

Quantifying Breast Milk Retinol Inadequacy and the Impact on Neonatal Outcomes in a Midwestern United States Population of Postpartum Women

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Background

- Low antioxidant concentrations at birth can lead to oxidative stress, bronchopulmonary dysplasia, retinopathy, etc.¹
- Low retinol (Vitamin A) levels are linked to night blindness and impaired immune system function.³
- The World Health Organization (WHO) defines Vitamin A deficiency as a public health issue if breast milk insufficiency/deficiency exists or maternal serum deficiency exceeds 2% of a population.⁴

Experimental Design

- An IRB approved study enrolled infant-mother pairs and collected maternal serum, breast milk, and dietary intake levels with the Willett Food Frequency Questionnaire (N=24).
- Descriptive statistics were run for all variables, including daily maternal retinol activity equivalents (RAE) intake.
- WHO criteria was used to evaluate retinol adequacy, insufficiency, and deficiency in breast milk and maternal serum.²

Retinol Levels (mcg/L)	
Adequacy	>300
Insufficiency	200-300
Deficiency	<200

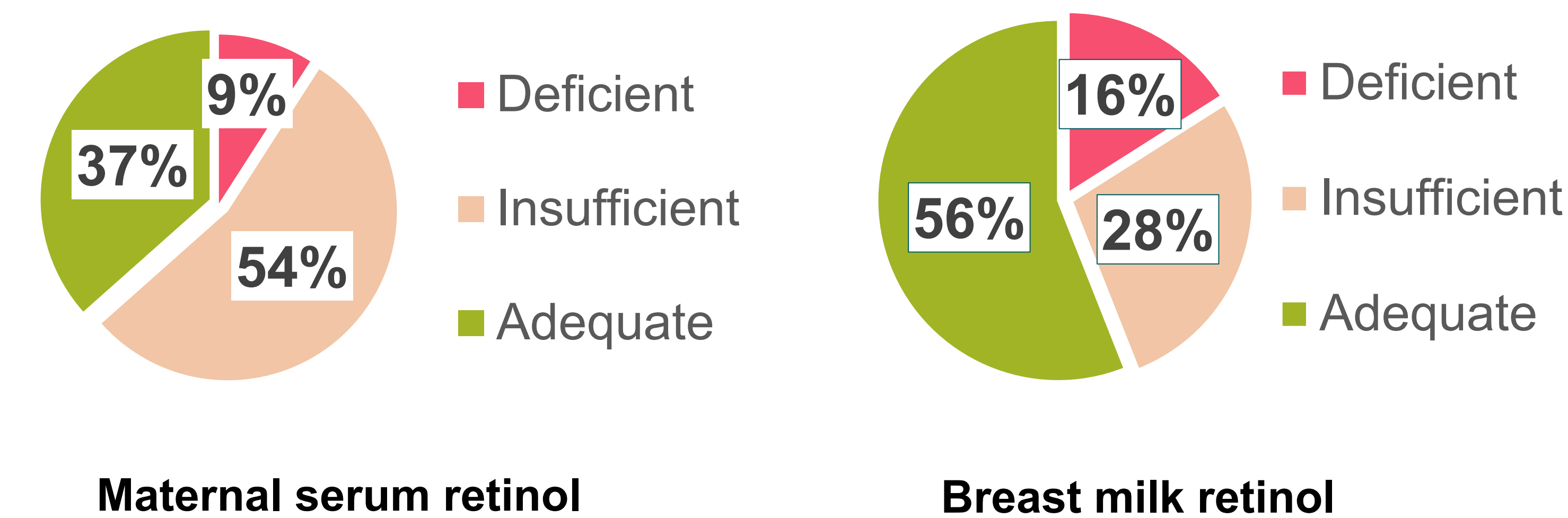
Demographics

Categorical Variables				
Sex	Male Infant	18 (72%)	Female Infant	7 (28%)
Race	White	13 (52%)	Non-White	12 (48%)
Prematurity	Premature	17 (68%)	Mature	7 (28%)
Delivery	C-Section	14 (56%)	Vaginal	10 (40%)
Continuous Variables				
		Median	Minimum	Maximum
Age	CGA (wks)	35.8	25	40

Results

- Only 56% of mothers had breast milk retinol adequacy**, while only 37% of mothers had maternal serum retinol adequacy.
- The median daily maternal RAE intake was 1740 mcg.**
- Neither maternal serum retinol nor daily maternal RAE intake were significantly correlated** with breast milk retinol.
- Breast milk retinol was negatively correlated with oxygen therapy days during infant NICU admission** (R=-0.483, p=0.017).
- This cohort meets WHO criteria for a **public health issue**.

High Prevalence of Maternal Serum and Breast Milk Retinol Inadequacy



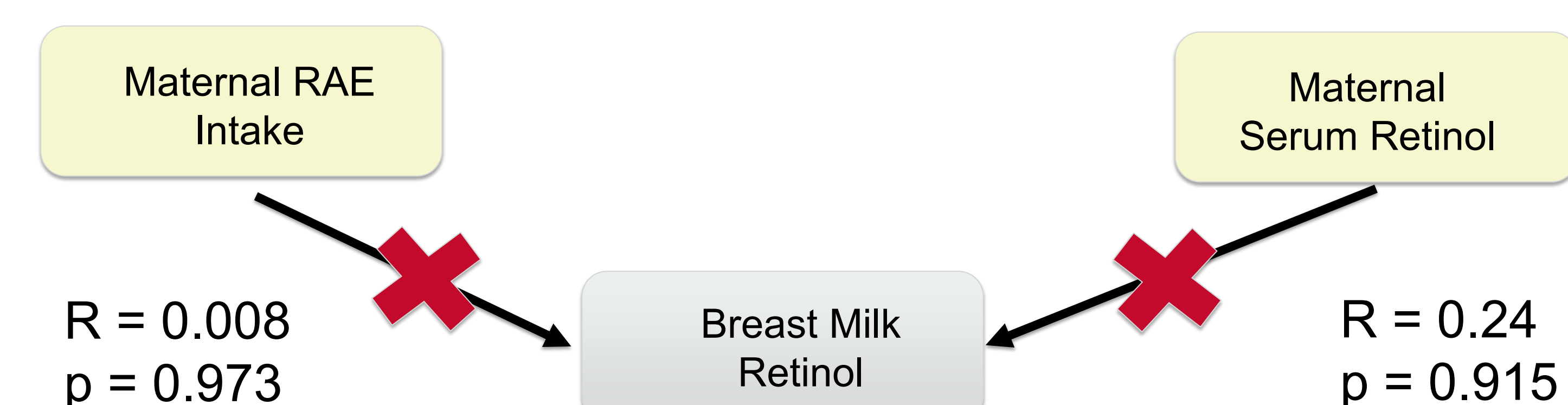
Discussion

- Breast milk retinol inadequacy may constitute a severe public health problem** and maternal serum retinol inadequacy may pose a mild public health problem to study participants.
- Maternal breast milk retinol adequacy may promote **healthy lung development** in neonates.
- The lack of significant correlation between maternal serum and breast milk retinol may be due to **varying levels of maternal retinol transport based on serum availability**.

Conclusion

- The study highlights a mild to severe Vitamin A deficiency in a Midwestern United States population of postpartum mothers.
- A limitation of this study was the small sample size of mothers with exclusively-NICU admitted infants, many born prematurely.
- Future studies should focus on replicating these results with a larger heterogeneous sample size.

No Correlation Between Maternal Serum Retinol or Maternal RAE Intake and Breast Milk Retinol



References

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