

This document provides short summaries of the key evidence in this area and can be used to persuade your team of the rationale.

1. Parents as equal partners in baby's care

O'Brien K, Robson K, Bracht M, et al. Effectiveness of Family Integrated Care in neonatal intensive care units on infant and parent outcomes: a multicentre, multinational, cluster-randomised controlled trial. *Lancet Child Adolesc Heal.* 2018;2(4):245-254. doi:10.1016/S2352-4642(18)30039-7

Brief summary: This multi-centre, cluster-randomised controlled trial assessed the effect of Family Integrated Care ("FICare") on various outcomes including breastfeeding. The study included 26 tertiary NICUs from Canada, Australia and New Zealand, stratified by country and size. Data was provided on 1020 infants born at gestational age less than 33 completed weeks with no or low-level respiratory support and parents able to be present for at least 6 hours a day.

The study found that the proportion of babies receiving high-frequency exclusive breastmilk feeding at discharge (defined as at least 6 times per day) was higher in the FICare group compared to the standard neonatal care group (70% compared to 63%, $p=0.016$)

Other key references:

O'Brien K, Bracht M, Macdonell K, et al. A pilot cohort analytic study of Family Integrated Care in a Canadian neonatal intensive care unit. *BMC Pregnancy Childbirth.* 2013;13 Suppl 1(Suppl 1):S12. doi:10.1186/1471-2393-13-S1-S12

Mitha A, Piedvache A, Khoshnood B, et al. The impact of neonatal unit policies on breast milk feeding at discharge of moderate preterm infants: The EPIPAGE-2 cohort study. *Matern Child Nutr.* 2019;15(4):e12875. doi:10.1111/mcn.12875

2. Antenatal Education

Friedman S, Flidel-Rimon O, Lavie E, Shinwell ES. The effect of prenatal consultation with a neonatologist on human milk feeding in preterm infants. *Acta Paediatr.* 2004;93(6):775-778. doi:10.1111/j.1651-2227.2004.tb03017.x

Brief summary: This retrospective case-control study matched mothers who received lactation-specific prenatal counselling from a neonatologist with those who did not and assessed the impact on breastmilk feeding outcomes. The study included 58 mothers of 92 infants born at gestational age of 23 to 35 completed weeks, matched for birthweight, gestational age and multiplicity, from a tertiary neonatal unit in Israel. Counselling covered the benefits and importance of human milk feeding and practical information regarding expression and storage of milk.

The study found that the mothers who had lactation-specific prenatal counselling were more likely to be exclusively breastfeeding at discharge from NICU (65% compared to 24% of those without prenatal counselling, $p=0.0001$) and fully breastfed for longer (mean 60 days after discharge compared to 21 days, $p=0.0001$). The two groups had residual significant differences despite the matching protocol – mothers not receiving prenatal counselling were slightly older, less likely to be

primigravida and more likely to return to work while infant still hospitalised or within a month of discharge. However multiple logistic regression analysis identified prenatal counselling as the most significant predictor of exclusive breastfeeding, $p=0.0005$).

Other key references:

Sisk PM, Lovelady CA, Dillard RG, Gruber KJ. Lactation counseling for mothers of very low birth weight infants: effect on maternal anxiety and infant intake of human milk. *Pediatrics*. 2006;117(1):e67-75. doi:10.1542/peds.2005-0267

Miracle DJ, Meier PP, Bennett PA. Mothers' decisions to change from formula to mothers' milk for very-low-birth-weight infants. *J Obstet Gynecol neonatal Nurs JOGNN*. 2004;33(6):692-703. doi:10.1177/0884217504270665

3. Initiation of expressing soon after birth

Parker LA, Sullivan S, Krueger C, Kelechi T, Mueller M. Effect of early breast milk expression on milk volume and timing of lactogenesis stage II among mothers of very low birth weight infants: a pilot study. *J Perinatol*. 2012;32(3):205-209. doi:10.1038/jp.2011.78

Brief summary: This pilot randomised controlled trial assessed the effect of initiating the expression of human milk within one hour of birth, compared to one to six hours after birth, on human milk feeding outcomes in the first few weeks of life. The study included 20 mothers of a single very low birth weight infant in the labour and delivery unit of a tertiary neonatal unit in America, who intended to breastfeed and could be consented before birth.

The study found that expressing within one hour of birth increased expressed milk yield from a mean of 267ml in 24 hours to 613ml in 24 hours, at week three of life ($p=0.01$). Lactogenesis II also had an earlier onset, from 137 hours after birth to 80 hours after birth ($p=0.03$). Both groups used an electric pump with simultaneous expression for 15 minutes.

Of note, this is a very small study and formed the pilot for a larger RCT included in the reference list below. The results of the large RCT are difficult to interpret due to a high number of expressing sessions with no recorded volume of milk expressed and significant differences between the maternal characteristics of the randomised groups. A simplistic analysis identified that expressing within one to three hours after birth was associated with increased rate of any human milk feeding at discharge from hospital, compared to both longer and shorter time periods. More complex statistical analysis did not appear to confirm this and suggested that expressing within three to six hours of birth was associated with the best expressed milk volumes. Given these findings, in combination with the results of non-randomised studies and with a pragmatic understanding of how this timing recommendation influences motivation from maternity and neonatal staff, the MBM Toolkit working group came to a consensus to recommend expressing as soon as possible after birth and certainly within four hours of birth.

Other key references:

Parker L, Mueller, Sullivan. Optimal time to initiate breast milk expression in mothers delivering extremely premature babies. In: *The FASEB Journal*. Vol 31. ; 2017:650.19.

Parker LA, Sullivan S, Kruger C, Mueller M. Timing of milk expression following delivery in mothers delivering preterm very low birth weight infants: a randomized trial. *J Perinatol*. 2020;40(8):1236-1245. doi:10.1038/s41372-020-0688-z

Maruyama H, Nakata Y, Kanazawa A, Kikkawa K. Importance of Milk Expression for Preterm Infants. *Acta Med Okayama*. 2016;70(1):45-49. doi:10.18926/AMO/54003

Mitha A, Piedvache A, Glorieux I, et al. Unit policies and breast milk feeding at discharge of very preterm infants: The EPIPAGE-2 cohort study. *Paediatr Perinat Epidemiol*. 2019;33(1):59-69. doi:10.1111/ppe.12536

4. Early colostrum

Ma A, Yang J, Li Y, Zhang X, Kang Y. Oropharyngeal colostrum therapy reduces the incidence of ventilator-associated pneumonia in very low birth weight infants: a systematic review and meta-analysis. *Pediatr Res*. Published online March 2020:1-9. doi:10.1038/s41390-020-0854-1

Brief summary: This meta-analysis of randomised controlled trials assessed the effect of early oropharyngeal colostrum on health outcomes for very low birth weight and/or very preterm infants. The study included eight RCTs involving 682 infants born at a gestational age of less than 32 completed weeks and/or a birthweight of less than 1500g.

The study found that oropharyngeal colostrum reduced the rate of ventilator associated pneumonia (odds ratio 0.39, 95% CI 0.17 to 0.88, $p=0.02$), the number of days to full enteral feeding (mean difference -2.7, 95% CI -4.5 to -0.8, $p=0.005$) and rate of necrotising enterocolitis, on the borderline of statistical significance (odds ratio 0.51, 95% CI 0.26 to 0.99, $p=0.05$). A reduction in mortality and proven sepsis were non-significant trends.

All studies used 0.2ml of maternal colostrum as the intervention, divided between the two cheeks and applied with a cotton swab or oral applicator. This was given every two to six hours, starting from within the first 24 hours, 48 hours or 96 hours of life. The MBM Toolkit working group came to a consensus to recommend an aim of colostrum being given to preterm infants within six hours of birth as a complement to the early expressing target and with a pragmatic understanding of how this timing recommendation influences an understanding of the urgency of transporting early colostrum from the mother to the baby.

Other key references:

Abd-Elgawad M, Eldeglia H, Khashaba M, Nasef N. Oropharyngeal Administration of Mother's Milk Prior to Gavage Feeding in Preterm Infants: A Pilot Randomized Control Trial. *JPEN J Parenter Enteral Nutr*. 2020;44(1):92-104. doi:10.1002/jpen.1601

Tao J, Mao J, Yang J, Su Y. Effects of oropharyngeal administration of colostrum on the incidence of necrotizing enterocolitis, late-onset sepsis, and death in preterm infants: a meta-analysis of RCTs. *Eur J Clin Nutr*. 2020;74(8):1122-1131. doi:10.1038/s41430-019-0552-4

Snyder R, Herdt A, Mejias-Cepeda N, Ladino J, Crowley K, Levy P. Early provision of oropharyngeal colostrum leads to sustained breast milk feedings in preterm infants. *Pediatr Neonatol*. 2017;58(6):534-540. doi:10.1016/j.pedneo.2017.04.003

Lee J, Kim H-S, Jung YH, et al. Oropharyngeal colostrum administration in extremely premature infants: an RCT. *Pediatrics*. 2015;135(2):e357-66. doi:10.1542/peds.2014-2004

5. Early and regular parental physical contact with the baby

Conde-Agudelo A, Díaz-Rossello JL. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. *Cochrane database Syst Rev.* 2016;2016(8):CD002771. doi:10.1002/14651858.CD002771.pub4

Brief summary: This Cochrane review meta-analysis of randomised controlled trials assessed the effect of “kangaroo mother care” on human milk feeding outcomes for low birth weight infants. The study included 21 RCTs involving 3042 infants with birthweight under 2500g.

The study found that kangaroo mother care (maximisation of skin to skin contact) leads to increased rate of exclusive human milk feeding at the combined time point of discharge or 40-41 weeks postmenstrual age (relative risk 1.2, 95% CI 1.07 to 1.25) and at one to three months’ follow up (relative risk 1.2, 95% CI 1.01 to 1.43).

Although most of the studies included were from low-income settings, subgroup analysis showed a similar result for high-income countries, with increased rate of any breastfeeding at one to two months’ follow-up (relative risk 2.0, 95% CI 1.28 to 3.21).

Other key references:

Acuña-Muga J, Ureta-Velasco N, de la Cruz-Bértolo J, et al. Volume of milk obtained in relation to location and circumstances of expression in mothers of very low birth weight infants. *J Hum Lact.* 2014;30(1):41-46. doi:10.1177/0890334413509140

Fewtrell MS, Kennedy K, Ahluwalia JS, Nicholl R, Lucas A, Burton P. Predictors of expressed breast milk volume in mothers expressing milk for their preterm infant. *Arch Dis Child Fetal Neonatal Ed.* 2016;101(6):F502-F506. doi:10.1136/archdischild-2015-308321

Mitha A, Piedvache A, Glorieux I, et al. Unit policies and breast milk feeding at discharge of very preterm infants: The EPIPAGE-2 cohort study. *Paediatr Perinat Epidemiol.* 2019;33(1):59-69. doi:10.1111/ppe.12536

Mitha A, Piedvache A, Khoshnood B, et al. The impact of neonatal unit policies on breast milk feeding at discharge of moderate preterm infants: The EPIPAGE-2 cohort study. *Matern Child Nutr.* 2019;15(4):e12875. doi:10.1111/mcn.12875

Bates S, Edwards L, Peters C, et al. Delivery room cuddles for preterm babies: should we be doing more? *Infant.* 2019;15(2):52.

Mehler K, Hucklenbruch-Rother E, Trautmann-Villalba P, Becker I, Roth B, Kribs A. Delivery room skin-to-skin contact for preterm infants-A randomized clinical trial. *Acta Paediatr.* 2020;109(3):518-526. doi:10.1111/apa.14975