

# Breastfeeding and Medications

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# Disclosures

- I have no financial relationships to disclose.

# Outline

- Benefits of Breastfeeding
- Contraindications to Breastfeeding
- What About Medications?
  - How Do Medications Pass into Breastmilk?
  - What Factors Increase the Likelihood of Passage into Milk?
  - Levels and Calculations...
- What Resources Are There?
- Specific Medications...

# Benefits of Breastfeeding, Infant

**TABLE 2** Dose-Response Benefits of Breastfeeding<sup>a</sup>

Condition	% Lower Risk <sup>b</sup>	Breastfeeding	Comments	OR <sup>c</sup>	95% CI
Otitis media <sup>13</sup>	23	Any	—	0.77	0.64–0.91
Otitis media <sup>13</sup>	50	≥3 or 6 mo	Exclusive BF	0.50	0.36–0.70
Recurrent otitis media <sup>15</sup>	77	Exclusive BF ≥6 mo <sup>d</sup>	Compared with BF 4 to <6 mo <sup>d</sup>	1.95	1.06–3.59
Upper respiratory tract infection <sup>17</sup>	63	>6 mo	Exclusive BF	0.30	0.18–0.74
Lower respiratory tract infection <sup>13</sup>	72	≥4 mo	Exclusive BF	0.28	0.14–0.54
Lower respiratory tract infection <sup>15</sup>	77	Exclusive BF ≥6 mo <sup>d</sup>	Compared with BF 4 to <6 mo <sup>d</sup>	4.27	1.27–14.35
Asthma <sup>13</sup>	40	≥3 mo	Atopic family history	0.60	0.43–0.82
Asthma <sup>13</sup>	26	≥3 mo	No atopic family history	0.74	0.6–0.92
RSV bronchiolitis <sup>16</sup>	74	>4 mo	—	0.26	0.074–0.9
NEC <sup>19</sup>	77	NICU stay	Preterm infants Exclusive HM	0.23	0.51–0.94
Atopic dermatitis <sup>27</sup>	27	>3 mo	Exclusive BFnegative family history	0.84	0.59–1.19
Atopic dermatitis <sup>27</sup>	42	>3 mo	Exclusive BFpositive family history	0.58	0.41–0.92
Gastroenteritis <sup>13-14</sup>	64	Any	—	0.36	0.32–0.40
Inflammatory bowel disease <sup>32</sup>	31	Any	—	0.69	0.51–0.94
Obesity <sup>13</sup>	24	Any	—	0.76	0.67–0.86
Celiac disease <sup>31</sup>	52	>2 mo	Gluten exposure when BF	0.48	0.40–0.89
Type 1 diabetes <sup>13-42</sup>	30	>3 mo	Exclusive BF	0.71	0.54–0.93
Type 2 diabetes <sup>13-43</sup>	40	Any	—	0.61	0.44–0.85
Leukemia (ALL) <sup>13-46</sup>	20	>6 mo	—	0.80	0.71–0.91
Leukemia (AML) <sup>13-45</sup>	15	>6 mo	—	0.85	0.73–0.98
SIDS <sup>13</sup>	36	Any >1 mo	—	0.64	0.57–0.81

ALL, acute lymphocytic leukemia; AML, acute myelogenous leukemia; BF, breastfeeding; HM, human milk; RSV, respiratory syncytial virus.

<sup>a</sup> Pooled data.

<sup>b</sup> % lower risk refers to lower risk while BF compared with feeding commercial infant formula or referent group specified.

<sup>c</sup> OR expressed as increase risk for commercial formula feeding.

<sup>d</sup> Referent group is exclusive BF ≥6 months.

# Benefits of Breastfeeding: Infant

- Decreased Obesity & Diabetes...
  - Insulin is a normal component of BM
  - Insulin promotes gut maturation and reduces intestinal permeability to macromolecules
  - May induce tolerance to insulin protecting from type 1 diabetes
    - (Shehadeh N, et al., Insulin in human milk and the prevention of type I diabetes. *Pediatr Diabetes* 2001;2(4):175-7.)
    - (Shehadeh N, et al., Importance of Insulin content in infant diet:suggestion for new infant formula. *Acta Paediatr.*, 2001;90:93-5.)
- Infant of Diabetic Mother
  - Decreased Diabetes when breastfed
    - (AAP Breastfeeding and the Use of Human Milk, *Pediatrics*; 129(3):827-841.)
  - Colostrum stabilizes infant blood glucose (enhances gluconeogenesis)
    - (Eidelman, AI, Hypoglycemia and the breastfed neonate. *Pediatr Clin of North Am.* 2001 Apr; 48(2):377-87.)

# Benefits of Breastfeeding:Mother

- Increased interval between births (lactational amenorrhea)
- Decreased post-partum bleeding
- More rapid uterine involution (increased oxytocin)
- Earlier return to prepregnancy weight
- Decreased risk of breast CA, ovarian CA
- Possibly decreased risk of hip fractures and osteoporosis when postmenopausal
- Increased self confidence in mothering abilities/contribution to preterm's care
- In GDM mom's decreased risk for later Type II DM
- Decreased RA & CV disease (HTN, Hyperlipid, per WHI)

# Benefits of Breastfeeding:Mother

- All Mothers
  - Decrease risk of obesity by 1% for each 6 mos of nursing
    - (Bobrow, KL, et al., Int'l Journal of Obesity 2013 May;37(5):712-7.)
- Non-Diabetic Mother
  - Decreased incidence of diabetes by 14-15% for each year BF
    - (Stuebe, AM, et al, JAMA, 2005,294(20):2601-2610, Duration of lactation and incidence of type 2 diabetes )
- Diabetic Mother
  - Decreased insulin need
    - Due to sugars in maternal blood being transferred to BM to meet infant's needs
    - 36% lower basal insulin requirement was thought to be caused by glucose use for milk production.
      - + (Riviello, C, et al., Breastfeeding and the basal insulin requirement in type I diabetic women. Endocr Pract. 2009;15:187-193.)
  - Lose weight/decrease obesity

# Benefits of Breastfeeding:Community

- Decreased annual health care costs in billions
- Decreased cost for WIC, etc.
- Decreased parental employee absenteeism (& loss of family income)
- Decreased environmental burden (formula waste)
- Decreased energy demands (to make formula)



# Contraindications to Breast Feeding

- Infection
  - HIV
  - HSV lesions on breast
  - Symptomatic w/(+) PPD & CXR=Presumed active TB
  - Active breast abscesses
- Infant w/Galactosemia
  - Lactose is predominant carbohydrate in BM
- Drugs
  - Cocaine, Meth, Cyclosporine, Lithium, MTX, Phencyclidine, Radioactive agents
- Flu until afebrile
- Varicella if developed 5 days or less before delivery and w/in 48hrs after delivery (can use expressed milk)

# NOT Contraindications..

- Hepatitis B positive mothers
  - Maternal Hepatitis C
  - Maternal fever
  - Maternal CMV (preterm?)
  - Maternal smoking
- 
- IF IN DOUBT START PUMPING AND CHECK WITH LACTATION OR PHYSICIAN

# What About Medications??

- How Do Medications Pass into Breastmilk?
- What Factors Increase the Likelihood of Passage into Breastmilk?
- Calculations:
  - Milk to Plasma Ratio
  - Relative Infant Dose...
- What Resources Are There?
- Specific Medications...

# How Do Medications Pass Into Milk??

- Diffusion
  - Movement of a drug from high concentration to a low concentration
- Simple Diffusion
  - Small water soluble nonelectrolytes
  - Pass through spaces between cells in the mammary epithelium
  - Rapid equilibration between milk and maternal plasma
- Passive Diffusion
  - Unbound, non ionized forms
  - Driven by concentration gradient between maternal plasma and human milk
- Active Transport
  - Few small molecules such as acyclovir, cimetidine, nitrofurantoin

# What Factors Increase Likelihood of Passage into Breastmilk??

- Low Molecular weight
- Low Protein Binding
- Weak Bases
- High Lipid Solubility
-

# Maternal Plasma Level

- Varies by...
  - dose administered
  - $\frac{1}{2}$  life of medication
  - Volume of distribution
  - Oral bioavailability
  - Protein Binding
- Don't forget that as maternal levels fall below milk concentration, drug can pass from milk back into mother's plasma.

# Milk to Plasma Ratio

- Ratio of concentration of drug in milk to that in plasma (Milk/Plasma)
- High (>1-5) useful indicator of drugs that may sequester in milk in high levels
- Difficult to accurately measure, very time dependent
- <1:1 generally felt to be safe

# Relative Infant Dose

$$\frac{\text{Daily infant dosage in breast milk (mg/infant weight in kg)}}{\text{Daily maternal dosage (mg/maternal weight in kg)}} \times 100$$

- IF <10% considered acceptable in breastfeeding
- IF >25% considered unacceptable
- 90% of drugs fall below the 10% level
- Few exceptions...very long half-lives, infant genetic susceptibility



# Medications and Breastfeeding

- SUMMARY:
- Drugs transfer into human milk:
  - Highly lipid soluble.
  - High concentrations in maternal plasma.
  - Low in molecular weight (< 500 ).
  - Low in protein binding.
- Milk to Plasma Ratio
  - <1:1 usually safe
- Relative Infant Dose (RID)
  - <10% maternal dose usually safe

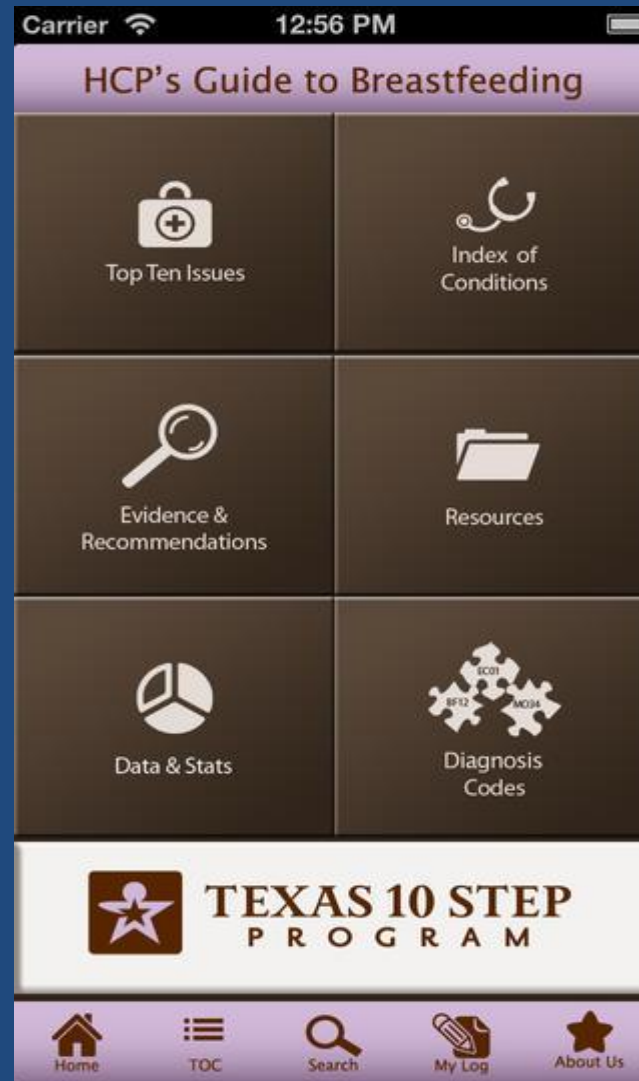
# How Does A Provider Know Which Medication Is Okay?

- Questions to begin with...
  - Can it be given to infants?
  - Is it Orally Bioavailable?
- Resources...
  - **LactMED NLM/NIH – App for phone**
  - AAP committee on Drugs
  - **Hale: Medication and Mother's Milk (Infant Risk, Mommy Meds App)**
  - Lawrence and Lawrence: Breastfeeding: A Guide for the Medical Profession
  - Briggs, Freeman, and Yaffe: Drugs in Pregnancy and Lactation
  - Lactation Study Center Drug Data Bank, University of Rochester, NY

# Hale Rating Scale


- **L1 = Safest/Compatible**
  - No to extensive data suggest there is little risk to a breastfeeding infant
  - Not bioavailable to infant
- **L2 = Safer/Probably Compatible**
  - Limited to extensive data suggests there are only limited risks to a breastfeeding infant.
  - Evidence for risk is remote
- **L3 = Moderately Safe/Probably Compatible**
  - No or limited data suggest this drug may be compatible in breastfeeding mothers.
  - Controlled studies only minimal non-threatening adverse effects
  - Use only if risk is justified.
- **L4 = Possibly Hazardous**
  - No data to significant data suggests there may be a possible risk to a breastfeeding infant, but the benefits from use in breastfeeding women may be acceptable despite the risk.
  - Evidence of risk to BF infant
- **L5 = Contraindicated/Hazardous**
  - Studies demonstrated significant risk or damage to infant
  - Avoid if at all possible

# Health Care Provider's Guide to Breastfeeding App



**Home**

LactMed  
@NIH  
Version 2.3.0



Looking for information on how drugs or dietary supplements can affect breastfeeding? LactMed has information about maternal and infant drug levels, possible effects on lactation and on breastfed infants, and alternative drugs or supplements to consider.

[Drug Name Search](#)









[Drug Class Search](#)

Home Drug Name Drug Class Info

Search a class name Top

## Drug Class

A




-  **Antineoplastic Agents**
-  **Abortifacient Agents,...**
-  **Abortifacient Agents,...**
-  **Acupuncture Therapy**
-  **Adenosine Deaminase**
-  **Adjuvants, Anesthesia**
-  **Adrenergic Agents**
-  **Adrenergic Agonists**

A B C D E F G H I K L M N O P R S T U V W X

Home Drug Name **Drug Class** Info

Back **Drug Info** Share

Search Term: Aleve  
Drug Name: Naproxen

-  **Summary of Use**
-  **Drug Levels**
-  **Effects in Infants**
-  **Effects on Lactation**
-  **Alternate Drugs**
-  **Drug Class**
-  **References**
-  **Full Record**

Home **Drug Name** Drug Class Info

# Infant Risk Center

## InfantRisk.com



# Medications and Breastfeeding

- Contraindicated Meds...
  - Amphetamines
  - Chemotherapeutics
  - Ergotamines
  - Statins
- Drugs that Inhibit Milk Production
  - Ergot alkaloids
  - Decongestants
  - Betamethasone
  - High dose Vitamin B6
  - Diuretics



# Medications and Breastfeeding

## Common Postpartum Meds...Pain Control

- Percocet (acetaminophen/oxycodone)
  - L3 – Limited Data – Probably Compatible
  - Acetaminophen (L1) minimal risk to infant
  - Oxycodone (L3) is secreted and may concentrate in milk
  - Sedation in infant is a significant possibility at higher doses
  - Avoid doses greater than 40mg/day of Oxycodone
- Ibuprofen
  - L1 – Extensive Data – Compatible
  - Ideal analgesic in breastfeeding mothers
  - Secreted minimally into breast milk
  - Commonly given medication to infants



# Medications and Breastfeeding

## Common Postpartum Meds...Antibiotics

- Nitrofurantoin (Macrobid)
  - L2 – Limited Data – Probably Compatible
  - Minimally secreted in to breastmilk
  - Caution in infants with G6PD or <1 mo with hyperbili
- Cephalexin (Keflex)
  - L1 – Limited Data – Compatible
  - Large experience in breastfeeding mothers
- Amoxicillin
  - L1 – Limited Data – Compatible
  - Large experience in breastfeeding mothers
  - Used and well tolerated by Neonates
- Sulfamethoxazole+Trimethoprim (Bactrim)
  - L3 – Limited Data – Probably Compatible
  - Secreted in breastmilk in small amounts
  - Caution in preterm, jaundiced infant, or <22 days
  - May increase hyperbilirubinemia in newborns, caution in first 30 days

# Medications and Breastfeeding

## Common Diabetic Meds...

- Insulin
  - L1, limited data-Compatible
- Metformin (Biguanides)
  - L1, limited data-Compatible
  - Safe to use in breastfeeding, has been used with no untoward effects in the breastfed infant
  - Transfer to milk is minimal and plasma levels are undetected in the breastfed infant.
  - Infants of mother who took metformin throughout pregnancy and lactation had normal growth, motor and social development

# Medications and Breastfeeding

## Common Diabetic Meds...

- Glyburide (Sulfonylurea)
  - L2-Limited Data – Probably Compatible
  - Transfer to milk is quite low, levels below limit of detection
  - No changes in infant's plasma glucose levels
- Glipizide/Glucotrol (Sulfonylureas)
  - L2-Limited Data – Probably Compatible
  - Transfer to milk is quite low, levels below limit of detection
  - No changes in infant's plasma glucose levels
- Repaglinide/Prandin (Meglitinides)
  - L4 – No Data – Possibly Hazardous
  - No data on transfer into human milk
  - Rodent data suggest transfer with hypoglycemic and skeletal changes, unclear dosing regimen
  - If must use, monitor infant for hypoglycemia and breastfeed several hours after the dose to reduce exposure

# Medications and Breastfeeding

## Common Diabetic Meds...

- Rosiglitazone/Avandia (Thiazolidinediones)
  - L3 – No Data – Probably Compatible
  - No data on entry into milk
  - Theoretical transfer and subsequent RID too low to be clinically relevant
- Januvia (Stagliptin Phosphate, DPP-4 Inhibitors)
  - L3 – No Data – Probably Compatible
  - Does not produce hypoglycemia in healthy nondiabetics
- Acarbose/Precose (Alpha-glucosidase Inhibitors)
  - L3 – No Data – Probably Compatible
  - Oral bioavailability is low (2%), unlikely to reach infant in any clinically significant amount
- Invokana/Canagliflozin (SGLT2 Inhibitors)...not yet listed

# Medications and Breastfeeding

## Common Postpartum Meds...Antidepressants

- *Risk of untreated depression is far higher than risks of medication*
- Fluoxetine (Prozac)
  - L2 – Limited Data – Probably Compatible
  - Preterm infants may develop toxicity after continued exposure in breastmilk
  - If born to mother on med, have steady state levels and each time they breastfeed level in infant may rise
  - Discontinuation syndrome can result in symptomatic infant
- Sertraline (Zoloft)
  - L1 – Extensive Data – Compatible
  - Milk levels are low and do not affect infant
  - Poorly absorbed in infant and do not affect platelet function
  - **PREFERRED** antidepressant

# Medications and Breastfeeding

## Common Postpartum Meds...Antidepressants

- Citalopram (Celexa)
  - L2 – Limited Data – Probably Safe
  - Somnolence, colic and restlessness in infant, newer reports less so
- Escitalopram (Lexapro)
  - L2 – Limited Data Probably Compatible
  - Limited experience in breastfeeding mothers
  - Milk levels are low, Infant plasma levels are low to undetectable
  - PREFERRED over Celexa
- Paroxetine (Paxil)
  - L2 – Significant Data – Compatible
  - Levels in milk are low and RID 2.8% of maternal dose (goal <10%)
  - Concern for use in pregnancy

# Medications and Breastfeeding

## Common Postpartum Meds...Antihypertensives

- Methyldopa (Aldomet)
  - L2 – Limited Data – Probably Compatible
  - Levels transferred into milk are minimal
  - No adverse effects reported in infants
  - PREFERRED Antihypertensive
- Propranolol (Inderal)
  - L2 – Limited Data – Probably Compatible
  - PREFERRED Betablocker
  - Low milk levels
  - Observe infant for bradycardia, sedation and hypotension
  - Caution with long term exposure
- Labetalol (Trandate)
  - L2 – Limited Data – Probably Compatible
  - Milk levels extremely low

# Medications and Breastfeeding

## Common Postpartum Meds...Antidiuretics

- All Diuretics have potential risk of decreasing milk supply
- Furosemide (Lasix) – L3
  - High doses required in infants due to low oral bioavailability so transfer through breast milk poses minimal risk to infant
- Hydrochlorothiazide
  - L2 – Limited Data – Probably Compatible
  - Clinically insignificant amount potentially ingested by infant
  - Undetectable infant serum concentration
- Spironolactone (Aldactone)
  - L2 – Limited Data – Probably Compatible
  - Metabolized to Canrenone which is secreted into milk
  - RID 2-4% maternal dose
  - Too low to be clinically significant



# Medications and Breastfeeding

## Common Postpartum Meds...Cholesterol-Lowering

- Atherosclerosis is a chronic process and discontinuation of lipid-lowering agents during pregnancy and lactation unlikely to have impact on the outcome of long-term therapy for primary hypercholesterolemia.
- Cholesterol and other products of cholesterol biosynthesis are essential components for fetal and neonatal development and the use of cholesterol-lowering agents would not be advisable under most circumstances.

# Medications and Breastfeeding

## Galactagogues

- Metoclopramide (Reglan) – L2
  - Elevated plasma prolactin levels in lactating women
  - Sedation and depression in mothers
  - Tardive dyskinesia after 3 months of exposure
- Domperidone – L1
  - Large experience in breastfeeding mothers
  - Peripheral dopamine antagonist
  - Increase serum prolactin and stimulate milk production
- Herbals
  - Not FDA regulated



Thank You