# CONFLICT OR CONGRUENCE?

## Exclusive breastfeeding duration & flexible family needs

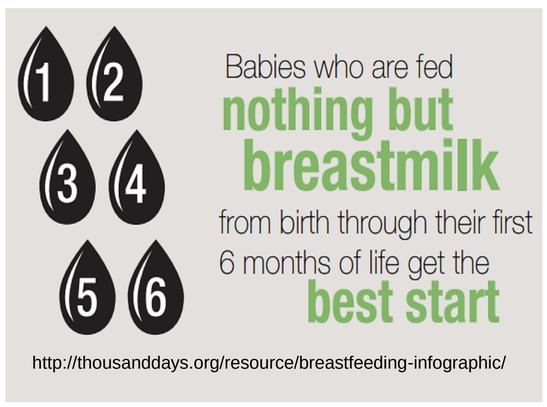
**Melanie Martin[1,2] Michael Gurven[2]**
[1]Yale University
[2]University of California Santa Barbara

## Background

The recommendation for 6 months of exclusive breastfeeding (EBF) is supported by epidemiological and biological evidence[1,2], and is a simple and effective message to promote breastfeeding and infant health[3].

However, EBF durations are varied[3]. Research on this variation tends to frame prolonged EBF as a conflict of maternal and infant needs, e.g. :

- Factors associated with shorter EBF are "barriers" to optimal feeding[4]
- Maternal costs of prolonged EBF "trade-off" against infant benefits[5,6]




**Yet flexible, responsive complementary feeding (CF) may also support maternal & infant well-being.** We examine evidence of maternal-infant conflict *and* congruence shaping EBF durations among the Tsimane.

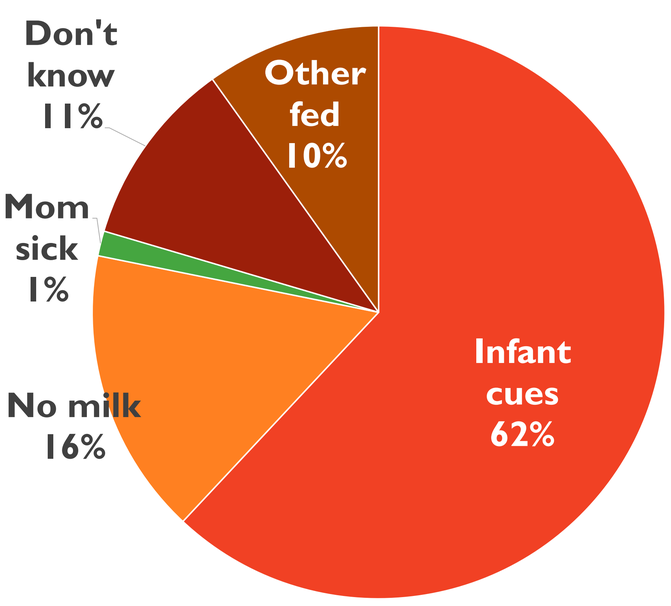



**Fig. 1:** Tsimane mothers' reported reasons for introducing CF. (n = 142) Infant cues cited included crying, hunger, large or small body size, growth, illness, and grasping for food.

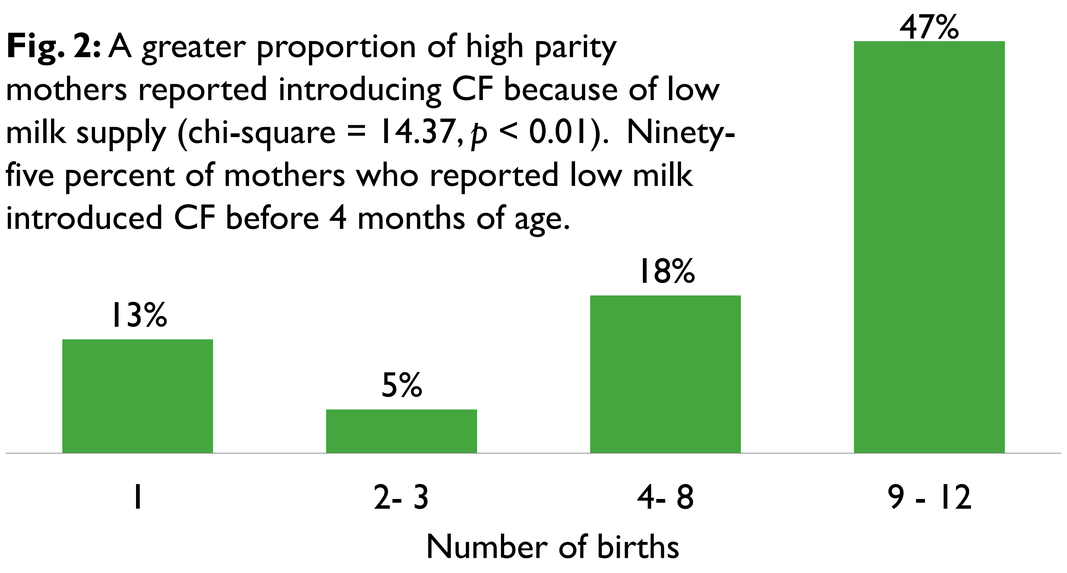



**Fig. 2:** A greater proportion of high parity mothers reported introducing CF because of low milk supply (chi-square = 14.37, $p < 0.01$). Ninety-five percent of mothers who reported low milk introduced CF before 4 months of age.

## Methods

The Tsimane are an indigenous natural-fertility population of the Bolivian Amazon. Infectious disease exposure and infant mortality rates are high, but mothers are well-nourished and breastfeeding is universal[7].

Interviews and anthropometric measurements were collected from 161 mother-infant pairs in 9 villages from July 2012 – April 2013 (infants aged 0-35 months at time of interview)..EBF status and age at CF introduction were determined through 24-hour dietary recalls and ethnographic interviews.

## Discussion

Our research with Tsimane mothers & infants suggests that:

- Reasons for introducing CF are primarily infant-centric (**Fig. 1**)
- While only 64% of infants are EBF to six months, 100% are still breastfeeding at 1 year and 87% are still breastfeeding at 2 years. As such, early CF may *supplement but not supplant* breastfeeding
- Early CF related to low milk and parity (**Table 1, Figs. 2 & 3**) may reflect physiological constraints on milk synthesis, given continued intensive and prolonged breastfeeding

Early CF may benefit infants immunologically and energetically[8,9], while risks may be minimized with high-quality foods and continued breastfeeding[9].

Promotion of EBF supports maternal-infant health and family-friendly policies. **However, a parallel dialog is needed recognizing early, low-risk CF as a means of supporting varying infant, maternal, and familial needs.**

**Table 1:** Cox proportional hazards model of days to CF introduction (n subjects = 161, events = 146). Model was fit with the *smoothHR* package in R[10].

| Factor | Hazard Ratio |
|---|---|
| Maternal height (cm) | 0.96* |
| Parity | Nonlinear** |
| Elapse time (days) | $1.00^{NS}$ |

The best fit model included maternal height, a penalized spline term for parity, and the time elapse between current infant age and reported age at CF introduction. Additional model terms excluded by backwards selection and AICc were infant sex, birth season, village region, and number of female household members > age 7.

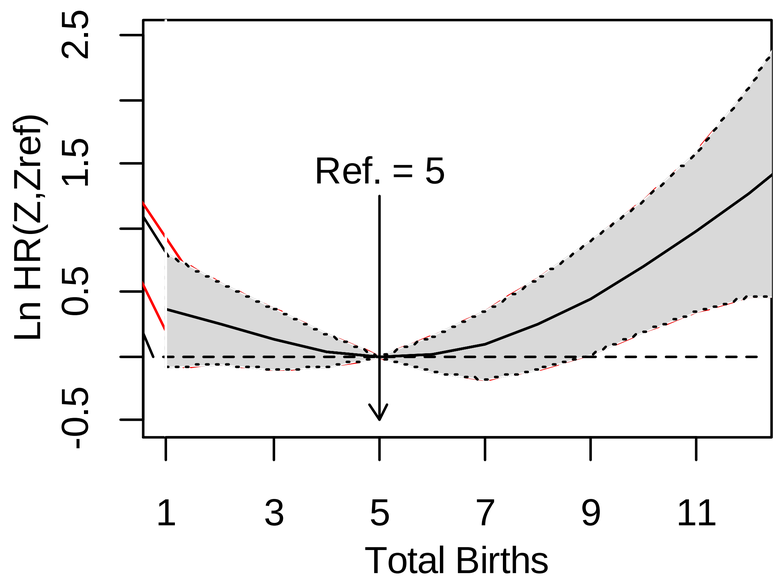



**Fig. 3:** Log hazard ratios from adjusted model demonstrate elevated risk (earlier CF) for low and very high parity mothers. Risk is relative to minimum hazard estimated at 5 births.

## References

[1] Kramer & Kakuma (2012) *Cochrane Library* 8. [2] Sellen (2007) *Ann Rev Nutr* 27: 123-48. [3] Lutter & Morrow (2013). *Adv Nutr* 4: 213-219. [4] Balogun et al. (2015). *Mat Child Nutr.* 11: 433-451. [5] Tully & Ball (2013) *Mat Child Nutr.* 9: 90-8. [6] McDade & Worthman (1998) *J Dev Behav Pediatr* 19: 286-299. [7] Veile et al. (2014) *Soc Sci Med.* 100: 148-158. [8] Waterlow (1981) *J Hum Nutr* 35:85-98. [9] Krawinkel (2011) *Curr Probl Adolesc Health Care* 41:240-243. [10] Meira-Machado et al. (2013) *Comput Math Methods Med.*

**Funding provided by the Wenner-Gren Foundation & the National Science Foundation DDIG 1232370**