

Donated breast milk stored in banks versus breast milk purchased online

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Abstract

Question One of my patients asked if she could buy human milk on the Internet to feed her infant if the need arose. Is using donated breast milk from the milk bank safer than buying it online?

Answer The World Health Organization and the American Academy of Pediatrics recommend the use of donated breast milk as the first alternative when maternal milk is not available, but the Canadian Paediatric Society does not endorse the sharing of unprocessed human milk. Human breast milk stored in milk banks differs from donor breast milk available via the Internet owing to its rigorous donor-selection process, frequent quality assurance inspections, regulated transport process, and pasteurization in accordance with food preparation guidelines set out by the Canadian Food Inspection Agency. Most samples purchased online contain Gram-negative bacteria or have a total aerobic bacteria count of more than 10^4 colony-forming units per millilitre; they also exhibit higher mean total aerobic bacteria counts, total Gram-negative bacteria counts, coliform bacteria counts, and *Staphylococcus* spp counts than milk bank samples do. Growth of most bacteria species is associated with the number of days in transit, which suggests poor collection, storage, or shipping practices for milk purchased online.



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The World Health Organization and the American Academy of Pediatrics recommend the use of donated breast milk as the first alternative when maternal milk is not available.¹ Human milk is recognized for its numerous benefits including inducing tolerance to allergens, providing passive immunization, improving lipid profiles, and controlling blood pressure.² In studies conducted in neonatal units, infants who were fed human breast milk had fewer severe infections, less necrotizing enterocolitis, and less colonization by pathogenic organisms.³ However, more than 2 decades after fears of HIV transmission forced the closure of all but 1 of Canada's milk banks, health professionals and parents remain divided on the safety of sharing breast milk.⁴ Breast milk is still easily available online (eg, www.eatsonfeets.org; <http://hm4hb.net>).

The Canadian Paediatric Society notes the following:

The preferred nutrition for the newborn is his/her own mother's milk. When this is not available or is limited, pasteurized human donor breast milk is a recommended alternative for hospitalized neonates The Canadian Paediatric Society does not endorse the sharing of unprocessed human milk.³

The Canadian Paediatric Society also recommends the following:

The use of pasteurized human donor breast milk should be prioritized to compromised preterm infants and selected ill term newborns.³

Pasteurized human donor breast milk should only be prescribed following written informed consent from a parent or guardian.³

Education of parents about the benefits of human breast milk or pasteurized human donor breast milk is essential to parental choice and informed decision making in prescribing an optimal feeding plan for hospitalized neonates.³

Quality control in milk banks versus in milk sold online

Human breast milk stored in milk banks differs from donor breast milk available online owing to the former's rigorous donor-selection process, the frequent quality assurance inspections, its regulated transport process, and its pasteurization.

Most human milk banks use the same selection and screening procedures for donor mothers that local blood banks use for blood donors.² Breast milk can be contaminated with drugs, chemicals, or pathogenic bacteria. Therefore, milk bank donor mothers are chosen if they are in good health and do not regularly take medications or herbal supplements; as well, they must undergo blood testing.⁵ Potential donors are excluded if they use illegal drugs or tobacco products; have undergone a blood transfusion or received blood products in the previous 4 months; have received an organ or tissue transplant in the previous 12 months; consume more than 2 ounces of alcohol per day regularly; have positive test results for HIV (or are at risk), human T-cell lymphoma virus, hepatitis B or C, or syphilis; were in the United Kingdom for more than 3 months between 1980 and 1996; or were in Europe for more than 5 years between 1980 and the present.⁵

In milk banks, human donor milk samples are cultured for bacterial growth and all contaminated milk is discarded.⁵ Keim et al⁶ conducted an observational study to compare samples of human milk purchased via a US milk-sharing website to unpasteurized samples of milk donated to a milk bank. Most (74%) samples purchased via the Internet were colonized with Gram-negative bacteria or had more than 10^4 colony-forming units per millilitre total aerobic count; they also exhibited higher mean total aerobic bacteria counts, total Gram-negative bacteria counts, coliform bacteria counts, and *Staphylococcus* spp counts than milk bank samples did. No samples were contaminated with HIV, but 21% of human milk samples purchased online compared with 5% of milk bank samples had positive test results for cytomegalovirus DNA. Growth of most species was associated with the number of days in transit, which suggested poor collection, storage, or shipping practices for milk purchased online. Canadian human donor milk stored in banks is collected, stored, cultured, and pasteurized in accordance with food preparation guidelines set out by the Canadian Food Inspection Agency.³

Pasteurization

While pasteurizing human breast milk inactivates bacterial and viral contaminants such as cytomegalovirus,⁷ pasteurized donor milk does not necessarily exhibit the same favourable effects as raw milk from the mother.² The pasteurization process results in the loss of quantity or activity of some biologically functional milk components to varying degrees, including mild to moderate decrease in immunoglobulin A; lower concentration of lactoferrin, lysozyme, some cytokines, growth factors, and hormones (insulinlike growth factor, adiponectin, insulin, and leptin); reduced antioxidant capacity; loss of lipase activity; lower immunoglobulin M concentration; and reduced white blood cell count.¹ Other important nutritional and biological components are preserved, such as oligosaccharides; lactose; glucose; long-chain polyunsaturated fatty acids; gangliosides; vitamins A, D, E, and B12; folic acid; some cytokines (interleukins 2, 4, 5, 8, and 13); and some growth factors (epidermal growth factor and transforming growth factor β).¹ Despite the loss of some biologically functional milk components, a meta-analysis conducted by Quigley and McGuire⁸ revealed that, in preterm and low-birth-weight infants, feeding with formula compared with donor breast milk resulted in a higher risk of developing necrotizing enterocolitis. Infants fed with donor milk exhibited slower growth rates compared with infants fed with formula, but no long-term effects on growth rates or neurodevelopmental outcomes were identified, and pasteurized milk without fortification was given in most studies. Nutrient-fortified donor breast milk is now commonly given in neonatal care.

Nonetheless, new methods for improving the biological quality and safety of donor human milk besides the usual Holder pasteurization are under investigation. Alternative methods under consideration include high-temperature, short-term pasteurization, known as *flash pasteurization* (72.8°C for 5 to 15 seconds); its homemade low-tech variant used in developing countries, known as *flash-heat treatment*; thermoultrasonic treatment; high-pressure processing; and Ohmic heat treatment.¹

Resources and costs

Human donor milk from milk banks costs \$3 to \$5 (US) per ounce, and so it might cost \$60 to \$100 (US) per day for an 3.6-kg baby to consume 20 ounces per day, compared with only \$0.50 to \$2 (US) per ounce when the milk is purchased online.⁹ But cost-effectiveness of human milk banking should not only be studied in relation to the expenses made during admission to the neonatal unit; it should also be seen in light of potential health care savings in later life.² No Canadian studies or data published on the economic evaluation of donor breast milk are currently available.³

Canadian milk banks

In Canada, there are no direct costs incurred by the baby's family for the donor milk. Considering the limited resources available, milk bank services are mainly available for hospitalized babies with very low birth weight. It can only be provided by prescription after receiving signed consent from a parent or guardian. In the event that donor milk supplies are limited, the highest-risk babies will receive donor milk first. **Box 1** lists milk banks currently operating in Canada.


Box 1. Canadian milk banks

Four milk banks are currently offering services in Canada:

- Montreal, Que: Héma-Québec (telephone 514 832-5000, extension 6909)
- Toronto, Ont: Rogers Hixon Ontario Human Milk Bank (telephone 416 586-4800, extension 3053; e-mail info@milkbankontario.ca; website www.milkbankontario.ca)
- Calgary, Alta: Calgary Mothers Milk Bank (telephone 403 475-6455; e-mail contact@calgarymothersmilkbank.ca)
- Vancouver, BC: BC Women's Milk Bank (telephone 888 823-9992; e-mail info@bcwomensfoundation.org)

Canadian milk bank processing follows guidelines set out by the Human Milk Banking Association of North America and is regulated by Health Canada.⁵

Conclusion

Human milk available via the Internet does not meet the expected rigorous criteria and is more often colonized with pathogenic organisms than donor human milk is. Human milk should be considered another regulated bodily substance, and milk sharing should only occur under medical supervision. 

Competing interests

None declared

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MOTHERISK

Motherisk questions are prepared by the Motherisk Team at the Hospital for Sick Children in Toronto, Ont.

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Do you have questions about the effects of drugs, chemicals, radiation, or infections in women who are pregnant or breastfeeding? We invite you to submit them to the Motherisk Program by fax at 416 813-7562; they will be addressed in future Motherisk Updates. Published Motherisk Updates are available on the *Canadian Family Physician* website (www.cfp.ca) and also on the Motherisk website (www.motherisk.org).
