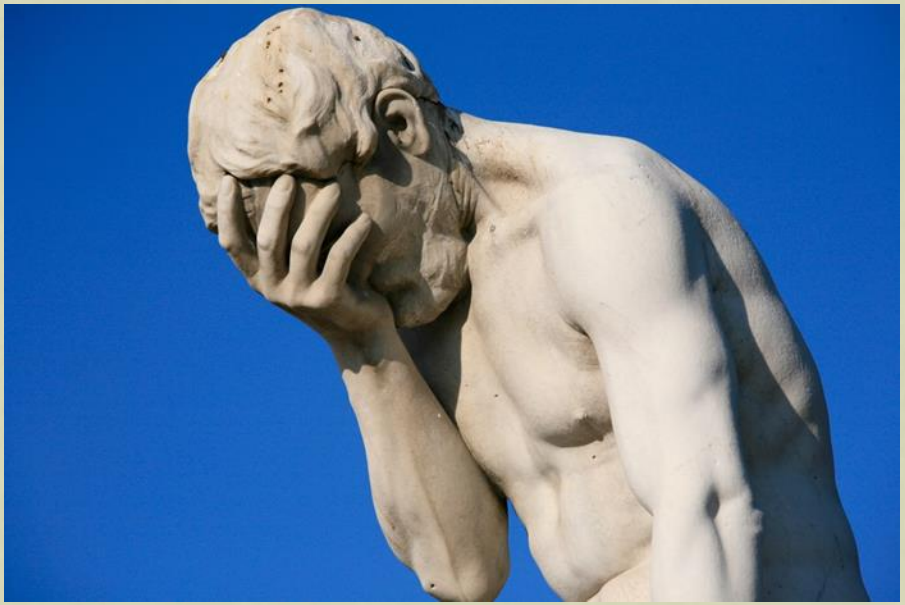
RADIOCONTRAST AGENTS

- Xrays pose no risk
- Gadolinium salts and Iodine contrast agents for CT/MRI have virtually no oral availability.
- Do not stop breastfeeding



RADIOCONTRAST AGENTS

- Get the name of the procedure
- Get the isotope and dose used
- Radioactive agents: discard milk for 5 half lives.
  That info at the end of MMM 2006 and on LactMed.

CONTRACEPTIVES

To minimize physiologic impact

First choice

- LAM (ABM protocol #13)
- Natural Family Planning
- Barriers
- IUD (not Mirena, necessarily)

CONTRACEPTIVES

Second Choice

- Progestin-only methods
- Depo- sigh

Third choice

Estrogen-containing contraceptives

MEDROXYPROGESTERONE

- Many anecdotal reports of cessation of milk supply and breastfeeding after administration of Depo Provera
- Current evidence is methodologically weak
- Strong biological model describing potential deleterious effects
- Need informed consent

Brownell, Breastfeeding Medicine, 2012

DRUG DEPENDENCY

ANESTHESIA

- Thiopental: plasma levels drop by 85% in one minute
- Morphine: infant dose about 6% of maternal dose due to poor oral availability
- Propofol: short half life
- Demerol: not a good choice
- Gases: very low concentration in milk
- Benzos: Rapid redistribution, only a problem with chronic use

OPIOID USE

LEGAL AND NOTSOMUCH

CHALLENGES

- Drug use often isn't the only problem for these women
  - HIV
  - Hep B and Hep C
  - Poor Nutrition
  - Poor behavior choices
  - Psychiatric disorders
- Polydrug use is the norm for this population (includes tobacco and alcohol)
- The drugs are often cut with dangerous substances

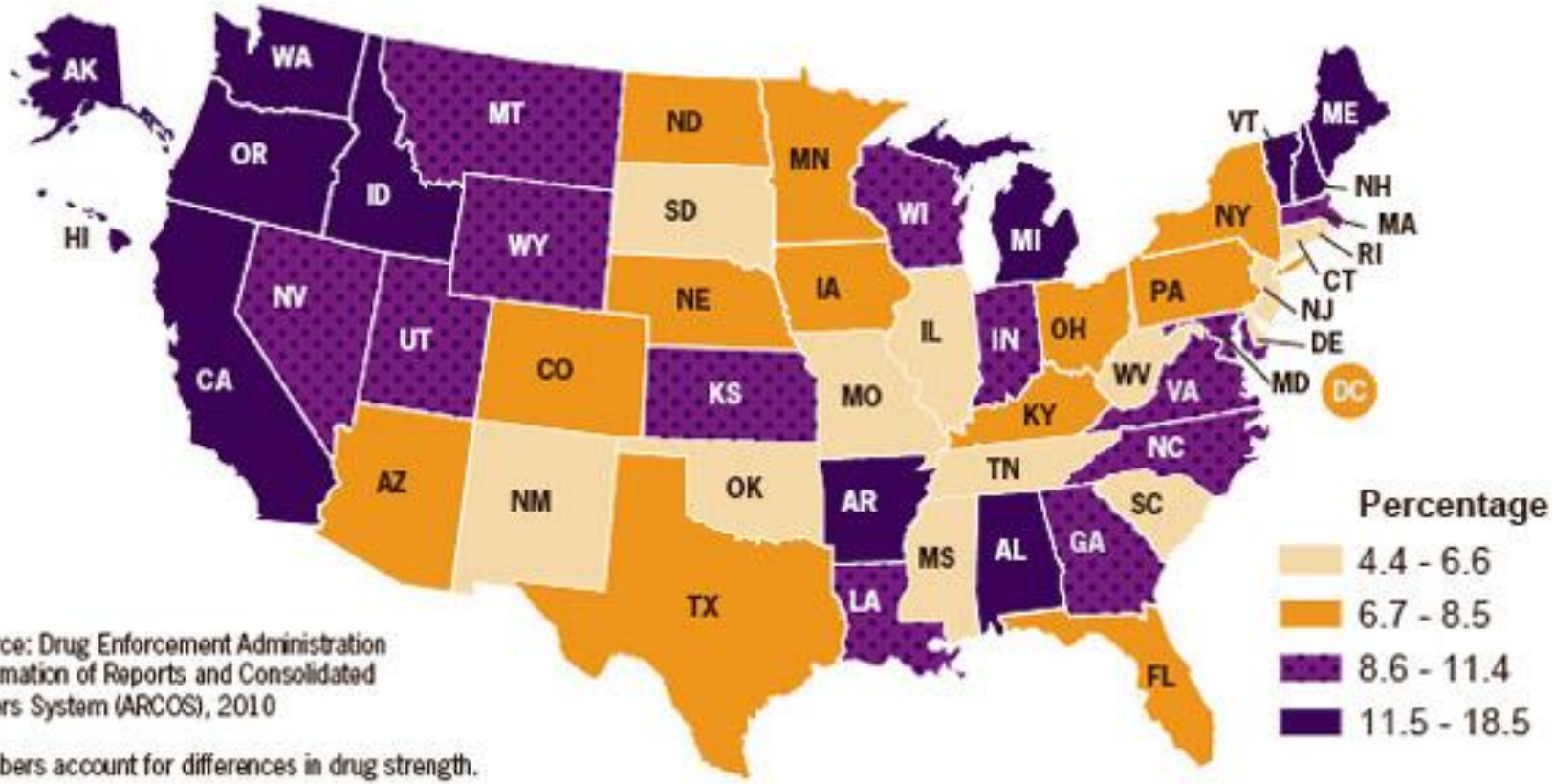
CHALLENGES

- Lack of comprehensive care
- The choice to breastfeed seems as if the mother is less likely to abuse substance- not true
- Heavy alcohol, marijuana use and moderate cocaine use did not significantly deter women from breastfeeding their infants (1988 US National Maternal and Infant Health Survey)
- Lack of evidence based guidelines for this population

CHALLENGES

- Despite all this- all the risks, the benefits of human milk and breastfeeding need to factor into the risk: benefit analysis

Methadone's share of prescription painkillers dispensed in each state



Source: Drug Enforcement Administration Automation of Reports and Consolidated Orders System (ARCOS), 2010

Numbers account for differences in drug strength.

METHADONE

- Has been studied
- Concentration in human milk is low
- No documented long or short term effects of methadone in human milk on neurodevelopment
- Does cause Neonatal Abstinence Syndrome (NAS)- withdrawal symptoms in infants including CNS hyperirritability and autonomic nervous system dysfunction
- Infants who are not breastfed are more likely to have severe NAS

SUBUTEX (BUPHENORPHINE)

- Cases- all small numbers with conflicting data
- All suggest that the amounts in human milk are small and unlikely to have negative effects on the developing infant
- However, infants exposed during pregnancy required significantly less morphine for the treatment of NAS, a shorter period for NAS treatment and a significantly shorter hospital stay than those infants exposed to methadone

(Jones, NEJM, 2010)

BREASTMILK AND NAS

- Methadone and Buphenorphine are compatible with breastfeeding
- Infants of breastfeeding mothers had significantly reduced mean NAS scores, delayed onset of withdrawal, a decreased need for medication and shorter hospitalizations than formula fed infants.
- Breastmilk is unlikely to ameliorate all the symptoms of NAS

Abdel-Latif, Pediatrics, 2006

MARIJUANA

YES, FINALLY. IT IS ILLEGAL.

ENDOCANNABINOIDS

- Endocannabinoids are the endogenous marijuana-like substances found in animals and humans.
  - Made by the brain
  - Made by the breast as a component of breastmilk
- Cannabinoids are the constituents in marijuana and endocannabinoids which activate cannabinoid receptors.
- Endocannabinoid system contains:
  - Specific genes which code for cannabinoid receptors
  - The things those receptors bind (remember, endogenous)
  - Proteins that synthesize and degrade them

ENDOCANNABINOIDS

- The endocannabinoid system:
  - Interacts with molecules which regulate appetite and weight
  - Regulation of energy and food intake
  - Involved in the expression of key genes involved in neural development

CANNABINOID PHYSIOLOGY

- CB1and CB2 cannabinoid receptors
  - CB1: located in the central nervous system
  - CB2: brain and spleen (primarily)

In utero: CB1receptor acts on brain development by neuronal differentiation, guiding axonal migration and facilitating synaptogenesis.

Post-natally: CB1 receptor blockade induces oral motor weakness.

CB1 has a critical role in initiation of milk suckling

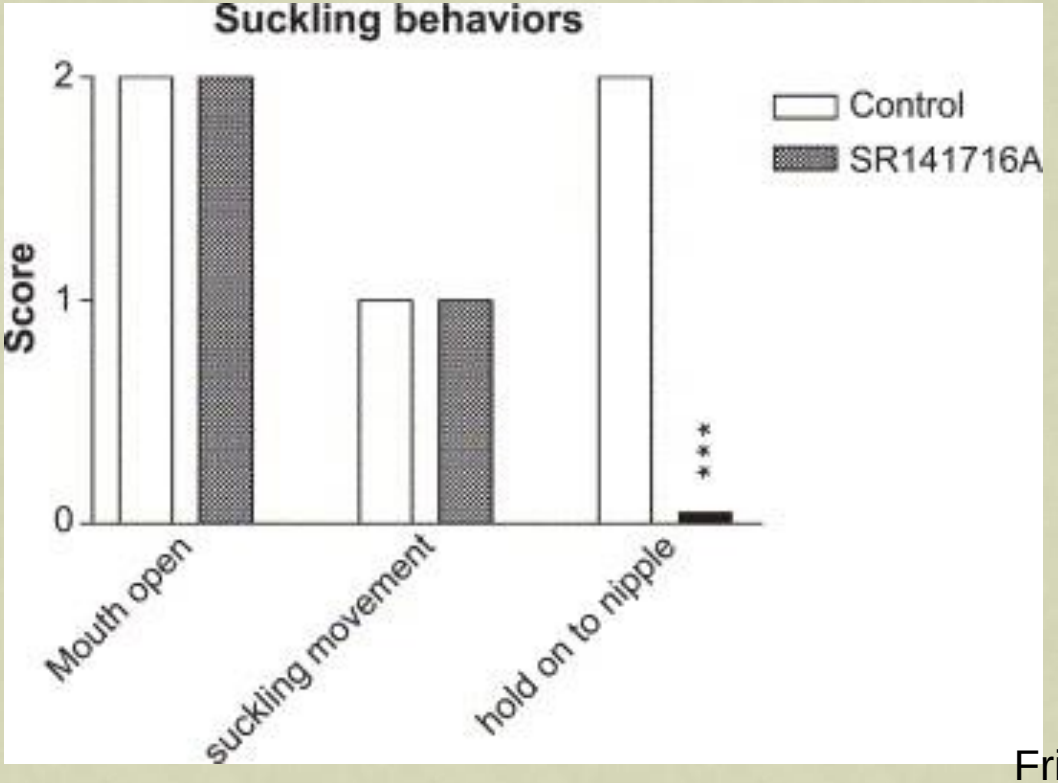
Fride, Journal of Neuroendocrinology, 2008

CB1 RECEPTORS AND MILK INTAKE

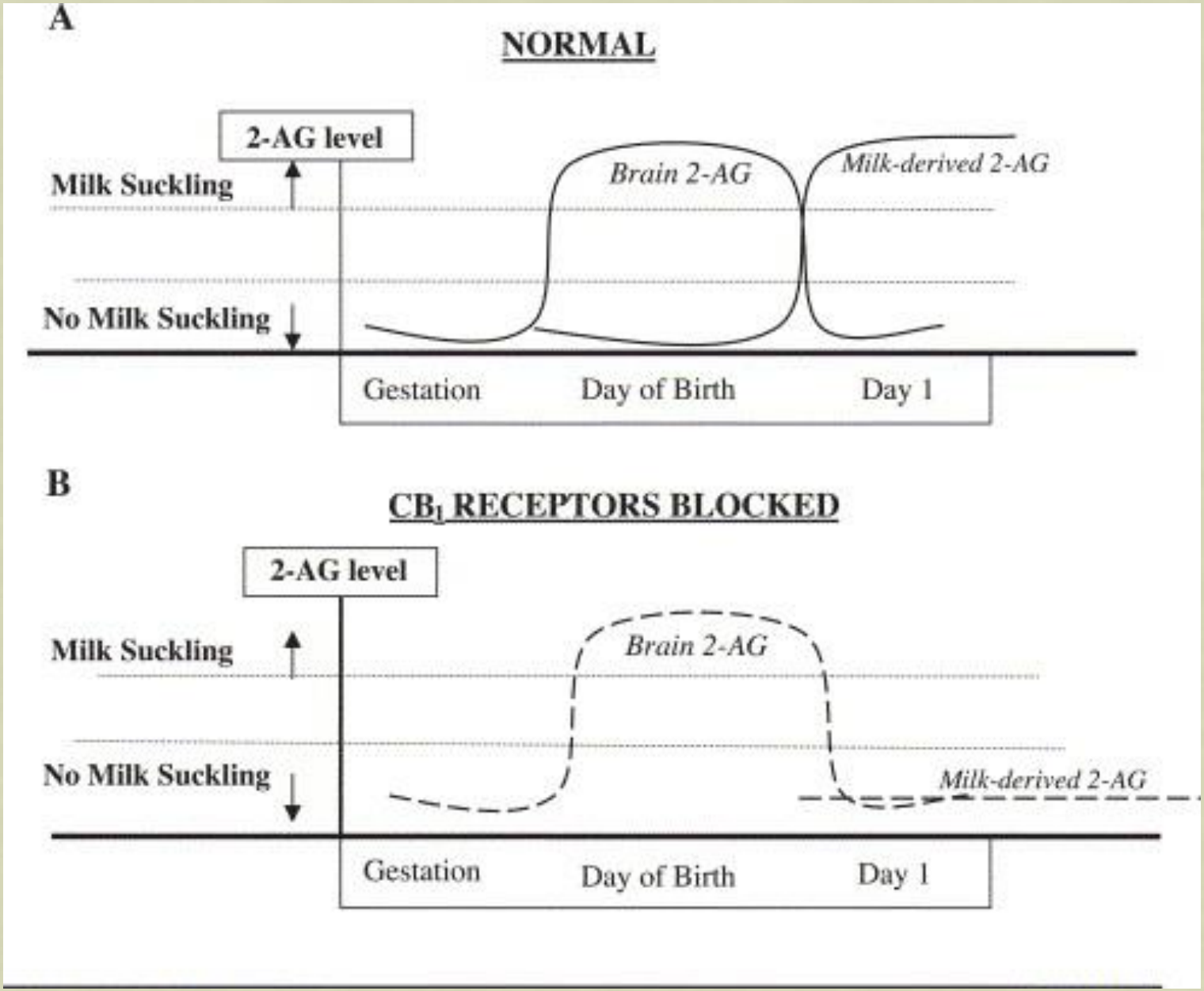
- Neonatally administered CB1 receptor antagonist prevents the development of milk ingestion.
  - 2- to 11-day-old mouse pups which had been injected with an antagonist or placebo, within 24 hours after birth, were allowed to nurse from an anesthetized nursing dam.
  - Placebo-injected pups all located the nipples and nursed from the dam on every testing day
  - None of the antagonist-injected pups did so on the day after injection.
  - Only the pups which survived the antagonist injection gradually developed the suckling response and suckled like controls by the end of the first week.

CB1 RECEPTORS AND MILK INTAKE

- Pups were manually brought in proximity of the nipple and scored them for components of behavior which are required for successful milk ingestion



Fride, E. (2004)



2-AG is a cannabinoid

CANNABINOID PHYSIOLOGY

- In animal models, prenatal manipulation the CB1 receptor system produces long-term effects in the offspring.
  - Disruptions of memory
  - Addictive behaviors
  - Disorders of higher cognitive 'executive' functioning of the prefrontal cortex
    - This was found to be true in 4 year olds exposed prenatally to exogenous cannabis

CANNABINOID PHYSIOLOGY

- CB2 receptors:
  - Involved in the control of fundamental neuronal processes like survival and proliferation.
  - Neuroprotection by counteract apoptotic cell death caused by remote axonal damage
    - Might be useful for delaying the progression of neurodegenerative disorders

CANNABINOID PHYSIOLOGY

- CB2 receptors
  - Are inducible
  - Anti-inflammatory effects
  - May be involved the regulation of emotions
  - Agonists are anxiolytics
  - Antagonists or disruption of the receptor: possible role in drug addiction, eating disorders, psychosis, depression, and autism spectrum disorders

CANNABIS PHARMACOLOGY

- Frequent cannabis use:
  - in teenage girls predicts later depression and anxiety
  - Increased risk of schizophrenia: the relative risk for schizophrenia among high consumers of cannabis is 6 compared with non- users.
  - In those with schizophrenia, frequent cannabis use worsens prognosis.

MARIJUANA DEFINITION

- *Cannabis sativa*
  - Comes from the hemp plant
  - Products from a seedling:
    - Marijuana: from dried leaves, stems and flower buds
    - Haschich: resin obtained from flower buds
    - Oils: contain more cannabinoids that the other forms
- Cannabis is the most common illicit drug used by mothers of childbearing age

CANNABIS PHARMACOLOGY

- Combined frequently with tobacco
- Has more than 450 compounds
- Active metabolite is TetraHydroCannabinol (THC)
- Half-life is 1-2.3 days
- Traces can persist for more up to 4 to 6 weeks
- Rapidly distributed to brain and adipose tissue
- Stored in adipose tissue for long periods (weeks to months)

MARIJUANA PHARMACOLOGY

- Absorption
  - Smoked ~ 25% (varies with topography; range of 2-56%)
  - Oral ~ 10-20%
- Distribution
  - High lipid solubility: fat, high perfusion-organs
  - Protein binding 97% or higher
- Cannabinoids obtained from Cannabis plant
  - 400 different types of cannabinoids
- Maternal Transfer
  - Breastmilk 0.8% per joint (highly variable)
  - Milk to plasma ratio as high as 8:1 in heavy users

Perez-Reyes, NEJM, 1982

MARIJUANA EFFECTS

- Decreases milk production
  - Suppression of prolactin production
  - Through a direct effect of mammary gland (animal studies)
- Effects on Infant
  - Observational reports: lethargy, less frequent feedings. Shorter feeding times
  - Effect on brain development unknown; theoretically could impact brain development
- Effect on Parenting
  - Ability to nurse and care for a child may be compromised

WHAT TO DO?

- Risk vs. Benefit
  - Drug-exposed infants are at a higher of medical, psychological, and developmental issues which breastfeeding can significantly effect
  - Risk of exposure to THC is dependent on topography
  - Long-term effects unknown
- Support and monitoring/reliability of parent
- Support with prenatal care

WHO SHOULD BREASTFEED?

Women who meet all of the following criteria under the following circumstances:

- Women engaged in substance abuse treatment who have provided their consent to discuss progress in
- treatment and plans for postpartum treatment with substance abuse treatment counselor
- Women whose counselors endorse that she has been able to achieve and maintain sobriety prenatally; counselor approves of client's plan for breastfeeding
- Women who plan to continue in substance abuse treatment in the postpartum period
- Women who have been abstinent from illicit drug use or illicit drug abuse for 90 days prior to delivery and have demonstrated the ability to maintain sobriety in an outpatient setting

WHO SHOULD BREASTFEED?

- Women who have a negative maternal urine toxicology testing at delivery except for prescribed medications
- Women who received consistent prenatal care
- Women who do not have medical contraindication to
- breastfeeding (such as HIV)
- Women who are not taking a psychiatric medication that is contraindicated during lactation
- Stable methadone-maintained women wishing to breastfeed should be encouraged to do so regardless of maternal methadone dose
- Academy of Breastfeeding Medicine Protocol #21

WHO SHOULD BE DISCOURAGED FROM BREASTFEEDING?

- Women who did not receive prenatal care
- Women who relapsed into illicit drug use or licit substance misuse in the 30-day period prior to delivery
- Women who are not willing to engage in substance abuse treatment or who are engaged in treatment but are not willing to provide consent for contact with the counselor
- Women with positive maternal urine toxicology testing for drugs of abuse or misuse of licit drugs at delivery
- Women who do not have confirmed plans for postpartum substance abuse treatment or pediatric care
- Women who demonstrate behavioral qualities or other indicators of active drug use

WHO NEEDS INDIVIDUALIZED CARE?

- Women relapsing to illicit substance use or licit substance misuse in the 90–30-day period prior to delivery, but who maintained abstinence within the 30 days prior to delivery
- Women with concomitant use of other prescription (i.e.,psychotropic) medications
- Women who engaged in prenatal care and/or substance abuse treatment during or after the second trimester
- Women who attained sobriety only in an inpatient setting

SAMPLE HOSPITAL POLICY

Urine tox screen up to 10 weeks before birth, if POSITIVE:

- Mother encouraged to formula feed
- Mother encouraged to attend infant massage class
- Breastfeeding is not recommended
- Lactation service will not be consulted
- Breast pump will not be provided
- If mother insists on breastfeeding, document
- Any concern for the safety of the infant, mother and infant may be separated by an attending physician order

SAMPLE HOSPITAL POLICY

Urine tox screen up to 10 weeks before birth: NEGATIVE and…

- Mother compliant in all drug addiction recovery programs for at least 12 months prior to birth
- And complaint with standard of care prenatal visits for at least 12 weeks prior to birth
- And negative urine toxicology screen in L&D

Then,

- Breastfeeding encouraged
- Tox screen on baby urine and meconium should be performed
- Social work and lactation consult