

# Breastfeeding and Diabetes Prevention and Management

Marji Cyrul, MPH, RD, CLS

April 27, 2017

# Objectives

Diabetes educators will learn how and why:

- ▶ BREASTFEEDING DECREASES INCIDENCE OF DM (LONG-TERM).
- ▶ BREASTFEEDING IMPROVES GLUCOSE METABOLISM IN WOMEN WITH GDM (SHORT-TERM).
- ▶ MECHANISMS UNDERLYING THE POSSIBLE PROTECTIVE EFFECTS OF BREASTFEEDING AGAINST PROGRESSION TO T2DM .
- ▶ BREASTFEEDING DECREASES RISK OF DEVELOPING DIABETES IN CHILDREN.
- ▶ BREASTFEEDING IS MORE DIFFICULT FOR WOMEN WITH GDM.
- ▶ PROVIDERS CAN IMPROVE BREASTFEEDING RATES IN WOMEN WITH GDM

# BREASTFEEDING DECREASES INCIDENCE OF DIABETES MELLITUS (LONG-TERM)



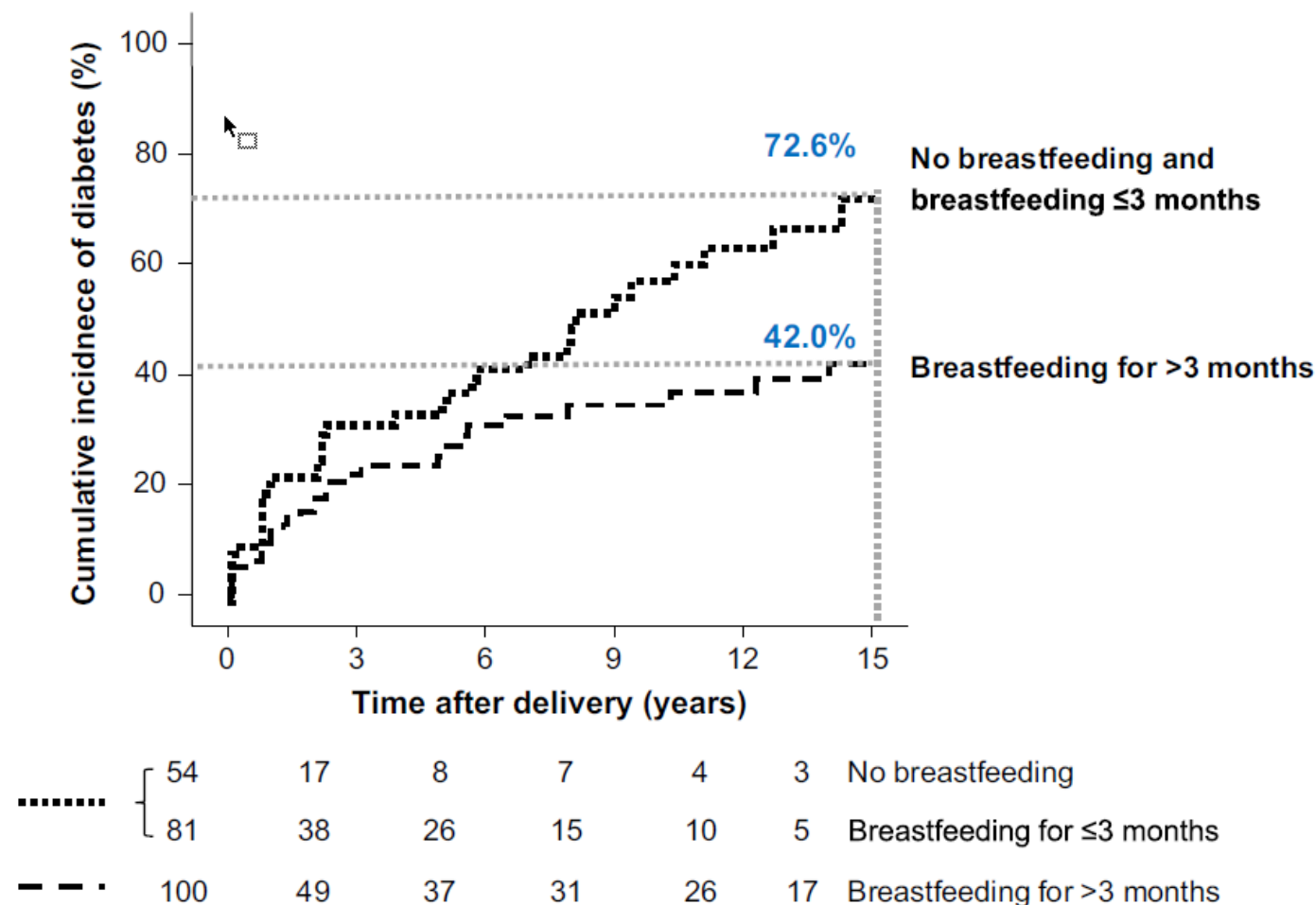
# Limitations of studies



# Munich, Germany Prospective Study







**Figure 2:** Cumulative life-table risk of postpartum diabetes in islet autoantibody negative women with gestational diabetes who breastfed for  $> 3$  months (dashed line) compared with those who did not breastfeed or breastfed for  $\leq 3$  months (dotted line). The numbers below the graph indicate the number of subjects at each follow-up. Published previously in Ziegler et al. Long term protective effect of lactation on the development of type 2 diabetes mellitus in women with recent gestational diabetes mellitus. Diabetes 2012, 61(12):3167–3171. Copyright 2012 by the American Diabetes Association.

# NHANES

- ▶ Have GDM? Odd of developing DM increases by 4.0 times.
- ▶ Breastfeed? Risk of developing DM decreased by 30%



# Breastfeeding suppression with medications increases DM risk





# Use of contraceptives increases DM risk

- ▶ Women with GDM who used progestin hormonal contraceptives during breastfeeding tripled their risk of developing T2DM at 7.5 years postpartum.



# BREASTFEEDING IMPROVES GLUCOSE METABOLISM IN WOMEN WITH GDM (Short-term benefits)



Kjos:  
Lactating group lower total AUC for glucose, lower mean fasting serum glucose, lower mean 2-hour glucose and high mean serum HDL.

McManus:  
Breastfeeding mothers had improved disposition index (DI) insulin sensitivity.

O'Reilly:  
10% decrease in persistent hyperglycemia in breastfeeding women.

Diniz and Costa:  
Decrease in AUC for insulin and peak insulin concentration at 12-18 months postpartum



# Other effects of breastfeeding have on GDM

- ▶ Improved lipid and glucose metabolic profiles for first 3 months after birth.
- ▶ Prevalence rate of T2DM 3.3% vs. 3.7% for formula feeding at 6-9 weeks.
- ▶ Prevalence of prediabetes 24.6% vs. 41.5% for formula feeding

# MECHANISMS UNDERLYING THE POSSIBLE PROTECTIVE EFFECTS OF BREASTFEEDING AGAINST PROGRESSION TO T2DM



### Short-term effects of lactation

- ↓ Plasma glucose  
(uptake by mammary gland for milk production)
- ↓ Plasma Insulin  
(secondary to lower glucose levels)
- ↑ Glucose utilization  
(for milk production)
- ↓ Lipotoxicity  
(mobilization of intracellular lipids from the liver and muscle for lactogenesis)



### Direct effects via prolactin



- ↑ Pancreatic  $\beta$  cell mass
- ↑ Pancreatic  $\beta$  cell proliferation
- ↑ Insulin secretion (possibly through regulation of expression of menin)

Reduced  $\beta$  cell load + preservation of  $\beta$  cell function



Long-term risk of T2DM

# BREASTFEEDING DECREASES RISK OF DEVELOPING DIABETES IN CHILDREN



Odds ratio 0.61

# BREASTFEEDING IS MORE DIFFICULT FOR WOMEN WITH GDM



How to fix?

Exceptional in-hospital breastfeeding support.

Skin-to-skin.

Pre-teach potential difficulty.

BREASTFEEDING IS A LOW-COST  
INTERVENTION FOR PREVENTING T2DM

# References

- ▶ Stuebe, A. M., Rich-Edwards, J. W., Willett, W. C., Manson, J. E., & Michels, K. B. (2005). Duration of lactation and incidence of type 2 diabetes. *Jama*, 294(20), 2601-2610.
- ▶ Kjos, S. L., Peters, R. K., Xiang, A., Thomas, D., Schaefer, U., & Buchanan, T. A. (1998). Contraception and the risk of type 2 diabetes mellitus in Latina women with prior gestational diabetes mellitus. *Jama*, 280(6), 533-538.
- ▶ Gunderson, E. P., Matias, S. L., Hurston, S. R., Dewey, K. G., Ferrara, A., Quesenberry, C. P., ... & Selby, J. V. (2011). Study of Women, Infant Feeding, and Type 2 diabetes mellitus after GDM pregnancy (SWIFT), a prospective cohort study: methodology and design. *BMC Public Health*, 11(1), 952.
- ▶ Much, D., Beyerlein, A., Roßbauer, M., Hummel, S., & Ziegler, A. G. (2014). Beneficial effects of breastfeeding in women with gestational diabetes mellitus. *Molecular metabolism*, 3(3), 284-292.