Breastfeeding, Diabetes and Medications

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Disclaimer

- This webinar is considered a resource, but does not define the standard of care in California. Attendees are advised to adapt the guidelines and resources based on their local facility’s level of care and patient populations served and are also advised to not rely solely on the guidelines presented here.
## Benefits of Breastfeeding, Infant

### TABLE 2: Dose-Response Benefits of Breastfeeding

<table>
<thead>
<tr>
<th>Condition</th>
<th>% Lower Risk</th>
<th>Breastfeeding</th>
<th>Comments</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Otitis media</td>
<td>23</td>
<td>Any</td>
<td></td>
<td>0.77 (0.64-0.91)</td>
</tr>
<tr>
<td>Recurrent otitis media</td>
<td>50</td>
<td>≥3 or 8 mo</td>
<td>Exclusive BF</td>
<td>0.50 (0.38-0.70)</td>
</tr>
<tr>
<td></td>
<td>77</td>
<td>≥3 mo</td>
<td>Compared with BF ≥8 mo</td>
<td>1.95 (1.08-3.59)</td>
</tr>
<tr>
<td>Upper respiratory tract infection</td>
<td>63</td>
<td>&gt;6 mo</td>
<td>Exclusive BF</td>
<td>0.30 (0.18-0.74)</td>
</tr>
<tr>
<td>Lower respiratory tract infection</td>
<td>72</td>
<td>≥4 mo</td>
<td>Exclusive BF</td>
<td>0.28 (0.14-0.54)</td>
</tr>
<tr>
<td>Lower respiratory tract infection</td>
<td>77</td>
<td>Exclusive BF</td>
<td>Compared with BF ≥8 mo</td>
<td>4.27 (1.27-14.35)</td>
</tr>
<tr>
<td>Asthma</td>
<td>40</td>
<td>≥3 mo</td>
<td>Atopic family history</td>
<td>0.60 (0.43-0.82)</td>
</tr>
<tr>
<td>Asthma</td>
<td>26</td>
<td>≥3 mo</td>
<td>No atopic family history</td>
<td>0.74 (0.6-0.92)</td>
</tr>
<tr>
<td>RSV bronchiolitis</td>
<td>74</td>
<td>&gt;4 mo</td>
<td>Preterm infants</td>
<td>0.26 (0.074-0.9)</td>
</tr>
<tr>
<td>NEC</td>
<td>77</td>
<td>NICU stay</td>
<td>Exclusive BM</td>
<td>0.23 (0.51-0.94)</td>
</tr>
<tr>
<td>Atopic dermatitis</td>
<td>27</td>
<td>&gt;3 mo</td>
<td>Exclusive Bf negative</td>
<td>0.84 (0.59-1.19)</td>
</tr>
<tr>
<td>Atopic dermatitis</td>
<td>42</td>
<td>&gt;3 mo</td>
<td>Exclusive Bf positive</td>
<td>0.58 (0.41-0.92)</td>
</tr>
<tr>
<td>Gastroenteritis</td>
<td>64</td>
<td>Any</td>
<td></td>
<td>0.36 (0.32-0.40)</td>
</tr>
<tr>
<td>Inflammatory bowel disease</td>
<td>31</td>
<td>Any</td>
<td></td>
<td>0.69 (0.51-0.94)</td>
</tr>
<tr>
<td>Obesity</td>
<td>24</td>
<td>Any</td>
<td></td>
<td>0.76 (0.67-0.86)</td>
</tr>
<tr>
<td>Celiac disease</td>
<td>52</td>
<td>&gt;2 mo</td>
<td>Gluten exposure when BF</td>
<td>0.48 (0.40-0.89)</td>
</tr>
<tr>
<td>Type 1 diabetes</td>
<td>30</td>
<td>&gt;3 mo</td>
<td>Exclusive BF</td>
<td>0.71 (0.54-0.93)</td>
</tr>
<tr>
<td>Type 2 diabetes</td>
<td>40</td>
<td>Any</td>
<td></td>
<td>0.61 (0.44-0.85)</td>
</tr>
<tr>
<td>Leukemia (ALL)</td>
<td>20</td>
<td>&gt;8 mo</td>
<td></td>
<td>0.80 (0.71-0.89)</td>
</tr>
<tr>
<td>Leukemia (AML)</td>
<td>15</td>
<td>&gt;8 mo</td>
<td></td>
<td>0.85 (0.73-0.98)</td>
</tr>
<tr>
<td>SIDS</td>
<td>56</td>
<td>Any &gt;1 mo</td>
<td></td>
<td>0.64 (0.57-0.81)</td>
</tr>
</tbody>
</table>

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

* Pooled data.
* % lower risk refers to lower risk while BF compared with feeding commercial infant formula or referent group specified.
* OR expressed as increase risk for commercial formula feeding.
* 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., Importance of Insulin content in infant diet:suggestion for new infant formula. Acta Paediatrica, 2001;90:93-5.)

• Infant of Diabetic Mother
  − Decreased Diabetes when breastfeed
    ▪ (AAP Breastfeeding and the Use of Human Milk, Pediatrics; 129(3):827-841.)
  − Colostrum stabilizes infant blood glucose (enhances gluconeogenesis)
Benefits of Breastfeeding: Mother

- **All Mothers**
  - Decrease risk of obesity by 1% for each 6 mos of nursing

- **Non-Diabetic Mother**
  - Decreased incidence of diabetes by 14-15% for each year BF

- **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.
  - Unclear if benefit to likelihood of development of long standing diabetes in GDM mother
  - Lose weight/decrease obesity
Diabetes and Breastfeeding

- Later onset of lactation in patients with type 1 diabetes than nondiabetic women
  - Greater delay in mothers with poor glucose control.

- Mothers with type 1 diabetes also discontinue nursing at a higher rate during the first week postpartum.
Diabetes and Breastfeeding

• Duration of lactation if established is the same in mothers with diabetes as in mothers without diabetes.
  - (Schoen S, et al., Breastfeeding duration in families with type I diabetes compared to non-affected families from BABYDIAB and DONALD studies in Germany. Breastfeed Med. 2008;3:171-5.)

• GDM mothers treated with insulin have a delayed onset of lactogenesis II compared to those not treated with insulin.
• Normal insulin levels are necessary for lactation.

• Appropriate glycemic control increases maternal serum and milk prolactin concentrations which is critical for the onset of lactation mitigating the delay that occurs in diabetic mothers
  − (13, Neubauer, SH et al., Delayed lactogenesis in women with insulin-dependent diabetes mellitus. Am J Clin Nutr. 1993;58(1):54-60.)
Breastfeeding & Insulin

• Insulin requirements are reduced postpartum in women with type 1 diabetes.

• Study, insulin requirements were lower than prepregnancy dosage.
  - During the first week postpartum:
    ▪ 54% of prepregnancy dosage on day 2
    ▪ 73% on day 3 postpartum
    ▪ On day 7 postpartum, insulin dosage returned to prepregnancy requirements.
Breastfeeding & Insulin

• Additional study, dosage requirements did not return to normal for up to 6 weeks in some mothers.
  − (Davies, HA, et al., Insulin requirements of diabetic women who breast feed. BMJ. 1989;289:1357-8.)

• A third study found that at 4 months postpartum, patients with type 1 diabetes who exclusively breastfed had an average of 13% lower insulin requirement than their prepregnancy requirement.
  − (Stage, E. et al., Long-term breastfeeding in women with type I diabetes. Diabetes Care. 2006;29:771-4.)
Breastfeeding Insulin

**Insulin Requirements During Pregnancy**

- **x1**: Weeks of Gestation
- **x2**: 13
- **x3**: 20
- **x4**: 26
- **x5**: 40
- **x6**: Weaning

Non-breast-feeding mother
Breast-feeding mother

Medications and Breastfeeding

• 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
Hale Rating Scale

• **L1 = Safest/Compatible**
  - Extensive data suggests 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

2015 Infant Risk Center App, Thomas Hale, PhD, R.Ph.
2012 Medications and Mothers’ Milk, Thomas Hale PhD
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 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 (Thiazolinediones)
  – 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…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…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

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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)
  − 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

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• Atherosclerosis is a chronic process and discontinuation of lip-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
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

Galactagogues

• Metoclopramide (Reglan)
  – Elevated plasma prolactin levels in lactating women
  – Sedation and depression in mothers
  – Tardive dyskinesia after 3 months of exposure

• Domperidone
  – Large experience in breastfeeding mothers
  – Peripheral dopamine antagonist
  – Increase serum prolactin and stimulate milk production

• Herbals
  – Not FDA regulated

2015 Infant Risk Center App, Thomas Hale, PhD, R.Ph
Breastfeeding Resources

• Providers
  - Health Care Providers Guide to Breastfeeding (free)
  - Infant Risk Center ($5.99)
  - LactMed (National Library of Medicine Toxicology Data Network, Free)

• Mothers
  - 1st Week
  - LatchMe (Free)
  - Mommy Meds (Free)
  - Nursing Apps (Free)
Breastfeeding Tools For Providers
Health Care Provider’s Guide to Breastfeeding App

The Health Care Provider’s Guide to Breastfeeding

HCP’s Guide to Breastfeeding
- Top Ten Issues
- Index of Conditions
- Evidence & Recommendations
- Resources
- Data & Stats
- Diagnosis Codes

TEXAS 10 STEP PROGRAM

CHOC Children’s

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
PREGNANT SECOND-TRIMESTER RATING:
PROBABLY SAFE

PREGNANT SECOND-TRIMESTER DESCRIPTION:
PROBABLY SAFE. Human studies linking the use of this product with birth defects are not available. Use only if the benefit to the mother exceeds the potential risk to the fetus. Studies on inhaled corticosteroids alone have not found an increase of prematurity, low birth weight, or pregnancy induced high blood pressure. Due to the adverse outcomes associated with uncontrolled asthma during pregnancy, the benefits of controller medication, when necessary, outweigh any probable risks. Advair is a combination of fluticasone and salmeterol. Fluticasone is a...
Breastfeeding Tools For Moms
## 1st Week

### Breastfeeding in the First Week

It is important that you breastfeed your baby regularly and often. Make sure to position your infant well and frequently check for proper attachment to the breast.

You can tell your baby is getting enough milk by the number of times your baby has passed stool and urine. This chart can help you determine if breastfeeding is going well. If you have any concerns or doubts, seek help from a breastfeeding counselor or your healthcare provider immediately.

<table>
<thead>
<tr>
<th>DAY 1</th>
<th>Milk is scanty and thick. Milk may be yellow.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="https://drzeka.wordpress.com/2013/08/18/breastfeeding-checklist-for-the-first-week/" alt="Image" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DAY 2</th>
<th>Milk is thick and yellow.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="https://drzeka.wordpress.com/2013/08/18/breastfeeding-checklist-for-the-first-week/" alt="Image" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DAY 3</th>
<th>Milk may start to change in appearance. Milk becomes more watery. Milk may start to drip on its own.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="https://drzeka.wordpress.com/2013/08/18/breastfeeding-checklist-for-the-first-week/" alt="Image" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DAY 4</th>
<th>Milk changes in appearance. Milk is whitish and more watery. Milk may start to drip on its own.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="https://drzeka.wordpress.com/2013/08/18/breastfeeding-checklist-for-the-first-week/" alt="Image" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DAY 5</th>
<th>Breasts begin to feel heavy. Milk is whitish and flows easily.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="https://drzeka.wordpress.com/2013/08/18/breastfeeding-checklist-for-the-first-week/" alt="Image" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DAY 6</th>
<th>Milk varies in color and consistency. Breasts are heavy before a feeding, lighter and softer after a feeding.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="https://drzeka.wordpress.com/2013/08/18/breastfeeding-checklist-for-the-first-week/" alt="Image" /></td>
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</tbody>
</table>
latchME

Help me find nearby...

- Public Places to Feed
- Fun Places to Shop & Feed
- Doctors Who Know Breastfeeding
- Lactation Professionals
- Mother Support Groups
- Breastfeeding-friendly Hospitals
- Human Milk Banks
- Places to Get Pumps and Stuff

Find convenient spots to feed, shared by local mothers

By CHOC Children's
latchME

Ask mothers and professionals anything, day or night!

Easily identify and connect with top professionals in your area

Enjoy high-quality tips and videos any time!
Baby Tracker Nursing App

All-in-one, easy to use

Stay organized with activity scheduling
Breastfeeding

Your breasts contain an amazing milk production system that is triggered by your pregnancy hormones. As soon as your baby is born, your breastfeeding hormones start working. The baby nursing at your breast signals your body to start making more milk.

Getting Started

How Often Should You Breastfeed?

Your Baby's Tummy Size

Is Your Baby Getting Enough Milk?
Thank You