

CIRCULAR OF INFORMATION PASTEURIZED HUMAN MILK

PLEASE READ CAREFULLY

1. General Information

- This circular supplements the information contained on the labels of bottles of pasteurized human milk.
- The Public Mothers' Milk Bank supplies pasteurized human milk for extremely preterm infants who require medical care.
- Human milk is donated voluntarily by qualified nursing mothers who produce surplus milk and have no medical and social history that indicate a risk of transmitting infectious agents.
- Human milk is collected by donors in sterile polypropylene bottles that are phthalate-free and bisphenol A-free.
- The human milk is then pooled from several mothers who have been pre-tested separately for syphilis, HBsAg, anti-HBc, anti-HCV, Anti-HIV 1/2, Anti-HTLV I/II, NAT HCV/HIV-1/HBV and.
- One bottle of human milk can feed several infants. Hospitals are responsible for maintaining a record of the human milk administered in each recipient's file.
- Pooled human milk is pasteurized using the Holder method at 62.5⁰C for 30 minutes.
- A microbiological analysis was performed on the human milk after pasteurization to ensure the product meets Héma-Québec standards.
- The final product is distributed in sterile polypropylene bottles that are phthalate-free and bisphenol A-free.
- Only qualified health care professionals can decide if it is appropriate to use milk from the Public Mothers' Milk Bank.
- Notify Héma-Québec by phone as soon as you detect any error, accident or adverse effect.
- CAUTION:** Consuming human milk carries a risk of transmitting known or unknown infectious agents. Pasteurization, thorough donor screening and current laboratory tests do not eliminate this risk completely. If improperly stored or handled in a way that does not comply with the instructions on this circular, human milk can be secondarily contaminated with bacteria that may alter the quality of the milk and cause adverse reactions in recipients.
- This circular should not be considered or interpreted, in whole or in part, as an explicit or implicit guarantee of the safety of human milk.

2. Use

- In the absence of the mother's milk, human milk from a bank is particularly indicated for infants born extremely preterm, at 32 weeks' gestation or earlier, as infants having ingested human milk are on average 3.3 times less prone to develop necrotizing enterocolitis compared to those having ingested prepared formula.^{1,2}

3. Not to use

- Do not use human milk if the preterm infant suffers from galactosemia, congenital lactase deficiency, glucose-galactose malabsorption or certain glycogen storage diseases.

4. Product Receipt and Storage Conditions

- Upon receipt of Héma-Québec's shipping box, check that the tamper-proof seal is intact.
- Human milk is delivered frozen in a box containing dry ice to maintain proper storage temperature conditions.
- Frozen human milk must be kept at or below -18°C. Hospitals are responsible for preserving the human milk in proper storage conditions from the time it is received until it is used or destroyed.
- Handle the box and contents with care to prevent damaging the bottles of frozen human milk.
- All handling of human milk must comply with strict hygiene regulations.
- Return the box to Héma-Québec as soon as possible.

5. Thawing and Preserving

- Before administering the milk, ensure that the bottle and foil lid are intact.
 - Check the expiry date on the bottle label.
 - Follow these instructions for thawing:
 - Thaw the milk in the refrigerator. Once the milk is in liquid form (no ice crystals remaining), quickly administer the product in accordance with hospital protocols or consult the accompanying chart for preserving the milk after thawing. (situation A)
 - Thaw quickly in a container of hot water no higher than 37°C. Once the milk is in liquid form (no ice crystals remaining), wipe the bottle and quickly administer the product in accordance with hospital protocols or consult the accompanying chart for preserving the milk after thawing. (situation A)
- Note: Never use the microwave.
- Once thawed, human milk must be gently shaken before administering to ensure the consistency of the product. Note that human milk can vary in colour depending on its stage of maturity, from an orange hue to light yellow (colostrum) to slightly bluish white (mature milk).

- Consult the following chart for preserving human milk:

Situation	Maximum time at room temperature	Maximum time in the refrigerator	Instruction
A. Previously frozen and thawed in the refrigerator or in a container of hot water	4 hours	24 hours	Do not refreeze
B. Milk at room temperature	Must be used within 4 hours	N/A	N/A

6. Effects of pasteurization on certain components of human milk

- As shown in the table below, few of the components of human milk are completely destroyed or inactivated with the Holder pasteurization process.

Little or no effect	Reduction	Destruction or inactivation
<ul style="list-style-type: none"> Lactose Oligosaccharides Vitamins A, D and E Insulin-like growth factors Insulin-like growth factor-binding proteins Gangliosides Glucoconjugate Long chain polyunsaturated fatty acids Epidermal growth factor 	<ul style="list-style-type: none"> Bacterial growth inhibitory properties Lysozyme Antibodies (IgG, IgA, IgM) Lactoferrin Complement C3 factor Glutathione peroxidase Vitamins B and C Folic acid 	<ul style="list-style-type: none"> Lipases Alkaline phosphatase

Adapted from the NICE³, Arslanoglu 2010⁴ and Arnold 2010⁵ clinical guidelines

Several essential nutrients are preserved during pasteurization. This is true of oligosaccharides, vitamins (A, D and E), lactose, epidermal growth factor and long chain polyunsaturated fatty acids, among others.^{3,4}

Conversely, other components are destroyed or inactivated completely or partially during pasteurization. According to two studies, concentrations of immunoglobulin A (IgA), lactoferrin and lysozyme can be reduced by up to 62%, 65% and 86% respectively.^{6, 7} Lipases and alkaline phosphatase, two heat-sensitive enzymes, are completely inactivated.⁶

Unlike IgGs, that are transferred from mother to child through the placenta before birth, infants do not obtain IgAs through transplacental transfer from mother to child.⁸ The IgAs transferred through human milk protect the digestive tract directly, influencing the intestinal flora and the development of the immune system.⁸ An observational study involving 101 mothers found that there is a higher concentration of IgAs (up to 3.102 g/l) in the colostrum of mothers of preterm infants born at less than 32 weeks' gestation than of IgGs (0.076 g/l) and IgMs (0.017 g/l).⁷ The same study found that pasteurization reduced the concentration of IgAs in the mother's milk by 34.5% to 2.032 g/l. While there is no proof that these immunoglobulins protect preterm infants directly from necrotizing enterocolitis, it should be noted that the concentration of IgAs remains relatively high in human milk even after pasteurization, unlike prepared formula that has no IgAs.

7. Adverse Effects of Administering Human Milk

- Administering human milk carries a risk of an allergic reaction.

8. Nutrition facts for Human Milk

- The table below shows the nutrition facts for human milk:

Nutrition Facts	
Per 100 ml	
	Amount
Calories	70
Fat	4 g
Sodium	10 mg
Carbohydrate	7 g
Fibre	0 g
Sugars	7 g
Protein	1 g
	% Daily Value
Vitamin A	2 %
Vitamin C	0 %
Calcium	4 %
Iron	0 %

Note: The % daily value for vitamin A and C, calcium and iron is based on the *Canadian Food Inspection Agency's* recommended daily intake for children under two years of age.



Produits sanguins
Cellules souches
Tissus humains

Public Mothers' Milk Bank
4045 Côte-Vertu Boulevard
Montréal, QC H4R 2W7
Tel.: (514) 832-5000, ext.6909
Toll free: 1(888) 666-4362, ext. 6909
Fax: (514) 904-2522
Toll free: 1 (866) 811-9465

References

1. Kim JH, Unger S. Les banques de lait humain. *Paediatr Child Health* 2010; 15(9):599-602.
2. Lucas A, Cole TJ. Breast milk and neonatal necrotising enterocolitis. *Lancet* 1990; 336(8730):1519-23.
3. National Institute for Health and Clinical Excellence. NICE Clinical guideline 93- Donor breast milk banks: the operation of donor milk bank services. 2010
4. Arslanoglu S, Ziegler EE, Moro GE. Donor human milk in preterm infant feeding: evidence and recommendations. *J Perinat Med* 2010; 38(4):347-51.
5. Arnold LDW. Human milk in the NICU: Policy into practice. Sudbury, USA: Jones & Bartlett Publishers; 2010.
6. Heiman H, Schanler RJ. Benefits of maternal and donor human milk for premature infants. *Early Hum Dev* 2006; 82(12):781-7.
7. Koenig A, Albuquerque Diniz EM, Barbosa SF, Vaz FA. Immunologic factors in human milk: the effects of gestational age and pasteurization. *J Hum Lact* 2005; 21(4):439-43.
8. Zinkernagel RM. Maternal antibodies, childhood infections, and autoimmune diseases. *N Engl J Med* 2001; 345(18):1331-5.