# Maternal pre-pregnancy obesity associated with failure to meet prenatal breastfeeding goals

Shannon C. Conrey[1,2] , Allison R. Burrell[1,2], Claire P. Mattison[3], Daniel C. Payne[3], Mary A. Staat[1], Laurie Nommsen-Rivers[4], Ardythe L. Morrow[1,2]

[1]University of Cincinnati College of Medicine, [2]Cincinnati Children's Hospital Medical Center, [3]The Centers for Disease Control and Prevention, [4]University of Cincinnati College of Allied Health Sciences

**Abstract ID:** 1173817, **Email**: conreysc@ucmail.uc.edu

## Background

- The American Academy of Pediatrics recommends[1]
  - Exclusive breastfeeding (EBF) to 6 months
  - Continued (any) breastfeeding (ABF) to 1 year
- Maternal obesity has been associated with reduced EBF and ABF[2]
  - Few studies included degree of obesity
  - Few studies included prenatal BF intentions
  - May be confounded by race, income, education
- We compared BF intentions, initiation rates, EBF & ABF duration, and achievement of prenatal BF recommendations by pre-pregnancy BMI category controlling for maternal race, income, education

## Methods

The PREVAIL Cohort[3] (*n*=245) is a CDC-sponsored, 2-year prospective birth cohort of healthy, term, singleton infants in Cincinnati, OH

**Data Collection** (April 2017 - October 2020)

- Prenatal (3rd trimester) enrollment visit
  - Socio-demographics
  - Pre-pregnancy weight and height
  - EBF to 6 months intention[4]
- BMI categorized as healthy (<25), overweight (25-29.9), obesity I (30-34.9), and obesity II+ (≥35)
- Breastfeeding initiation, exclusivity, and duration collected during quarterly study surveys

**Statistical Analysis**

- Fisher exact test compared demographics, EBF intention, and initiation proportions
- Kaplan Meier survival analysis compared duration of ABF
- Logistic regression compared odds (aOR) of EBF to 6 months and ABF to 1 year
  - Adjusted for maternal race, education, and family income
  - Healthy BMI, reference
- All analysis performed using R Statistical Environment[5]

## References

1. American Academy of Pediatrics. Breastfeeding and the Use of Human Milk. Pediatrics. 2012 American Academy of Pediatrics;129(3):e827-41.
2. Winkvist A, Brantsaeter AL, Brandhagen M, Haugen M, Meltzer HM, Lissner L. Maternal Prepregnant Body Mass Index and Gestational Weight Gain Are Associated with Initiation and Duration of Breastfeeding among Norwegian Mothers. J Nutr. 2015;145(6):1263-70. Epub 2015/04/24. doi: 10.3945/jn.114.202507. PMID: 25904732; PMCID: PMC4442110.
3. Morrow AL, Staat MA, DeFranco EA, McNeal MM, Cline AR, Conrey SC, Schlaudecker EP, Piasecki AM, Burke RM, et al. Pediatric Respiratory and Enteric Virus Acquisition and Immunogenesis in US Mothers and Children Aged 0-2: PREVAIL Cohort Study. JMIR Res Protoc. 2021;10(2):e22222. Epub 2021/02/13. doi: 10.2196/22222. PMID: 33576746; PMCID: PMC7910118.
4. Nommsen-Rivers LA, Cohen RJ, Chantry CJ, Dewey KG. The Infant Feeding Intentions scale demonstrates construct validity and comparability in quantifying maternal breastfeeding intentions across multiple ethnic groups. Matern Child Nutr. 2010;6(3):220-7. Epub 2010/10/12. doi: 10.1111/j.1740-8709.2009.00213.x. PMID: 20929494; PMCID: PMC6860600.
5. R Core Team. R: A language and environment for statistical computing. R Foundation for Statistical Computing Vienna, Austria [Internet]. 2018. Available from: https://www.R-project.org/.

**Table 1: Demographics, Prenatal EBF intention, BF initiation, & BF duration by pre-pregnancy BMI category**

| | BMI category *n* (%) | Healthy *n*=89 (36.3%) | Overweight *n*=56 (22.9%) | Obesity 1 *n*=43 (17.5%) | Obesity 2+ *n*=57 (23.3%) | *p* |
|---|---|---|---|---|---|---|
| Race | Black | 25 (28%) | 18 (32%) | 24 (56%) | 40 (70%) | <0.001 |
| | Not Black | 64 (72%) | 38 (68%) | 19 (44%) | 17 (30%) | |
| Family Income | ≤$50,000/year | 24 (27%) | 27 (48%) | 20 (47%) | 44 (77%) | <0.001 |
| | >$50,000/year | 53 (63%) | 29 (52%) | 23 (53%) | 13 (23%) | |
| Maternal Education | ≤High school | 36 (40%) | 28 (50%) | 19 (44%) | 32 (56%) | 0.288 |
| | >High School | 53 (60%) | 28 (50%) | 24 (56%) | 25 (44%) | |
| Intention to EBF 6M | Yes | 52 (58%) | 25 (45%) | 29 (67%) | 25 (44%) | 0.044 |
| Initiated breastfeeding | Yes | 82 (92%) | 49 (88%) | 37 (86%) | 49 (86%) | 0.651 |
| EBF to 6M | Yes | 30 (34%) | 5 (9%) | 4 (9%) | 2 (4%) | <0.001 |
| ABF to 1 year | Yes | 38 (43%) | 6 (11%) | 6 (14%) | 5 (9%) | <0.001 |

**Figure 1: Adjusted odds of meeting ABF and EBF recommendations Healthy BMI, reference**

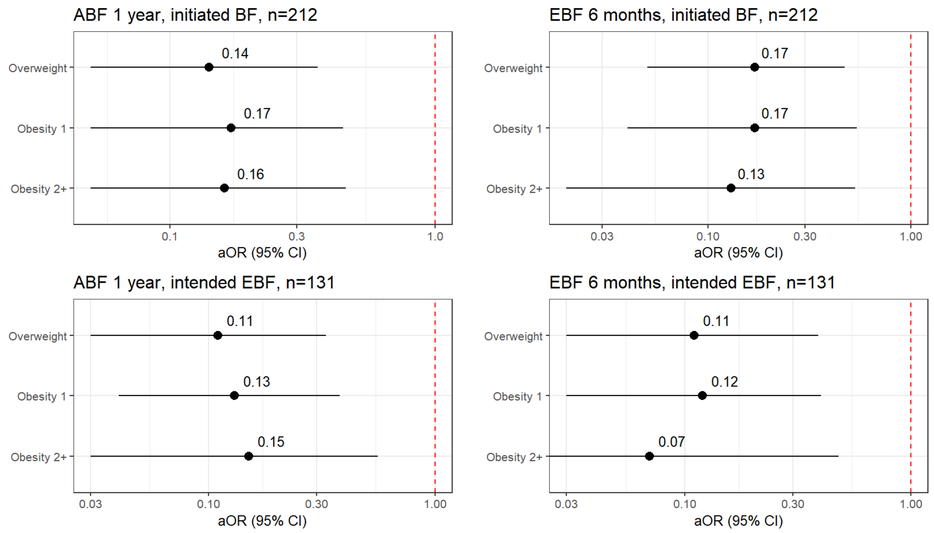
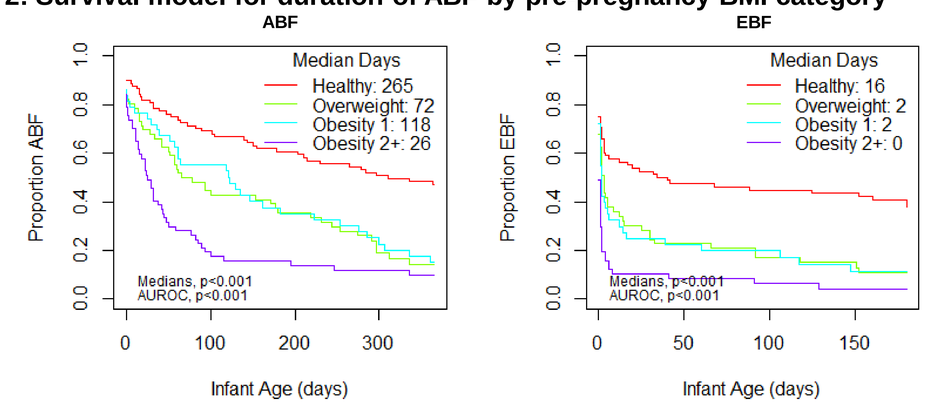



**Figure 2: Survival model for duration of ABF by pre-pregnancy BMI category**




## Results

**High rates of obesity, low rates of achieving recommendations (table 1)**

- Obesity prevalence was 41% (*n*=100); 23% (*n*=57) met obesity 2+ criteria
- Race & income significantly different in proportion healthy & obesity 2+ BMI categories
- Only significant difference in EBF intention between obesity 1 & 2+
- No difference in initiation rates
- Overall low rates of meeting recommendations:
  - 22% (*n*=55) met ABF
  - 17% (*n*=41) met EBF

**Intention to EBF to 6M increased odds of EBF to 6M**

- aOR 7.94 (95%CI 2.7, 29.8)

**Mothers with overweight, obesity 1, or obesity 2+ EBF and ABF at lower rates than those with healthy BMI**

- Lower aOR of meeting EBF or ABF recommendations (figure 1)
- Provided ABF for fewer days (figure 2)

## Discussion

**Mothers with obesity 2+ were far less likely than those with healthy BMI to meet recommendations:**

- EBF 6 months (4% *vs* 34%)
- ABF 1 year (9% *vs* 43%)

**Women with obesity 2+ had**

- Lowest aOR of EBF to six months
- Shortest duration of ABF

**Intention to EBF 6 months**

- Greatly **increased** odds to achieve recommendations
- **BUT: increased disparity** in aOR of meeting recommendations between healthy BMI and all others
  - Physiological differences? Social differences?

**Strengths**

- Validated prenatal intention scale
- Longitudinal data
- Diverse cohort

**Limitations**

- Small sample size
- May not be representative of all US mothers
- Does not address barriers/reasons for cessation

**More research is needed**

- Identify barriers (physical, social) to meeting recommendations for all mothers & those with higher BMI
- Include larger sample, greater geographic area