Guidelines for use of human milk and milk handling in Sweden

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Term definitions

- Human milk bank = facility that handles and supplies breast milk to medical services.
- Mother's own milk = breast milk from the infant's biological mother.
- Donor milk = breast milk from a woman who is not the biological mother of the recipient of the milk.
- Lactation = breast milk production. The breast milk is received by the infant directly via nursing or after having first been expressed from the breast and collected in an appropriate container.
- Pasteurization = heat treatment. Usually means Holder pasteurization (62.5°C for 30 min) in an equipment for this purpose, but there are alternative methods.
- Preterm milk = milk from a woman who has given birth to a preterm infant (born before 37 weeks of gestation). The composition of certain nutrients (e.g. higher protein content) can differ from that of the milk of mothers of full-term infants for varying periods of weeks or even months.
- Pooled milk = donated milk from several individual women, pooled before use.

Background

Breast milk is the first choice for feeding newborn infants, and that choice has a long tradition in Sweden and in Scandinavia. In other countries infant formula has been widely used. In the 1900s (starting in 1909 in Vienna), human milk banks were established in many countries to handle the milk of other mothers than an infant's own, primarily in neonatal care (1). Many of these banks were phased out during the 1980s due to the fear of transmission of HIV. However, many have later been re-established, and the number of milk banks is now increasing (2,3). One reason is that the benefits of using breast milk and donor milk for both full-term and preterm infants have become recognized, as compared with infant formula (4-6).

Access to donor milk is currently limited. Most of the donated milk in Sweden today is used for the nutrition of preterm infants (7).

In 2001 a network called the Swedish Milknet was formed of representatives of neonatal care (dieticians, assistant nurses, neonatal nurses and neonatologists). The first Milknet meeting was held in Uppsala, and subsequent ones in Lund, Stockholm, Umeå, and back in Uppsala. Its purpose is to maintain and improve access to donated milk, and to exchange experiences in breast milk handling and breast-milk feeding of newborn infants. A primary tangible ambition was to create these uniform guidelines for Sweden for practical breast milk handling in neonatal care; the guidelines are based on earlier recommendations (8). National guidelines exist from 2010 in Great Britain, from 2007 in the USA, and from 2002 in Norway (9-13). An authorial group composed of representatives of the country's various profession branches in neonatal care has been formed, and these recommendations are the result of the group's efforts. The first version was published in March 2008, and this is the first revised version.

In Europe there is a network of representatives from human milk banks, and in October 2010, after several years of meetings, it started the European Milk Bank Association (EMBA). Its headquarters is in Milan, and its website is www.europeanmilkbanking.com. The first board is made up of 11 members from 9 European countries. Sweden is represented by Staffan Polberger.

Donor milk

Target groups for use of donor milk

Donated milk is used primarily for preterm infants during their first days, until mother's own milk production has started. It is also used for infants in later stages of prematurity, if the mother cannot produce sufficient amounts of milk, for any reason cannot produce milk at all, or the milk cannot be used. In certain cases other groups of infants can be given donated milk.

In Sweden almost all handling of donor milk is performed in neonatal care units. There shall be a medically responsible physician and specified staff who attend to the milk handling, and if possible the staff should not have other responsibilities in the neonatal unit.
Appendix 1 is a telephone and e-mail list of the 27 national human milk banks, with information about their activities during 2009.

All use of donor milk use shall be prescribed in writing by a physician, and shall not be started without the consent of at least one of the parents of the recipient infant. The approval shall be documented in writing in the medical records. Use of donor milk shall be registered daily in the child's medical record, including the donor code, so that it is possible to trace the donor in case of eventual infection.

Recruitment of donors

All healthy women who produce breast milk can be presumptive donors to a human milk bank, but there are a number of **exclusion criteria**:

1. Tobacco smoking or use of snus, regardless of quantity.
2. Use of alcohol, except for occasional limited consumption.
3. Use of any kind of illegal drug.
4. Use of any kind of medication, including certain naturopathic preparations (up to individual judgment).
   However, milk donation can be accepted despite treatment with certain medications:
   - Substitution treatment with various hormones, e.g. thyroid hormones and insulin.
   - Topical asthma treatment with inhaler.
   - Topical treatment of skin, nose, and eyes.
   - Contraceptives in gestagen form.
   - Occasional use of analgesics.

   During systemic antibiotic treatment (perorally or injection), the collections for the milk bank shall be temporarily suspended until 24 hours after completed treatment.
   All medication consumption, including that of naturopathic preparations, vitamins, homeopathic preparations, and herbal preparations shall be reported to the milk bank. Temporary suspension of milk donation can be necessary. Donor use of coffee and caffeine-containing beverages is acceptable in moderate amounts (up to e.g. 3 cups per day).

The following groups of women are unsuitable as milk donors:

1. Those who have earlier been or are presently illegal drug abusers.
2. Those who have had any transfusion of blood cells or other blood products in the past 12 months.
3. Those who have had tissue or organ transplantations in the past 12 months.
4. Those who have had body-piercing or tattooing in the past 12 months (except for earrings).
5. Those who have had a sex partner during the past 12 months who is suspected of being a carrier of HIV, HTLV, or hepatitis or who has used injection needles for illegal drugs. or is a known hemophiliac. Those who have chronic infections themselves such as HIV, HTLV, hepatitis B or C, malaria, or active tuberculosis.
6. Those who have any cancer disease (with the exception of localized skin cancer that is not melanoma or cervical cancer in situ).

Breast milk donation should be temporarily suspended in connection with:

1. All acute infections, including mastitis (mammary gland inflammation) and possibly diffuse infection around the nipple.
2. Reactivated herpes or zoster infection (shingles).

Acupuncture and electrolysis done with sterile disposable needles are acceptable.

A milk donor's diet should be balanced. Women who have non-conforming diets that eliminate several important staple foods shall not be accepted as breast milk donors. If needed, vegetarians shall take food supplements to ensure a balanced diet (the potential donor should if necessary discuss this with a dietician).

Health declaration

Before a woman can be accepted as a donor, she shall have completed a health declaration that is to be approved by the responsible physician of the local milk bank. A sample health declaration is attached here as Appendix 2.

Serological screening/other examinations

All presumptive donors are screened with blood tests for HIV-1, HIV-2, HTLV-I, HTLV-II, hepatitis B, and hepatitis C. Breast milk from donors shall not be used until negative results of these tests are available. If the results of any of these analyses are positive, local routines shall exist to take care of the woman rapidly to avoid unnecessary worry.

If the donor is to continue providing milk for longer than 3 months from the infant's birth, this serological screening shall be repeated, and the milk shall not be used until the new negative results are available (13).

Syphilis serology has been done at the maternity clinic and need not be repeated.

A negative lung X-ray is required at some Swedish hospitals to eliminate the possibility of active tuberculosis, especially where unpasteurized breast milk is used.

Bacteriological testing

Before the milk can be approved for use as donor milk, it must undergo a bacterial culture test. The sample is taken before pasteurization. The sampling is done most easily as a scrape test, using a sterile medical spatula or similar device to scrape a sample from the frozen milk and transfer it to a bacterial testing tube. The milk does not need to be defrosted in order to obtain a representative milk sample for bacterial analysis.

The following requirements must be met for approval:

- No pathogenic bacteria such as group B streptococci, listeria, or salmonella.
- $< 10^8$ CFU/L Gram-positive bacteria such as staphylococcus aureus.
- $< 10^5$ CFU/L Gram-negative bacteria (enterobacteriaceae).
- There is no upper limit for growth of exclusively coagulase-negative staphylococci or alpha-hemolytic streptococci.

These limits were originally developed for use of unpasteurized milk, but can also function as criteria for milk that is to be pasteurized (8,14). Even though almost all bacteria are killed in the pasteurization process, the infant still ingests the microorganisms.

If the requirements are not met, a new sample is taken for culture after improved hygienic procedures have been discussed with the donor. During continued milk donation, bacterial testing shall be performed once a month as a donor hygiene check.

In some countries samples of milk are cultured after pasteurization as a sterility requirement. This is rarely done in Sweden. In a recent study it was found that 93 % of the milk cultures were sterile after Holder pasteurization (15).

Pooling of milk

Pooling involves blending the milk of several donors to achieve a more homogeneous milk composition. In most neonatal units donor breast milk from individual mothers is used in order to limit the individual infant's exposure to a number of donors. Using this system means that there can be large variations in the donated milk's nutritional values. When nutritional analyses are done, the most appropriate milk can be chosen, for example the most protein-rich donor milk for a newborn, very immature infant. With pooling the possibility of choosing an extra protein-rich milk is lost, and the possibility for tracing infections is made more difficult. Thus, pooling of donor milk is not recommended.

Financial compensation

Rental for the breast pump is always paid by the healthcare system if the mother is expressing milk for medical reasons (such as a sick infant in the neonatal unit), or is a donor to the milk bank. Delivery and return of the pump as well as access to service shall be available close to the care unit and milk handling at the hospital.

In Sweden a varying financial compensation per liter of 100-200 SEK (about 16-31 USD in February 2013) is paid to the donor. This compensation is tax-exempt (Income Tax Act 1999;8:29). Uniform compensation rules for the entire country should be strived for.

Pasteurization (heat treatment)

Almost all donated milk is pasteurized (heat-treated) in Sweden prior to use. The most frequently used method is rapid heating to 62.5°C for 30 minutes followed by rapid cooling to room temperature – the Holder pasteurization method, using specific equipment. Other methods of pasteurization are being discussed, but are rarely used in Sweden. Examples of these are heating at 57°C for 30 min (16), 62-75°C for 5-15 sec (17-19), or 56°C for 15 min (20).

Microwave ovens are not suitable for pasteurizing, for defrosting, or for warming milk, as the temperature distribution can be uneven or the temperature can become too high, as well as possibly presenting an increased risk of bacterial growth (12, 21-23).

Holder pasteurization kills all viruses (with some uncertainty about hepatitis B), as well as almost all bacteria. At the same time it reduces the activity of the antibacterial protective factors in milk, such as sIgA (secretory IgA), lysozyme and especially lactoferrin (14). Macrophage activity ceases, as does lipase activity in the milk, which leads to decreased absorption of fat (24).

If breast milk in a neonatal unit is subjected to bacterial contamination, it must be remembered that the risk of bacterial growth is probably greater in heat-treated milk than in milk that has not been heat-treated. This is because some of the milk's bacteriostatic properties have been damaged by the pasteurization process (14).

In Appendix 3 there is a suggestion in how the pasteurization is done in a neonatal unit (in Lund), using equipment from Sterifeed.

Unpasteurized donor milk

If an individual infant, for example a very immature infant, should receive unpasteurized donor milk for medical reasons, this option is still possible (14). If there are no such reasons, the donated milk shall be pasteurized. In contrast, unpasteurized donor milk is widely used in some countries such as Norway and parts of Germany (25).
Donor milk that is used unpasteurized shall not be pooled. Use of unpasteurized donor milk requires following very strict hygiene rules, and demands awareness that a risk of cytomegalovirus (CMV) contamination may necessitate serological testing of the donor. See discussion under "Mother's own expressed milk", below.

Labeling/coding

All donor milk shall be labeled in such a way that it is possible to trace it back to the donor in case of contagion. It shall also be possible to track down which infants have received which donor milk. When the milk is pasteurized a code shall be assigned to the individual donor. For example, a bar code system can be used. Alternatively, the milk can be coded using a marking such as "09-15C", where the "09" stands for the year the donor was recruited, the "15" stands for the donor, and "C" shows that this is the third batch of milk that is pasteurized from this individual donor (this is the system used in Lund). In the milk bank's documentation there should be notations of the time period in which the milk was collected. Considering the periodical shortages and the increased exchange of donor milk between hospitals, it would be useful to have uniform labeling throughout the country.

Transportation between hospitals

Donor milk can be transported to other hospitals if it remains frozen for the whole transfer. The transfer time shall be registered.

Milk kitchen/Human milk bank procedures

Staff who handle donor milk, for example during pasteurization, shall not be engaged in care of sick infants at the same time. It is also desirable that staff who handle breast milk for measurement, fortification, etc. are not caregivers of sick infants at the same time.

The following information about breast milk donors shall be kept available and shall be archived for 30 years:

- Declaration of health.
- Results of serological screening and other testing.
- Results of bacteriological tests of the milk.
- Data on coding of the donor, collection dates of milk, and volumes.
- Finances, compensations paid.

Mother's own expressed milk

A mother can almost always give her infant her own breast milk, and in Sweden only mothers who have active tuberculosis or are HIV-positive are advised not to nurse their infants. Exclusive breastfeeding works only for reasonably healthy full-term infants, and the sick or preterm infant (<34-35 weeks gestational age) is at least partly dependent on provision of breast milk via a nasogastric tube.

Mother's own expressed milk is given fresh or after freezing and defrosting, and in Sweden there is no tradition of heat-treating mother's own milk. Neither sampling for bacteria nor hygiene checks in general are done, unless there is a suspicion of infection.

For various reasons it may be necessary for the nursing mother to take medications. The breast milk can often be used during such periods, but with certain medications the donation may be suspended. This must be decided individually, depending on the medication, the dosage, etc. (In Sweden, FASS, the Swedish medical products list at www.fass.se is consulted).

Mother's own milk is most often given succeedingly, as it is expressed. Many hospital units try to give the milk to the infant in chronological order, in other words in the order in which it was expressed. Using this system a reduced variation in nutrient intake is achieved, as the nutritional content of, for example, levels of protein decreases as lactation progresses. The milk of an individual mother can vary greatly in nutritional content over the course of a 24-hour period, in the amounts of protein, and especially of fat (26-29). By routinely mixing all milk being expressed over 24 hours, this variation can be significantly reduced before the milk is given to the infant or, alternatively, frozen (30,31).

This means that the majority of the milk supplied has been frozen and defrosted previous to use, which can be an advantage, especially from a virological point of view. In recent years there has been an increased interest in the risk of acquired symptomatic postnatal cytomegalovirus (CMV) infection in preterm infants, particularly in extremely preterm infants (< 28 weeks gestational age, 20,32).

Fifty to seventy percent of all pregnant women in Sweden carry CMV antibodies, with a risk of reactivation of the infection when lactating. Thus an infant can be infected by its own mother's breast milk. The risk of a CMV infection appearing as a sepsis-like syndrome is probably very little but the clinical picture can in exceptional cases become serious, especially in very immature infants, necessitating ventilator treatment. By freezing the milk before use the risk can be reduced, but not eradicated (33,34). This could not be verified, however, in a randomized Swedish study (35).

Pump expression techniques

- Electric pump recommended
- Hand pump possibly
- Hand expression not recommended
- "Drip milk" not accepted

In order to start lactation quickly, the mother should start to pump as soon as possible after childbirth, preferably during the first hours and at the latest within 6 hours (9).

The dominant method is to use an electric pump (36-38). A hand pump can also be used, but it is usually difficult to collect even moderate amounts for a milk bank this way, and can increase the risk of bacterial contamination (24). Hand expression is more dubious because of lower fat content, smaller volumes, as well as increased risk of bacterial contamination (37). If one is considering use of such milk, it should be nutritionally analyzed and also be submitted to a careful bacteriological check. ”Drip milk”, (milk that spontaneously drips from one breast during nursing or pumping at the other) has a low fat and protein content, and poses a risk for bacterial contamination (14,24,39,40). It shall not be used as donor milk.

It is important that a donor receives information about the various methods available for pumping. An electric pump is recommended when the expression needs to be done for a longer period. Milk production is controlled by how many times per day nursing or expression are done. If the infant is not nursing and the electric pump is used to stimulate milk production, the pumping shall be done 6 to 8, possibly even 10 times during a 24-hour period (41). Until the milk production is established, it is often sufficient to pump for 5 minutes on each breast, and then for as long as the milk is secreted, a maximum of 15 (to 20) minutes per pumping session.

A few minutes of breast massage before expression enhances the release of the oxytocin and prolactin hormones. When levels of prolactin increase, it leads to increased milk production. Skin-to-skin-contact with the infant is also effective during pumping. Double pumping, i.e. pumping both breasts simultaneously, is an efficient way to increase the milk volume because more hormones are being released. It can also save time (42). New technology is being developed to make expression of the milk more physiological (38,43).

Hygiene rules

To avoid contamination of the banked milk, strict hygiene is required. The donor shall receive written information on the hygiene rules and on how the breast pump’s various parts shall be cleaned.

- Approved disposable containers for storage of breast milk are supplied by the milk bank/milk kitchen.
- Hands shall be washed carefully with soap and water and dried with a clean towel. In the hospital disposable paper towels are used, followed by skin disinfectant (alcohol hand gel).
- Both nipple and the areola shall be washed with water, using a disposable paper washcloth. Avoid perfumed soap, which dries the skin and can cause skin irritation.
- Also include the first portion of milk being expressed, as the bacterial count is similar to that of the milk expressed later (44).
- The container used to collect the milk shall be thoroughly washed.

Pumping/nursing room

In the neonatal care unit there shall be a place for the mother to pump milk/nurse her child undisturbed, preferably in the ward room or a special area. If the parents cannot stay with their child on the ward, there shall also be a breast pump available in the overnight room.

Practical handling of breast milk

Basic rules of hygiene shall be followed in all handling of breast milk.

Freezing

Mother’s own milk

Mother’s own milk shall be transferred to a plastic container that is closed with a lid. The milk is collected in the refrigerator during the day; each new portion of expressed milk shall be chilled separately

before it is mixed with other milk. Do not fill the container all the way to the top; leave about 2 cm [about ¾ in] under the lid, as the frozen milk expands. The entire 24-hour collection can be mixed before it is frozen in suitable volumes, to minimize variation in nutritional content, primarily of fat and protein (29-31,39,40,45).

Always label with: 1. Child's name. 2. Birth date and personal identity number (when there is a risk of mix-up). 3. Expression date. The milk is to be frozen at -20°C. At the hospital the freezer's temperature shall be documented in a standardized manner, and the freezer shall be connected to an alarm when necessary. Freezing breast milk does not affect the bacteria count, or the activity of such enzymes as lipase, or the proteins. However, living cells such as macrophages or lymphocytes are killed (14), which appears to be of little practical significance. Moreover, some but not all viruses are killed, such as CMV (33,34).

Donor milk

Donor milk shall be kept frozen in plastic containers marked with code numbers and dates of heat treatment. Data on the donated milk (nutritional content, total amount, and where the milk is stored) is kept accessible for the care staff.

Storage

The breast milk is stored in the dark in refrigerators and freezers in the milk kitchen in or adjacent to the neonatal unit.

Refrigerators

Fresh and defrosted pasteurized breast milk can be kept in a refrigerator at +4-6°C for up to 48 hours (46,47). If the milk is to be frozen, this should be done within 24 hours. Newly pumped body-temperature milk shall not be mixed with refrigerator-cold or frozen milk, but must be chilled in a separate container first (14). The temperature in the refrigerator at the hospital shall be checked and documented in a standard manner, and the refrigerator shall be connected to an alarm when necessary.

Freezer

Breast milk can be kept in a freezer (at least -20°C) for a maximum of 6 months (10). For donated milk this refers to the entire time it is frozen, i.e. the total frozen time before and after heat treatment (13).

Defrosting

Frozen milk shall be defrosted at room temperature, in a water bath with **cold** water fresh from the tap. This should take about 2-3 hours for 100-200 ml. For larger volumes, defrost overnight in a refrigerator.

Defrosting in a microwave oven is not recommended because of uneven temperature distribution (12,22-24)! Defrosted breast milk can be kept at room temperature for a maximum of 2 hours before it is given to the infant.

Avoid exposing the milk to light by covering it with a towel. Light can destroy vitamins and also affects fatty acids, especially polyunsaturated fatty acids.

Warming

The milk shall be warmed shortly before feeding.

- **> 20-30 ml**: Warm water bath in a plastic container. Use warm water fresh from the tap. The time can be 10-20 min, possibly longer for larger volumes. Avoid use of bottle warmer, especially if < 100 ml, because of the risk of boiling dry.
- **< 20-30 ml**: Warm water bath in a drug dosage cup with lid or a syringe. Use warm water fresh from the tap. Time up to 5 min. For small volumes, warm under running water.

Always check the milk temperature on the back of the hand before feeding. Try to give all milk at body temperature, but never warmer (32-37°C). Lower milk temperature causes slower gastric emptying (48).

Nutritional assessment of milk

Mother's own milk
With some local variations, the milk of mothers with preterm infants (< 32 weeks gestational age) is nutritionally analyzed, from the time the infant is 1-2 weeks old, and subsequently every half-week, whole week, and finally every 2 weeks. Nutritional analyses can also be made of other breast milk for other reasons.

The milk sample is always taken from a 24-hour collection if possible; the milk is collected in the refrigerator for a 24-hour period (preferably from one morning until the following morning – do not include two morning collections!) Nutritional analysis of a random sample of breast milk gives, because of the great variation, a result that is difficult to interpret. It cannot be used as a basis for calculation of the nutritional intake (30,40,45).

A representative sample is taken **after careful mixing** of the 24-hour batch (possibly using a wire whisk to gently mix the fat). Note that this is very important, as there is a great risk that the fat in the milk, especially if it is refrigerated, can adhere to various surfaces; this can lead to falsely low fat values.

If the mother has insufficient amounts of her own milk and it is impossible to collect milk over a 24-hour period, taking 1-2 ml of milk from each milk collection can be considered. After storage in the refrigerator, these samples are mixed into a 24-hour collection, which is then analyzed. This gives a somewhat less reliable picture of the average nutritional content of the milk, but can be a considerably better alternative than giving donor milk or not analyzing the milk at all.

The sample (5-10 ml) is transferred directly to a plastic tube; the volume is determined by which equipment is being used. Pour the milk directly into the test tube from the 24-hour collection! Avoid intermediate steps such as drawing it up into a syringe; every extra step in the milk transfer increases the risk of fat globules fastening on the sides of a vessel, resulting in inaccurately low concentrations of fat and energy.

If the sample cannot be kept refrigerated or is to be sent for analysis to a distant laboratory, 20 µl of bronopol (preservative) shall be added per 10 ml milk. (Note that it is very toxic!) Bronopol is to be kept and used outside the milk kitchen.
Label the tube with: 1. The child's name, 2. Birth date/Personal identity number, and 3. Date of milk collection.

Donor milk
Donor milk is usually analyzed for protein, fat, and carbohydrate contents, which gives a calculated energy value. A sample is taken from carefully stirred milk. When the analysis is done with infrared technology, the sample is always taken before pasteurization as there is otherwise a risk of incorrect results because of the heat treatment. The results of the analysis are documented in such a way that they are available to care staff around the clock.

Fortification of milk

Fortification involves adding protein, carbohydrates, fat, minerals and sometimes vitamins to the breast milk (mother's own or donor milk). In Sweden this is done by using a powder product that contains concentrated nutritional elements without adding extra volume to the infant. The preparations available on the Swedish market are all bovine based. In the USA there is currently available a com-

mercial preparation based on human breast milk, but in Sweden we lack any experience of the use of this very expensive product.

Fortification is done mostly for breast milk that is used to feed preterm infants (predominantly < 32 weeks gestational age), and it can be done in several different ways:

1. **Individualized fortification**, the method most often used in Sweden today, means that both mother's own and donated milk are enriched according to the nutritional content determined by the nutritional analysis (31,49). Nutritional analysis is usually started 7-14 days after birth, and later at ½-1-, and possibly 2-week intervals. One alternative, sometimes in combination with milk analyses, can be so called adjusted fortification with protein based on serum concentrations of urea (50).
2. **Semi-quantitative fortification** means that consideration is taken of which type of milk is enriched. For example, more fortifier is added to donor milk of mothers who have delivered a full-term infant than to preterm milk, but no analysis is done of the milk's nutritional content.
3. **(Standardized fortification,** also called "blind" fortification. This means that all infants receive milk with identical amounts of fortification, irrespective of what milk is given. This method is inaccurate, and can lead to under- or overnutrition with possible deleterious effects on the infant's central nervous system. This is not used in Sweden.)

Fortification shall lead to an optimal nutritional intake, and new recommendations for enteral nutritional intakes were published in 2010 (51).

Regardless of which fortification system is used, there shall be well-developed routines for how the fortification is done in practical terms. It is always safest to weigh out the amount of supplements that is to be added to a certain volume of breast milk. The milk is enriched before each feeding, because of the risk of bacterial growth in ready-mixed enriched breast milk (52, 53). Neither enrichment powder nor infant formula powder can be produced in a sterile form.
Use electronic scales accurate to at least 0.1 gram. The scales shall be calibrated regularly.

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Appendix 1. List of human milk banks in Sweden, 2009

This is a list of the active human milk banks in Sweden, i.e. units that handle breast milk from donors for use by other infants than their own (donor milk).

Hospital	**Tel**	**E-Mail address**	**No. of donors 2009**	**No. of liters breast milk 2009**
Borås	+46 33-6163129	felicia.johansson@vgregion.se	6	121
Eskilstuna	+46 16-104546	agneta.erlandsson@dll.se	8	59
Falun	+46 23-492033	karin.wickstrom@ltdalarna.se	35	350
Gävle	+46 26-154124	christina.johansson@lg.se	10	93
Göteborg	+46 31-3434265	lennart.stigson@vgregion.se	74	579
Helsingborg	+46 42-4061937	eva.almeflo@skane.se	23	153
Hudiksvall	+46 650-92318	ann-chatrin.dahlberg.aslund@lg.se	10	51
Jönköping	+46 36-322280	susanne.nilsson@lj.se	11	128
Kalmar	+46 480-448179	ann.lindmark@ltkalmar.se	8	69
Karlskrona	+46 455-734274	ann-christin.olausson@ltblekinge.se	10	94
Karlstad	+46 54-617679	karin.augustsson@liv.se	23	232
Kristianstad	+4644-3091830	birgitta.rolandsson@skane.se bo.selander@skane.se	2	4
Linköping	+4610-1031115	dagny.nilsson@lio.se	19	103
Lund	+46 46-178438	kirsten.jonsson@skane.se marianne.christiansson@skane.se	53	291
Malmö	+46 40-331641	marie.a.svensson@skane.se monica.wiberg@skane.se	12	64
Norrköping	+46 10-1043721	gunilla.wastesson@lio.se	4	40
Skövde	+46 500-432214	46.nutrition.skas@vgregion.se	26	110
Sundsvall	+46 60-181237	zanita.rytko@lvn.se	33	253
Södersjukhuset	+46 10-4476356	christiane.engelbrektsson @apoteketfarmaci.se	273	690
Trollhättan	+46 520-91340	anette.erixon@vgregion.se	50	600
Umeå	+46 90-7853687	susanne.jacobsson@vll.se inger.ohlund@kost.umu.se	15	153
Uppsala	+46 18-6115877	agnes.pal@akademiska.se	28	424
Västervik	+46 490-86614	mona.gustafsson@ltkalmar.se	6	27
Västerås	+46 21-173341	carina.olsson@ltv.se	10	141
Växjö	+46 470-588010	ingalill.areskoug@ltkronoberg.se	21	162
Örebro	+46 19-6021041	gunn-eli.breivik@orebroll.se	17	116
Östersund	+46 63-154483	inger.holmberg@jll.se emma.hellner@jll.se	14	202
Total	**27**		**801**	**5309**

Per donor 6.6 liters

S Polberger 2011-03-29 (Corresponding numbers for 2007 were 664 donors and 5201 liters)

Appendix 2. Health declaration of breast milk donors (example)

Name

Personal identity number (in Sweden; similar to U.S. Social Security number)

Address

Telephone

Being a breast milk donor carries responsibility. Your milk will be used to feed small and/or sick newborn infants. We will discuss all the written answers with you, before determining whether you can or cannot donate milk. Circle the appropriate answer below.

Have you donated breast milk earlier?	YES	NO
Are you healthy? If you answered no, give illness and treatment.	YES	NO
_____		
Have you had a serious illness earlier that required treatment? If you answered yes, give illness and treatment.	YES	NO
_____		
Have you had or been exposed to hepatitis?	YES	NO
Have you been exposed to HIV?	YES	NO
Have you had a blood transfusion? If you answered yes, when and at which hospital?	YES	NO
_____		
Have you injected or used narcotics or anabolic steroids?	YES	NO
Have you had any body piercing or tattooing in the past 12 months?	YES	NO
Do you drink alcohol? If you answered yes, how much per week?	YES	NO
_____		
Do you have any special diet?	YES	NO

If you answered yes, please describe it.

_____

Do you smoke? YES NO

Do you use snus or other tobacco products? YES NO

Do you take medications? YES NO
If you answered yes, please give kind and dose.

_____

In which week of pregnancy was your child born?

_____

Child's birth date

_____

Today's date

_____

Signature

_____

Approved as donor

_____ _____
Signing for milk bank Physicians signature

Appendix 3. Pasteurization of donor milk (example)

All handling of milk for heat treatment (pasteurization) of donor milk shall be done in a separate locale by staff separated from those in care units. The method used is Holder pasteurization, which involves heating the milk to 62.5°C for 30 min in a Sterifeed Infant Feed Pasteurizer.

Day 1

- Take the breast milk from the freezer the evening before pasteurization.
- Defrost in the milk containers at room temperature overnight.
- **NB!** The health declaration, the serological screening, and the culture test shall be approved.

Day 2

- Staff shall not start the pasteurization day with work in the care ward.
- Disinfect the work surfaces and use careful hand hygiene.
- Take out containers and wire whisks.
- Measure out the milk and pour all milk from one donor into a container. If there are several donors use separate containers.
- Label containers to indicate which milk is in each respective one.
- Any possible spills shall be wiped up immediately.
- The milk shall be mixed well; no ice crystals shall be left when the sample is taken for nutritional analysis.
- 5-10 ml milk is poured into a test tube and stored in the refrigerator for individual nutritional analysis or sent to a distant laboratory. Label with code and sample date. Remember to add 20 µl of preservative (bronopol) if the sample is sent to a distant laboratory.
- Label with appropriate code.
- Record in journal the code, when breast milk was collected, and number of liters.
- Codes are given in chronological order and which time in that succession this person has donated milk. For example 11-23B means that the year is 2011, this is the 23rd donor that year, and that this is the second time this donor's milk is being pasteurized.
- Pour the milk into small bottles (130 ml), maximum 120 ml in each bottle. When the milk is expected to have a high protein content (preterm milk), only 50 ml is poured into each bottle.
- Label the bottles carefully, and put them in the rack.
- Start the pasteurization machine (see separate description).
- When the machine has warmed up, the rack of bottles is placed in the machine.
- When the program is finished the bottles shall be placed in the freezer immediately.
- All material that has been used shall be washed and dried, and all surfaces disinfected.
- When the results of the nutritional analysis have arrived the milk is ready to be used. The results are recorded in a notebook that is kept in the milk kitchen of the neonatal care unit.
- Remember to use the milk in chronological order, i.e. the oldest milk first.
- Counted from the first day of pumping, the milk will keep for 6 months at -20°C.

This information is based on routines used in the Neonatal Clinic in Lund, 2010.